

Money Demand, Money Velocity, and Twisting the Yield Curve

Three Essays in Empirical Macroeconomics

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Die Fakultät hat diese Arbeit am 24. Mai 2018 auf Antrag der drei Gutachter Prof. Dr. Luca Benati, Prof. Dr. Peter Ireland und Prof. Dr. Refet Gürkaynak als Dissertation angenommen, ohne damit zu den darin ausgesprochenen Auffassungen Stellung nehmen zu wollen.

Preface

This doctoral thesis is a collection of three separate essays. Although the three papers comprising this thesis are independent studies, they can be assigned to the same broad line of research. In each chapter I empirically examine different monetary issues relevant for the conduct of monetary policy. The broad goal of this thesis has been to assess how different monetary policy strategies affect key macroeconomic variables such as GDP, interest rates, and inflation, using state-of-the-art empirical methods. A further objective of this thesis has been to add a new perspective on monetary phenomena by specifically examining data from countries around the world and from the period before World War II rather than solely relying on the excessively studied U.S. post-World War II period.

The first part of this thesis, consisting of chapters 1 and 2, examines the long-run relationship between the amount of money available in the economy and key macroeconomic variables. Over the last three decades, economists and central bankers have lost confidence in monetary aggregates as information variables in the conduct of monetary policy. The main reason behind the move away from monetary aggregates in monetary policymaking has been the alleged disappearance, starting from the early 1980s, of any previously identified stable relationship between monetary aggregates, GDP, and interest rates. In the literature the standard explanation for the instability in long-run money demand relationships is that exogenous variations in money velocity play large, or even a dominant role. The three main sources of such exogenous variations in money velocity are financial deepening, technological advances and institutional changes. Chapters 1 and 2 of this thesis re-investigate the

issues of money demand stability and the role of shocks to money velocity.

The third chapter, on the other hand, studies the effects of unconventional monetary policy based on a monetary policy operation in the United States in the early 1960s. In recent monetary history, central banks around the world have introduced unconventional monetary policy measures, such as extending or restructuring the asset side of their balance sheet. The origin of these monetary policy tools goes back to an intervention by the U.S. Federal Reserve System under the Kennedy administration in 1961, known as Operation Twist. Chapter 3 reconsiders this early version of central bank balance sheet operations, analyzes the policy actions and studies their effects on the yield spreads.

Chapter 2 is conducted jointly with Luca Benati and chapter 3 is co-authored with Simon Beyeler from the Study Center Gerzensee. The subsequent paragraphs summarize each chapter's motivation, research question, methodology and main findings.

Chapter 1 reconsiders the issue of the stability of the long-run demand for M2 based on a dataset for over 30 countries since the mid-19th century. The motivation for this large-scale analysis is a recent paper by Benati, Lucas, Nicolini and Weber (2018) who find that, contrary to conventional wisdom, the long-run demand for M1 has been stable in many countries. For broader aggregates, a corresponding systematic investigation has never been done before. Broader aggregates such as M2 better internalize the substitution between different monetary assets that may cause instabilities in narrower definitions of money. I assess the stability of the long-run M2 demand based on five different money demand specifications using state-of-the-art cointegration techniques, where I bootstrap the cointegrated systems. The main finding of this large-scale analysis is that, contrary to M1, there is essentially no evidence of a stable long-run demand for M2. The stability of the long-run demand for M1 and the opposite results obtained for M2 naturally suggest that the instability for M2 originates from the non-M1 component of M2, i.e. $M2-M1$. Therefore, if we want to understand money demand, we need to split the stable part (M1) from the unstable part ($M2-M1$). This leads to chapter 2.

PREFACE

Chapter 2 investigates the importance of velocity shocks in driving low-frequency fluctuations in money velocity. We analyze the drivers of money velocity for the United States and Canada since World War I. The fact that the long-run demand for M1 is stable, i.e. the existence of a cointegration relationship between M1 velocity and short-term interest rates, implies that shocks to M1 velocity play no role in driving low-frequency fluctuations in M1 velocity. For M2 this is not the case. We therefore split M2 into its stable M1 and its unstable M2-M1 component. Using cointegrated vector autoregressions we show that a significant fraction of variation in the velocity of M2-M1 is not due to exogenous velocity shocks but due to permanent interest rate fluctuations that cause portfolio reallocations between non-interest-bearing M1 and interest-bearing M2-M1. Once we split M2 into its M1 and its non-M1 component, the role of velocity shocks specific to M2-M1 is negligible. However, repeating the analysis without splitting M2 into its two components results in spurious evidence for a dominant role for M2 velocity shocks. The reason for this is that permanent interest rate shocks have an opposite effect on the velocities of M1 and M2-M1, so failure to split M2 into M1 and M2-M1 causes these shocks' impacts to cancel out in the aggregate. As a result, this spuriously creates the need for another 'shock' in order to explain the long-horizon dynamics of M2 velocity. Our evidence suggests that most of the fluctuations in U.S. money velocity since World War I have not been caused by exogenous velocity shocks, and they have rather originated from permanent interest rate fluctuations which, historically, have been one of the defining features of the period following the collapse of the Classical Gold Standard in 1914.

