The Political Economy of the Yield Curve

Di Maggio, Marco

Massachusetts Institute of Technology

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Marco Di Maggio
Massachusetts Institute of Technology

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Abstract

This paper proposes a novel method to recover the market's beliefs about the Fed's monetary policy by using the responses of interest rates to economic news. We investigate the differential impact of news over time showing that the impact of this information is time varying, and that the importance of the housing and labor markets has sharply increased after the crisis. We follow a difference-in-difference estimation procedure to test for the presence of political constraints in the U.S., employing as control group the response of the European swap rates to macroeconomic announcements. We provide strong evidence that after the crisis of 2007, the Federal Reserve has been subject to the political pressure exerted by the Congress.

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1 Introduction

Stressful economic times almost invariably fuel political support for inflationary policies. The current financial crisis is no exception, and the Federal Reserve is under intensifying attack in Congress. One proposal would subject the monetary policy decisions of the Fed to congressional scrutiny, while another would make the presidents of the 12 semi-autonomous regional reserve banks more politically accountable. The current administration has proposed expanding its regulatory oversight to contain future crises, while the treasury secretary has proposed to strip the central bank of its consumer-protection duties. Although just one senator voted against Bernanke's confirmation in 2006, between 15 and 30 senators from both parties may vote to do so by the end of January 2010[1]. On the other hand, the Fed is trying at the same time to unwind its unconventional stimulus and to avoid attracting too much attention from the market. On Christmas Eve of 2009, for example, the Fed announced that Fannie Mae and Freddie Mac were able to buy mortgages without any caps.

[1] See for example the newspaper articles "Policy punchbags", Jan 14, 2010, and "This way out", Jan 4, 2009 (*The Economist)*.

The choice to announce that decision on Christmas Eve allowed the Fed to avoid the opposition of Congress and the overreaction of the market.

This is not the first time that the Fed is under political pressure by the Congress. One well-known example of political pressure is the instance when President Johnson took Federal Reserve Chairman Martin "out to the woodshed" in December 1965, shortly after the Federal Reserve Board approved an increase in the discount rate. Transcripts of President Nixon's office recordings have revealed the pressures faced by Chairman Burns in the early 1970s.

A variety of documents have underscored the political pressures on the Federal Reserve during the early years of the Carter Administration[2]. Recently, Levin and Taylor (2009) identified political constraints as the main causes of the Great Inflation. The conduct of monetary policy became relatively well insulated from political pressures after the Great Inflation[3]. The clarification of Federal Reserve accountability that came with the introduction of regular policy reports and testimony under the "Full Employment and Balanced Growth Act" (1978) likely helped defuse some of the political pressures on the Federal Reserve. In the early 1980s, President Reagan voiced consistently strong support for Chairman Volcker's policies, thereby initiating a pattern of acknowledging the Fed's operational independence that was generally followed by subsequent administrations.

This paper addresses the following question: beyond the anecdotal evidence, is the FED under political pressure? We do not participate in the current debate over the benefits of having an independent central bank; we rather want to understand whether the market reaction during the crisis has been consistent with the idea that the Fed is more amenable to the politicians' requests now than in the past.

In principle, one could try to address this question directly by analyzing data about the speeches, statements, and hearings of the House Financial Services Committee or, as in the previous literature, employing data on politicians' speeches in the Wall Street Journal. However, direct measures are problematic in part because of timing; while a congressman might propose a bill to reduce Fed's independence, it is rarely unanticipated, and news leaks pose a real problem. Therefore, it would be very difficult to identify the Fed's reactions to these pressures. We follow a different approach.

We aim to identify the existence of political constraints on the Fed as *perceived* by the market. That is, market participants will respond differently to certain economic news depending on whether they believe that the Fed is politically constrained to support the housing market with low mortgage rates and the labor markets with inflationary monetary policy. The reaction of the yield curve to economic news is then a good proxy for the market participants' beliefs about the Fed's future decisions. We start by analyzing the response of the term structure of interest rates to a set of macro announcements and we find evidence that few of them are relevant to explaining the daily

[2] See for example Weise (2008), Meltzer (2010) and Biven (2002).

[3] The Great Inflation from 1965 to 1984 is the climactic monetary event of the last part of the 20th century. The annual reported rate of consumer price increase rose from 1.07 percent in January 1965 to 13.70 percent in March 1980 before declining in 1983.

change in the rates of different maturities.

We then try to isolate the effects of news about the housing and the labor markets on the interest rates. If it is true that such political pressure has been exerted by the congress after the beginning of the crisis, then such news must have different impacts on the markets before and during the crisis. While the existing literature[4] presents evidence that few macro announcements, like non farm payroll, have significant effects on the yield curve, we provide evidence that during the crisis, many more economic releases are under the scrutiny of market participants. We find that mortgage applications, the federal deficit, the Case-Shiller index and the auction announcement together with the unemployment rate are the most significant.

This is consistent with the political pressure hypothesis that the market expects the Fed to react to these announcements more strongly during the crisis than before the crisis. That is, these effects, which were never investigated in the previous literature, suggest that the interest rates will be more responsive to politicians' requests to support the households of their constituents.

Because the Fed has injected a record amount of liquidity into the financial markets in the last two years, we collect data about treasury auctions and analyze the impact of these announcements on the yield curve, finding a significant supply effect. That is, we consider the variation in the ratio between the sum of bids accepted and the sum of bids offered finding that it significantly affects the daily variation in treasury rates.

We then turn to the time varying effect of these announcements on the term structure of interest rates. This is the first attempt to analyze the differential impact of economic news on the yield curve over time. We find strong and significant evidence that releases of information about the housing and the labor markets became more significant after August 2007. Although it is not surprising, it suggests a deeper analysis than the one presented in the existing event study literature. In fact, we differentiate between the surprises and analyze the response to good and bad news about each figure, finding a significant asymmetry between good and bad news. One question remains to be answered, why are these effects more significant now?

Up to now, the evidence is not sufficient to disentangle the presumed effect of political pressure had on the Fed from the *fragility hypothesis*. That is, certain economic figures became relevant only during the crisis because they then reached a critical level at which the Fed has to react.

