A Narrative Indicator of Monetary Conditions in China*

Rongrong Sun
School of Economics, Henan University

This paper studies the Chinese monetary policy measurement problem. First, we construct a narrative index series to measure the PBC's policy stance in 2000–14, based on the information abstracted from the PBC's documents. Second, this narrative index is assessed in comparison with other composite indexes developed in the literature. Third, we study the nexus between the narrative index and individual quantitative policy variables such as policy instruments, operating targets, and intermediate targets. Our findings are twofold. First, the narrative-based and instrument-based indexes differ in the criteria for indicating what a policy shift is. Changes in the former reflect the PBC's responses to its perceptions of real economic growth and inflation, while the latter records all the changes in the instruments, driven by both these two objectives and regular liquidity management as a result of sterilization needs. The second finding is that the PBC relies mainly on interest rates and the required reserve ratio in realizing its policy shifts. Yet, they cannot be good policy indicators, as a substantial amount of variation in them reflects influences from factors other than monetary policy. Neither base money nor broad money can measure the PBC's policy stance, given that there is no clear link between them and policy shifts.

JEL Code: E58.

1. Introduction

The People's Bank of China (PBC) is a "young" but fast-evolving central bank. Only in 1984 was it designated exclusively as a central

*The first draft of this paper circulated with the title "A Narrative Indicator of Monetary Policy in China." I thank Jan Klingelhöfer and one anonymous referee for helpful discussions and comments, and Yi Li for her research assistance. Any remaining errors are my own. Author contact: rongrong.sun@cfds.henuecon.education.

bank; since then, both its institutional framework and its operating procedures have experienced substantial changes. Its current monetary policy is characterized by a multiple-instrument and multiple-objective operating regime, with M2 and the new total bank lending as the intermediate targets and the excess reserve ratio and the money market interest rate as the operating targets (see, e.g., Zhang and Ji 2012; Bell and Feng 2013). To achieve various policy objectives (economic growth, price stability, and financial stability), the PBC uses a mix of quantity- and price-based policy instruments, together with administrative tools (see, e.g., Sun 2013; Klingelhöfer and Sun 2017).[1] These tools are different in nature and none of them is dominant. Some recent research has studied this measurement problem in the Chinese framework, coming to the conclusion that the changes in the PBC's frequently used policy tools may contain the information on its policy stance and thus a comprehensive measure of monetary policy stance would be helpful that monitors a set of indicators, rather than only an interest rate or a monetary aggregate (see, among others, He and Pauwels 2008; Shu and Ng 2010; Xiong 2012; Chen, Chen, and Gerlach 2013; Sun 2013, 2015).

Along this line, several composite policy indexes have been developed, mainly following two approaches. The first one is the instrument-based approach, as in He and Pauwels (2008), Xiong (2012), and Sun (2015). These studies consider the PBC's instrument set directly. Based on the observed changes in the instrument set, they build time series of a comprehensive indicator to measure policy changes.

Another approach is the narrative approach. The use of this approach in monetary economic analysis has a long tradition.[2] It relies on the reading of the central bank's documents to infer additional information on policymakers' intentions. It has been adopted in the early studies searching for a monetary indicator for the case

[1]They are the open market operations, central bank lending, the interest rate, reserve requirement, and window guidance. This practice differs from the conventional interest rate policy framework adopted in many advanced economies in normal times, where their monetary policy is well measured with this single instrument.

[2]This approach has been applied in studies on the effect of fiscal policy as well (see, e.g., Ramey and Shapiro 1998; Romer and Romer 2010; Ramey 2011; Alesina, Favero, and Giavazzi 2012).

of the Federal Reserve. Among them, Friedman and Schwartz (1963) and Romer and Romer (2004) read Federal Reserve diaries and policy records, complemented with time-series data, to identify monetary disturbances in the series of the monetary aggregate (in the former work) or the federal funds rate (in the latter work). Brunner and Meltzer (1964) and Boschen and Mills (1995), among others, read Federal Reserve documents and construct a time series of index to measure the policy stance (tight, neutral, or easy). Romer and Romer (1989) then use the additional information on the Federal Reserve governors' intentions behind each policy movement to identify the initial month of anti-inflationary shifts, measured as the Romer-Romer dates.

Shu and Ng (2010) and Sun (2013) apply the narrative approach to China's case through studying the PBC's documents. In particular, Shu and Ng (2010), following Brunner and Meltzer (1964) and Boschen and Mills (1995), build a time series to gauge the general monetary policy condition in China as tight, neutral, or easy for the period of 2001–08; Sun (2013), in the spirit of Romer and Romer (1989), identifies three exogenous contractionary monetary policy episodes.

In this paper, we study the PBC's policy measurement issue. First, we build a narrative-based five-value time series to measure its policy stance for the period of 2000–14. As long as the PBC sticks to its current multiple-objective and multiple-instrument operating procedures, the policy stance measurement remains a challenge. It is the case that as the PBC's governor, ZHOU Xiaochuan, pointed out at the 2014 Boao Forum for Asia,[3] the PBC's monetary policy is and will continue to be "unconventional" and feature these two multiples. Our indicator extends the Shu-Ng narrative index, and this extension is a part of continuous work with regular updating.[4] This narrative indicator, in contrast to only anti-inflationary policy shocks identified as starting months and episodes in Romer and Romer (1989) and Sun (2013), provides an overall measure of the policy stance over time. This measure, with continuous regular

[3]See the webpage http://www.china.org.cn/business/2014-04/12/content_32075309.htm.

[4]The index is presented in the appendix for the period of 2000–14. It is updated regularly and available at my personal google webpage: https://sites.google.com/site/rongrongsun2013.

updates, can be applied for various research purposes to improve our understanding of the Chinese monetary policy.

Second, we compare the above-mentioned two kinds of composite measures—the instruments-based indicators and the narrative-based indicators. We find that the divergences in these two kinds of measures are mainly due to differences in the policy content that they cover. The narrative-based indicators measure the policy shifts that are triggered by the PBC's concerns about economic growth and inflation, while the instruments-based indicators measure adjustments in quantitative policy instruments without identifying driving forces. We find that a large part of these instrument adjustments is due to the PBC's sterilization needs as a result of foreign exchange market interventions—for example, the issuance of central bank bills or hikes in the required reserve ratio.[5] This kind of "sterilization" operation should not be interpreted as a policy tightening.

Third, we examine the nexus between our narrative indicator and individual quantitative policy variables such as policy instruments, operating targets, and intermediate targets.[6] We model their relation in bivariate VARs and find that the PBC relies heavily on interest rates and the required reserve ratio to realize the policy stance adjustments. However, they cannot be good policy indicators, as a substantial amount of variation in them reflects influences from factors other than monetary policy. Neither base money nor broad money can measure the PBC's policy stance, given that there is no clear link between them and policy shifts.

Our paper is organized as follows. In section 2, we build our narrative index. Section 3 assesses our narrative index, compared to other composite indexes. In section 4, we study the nexus between the narrative index and individual quantitative policy variables. Section 5 concludes.

[5]Hikes in the required reserve ratio succeed in absorbing excess liquidity from the banking sector by freezing it at the balance sheet of central banks. But this practice does not end with unchanged monetary base (compared to that before foreign exchange interventions), suggesting that it is not standard sterilization as defined in the textbook (see also Sun 2015). Some studies refer to this offsetting practice as sterilization as well (e.g., Zhang and Ji 2012). We follow this convention but with quotation marks.

[6]Boschen and Mills (1995) examine such relation between various narrative indicators and quantitative policy measures for the case of the Federal Reserve.

2. A Narrative Policy Index Based on Inflation and Output Goals

We study two sources of the PBC's documents for the period of 2000–14: press releases on quarterly meetings of the Monetary Policy Committee (MPC) and the China Monetary Policy Report (a quarterly executive report of monetary policy of China).

The MPC was established in July 1997, designated as a consultative body for the policymaking of the PBC, as reflected in its responsibility "to advise on the formulation and adjustment of monetary policy and policy targets."[7] Since 1999, it holds regular quarterly meetings to discuss current policy issues. After each meeting, the PBC discloses the main contents of the discussion by issuing a short press release, available on the PBC's homepage (in both Chinese and English). Though brief, this press release covers the MPC's overviews of current economic conditions and its forecasts for the future, its assessments of current monetary policy, and in particular, its suggestion for future monetary policy, which is clearly stated and explained. Based on this information, we build a time series of index to describe the current state of monetary condition.

As a cross-check, we control our findings from the press release with a comparison to the interpretation of the China Monetary Policy Report, which is an executive summary of monetary policy and published each quarter by the PBC since 2001. This report analyzes economic and financial conditions and explains the monetary policy operations. One chapter addresses the PBC's policy intentions for the next period, and changes in the policy stance are explained.

Table 1 lists the classification criteria of the five-value monetary stance indicator, which are in line with those used by Boschen and Mills (1995). These criteria are based on how the PBC balances the weights on two policy goals. The PBC's mandate is defined in the People's Bank of China Act (amended in 2003) as "to maintain the stability of the value of the currency and thereby promote economic growth." At the same time, the PBC's monetary policy is entrusted to "guard against and eliminate systemic financial risk and maintain financial stability." To summarize, the PBC's policy objectives

[7]See the PBC's website: http://www.pbc.gov.cn/english/130727/130873/index.html?from=singlemessage.

