Global Real Interest Rate Dynamics and Monetary Policy Announcements

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Supervisor: Farzad Saidi

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Alper Yıldırım

Matriculation Number: 50075931

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By providing long-run guidance, the central bank may influence long-term interest rates.

— Isabel Schnabel, Member of the Executive Board of the ECB

1 Introduction

The declining trend of the interest rates in the past 50 years is striking. Although some authors discussed that the secular decline can be traced back for centuries. (Rogoff et al., 2022) In a recent study, Hillenbrand (2022) found that a 3-day time windows around the Federal Open Market Committee (FOMC) meetings capture the secular decline in 10-year Treasuries in the past few decades, and outside-window yield changes are transitory. In the face of this research, the natural question that arises is the following: Can the monetary policy decisions of central banks other than the Fed explain the change in long-term national bond yields, by providing a kind of "long-term forward guidance", or is this a unique case for the Fed? Furthermore, in relation to "Global Financial Cycle" research (Miranda-Agrippino and Rey, 2020, 2021), can the secular decline in other national long-term bond yields be accounted by the Fed's monetary policy decisions?

2 Related Literature

The secular decline is noted by Summers paper belki buraya. Moreover, Rogoff et al. (2022) claimed that the decline in interest rates can be traced back until 1300s, reflecting the reduced discount/risk factors globally over time.

In their study, Gilchrist et al. (2014) presented that the longer-term interest rates in advanced economies, proxied by 10-year bond yields, were declined in response to both an unanticipated conventional easing and unconventional monetary actions of the Fed. While conventional monetary easing steepens the yield curve in advanced economies through a larger decline in the short-end of the yield curve, unconventional monetary actions narrows the yield spread of nominal foreign interest rates down.

Hillenbrand (2022) states that a narrow window around Fed meetings captures the secular decline in U.S. Treasury yields since 1980. Yield movements outside this window are transitory and wash out over time. This is surprising because the forces behind

the secular decline are thought to be independent of monetary policy. However, Fed announcements might provide guidance about the long-run path of interest rates. In direct support of such"Long-run Fed Guidance".

Hanson and Stein (2015) documented that the changes in monetary policy affect the 10-year forward real rates, utilizing movements during the FOMC announcement days. They offer a "reaching for yield" mechanism such that the yield-oriented investors substitute to longer-term bonds as short-term yields decline, if the yield curve is upward-sloping. In turn, increasing demand for the longer maturity bonds leads to increasing prices and declining yields. That is, this explanation relies on a "term premium" effect. (Hanson and Stein, 2015)

Another line of research, namely on the "Global Financial Cycle", is reflected in Miranda-Agrippino and Rey (2020) and Miranda-Agrippino and Rey (2021). Miranda-Agrippino and Rey (2020) demonstrated that a single global factor explains around one-fifth of a common variation of the risky asset prices around the world. Given that the U.S. dollar is the dominant currency of global banking, one instance of this that the almost %x0 of the syndicated loans between x and x is denominated in the U.S. dollar, the monetary policy decisions by the Fed has a direct impact over the Global Financial Cycle. The potential explanations for this phenomenon is the deleveraging of the financial intermediaries around the globe, and relatedly, decline in global credit and gross capital flows, and a significant rise in aggregate risk aversion. (Miranda-Agrippino and Rey, 2020)

In their work on surrender options in life insurance and market interest rates, Kubitza et al. (2023) estimates two-stage least-squares regressing German government bond rates on the U.S. monetary policy shocks, claiming a transmission through the international bond market channel.

3 Data and Institutional Background

3.1 Eurozone

The Governing Council is the principal decision-making entity of the European Central Bank (ECB) for conducting monetary policy. The Governing Council consists of twenty-

six members—six members of the Executive Board and the Euro-area national central bank governors. While the Governing Council members meet twice a month in order to evaluate macroeconomic and financial conditions, it decides monetary policy stance in every six weeks. The Governing Council conducts monetary policy through three key interest rates: the main refinancing operations rate, the deposit facility rate and the marginal lending facility rate. I obtained the dates of monetary policy decisions from the ECB website. My sample contains in total 299 monetary policy decision dates, from March 1999 to March 2024.

I collected yield data on European bonds, which includes *nominal* interest rates of the AAA-rated government bonds, using the ECB Data Portal. The term structure data is modeled with the Svensson model, i.e., this data offers zero-coupon continuously-compounded yield curve.