In order to disentangle the political pressure hypothesis completely from the fragility hypothesis, we follow a difference-in-difference estimation procedure. We collect data about the Euro interest rates and economic announcements in the Euro area and try to estimate the response to the latter. The Euro zone is a valid control group; in fact, the European Central Bank (ECB) is not as easily subject to political pressure as the Federal Reserve, given the low relative power of each member of the European Union. Moreover, the Euro zone has experienced the same economic slow down as in the U.S.; the unemployment rate has reached almost 10% of the labor force, exactly the

[4] The next section is dedicated to a review of the existing literature.

same as the record reached in the U.S., so in absence of any political pressure the market should believe that the ECB will react in the same way to economic news related to housing and labor markets as the FED. The differential response, if any, is evidence in favor of the political pressure hypothesis. We find that this differential effect is statistically and economically significant. It remains significant even after controlling for differences between the U.S. and the Euro zone prior to any political pressure attempt and for aggregate factors that would cause changes in the interest rate responses even in the absence of political pressure on the Fed. Furthermore, we provide a number of different specifications, which test the robustness of our findings and show that this increased political pressure on the Fed in the post-crisis period is not an artifact of the media but an economically significant effect.

The structure of the paper is as follows. Section 2 discusses the existing literature on related topics. Section 3 presents our data, hypothesis and methodology. Section 4 presents preliminary results while the discussion of the main empirical findings is presented in Section 5. In Section 6 we present some extensions to check the robustness of our results and gain some new insights. The paper closes with conclusions and ideas for further research in Section 7.

2 Related Literature

This paper bridges several different strands of the economics and financial literature.

First, it is related to the growing literature related to the effect of economic news on the yield curve. This literature analyzes the signed price impact of non-anticipated information, and mainly investigates which types of announcements significantly affect the interest rates. Early studies focused on a selected number of macroeconomic figures and on selected points of the yield curve. Grossman (1981) and Urich and Watchel (1988) analyze the impact of money supply; Hardouvelis (1988), Prag (1994) and Edison (1996) analyze the effect of surprises about the labor market along with Consumer Price Index and Producer Price Index. More recently, Fleming and Remolona (1997, 2001), Balduzzi et al. (2001) and Guegan and Ielpo (2008) employ intraday data and a broader range of economic figures. They investigate the time necessary for financial markets to incorporate the news on asset prices. Because we are interested in the time-varying differential effect of economic figures on the whole yield curve, we employ daily data because intraday data would be hard to manage for such a long interval and would contain much more noise than daily data. Moreover, the significance of our effects is even more striking given our focus on the daily variations of the interest rates, with respect to the response in a window of a few minutes.

In its attempt to investigate the effect of auction announcements on the yield curve, this paper is also related to the literature on treasury auctions built on the seminal paper by Cammack (1997), which studies treasury auctions and shows that imperfect information is present in the treasury

bill market. In 2008 and 2009 the treasury has issued a record amount of debt, and the Fed has scheduled an average of sixteen auctions a month for the year 2010. It is thus reasonable to think that the market will react more strongly to the announcement of these new auctions than in the past. We provide evidence to support this hypothesis.

It is also related to the macro-finance literature on the factors that may explain the dynamics of the yield curve. On the one hand, empirical macroeconomic research has investigated whether and how government deficits and other macro related factors may affect interest rates. Ang and Piazzesi (2003) and Bernanke and Bovin (2003) are examples of this strand of the literature. On the other hand, the importance of principal component analysis in explaining and forecasting the movements of the yield curve has been recognized since the seminal paper by Litterman and Scheinkman (1991). We follow Diebold and Li (2006) in distilling the entire yield curve into a three-dimensional parameter that evolves dynamically.

Moreover, recent research in finance has led to a better understanding of the dynamic properties of the term structure of interest rates. The models are parsimonious, financially coherent, and able to capture some important stylized facts. Most of these bond pricing models, however, are based on unobserved risk factors that are not easy to interpret. In this literature, Diebold, Piazzesi and Rudebusch (2005) and Christensen, Diebold and Rudenbusch (2009) aim to draw explicit connections between the latent risk factors that drive the dynamics of the term structure and the observable macroeconomic variables that characterize the state of the economy. Interestingly, Dewachter and Lyrio (2006) find that each latent factor has a macroeconomic source. The level effect can be linked to lung-run inflation effects the slope factor correlates well with the predictable inflation and the business cycle components, and the curvature effect is related to the current stance of monetary policy, i.e., to real interest rate movements not related to the standard macroeconomic conditions. This confirms the strong relationship between macroeconomics and finance in this area of research. Monch (2008) suggests the following interpretation: "Almost 80% of the variation in the slope of the yield curve is explained by the macro factors. Both the business cycle related first and the inflation-related second factor are positively linked with the slope of the yield curve. This is consistent with the fact that short-term interest rates are expected to rise relative to long-term interest rates in an inflationary environment. Moreover, the short rate has a strongly significant negative coefficient in the slope equation which is consistent with the intuition that rises in the short rate lead to a decreasing yield curve slope".

Our paper improves on these results by showing that fiscal policy, housing and labor markets factors may also have a significant influence on government bonds. In this respect, our work is related to that of Dai and Philippon (2006), which argues that in order to price long term bonds correctly it is important to take into account the fiscal position of the government, above and beyond inflation and real activity. This suggests that politicians' choices affect the yield curve and then the monetary policy, although the latter should in principle be established only by the Fed.

Furthermore, it has been shown that the business cycle may also significantly influence the yield curve; the paper of Ang and Bekaert (2002) is one of the first attempts to model the term structure by using regime-switching models. They show that interest rate regimes correspond reasonably well with business cycles in the U.S. This suggests that interest rates respond significantly to the economics conditions. We qualify this finding by analyzing data before and after the financial crisis of 2007 and investigating whether the yield curve responds differently to macro announcements with respect to the past. That is, we are able to address the following questions: does a significant difference exist in the impacts of economic news on the yield curve before and after the crisis? More generally, did the crisis change the market participants' beliefs about the Fed's independence from Congress?

In this respect our paper is related to Hamilton, Pruitt and Borger (2009) which proposes a novel method for estimating a monetary policy rule using macroeconomic news. They estimate directly the policy rule agents use to form their expectation linking how the forecasts of economic conditions and monetary policy are affected by news. We share with this study the same intuition, that is, the possibility to recover the market's beliefs about monetary policy by using the responses of interest rates to economic news. However, they focus on the period 1994-2007 trying to estimate a Taylor Rule based policy function. Our main focus is on the differential impact of news over time and across different currency areas to identify the presence of political constraints to the Federal Reserve's monetary policy as perceived by market participants.

Finally, this paper is related to the political economy literature, which both empirically and theoretically studies the independence of central bank authorities. The literature on the independence of central authorities began with the paper by Bade and Parkin (1982), but Cukierman et al. (1991) developed a widely used index of central bank independence. The papers on political cycles by Alesina (1987), Persson and Tabellini (1990) and Alesina and Roubini (1992), among others, are also relevant.

