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## The Effectiveness of Monetary Policy in China: Evidence from a Qual VAR

Hongyi Chen, Hong Kong Institute for Monetary Research  
Kenneth Chow, Hong Kong Monetary Authority  
Peter Tillmann, Justus Liebig University Giessen

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# The Effectiveness of Monetary Policy in China: Evidence from a Qual VAR

**Hongyi Chen**\*

Hong Kong Institute for Monetary Research

and

**Kenneth Chow**

Hong Kong Monetary Authority

and

**Peter Tillmann**

Justus Liebig University Giessen

## Abstract

Analyzing monetary policy in China is not straightforward because the People's Bank of China (PBoC) implements policy by using more than one instrument. In this paper we use a Qual VAR, a conventional VAR system augmented with binary policy announcements, to extract a latent indicator of tightening and easing pressure, respectively, for China. The model acknowledges that policy announcements are endogenous and summarizes policy by a single indicator. The Qual VAR allows us to study the impact of monetary policy in terms of unexpected changes in these latent variables, which we identify using sign restrictions. We show that the transmission of monetary policy impulses to the rest of the economy is remarkably similar to the transmission process in advanced economies in terms of both output growth and inflation despite a very different monetary policy framework. We find that bank loans are not sensitive to policy changes, which implies that window guidance is still a

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\* Email addresses: [hchen@hkma.gov.hk](mailto:hchen@hkma.gov.hk), [kkochow@hkma.gov.hk](mailto:kkochow@hkma.gov.hk), [peter.tillmann@wirtschaft.uni-giessen.de](mailto:peter.tillmann@wirtschaft.uni-giessen.de). We thank an anonymous referee of the HKIMR working paper series for valuable comments. The paper has been written while Peter Tillmann was Research Fellow at HKIMR. He thanks the HKIMR for its generous hospitality. We thank seminar participants at HKIMR for helpful comments and suggestions.

necessary policy tool. We also find that the impact of monetary policy shocks is asymmetric in terms of asset prices, that is, the asset price reactions differ in their sensitivity to tightening shocks and easing shocks, respectively. In particular, an easing of monetary conditions boosts stock prices while a tightening shock leaves stock prices unaffected. This shows that monetary policy is not a suitable tool to stabilize asset prices, which raises implications for financial stability and macroprudential policy.

**Keywords:** China, monetary policy, Qual VAR, transmission mechanism, asset prices, financial stability

**JEL classification:** E4, E5, C3

# 1. Introduction

Understanding Chinese monetary policy is more important than ever before. Growth and financial stability in China are increasingly important in driving other countries' financial and business cycles – in Asia and beyond. At the same time, however, interpreting monetary policy in China is difficult. This is because the People's Bank of China (PBoC) uses more than one instrument to implement monetary policy. In fact, the PBoC frequently uses a multitude of instruments ranging from required reserve ratios, benchmark lending rates to benchmark deposit rates to set policy. A characterization of the monetary policy stance that does not draw on the entire instrument set of the PBoC remains incomplete. Therefore, a conventional vector autoregression, which has been the workhorse model for monetary policy analysis in the U.S. and other advanced economies (Christiano, Eichenbaum and Evans, 1999), is not suitable for the Chinese case. Using these models researchers typically identify a monetary policy shock that is driving, among other variables, the single instrument of the central bank.

The aim of this paper is to propose an alternative framework for estimation, which encompasses the multitude of instruments used by the PBoC and, at the same time, remains as close as possible to the standard VAR framework used so widely. Here we propose Dueker's (2005) Qual VAR as a highly useful framework to model Chinese monetary policy. The approach combines a VAR model with a binary variable reflecting policy steps. The assumption is that the binary policy observations, e.g. a series of tightening or easing steps, are driven by a latent variable, which is also included in the VAR system. The latent variable is filtered out of the observables using Markov Chain Monte Carlo estimation based on the two observable inputs, the binary policy dates and the VAR dynamics. In our case, the latent variable can be interpreted as reflecting the PBoC's tightening or easing pressure.

