

When Policy Surprises Spain

Volatility and Predictability of Monetary Shocks Around Policy Announcements

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Overview

1. Introduction and Motivation
2. Data and Identification Strategy
3. Volatility
4. Contemporaneous Analysis
5. Conclusion

Introduction and Motivation

The big question

- Rising concern for communication strategies of Central Banks

Adjacents'

- How do monetary news spread on the very short run?
- Do we have something to say about monetary shocks?
- Are they really unpredictable?

Introduction and Motivation

I use the database built by [Altavilla et al., 2019] to study two features of shocks to Spanish sovereign Debt Yields

- Volatility.
- (partial) predictability of such shocks during very short periods of time

- **Euro Area Monetary Policy Event-Study Database**, built by [Altavilla et al., 2019]
- **Measures percentage deviation** of a wide range of European assets at the moment in which the European Central Bank releases news (Governing Council Meetings).
- **198 observations**, (approximately) **monthly**, for **46 variables**. For instance STOXX50, exchange rates, Overnight Index Swaps and others. **I focus on Spanish bonds for 2, 5 and 10 years of maturity.**

Identification Strategy

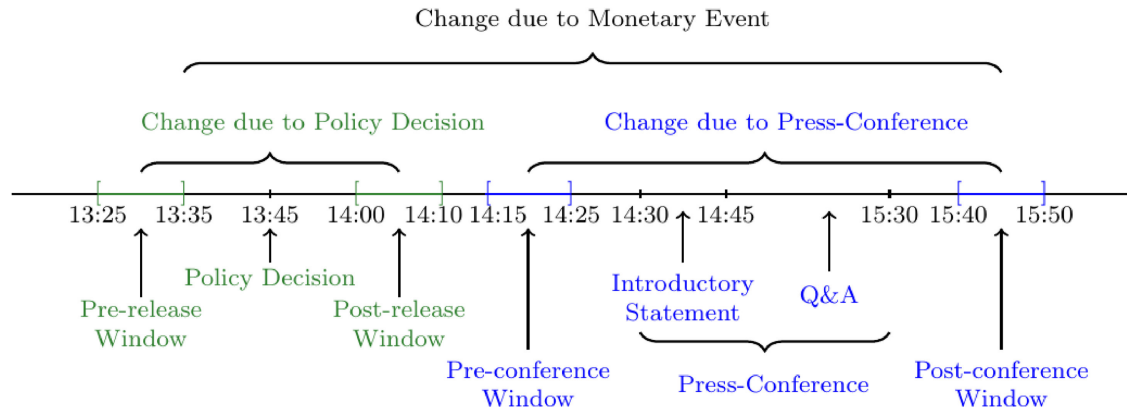


Figure: Sequence of events of the Governing Council Meetings, and data collection procedure. Original picture from [Altavilla et al., 2019].

How does the data looks like?

Our variable of interest are **shocks** (ε_t). **Serially uncorrelated**, with **constant mean**, and **covariance-stationary**. However, volatility changes a lot across sub periods.

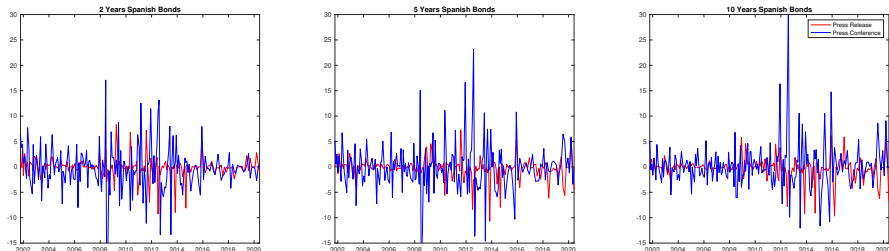


Figure: 2, 5 and 10 Years Spanish Bonds. Red Line Press Release (policy announcement), Blue Line Press Conference (Policy Explanation).

ACF and PACF

As an illustration, Figure 3 shows **ACF and PACF for 2 Years Spanish Bonds** during the **Press Conference**. Except for the lag 4, which might be an outlier, **all the lags are within the confidence bands**. **Ljung-Box** critical values are **high**, so we **cannot reject the null H_0** = no correlation.

