Narratives in Finance

Master's Thesis

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Master of Arts in Quantiative Economics and Finance

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Abstract

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Chapter 1

Introduction

Chapter 2

Monetary Policy and Interest Rates

However little understood, the relationship between monetary policy and market interest rates is undeniable. Interest rates of all maturities react to changes in monetary policy, creating opportunities and risks for traders, challenges for policy makers, and puzzling effects for academics to study (Ellingsen and Söderström 2001, p. 1594).

Target rate changes in particular have an impact on the bond market and on interest rates (Cook and Hahn 1989, p. 332). Yet, the understanding of yield curve movements is incomplete at best. On average, the relationship between monetary policy and interest rates appears to be positive: An increase in the central bank's target rate leads to an increase in the interest rates of all maturities. However, there are many instances where this simple rule has proven false and interest rates of long maturities fell in response to an increase in the central bank's rate (Ellingsen & Söderström, 2001, p. 1594).

Chapter 2.1 gives an account of the puzzle posed by the inconsistent response of long-term rates, Chapter 2.2 touches on previous research on the topic, and Chapter 2.3 outlines how an investigation of narratives might be able to shed light on this puzzle.

2.1 Excess Sensitivity Puzzle

Cook and Hahn (1989) analyzed financial data from the late 70s and found that the U.S. Federal Reserve (Fed), by setting the target for the federal funds rate, had a strong influence on interest rate movements. While short-term rates reacted particularly strongly, changes in the target

rate also caused small but significant movements in long-term rates.

It is not surprising that short-term rates follow the target rate closely, after all the Fed keeps the overnight rate close to the target and thus directly influences the one-month rate (Ellingsen, Söderström, & Masseng, 2003, p. 1). The movements of the long-term rates are more ambiguous. Cook and Hahn (1989, p. 343–346) interpret the fact that, on average, 10-year and 30-year bonds co-move with the short-term rates as evidence for the expectation theory of the term structure of interest rates. According to the expectation theory, long-term rates are equal to short-term rates over the same period of time plus a term premium. Thus, an increase in the short-term rates is expected to drive up long-term rates as well, but to a lesser extent (Ellingsen & Söderström, 2001, p. 1594).

To Romer and Romer (2000), on the other hand, the response of long-term rates presents a puzzle. They argue that standard theory predicts a drop in inflation as short-term rates rise, which ought to lead to a reduction in long-term rates. The opposite can be observed, however: Interest rates for all maturities typically rise following an increase in the target rate. Romer and Romer (2000) explain this anomaly with information-asymmetry between the Fed and the general public. They find evidence that the Fed is in possession of private information, which it reveals to other market participants through its monetary policy. In response, market participants adjust their inflation expectations upwards, causing long-term rates to rise.

Dissecting the interest rate response in more detail led Skinner and Zettelmeyer (1995) to paint an even complexer picture. While the yield curve shifts upwards on average, they found a number of occasions where an adjustment to the target rate caused the yield curve to tilt: Long and short rates responded by moving in opposite directions (as cited in Ellingsen et al. 2003, p. 1). Skinner and Zettelmeyer came to the conclusion that these were not singular occurrences, but that such tilts made up a considerable portion of the yield curve responses and could be observed in all four of the big economies they studied, that is in France, Germany, the United Kingdom, and the United States (as cited in Ellingsen and Söderström 2001, p. 1594). An example is the yield curve movement in 1994, where interest rates of long maturities fell after the Fed announced an increase in its target rate (Ellingsen & Söderström, 2001, p. 1594). So not only is the positive response of long-term rates difficult to explain, the response is not even consistent in its direction: long-term rates may move up or down when the Fed increases the

target rate.

Whether positive or negative, to Gürkaynak, Sack, and Swanson (2005, p. 425) any response of long-term rates is in contradiction to standard macroeconomic models. They argue that models predict that short-term rates return quickly to their steady state and thus have only a transitory effect on the future path of interest rates. Therefore, one would expect long-term rates not to react to monetary policy changes. They refer to the fact that long-term rates move significantly in response to monetary policy decisions as *excess sensitivity* of long-term interest rates (Gürkaynak, Sack, & Swanson, 2003, p. 2).