This Qual VAR has several advantages in the context of Chinese monetary policy: First, it can deal with various policy instruments at the same time. As long as, e.g., tightening events are coded as "1" and all other events exhibit a "0", the latent variable summarizes the tightening pressure implemented by multiple policy instruments. In this sense we can account for the multitude of instruments used by the PBoC. Second, the model retains the important features of VAR models. Policy is interpreted in

terms of policy shocks through imposing suitable restrictions on the VAR model. In this paper we use sign restrictions (Uhlig, 2005) to identify a policy shock. A shock is interpreted as a surprise change in the latent policy stance that also affects inflation and output. Hence we do not estimate merely the response at selected policy dates, but locate a shock in periods in which the latent policy pressure moves unexpectedly. That also implies that policy is endogenous as the business cycle feeds back on policy through the VAR dynamics. This is an important advantage over other models using binary policy indicators as exogenous treatments.

In our application the binary data reflects calendar dates at which the PBoC changed its monetary policy. We construct two alternative binary indices, one for policy tightening against the alternative of no policy action and one for policy easing against the alternative of no policy action and estimate a tightening and an easing model separately. This allows us to shed light on the asymmetry involved in the policy transmission process.

It is important to note that the binary coding of policy steps does not imply that all policy steps are equally important. Although each policy tightening and easing is assigned a “1”, irrespective of whether it is a weak or a strong policy action, the model endogenously differentiates the relevance of policy steps. Ultimately, it is a surprise change in the policy stance that serves as a monetary policy shock – and this can differ a lot across policy announcements.

Our results are twofold. First, we find that the transmission of policy impulses to the rest of the economy is remarkably similar to the transmission process in advanced economies despite a very different monetary policy framework. After a policy tightening inflation and growth fall for a considerable period of time. In addition, consumption growth falls after a tightening. Following an easing of policy, we see these effects roughly in reverse. We also find an important difference with respect to the transmission mechanism in advanced economies: bank loans do not respond to monetary policy shocks in a way consistent with the VAR evidence on policy transmission in other countries. This is because in China the growth rate of bank loans is detached from conditions on the

interbank market set by the central bank (see Chen, Chen and Gerlach, 2011). Our second finding is related to the asymmetries of policy. We show that a policy easing boosts stock prices. A tightening shock, however, also raises stock prices. The exact opposite happens for housing prices. Both tightening and easing shocks reduce the growth of house prices. Hence, monetary policy has no leverage in containing asset price bubbles. This raises important financial stability concerns.

Our paper is particularly related to two major contributions to the literature: First, He and Pauwels (2008) address the fact that no tool studied in isolation is a good description of monetary policy by modeling the policy stance as a latent variable.<sup>1</sup> They code tightening and easing actions implemented by different instruments as a series of -1/ 0/ +1 and estimate a discrete choice model for China. They show that the reactions function of the PBoC is a function of the inflation gap and the money growth gap, but not the output gap. In this paper we extend this reasoning by letting the latent variable interact with the macroeconomy in order to see the dynamic effect of monetary policy on the economy.<sup>2</sup> Second, Fernald, Spiegel and Swanson (2014) estimate a Factor-augmented VAR model (FAVAR) following Bernanke, Boivin and Elias (2005) in order to obtain impulse response functions. They collect a large set of variables from which they extract factors, such that each factor should be less affected by measurement errors or noises. A shock to required reserves or policy-determined interest rates is shown to be transmitted to the economy in a way that is similar to advanced economies. We take away from this study that a VAR system, in our case with a latent variable instead of factors, is generally suitable to analyze the dynamic effects of China's monetary policy transmission. In contrast to their study, we identify monetary policy shocks not through a triangular Choleski decomposition but through sign restrictions.

The remainder of the paper is organized as follows: Section two briefly outlines the policymaking framework of the PBoC. Section three introduces the Qual VAR, the data set and the identification scheme. Section four discusses the main results of the estimation. The results are compared to those

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<sup>1</sup> Other recent papers that aim at measuring the monetary policy stance are Shu and Ng (2010) and Sun (2015).

<sup>2</sup> Xiong (2012) extends the work of He and Pauwels (2008).

of a conventionally used shock in required reserves in section five and section six offers some further robustness analyses. Section seven concludes.

## 2. Some background on China's monetary policy

The objective of the PBoC's monetary policy is stipulated by law as maintaining the stability of the currency and thereby promoting economic growth. In terms of priority, the stability of the currency comes first. Recently, the PBoC added financial stability to its policy objectives, although this was not explicitly listed in the Central Bank Law.