Table 1. The Classification Criteria of Five-Value Monetary Stance Indicator

Policy Stance	Classification Criteria
2 (Very Tight)	Strong emphasis on inflation reduction "Prevent full-scale inflation"; "Tight monetary policy"; "Restrain the excessive growth of money and credit"
1 (Tight)	Mild emphasis on inflation control, liquidity management, and macroeconomic management "Sound monetary policy featuring a steady and moderate tightening"; "Strengthen liquidity management"; "Strengthen macroeconomic management"; "Curb rapid growth of money and credit"; "Moderate tightening"
0 (Neutral)	Neutral "Maintain interest rates and the exchange rate stable"; "The economic condition has a good tendency"
–1 (Easy)	Mild emphasis on real growth "Unfavorable outlook of the world economy"; "Strengthen coordination of monetary policy with fiscal policy"; "Liquidity was appropriate"; "Keep close watch on the effects of the too high increase of money supply and credits on the macroeconomy"; "Appropriate money and credit aggregate"; "Appropriately adjust money supply"
–2 (Very Easy)	Strong emphasis on real growth "Loose monetary policy"; "Weak economy"; "Critical time for economic development"; "Strengthen financial support for economic growth"; "Promote stable money and credit growth"; "Maintain adequate liquidity"; "Increase support for economic growth"; "Appropriately increase money supply"

Source: Author's summary.

are threefold: price stability, economic growth, and financial stability. The last task is mainly reflected in exchange rate stability and credit control/guidance. The RMB exchange rate regime[8] requires that the PBC be actively engaged in foreign exchange interventions and the subsequent "sterilization" operations. The foreign exchange purchases are first reflected in rises of excess reserves. This resulting excessive liquidity is not necessarily what the PBC wants. The PBC withdraws excessive liquidity in three ways: repo transactions, issuance of central bank bills, and increase of the required reserve ratio (Sun 2015). However, these "sterilization" operations are necessary liquidity management as a result of foreign exchange interventions and say nothing about policy tightening, as ZHOU Xiaochuan pointed out (Caixin 2012). Hence, our underlying classification criteria focus on the PBC's two objectives only and are mainly based on how it trades off price stability and economic growth.

Together with the general description of those criteria, we list some key words that are used to describe either the policy stance or the policymakers' intentions behind corresponding policy shifts. On the basis of the degree of policy tightness, we assign each quarter an integer value from −2, indicating a strong emphasis on promoting real growth (strong easing), to 2, which indicates a strong policy emphasis on inflation reduction (strong tightening). The emphasis of monetary policy often shifted in stages. We code mild emphases on real growth and inflation control with values of −1 and 1, respectively. The value of 0 stands for a neutral monetary policy stance. In the appendix, we present a brief summary of our narrative index, together with this index's time-series table (2000:Q1–2014:Q4), which is supported by the extracts of remarks from the policy record.

As our coding of the PBC's policy stance is based on reading two documents—press releases on the MPC's quarterly meetings and the China Monetary Policy Report—the natural question is whether there is inconsistency of policy description in these two documents.

[8]In July 2005, China announced it would give up its decade-long dollar peg and switch to a managed floating exchange rate regime. The exchange rate is thus set "with reference to a basket of currencies," allowing a daily movement up to ±0.3 percent in bilateral exchange rates. This daily band was extended gradually to the current level (±3 percent) in July 2015.

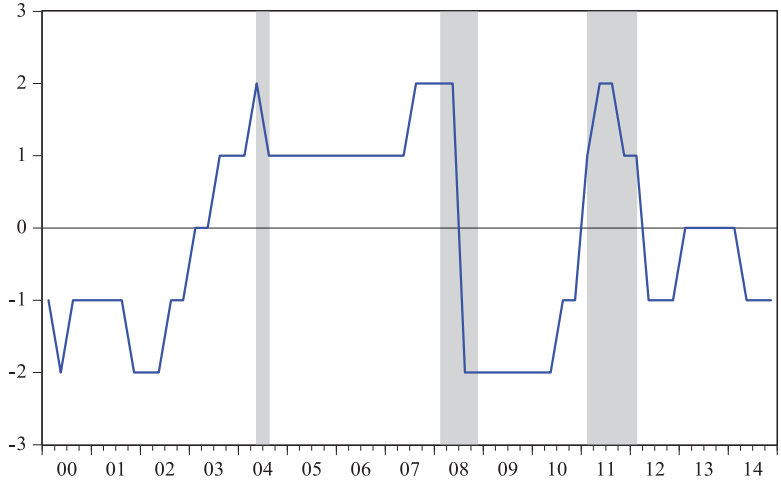
Indeed, it occurred once—2008:Q3. It arises due to the fast spread of the 2008 financial crisis and the different publication time of the two documents. Starting from the second quarter of 2003, the MPC's meeting is held at the end of each quarter to decide which policy stance to take in the coming quarter. The policy stance based on the press release (on the MPC's quarterly meetings) is ex ante, while the review of monetary policy operations in the China Monetary Policy Report provides the information on the actual monetary condition. At the MPC's 2008:Q1 meeting (on March 27, 2008), the Committee still held the view that there was noticeable inflationary pressure and hence proposed a tight monetary policy for the coming quarter. Yet, in the second half of 2008, the U.S. subprime mortgage crisis spread quickly. This led to a worldwide economic slowdown. During this quarter, the PBC implemented moderately easy policy, as described in the China Monetary Policy Report of 2008:Q3, to keep enough liquidity in the banking system, and to promote steady and fast economic growth. We hence record a relatively loose monetary condition (−2) for 2008:Q3 according to the realized policy.

Our narrative policy index measures the PBC's current policy stance in a comprehensive way. Changes in this indicator reflect the PBC's decisions for shifts in the policy stance, in response to the incoming information on real activity and inflation. We report our narrative indicator in figure 1, together with the Sun (2013) contractionary episodes (in gray shaded areas). Three local peaks in our narrative index—that is, the maximum tightness periods—coincide with the Sun (2013) contractionary episodes when the PBC took various measures to rein in high inflation.

3. Composite Monetary Policy Indexes: A Comparative Perspective

There are three composite policy indexes developed in the literature, following the instrument-based approach. They are He and Pauwels (2008), Xiong (2012), and Sun (2015). The former two papers weight all the instrument adjustments equally. They assign a value to each adjustment and then summarize all these indexes into a single indicator (−1, 0, 1) to directly measure *policy changes* (as expansionary, no change, and contractionary), rather than the current state of policy. In this respect, these two indexes differ from other composite

Figure 1. The Narrative Policy Stance Indicator, 2000–14



Source: Author's compilation and Sun (2013).

Note: The gray shaded areas are the contractionary episodes, identified by Sun (2013).

indexes. A zero value of these two indexes can indicate either an existing tight or easy policy, depending on what the most recent policy change was. The Xiong index extends the He-Pauwels index (monthly, 1997–2007) substantially to a time series from 1986 to 2010 (quarterly), but differs from He and Pauwels (2008) in allowing the reference instrument set to vary over three episodes, based on the observation that the PBC's operating procedures were changing over time. For the period of 1986–1997, Xiong (2012) refers to the instrument set of the credit plan for banks' lending and various interest rates;[9] then for the period of 1998–2002:Q3, the set consists of central bank lending to banks, various interest rates, and the required reserve ratio; finally, for the period of 2002:Q4–2010, it entails central bank bills, various interest rates, and the reserve ratio. By contrast, the He-Pauwels index is based on the fixed reference instrument set of four, which is comparable to that of Xiong (2012) for the last episode—the required reserve ratio, two interest

[9]They include the lending rate, the deposit rate, and two central bank lending rates.

rates (the lending and the deposit rate), and the net outstanding central bank bills.

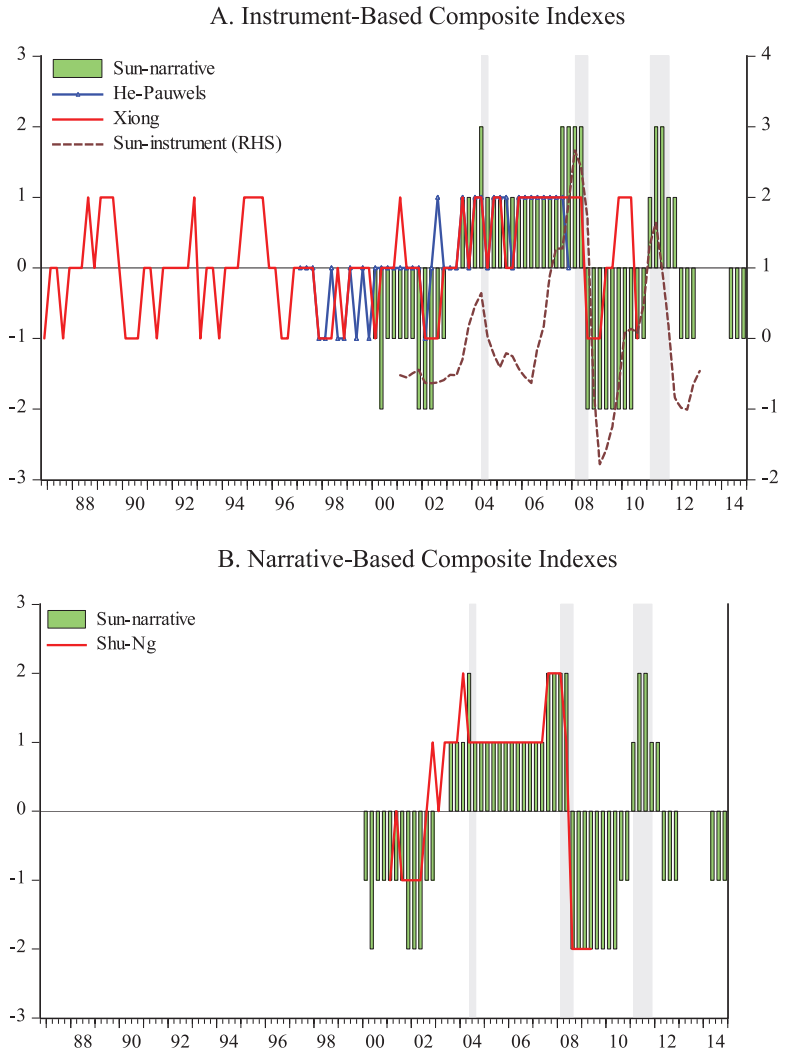
Unlike the He-Pauwel and the Xiong indexes, Sun (2015) lets the weight on each instrument be determined in a vector autoregression (VAR) model and estimates a time series of the linear combination of all policy variables (the required reserve ratio; two interest rates, the money market rate and the central bank lending rate; and two quantity measures, total reserves and excess reserves). After smoothing and normalizing, this series (monthly, 2001–12) (hereafter the Sun-instrument index) is used to measure the overall stance of monetary policy.

