Monetary policy in China: the role of the qualitative instruments

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Abstract

The objective of this paper is to shed some light on the role of the qualitative instruments for monetary policy conduct in China. The unobservable qualitative instruments are calculated by Kalman filtering and then are used in a Taylor rule regression, to estimate if and how they react to inflation and the output gap. The results are compared to the estimates of a classic Taylor rule, with the base interest rate as the monetary policy instrument. Results suggest that qualitative instruments react to the business cycle, but not to inflation, while base interest rate reacts both to inflation and output. As Chinese monetary policy relies more on the qualitative than on the quantitative instruments, People's Bank of China seems to promote growth primarily through stabilizing output, not inflation.

Keywords: China, monetary policy, qualitative instruments, Kalman filter, Taylor rule

JEL classification: E12, E43, E52

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I. Introduction

As the importance of the People's Republic of China for the world economy has been growing, so has economists' interest in the Chinese economy. Still, one issue has remained mainly unexplored, despite its relevance: Chinese monetary policy. This can be attributed to the specifics of the Chinese economy. Namely, there is large difference between the rate of return to capital in China, which is estimated at around 20% by Bai *et al*. (2006), and the People's Bank of China (PBC) interest rate, which is, roughly, 5%. As a consequence, the PBC interest rate is unlikely to be an effective instrument for affecting the economy. In addition, the Chinese financial system, unlike the systems in developed countries, is dominated by big state commercial banks. These two facts than imply different monetary policy transmission, and consequently, different way of conducting monetary policy than in developed countries. Specifically, China uses both conventional monetary instruments, like the interest rate and the reserve requirement, on which official data are available (called quantitative instruments) and 'unconventional' instruments, like the 'window guidance' (giving instructions to the commercial banks on their credit activity) and selective credits, on which data are not available (called qualitative instruments). It is well acknowledged in the literature that the qualitative instruments may be more important for conducting monetary policy in China than quantitative instruments (Goodfriend and Prasad, 2006). The absence of data on the qualitative instruments is then another reason for the scarcity of research on Chinese monetary policy. Some studies that analyse Chinese monetary policy include: Xie (2004), Jinwen and Hui (2006), Zhang (2009), Fan *et al*. (2010), Liu and Zhang (2010), Mehrotra and Sanchez-Fung (2010), Ma *et al.* (2011); however, they completely abstract from analysing the qualitative instruments. This paper aims to fill this gap by investigating the role of the qualitative instruments for the monetary-policy conduct in China. In the first part of the analysis, the qualitative instruments are obtained by a Kalman-filter estimation of a money-demand function for China. The second stage examines how these qualitative instruments

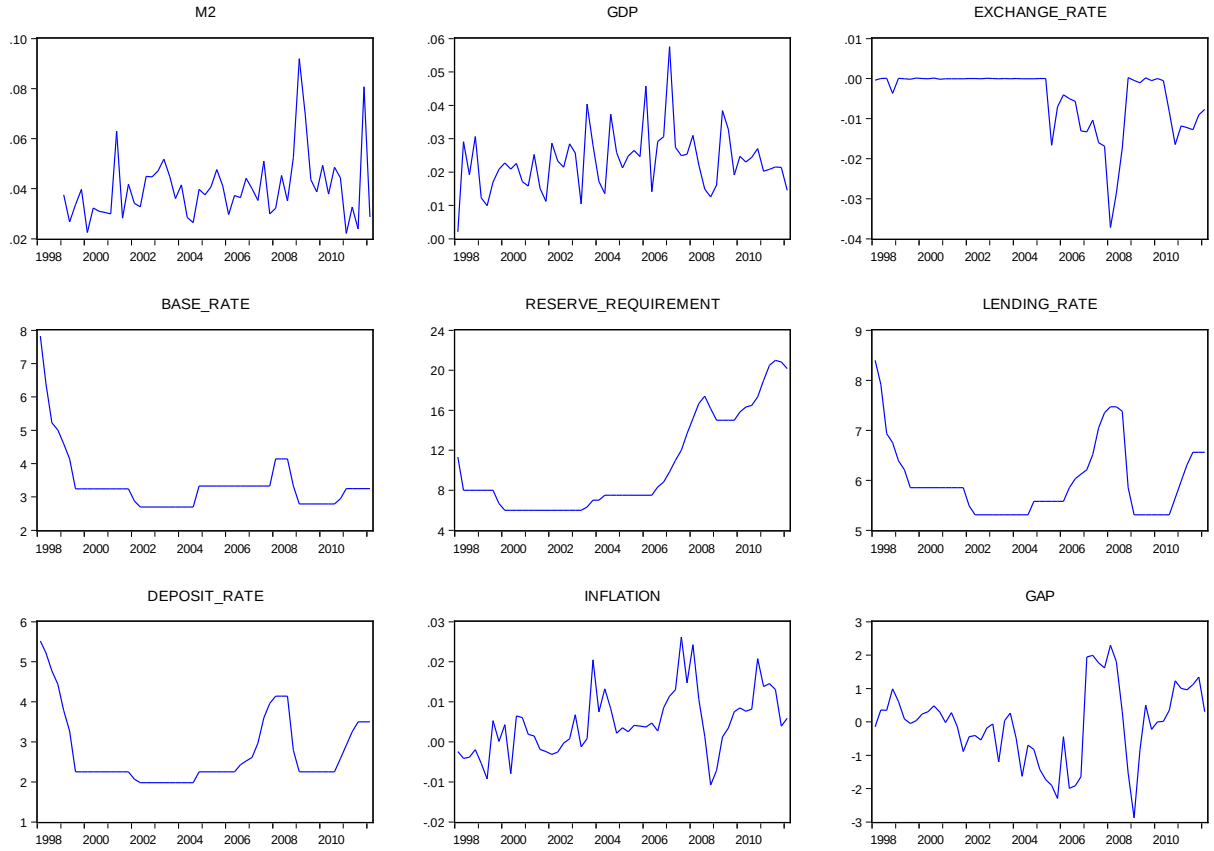
have responded to Gross Domestic Product (GDP) and inflation, and compares these findings with the findings for the main conventional instrument, the PBC base interest rate.

