UNIVERSITA' DEGLI STUDI DI PADOVA

DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI "M. FANNO"

CORSO DI LAUREA IN ECONOMIA

PROVA FINALE

MONETARY POLICY SURPRISES AND THEIR FINANCIAL MARKET EFFECTS: AN EMPIRICAL ANALYSIS

RELATORE:

CH.MO/A PROF./SSA CAGGIANO GIOVANNI

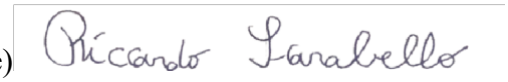
LAUREANDO/A: SCARABELLO RICCARDO

MATRICOLA N. 2000719

ANNO ACCADEMICO 2022 – 2023

Dichiaro di aver preso visione del "Regolamento antiplagio" approvato dal Consiglio del Dipartimento di Scienze Economiche e Aziendali e, consapevole delle conseguenze derivanti da dichiarazioni mendaci, dichiaro che il presente lavoro non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere. Dichiaro inoltre che tutte le fonti utilizzate per la realizzazione del presente lavoro, inclusi i materiali digitali, sono state correttamente citate nel corpo del testo e nella sezione 'Riferimenti bibliografici'.

I hereby declare that I have read and understood the "Anti-plagiarism rules and regulations" approved by the Council of the Department of Economics and Management and I am aware of the consequences of making false statements. I declare that this piece of work has not been previously submitted – either fully or partially – for fulfilling the requirements of an academic degree, whether in Italy or abroad. Furthermore, I declare that the references used for this work – including the digital materials – have been appropriately cited and acknowledged in the text and in the section 'References'.

Firma (signature) 

Index

ABSTRACT

In questo estratto, si andranno a discutere i temi legati ai vari aspetti di politica monetaria delle banche centrali ed i relativi annunci espressi dai principali funzionari pochi minuti dopo aver attuato le suddette manovre. In particolare, si analizzerà e ci si interrogherà sugli andamenti relativi agli strumenti finanziari e fattori macroeconomici, i quali sono fortemente correlati. Inoltre, si andrà a presentare un'ulteriore tematica, il cosiddetto "canale di assunzione dei rischi" (risk-taking channel), grazie al quale si riuscirà a comprendere le misure di volontà nella propensione o nell'avversità al rischio di detenere in portafoglio prodotti finanziari.

Successivamente, si andranno a stimare alcuni particolari modelli lineari statistico-econometrici chiamati 'local projections', al fine di poter comprendere, analizzare e verificare gli impatti delle suddette politiche monetarie, attese ed inattese all'interno dei mercati finanziari, e se gli immediati annunci nonché le informative delle banche centrali siano stati effettivamente strumenti significativi in merito a impreviste oscillazioni riguardanti gli indici di borsa. L'obiettivo principale, quindi, è quello di capire in che modo e soprattutto entro quali tempistiche, gli agenti economici, ovvero imprese, famiglie, banche ed investitori, recepiscono ed assimilano tali informazioni in vista del futuro, per poi andare a compiere operazioni nei mercati finanziari.

I risultati ottenuti infatti, utilizzando il linguaggio di coding software del programma R, vanno contro ciò che la teoria economica insegna. Una decisione di politica monetaria restrittiva non attesa dagli investitori, nonostante un conseguente annuncio di una visione futura positiva riguardanti i principali fattori macroeconomici da parte della banca centrale, porterà gli agenti economici a fidarsi dell'istituzione, creando ottimismo nei mercati finanziari.

Sottolineo infine di affrontare l'argomento prettamente in lingua inglese, in luce del fatto che, essendo tutti i papers da me studiati scritti in lingua originale, mi sembra doveroso ed opportuno esprimermi di conseguenza.

CHAPTER 1: A NARRATIVE APPROACH

It's been known for some time that the central banks committees take crucial actions to regulate and deal with economic phenomena such as inflation, GDP, unemployment and real economic growth. In fact, it's an important step understanding certain issues can be an added value in being able to predict what type of maneuvers will be implemented at a monetary level, thus being able to behave accordingly, for example to manage one's financial portfolio in a different way for private investors, or, in business environment, by implementing investment plans that are efficient in terms of opportunity cost.

1.1 Taylor Rule

First, it's primary to introduce the so-named 'Taylor Rule', a simple equation model invented by famed economist John Taylor in 1992 and refined in his 1993 work, 'Discretion versus Policy Rules in Practice' (Taylor, 1993). This formula describes and measure the interest rate decisions of the central banks, in particular the Federal Reserve's Federal Open Market Committee (FOMC), to account for inflation and other economic conditions, such as real output. In fact, the Taylor Rule suggests that the central banks should raise rates when inflation is above the target or when gross domestic product (GDP) growth is too high and overcoming the potential level.
By contrast, it also implies that they should decrease interest rates when inflation is below the target level as well as GDP growth is too intricate and below potential.

$$i_t = \pi_t + r^* + a_\pi(\pi_t - \pi^*) + a_t(y_t - \overline{y}). \quad (1.1)$$

This is the Taylor Rule express in a linear mathematic equation, in which the dependent variable is the short-term nominal interest rate applied by the Central Bank.
The other variables represent in order: the inflation rate at time t measured with GDP deflator, the equilibrium real interest rate, the difference between the inflation rate at time t and the target inflation rate (about 2%), as well as the difference between effective GDP and the potential GDP, that is the so-named 'output gap', both of them multiplied by a coefficient that acts as monetary policy sensibility. In this equation, these coefficients should be positive (as a rough of thumb, Taylor suggests setting them equal to 0.5).

That is, when inflation is above the target level or when GDP is above its potential, in order to reduce inflationary spirals, the rule suggests a nominal interest rate higher than them. However, this is called a 'tight' monetary policy. In the opposite situation, it occurs an 'easy' monetary policy, that it recommends a relative low interest rate to stimulate investments, consuming and, consequently, GDP.

It's more advantageous starting with this fundamental concept in order to make clear that a simple equation that represents the central bank's policy decisions, doesn't explain all the variables within the economic system. In fact, despite of following this rule relative to monetary policy movements, central bankers not always have reached their goals regarding an optimized inflation target as well as a potential GDP level or a significant employment rate. What are the variables that have prevented central banks from being able to achieve certain sustainable economic objectives?

1.2 Financial Risk, Risk Appetite, and Monetary Policy

As second step, it's fundamental to talk about the "risk appetite" and the "risk-taking channel" of monetary policy concepts, concerned by Bauer, Bernanke and Milstein (Bauer, et al., 2023).

Monetary policy works primarily through three important channels: cost of capital effects, wealth effects, and exchange-rate effects.

Indeed, higher rates will reduce the present value of various assets and will dissuade capital investments by firms and purchases of houses or durables by consumers. Besides, an increase of interest rates will strengthen the domestic currency, depressing net exports.

These basic channels are directly correlated to monetary policy acts, in fact they influence the willingness to take risks: with easier policy associated with a greater appetite for risk while tighter policy linked to reduced risk appetite.

Obviously, risk appetite is likely to improve if the economic outlook becomes more favorable, with the result of raising the mean or reducing the variance of future consumption, by improving the perceived economic and financial environment, for example, by upgrading the economic outlook, reducing economic uncertainty, or strengthening the balance sheets of borrowers and lenders.

On the other hand, in an environment in which investors reach for yield, the low interest rates could make investors effectively less risk-averse, relative to a situation in which policy was tighter and rates were higher.

This measure is based on changes in interest rates over a tight intraday window around the Federal Open Market Committee (FOMC), from 10 minutes before until 20 minutes after the

announcement. The calculation is based on changes in the interest rates on Eurodollar futures, which are derivative contracts with payoffs tied to the three-month London Interbank Offered Rate (LIBOR). Why did they take this decision? Well, this interest rate is an important benchmark for short-term lending in US dollars, and it's directly affected by changes in the Fed's policy rate.

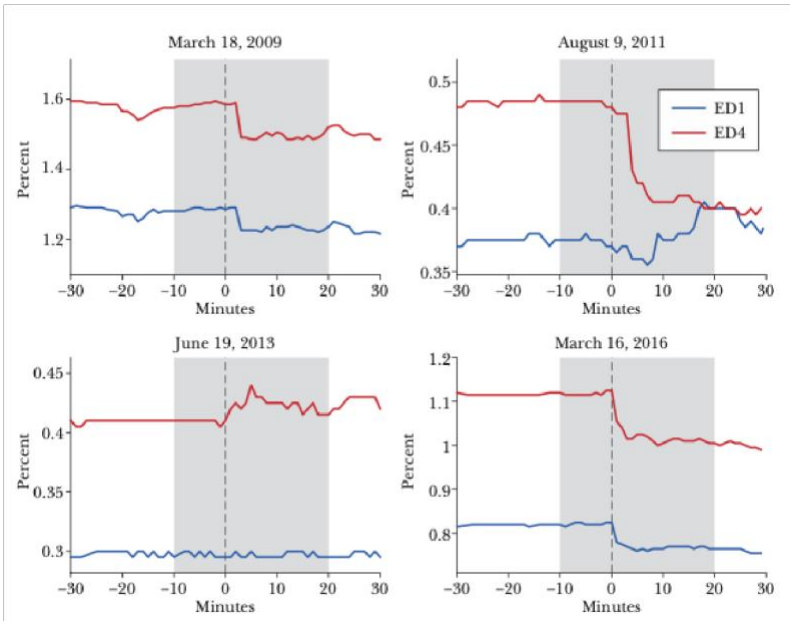


Figure 1

M.Bauer, B.Bernanke and Eric Milstein: 'Risk Appetite and the Risk-Taking Channel of Monetary Policy' (2023)

This figure illustrates how monetary policy surprises capture the unanticipated component of FOMC decisions, by plotting the evolution of the ED1 and ED4 rates.