More recently, Havrilesky (1995) to examine to which extent politicians influenced policies of the Fed, he constructed an indicator for political pressure on the central bank by counting the number of reports in the Wall Street Journal of politicians arguing in favor of more or less restrictive monetary policy[5]. We aim to identify, instead, whether the Congress has had any influence on the Fed, and whether it will have any influence on the exit strategy from the unconventional stimulus, by employing the market reactions to relevant economic surprises.

[5]Maier et al. (2002) employs this approach to investigate the political constraints on the Bundensbank, finding that the Bundensbank did not respond to political pressure.

3 Research Design

We now present our hypotheses, the methodology we use to test them, and the associated dataset. We first present in detail the hypotheses we investigate and then the model for the yield curve with the economic intuition behind it. We then discuss how we address some known issues related to the series. Finally, we describe the data employed to carry out our analysis.

3.1 Hypothesis

Economic theory suggests that the information and beliefs held by market participants ought to be the key determinant of asset prices. Accordingly, the deviations of the realized figure for some key economic indicator from the market consensus, should lead to a revision of the market's beliefs and to a change in asset prices. Yet, several studies have documented that few macroeconomic releases have an influence in financial markets. The existing literature has documented a significant reaction to non-farm payroll, price indexes and a few other economic activity indicators. Financial markets also try to infer from employment figures whether inflationary pressures are building up, which may arise in a tighter labor market. Moreover, in 2009 the unemployment rate has registered a record 10%, which is the highest recorded since the 1980s. Therefore, the unemployment rate has recently been more closely monitored. Note also that once recovery is entrenched and unemployment starts falling, the Fed should raise interest rates and shrink the Fed's balance sheet. However, this policy is expected to draw attacks from the Congress. This means that the unemployment rate, as well as other labor market figures, contains information not only about the current economic condition and the expectations about inflation, but the variation in the interest rates is also a proxy for the market's beliefs about how fast the Fed will be able to unwind the stimulus package. At the same time, the housing market indicators are relevant to understanding the movements of the yield curve because the interest rates are also settled in response to the housing market conditions. Due to the information content of the figures described above, one would expect surprises in any of these figures to contribute to the explanation of changes in the yield curve after an announcement. This is stated in hypothesis H1.

- **H1: Impact of labor and housing market figures**

  Interest rates react significantly to unanticipated information about the conditions of the labor and housing markets.

The housing bubble has been recognized as one of the main factors contributing to the crisis. The beginning of the crisis with the burst of this bubble led market participants to monitor the housing market indexes closely. Ever since the first few indicators, such as the Case-Shiller Index and the existing home sales figures, began to suggest that the house prices were starting to fall for the first time in a decade, all the housing market figures have gained widespread attention from

market participants. Moreover, the Fed's attempt to sustain a regime with low mortgage rates made these indicators even more informative of the Fed's policy reactions during the crisis. The deep economic recession led the unemployment rate to rise up to a record 10% in the end of 2009. The Fed has reacted to this development by maintaining low interest rates. Due to the information content of the figures described above, especially during the crisis, one would expect surprises in these figures to have different impacts on the term structure of interest rates before and during the crisis. Hypothesis H2 summarizes this argument.

- **H2: The crisis has increased the impact of labor and housing market figures**

  Interest rates react more strongly to non-anticipated information about the labor and housing markets after August 2007.

Since August 2007, the Fed has reacted to the lack of trust among financial institutions by supplying liquidity to the banking system. There have been an increasing number of treasury auctions, and then the market started to absorb an increasing amount of treasury bonds, well above the level that was standard in the past. One would therefore expect the market react more significantly to auction announcements during the crisis, as the supply of treasury bonds has increased significantly. Moreover, the possibility of a tail auction, that is, one in which the supply exceeds demand, as occurred in October and December 2009, is an event that gains much attention from market participants. However such reaction is not guaranteed; in fact, during recessions market participants tend to buy more treasuries to hold more liquidity. The following hypothesis states this formally.

- **H3: The auction announcement effect**

  Interest rates respond more strongly to the announcement of a new treasury auction during the crisis than before, and their reactions also depend on the numbers of bids accepted by the treasury.

It is well known in the finance literature[6] that the market reacts differently to unexpected good and bad news. A series of good news about the housing market, such an increase in home prices or in the number of mortgage application above the market's consensus forecasts, makes the release of unexpectedly bad news about the housing market a particularly relevant event that may have a greater impact on the interest rates. The same holds for the labor market. The recession caused a sharp increase in the unemployment rate as well as in jobless claims, so a positive surprise may have a different impact on the interest rates. Hypothesis H4 follows this line of reasoning.

- **H4: Asymmetry in the reactions to good and bad news**

[6] Examples of these market reactions may be traced in the literature on the effects of earnings announcements since Chambers and Penman (1984).

Market participants react differently to surprises that indicate worsening economic conditions and to non-anticipated information that suggests an improvement of the economy.

Now we try to shed new light on the fundamental reasons underlying the different patterns in the yield curve reactions to economic news mentioned above. If a differential impact of surprises about housing and labor markets on the interest rates over time exists, this may be for two different reasons. On one hand, the Fed's and the market's reaction to the news about the conditions of the economy may well be cycle-dependent. Moreover, the market's reaction may be exacerbated by the record levels reached by these market indexes. Hypothesis H5 suggests this "fragility effect".

- **H5: The fragility hypothesis**

  Interest rates react more strongly to news related to unemployment and housing market because they have reached critical levels that require stronger interventions.

On the other hand, the time varying reactions of the term structure of interest rates to macro surprises may signal that the market believes that the Fed's policy reaction function is constrained by the political pressure exerted by the Congress. That is, the overreaction to bad news about the labor market or the housing market may be motivated by the fact that the market perceives the Fed as being under pressure to maintain a low interest rate regime. The reaction to good news about the economic news may reflect the market's expectations that the Fed will not raise the interest rates as promptly as it should in order to avoid an inflationary wave. The market's presumption that the Fed will be biased in its reactions to the economic news may explain the variations in the interest rates (hypothesis H6).

- **H6: The political pressure hypothesis**

  The stronger response of the interest rates to labor and housing market statistics is due to the belief that the Congress's pressure on the Fed has conditioned and will influence its monetary policy.

3.2 Methodology

We propose to estimate a version of the model of Balduzzi et al. (2001), refined and augmented to take in consideration the possibility of serially correlated errors and the different levels of volatility of the interest rates over time.