Chapter 3 assesses the implementation and success of an early version of central bank balance sheet operations in the history of monetary policy that was implemented in the early 1960s. At that time, the U.S. economy was recovering from a recession and the newly elected Kennedy administration wanted to stimulate the economy with easier money. However, the Federal Reserve System (FED) was unwilling to lower short-term interest rates because of a growing differential between U.S. and European interest rates which had led to increased outflows of dollars and gold towards Europe under the

institutional setting of the Bretton Woods system. Therefore, stimulating the economy by lowering short-term interest rates was not an option. Instead, the Kennedy Administration persuaded the FED to cooperate with the Treasury to jointly reduce the relative supply of longer-term government bonds available to the public which, so was the idea, would narrow the spread between long- and short-term interest rates, thus twisting the yield curve. We assess the implementation of this operation using balance sheet data on the FED's and the Treasury's positions of government securities which reveal information on the respective actions undertaken by the two authorities. Further, we investigate the operation's success in compressing the long-short spreads using an autoregressive distributed lag model, in which we regress long-short spreads on lagged values of themselves and a set of explanatory variables controlling for the state of the economy. Our analysis shows that the joint policy actions undertaken by the Treasury and the FED were rather moderate and did not affect the public holdings of long-term government debt to a large extent. Although the intervention was minor, we find a weakly significant compression in the spreads between long-term and short-term interest rates for the corresponding Treasury securities during Operation Twist. Alternative securities with similar maturities were, however, not significantly affected by the intervention.

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Chapter 1

The Long-Run Demand for M2 Reconsidered¹

Abstract

This chapter reconsiders the long-run demand for M2 based on a newly constructed dataset featuring 32 countries since the first half of the 19th century. The evidence from cointegration tests suggests that a long-run equilibrium relationship for M2 demand is hardly present. Specifically, only for five countries (Finland, Korea, Mexico, Paraguay and Taiwan) cointegration tests produce strong evidence in favor of a stable long-run money demand. Evidence for Israel and Lebanon is weaker, but still points towards a stable long-run demand for M2. For all other countries evidence speaks against a stable money demand or it is mixed across money demand specifications and/or type of cointegration test.

¹Altermatt, Sophie (2018): “The Long-Run Demand for M2 Reconsidered,” Discussion Paper dp1824, University of Bern, Department of Economics

Chapter 2

What Drives Money Velocity?¹

joint with **Luca Benati**

Abstract

Since World War II, permanent interest rate shocks have driven nearly all of the fluctuations of U.S. M1 velocity, which is cointegrated with the short rate, and most of the long-horizon variation in the velocity of M2-M1. Permanent velocity shocks specific to M2-M1, on the other hand, have played a minor role. Further, counterfactual simulations show that, absent permanent interest rate shocks, M1 velocity would have been broadly flat, and fluctuations in the velocity of M2-M1 would have been more subdued than they have historically been. We show that failure to distinguish between M1 and M2-M1 causes a significant distortion of the inference, erroneously pointing towards a dominant role for M2 velocity shocks.

¹Altermatt, Sophie, and Benati, Luca (2017): “What Drives Money Velocity?,” Discussion Paper dp1707, University of Bern, Department of Economics

Chapter 3

Shall We Twist?¹

joint with **Simon Beyeler**

Abstract

In recent monetary history, central banks around the world have started to introduce unconventional monetary policy measures, such as extending or restructuring the asset side of their balance sheet. The origin of these monetary policy tools goes back to an intervention by the U.S. Federal Reserve System under the Kennedy administration in 1961 known as Operation Twist. Operation Twist serves as a perfect laboratory to study the effectiveness of such balance sheet policies, because interest rates neither were at their effective lower bound nor was the economy in a historical turmoil. We assess the actions of the FED and the Treasury under Operation Twist based on balance sheet data and evaluate their success using modern time series techniques. We find that, although being of rather moderate size, the joint policy actions were effective in compressing the long-short spreads of the Treasury bond rates.

¹Altermatt, Sophie, and Beyeler, Simon (2018): “Shall We Twist?,” Discussion Paper dp1825, University of Bern, Department of Economics