These three instrument-based indexes, as presented in figure 2A,[10] are built in reference to different instrument sets. Not surprisingly, they do not illustrate a close co-movement, as also confirmed by the pairwise correlations, presented in table 2 (with the t-statistics reported in parentheses). The Sun-instrument index is volatile. It is poorly correlated with both the He-Pauwels index (of the correlation of 0.26, which is not statistically significant from zero at the 10 percent level of significance) and the Xiong index (of the correlation of 0.37). The two trinomial indexes, the He-Pauwels index and the Xiong index, are more correlated with the correlation of around 0.7 for the sample of 1997–07. This correlation improves to 0.76 when we compare them for the 2003–07 sample, during which these two indexes are built in reference to essentially the same instrument set.

In figure 2A, we also include our narrative index that was developed in the previous section (hereafter the Sun-narrative index), shown in green bars (see the online version at http://www.ijcb.org for colors). The correlations between our narrative index and these three instrument-based indexes are moderate and consistent: all around 0.6, as shown in table 2. This suggests that the intentions of policy shifts, as captured by the Sun-narrative index, are well accompanied and materialized by the adjustments of the policy instruments. Yet, it seems that there are certain periods that indicate substantial discrepancies in the policy stance that these two kinds

[10]The figure shows all the indexes on a quarterly basis, with the He-Pauwels index and the Sun-instrument index transferred from a monthly basis by taking a simple average over the months of the quarter.

Figure 2. Composite Monetary Policy Indexes, 1986–2014



Source: He and Pauwels (2008), Shu and Ng (2010), Xiong (2012), Sun (2013, 2015).

Note: The gray shaded areas are the contractionary episodes, identified by Sun (2013).

Table 2. Correlations between Composite Indexes

		Instrument-Based Indexes			Narrative-Based Indexes
		He-Pauwels Index	**Xiong Index**	**Sun-Instrument Index**	**Shu-Ng Index**
Instrument-Based Indexes	Xiong Index	0.69			
		(6.26)			
	Sun-Instrument	0.26	0.37		
	Index	(1.36)	(2.45)		
Narrative-Based Indexes	Shu-Ng Index	0.56	0.73	0.50	
		(3.47)	(6.06)	(3.29)	
	Sun-Narrative	0.67	0.62	0.59	0.91
	Index	(4.88)	(5.04)	(5.02)	(12.48)

Source: Author's estimation.
Notes: The correlations are calculated for each pair of time series over their common samples, with t-statistics reported in parentheses.

(narrative based versus instrument based) of indexes describe. We summarize the main discrepancies in table 3.

The main discrepancy between the Sun-narrative index and the He-Pauwels index is found in 2002:Q3, when the former reports a policy easing while the latter reports a policy tightening. A close check indicates that the He-Pauwels index assigns a value of 1 to this quarter based on the observation that in September 2002, the net outstanding central bank bills increased by 194 billion yuan. Central bank bills are short-term securities issued by the PBC, which were introduced in 2002. Through issuing central bank bills, the PBC can effectively reduce the money supply. The PBC has used them extensively to offset rises in liquidity in the banking system as a result of the PBC's foreign exchange purchases.[11] However, such "sterilization" operations do not signal a policy tightening. Rather, in 2002:Q3, economic growth was continuously at a rapid pace and the CPI index decreased compared to the same period of the last year (China Monetary Policy Report of 2002:Q3, pp. 8–9). The PBC hence decided for sound monetary policy, calling for appropriately adjusting the money supply to provide more support to the economic growth and maintaining interest rates stable (Press Release on the 2002:Q3 MPC meeting). Its policy stance is hence better described as easy, as in the Sun-narrative index as well as other composite indexes.

There are two main discrepancies between the Sun-narrative index and the Xiong index: 2001:Q1 and 2009:Q4–2010:Q2. The Xiong index attributes a value of 1 in both these episodes based on the observations that in 2001:Q1, the central bank lending declined and during the latter period, the required reserve ratio went up or the PBC issued more central bank bills. However, these do not necessarily imply a policy tightening. In 2001:Q1, the decline of central bank lending could be partly due to the weakening demand for liquidity/credit given an economic slowdown. During the period of 2009:Q4–2010:Q2, hikes in the required reserve ratio and the net outstanding central bank bills were both driven by the PBC's need to offset the excessive liquidity arising from foreign exchange interventions. The economic conditions provide further support for

[11] Often, central bank bills are referred to as sterilization bonds.

Table 3. Main Discrepancies among Composite Indexes

	He-Pauwels Index	Instrument-Based Indexes			Narrative-Based Indexes
		Xiong Index		Sun-Instrument Index	Shu-Ng Index
Sun-Narrative Index	2002:Q3 (–1, 1)	2001:Q1 (–1, 1)	2009:Q4–2010:Q2 (–2, 1)	2005:Q1–2006:Q2 (1, <0)	2002:Q4 (–1, 1)

Source: Author's estimation.
Notes: The table reports the periods when the main discrepancies of the policy stance description between the Sun-narrative index and the others arise. In the parentheses below the marked discrepancy period are two entries, with the first number standing for the policy stance given by the Sun-narrative index (in the column) and the second given by the index listed in the corresponding row.

our argument for a policy stance of easing. In both episodes, the economy recovered from previous slumps; the overall growth was good and inflation was low or moderate. Indeed, the PBC called for appropriately increasing money supply to support economic growth (2001:Q1) or it described its policy directly as relatively easy monetary policy for the period of 2009:Q2–2010:Q3 (Press Release on the various MPC meetings).

The main discrepancy between the Sun-narrative index and the Sun-instrument index is found for the period of 2005:Q1–2006:Q2, when the former describes the PBC's policy as tight while the latter shows an easing. The driving force for the Sun-instrument index's easing is due to a low and declining interbank money market interest rate over that period. This money market rate is the borrowing cost on the interbank money market, and it is one of two operating targets that the PBC sets for its open market operations (Zhang and Ji 2012, p. 186) However, not all the banks have perfect access to the interbank loan market, particularly in the early period. In the early 2000s, this money market rate did not play a dominating role in signaling the policy stance when banks relied heavily on central bank lending.[12] This is still the case for the period of 2005–06. Other more important policy interest rates (i.e., the benchmark lending rate and deposit rate) remained unchanged after a hike in mid-2004. This suggests a continuing tight monetary policy, as described by our narrative index and all other indexes. The ups and downs of this money market interest rate reflect something other than shifts in the policy stance—perhaps a decreased demand for interbank loans.

Compared to the narrative indexes, the instrument-based indexes record all the changes in policy tools. Yet, some changes are driven by the PBC's "sterilization" needs, not necessarily suggesting a change in the policy stance. In using the instrument-based indexes, one should be aware of this and carefully model the PBC's response functions to incorporate the liquidity management driven by the foreign exchange interventions and subsequent sterilization.

Compared to the instrument-based indexes, the narrative policy indicator measures the PBC's current policy stance, reflecting

[12]This is evidenced in the transaction volume of interbank loans, which used to be very low. Only starting with early 2007 did the monthly turnover of total interbank loans exceed 10 percent of total reserves.

the PBC's decisions for policy in response to the incoming information on real activity and inflation.[13] Its variations are independent of demand shocks in liquidity/financial markets. This indicator is hence free of endogeneity problems arising with quantitative variables that are included in the instrument-based indexes, for example, a money market interest rate or a monetary aggregate.

In figure 2B, we report two narrative-based indexes: the Sun-narrative index (quarterly, 2000–14) and the Shu-Ng index (quarterly, 2001–2009:Q2). Both indexes code the PBC's policy stance in the same way by referring to the importance that the PBC attaches to inflation reduction relative to real economic stimulus. Despite different authors' independent work on the PBC's documents, these two indexes conform well, with the correlation of 0.91 for the common sample, as shown in table 2. This high level of agreement suggests consistency of their interpretations. It provides strong evidence to dismiss the usual concern about the narrative approach's subjectiveness.

The main discrepancy between these two series is found in 2002:Q4, as reported in table 3. The Sun-narrative index describes the policy as easy while the Shu-Ng index describes it as tight. Carefully referring back to the China Monetary Policy Report of 2002:Q4 (p. 47), we find that the PBC's perceptions about economic conditions do not propose a tightening. The economic growth is described as satisfactory and prices are low (China Monetary Policy Report of 2002:Q4, p. 17). The PBC decided for a sound monetary policy (Press Release on the 2002:Q4 MPC meeting). Hence, we continue to describe 2002:Q4's policy stance as easy. This is consistent with the He-Pauwels index and the Xiong index, both of which assign no change for 2002:Q4.