Suppose that we observe J types of macroeconomics announcements. For each announcement $j = 1, ..., J$, there is a consensus forecast given by the median of a survey of economists. Let $F_{i,t}$ be this forecast at time t for the announcement j and $G_{j,t}$ be the realized announcement. We follow

Balduzzi et al. (2001) and Guegan and Ielpo (2008) in defining the surprise j at time t as

$$S_{j,t} = \frac{G_{j,t} - F_{j,t}}{\sigma_j}$$

where σ_j is the standard error of the economic surprises calculated over the whole sample. This scaling procedure enables us to compare the results between surprises.

Surprises are used as explanatory factors for the daily variation of rates for a given maturity. Let $R_{t,\tau}$ be the daily closing interest rate of maturity τ on date t. Then, the linear model used in the literature to estimate the effects of economic news on the yield curve can be stated as follows:

$$R_{t,\tau} - R_{t-1,\tau} = a + \sum_{j=1}^{J} \beta_{j,\tau} 1_{j,t} S_{j,t} + \varepsilon_{t,\tau} \tag{1}$$

where $1_{j,t}$ is an indicator function equal to one if the surprise j is realized on date t, and zero if not[7].

We improve this standard model in a number of different ways. First, we propose to add to this model the factors $f_{i,t}$, $i = 1, 2$, obtained from the principal component analysis (PCA) performed on the rates. This is suggested by the existing and growing literature following the paper by Litterman and Scheinkman (1991), which identifies three common factors to explain bond returns. Their finding, which was confirmed by the subsequent literature in fixed income markets is that three factors explain up to 98% of the variations in the interest rates. These factors are commonly interpreted as the level, the slope and the curvature factors. Let ΔR be the matrix of the daily variations in interest rates for each of the US maturities available, i.e.

$$\Delta R = [R_{t,\tau} - R_{t-1,\tau}] \ \forall t, \tau$$

Let C be the covariance matrix associated with the series in ΔR. Given that C meets the conditions for the Spectral Theorem, it can be decomposed as

$$C = D \Lambda D,$$

where $\Lambda = diag\,(\lambda_1, ..., \lambda_p)$ is the ordered eigenvalue matrix, p is the rank of the matrix C, and D is the matrix containing the associated eigenvectors. Recall that the PCA factors are $f_i = \Delta R D_i$, where D_i is the i^{th} column of the matrix D. The vector of factors is $f_i = (f_{i,1}, f_{i,2}, ..., f_{i,n})'$ for a sample of size n, where $f_{i,t}$ is the value at time t for the i^{th} factor. The model presented in equation

[7] See Balduzzi et al. (2001) for the releasing time of each economic figure and for the list of contemporaneous announcements.

(1) can be augmented in the following way:

$$R_{t,\tau} - R_{t-1,\tau} = a + \sum_{j=1}^{J} \beta_{j,\tau} 1_{j,t} S_{j,t} + \sum_{i=1}^{2} \delta_i f_{i,t} + \varepsilon_{t,\tau} \tag{2}$$

These two factors take into account the level and the slope of the yield curve[8]. Although including them in the regressions decreases the possibility to find any significant effect of the economic surprises, it allows us to identify new significant effects.

Second, because interest rates time series usually display a form of autoregressive variance, we account for heteroskedasticity by allowing $\varepsilon_{t,\tau}$ to follow a GARCH (1,1) process. Our model can be consistently estimated by Generalized Least Squares, thus taking into account non-spherical innovations. By the Zellner theorem, this is equivalent to estimating these equations either simultaneously or maturity by maturity. We opt for the second approach because it is numerically easier to implement. Moreover, to account for a time varying volatility, whenever allowed by data availability, we fit (2) with a model of autoregressive conditional heteroskedasticity (ARCH) by using a maximum likelihood estimator. In many of the regressions discussed below we also estimate a set of Seemingly Unrelated Regressions, to take into account the fact that the errors in the regression for the interest rate of maturity τ are correlated with the errors of the regression for the rate of maturity τ'.

In the specifications above, we have assumed that the response to economic news is invariant over our sample. To identify some pattern in the effects of economic announcements on interest rates over time, we follow Almeida, Goodhart and Payne (1998), employing a different dummy variable for each year in our sample, that is, from 1996 to 2009. These dummies are interacted with the surprise series, giving for each announcement a different regressor for each year in the sample. Hence, our analysis of time varying effects of economic announcements starts in its simplest form from the the following equation:

$$R_{t,\tau} - R_{t-1,\tau} = a + \sum_{t=1}^{13} 1_t \left(\sum_{j=1}^{J} \beta_{j,\tau} 1_{j,t} S_{j,t} \right) + \sum_{i=1}^{2} \delta_i f_{i,t} + \varepsilon_{t,\tau}, \tag{3}$$

where 1_t are the yearly indicator variables. Because only the dummies from 2007 through 2009 turn out to be significant, we improve the efficiency of our estimator by including a single dummy which accounts for the post-crisis period. In some specifications, we augment the model in equation (3) allowing for Fed's chairman fixed effects. Although our sample is restricted by data availability to the 1996-2009 period, we add an indicator function to account for the different FED chairmen in this period. This takes into account the fact that the two different chairmen may have had different

[8] The results are not sensitive to the inclusion of the curvature factor in the regressions.

policy reaction functions that could interfere with the interpretation of the result of the coefficients over time. Moreover, we also include a daily dummy to take into account the possibility of a Friday fixed-effect. Neither of the two is significant, and then we omit them from the tables.

We estimate the model (2) employing different maturities. However, in trying to investigate the effects of selected economic surprises on the whole yield curve, we use as dependent variables the first and the second factors[9]. In this way, we are able to identify whether a particular bit of economic news is more likely to change the level of the interest rates or to change the slope of the yield curve. To analyze the time-varying impacts, we make use of both a rolling regression and of a difference-in-difference estimator across periods.

Finally, to analyze the evidence in support of the political pressure hypothesis against the fragility hypothesis, we employ a difference-in-difference approach, using Europe as the control group. This procedure will be discussed in detail in Section 4.2.

3.3 Data

The U.S. rate dataset contains daily treasury and swap rates with maturities ranging from 1 to 30 years, which are used to compute the PCA factors. The Euro dataset contains only swap rates. Our sample covers the period September 30, 1993 – January 10, 2010, including each business day, and is provided by Credit Suisse[10]. Table 1 presents descriptive statistics on the daily changes in interest rates, for selected maturities.