Because ED1 is tied to the short rate at the end of the current quarter, it captures the market surprise about the current funds rate target decision, as well as changes in very near-term expectations. On the other hand, ED4 reflects expectations for short-term rates at the horizon of about one year and therefore captures changes in more distant expectations, arising for example from the Fed's forward guidance and other communications.

For instance, in the graph at the top right occurs that after two minutes from the moment of the FOMC announcement, the Eurodollar future rate on the three quarter-ahead (ED4) undergoes a sharp decline because the Committee want to avoid raising the funds rate "at least through mid-2013".

This statement basically lowered rate expectations, causing the ED4 rate (red line) to decrease by close to ten basis points.

Another fundamental example can be obtained in the graph at the bottom right, in which the FOMC statement say that a tight monetary policy that has been expected by markets would be deferred, resulting in a significant easing surprise.
In fact, the latter on March 16, 2016, was almost -9 basis points, reflecting the decline in all four Eurodollar futures rates in response to the FOMC declaration.
Furthermore, in this paper the authors estimate the impact of unanticipated monetary policy changes on some daily variables that reflect the risk appetite of investors such as: the S&P 500 stock market index, the spread of an index of long-term Baa-rated corporate bond yields over ten-year Treasury yields, the trade-weighted US dollar exchange rate against advanced foreign economies and others.
As the economic theory teaches, a surprise tightening of monetary policy, by reducing risk appetite and increasing the risk-adverse behavior of investors, should decrease stock prices, increase the volatility of equities and reinforce the US dollar exchange rate.

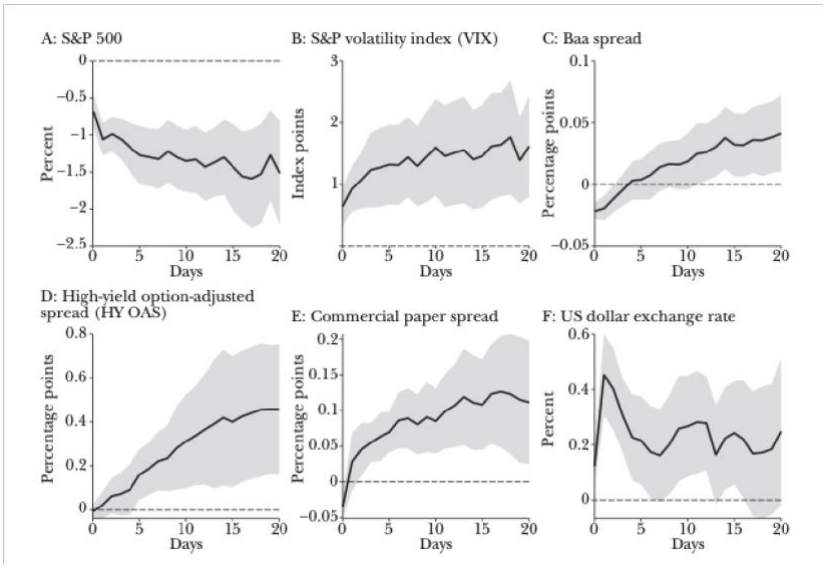


Figure 1.1

M.Bauer, B.Bernanke and Eric Milstein: 'Risk Appetite and the Risk-Taking Channel of Monetary Policy' (2023)

As can be seen from figure above, graphs respect what the economic theory says, that is, a surprise monetary tightening most likely lowers stock prices by decreasing expected future dividends and reducing risk appetite of investors.
Besides, US dollar exchange rate becomes stronger than before, and all three credit-spread (panel C-D-E) increase as well; most likely because financial markets expect a deterioration of the macroeconomic outlook and thus higher expected rates of defaults.

A substantial and startling factor is that, by contrast on theory, the spreads don't increase on impact but with a delay of few days, this means substantially that lack of liquidity and transparency help to explain this result. In fact, if Treasury yields rise quickly after a surprise monetary tightening, investors may wait some days or maybe weeks for figuring out which actions take, just because of in this case there is not immediately clear what can happen in the financial markets and, more specifically, in the firm's balance-sheets. Besides, to resume the level of risk-appetite in the market, it's possible to see how in the figure 3 it's illustrated a lot of "risk-off" days, when agent's risk-appetite drops, on specific historical dramatic events, for example the COVID shock in 2020 and the subprime crisis in 2008.

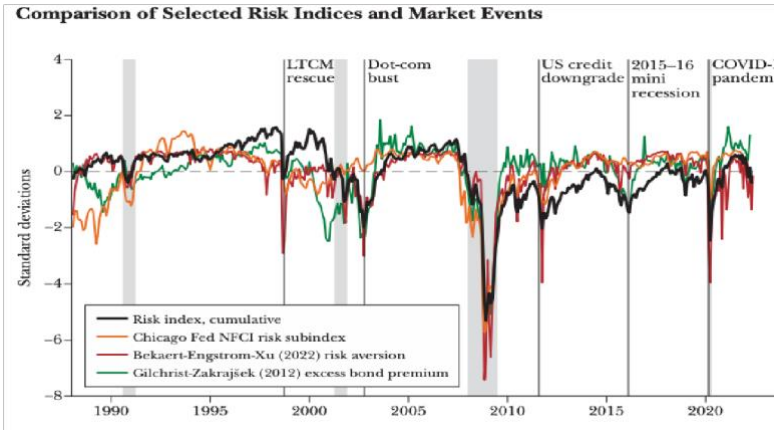


Figure 1.2

M.Bauer, B.Bernanke and Eric Milstein: 'Risk Appetite and the Risk-Taking Channel of Monetary Policy' (2023)

So, this data can be interpretated by saying that it seems to be a cycle of sharp declines in risk-appetite followed by small and slow recoveries.

Finally, it's understood that monetary policy actions strongly influence the level of risk appetite in financial markets, in which economic agents have a greater risk appetite when economy outlook is viewed positive in the near future.

1.3 How Policy Shocks Affect the Economy System

Another important and useful work is made by Romer and Romer, titled: 'Does Monetary Policy Matter? The Narrative Approach After 35 Years' (Romer & Romer, 2023). In all research, they wonder if monetary policy actions are truly elements whereby being focused on the light of real activities effects as well as how much these policies might be efficient regarding inflation/deflation movements, employment/unemployment rate changes or financial expectations.

The ‘shock’ term is related to an unexpected monetary policy act that is not being driven by factors affecting output, in other terms, it means that movements in monetary policy are unrelated to current or prospective real economic activity.

These shocks needn’t be unanticipated when they occur, that is, if policymakers respond in their usual way to something unrelated to current or prospective real output, that still constitutes a shock by (Romer, 2023) definition.

For instance, if central bankers think that inflation is too high and unacceptable, despite of a stable level of growth and unemployment, then they take actions to reduce it with a tight monetary policy.

To test the veracity and the rely of this work, the authors provide two significantly examples of both contractionary and expansionary monetary policy shocks in the history.

The first example occurred in December 1988 as a contractionary monetary policy shock, that is, the latest contractionary monetary policy shock in their sample, that ends in 2016. Between 1987 and 1988, central bankers were afraid of inflation changes on the economy system because they expected it would raise up if they didn’t act a tightening policy. In first times, policymakers didn’t try to move the aggregate demand curve back from a steady level, that is, in other terms, they didn’t implement a strong tighten monetary policy on the light of the fact that, in their opinion, inflation rate wasn’t so risky and unsafe.

In May 1988 though, many specialists started to figure out that the current level of inflation was too dangerous and unacceptable. For instance, one of them said: ‘In terms of our own inflation rate…we have been stalled at a rate that I think is too high for most of us’ (W. Lee Hoskins, Transcript, May 17, 1988, p.5).

Another one claimed: ‘whatever is likely to happen on the wage and price side, it doesn’t seem to me that there’s going to be any deceleration next year unless we act. I think it is time for some further action’ (Gary Stern, pp.4-5).

However, a lot of other policy members were still hesitant on reducing inflation level not caring that there might be drastic output changes and consequences.

Despite of this apparent quiet, inflation kept going up until December 1988, in which a loud desire to reduce it and a strong willingness to accept the likely GDP consequences became much more wanted. In fact, there was a meeting in that month where many members said that a stable inflation level must be the priority at that point and slowing economy, even though there will be important impacts and unexpected behaviors on the financial markets. Finally, FOMC members agreed to implement a significant tightening monetary policy by increasing fed funds rates.

This example as said before, represents a contractionary monetary policy shock in authors opinion because, despite of a stable level of growth and unemployment, central bankers

determined that that current inflation rate was too high and thus dangerous, so that they had to reduce it. Besides, after took tightening actions, they figured out that there might be substantive negative responses for GDP and unemployment.