Gürkaynak et al. (2005, p. 426–427) focus on the response of *forward* interest rates as a different way of expressing the yield curve. They find that long-term forward rates move in the opposite direction to the monetary policy actions. As they note, this stands in sharp contrast to the findings of Cook and Hahn (1989) and Romer and Romer (2000), who observed a co-movement of long-term rates. Gürkaynak et al. put this down to their use of forward rates, which they consider a better measure for sensitivity. Additionally, they criticize previous research for the usage of raw change in the target rate, neglecting to differentiate between expected and unexpected policy moves. In their opinion, only the unexpected components of a monetary policy action can be expected to influence the term structure (Gürkaynak et al., 2005, p. 430–431).

Since Gürkaynak et al. observe a negative response of the long-term forward rates, they suggest that such a response is not an anomaly but has a very natural explanation. Standard macroeconomic models assume that long-run levels of inflations and real interest rates are relatively fixed and known by all market participants (Gürkaynak et al., 2005, p. 425). Gürkaynak et al. argue that models might be misspecified and long-run inflation expectations are not as perfectly anchored as assumed. They see the most plausible explanation for the observed term structure movements in the fact that monetary policy surprises lead market participants to adjust their expectations of the long-run level of inflation (Gürkaynak et al., 2005, p. 434–435).

Even though Gürkaynak et al. (2005) are able to account for the negative response of long-term forward rates to an increase in the target rate, Ellingsen and Söderström (2004, p. 2) maintain that their model is unable to explain the positive response of long-term yields observed by other researchers. Thus, Gürkaynak et al. (2005) fail to solve the puzzle as to why the yield

curve shifts on one occasion but tilts at another when provoked by apparently identical monetary policy actions. Ellingsen et al. address this shortcoming in their own model (2001) and provide empirical support for their hypotheses (2003).

2.2 Existing Research

E2001 is a narrative approach

> It has often been noted that the response of long-term interest rates to monetary policy innovations differs from occasion to occasion: sometimes long rates move in the same direction as the policy innovation, sometimes they move in the opposite direction. Most models of monetary policy cannot account for this puzzling behavior of long-term interest rates. In our previous work, we have shown that such a behavior is easily explained in a model where the central bank has private information about economic shocks and its own preferences or targets. Ellingsen and Söderström (2004)
>
> (2001) find that the yield curve response to monetary policy innovations depends crucially on the interpretation of bond market participants of the reasons behind the policy move.
>
> The intuition behind these results is straightforward. When supply or demand shocks cannot be directly observed, any unanticipated increase in the central bank's policy rate is interpreted as a response to an unobserved inflationary shock. As the central bank is expected to counteract this inflationary impulse by tightening policy for some time, interest rates of all maturities increase as market participants update their expectations of the future path of the short rate. If, on the other hand, shocks are observable, but central bank preferences or objectives are not, an unanticipated tightening of policy is interpreted as a shift to a more inflation averse policy. Such a shift will imply a period of tighter policy than previously expected, but a quicker return to a neutral stance. Thus, short-term rates will increase in response to the policy innovation, while longer rates fall. Ellingsen and Söderström (2004)
>
> In Ellingsen and S¨oderstr¨om (2003) we test these theoretical predictions by clas-

> sifying policy moves in the U.S. as endogenous or exogenous using reports in the *Wall Street Journal*. The results are illustrated in Figure 3. Panel (a) reiterates the results from Figure 1, showing the estimated response of the yield curve to changes in the three-month T-bill rate (our measure of policy innovations) on all days when the Federal Reserve's target for the federal funds rate was changed from October 1988 to December 2001.8 Ellingsen and Söderström (2004)

> after policy moves classified as endogenous, interest rates of all maturities tend to move in the same direction, but after moves classified as exogenous, long and short rates move in opposite directions.10 Ellingsen and Söderström (2004)

Idee: es hängt von der Interpretation ab, von der Narration die darum herum aufgebaut wird

von Krosigk (2017) tried to replicate the results using text mining techniques but was unable to do so for the years xxx.