[Insert Table 1, about here]

During a given trading day, the moments at which the intraday database is updated are rather random, and this randomness extents to the values of the maturities that are being updated. On the contrary, for the closing interest rates, the time of the update is rather homogeneous. This is why we propose to use a daily dataset consisting of these closing interest rates. Notice that this choice reduces the possibility of finding any significant result; in fact, market participants react immediately to the release of economic news, and although the response may be quite large, it may disappear before the end of the day.

The economic calendar across the dates in question for the interest rates has been extracted from Bloomberg. This calendar contains all the economic announcements linked to the U.S. and Euro area economy that are supposed to be monitored by financial market participants. Several of these figures are well known to economists, such as the Non-Farm Payroll figure, i.e., the number of jobs created in a one month period, as issued by the Bureau of Labor statistics. Other figures are used by practitioners as indicators of the yield curve movements, such as Consumer Confidence

[9] We are indebted to Steve Ross for having suggested this procedure.
[10] The main sources were Datastream, Bloomberg and Locus.

or Philifed Index announcements, among other indicators.

Table 2 lists the announcements whose impact on the interest rate is investigated for both the U.S. and Europe. In our methodology, we use the first estimates of the macroeconomic news. Most of the macroeconomic figures released in the US are initially preliminary estimates.

[Insert Table 2, about here]

On the next announcement for the same figure, a revised estimate of the preceding figure is released. Most of the macroeconomics datasets used in empirical papers make use of the revised figures; however, the market participants face and primarily react to the first announcement. Therefore, for our purposes, the use of the first announcement is of tremendous importance. Recently, Bernanke and Boivin (2001) and Kishor and Koenig (2005), among others, took this data revision problem into consideration. The Bloomberg calendar also contains the Bloomberg forecasts regarding each of these figures.

[Insert Table 3, about here]

Bloomberg forecasts are formed using the 50% empirical quantile of the distribution of a survey of the forecasts of several economists regarding a precise figure. The use of the median as a measure of the expectations makes the forecast robust to the attempts of self-serving economists who might try to manipulate the forecast for their own profit. Table 3 presents descriptive statistics on the surprises for both U.S. and the Europe. We retain the last median computed by the Bloomberg services. Bloomberg also provides the economic releases for Europe with the related economists' forecasts.

4 Preliminary Results

This section presents some new results on the impact of economic news on the term structure of interest rates. Although these are of interest in and of themselves, suggesting the greater importance of some values compared to others and highlighting their time variation effects, they are also functional to our analysis.

Table 4 presents the estimation results for the six available interest rates: one-year, two-year, three-year, five-year, ten-year and thirty-year maturities. The table shows the slope coefficients, standard errors and R^2 estimates. Intercept terms are not reported because they are rarely significant.

[Insert Table 4, about here]

For each maturity we estimate the model presented in 2 using Prais-Winsten regression and bootstrapped standard errors. The first column for each maturity presents the results including only the first factor, that is, controlling for the level of the interest rates. The second column also includes the second factor as a regressor, in order to control for the steepness of the yield curve.

In summary, we find that interest rates react significantly to only a few economic figures. Announcement about Mortgage Applications affect the whole yield curve economically and statistically significantly, with the exception of the three-year interest rate. The effect on the short end of the yield curve is positive while the effect on the long end is significantly negative suggesting a flattening of the yield curve as a response to an unanticipated release in mortgage applications. Another announcement that has a significant impact on the whole yield curve is ISM Non Manuf. Personal Consumption and Non-farm Payroll affect only the five-year notes, while CPI influences the two-year interest rate. One announcement, Retail Sales, only has an impact on the three-year notes.

The other economic announcements, even those that we would have expected to be relevant, do not seem to have any effects on the interest rates. Therefore, apart from Mortgage Applications, we cannot provide evidence to support the first hypothesis H1 on the importance of housing and labor markets.

However, our regression has estimated the average effect of these surprises over quite a long sample period, possibly reducing the probability of finding a statistically significant effect. In order to overcome this problem, we investigate whether there is a differential effect of some key economic releases on the interest rates. As a first step we estimate a rolling regression over the sample period for the Mortgage Applications, Unemployment Rate and Durable Goods surprises.

[Insert Figure 1, about here]

Figure 1 shows the slope coefficients of model (2) on the two-year and the thirty-year interest rates. It clearly shows that while the effect of Mortgage Applications on the two-year notes was not significantly different from zero before November 2007, it became statistically and economically significant at the beginning of 2008 with a coefficient close to 0.6. The same pattern is found for the effect on the thirty-year bonds, with the only difference being that starting in December 2007, surprises about Mortgage Applications negatively affected the long end of the yield curve. This suggests that after the beginning of the crisis, with the first negative surprises about the housing market conditions, the market participants correctly anticipated a decrease in interest rates at longer maturity.

[Insert Figure 2, about here]

Figure 2 shows the time varying slope coefficient of the Unemployment Rate suprises on the two-year interest rate. While it is not significantly different from zero until the end of 2007, it becomes

significant later on, with a negative sign. This suggests that an increase in the unemployment rate has triggered a reduction in interest rates during the crisis. Finally, Figure 3 shows that the same pattern can be found analyzing the slope coefficient of the Durable Goods Orders, which becomes significantly negative in 2007.

To explore this issue further, we regress interest rate changes on announcement surprises, including an interaction dummy for each year in our sample. Because we have found that after 2007, those interaction terms become significantly positive, also taking into account the constraint due to data availability, we have decided to consider only the effect before and during the crisis. We have analyzed the Libor and the Volatility index to identify the exact starting point of the crisis. Both measures indicate in the beginning of August 2007 as the period in which the market realized that the U.S. economy first and then the world as a whole were going towards a deep recession[11].

4.1 Housing Market News

Table 5 displays the estimation results for the four securities: two-year notes, five-year notes, ten-year notes and thirty-year bonds. For each instrument, the first column presents the results of an ARCH estimation of the Mortgage Application surprises controlling for the level of the interest rates. The second column includes a dummy variable equal to 1 after the August 1, 2007, and an interaction term between the dummy and the market surprises regarding Mortgage Applications. Note that Mortgage Application announcements are not release contemporaneously with others economic figures.