A quick summary follows that these indexes differ in the criteria for indicating what a policy shift is. The narrative-based indexes are built on the criterion of how the PBC balances economic growth and price stability, while the instrument-based indexes also include

[13]It follows that this indicator can be easily used in modeling the PBC's reaction to the economic condition measured by these two variables as in a standard Taylor response function. Using our narrative indicator, Klingelhöfer and Sun (2018) estimate such a response function for the period of 2000–15, evidencing its asymmetric and regime-switching nature.

the PBC's daily liquidity management and "sterilization" operations. Yet, despite the fact that they are derived with very different methods and they cover different but overlapping periods of time, a certain degree of consistency does prevail. For example, the Sun anti-inflationary episodes (Sun 2013) are marked in the gray shaded areas in both graphs of figure 2. The local peaks of three instrument-based indexes and the Sun-narrative index—that is, the policy tightening—are well captured in the Sun episodes when the PBC took various measures to rein in high inflation.

In addition to the direct comparison of these indexes, we further assess their role as a policy indicator. As suggested by, for example, Hamburger (1970); McCallum (1991); Bernanke and Blinder (1992); and Friedman and Kuttner (1993), the policy indicator should be informative about the state of the economy. The logic behind this is that if the indicator is a measure of policy and if policy is effective, then this indicator should be a good reduced-form predictor of major macroeconomic variables (Bernanke and Blinder 1992, p. 903). We follow this criterion to study the information content of different indexes in a series of VAR-based tests and compare their predictive power.

Our VAR model is of three endogenous variables: GDP growth, CPI inflation, and one of these policy measures. Two lags are included in the baseline model. As exogenous variables, we include the current and one-lagged values of PPI inflation[14] (inflation based on the producer price index) to proxy the inflation expectation that the PBC has at the policymaking.[15] Quarterly data are used, obtained from the National Bureau of Statistics and the PBC. The full-sample period runs from 2000:Q1 to 2014:Q4.

Altogether, ten VARs are estimated, corresponding to ten different policy measures. They are five composite indexes that our analysis is focusing on, together with five individual quantitative policy variables that we refer to for comparison purposes.[16] These

[14]All these growth rates (GDP growth, CPI inflation, and PPI inflation) are annualized growth rates of the corresponding variable over the same period of the previous year.

[15]In the VAR literature, it is a common practice to tackle the potential price puzzle problem by incorporating the proxy of the central bank's inflation expectation in the model.

[16]They are shown in figures 3 and 4 in the ensuing section.

five individual variables are (i) the lending rate (the benchmark lending rate[17] with the maturity of one year); (ii) the interbank offered interest rate (IBOR,[18] an overnight money market interest rate); (iii) the RRR (the required reserve ratio); (iv) the log difference of monetary base[19] (ΔMB); and (v) the log difference of broad money (ΔM2). They are either the PBC's policy instruments (the lending rate, the RRR), its operating target (the IBOR), or its intermediate target (M2), which measure the PBC's operating procedures at different stages.

The state of the economy is measured with GDP growth and CPI inflation. We test whether our lagged policy measures help explain these two macroeconomic variables. Our tests focus on the following two reduced-form equations:

$$Y_t = c^Y + \sum_{i=0}^{1} \alpha_i^Y P_{t-i} + \sum_{i=1}^{2} \beta_i^Y Y_{t-i} + \sum_{i=1}^{2} \gamma_i^Y \pi_{t-i} + \sum_{i=1}^{2} \theta_i^Y MP_{t-i} + \epsilon_t^Y \tag{1}$$

$$\pi_t = c^\pi + \sum_{i=0}^{1} \alpha_i^\pi P_{t-i} + \sum_{i=1}^{2} \beta_i^\pi Y_{t-i} + \sum_{i=1}^{2} \gamma_i^\pi \pi_{t-i} + \sum_{i=1}^{4} \theta_i^\pi MP_{t-i} + \epsilon_t^\pi, \tag{2}$$

where Y stands for GDP growth, P for PPI inflation, π for CPI inflation, and MP for monetary policy that is measured with our five composite policy indexes and five individual quantitative policy variables in different models. Note that given the inflation inertia, our reduced-form equation for the CPI inflation deviates slightly from the benchmark by including four lags of the policy measures.

[17]The PBC used to exert direct influences on private saving and bank lending by setting benchmark deposit rates and lending rates (of various maturities), while commercial banks were allowed to adjust their interest rates around the benchmark within a limited band. The interest rate liberalization was gradual in China; it started in 2004 and was finalized in October 2015 when the last ceiling on the deposit rate was lifted (for more, see Sun 2018a, 2018b).

[18]This IBOR is a transaction-based money market interest rate, called CHIBOR (available since January 1996), to distinguish it from SHIBOR (LIBOR equivalent, quote-based, introduced in 2007).

[19]According to the PBC, monetary aggregates are M0 (currency in circulation), M1 (sum of M0 plus demand deposits), and M2 (the sum of M1 plus savings and time deposits) (see the PBC's Annual Report 2007).

Table 4 reports the marginal significance levels of ten policy measures for forecasting GDP growth (in the upper panel, corresponding to equation (1)) and CPI inflation (in the lower panel, corresponding to equation (2)), for both the full sample and the subsamples. The Chow test suggests a break at the end of 2006. This corresponds roughly to the point in time when the PBC started to intensively use the required reserve ratio to dry up excessive liquidity. We allow a possible regime switch around 2006 by reestimating the models for two subsamples (2000–06 and 2007–14). Each entry in the table shows the p-value (chi-square statistic) of the Wald test that lags of the column's policy measure do not enter equations (1)–(2) for GDP growth (i.e., $\theta_1^Y = \theta_2^Y = 0$) and for CPI inflation (i.e., $\theta_1^\pi = \theta_2^\pi = \theta_3^\pi = \theta_4^\pi = 0$).[20] A small value indicates that the column's policy measure is important for predicting macroeconomic conditions. We highlight those entries in gray that are significant at the 5 percent level of significance.

First, we focus on the information content that different policy measures contain for forecasting GDP growth, listed in table 4, panel A. The full-sample results suggest that at a 5 percent level of significance, two composite indexes (the Sun-narrative index and the He-Pauwels index) as well as one policy instrument (the lending rate) help predict real economic activity, while all other policy measures (the Shu-Ng index, the Sun-instrument index, and the Xiong index, as well as the IBOR, the RRR, and two monetary aggregates) hardly have predictive power. However, the performance of both the He-Pauwels index and the lending rate turns out to be unstable: the lagged terms of these two indexes do not contribute to explaining the current GDP growth in the first subsample. By contrast, the required reserve ratio starts to gain the predictive power when the sample is split into two, allowing the regime shifts. In the second subsample, this reserve ratio has been widely used for various purposes (for example, liquidity management as well as economic stimulus).

[20] Alternatively, we tried the Wald tests with two lags of policy measures included, where we hardly found any evidence in support of the significance of monetary policy, no matter how it is measured, in forecasting CPI inflation. This might be due to the fact that monetary policy affects inflation with a longer delay, as suggested by the findings in the literature.

Table 4. Comparison of the Information Content of Policy Measures

	Composite Policy Indexes					Individual Quantitative Policy Variables				
	Narrative-Based Indexes		Instrument-Based Indexes							
	Sun-Narrative	Shu-Ng	Sun-Instrument	Xiong	He-Pauwels	Lending Rate	IBOR	RRR	ΔMB	ΔM2
A. Marginal Significance Levels of Policy Measures for Forecasting GDP Growth										
Full Sample[a]	0.010	0.355	0.591	0.055	0.027	0.010	0.599	0.981	0.586	0.834
First Subperiod (2000–06)[b]	0.016	0.289	0.882	0.509	0.896	0.719	0.034	0.098	0.178	0.453
Second Subperiod (2007–14)[c]	0.000		0.240			0.000	0.721	0.014	0.803	0.913
B. Marginal Significance Levels of Policy Measures for Forecasting CPI Inflation										
Full Sample[a]	0.048	0.036	0.011	0.699	0.566	0.129	0.868	0.023	0.094	0.917
First Subperiod (2000–06)[b]	0.021	0.001	0.000	0.000	0.074	0.511	0.333	0.000	0.010	0.936
Second Subperiod (2007–14)*c*	0.081		0.099			0.000	0.558	0.000	0.061	0.525

Source: Author's estimation.

Notes: The table presents marginal significance levels of ten policy measures for forecasting GDP growth (panel A) and for forecasting CPI inflation (panel B).

[a]Due to the data availability, the full samples differ across these ten models. They are 2000–14 for the models with the Sun-narrative index and five individual quantitative policy variables; 2001–2009:Q2 for the model with the Shu-Ng index; 2001–12 for the model with the Sun-instrument index; 2000–10 for the model with the Xiong index; and 2000–07 for the model with the He-Pauwels index.

[b]Due to the data availability, the first subsample for the models with the Shu-Ng index and the Sun-instrument index starts with 2001.

[c]Due to the limited data, the estimates of the models with the Shu-Ng index, the Xiong index, and the He-Pauwels index are missing for the second subsample. The second subsample for the model with the Sun-instrument index covers the period of 2007–12 only.

Not surprisingly, its predictive power turns out to be significant as well.