The second example is about an expansionary monetary shock occurs in January 1972, the only one in the authors' sample.

In the middle of recovery from the short recession of 1969-70, FOMC staff had noticed that unemployment rate was raising up at a too high level.

For instance, the FOMC members, in November 1971, forecasted that unemployment level would be dropped only by about 70 basis point (from 6 percent to 5.3 percent) in 1972. These previsions didn't realize, in fact by December 1971, a stronger thinking occurred from the Federal Reserve staff, that is, the current level of unemployment was unmanageable and unacceptable. At this point policymakers had to move on an expansionary monetary policy action. Indeed, on January 11, 1972, Fed Chairman Arthur Burns, since he wanted strongly to interfere with the monetary policy assessment, convened a particular assembly of the FOMC, in which affirmed clearly that 'there could be a further reduction in interest rates, possibly of significant dimensions' (Memorandum of Discussion, January 11, 1972, pp.63-64). Obviously, as theory says, after Burns statements, many Congress members was afraid of the fact that there will probably be an instant reserve increasing followed by a drop in interest rates that could generate inflation. However, one of them claimed that it would be fair to think that using an easing policy by energizing the economy with much more money in the system may involve, in the short run, an important social cost in terms of inflationary spiral expectations by agents. Another member even said that fighting against inflation phenomena is never an easy task, mostly if you overly implement offensive policy actions, as a result of which we could run into inflation rather difficult to contain.

Nevertheless, even if there were three negative votes about the willingness to carry out an easing monetary policy, a majority of the FOMC agreed to introduce significantly more reserves into banking system.

This last simple example represents an expansionary monetary policy shock for the reason that the Fed committee decided to counteract a really high unemployment rate since the current level was truly dangerous for the economy, despite a stable rate on the other variables, such as inflation or output.

Finally, as said before, if you think about the straight graph of supply and demand, central bankers had advisedly moved the aggregate demand curve on the right sense, aware to the fact that an act like this could get started a strong inflationary event.

1.4 Local Projections Model and Results

For analyzing the impact of monetary policy, the dates of monetary policy shocks get used to create a dummy variable.

So, it's set it equal to 1 in the months (or quarters) of a contractionary shock, -1 in the month (or quarter) of an expansionary shock, and zero otherwise. After that, they regress the outcome variable of interest on the dummy variable.

However, it's used a Jordà local projection model (Jordà, 2005), in which involves running a series of regressions of some outcome variable at different horizons after time t on the independent variable of interest at t and control variables:

$$\boldsymbol{Y_{t+h} = a^h + \beta^h S_t + \sum_{k=1}^{k} \varphi_k^h S_{t-k} + \sum_{k=1}^{k} \theta_k^h Y_{t-k} + e_t^h,} \qquad \textit{(1. 2)}$$

where Y is the outcome dependent variable and S represents the dummy variable for the dates of monetary policy shocks. However, the estimated betas in the model are considered as responses of the outcome to a contractionary monetary policy shock because they give value of 1 for this dummy variable. Therefore, this model traces out the impulse response function to a monetary policy shock. The authors consider a range of outcome variables, such as monthly unemployment rate and quarterly Gross Domestic Product (GDP) for analyzing the real economic effects. Besides, they put into the model quarterly inflation, calculated by the price index for personal consumption expenditures (PCE), the GDP price index, and price index for PCE excluding food and energy, that is, the so-named core inflation index.

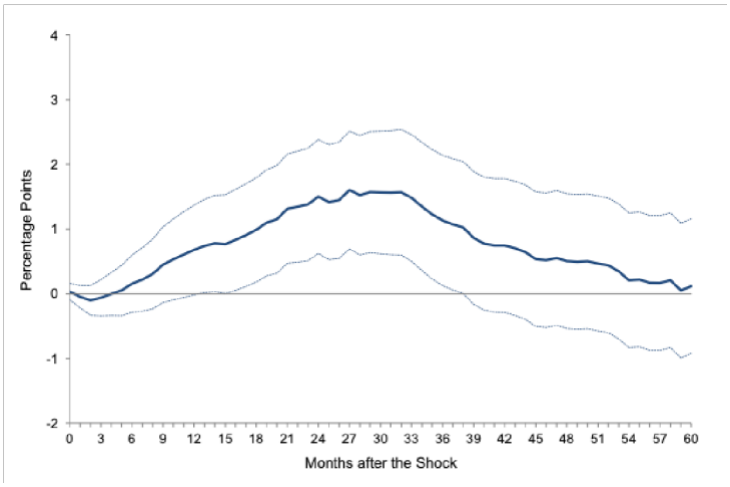


Figure 2

This graph represents the estimated impulse response function of the unemployment rate calculated monthly to a tightening monetary policy shock.
In fact, as it can see by the function, the unemployment rate starts rising about 5 months after the policy shock, by reaching the peak after 27 months with 160 basis points or 1.6 in percentage. Moreover, in their sample, the unemployment rate rises on average by 280 basis points in recession events. Thus, it means that in an environment where a monetary policy shock occurs, the unemployment rate increases more than half compared to a typical recession, then it drops 33 months after the monetary policy shock.

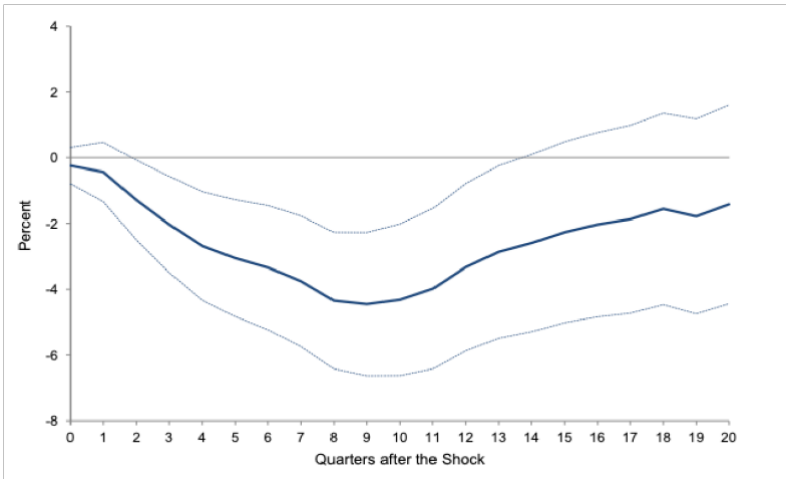


Figure 2.1
C.Romer and D.Romer: 'Does Monetary Policy Matter? The Narrative Approach After 35 Years' (2023)

Furthermore, the figure above shows the estimated impulse response function of Real GDP, which is computed quarterly, to a contractionary monetary policy shock as always.
Still here, two quarters after shock it starts dropping, while after having reached the nineth quarters with the maximum peak of -4.4 %, it starts growing.
Finally, the last graph at the bottom shows how is the inflation rate movements using PCE data as said above, in response to a contractionary monetary policy shock, and it's quite clear that the central bank goal is reached after four quarters, it means that one year is enough to get inflation rate drop. Besides, it continues decreasing until the seventh quarter after the shock by about 150 basis points, and then it gets an increasing by 100 basis points from the twelfth to the thirteenth quarter. Another significant approach to understand unexpected changes in response to monetary policy shocks is the so named high frequency evidence, in which data get computed in minute by minute or hourly. Doing these simple but crucial statistic actions,

it’s possible identifying policy surprises by studying changes in a short window about central bank announcements.

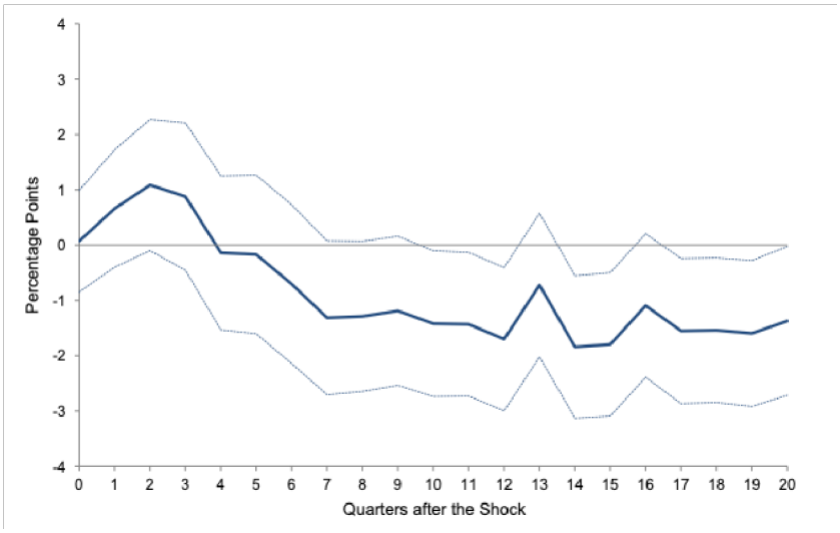


Figure 2.2

C.Romer and D.Romer: ‘Does Monetary Policy Matter? The Narrative Approach After 35 Years’ (2023)

CHAPTER 2: THE CENTRAL BANK INFORMATION SHOCK ROLE ON THE ECONOMIC SYSTEM

So far, it's demonstrated that monetary policy shocks have a significant impact on the financial and macroeconomic events, by affecting in a reasonable short time the entire economic system. Therefore, it's clear that these types of shocks should not be underestimated.