[Insert Table 5, about here]

While in the first specification the effect is significant only on the two-year note, including the effect of the crisis makes the coefficient on the surprises significant at the 1 percent level for all the maturities. The coefficients are positive, suggesting that a surprise in the number of mortgage applications positively impact the change in interest rates. They are also of the same magnitude across maturities. The coefficient on the surprise, except for the two year note, becomes positive only after the inclusion of the crisis. This signals that the response of the interest rates to these announcements has changed during the crisis, as suggested by the significance of the time dummy. The interaction term, however, is not significant, suggesting that after controlling for the crisis, the Mortgage Application has a significant effect but not a *differential* effect during the crisis. This may also be due to the availability of the data for this indicator, which is restricted to 2006-2009.

Furthermore, we further investigate the importance of the housing market considering the impact of the Case-Shiller index[12] on the interest rates.

[11] We have estimated our regressions with different starting points for our crisis dummy, ranging from the March 2007, the bailout of Bear Sterns, to the end of 2007, obtaining the same results.

[12] The S&P Case-Shiller Home Prices Index measures the residential housing market, tracking changes in the value of the residential real estate market in 20 metropolitan regions across the United States. Due to the lack of

[Insert Table 5B, about here]

Table 5B shows that the announcement of this home price index significantly affect the high end of the yield curve and its effect is increased during the crisis. Moreover, as suggested by the opposite signs on the coefficients for the ten and the thirty year bonds, we find that the announcement of this index makes the yield curve steeper.

4.2 Labor Market News

Table 6 presents the results of estimating the effect of Unemployment Rate surprises on the same four indicators. We have included in the regression the contemporaneous Jobless Claims and Non Farm Payroll announcements. Table 6 shows the coefficients only for the Unemployment Rate, because it is the indicator that has a differential effect during the crisis. In fact, in this case while the impact of surprises about the unemployment rate is not significant over the whole period, the interaction term between the crisis and the surprises is economically and statistically significant across all maturities except for the five-year notes.

[Insert Table 6, about here]

The coefficients are positive across maturities and significant at the 5 percent level. Thus, a surprise about the unemployment rate induces –during the crisis– a positive variation in the interest rates. Of greater relevance to the current paper, is the support that these results provide to H2, that is, that during the crisis unexpected information on labor markets has become more relevant in predicting changes in the interest rates.

4.3 Consumption News

Table 7 shows the estimation results for the same four securities but considering the effects of Durable Goods Orders and Retail Sales on them. Panel A shows that while the effect of unanticipated information about Durable Goods Orders on the whole sample is averaged out and becomes insignificant, the effect of these surprises during the crisis is stronger and significant across all the four securities.

[Insert Table 7, about here]

The coefficient is significant at the 1 percent confidence level, on the higher end of the yield curve. While the effect is always positive, its magnitude increases with maturity. This is consistent with the interpretations of market participants of these figures in terms of inflation expectations.

forecasts for this index we consider just the announcement effect on the interest rates. We have considered only the observations for which it is the only economic announcement.

Panel B shows the results for the Retail Sales, showing that there exists a significant effect if and only if we control for the crisis, but the interaction term is significant only on the five-year note. This suggests that the response of the yield curve changed over time, becoming more responsive to these news.

4.4 News from the Fed

We now turn to the announcements directly made by the Fed. First, Table 8 shows the results of model (2) considering the effect of an auction announcement on the changes in the interest rates. The Auction Effect is defined as the change in the ratio between the total amount accepted and the total amount tendered for each auction announcement. These are the sum of all bids accepted and of all bids offered, respectively. This means that the value of our auction effect ranges from zero to one, with a value close to one representing an auction in which the supply is extremely high or the demand is extremely low. We consider the variation in this ratio as dependent variable to take into account the possibility that the Fed may have injected too much liquidity into the market and then may be forced to offer a higher interest rate to induce the market to absorb it. This may be due to two main reasons. First, record debt sales, as the government responds to the recession and surging budget deficits, has "created significant indigestion and uncertainty for Treasury investors" and rising investor uncertainty "ultimately would mean greater cost" to the government[13]. Second, for the first time since 1960, when it created the network of securities firms obligated to buy and sell Treasury bonds, the U.S. government has the fewest bond traders making markets in its debt. In fact, the number of primary government securities dealers declined to 19 in August 2008. This means that the competition among these bidders declined during the crisis, that is, when American taxpayers were financing a record federal deficit.

Panel A finds supportive evidence that auction announcements are important in understanding the variations in the interest rates during the crisis.

[Insert Table 8, about here]

The coefficients are significant at the 5 percent confidence level for the two-year, five-year and thirty-year securities. They are positive at the short end of the yield curve and negative at the long end. This suggests, as stated in hypothesis H4, that not only auction announcements have gained much attention from the market during the crisis, but that injecting a record amount of treasuries in the market has increased the cost (higher yields) of the federal deficit for the U.S. government. The negative effect on the thirty year bond is due to the Fed repurchasing long maturity bonds, for almost a $300 billion amount, to keep mortgage rates low. The announcements of these purchases are usually contemporaneous to the auction announcements.

[13] See "Auction Tails Suggest Record Treasury Sales May Boost Yields", February 4, 2009 *Bloomberg News*.

Having highlighted the role played by the record U.S. government debt, we further investigate this issue analyzing surprises about the Federal Deficit. Panel B presents the effect of this figure usually disregarded by market participants. The slope coefficients are significant during the crisis at the short and long ends of the yield curve, with opposite signs, suggesting that surprises about the Federal Deficit during the crisis have influenced the market's expectations about inflation, making the curve steeper.

The evidence reported in Tables 4 - 8 suggests two main considerations[14]. First, if we restrict attention to the average effect of economic news on the yield curve, very few information releases turn out to be significant, while if we try to disentangle the effect that these figures had before and during the crisis, we find that new economic announcements have gained importance. Second, the impact of this information is time varying, that is, their explanatory power is not the same over time. The importance of the housing and labor markets, for example, has sharply increased during the crisis. This constitutes supportive evidence for H1, H2 and H3.

5 Main Results

We now turn to the main question, motivated by the previous findings, that is, is the FED under political pressure during the crisis, or to put it differently, does the yield curve different response to economics announcements during the crisis signals the presence of political constraints on the Federal Reserve?

To investigate this issue we start analyzing the differential impact of economic news on the level and on the slope of the yield curve. Table 9 presents the estimation results. Panel A shows the impact of news that are relevant for the level of interest rates. These announcements are Jobless Claims, Average Hourly Earnings, Weekly Hours, Personal Consumption, Personal Income, Number of Permits and Mortgage Applications[15].

[Insert Table 9, about here]

The ARCH model is augmented to include, as discussed above, an interaction term between the single announcements and the crisis. It provides strong evidence that the yield curve is significantly affected by these economic news announcements and that these effects are significant only during the crisis[16]. Both the news about the labor markets and those about the housing market are

[14] We have estimated the same regressions using a SUR estimation procedure, without obtaining any different result.