II. **Empirical Analysis**

Data

Quarterly data for the period 1998Q1-2012Q1 are used. Data on the reserve requirement are from Ma *et al.* (2011), data on all else are from IMF's International Financial Statistics. GDP, broad money (M2) and Consumer Price Index (CPI) are seasonally adjusted, using the Census X-12 method. Output gap is calculated by the Hodrick-Prescott filter. GDP, CPI, M2 and the exchange rate, as non-stationary variables, are first-differenced; all other variables are in levels. The exchange rate is defined so that decrease stands for appreciation of the renminbi. The variables are shown on Fig. 1.

Fig. 1: Variables



Source: IMF; Ma et al. (2011)

Calculating the qualitative instruments

The qualitative instruments are obtained through a Kalman-filter estimation of an unobserved-components model of the Chinese money demand. In the measurement equation of the model (Equation 1), M2 is expressed as a function of the quantitative instruments, GDP and the qualitative instruments. In the transition equation (Equation 2), the unobservable qualitative instruments are modelled as a first-order autoregressive (AR(1)) process:

$$M2=\beta_1 + \beta_2*base\_rate + \beta_3*reserve\_requirement + \beta_4*lending\_rate + \beta_5*deposit\_rate + \beta_6*exchange\_rate + \beta_7*GDP + qualitative + \varepsilon_1 \quad (1)$$

$$qualitative = \beta_8*qualitative(-1) + \varepsilon_2 \quad (2)$$

where ε_1 is the monetary policy shock and ε_2 is the shock to the qualitative instruments, both white-noise processes. The included quantitative instruments capture the main characteristics of the Chinese monetary-policy conduct: 1) the PBC base interest rate and the required reserve are the main instruments (Peng *et al*. 2006); 2) the lending and the deposit rates of the financial institutions can be treated as monetary policy instruments, since the Chinese financial system is dominated by the state-owned banks (Podpiera, 2006, Peng *et al*. 2006); and 3) the nominal exchange rate against the US dollar is included since the renminbi is heavily managed and any change in its parity is likely to affect the money.

Technically speaking, the transition equation identifies latent autoregressive process of order 1 (AR(1)) that affects money growth. The reification of this process into the qualitative instruments may seem arbitrary, but is justified by the following arguments: 1) AR(1) structure implies smoothness of the process, and the qualitative instruments are likely to change only gradually in accordance with the understanding that the role of monetary policy is to smooth fluctuations; and 2) all other major factors that may have AR(1) structure and affect money are already included in the measurement equation, so the major remaining factor are the qualitative instruments.

The results of the Kalman filter estimation are:[1]

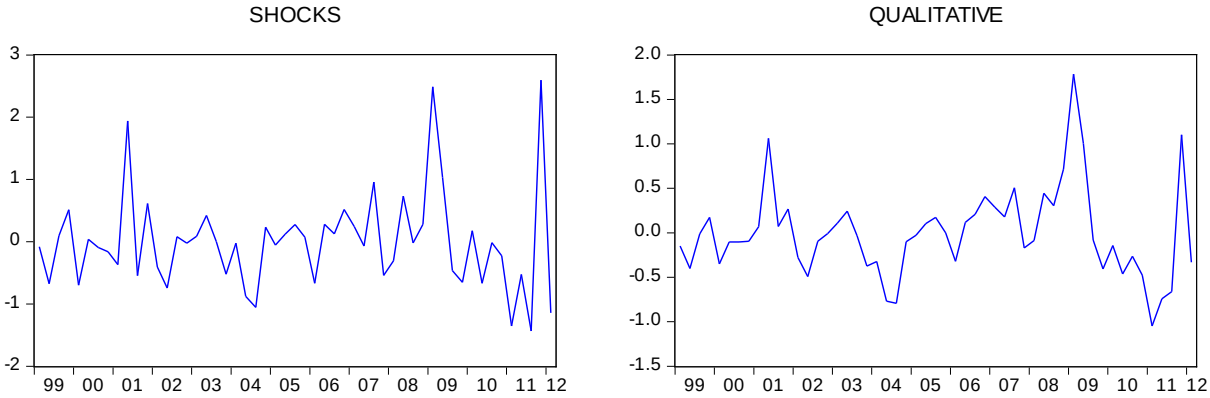
[1] The starting values for the parameters in the *measurement* equation were determined in the conventional way, on the grounds of the OLS regression, while the AR(1) coefficient in the *transition* equation was set to 0.6. More details about the estimation are available upon request.