What is puzzling is the poor performance of the Shu-Ng narrative index, very different from that of the Sun-narrative index despite that they are highly correlated. The hypothesis that the lagged terms of the Shu-Ng index are jointly zero in equation (1) cannot be rejected for the sample ending with 2006:Q4 (the first subsample) or the sample ending with 2009:Q2 (the full sample), while the lagged terms of the Sun-narrative index are jointly significantly different from zero in the subsamples and in the full sample. We refer back to the comparison of these two indexes, as presented in figure 2B. It suggests that the high correlation between these two indexes is mainly due to their high degree of consistency over the post-2002 period. During the period of 2001–02, there are some discrepancies between these two, which could drive their different performances in explaining the current GDP growth. Again, this relatively good performance of the Sun-narrative index seems to provide supportive evidence in favor of our interpretation of the PBC's documents.

Table 2, panel A suggests that the Sun-narrative index is superior and is the only policy measure that significantly helps forecast GDP growth. Its performance as a policy indicator is stable and consistent over time, regardless of regime switches. It is so far the most reliable indicator for real economic activity.

Analogously, the lower panel of table 4, panel B, shows the information content that different policy measures contain for forecasting CPI inflation. In general, all the composite indexes perform well in helping predict inflation in the first subsample. But the full-sample results suggest that the lagged terms of two instrument-based indexes—the Xiong index and the He-Pauwels index—are not jointly significantly different from zero, while two narrative indexes and the Sun-instrument index, at a 5 percent level of significance, continue to contribute to explaining inflation. During the second subsample, the performance of the composite indexes (with the results for two indexes only due to the limited availability of other indexes) is moderate: the predictive power of the Sun-narrative index and the Sun-instrument index is significantly recognized only at a 10 percent level of significance.

Among individual quantitative policy variables, the performance of the required reserve ratio is outstanding compared to the others. This ratio remains significant in predicting inflation both for the full sample and subsamples. The main reason might be that this ratio is heavily used by the PBC for liquidity management and hence for reining in inflation. In general, two interest rates (the lending rate and the money market rate, IBOR) do not help predict inflation, except that during the second subsample period the lending rate turns out to be significant in forecasting inflation. More interesting is the different performance of two quantity variables: the growth rate of narrow money (monetary base) helps predict inflation regardless of periods that we focus on, at least at a 10 percent level of significance, while the joint lagged growth rates of broad money (M2) are highly insignificantly different from zero in equation (2), consistently across subsamples. It seems that the linkage between inflation and broad money is weak.

It seems that the Sun-narrative index is not the superior indicator of all in helping predict inflation. Yet, its predictive power for future inflation is moderate and consistent across samples.

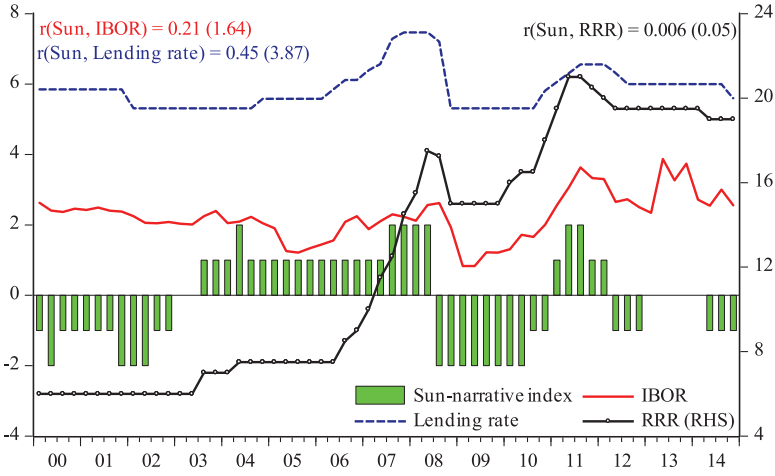
In this section, we compare different composite indexes developed in the literature. They cover different but overlapping periods of time. They are developed based on different criteria and hence their suggested policy shifts differ in certain ways. Two narrative-based policy indexes' time series (the Sun-narrative index and the Shu-Ng index) describe the current state of monetary policy as how the PBC balances two objectives—economic growth and price stability. The Sun episodes (Sun 2013) focus solely on the periods of an anti-inflationary policy shift. The instrument-based indexes record the changes in policy instruments. The implied policy changes by these indexes are driven by both these two objectives and the sterilization needs as the result of foreign exchange management. Second, the quick assessment of the Sun-narrative index suggests that it is informative about the state of the economy. Compared to other composite indexes and individual quantitative policy variables, its performance as a policy indicator is consistent over time and free of concerns about regime switches. It is hence especially recommended because, the PBC, as a "young" and fast-evolving institution, has been experiencing large changes in its operating procedures.

4. Nexus between the Narrative Index and Quantitative Policy Measures

Shifts in the policy stance are realized though adjustments in policy instruments. In this section, we check the nexus between the Sun-narrative index and the PBC policy instruments, its operating targets, and intermediate targets to see how the policy shifts (as measured by the Sun-narrative index) are linked with them. Due to the space limit, we focus on the Sun-narrative index only in this section when measuring the PBC's policy. We continue section 3 to use five quantitative policy variables: the lending rate, the IBOR (the interbank offered interest rate), the required reserve ratio (RRR), the log difference of monetary base (ΔMB), and the log difference of broad money (ΔM2). They reflect the PBC's policy operations at different stages. The question underlying these tests is whether we can find a quantitative policy measure that is closely related to the Sun-narrative index such that it can proxy this composite policy index.

We plot these five quantitative policy measures and the Sun-narrative index in figures 3 and 4 for the period of 2000:Q1–2014:Q4, together with the calculated correlations and their t-statistics. Two interest rates and the required reserve ratio are shown in figure 3. It appears that changes in the policy stance are associated with adjustments of the lending rate, while the co-movement pattern between the narrative indicator and the IBOR is less apparent. Meanwhile, in August 2003 the PBC started to incorporate an active use of the reserve ratio into its toolkit. The policy changes are accompanied by hikes and drops of this ratio. Since the middle of 2006, changes in the required reserve ratio have become more frequent, as the PBC started to use it as a "sterilization" tool (Sun 2015). It turns out that not all of these adjustments are necessarily accompanied by changes in the policy stance. For example, within one year (starting from mid-2006) the PBC continuously raised the required reserve ratio in six steps. Yet, its policy stance remained unchanged over this period: tight. Indeed, changes in the reserve ratio are "not necessarily indicative of monetary easing or tightening, but are more related to the management of foreign exchange reserves," as pointed out by ZHOU Xiaochuan (Caixin 2012).

Figure 3. Sun-Narrative Index and Three Selected Policy Variables



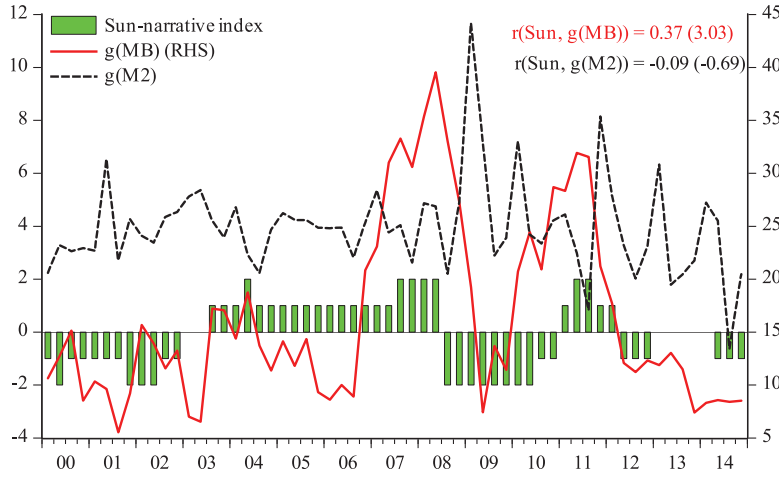
Source: Author's compilation and the PBC's statistics data set.

Note: The correlations between the Sun-narrative index (Sun) and various quantitative policy measures are reported as r(Sun, MM), with t-statistic in the parentheses.

These observed relation patterns are further confirmed by their correlations with the narrative indicator, as shown in the figure. These correlations are 0.45 for the lending rate, 0.21 for the IBOR, and 0.006 for the required reserve ratio, of which only the correlation with the lending rate is statistically significant. Possibly, the policy instruments follow changes in the policy stance with some lag. If we take this into consideration and compute the dynamic correlations (not shown in the paper), we come to the same conclusion. It seems that contractionary policy shifts are closely followed by rising lending rates with a one-quarter lag: the highest correlation (0.60) is found between this interest rate and the narrative indicator of one lag, while the other two correlations are not much improved.

Analogously, figure 4 plots two monetary aggregates: growth of monetary base and M2. These two time series are much more volatile. No clear relation patterns can be detected. But the correlation suggests that the Sun-narrative index is significantly positively correlated with base money, though the theory predicts the

Figure 4. Sun-Narrative Index and Two Monetary Aggregates



Source: Author's compilation and the PBC's statistics data set.

Notes: g(MB) and g(M2) are growth of MB and M2, respectively. See notes of figure 3.

opposite. Possibly, this positive correlation is due to the fact that in China the reserve ratio is intensively used as a liquidity management tool. The PBC raises this ratio in a contractionary policy shift to absorb excessive liquidity in the banking system. It leads to an increase of required reserves that banks hold at the PBC, and hence a rise of base money[21] (Sun 2015). Such a hike is driven by a rising ratio of required reserves in base money, which does not indicate a surge of liquidity. Indeed, we find that broad money M2 is negatively correlated with our narrative indicator, though insignificantly.

We further estimate the relation between our policy indicator and the money market variables using a bivariate VAR model, (Sun_t, MM_t), which contains the Sun-narrative index (Sun) and one of five quantitative policy measures, which we will label with MM. We run five VARs. Four lags are included, as the (Akaike) information criterion suggests.