[15] We estimate the coefficients for the contemporaneous variables in the same regression, obtaining the same results. Regressing each announcement separately gives us a clear representation of the differential effect of these announcements before and after the crisis. Including the contemporaneous variables in the same regression, although does not affect the significance of the estimated coefficients, increases the standard errors and does not allow us, due to the number of observation, to include an interaction term for each variable.

[16] We have performed the same analysis on different subsamples, for the surprises for which we have the data,

statistically and economically significant during the crisis. This, together with the evidence reported in the previous section, suggests that to explain the level of interest rates after the economic meltdown it is important to look at these information releases. Pro-cyclical variables such as Personal Consumption, Personal Income and Mortgage Applications have indeed a negative effect on the level of the yield curve.

We then turn to the impact of economic news on the slope of the yield curve. Panel B reports the effects of the relevant economic announcements in explaining variations in the slope of the yield curve. These surprises are Jobless Claims, Non-Farm Payroll, GDP, Personal Income, Durable Goods Orders, Mortgage Applications, New Housing Starts, Existing Home Sales and Federal Deficit. Note that the labor market information and the income related announcements have a significant impact only during the crisis, while the information about the housing market is significant directly through the figure announcements, without considering the interaction term. This is also due to the fact that the news about the housing market start changing sign during the crisis. The Existing Home Sales, for example, has been above the economists' forecasts throughout 2004-2007 period. It started to negatively surprise the market in June 2008, suggesting that only at that time that announcement started having a significant effect on the yield curve. We now turn to this asymmetry in market reactions.

Up to this point we have simply considered the set of all surprises, without differentiating between good and bad news. We turn to this issue now, estimating the effect of selected figures on the level and slope of the yield curve while differentiating between positive and negative surprises and whether or not those correspond to encouraging news about the economy. The announcements considered are those considered in the previous regressions, but only the significant ones are presented in Table 10.

[Insert Table 10, about here]

Panel A, which considers the effects on the level of the yield curve, provides strong evidence to support H3, that is, that there is a significant asymmetry in the way interest rates respond to good and bad news. Consider, for example, the effect of Jobless Claims. Before the crisis, this variable is significant only if it represents good news, whereas, during the crisis it is significant only if it represents worsening labor market conditions. The same pattern is identified for all the labor releases, such as the Average Hourly Wages and Weekly Hours. The number of Housing Starts influences the yield curve only if it is a positive surprise during the crisis, suggesting that it is more informative during the crisis to have good news about the housing market than bad news, which are probably already incorporated in the market's expectations. The Number of Permits, in contrast, has a significant effect only before the crisis when it indicated bad news, suggesting that this index

obtaining the same results. This shows that the results are not due to the higher variability of the regressors during the crisis.

always performed better than the economists' forecasts before the crisis, and thereafter only a sharp decrease could cause a significant reaction in the interest rates. T-tests for the difference in the coefficients of each economic announcement between good and bad news reject the null hypothesis at the 1 percent confidence level for all the variables.

Panel B presents the estimated coefficients of the economic news that significantly affect the slope of the yield curve. The first thing to notice is that the dummy that accounts for the crisis is more significant here than in the level case, consistent with the evidence that during the crisis we are facing the steepest yield curve in the U.S. history. All the economic news, with the only exception of Jobless Claims, have a significantly greater impact on the yield curve when they represent bad news about the underlying economic fundamentals.

In summary, we have found evidence that supports the hypotheses about the attention gained by housing and labor markets during the crisis, the time varying effects of these announcements on the yield curve and the asymmetry between the responses of the interest rates to good versus bad news.

5.1 Difference-in-Difference Estimator

This evidence is consistent with the hypothesis that the Fed has changed its policy reaction function during the crisis; however, we are still not able to assess the relative likelihood of the fragility versus the political pressure hypotheses. To address this issue, we turn to a cross-sectional difference response of the yield curve to economic news. That is, we collect data about Euro swap rates and economic figures and forecasts related to the labor market and try to estimate the impact of these indicators. The results are presented as references in Table 11.

[Insert Table 11, about here]

It shows that the economic figures we have collected are relevant to explain the daily variations in the Euro swap rates[17]. Moreover, we can observe a similar time varying pattern as the one highlighted for the U.S.. Unemployment Rate, for example, has a significant impact only on the slope of the yield curve and the interaction term which accounts for the differential effect of unemployment surprises during the crisis is significant at 1 percent confidence level. GDP and IFO Business Climate have a significant effect on both the level and the slope of the yield curve, while surprises about Retail Sales impact only the yield curve slope.

Up to now we have very strong evidence that the crisis has changed the way market participants and then interest rates react to economic news. However, we have not explained the driven forces of these new effects. In fact, this evidence is not sufficient to disentangle the fragility hypothesis from the political pressure hypothesis. Assuming that the political pressure has indeed been exerted

[17] We use U.S. swap rates instead of treasuries to be consistent with the data available for Europe.

by the Congress during the crisis, there should be a systematic difference in market participants' beliefs, and thus, in the way interest rates respond to macro announcements, between the U.S. with and without political constraints. We have investigated the time dimension of our dataset, but because the political constraints coincide with the starting of the crisis we cannot disentangle the two hypothesis looking just at the time varying market's beliefs. We need a control group.

We have chosen Europe as the control group for three main reasons. First, Europe has experienced the same deep recession as the one that has hit the U.S. For example, in Europe the level of unemployment rate spiked to a 10-year high in May 2009 with more than 15 million people out of work. Moreover, even the European banking sector experienced similar dissiculties to the U.S., in fact, the International Monetary Fund estimated that large U.S. and European banks' expected losses will reach $1 trillion in the U.S. and $1.6 trillion in Europe by the end of 2010. Then, a different magnitude of effects during the crisis between the two currency areas cannot be to larger magnitude of shock in one of them.

Second, there is usually a high degree of correlation between central banks policy reaction functions, which means that they should react almost uniformly to information releases[18]. However, to account for differences in the policy reaction functions we add fixed effect to our main specification, in order to take that effect into account.

Third, and most importantly, given the low influence of each member and the heterogeneity of interests in the European Union, the ECB has not experienced any political pressure during the crisis to change the interest rates[19]. There exists also a significant difference in the Statute of the ECB with respect to the Fed's, which makes the former less accountable. In fact, based on the Maastricht Treaty, neither ECB nor any member of decision-making bodies are allowed to seek or to take instruction from community institution, while the Fed is ultimately countable to Congress and come under government audit and review.