2.1 The Central Bank Information Influences

Nevertheless, there is another fundamental tool that it has been introduced by Jarocinski and Karadi in: "Deconstructing Monetary Policy Surprises-The Role of Information" (Jarocinski & Karadi, 2020), that is the central bank information shocks. In this paper, they study the importance of central bank communication on the macroeconomic and financial Euro and US areas. As said previously, theorical economy teaches that if central bankers decide acting a monetary policy tightening, then the present value of future dividends decreases because the expected dividends decline due to the suspicious financial outlook. These acts are seen like a monetary policy shock. By contrast, if they decide to increase interest rate and successively an improvement in financial conditions occurs, that is, an increasing of stock prices, then we talk about a central bank information shock. See (Gurkaynak, et al., 2005) for US data.

2.2 USA Results

This graph shows a scatterplot of the S&P 500 index movements in response to a surprise of Fed fund futures rates, in which each dot represents one FOMC announcement.

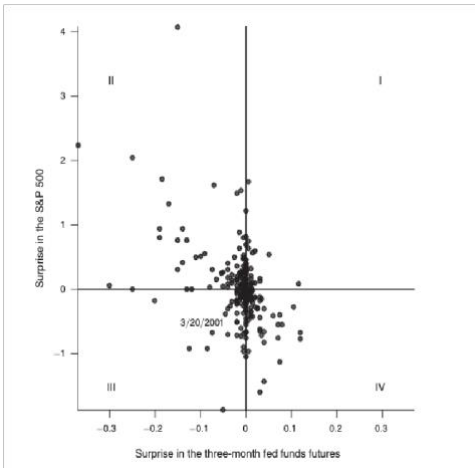


Figure 3

M.Jarocinski and P.Karadi: 'Deconstructing Monetary Policy Surprises-The Role of Information Shocks' (2020)

However, in the Jarocinski and Karadi work, they ask whether the central bank information shocks have a sizable macroeconomic impact.
In fact, a significant example that explain this phenomenon has been introduced, by focusing on the fluctuations of the financial markets, on the S&P 500 stock market index.
On March 20, 2001, the Federal Open Market Committee (FOMC) surprised the market with a larger than expected 50 basis point federal funds rate cut; the S&P 500 index, however, instead of appreciating as standard theory suggest, showed a sizable decline within 30 minutes of the announcement. What is the reason for a positive co-movement between the monetary policy actions and financial markets? The answer is identified in the accompanying statement of the FOMC, in which they put in evidence that in the foreseeable future there are "substantial risks that demand and production could remain soft". In their view, this pessimistic communication depreciated stock valuations independently of the surprise policy easing. Anyway, to answer at the question: how best to extract a measure of the unexpected change in the target rate on date t, relative to the forecast made on date t-1,

$$\tilde{r}_t - E_{t-1}\tilde{r}_t,$$

(2. 1)

this is a simple operation studied by (Kuttner, 2001). The author use futures data because they are a very useful measure of expected Fed policy; in fact, it's shown that the spot futures rate can be considered as the significant and verified expectation of the average Fed funds rate,

$$f^0_{s,t} = E_t \frac{1}{m_s} \sum_{t \in s} r_t + u_t,$$

(2. 2)

where f is the spot future rate, m is the number of days in month s, and r is the realized funds rate. As said before, Kuttner and successively, Jarocinki-Karadi use Fed funds future rate because if it's assumed that on date t-1, those who invest in futures market expected the Federal Reserve to increase or not the Fed funds target rate on date t, and that no further changes were expected within the month, then the futures rate on date t-1 would embody the average of realized funds rates through that date, and expectations about the rates prevailing after that date.

$$\begin{pmatrix} \boldsymbol{m_t} \\ \boldsymbol{y_t} \end{pmatrix} = \sum_{\boldsymbol{p=1}}^{\boldsymbol{P}} \begin{pmatrix} \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{B_{YM}^p} & \boldsymbol{B_{YY}^p} \end{pmatrix} \begin{pmatrix} \boldsymbol{m_{t-p}} \\ \boldsymbol{y_{t-p}} \end{pmatrix} + \begin{pmatrix} \boldsymbol{0} \\ \boldsymbol{c_Y} \end{pmatrix} + \begin{pmatrix} \boldsymbol{u_t^m} \\ \boldsymbol{u_t^y} \end{pmatrix}, \quad \begin{pmatrix} \boldsymbol{u_t^m} \\ \boldsymbol{u_t^y} \end{pmatrix} \sim \boldsymbol{N(0, \Sigma)},$$

(2. 3)

In this specific VAR formula adopted by Jarocinki and Karadi, y represents a vector of macroeconomic and financial variables observed in month t, while m is a vector of surprises in financial instruments observed in month t as well. Their baseline VAR is characterized by seven variables: m consists of the surprises in the three-month fed futures and the S&P 500 stock market index; y includes a monthly interest rate, a stock price index, indicators of real activity, the price level and financial conditions.

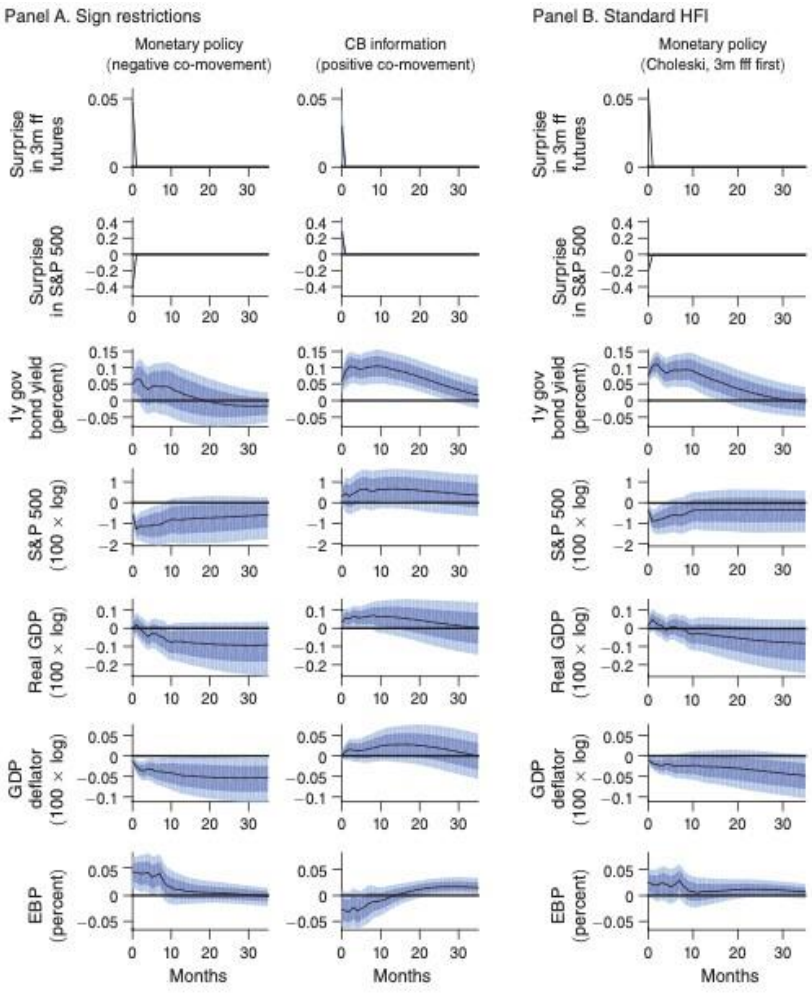


Figure 3.1

M.Jarocinski and P.Karadi: 'Deconstructing Monetary Policy Surprises-The Role of Information Shocks' (2020)

The fundamental key message to this research occurs in this figure above. In fact, it presents the impulse response to monetary policy and central bank settlement shocks in the 30-minutes window.

In the first column on the left, it's possible to see all that the economic theory explains because of a tightening monetary policy. In fact, it occurs a drop in the S&P 500 index from 23 to 52 basis point, the one-year government bond yield increasing by 5 basis points, the EGP (Excess Bond Premium) raising by about 5 basis point as well, real GDP (Gross Domestic Product) and its deflator, that is, the inflation level, both decrease significantly by 10 and 5 basis points.

On the second column, it's demonstrated how the variables change to the central bank information shock. In this case, the graphs show us the impact of these banking settlements at the public, that is, the focal point of the research.

In fact, the shock occurs with an increasing to 5 basis points in the three-month fed funds futures and, more important, a 3 to 45 basis points raise in the S&P 500 index in the 30minutes window. Besides, the excess bond premium got significantly reduce by about 3 basis points, and then, another important data is that the GDP deflator and the real GDP instead of dropping as happened in the monetary policy shock graphs, the first increase by about 2 or 3 basis point and the second raise by 5 or 6 basis points by keeping this slope for ten minutes from the central bank information.