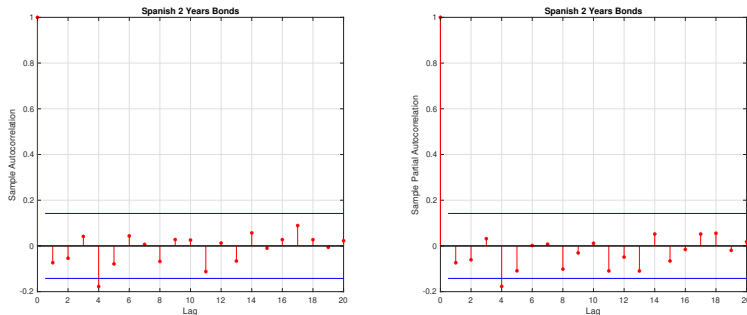


Figure: Autocorrelation and Partial Autocorrelation function for Spanish two years bonds during the Press Conference.

What about Volatility?

I find two interesting volatility clusters:

- **Between-Windows:** In Figure 2 is the difference between the Blue and the Red line. Shocks during the Press Conference (blue) are fluctuate more than during the Press Release (red). % Changes in assets are much more volatile during the Press Conference than during the press
- **Between-Periods:** In figure 2, for a given line, for instance the blue, is the differences in fluctuations across different years.

release.

Distribution of Observations

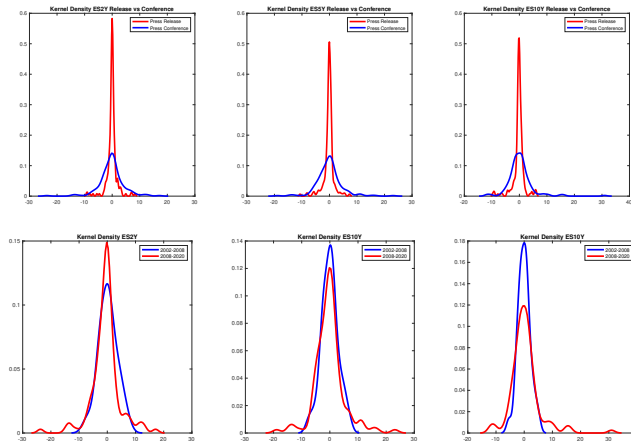


Figure: Kernel Density Spanish Bonds 2,5 and 10 years of maturity. First row, Press Conferenc vs Press Release. Second row, 2001-2008 vs 2008-2020.

G/ARCH Estimation

1. ACF & PACF of the square of the variables.
2. ARCH Test signals effects for the Press Conference and Monetary event; no Press Release.
3. Insignificant effects during the Press Release.

Square ACF/PACF

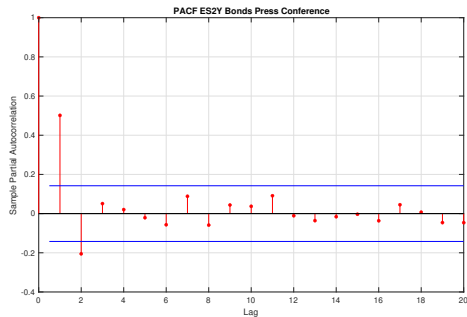
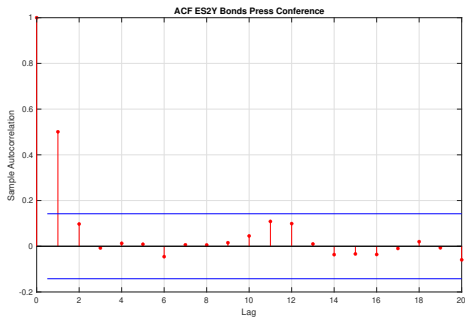


Figure: Squared ACF and PACF

Are the square of the residuals autocorrelated up to n lags?

$$\varepsilon_t^2 = a_0 + a_1\varepsilon_{t-1}^2 + \dots a_n\varepsilon_{t-n}^2$$

The answer depends on the window, **Press Release has NO ARCH effects**, **Press Conference and Monetary Event HAVE ARCH effects**

G/ARCH Estimation

G/ARCH for 2, 5 and 10 Years Spanish Bonds

$$\varepsilon_t = v_t \sqrt{h_t}$$
$$h_t = \alpha_0 + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^q \beta_i h_{t-i}$$

Where ε_t is our relevant series, and v_t is some Gaussian process with known distribution.

G/ARCH Results

ARCH effects are **always significant**. In contrast **GARCH** is **only significant for 10 Years and Monetary Event**.