*M2=15.5-0.9*base_rate-0.01*reserve_requirement-2.4*lending_rate+2.1*deposit_rate -0.3*exchange_rate+ 0*GDP+qualitative*

*qualitative= 0.3*qualitative(-1)*

All the coefficients are with the expected signs. The GDP and the reserve requirement have rather small magnitudes, and all the coefficients are insignificant, but this is likely due to multicollinearity, which is apparent even from Fig. 1. All the coefficients are insignificant, which is, again, probably due to multicollinearity. Fig. 2 shows the calculated monetary shock and the qualitative instruments.

Fig. 2: Monetary shocks and the qualitative instruments



Source: Authors' calculations

The qualitative instruments broadly correspond to the narrative evidence on the behaviour of the Chinese monetary policy. For example, the spike in the series at the end of 2008 and the beginning of 2009 signifies monetary expansion, which captures the stimulus package that PBC undertook to prevent spreading of the financial crisis to China. The subsequent decline in the series is the contraction that PBC made during 2009 and 2010, in order to prevent overheating of the economy. The final spike is the expansion that PBC did at the end of 2011,

when GDP growth significantly slowed down (see PBC, 2009, 2010 and 2011). Hence, it seems that the qualitative instruments have been estimated reasonably well.

Monetary policy rules

In the second stage of the analysis two different monetary-policy rules are estimated: a traditional Taylor rule, where the PBC base interest rate is regressed on inflation and the output gap, and a rule featuring qualitative instruments instead of the base interest rate. These two rules are then compared, in order to assess the role of the qualitative instruments. The monetary policy rules are as follows:

$$instrument_t = constant + \gamma_1 * instrument_{t-1} + \gamma_2 * inflation_t + \gamma_3 * gap_t + \eta_t \qquad (3)$$

whereby $instrument_t$ are either the qualitative instruments or the base interest rate, $inflation_t$ is the quarter-on-quarter inflation, gap_t is the output gap and η_t is the error term which is assumed to be well-behaved. To estimate the rules, we use GMM in order to account for the present endogeneity in such types of estimations (e.g. Clarida *et al*. 1998). Lags of the included variables are used as instruments whose validity is appropriately tested.

Results are presented in Table 1. Our main interest is the column with the qualitative instruments. These results suggest that qualitative instruments are heavily used for 'development' purposes in China: the central bank uses them to react to the output gap, but not to inflation. In comparison, the results with the base interest rate suggest that PBC reacts to both inflation and the output gap.

Table 1 – Results

	Qualitative instruments	**Base interest rate**
	(1)	(2)
γ_1	0.586***	0.741***
γ_2	-0.225	5.326***
γ_3	0.048**	0.074***
Constant	0.021	0.773***
Observations	53	53
Weak identification test	18.667	44.875
Hansen test	0.8367	0.9207

Source: Authors' estimations.

*Notes: *,** and *** denote significance at the 10, 5 and 1% level, respectively.*

Table 2 gives the coefficients of variation of the PBC's instruments, in order to highlight their approximate relative utilization over the observed period. Undoubtedly, the qualitative instruments have seen much heavier and more frequent usage as compared to the quantitative instruments, in accordance with the discussion in Goodfriend and Prasad (2006).

Table 2 – Coefficients of variation of PBC's instruments

Base interest rate	**Deposit rate**	**Lending rate**	**Reserve requirement**	**Qualitative instruments**
0.27	0.33	0.13	0.47	13.31

Source: Authors' calculations.

Hence, while inflation remains a concern of PBC when judged according to the base interest rate, or the quantitative instruments in general, the qualitative instruments, which are used much more often, point out that the monetary policy in China is concerned mainly with stabilizing the output, not with price developments.

III. Conclusion

This paper examines monetary policy in China by shedding light on the role of qualitative instruments (crediting selected sectors of the economy and 'window' guidance) for monetary policy conduct. Findings suggest that the neglect of the qualitative instruments may lead to a wrong description of the monetary policy in China: results obtained when monetary policy is measured by the base interest rate point out that authorities react to both inflation and output gap; on the other hand, qualitative instruments react only to the business cycle. As the PBC states, its objective is 'to maintain the stability of the value of the currency and thereby promote economic growth'.[2] Since the qualitative instruments are used more often in the monetary-policy conduct than the quantitative instruments, as suggested by their variability, it seems that PBC has indeed been focused on promoting growth, but rather through stabilizing output fluctuations, not so much through maintaining the value of the currency.

[2] PBC website, http://www.pbc.gov.cn/publish/english/970/index.html, accessed on September 23, 2012.

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