[21] It is the sum of the currency in circulation and the total reserves that banks hold at the central bank.

Table 5 summarizes the Granger-causality statistics for these five bivariate VARs. It reports the p-value of each F-test on the null hypothesis that the coefficients of all the lags of a given column's variable are jointly zero in the reduced-form equation for the row's variable. That is, the first row tests whether there exists a predictive relationship running from quantitative policy measures to our narrative indicator, while the second row tests the reversed Granger causality that runs from measured monetary policy to quantitative policy variables.

Clearly, the Sun-narrative index is never Granger-caused by these five quantitative measures. But reverse Granger causality exists: at the 5 percent significance level, lags of our narrative indicator help to predict the required reserve ratio, the lending rate, and the IBOR. However, such a relation does not prevail for two monetary aggregates: lags of the narrative indicator do not help explain ΔMB nor ΔM2.

We further estimate the generalized impulse response function (IRF)[22] (Pesaran and Shin 1998) of our bivariate VAR models. With the generalized IRF, we avoid proposing the ordering assumption (known as Cholesky decomposition in the VAR literature) on the contemporaneous relationship between our narrative policy indicator and these quantitative indicators. This Cholesky decomposition approach is widely applied in the VAR literature, but both impulse responses and forecast error variance decompositions are not invariant to the ordering of the variables. In our case, we use quarterly data, and any ordering assumption would be difficult to justify.

Figure 5 shows the generalized responses of quantitative variables to a one-unit positive shock in the Sun-narrative index.[23] Our analysis focuses more on qualitative comparison of their response patterns, rather than quantitative comparison of their response magnitudes, as variations in these five quantitative policy measures are remarkably different and it will not be surprising that their response magnitudes vary a lot as well. The responses of the required reserve ratio and two interest rates display the same basic pattern: policy

[22]It is *general* (not orthogonalized) because it is invariant to the ordering of the variables in the VAR.

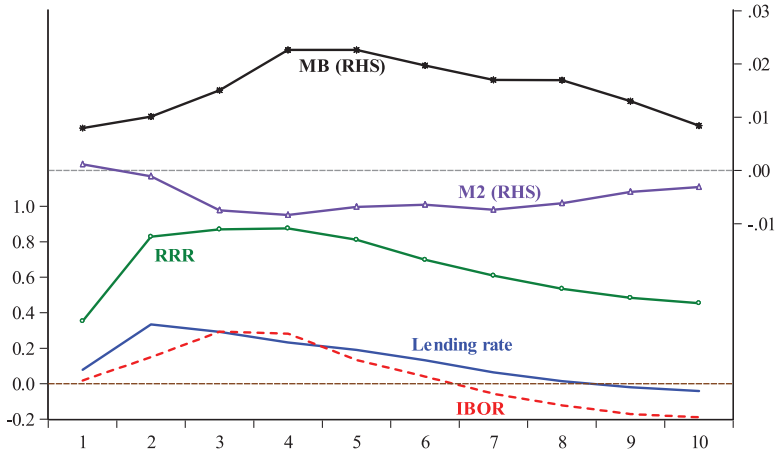
[23]The confidence intervals of all the estimates are not reported in order to keep the figures readable.

Table 5. Joint Significance Tests in the Bivariate VARs

Dependent Variable	*p*-values for									
	Sun	**Lending Rate**	**Sun**	**IBOR**	**Sun**	**RRR**	**Sun**	**ΔMB**	**Sun**	**ΔM2**
Sun	—	0.128	—	0.631	—	0.743	—	0.784	—	0.415
MM	0.000	—	0.000	—	0.013	—	0.313	—	0.263	—

Source: Author's estimation.
Notes: The entries show the *p*-values for *F*-tests that lags of the column variables do not enter the reduced-form equation for the row variable labeled "Dependent Variable." Those *p*-values smaller than 0.05, highlighted in gray, suggest that the corresponding null hypotheses must be rejected at the 5 percent level of significance. "Sun" stands for the Sun-narrative policy stance index; "MM" stands for a quantitative policy measure variable, including the lending rate, the IBOR, the RRR, ΔMB, and ΔM2.

Figure 5. Responses of the Five Quantitative Policy Measures to a Contractionary Policy Shock



Source: Author's estimation.

Note: The generalized impulse responses are estimated from five bivariate VARs (see text for explanations).

innovations are consistently associated with subsequent movements in these instruments. The PBC's decisions for a contractionary shift are followed by its actions to raise both the required reserve ratio and the interest rates. These three instruments respond rapidly, rising quickly to the peak (two or three quarters after the initial policy shock). The two interest rates' response dies out slowly (in about two years), while the required reserve ratio remains high.

The cumulative responses of two monetary aggregates are reported in the graph as well.[24] The point estimates suggest that rather than falling, base money rises after a contractionary shift, which is in contrast to the theoretical prediction but consistent with what we found with the correlations. As pointed out, this hike in the MB is attributable to a rise of the required reserve ratio in response to a contractionary policy shock, which is evidenced by the

[24]In the bivariate VAR model, the monetary aggregates are included in the log-first-difference form. Hence, we display their cumulative responses to the innovation in the policy stance, which measure the percentage increases in the level of the monetary aggregates.

reserve ratio response function in this figure. It does not indicate an increase in liquidity: broad money, M2, is declining, though slowly with a two-quarter delay.[25]

The analysis indicates that the PBC's policy intentions are closely followed by actions. The shifts of the policy stance are realized in policy actions reflected in changes in various quantitative policy measures. The Sun-narrative indicator is more closely correlated with policy instruments than with monetary aggregates. Then, the question follows: Are the policy decisions the major driving force for the observed changes in the quantitative measures? If that is the case, they would be able to measure monetary policy as well. To answer this question, we study the forecast error variance decompositions from our bivariate VARs. Table 6 reports the percentage of forecast error variance in these five quantitative measures at different horizons that is attributable to the innovation in the narrative policy stance. Consistent with what we find above based on other exercises, policy innovations do not play a significant role in explaining the variation in monetary aggregates at all horizons. For M2, the maximum explained part is 10 percent at the four-quarter horizon, while policy decisions have an even smaller impact on base money. Apparently, a substantial amount of variation in this narrow money is caused by non-policy factors, such as the use of the required reserve ratio as a "sterilization" tool, as discussed above.

On the contrary, policy innovations explain much more of the variations in three policy instruments. Most notably, the fraction of explained lending rate variance rises quickly to 43 percent at the two-quarter horizon and remains at this high level afterwards. Similarly, monetary policy tends to explain more variance in the IBOR at longer horizons as well, though quantitatively, the explanatory power for this money market interest rate is slightly smaller, about 36 percent at the peak. Interestingly, the required reserve ratio variance decomposition displays a different timing pattern. At the one-quarter horizon, the narrative indicator already explains over 20 percent of the variation in this ratio. This explanatory power rises to about 40 percent in quarter 3; afterwards, it declines.

[25]The statistical uncertainty about these estimates is large: estimated cumulative responses of both the MB and M2 are not significantly different from zero at all horizons.

Table 6. Variance Decompositions: Impact of Monetary Policy on Quantitative Variables
(percentage of n-step-ahead forecast error variance due to a monetary policy innovation)

	Horizon							
Explaining	**One Quarter**		**Two Quarters**		**Four Quarters**		**Eight Quarters**	
Lending Rate	6.79	(6.64)	42.88	(11.07)	44.48	(15.24)	44.29	(17.09)
IBOR	0.17	(2.83)	7.93	(7.89)	35.85	(13.53)	36.08	(13.04)
RRR	21.12	(9.61)	38.76	(11.75)	37.76	(14.91)	29.13	(18.05)
ΔMB	2.64	(4.42)	2.80	(5.20)	5.92	(6.93)	4.68	(6.81)
ΔM2	0.30	(2.83)	1.39	(5.30)	9.19	(8.36)	8.71	(8.40)

Source: Author's estimation.
Notes: The forecast error variance decompositions are computed from five bivariate VARs (see text for explanations). The numbers in parentheses are the Monte Carlo standard errors obtained after 500 repetitions. Those estimates that are significantly different from zero at the 5 percent level of significance are highlighted in gray.

In general, though, the explanatory power of monetary policy for these three policy instruments is limited. The explained portion never exceeds 50 percent. It seems that a substantial amount of quarterly variation in these variables is not associated with policy innovations.

Our analyses in this section suggest weak linkages between monetary policy and money aggregates. Although we find positive evidence for three policy instruments, their linkages with policy are limited. A large portion of changes in these instruments reflects impacts of other factors, rather than monetary policy. Hence, none of them can replace the narrative indicator to measure Chinese monetary policy.

5. Conclusion

In this paper, we contribute to the existing literature in three aspects. First, we build a time series of narrative-based policy index to measure the Chinese monetary policy stance. It extends the Shu-Ng index (2001–08) to 2000–14. It is a part of continuous work, with regular updating. Second, we compare and assess different composite indexes developed in the literature. Two kinds of indexes (the narrative-based versus the instrument-based indexes) differ in their coding criteria and how they indicate a policy shift. Changes in the former reflect the PBC's responses to its perceptions of real economic growth and inflation, while the latter records all the changes in the instruments, driven by both these two objectives and daily liquidity management as a result of sterilization needs. Third, we check the links between the narrative indicator and individual quantitative policy measures that are policy instruments, operating targets, or intermediate targets. The analysis indicates that there is no clear relation between policy shifts and monetary aggregates; the PBC relies mainly on interest rates and the required reserve ratio in realizing the policy stance adjustment. However, none of them can be a good policy indicator, as a substantial amount of variation in them reflects influences from factors other than monetary policy. There is no clear trend that the PBC is going to switch to a single-instrument policy regime. Rather, the PBC seems to be determined to stick to this multiple-instrument operating regime given its various tasks and the requirement for macroprudential policy management. Therefore,

a composite index to measure its policy stance is still necessary. Our qualitative measure, based on the reading and interpretation of the PBC's documents, is one possible solution.