	Press Conference		Monetary Event	
	ARCH(1)	GARCH(1,1)	ARCH(1)	GARCH(1,1)
ES2Y	0.52***	0.56*** 0.03	0.35***	0.35*** 0
ES5Y	0.42***	0.42*** 0.02	0.301***	0.301*** 0
ES10Y	0.41***	0.43*** 0.13	0.27***	0.11*** 0.88**

Table: Estimation output from G/ARCH.

G/ARCH Simulations

Simulation of the square of the series, vs simulation

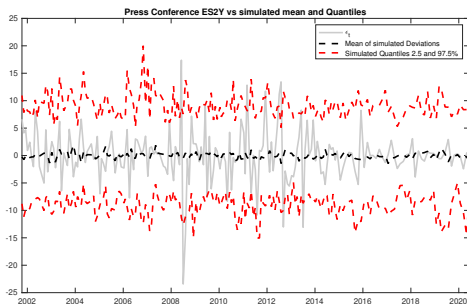
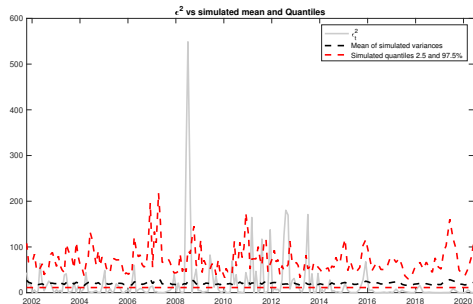


Figure: Montecarlo Simulation 2 Years Spanish Bonds, $N = 50$

Contemporaneous Analysis

- Shocks at the Press Release have predictive power over shocks at the Press Conference.
- I consider the shock at the Press Conference as a function of the Shock at the Press Release.

$$\varepsilon_t = \phi v_{\tau,t} + \eta_t$$

- This parametric form attains all the observed characteristics of the shocks at the Press Conference

$$\mathbb{E}_{\tau}[v_{\tau,t}] = 0 \qquad \mathbb{E}_t[v_{\tau,t}] = v_{\tau,t} \qquad \mathbb{E}_t[\varepsilon_t] = \phi v_{\tau,t} \qquad (1)$$

Dynamic Regression Results

	ES 2 Year Yield	ES 5 Year Yield	ES 10 Years Yield
ES 2 Years Yield	-0.45***	0.49***	0.26
ES 5 Year Yield	0.18	-1.17***	-0.78***
ES 10 Years Yield	-0.08	0.47	0.17
DE 10 Years Yield	0.043	0.46	0.66***

Table: Estimated parameters of the dynamic equation. The first row contains the dependent variable, Spanish yield movements during the Press Conference, and the first column shows the covariates, Spanish bond yields and 10 Years German bonds during the Press Release. Three asterisks means significance over 5%

Fitted vs Predicted Values

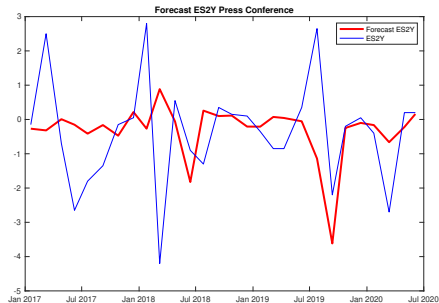
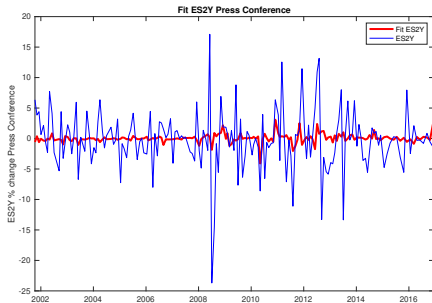



Figure: Fitted vs Predicted values using the Dynamic Regression for 2 Years Spanish Yield's shocks during the Press Conference.

Closure Remarks

- Spanish Bonds react immediately to ECB announcements.
- Reactions can be broken down into two, one for the release, and one for the explanation of the policy.
- Shocks during the Press Release are White Noise. Shocks during the Press Conference have volatility clusters that allows to estimate an ARCH model.
- Shocks during the Press Release are well predictor of shocks during the Press Conference. There is a dynamic association among them that allows to make static forecast for the deviation during the press conference.

-  Altavilla, C., Brugnolini, L., Gürkaynak, R. S., Motto, R., and Ragusa, G. (2019).
Measuring euro area monetary policy.
Journal of Monetary Economics, 108:162–179.