In order to achieve these multiple objectives, the PBoC sets multiple variables such as M2 growth, new loans and outstanding loan growth, interbank interest rates and reserve money as its intermediate operational targets, although it has never strictly stuck to a particular combination of these variables.

The policy instruments that the PBoC uses to achieve its goals can be broadly classified into two categories: quantity based and price based instruments (Shu and Ng, 2010). For each of these categories, the instruments can be either market based or non-market based. The quantity-based instruments include required reserve ratios (RRR), differentiated, dynamic and target reserve requirements, central bank bills, the amount of repo or reverse repo. Until October 2015, the PBoC had maintained either retail deposit rate or retail lending rate controls. The price based policy instruments include benchmark lending and deposit rates, issuance rate of central bank bills, repo or reverse repo rates. After October 2015, the PBoC lifted both retail deposit and lending rate controls, although it continues to announce benchmark deposit and lending rates. Ever since, the PBoC has been trying to establish an interest rate corridor system similar to that of the ECB, with the interest rate on excess reserves at the central bank serving as a floor and the interest rate on the standing lending facility (SLF) serving as the upper limit on short term interest rates. Through the adjustment of short

























































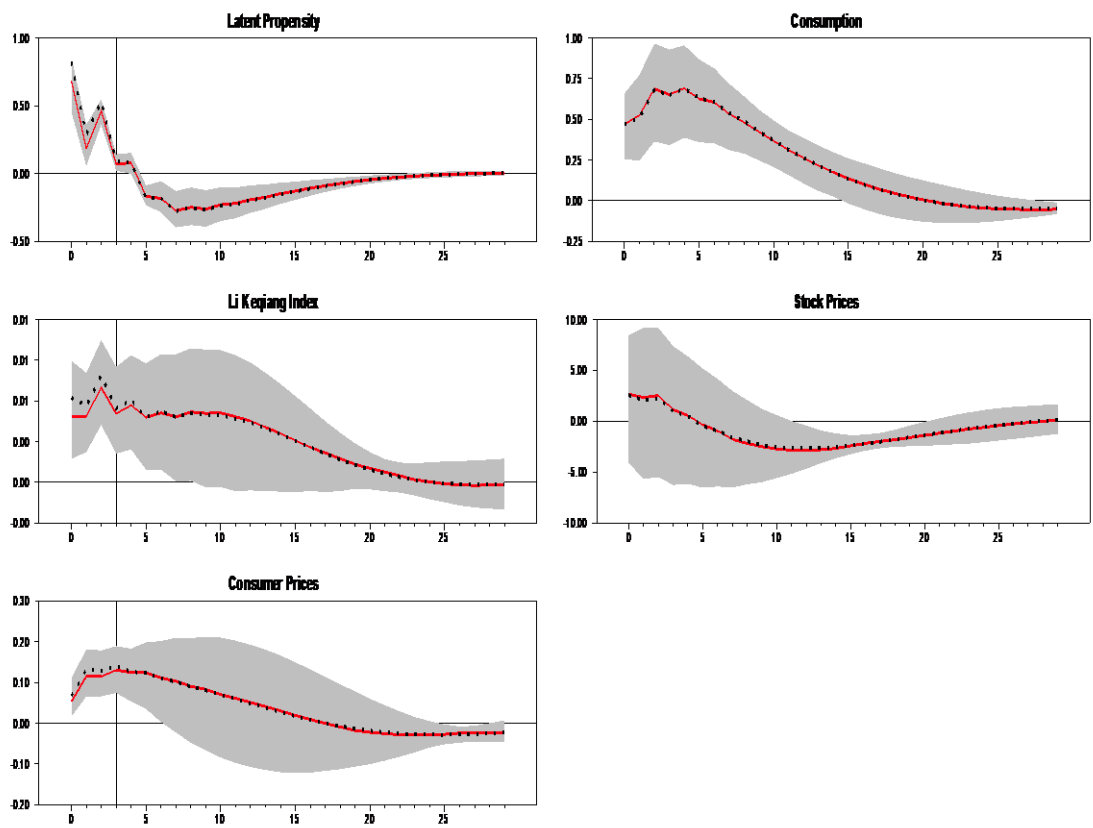












**Figure 12:** Response to easing in the model with Li Keqiang index

*Notes:* The red line is median response; the dotted line is the Fry-Pagan median-target response. Confidence bands around the median response are shaded grey. The vertical line indicates the four months for which sign restrictions are imposed.