Why has it happened that in the second column these shocks don't follow what the economic theory says? The answer is straightforward: soon after the Federal Reserve implemented a restrictive economic policy by raising interest rates with the aim of slowing inflation mainly and not overheating the economic development, the central bank communicates good news about the forecast economy (i.e., 'despite the raise in fed funds rate, we expect that the consumption demand and general tool productions could remain high') by making itself independently of the monetary policy.

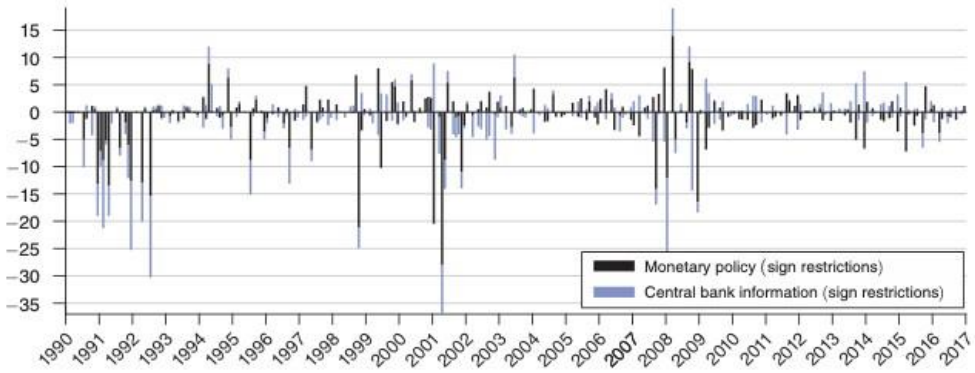


Figure 3.2

M.Jarocinski and P.Karadi: 'Deconstructing Monetary Policy Surprises-The Role of Information Shocks' (2020)

This figure above represents both monetary policy shocks (in black) and the central bank information shocks (in blue) over time.
The shocks are measured in terms of the three-month fed funds futures surprises in basis points. As it's easy to see, there is a positive downgrade correlation between the two lines in average from 1990 to 2002 because of the so named 'Black Wednesday' currency crisis in 1992 and the burst of the dot-com bubble as well as the terrorist attack at the Tween Towers in 2000-2001. For instance, in August 2001 the FOMC took an important decision: it reduced the fed funds target rate by 25 basis point in that, the statements supported by the committee mention 'household demand has been sustained, but business profits and capital spending continue to weaken, and growth abroad is slowing, weighing on the US economy', and announced that 'risks are weighted mainly toward conditions that may generate economic weakness in the foreseeable future'.
These data and graphs expose above affect the USA area, while from now on the graphs relating to the Euro area will be analyzed and discussed.

2.3 Eurozone Results

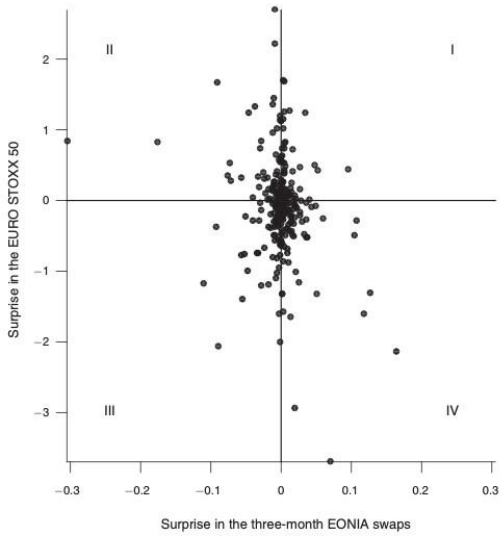


Figure 3.3
M.Jarocinski and P.Karadi: 'Deconstructing Monetary Policy Surprises-The Role of Information Shocks' (2020)

This dataset is characterized by 280 ECB policy statements from 1999 to 2016.
Similarly, to the US dataset graphs, they measured the shocks across 30-minute windows around press settlements and 90-minute windows around press conferences. The timing

in which these banking averments and conferences starting and ending is respectively calculated 10 minutes before and 20 minutes after the events.

For computing the surprises, the responses in the two windows are added every time a press conference and a press statement occur.

In the Eurozone dataset, the correlation between the EONIA interest rate swaps with maturity of one month up to two years and the EURO STOXX 50, a market capitalization-weighted stock market index including 50 blue-chip companies from 11 eurozone countries is studied and showed.

The EONIA is the average reference interest rate in very short-term transactions (overnight) carried out on the European interbank market and then, the EONIA interest rate swap reflects the expected average level of the overnight interbank EONIA over the term of the swap.

In that scatterplot, each dot represents one announcement by the Governing Council of the European Central Bank (EBC) but this time, unlike the USA area, more than 40 percent of the data are in quadrants I and III, where there are the inverse stock market responses. This is because for instance, the ECB started with organizing press conferences since 1999 while the Fed introduced them only in 2011. Nevertheless, the ECB shows and issues staff forecast instantly after they are produced while the Fed does these actions with five-year delay.

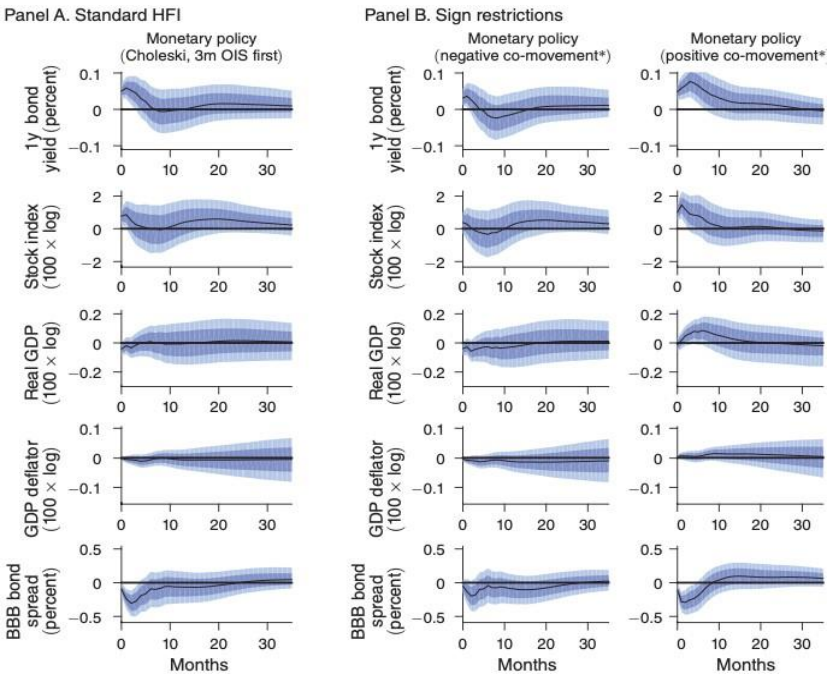


Figure 3.4

M.Jarocinski and P.Karadi: 'Deconstructing Monetary Policy Surprises-The Role of Information Shocks' (2020)

Similarly, to the US data, these graphs represent a VAR model that shows the impulse response of the variables y to one standard deviation shocks in the Euro area.
In this section, the German one-year government bond yield is used to measure the securest and the least risky one-year interest rate in the Eurozone. Besides, for measuring financial conditions in that time, it's studied the BBB bond spread movement, that is, the difference between the corporate yields and the Treasury yields.
The other variables are similar, such as real GDP and GDP deflator series as well as the blue-chip STOXX 50 index. The sample is from January 1998 to a December 2016.
In the first column from the left (Panel A), that it's characterized by the standard high frequency of monetary policy shocks, we see that some responses are inconsistent with studies and expectations of standard economic theory. More specifically, as showed by the functions, stock prices increase, and corporate bond spreads fall as well in response to an unexpected tightening monetary policy.
Finally, in the Euro area it's obvious and trivial that is necessary to decompose the monetary policy surprises further, by analyzing the central bank information shocks.
There are two big differences from the United States graphs: the first one is that the stock market response to the central bank information shock is positive and wide, while it was quite meaningless in the United States, second point, the movements and the responses of prices are weaker (see GDP deflator), and the response of real GDP is much stronger and bigger than in the United States. In summary, the differences between monetary policy shocks and central bank information shocks are wide and significant. In fact, as we know, a negative monetary policy surprise is a conventional policy easing, by contrast, if they decide to implement a conventional policy tightening then it occurs a positive monetary policy shock.
Consequentially, a positive central bank information shock implements good news about the economy while a negative central bank settlement shock looks like bad news and expectations about production, consuming and investments, as we can see by the graphs, especially in the Eurozone. The figure below shows the euro-area shocks over time.
On the whole sample the central bank information shocks occur, as in the US timeline. However, during the European sovereign debt crisis in August 2011 we can see one of the biggest and widest central bank information shocks.
In effect, as economic history teaches, on August 4, the ECB assembly decided not to increase or decrease policy rates by keeping them unchanged and excluding in the near future a tightening policy. Although these actions would predict a sort of relief for financial markets, as economic theory says, the STOXX 50 blue-chip stock market index toppled suddenly, since after thoughtful monetary policy actions, the banking statement overheated financial system

by declaring that uncertainty, especially, on financial markets, is ‘particularly high’. Another significant example can be studied in July 2012, in which the Governing Council of the ECB reduced the target interest rates by 25 basis points as monetary policy action. After that, European central bankers revealed that ‘some of the previously identified downside risks to the euro-area growth outlook have materialized’.