[Insert Table 12, about here]

We employ a difference-in-difference approach to estimate the different response of the level and the slope of interest rates in the two monetary zones, controlling also for any fixed effects that could determine the different response of the European monetary policy from that of the U.S.. That is, we estimate the following model:

$$y = \beta_1 Crisis + \beta_2 Unemp + \beta_3 Country + \beta_4 X + \beta_5 Crisis * Unemp * Country + \varepsilon \qquad (4)$$

where we have omitted the time subscript. The dependent variable is the level and the slope of the

[18] The existing literature usually assumes that the policy reaction function is a version of the Taylor Rule. Then, the way in which the central banks respond to macroeconomic announcements is very similar.

[19] See Maier et al. (2002) for evidence supporting this hypothesis.

yield curves.

The first three terms account for the different fixed effects: a time fixed effect, an unemployment fixed effect and a country fixed effect. The first takes into account aggregate factors that may have changed in Europe and U.S. as a consequence of the crisis. Although we have argued that the crisis had the same impact on both areas, the inclusion of this term allows us to capture all the factors that we cannot explicitly consider.

The second variable captures the differences in the the two central banks' response functions and how responsive they are to news about the economic conditions. In principle, the ECB may decide to react less to certain macroeconomic announcements because it aims to implement a different monetary policy.

The third fixed effect aims to capture all the others aggregate factors, for example the different market conditions or the heterogeneity in the policy makers' expectations about the economic fundamentals. The inclusion of these fixed effects and of all the interaction terms in X is essential to take into account the aggregate factors that may lead to a different response to economic news in the two currency areas.

The focus of our analysis is on the the coefficient β_5, which is our diff-in-diff coefficient. Table 12 highlights two main findings. First, all the fixed effects are economically and statistically significant. This means that it was important to take those into account for the validity of our conclusions. Second, the estimated coefficient β_5 is significant at 5 percent level for the regression of the slope, meaning that there exists a significant difference in the way the market believes the rates will change in U.S. with respect to the Europe.

To further test this hypothesis we estimate the same regression as in (4) but considering the differential impact to GDP announcements. The third and fourth columns of Table 12 show that both the level and the slope of the yield curve react differently to economic news about the GDP.

In summary, we find strong evidence in favor of the political pressure hypothesis exploiting the cross-sectional dimension of our data. The significance of the difference-in-difference estimator between the U.S. and the Europe suggests that, according to the market, something else other than the crisis and the economic conditions explains the difference between the reaction of interest rates to economic news. Given the anecdotal evidence presented in the introduction, we believe that it is capturing the presence of political constraints on the Federal Reserve.

6 Extension: Future Funds Rate as Measure of Future Policy

We have considered the market's beliefs about what the Fed will do as the response of the yield curve to economic news. However, there exists an accurate measure of the Fed's policy decisions,

the future funds rate. Now we aim to consider this as an alternative approach to estimate the time varying market's beliefs about the Fed's policy function.

Up to this point, we have tried to measure the market's expectations about the policy changes with the response of the yield curve to economic news. However, many analysts look to the federal funds futures market for an indication of whether the market anticipates a change in Fed policy. The Chicago board of Trade began offering federal funds future contracts in October 1988. The future contract is for the simply average of the daily effective federal funds rate during the month of the contract. Their settlement price is equal to 100 minus the average of the effective feral funds rate for the month of the contract. Hence, a market price of 94.3 for a one-month contract means that the current futures rate for the next month is 5.7 percent. Because market participants make commitments that are contingent on what they believe the federal funds rate will be, they necessarily look to factors they believe will influence its course. Hence, the federal funds future rate naturally embodies the market's expectation of what the Fed will do. As suggested by Hamilton (2008) the Federal Reserve's expected future policy rate influences current interest rates immediately upon the market learning about the Federal Reserve's intentions to stimulate or curtail economic behavior.

Table 13 shows the effect of selected economic announcements on the daily changes in the future fund rate. We consider the Jobless Claims, Average Hourly Earnings, Non Farm Payroll and Unemployment Rate in the first two columns. We control for the lagged target rate. We find that all the interaction terms between the labor market surprises and the crisis are statistically significant, except for Non Farm Payroll. This is consistent with the evidence reported above, in fact, it shows that there has been a significant change in market's beliefs about the changes in monetary policy. All the coefficients are negative suggesting a decrease in the interest rates as a response to worsening labor market conditions. We then consider also the impact of Mortgage Applications, Housing Starts and Existing Home Sales. The results are highly significant both statistically and economically, which establishes that the market's beliefs about the Federal Reserve's response to housing market fundamentals has changed during the crisis. Controlling for the lagged target rate makes sure that these effects are not due to the current low interest rates.

7 Conclusion

This paper takes advantage of both a time-varying differential effect of economic news and of their different impact on the U.S. with respect to the Euro zone to provide evidence that during the crisis there has been a successful attempt by the Congress to influence the Fed's monetary policy.

We have first shown that housing and labor market figures, together with Treasury auction announcements, have gained most of the market participants' attention during the crisis. Furthermore, these figures have different impacts over time on the interest rates, confirming that during the crisis they are being more closely monitored. Then, we have shown that there is an asymmetry

in the response of the interest rates, as proxied by the first two PCA factors, to good and bad news over time. This shows that not only the response to economic news has changed, but that the whole Fed's policy response function has been modified.

To support this evidence and to disentangle the political pressure hypothesis from a Fed's genuine attempt to respond to the changed economic conditions, we employ as control group the European interest rates. We find that there exists a significant difference in the change in level and slope of the yield curve during the crisis as a response to economic news. We interpret this as evidence that the Fed has been politically constrained.

We augment the finding that the crisis has significantly changed the way the market's beliefs respond to release of unexpected information with an analysis of Future Funds rate, which shows, consistently to the previous results, that market's expectations about the Fed's future policy has been significantly affected during the crisis.

We also want to highlight an important avenue for future research[20]. We have not disentangled political pressure from the accountability of the Fed to the Congress. We called this effect political pressure, as suggested by the attempt to put the Federal Reserve's operations under the supervision of the Congress and by some of the clear although just anecdotal evidence discussed in the introduction. Yet, this effect may be interpreted as an accountability effect, that is, an attempt by the Congress to prevent the Fed from being captured by Wall Street bankers. Evidence on this issue would shed important light on this topic.

[20] We thank Daron Acemoglu for this suggestion.

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