Appendix

In this appendix, we first present a brief summary of our narrative index, categorized in three periods according to the policy stance features. It is then followed by the index time-series table (2000:Q1–2014:Q4), with the extracts of remarks from the policy record included.

2000:Q1–2007:Q4: Prudent (Easing/Tightening) Monetary Policy

Quite often, the PBC described its policy as "the prudent monetary policy,"[26] especially for the period of 2000:Q1–2007:Q4. Yet, it does not mean there is no change in the policy stance over this period. According to the PBC, the prudent monetary policy generally implies that monetary policy is not neutral. Instead, it refers to an activist policy that "aimed to keep a proper growth rate of money supply under the precondition of preventing financial risks to support the stable and healthy development of the economy" (China Monetary Policy Report of 2010:Q4, p. 47). Under a prudent monetary policy, policy can feature either tightening or easing. For example, in the China Monetary Policy Report of 2010:Q4 (p. 47), the PBC describes its monetary policy from 1998 to 2007 all as a prudent policy; however, for the former period (1998–2002), it is a prudent easing policy to stimulate domestic consumption and fight against deflation while for the latter period, it is a prudent tightening monetary policy to curb excessive investment and tackle inflation.

Our reading of the documents does reveal variations in the policy stance over the period of 2000:Q1–2007:Q4. In particular, the policy stance for the beginning period is well described as either "easy" (-1) or "very easy" (-2) given that the PBC put much emphasis on

[26]In Chinese it is "稳健的货币政策," also translated as "sound monetary policy."

appropriate financial support for economic growth or "to prevent the economy from a slowdown." Only for 2003:Q1–2003:Q2 is the policy stance identified as "neutral" (0). Afterwards, this prudent monetary policy started to tilt toward tightening. For the 2007:Q3–2007:Q4 period, the PBC described its policy as a "sound monetary policy featuring a steady and moderate tightening" to "prevent a shift from a relatively fast growth to an economic overheating" (Press Release on the 2007:Q2 MPC meeting).

It is likely that both statutory objectives are addressed in the press release. For example, over the period of 2005:Q3–2007:Q2 the MPC continuously put forward to boost consumption demand, "rationalize the relation between investment and consumption" (Press Release on the 2005:Q2 MPC meeting), and "adjust economic structure and growth model" (Press Release on the 2007:Q1 MPC meeting). Yet, meanwhile, the PBC was aware of the inflationary pressure arising from an economic overheating. Repeatedly, the MPC proposed that "various instruments should be adopted to appropriately control money and credit aggregates" (Press Release on the 2006:Q1 MPC meeting) "to maintain price stability" (Press Release on the 2007:Q1 MPC meeting). The main reason for these seemingly conflicting focuses is that Chinese monetary policy has also been used for directing bank loans to solve the structural problems. However, the signal is clear that the mandate to maintain price stability has been dominating: the PBC raised interest rates and the required reserve ratio during this period to rein in inflation. We record a mild tightening policy stance (1) for these quarters.

2008:Q1–2012:Q4: Monetary Policy over the Crisis Period

The PBC's monetary policy over this period is identified as easy, tight, and easy. In the beginning of 2008, the PBC continued its tight monetary policy to rein in inflation. By the second half of 2008, the financial crisis triggered a worldwide economic slowdown. As a response, the MPC decided to adopt loose monetary policy to "strengthen coordination of monetary policy with fiscal policy"[27] (Press Release on the 2008:Q3 MPC meeting). By the end of 2010,

[27]The RMB 4 trillion fiscal stimulus package was announced in November 2008.

this easy money generated inflationary pressure. The MPC agreed to "give more priority to stabilizing the general price level in 2011" (Press Release on the 2010:Q4 MPC meeting). But in 2012, the PBC shifted the focus back on the economic growth and called for "reasonable growth of money and credit . . . (to) support stable and fairly rapid economic growth" (Press Release on the 2012:Q1 MPC meeting).

2013:Q1–2014:Q4: Macroeconomic Management

Over these two years, the PBC has put more emphasis on macroeconomic management through fine-tuning and preemptive adjustment measures in an attempt to balance economic growth, price stability, and risk prevention. The main focus of monetary policy is "to create good monetary conditions for the adjustment of economic structure" (Press Release on the 2013:Q2 MPC meeting).

Both documents indicate that over the period of 2013:Q1–2014:Q1,[28] the PBC "continued to implement the sound monetary policy, neither loosening nor tightening the supply of money" (China Monetary Policy Report of 2013:Q3, chapter II). During this period, the PBC focused on using multiple instruments to maintain an appropriate smooth growth rate of money and credit and promote improvements in the credit structure. We hence record a neutral monetary policy stance (0) continuously for these five quarters. Afterwards, monetary policy stance turned to be "easy" (−1) as the PBC has "actively taken measures to respond to downward pressures and moderate growth in price levels" (China Monetary Policy Report of 2014:Q2, chapter I) by lowering the required reserve ratio (for selected financial institutions) and extending central bank lending.

[28]June 2013 saw a liquidity crunch in the Chinese money market. The interbank offered interest rate (IBOR) rose from 4.6 percent on June 3 to the peak of 13.2 percent on June 20; it then fell back to 5.4 percent by the end of June. Even if we take a monthly weighted average (6.6 percent), it was clearly higher than its adjacent months—2.8 percent (in May) and 3.3 percent (in July). Yet, this high IBOR did not implicate monetary tightening. Rather, it reflected the PBC's determination to give priority to restructuring and it hence did not react to a rise in the demand for liquidity. We record monetary policy as neutral for June 2013 as well.

Table 7. Monetary Policy Stance

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2000:Q1	–1	Play a bigger role to balance the relationship between economic growth and financial stability.
2000:Q2	–2	Increase the support for economic growth. Appropriately increase the money supply.
2000:Q3	–1	Strengthen and develop the good momentum of the economic recovery while keeping watch on the macroeconomic effects of high growth of money supply.
2000:Q4	–1	Further contribute to the economic recovery, but meanwhile keeping watch on the fast increase in money supply and credits.
2001:Q1	–1	Appropriately increase money supply, increase the support for economic growth. While trying to prevent deflation, . . . keep alert to inflation.
2001:Q2	–1	Keep on increasing the domestic demand. Keep the stable growth of money supply. Strengthen the credit supervision.
2001:Q3	–1	Stimulate the domestic demand. Maintain the appropriate increase of money supply. Keep the interest rates stable.
2001:Q4	–2	Keep an appropriate increase of money supply . . . support the expansionary fiscal policy to prevent economic slowdown.
2002:Q1	–2	Strengthen the support for economic development to prevent further economic slowdown
2002:Q2	–2	Increase the money supply so as to strengthen financial support to economic development.
2002:Q3	–1	Sound monetary policy. Appropriately adjust the money supply. Maintain interest rates stable.
2002:Q4	–1	Sound monetary policy. Adjust the money supply appropriately and accordingly.

(*continued*)

Table 7. (Continued)

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2003:Q1	0	Maintain interest rates and the exchange rate stable. The economic condition has a good tendency. Strengthen the credit management.
2003:Q2	0	Sound monetary policy, . . . ensured timely provision of financial services for SARS prevention activities.
2003:Q3	1	Keep the interest rates and the exchange rate stable. Closely monitor rapid credit growth. Strengthen credit risk early-warning and surveillance arrangement.
2003:Q4	1	Good momentum of economic and financial development. Faster-then-desired growth of money supply and credit. Prevent new credit risks.
2004:Q1	1	Maintain the interest rates stable. Adjusted the total amount of money and credits and their structure, . . . keep alert to inflation.
2004:Q2	2	Strengthen macroeconomic and financial management. Properly control money and credit growth, . . . no tolerance in preventing inflation and financial risks.
2004:Q3	1	The strong growth momentum of money supply and loans had been reined in. The Chinese economy in general was in good shape. Macroeconomic management.
2004:Q4	1	Meet the requirements of strengthened macroeconomic control, . . . continue to appropriately manage the money and credit aggregate.
2005:Q1	1	Further improve financial macro adjustment. Manage the liquidity of the financial system in a timely and appropriate manner.
2005:Q2	1	Inflationary pressures had not yet been eased fundamentally. Further strengthen macrofinancial management.
2005:Q3	1	Improve macrofinancial adjustment to ensure price stability and healthy economic development. Rationalize the relationship between investment and consumption.

(*continued*)

Table 7. (Continued)

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2005:Q4	1	Strengthen preemptive and fine-tuning measures. Coordinate macroeconomic policies, boost consumption demand, . . . and realize sustained growth and price stability.
2006:Q1	1	Pressures on a rebound in fixed-asset investment growth. Coordinate macroeconomic policies. Appropriately control and adjust money and credit aggregates.
2006:Q2	1	Strengthen macroeconomic management to ensure a continuously steady development of Chinese economy as well as a basic stability of the price level.
2006:Q3	1	Strengthen the liquidity management. Prevent an excessively rapid growth of money and credit. Properly control the scale and pace of mid- and long-term lending.
2006:Q4	1	The economic situation was broadly favorable. Strengthen the liquidity management of banking system.
2007:Q1	1	Strengthen banking liquidity management to . . . maintain price stability. Keep money and credit growth at an appropriate level.
2007:Q2	1	Enhance macroeconomic management. Strengthen liquidity management . . . to maintain price stability. Properly control the growth of money and credit.
2007:Q3	2	Sound monetary policy featuring a steady and moderate tightening. Prevent a shift from a relatively fast growth to an economic overheating. Maintain basic stability of the price level.
2007:Q4	2	Sound monetary policy featuring a steady and moderate tightening. More-than-desired expansion of credit. Building-up of inflationary pressures and rising asset prices. Keep money and credit growth at reasonable speed.