Because of these strong settlements, how did financial markets react?
Well, according to this logic implemented so far, the stock market dropped by more than 2 percent. However, as said before, this figure represents the contribution of shocks to the surprise in the three-month EONIA swap, in basis points.

So, throughout the sample we can see that both shocks occur, not only during the historical economic crisis.

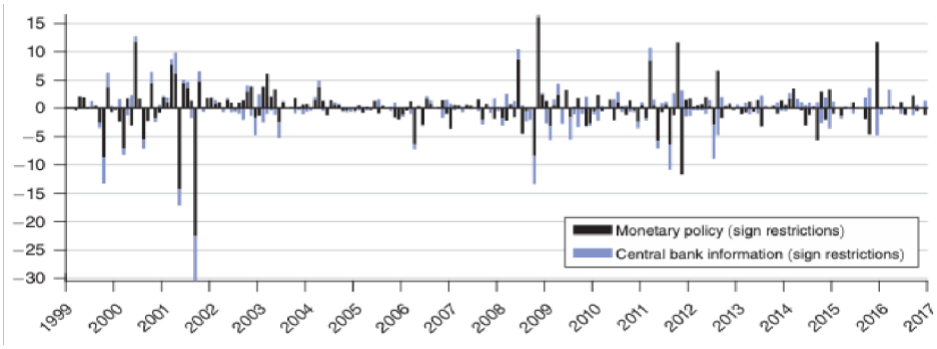


Figure 3.5

M.Jarocinski and P.Karadi: ‘Deconstructing Monetary Policy Surprises-The Role of Information Shocks’ (2020)

Finally, to conclude the Jarocinski-Karadi work, it’s possible to figure out that studying and measuring the central bank information roles could be very useful and significant because it may change the market agents’ expectations and views concerning with the level of importance on future fluctuations in the financial markets after central banks having implement a monetary policy decision. In particular, positive news about the near future growth of the economy can lead to a raising asset price and simpler as well as more fluent credit conditions.

2.4 Other Particularities on Central Bank Announcements

Another important work paper for analyzing and representing the relation between monetary policy and financial markets, in particular the market for equities, is written by Bernanke and Kuttner titled: ‘What Explains the Stock Market’s Reaction to Federal Reserve Policy?’

(Bernanke & Kuttner, 2005). The authors would like to capture and measure the reaction of stock market by discovering that, on average, an association between a presumed unanticipated 25 basis point drop in the Fed funds rate target and a 100 basis points raise in stock indexes.

Despite of the naturally intuition in which asset prices will also change to implement in future policy expectations, they focus on unexpected policy actions made by policymakers, thanks to which it's possible to elude many econometric problems regarding endogeneity and simultaneity, by having a broader comprehension about the stock market reactions to monetary policy.

Like Jarocinky and Karadi method, in this paper Bernanke and Kuttner use Federal funds future rates to identify unexpected Fed funds rate as well.

$$\Delta i^{u} = \frac{D}{D-d}\left(f^{0}_{m,d} - f^{0}_{m,d-1}\right).$$

(2. 4)

This simple equation shows that for an act occurs on day d of month m, the unexpected or 'surprise' Fed funds rate variation is measured on the deviation in the rate involved by the current-month futures contract, indicated with f.

In fact, changes in the futures contract's price relative to the day prior to the policy action may be an efficient and valid measures of the surprise in Federal funds rate target. However, it's important knowing that the future price often incorporate the day's acts about monetary policy, because the Fed funds rates movements generally are announced before the closing of the futures market.

As an informative title, the implied futures rates are computed by 100 minus the relative contract prices and are traded on the Chicago Board of Trade.

$$H_t = a + b^{e}\Delta i^{e}_{t} + b^{u}\Delta i^{u}_{t} + \varepsilon_t.$$

(2. 5)

This figure represents the multiple regression that measures the stock return H in response to expected and unexpected fed funds rate variations.

Regressor	Full Sample (a)	Full Sample (b)
Intercept	0.23	0.12
	(2.58)	(1.35)
Raw funds rate change	−0.61	–
	(1.06)	–
Expected change	–	1.04
		(2.17)
Surprise change	–	−4.68
		(3.03)
$\bar{R}^2$	0.007	0.171

Figure 4

B.Bernanke and K.Kuttner: 'What Explains the Stock Market's Reaction to Federal Reserve Policy' (2005)

On this table it's clear that, by adding surprise change effects in column (b), the estimated beta suggests an unexpected, fed funds rate cut by 1% could get drop the stock return by 4.68%. This significant result goes surprisingly against what economic financial theory says, as discovered in the Jarocinski and Karadi work in fact, other variables can make changes within the economic financial system, not only the monetary policy, such as central bank information, bank meeting or reports about the macroeconomic factors.

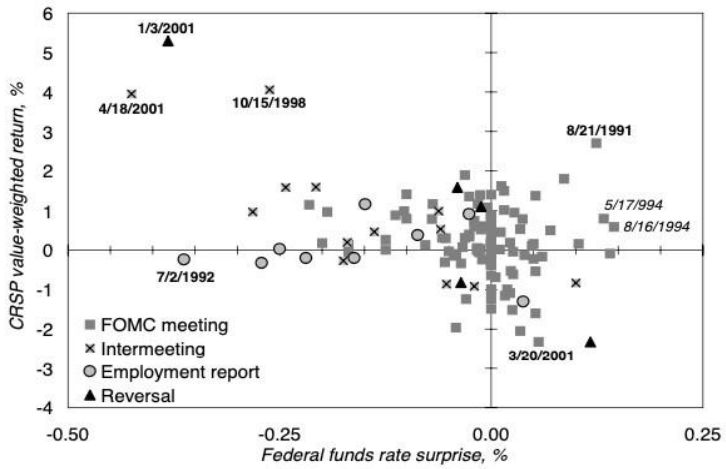


Figure 4.1

B.Bernanke and K.Kuttner: 'What Explains the Stock Market's Reaction to Federal Reserve Policy' (2005)

This figure above indicates a daily data scatterplot on Federal funds rate surprises in percent and stock market returns, more specifically on the CRSP value-weighted return, a Swiss American biotechnology company that developments medicines for the treatment of various rare and common diseases instead of the S&P500 index. The sample contains 77 FOMC

meetings and 55 Fed funds target rate shifts for a total of 131 observations dates over the period from June 1989 until December 2002, that are also characterized by their combination with the news about employment reports and changes in the Fed funds rate movements (reversals). More specifically, we can see a one-day CRSP value-weighted equity return versus the surprises Fed funds rate movements with a clear visible negative correlation. The graphs dots follow ton average the economic theory vision, for example on January 3 and April 18, the unexpected 50 basis points intermeeting rate drops and consequently, a 1-day positive returns of 5.3% and 4 %. In March instead, there was a cutting about 50 basis points, in which thus financial statements claimed that many companies' investors were disappointed the rate cut had not been bigger than 75 basis points. Because of this pessimistic situation, the return turned into a negative measure by about more than 2 %.

Another strange reaction regarding financial market movements to a monetary policy action, is carried out on October 15, 1998, in which equities return increased over 4% due to the unexpected FOMC intermeeting interest rates cut by about 25 basis points, that was acted for restoring financial markets conditions, as for instance the uncomfortable state in Russia and Asia. It's important to mention the outlier implemented on August 21, 1991, when the CRSP return raising by about 3% had associated with an FOMC meeting despite of the decision to not change rates. According to the financial press, this action is due to the fact of failed coup attempt in Russia, obviously an event didn't relate to that day's FOMC decision.

Anyway, there is a good method to estimate monetary policy surprises' efficient on expected interest rates, that is, by carrying out the Fed funds futures rate changes next to the surprises event.

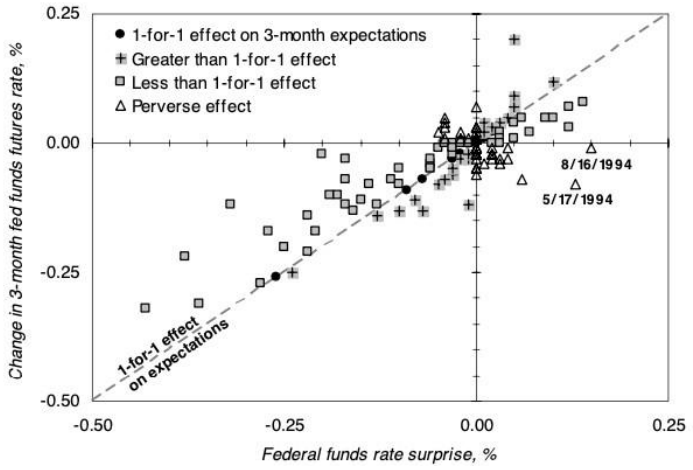


Figure 4.2

B.Bernanke and K.Kuttner: 'What Explains the Stock Market's Reaction to Federal Reserve Policy' (2005)

In this scatterplot graph, it's clear observing the relationship between Federal funds rate surprises and 3-month fed funds futures rate changes from June 1989 to December 2002 sample with 131 observations. The two of them characterized by written date, represent unusual statements by the FOMC.
The results are measured based on if the changing in fed future rates are greater than, less than, equal to, or opposite in sign from the Fed funds rate surprise.