3.2 United Kingdom

The Monetary Policy Committee (MPC) is the key decision-making body of the Bank of England (BoE) to conduct monetary policy. The MPC is made up of nine members – the Governor, the three Deputy Governors for Monetary Policy, Financial Stability and Markets and Banking, our Chief Economist and four external members appointed directly by the Chancellor. The main monetary policy interest rate set by the MPC is called 'Bank Rate', which refers to the interest rate BoE pay to commercial banks that hold money with the BoE. I collected yield data of UK government bonds, also known as gilts, from XXXX to XXXX from the BoE database. Similarly, the yield data contains estimation for zero-coupon continuously-compounded yields. Anderson and Sleath (2001)

3.3 Switzerland

The Governing Board is the SNB's highest management and executive body. Its three members are appointed for a six-year term by the Federal Council on the recommendation of the Bank Council. The Governing Board is responsible, in particular, for monetary policy. The Swiss National Bank implements its monetary policy by setting the SNB policy rate. In so doing, it seeks to keep the short-term Swiss franc money market rates close to the SNB policy rate. These yields are known as spot interest rates, i.e. yields on zero-coupon bonds. Spot interest rates and/or the maturity/interest rate structure are

estimated using the extended Nelson/Siegel procedure.

3.4 Japan

The basic stance for monetary policy is decided by the Policy Board at Monetary Policy Meetings (MPMs). At MPMs, the Policy Board discusses the economic and financial situation, decides the guideline for money market operations and the Bank's monetary policy stance for the immediate future, and announces decisions immediately after the meeting concerned.

3.5 Australia

The Reserve Bank Board is the key decision-making body of the Reserve Bank of Australia. The Reserve Bank Board consists of nine members, of which at least five (including the Governor as Chair or Deputy Governor as Deputy Chair) must be present to conduct a meeting. The Board meets eight times a year. The Reserve Bank Board operates monetary policy through the 'cash rate target', i.e., the interest rate on overnight loans. In sample, dates for the monetary policy decisions are ranged from August 1992 to March 2024, and in total, there are 215 meetings. Similarly, I collected yield data of Australian government bonds from July 1992 to May 2013 from the Reserve Bank of Australia's database. The data contains estimation for zero-coupon continuously-compounded yields.

3.6 Canada

Bolder et al. (2004) constructed the historical zero-coupon yield curve data.

4 Empirical Strategy

In order to test the statistical significance of this relationship, I regress the daily yield change of 10-year government bonds on the 3-day window of both national and the U.S. monetary policy decisions, and quantitative easing variables, to strip the yield effect of QEs out, such that the specification is:

$$\begin{aligned}\Delta_{t-1,t}10\text{yr} = \beta_0 + \beta_1 \,&\text{Dummy(3-day MP Window)}_t + \\ \beta_2 \,&\text{Dummy(3-day FOMC Window)}_t + \\ \beta_3 \,&\text{Dummy(QE)}_{t,s} + \beta_4 \,\text{Dummy(QE)}_{t,\text{US}} + \mathbf{Z}_t + \varepsilon_t\end{aligned}$$

where $\Delta_{t-1,t}10\text{yr}$ represents the yield change of 10-year government bond from $t-1$ to t. While MP Window$_t$ represents domestic 3-day window, FOMC Window$_t$ is the U.S. monetary policy. QE variables are by construction dummy, and the domestic and U.S. quantitative easing variables, respectively. $\mathbf{Z}_t$ denotes the set of control variables to avoid potential endogeneity problems. Since the on-the-run bond prices are determined in the market through the supply and demand, (1) US Dollar Index to measure the strength of the U.S. dollar against a basket of currencies, (2) CBOE Volatility Index to capture market sentiment and volatility as both might impact investors' preferences, (3) Index of Global Real Economic Activity to capture the state of global real economic activity (developed by Kilian (2009, 2019)), are included in the matrix of control variables, $\mathbf{Z}_t$.

5 Results

Table 1: Regression Results

	Dependent variable: 10yr Change					
	ECB	BoE	BoJ	SNB	RBA	BoC
In BoC 3dWindow						-0.000
						(0.000)
In BoE 3dWindow		-0.002				
		(0.007)				
In BoJ 3dWindow			0.000			
			(0.001)			
In ECB 3dWindow	0.001					
	(0.002)					
In Fed 3dWindow	-0.002	-0.010	-0.003**	0.001	-0.004	-0.000**
	(0.002)	(0.007)	(0.001)	(0.002)	(0.004)	(0.000)
In RBA 3dWindow					0.001	
					(0.005)	
In SNB 3dWindow				-0.000		
				(0.002)		
Intercept	-0.016**	-0.016	-0.006*	-0.005	-0.008	-0.000
	(0.007)	(0.035)	(0.003)	(0.004)	(0.010)	(0.000)
DXY	0.000**	0.000	0.000*	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IGREA	0.000*	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VIX	0.000	0.000	-0.000	-0.000**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4284	1071	3412	5371	4556	5168
R^2	0.002	0.005	0.003	0.001	0.001	0.001
Adjusted R^2	0.001	0.001	0.001	0.000	-0.000	0.000
Residual Std. Error	0.041	0.060	0.019	0.035	0.074	0.000
F Statistic	1.496	1.175	1.997*	1.471	0.732	1.001