Ellingsen, Söderström and Masseng (2003) run two regressions to test their model of market interest rates and target adjustments. First, they test their theory whether the relationship between long and short rates differs on policy days and non-policy days. For that purpose, they estimate the regression (von Krosigk, 2017, p. 30)

$\Delta i_t^n = \alpha + (\beta_n^{NP} d_t^{NP} + \beta_n^P d_t^P)\Delta i_t^{3m} + v_t^n$

H1: for large n: $\beta_n^P < \beta_n^{NP}$

Secondly, Ellingsen, Söderström and Masseng (ibid.) investigate whether the long and short rates behave differently on policy days classified as endogenous or exogenous as well as whether non-policy days have a similar impact as endogenous policy days. (von Krosigk, 2017, p. 30)

$\Delta i_t^n = \alpha + (\beta_n^{NP} d_t^{NP} + \beta_n^{Ex} d_t^{Ex} + \beta_n^{End} d_t^{End})\Delta i_t^{3m} + v_t^n$

H2: for large n: $\beta_n^{Ex} < 0 < \beta_n^{End}$

2.3 New Insights Through Narrative Research

Narratives / interpretation plays a big role in how people react to financial facts.

> In joint work with Goetzmann and Kim (2016), using data from a questionnaire sur-

> vey I have been conducting with institutional investors and high-income Americans since 1989, we found that these people generally have exaggerated assessments of the risk of a stock market crash, and that these assessments are influenced by the news stories, especially front page stories, that they read. One intriguing finding was that an event such as an earthquake could influence estimations of the likelihood of a stock market crash. (Shiller, 2017, S. 974)

also kann Textauswertung etwas dazu beitragen, es geht um das Verständnis zu Narrativen - aber jetzt die Frage der Zeitdimension: die Kurse sind innerhalb einer halben Stunden verändert - question: is the narrative really driving the change still or is this rather a case of already observing the result -¿ we can't explain y by knowing y!

So, use NLP techniques and then model like thus: aber jeder regressor erh;ht nat[rlich das R2]

$$\Delta i_t^n = \alpha + (\beta_n^{NP} d_t^{NP} + \beta_n^{N1} d_t^{N1} + \beta_n^{N2} d_t^{N2} + + \beta_n^{N3} d_t^{N3} + ...)\Delta i_t^{3m} + v_t^n$$

Cook and Hahn (1989) use Wall Street Journal articles, even though they mention the speculative wording of the journals, they try their best ot isolate the facts in the articles, completely ignoring the manner in which the facts are presented¿ giving example of wording Even when the facts are not clearly stated, they try to find the facts and approximate them, instead of analyzing what kind of information the public had at its disposal

Gürkaynak, Sack, and Swanson (2004) - here they analyze statements, should I involve that in any way?

Chapter 3

Narratives and Decision Making

3.1 What Narratives Are

3.1.1 McAdams Research on Narratives

3.1.2 Social Psychology Background

3.2 How Narratives can help

3.2.1 Bayesian Brain and Predictive Coding

Here, there could be a direct link to the algorithms that are used in Machine Learning, AI, and NLP.

3.2.2 Influence and Change on Human Beings

Akerlof and Shiller understand narratives as a convention, but it is more than that, it changes how people think and perceive the world. Akerlof and Snower (2016)

3.3 Narrative Research

Chapter 4

Natural Language Processing

4.1 Methods in Natural Language Processing

4.1.1 Sensitivity Analysis

4.1.2 Topic Modeling

Chapter 5

Data and Methodology

Chapter 6

Results

Chapter 7

Conclusion

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Appendix A

Whatever may come...

A.1 For Example...

Appendix B

Whatever may come...

B.1 For Example...

Declaration of Authorship

"I hereby declare

- that I have written this thesis without any help from others and without the use of documents and aids other than those stated above;
- that I have mentioned all the sources used and that I have cited them correctly according to established academic citation rules;
- that I have acquired any immaterial rights to materials I may have used such as images or graphs, or that I have produced such materials myself;
- that the topic or parts of it are not already the object of any work or examination of another course unless this has been explicitly agreed on with the faculty member in advance and is referred to in the thesis;
- that I will not pass on copies of this work to third parties or publish them without the University's written consent if a direct connection can be established with the University of St.Gallen or its faculty members;
- that I am aware that my work can be electronically checked for plagiarism and that I hereby grant the University of St.Gallen copyright in accordance with the Examination Regulations in so far as this is required for administrative action;
- that I am aware that the University will prosecute any infringement of this declaration of authorship and, in particular, the employment of a ghostwriter, and that any such

infringement may result in disciplinary and criminal consequences which may result in my expulsion from the University or my being stripped of my degree."

.....	.....
Location, Date	Signature

By submitting this academic term paper, I confirm through my conclusive action that I am submitting the Declaration of Authorship, that I have read and understood it, and that it is true.