Regressor	(a)
Intercept	−0.01 (1.46)
Expected change	0.07 (2.10)
Surprise change	0.65 (13.37)
Surprise change × no rate change	–
FOMC meeting	–
reversal	–
R^2	0.726

Figure 4.3
B.Bernanke and K.Kuttner: 'What Explains the Stock Market's Reaction to Federal Reserve Policy' (2005)

Moreover, by regressing this strong relation, an estimated coefficient of surprise change measures by 0.65. This slope tells us that the policy surprises gauge on expectations movements is often correlated much less than one-for-one with the fed funds future rates changes. It means that if a policy rate surprise moves by 1%, that is, a current-month fed funds futures rate movement, then a 3-month fed funds futures rate should change by about 0.65% on average, as the response of interest rate expectations to Federal funds rate surprises. However, the Bernanke and Kuttner intuition is that, in order to calculate the importance of policy surprises differences relative to the market expectations, could demonstrate the equity market's changes, their idea is finding a variable that computes the difference between the surprises' impacts on current and 3-month-ahead interest rate expectations by incorporating this result in the stock return regressions. In other terms, this significant gauge is called 'timing surprise' variable, that symbolizes the difference between the 3-month fed funds futures rate change and the current Fed funds rate surprise movements.

	Full Sample	
Regressor	(a)	(b)
Intercept	0.12	0.09
	(1.35)	(1.09)
Expected change	1.05	1.34
	(2.17)	(2.92)
Surprise change	−4.68	−6.20
	(3.03)	(3.80)
Timing surprise	–	−4.29
		(2.20)
Effect of "pure" timing surprise	–	−1.91
		(0.91)
$\bar{R}^2$	0.171	0.192

Figure 4.4

B.Bernanke and K.Kuttner: 'What Explains the Stock Market's Reaction to Federal Reserve Policy' (2005)

This table represents the impacts of the 1-day CRSP value-weighted return on the expected and surprise Fed funds change as well as the timing surprise.

Instead, column (b) shows that, by adding this term on the sample, raises the impact of the current-month surprise coefficient from -4.68 to -6.20.

This important result means that surprises with a less-than one-for-one impact on expectations, that is, those changes in the 3-month federal funds futures rate that are smaller than the current-month futures rate surprises, have a significantly smaller effect on stock prices. Moreover, it means that the gauges imply a -1.52% (-6.20% -(-4.68%)) 1-day stock prices return more than the column (a) regression, in response to a 1%-point monetary policy surprise rate cut.

CHAPTER 3: AN EMPIRICAL VIEW

So far, how literature identifies unanticipated variables of interest rates in a theory way has been discussed by illustrating some considerable tables and graphs relative to the macroeconomic and financial effects, due to monetary policy surprises shocks as well as the central bank information, extraordinary Council meetings, macroeconomic trends and so on.

3.1 Dataset, Variables and Methods

Considering these facts, some data are studied and analyzed concerning with the Euro Area monetary policy shocks and the subsequent response of the financial market, more specifically the Euro Stoxx 50, that represents a stock index of the main companies in the Eurozone and includes a representation of the most important industrial sectors in the area. Moreover, it's composed by 50 stocks of eleven counties in Europe, such as: Austria, Belgium, Finland, Germany, Ireland, Italy, Leasburg, Netherlands, Portugal and Spain. Therefore, the variable named 'STOXX50_mpd' represents Monetary Event-window changes in the Euro Stoxx 50 index. For measuring the monetary policy shocks in the Eurozone, I take the variable who embodies the first principal component of the Monetary Event-window movements in overnight index swaps (OIS) with different maturities: 1, 3, 6 months and 1-year, named 'pc1_mpd'.
These financial tools, in extremely synthetic and practice terms, can be defined as the agreement between two parties who undertake to exchange a series of daily payments at the EONIA variable rate, for a certain period, in return for a fixed rate, that is, the overnight interest swap. This rate reflects the 'expected average level' of the overnight interbank rate (EONIA), that is calculated as weighted overnight rates average of the operations made in the interbank market, over the term of the swap.

	pc1_mpd	STOXX50_mpd	CPHPTT01EZM659N	LRHUTTTTEZM156S	Ultimo
1	-0.03244615	-1.44356899	0.8514144	10.1	1,1368
2	0.00000000	0.17415741	0.8356164	10.0	1,1336
3	-0.00244357	0.14332836	1.0259918	9.9	1,1561
4	-0.00972728	0.05465677	1.1326419	9.9	1,1581
5	0.00593266	-0.38800092	0.9941441	9.9	1,1807
6	-0.00538368	-0.32633045	0.9391588	9.8	1,1870
7	0.02255368	0.51253552	1.0752688	9.8	1,1855
8	-0.00138764	-0.23559841	1.1702272	9.7	1,2225
9	-0.04540718	0.56936632	1.3066558	9.7	1,2018

Showing 1 to 10 of 276 entries, 5 total columns

	pc1_mpd	STOXX50_mpd	CPHPTT01EZM659N	LRHUTTTTEZM156S	Ultimo
10	-0.16757417	-0.59418328	1.3886998	9.6	1,1728
11	0.05511490	0.56751257	1.5248468	9.6	1,2074
12	-0.00026669	0.24308875	1.8233773	9.5	1,2136
13	-0.01188501	-0.54553480	1.9335730	9.4	1,2213
14	0.02468071	1.64447894	2.0243777	9.3	1,1928
15	-0.08137837	0.76771789	2.0586172	9.2	1,1647
16	0.00844729	-0.61104878	1.8085705	9.1	1,1718
17	-0.00034372	1.98925878	1.8613535	9.0	1,1936
18	0.15808634	-1.01204578	2.2121343	9.0	1,1774

Showing 10 to 19 of 276 entries, 5 total columns

In these pictures, a data frame has been created in R program composed by 5 variables in columns and 276 monthly frequency results of each, started from January 1, 1999, to December 31, 2021.
The first two started from the left I just explained above (pc1_mpd and STOXX50_mpd), while by now, I illustrate the other three variables: the Consuming Price Index (CPHPTT01EZM659N), in percentage, that assumes the estimation of the inflation rate, the Harmonized Unemployment Rate (LRHUTTTTEZM156S), that represents in percentage, the active unemployed without time limits (FRED, s.d.), and finally the Euro-Dollar Exchange Rate (Ultimo), (Investing, s.d.).

```
Endogenous_Data<-Every_Data[,1:2]
Shock_Variable<-as.data.frame(Every_Data[,1])
Instrument_Variables<-Every_Data[,3:5]
Linear_Model_IV<-lp_lin_iv(endog_data = Endogenous_Data,
                           lags_endog_lin = 12,
                           shock = Shock_Variable,
                           use_twosls = TRUE,
                           instrum = Instrument_Variables,

                           trend = 0,
                           confint = 1.96,
                           hor = 20)
```

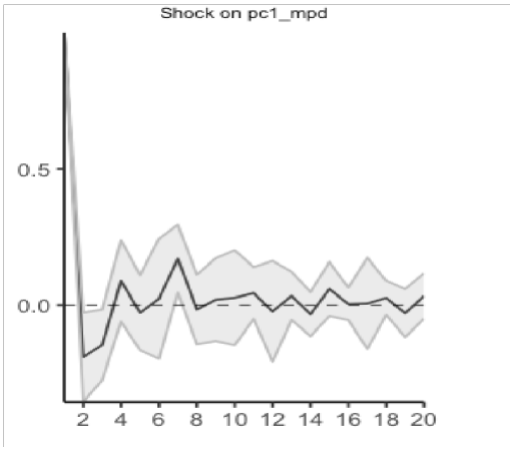
Nevertheless, after having fixed these significant variables in a single data frame, I divided them in shocks variables and instrument variables by using IV Estimator or Two-stage least squares regression logic. In fact, this method uses instrument variables, that, in this specific case, are the consumer price index, the harmonized unemployment rate and the Euro-Dollar exchange rate, that are uncorrelated with the error terms to measure estimated values of the problematic predictor, called ‘the first stage’, and then uses those gauged results to estimate a linear regression model of the dependent variable, that in this case is the Euro Stoxx 50 index

(the second stage). Moreover, I think that these three variables are useful for analyzing with more quality and efficiency the regressor variable changes.
Obviously, I adopted the overnight interest swap (pc1_mpd) as shock variable in this sample. In order to compute the so-named 'impulse response function', I used the local projection method by (Jordà, 2005), an alternative simpler approach than VAR to estimate the regressor variables coefficients. As we can see on the figure above, I used a function, thanks to the 'lpirfs' package downloaded in R, named 'lp_lin_iv', to estimate a linear local projection regression model with a temporal horizon by about 20 months.

```
summary(Linear_Model_IV)
IV_Linear_Plots<-plot_lin(Linear_Model_IV)
Plots_Combine<-list()
Plots_Combine[[1]]<-IV_Linear_Plots[[1]]
Plots_Combine[[2]]<-IV_Linear_Plots[[2]]
Plots_Combine[[3]]<-IV_Linear_Plots[[2]]
Plots_Combine[[4]]<-IV_Linear_Plots[[2]]
All_Plotss<-sapply(Plots_Combine,ggplotGrob)
marrangeGrob(All_Plotss,nrow = 2, ncol = 3,
             top = NULL)
```

Finally, both shock graph on pc1_mpd, that reflects the overnight interest rate swap (OIS) changes throughout 20 months and shock graph on STOXX50_mpd, that shows the response of the European index to the overnight interest swap surprise changes (pc1_mpd) have been combined.