Note: *p<0.1; **p<0.05; ***p<0.01

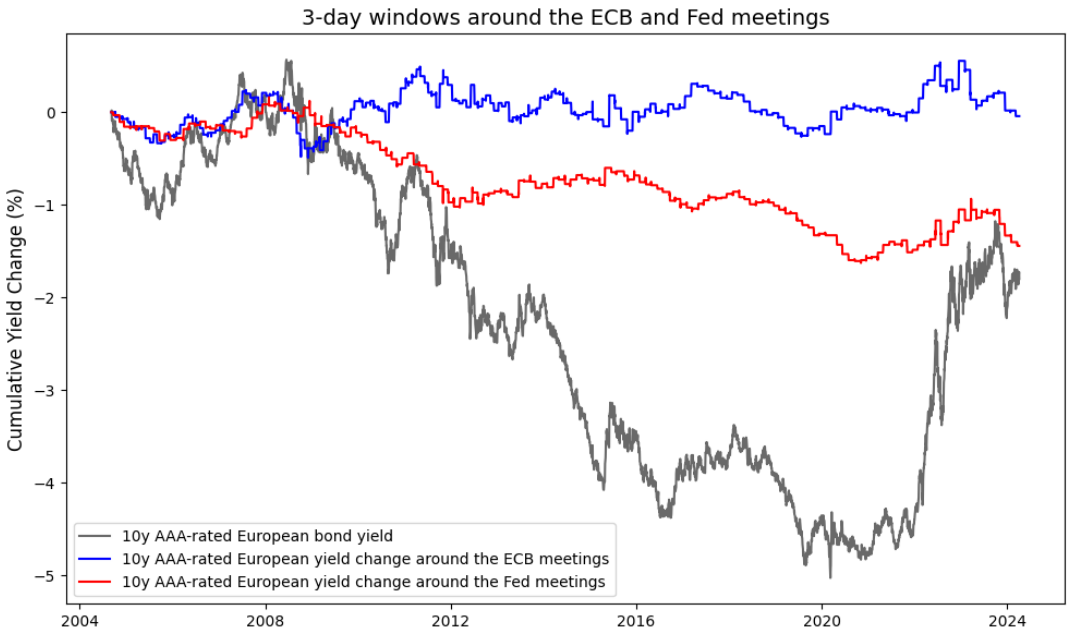

Figure 1: Caption

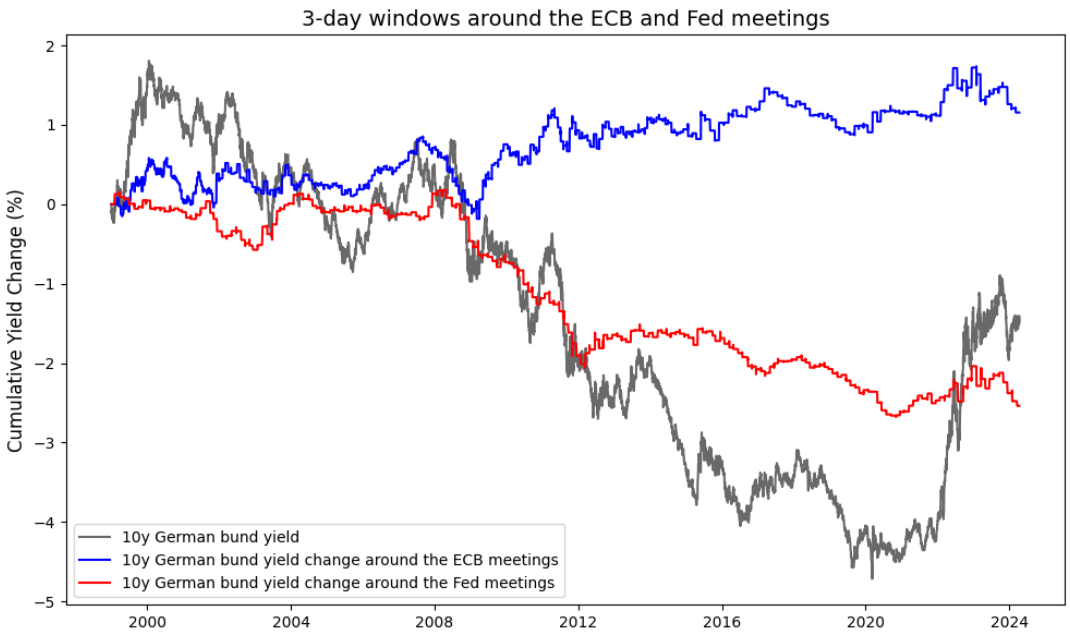

Figure 2: Caption

6 Conclusion

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Appendix

Estimation of Yield Curve with Nelson-Siegel-Svensson Model

In their seminal paper, Nelson and Siegel (1987) specifies the forward rate curve $\tau(f)$ as follows:

$$f(\tau) = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \end{pmatrix}' \begin{pmatrix} 1 \\ e^{-\tau/\lambda} \\ (\tau/\lambda)e^{-\tau/\lambda} \end{pmatrix} = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \end{pmatrix}' \begin{pmatrix} f_0 \\ f_1 \\ f_2 \end{pmatrix}$$

The spot rate function, which is the average of the forward rate curve up to time to maturity τ, is defined as:

$$r(\tau) = \frac{1}{\tau} \int_0^\tau f(u)\, du$$

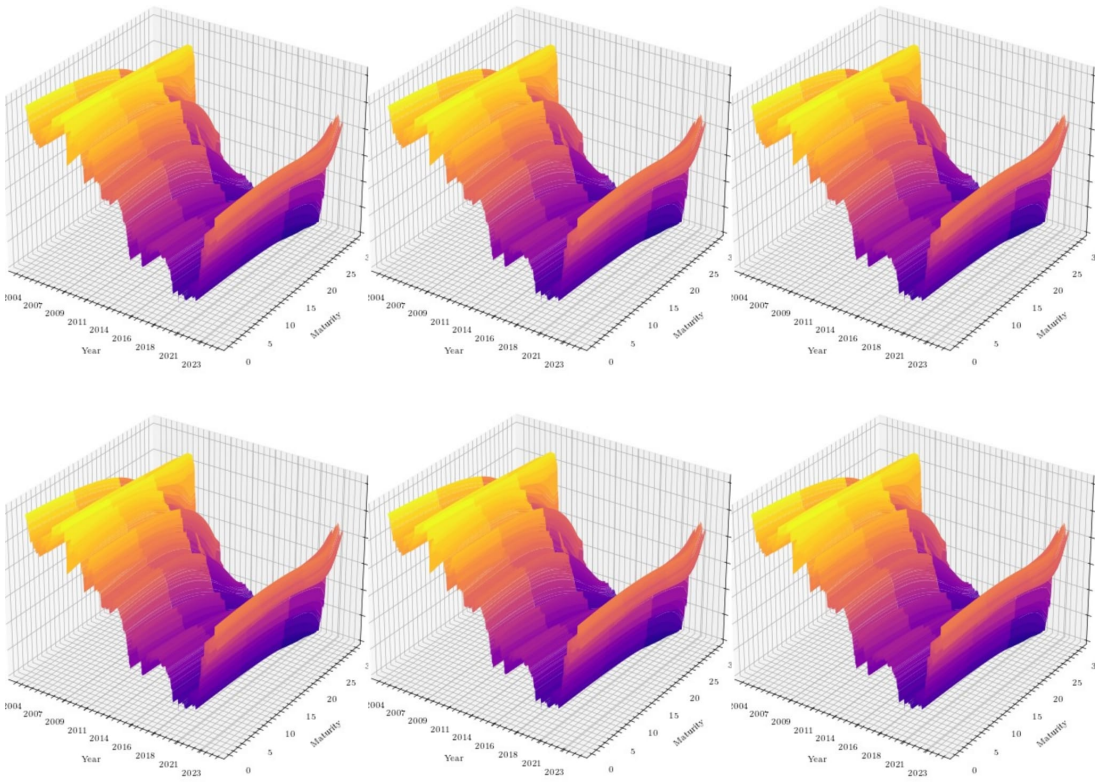
with continuous compounding. Hence, the corresponding spot rate function at time to maturity τ reads

Historical Interest Rates

Figure 3: Long-Term *Nominal* Interest Rates

Note: In this figure, long-term interest rates refer to 10-year bond yields. The data is obtained from OECD Database.

Figure 4: Yield Curves of Sampled Countries



Statement of Authorship:

I hereby confirm that the work presented has been performed and interpreted solely by myself except for where I explicitly identified the contrary. I assure that this work has not been presented in any other form for the fulfillment of any other degree or qualification. Ideas taken from other works in letter and in spirit are identified in every single case.