(*continued*)

Table 7. (Continued)

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2008:Q1	2	Tight monetary policy. Prevent shifts from a relatively fast growth to an economic overheating and from structural price rise to full-scale inflation. Strengthen liquidity management. Restrain the excessive growth of money and credit.
2008:Q2	2	Tight monetary policy. Prevent excessive increase of general price. Curb excessive growth of money and credit. Retrain the excessive growth of money and credit.
2008:Q3	–2	Moderate loose monetary policy. Keep enough liquidity in the banking system. Strengthen support to economic growth.
2008:Q4	–2	The outlook of the global economy was unfavorable, and proper measures should be taken accordingly. Strengthen coordination of monetary policy with fiscal policy.
2009:Q1	–2	Moderately loose monetary policy. Greater financial support to economic growth. Maintain adequate liquidity and promote the stable money and credit growth.
2009:Q2	–2	Relatively loose monetary policy. Stimulate domestic demand.
2009:Q3	–2	Relative loose monetary policy. Critical time for the stability and recovery of the Chinese economy.
2009:Q4	–2	Relative easy monetary policy. Increase the contribution of domestic demand (household consumption) to economic growth.
2010:Q1	–2	Relatively easy monetary policy. Keep good control of the growth rates of money and credit so as to avoid big swings.
2010:Q2	–2	Relatively easy monetary policy. Maintain adequate liquidity in the banking system and guide reasonable increase of money and credit supply.
2010:Q3	–1	Relatively easy monetary policy. The liquidity in the banking system was appropriate.

(*continued*)

Table 7. (Continued)

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2010:Q4	–1	Relatively easy monetary policy, . . . facing a hard task on how to manage the inflation expectations.
2011:Q1	1	Give more priority to stabilizing the general price level in 2011. Control liquidity and bring the monetary and credit conditions back to a normal state.
2011:Q2	2	Prudent monetary policy. Keeping price stability is top priority of macro management. Manage the liquidity and keep money and credit at a reasonable level.
2011:Q3	2	Prudent monetary policy. Manage the liquidity.
2011:Q4	1	Prudent monetary policy. Manage the liquidity.
2012:Q1	1	Prudent monetary policy. Macroprudential policy measures will be employed to make countercyclical adjustment.
2012:Q2	–1	Sound monetary policy. Play a countercyclical adjustment role to guide reasonable growth of money and credit . . . support stable and fairly rapid economic growth.
2012:Q3	–1	Sound monetary policy. Guide an appropriate growth rate of money and credit . . . to contribute to economic growth. Strengthen fine-tunings and preemptive adjustments.
2012:Q4	–1	Sound monetary policy. Guide an appropriate smooth growth rate of money and credit. Improve financial services and better support the real economy and hence promote GDP smooth and faster developments.
2013:Q1	0	Sound monetary policy to balance among maintaining stable growth, adjusting economic structure, containing inflation, and preventing risks.
2013:Q2	0	Sound monetary policy to maintain policy continuity and stability. Maintain a stable monetary environment.

(*continued*)

Table 7. (Continued)

Period	Indicator	Remarks from Press Release (on Quarterly Meetings of Monetary Policy Committee)
2013:Q3	0	Sound monetary policy to maintain policy continuity and stability, guide appropriate growth of money supply and credit. MPR 2013-3: The PBC continued the sound monetary policy, neither loosening nor tightening the supply of money.
2013:Q4	0	Sound monetary policy. Create good monetary conditions for the adjustment of economic structure, upgrading and transformation of the economy.
2014:Q1	0	Sound monetary policy. Maintain appropriate liquidity, guide money and credit aggregates to grow at a proper pace. Optimize the financing and credit structure.
2014:Q2	–1	Sound monetary policy. "The PBC has actively taken measures to respond to downward pressures and moderate growth in price levels" (MPR 2014-2: II).
2014:Q3	–1	Sound monetary policy. "The PBC has taken measures to respond to the downward pressures and the moderation in price inflation" (MPR 2014-3: I).
2014:Q4	–1	Sound monetary policy. Keep liquidity at appropriate levels. Improve efficiency and build stronger capacity to serve the real economy.

Source: The PBC's Press Release (on MPC quarterly meetings), 2000:Q1–2014:Q4, with the author's extraction.
Notes: The MPC meeting used to be held at the beginning of the quarter (2000:Q1–2003:Q1). We code the statement of monetary policy stance as the contemporary quarter. Yet, starting with 2003:Q2, the meeting is rescheduled to be held at the end of the quarter and the emphasis is shifted to pin down the monetary policy stance for the coming quarter. We thus start to code the policy stance based on the Press Release of the previous quarter's MPC meeting (for example, we code the policy stance of 2003:Q3 based on the Press Release of the 2003:Q2 MPC meeting). MPR stands for China Monetary Policy Report.

References

Alesina, A., C. Favero, and F. Giavazzi. 2012. "The Output Effect of Fiscal Consolidations." NBER Working Paper No. 18336.

Bell, S., and H. Feng. 2013. *The Rise of the People's Bank of China.* Cambridge, MA: Harvard University Press.

Bernanke, B. S., and A. S. Blinder. 1992. "The Federal Funds Rate and the Channels of Monetary Transmission." *American Economic Review* 82 (4): 901–21.

Boschen, J. F., and L. O. Mills. 1995. "The Relation between Narrative and Money Market Indicators of Monetary Policy." *Economic Inquiry* 33 (1): 24–44.

Brunner, K., and A. H. Meltzer. 1964. *The Federal Reserve's Attachment to the Free Reserve Concept: A Staff Analysis.* Washington, DC: U.S. Government Printing Office.

Caixin. 2012. "Central Banker Says Monetary Policy Rests on Forex Flows."

Chen, H., Q. Chen, and S. Gerlach. 2013. "The Implementation of Monetary Policy in China: The Interbank Market and Bank Lending." *International Finance Review* 14: 31–69.

Friedman, B. M., and K. N. Kuttner. 1993. "Why Does the Paper-Bill Spread Predict Real Economic Activity?" In *Business Cycles, Indicators and Forecasting*, ed. J. H. Stock and M. W. Watson, 213–54. University of Chicago Press.

Friedman, M., and A. J. Schwartz. 1963. *A Monetary History of the United States 1867–1960.* Princeton, NJ: Princeton University Press.

Hamburger, M. J. 1970. "Indicators of Monetary Policy: The Arguments and the Evidence." *American Economic Review* 60 (2): 32–39.

He, D., and L. L. Pauwels. 2008. "What Prompts the People's Bank of China to Change Its Monetary Policy Stance? Evidence from a Discrete Choice Model." *China & World Economy* 16 (6): 1–21.

Klingelhöfer, J., and R. Sun. 2017. "Macroprudential Policy, Central Banks and Financial Stability: Evidence from China." MPRA Paper No. 79033.

———. 2018. "China's Regime-Switching Monetary Policy." *Economic Modelling* 68 (January): 32–40.

McCallum, B. T. 1991. "Targets, Indicators, and Instruments of Monetary Policy." NBER Working Paper No. 3047.

People's Bank of China. *China Monetary Policy Report*, various issues.

———. Press Release on the MPC Quarterly Meeting, 2000:Q1–2014:Q4.

Pesaran, H. H., and Y. Shin. 1998. "Generalized Impulse Response Analysis in Linear Multivariate Models." *Economics Letters* 58 (1): 17–29.

Ramey, V. A. 2011. "Identifying Government Spending Shocks: It's All in the Timing." *Quarterly Journal of Economics* 126 (1): 1–50.

Ramey, V. A., and M. D. Shapiro. 1998. "Costly Capital Reallocation and the Effects of Government Spending." *Carnegie-Rochester Conference Series on Public Policy* 48 (1): 145–94.

Romer, C. D., and D. H. Romer. 1989. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz." *NBER Macroeconomics Annual 1989*, Vol. 4, ed. O. J. Blanchard and S. Fischer, 121–70. MIT Press.

———. 2004. "A New Measure of Monetary Shocks: Derivation and Implications." *American Economic Review* 94 (4): 1055–84.

———. 2010. "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks." *American Economic Review* 100 (3): 763–801.

Shu, C., and B. Ng. 2010. "Monetary Stance and Policy Objectives in China: A Narrative Approach." *China Economic Issues* (Hong Kong Monetary Authority) 1/10 (January).

Sun, R. 2013. "Does Monetary Policy Matter in China? A Narrative Approach." *China Economic Review* 26 (September): 56–74.

———. 2015. "What Measures Chinese Monetary Policy?" *Journal of International Money and Finance* 59 (December): 263–86.

———. 2018a. "Monetary Policy Announcements and Market Interest Rates' Response: Evidence from China." MPRA Paper No. 87703.

———. 2018b. "Requiem for the Interest-Rate Controls in China." MPRA Paper No. 87700.

Xiong, W. 2012. "Measuring the Monetary Policy Stance of the People's Bank of China: An Ordered Probit Analysis." *China Economic Review* 23 (3): 512–33.

Zhang, X., and Z. Ji. 2012. *China Monetary Policy*. Beijing: China Financial Press.