3.2 Impulse Response Functions

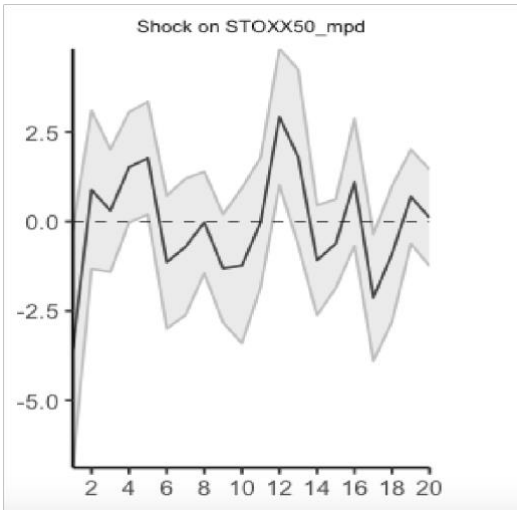


As said above, this figure represents the shocks movements of 'pc1_mpd' variable, by reflecting the regressor dependent variable in the local projection model.
This significant measure, that is the overnight interest swap, embodies not only the monetary policy shock in the Eurozone, but also another main character that plays a fundamental role, the central bank information shock. It means that by adding monetary policy shocks with the central bank settlements changes, the result of the pc1 variable is computed and obtained. This dataset shows a significant factor, that is, the sum of 'MP_pm_mpd' that represents the monetary policy shocks over months, and 'CBI_pm_mpd' that express the results of the central bank information shocks, the 'pc1_mpd' variable exactly get find. For instance, in the first line, 0.00343009 (MP variable) plus -0.03587624 (CBI variable) is equal to -0.03244615 (pc1 result).

	year	month	pc1_mpd	STOXX50_mpd	MP_pm_mpd	CBI_pm_mpd
1	1999	1	-0.03244615	-1.44356899	0.00343009	-0.03587624
2	1999	2	0.00000000	0.17415741	0.00000000	0.00000000
3	1999	3	-0.00244357	0.14332836	-0.00244357	0.00000000
4	1999	4	-0.00972728	0.05465677	-0.00266690	-0.00706038
5	1999	5	0.00593266	-0.38800092	0.00593266	0.00000000
6	1999	6	-0.00538368	-0.32633045	0.00171504	-0.00709872
7	1999	7	0.02255368	0.51253552	0.00133345	0.02122023
8	1999	8	-0.00138764	-0.23559841	0.00000000	-0.00138764
9	1999	9	-0.04540718	0.56936632	-0.04540718	0.00000000

Showing 1 to 9 of 276 entries, 8 total columns

Discussing the graph above where the way in which 'pc1_mpd' changes over 20 months is showed, it's quite clear that from time 0 to 2 months occurs a sharp overnight interest swap decline to then goes up immediately after the fourth month. This first reaction tells us that, until the fourth month, the economic agents expect an increasing on the average level of the EONIA interbank rate by about 10 basis point. Furthermore, on the seventh months, there is a strong rise of pc1 but, consequently in the Euro Stoxx 50, occurs the same thing, in fact the financial European index start to increase, it means a significant increase of his value regarding financial expectations by about 1.25 percent.



This graph in fact, represents the impulse response of the Euro Stoxx 50 index to the so named 'pc1_mpd' variable shocks. If you tried to compare the two figures above, it's straightforward understanding that the financial market index is much more volatile than overnight interest rate swaps changes that, as prior said, are characterized by both factors of monetary policy shocks and the central bank information shocks, such as unexpected Council meetings relative to foreseen financial conditions and announcements on events concerning their views on macroeconomic topics: the unemployment rate trend, goals on how to reduce or increase consumptions or investments demand by regulating the inflation rate level etc.
Hence, as described in papers previously named, monetary policy shocks are not enough to fully explain the strange and unexpected effects taking place in financial markets. In effect, one of the main causes of these changes in stock market that go against economic theory, is surely due to importance of the central bank information and the consequent announcements.
A further significant detail can be found by simultaneously observing both the graph reflecting the shocks of pc1 variable (overnight interest rate swap) and the graph showing the shocks of the Euro Stoxx 50 index in response to sudden movements in the dependent variable pc1 in the twelfth month. As can be easily observed, Euro Stoxx 50 reaches its highest peak passing from the tenth to the twelfth month with an impressive leap of no less than 120 basis points,

that is the 1.2 % difference. In fact, in the twelfth month, the independent variable y of my local projection model, the Stoxx 50 index, exceeds 2.5 % reaching approximately 2.7 %. On the other hand, in the graph illustrating the shock of pc1 over time, if we look at the twelfth month, we will notice an almost zero change or just below 0 %, slightly a negative result. This interesting comparison can be very useful and effective to figure out that the economic agents that in this specific sample are part of the Euro system, have reacted in a very optimistic way to the near future by predicting a good propensity for technological development in terms of long-term investments and consequently economic growth thought the likely expansion of businesses network or the possibility for start-ups to receive greater financial aid, despite the zero or almost zero change on overnight EONIA interest rate swaps.

CONCLUSIONS

Could monetary policy surprises be the only variable to be able to give a response to financial market movements that go against what economic theory says?
This is the main question to which I tried answering so far in this work, and I've come to a simple and clear conclusion, that is, it's quite easy to understand that a negative answer is the right answer. In fact, with the precious help of the mentioned literature, it's been demonstrated that monetary policy shocks, measured by financial derivative contracts, such as, for instance, Fed funds futures, Eurodollars, and overnight interest swaps, are completely not sufficient variables to explain asset prices changes. Instead, there's another valuable factor that can be easily related to this peculiar phenomenon: the central bank information or the Council announcements on financial market conditions as well as the foreseen economic growth situations, release immediately after tightening or easing monetary policy actions. However, the events mentioned above don't imply that these types of statements may represent an independent policy act. Furthermore, it's evident that the central bank announcements are used for influencing the expectations of economic agents about future policy maneuvers. It's crucial to figure out that the word 'expectations' is the key to empirical reasoning. Indeed, it represents the most important factor in these examples explained so far, because it incorporates investors critical thinking. For instance, European Central Bank (ECB) decides to implement a restrictive monetary policy by increasing interest rates from 4% to 4.5%, despite many agents expecting a raise of at most 20 basis points, that is, in percentage 0,2% (from 4% to 4.2%). ECB Council, twenty minutes after having carried out these policy actions, explains the reasons that led to implement certain policies: 'It has long been known that the inflation rate is rising higher and higher, having already overcame the threshold level. Mainly for this reason we have decided to increase interest rates by 50 basis points. Even though this move seems to inevitably lead to an imminent recession, our research data suggests that consuming demand continue to be very intense and businesses earnings maintain a constant cash flow as well as fund requests, expecting a slow but lasting growth. Nevertheless, many public companies could likely continue to distribute dividends and being performing on the market' and next they announce that 'we are confident regarding the fact that there should be no major surprises in the stock market and the European economy will be monitored in case of high uncertainties.' Therefore, based on previous work papers and my empirical research, it's clear that a tight monetary policy followed by the positive central bank information about financial and macroeconomic events will have a short-term bullish effect on the financial market.

Number of words written: 8594

REFERENCES

Bauer, M., Bernanke, B. & Milstein, E., 2023. Risk Appetite and the Risk-Taking Channel of Monetary Policy. *Journal of Economic Perspectives,* Volume 37, pp. 77-100.

Bernanke, B. & Kuttner, K., 2005. What Explains the Stock Market's Reaction to Federal Reserve Policy?. *The Journal of Finance,* 60(3), pp. 1221-1257.

FRED, s.d. *Euro Area.* [Online] Available at: www.stlouisfred.org [Consultato il giorno 2023].

Gurkaynak, R., Sack, B. & Swanson, E., 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), pp. 55-93. Investing, s.d. *Valute.* [Online] Available at: www.investing.com [Consultato il giorno 2023].

Jarocinski, M. & Karadi, P., 2020. Deconstructing Monetary Policy Surprises-The Role of Information. *American Economic Journal: Macroeconomics,* 12(2), pp. 1-43.

Jordà, O., 2005. Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review,* 95(1), pp. 161-182.

Kuttner, K., 2001. Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *Journal of Monetary Economics,* 47(3), pp. 523-544.

Romer, C. & Romer, D., 2023. Does Monetary Policy Matter? The Narrative Approach After 35 Years. *American Economic Review,* 113(6), pp. 1395-1423.

Romer, R. a., 2023. *Does Monetary Policy Matters ?.* s.l.:s.n.

Taylor, J., 1993. Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy,* Volume 39, pp. 195-214.