# Measuring the monetary policy stance of the People's bank of china: An ordered probit analysis☆

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## A R T I C L E   I N F O

## A B S T R A C T

The People's Bank of China (PBC) has employed a range of different instruments in the implementation of its monetary policy over the past decades, so perhaps no single instrument would constitute an adequate representation of the monetary policy stance. We thus develop a new policy stance index, and examine it in an ordered probit model, which follows the studies by Gerlach (2004) and He and Pauwels (2008). The empirical results show that in a backward-looking model, monetary policy reacts to actual output growth; one the other hand, when deviations from trend levels are considered, the PBC concerns inflation most seriously. In a forward-looking model, when we examine the PBC's statements in its quarterly *Monetary Policy Executive Report* from 2001Q1 to 2010Q3, it seems that the PBC's assessment of the prospects for inflation plays a key role determining the PBC's monetary policy stance. Our conclusions suggest that the PBC is informally targeting inflation, although no explicit target has ever been announced to the public by the PBC.

## 1. Introduction

As an important component of the framework of China's macroeconomic policy, the monetary policy operations of the People's Bank of China (PBC) have become of great concern to the rest of the world. One example is the disagreements over China's foreign exchange rate policy between China and its main trading partners such as the US and the EU since the 1990s, for which the value of the RMB is a cause for concern over cheaper and more competitive Chinese products. However, despite the growing literature on China's monetary policy, less attention has been paid to looking for an indicator which can accurately represent the stance of monetary policy. As Bernanke and Mihov (1998) indicate, measuring monetary policy accurately is important both to policy makers for practical reasons and to researchers for analytical reasons.

A good measure of the monetary policy stance should be able to tell us, either qualitatively or quantitatively, whether monetary policy is becoming contractionary, unchanged, or expansionary. Most current studies only focus on the link between the changes in a single policy instrument (or a single monetary indicator) and the macroeconomic situation in considering monetary policy stance. For example, in many studies the growth rate of broad money supply M2 is often used as an indicator to represent the PBC's monetary policy stance. By 2009, M2 was almost forty times higher than in 1990, with an average nominal annual growth rate over the period of 21.4% per annum. Can we simply conclude, based on the fast growth rate of M2, that China has conducted an expansionary monetary policy throughout the past two decades? The answer is "No", particularly when the PBC officially announced a switch from a loose monetary policy towards fighting the battle against high inflation in 2007 and 2009.

One significant difference between the measure of policy stance used by Bernanke and Mihov (1998) and that of other studies is that they account for the federal funds rate, nonborrowed reserves and total reserves in their indicator of policy stance, because

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they argue that the Fed's operating procedure evolved substantially during the period of interest to them. This concern is particularly relevant for studies of the Chinese case. Given the rapid process of economic transition in China since the early 1980s, the operating procedures of the monetary authority have been changing dramatically over time as well. Thus, to measure policy stance accurately requires us to take into account a wider range of monetary policy instruments. To this end, the main contribution of this paper is the construction a new policy stance index for China between 1986Q4 and 2010Q3. Once such a measure is constructed, a monetary reaction function can then be used to identify the connection between this measure and the state of the economy. Instead of the standard OLS analyses, the main empirical results in this paper are obtained in the framework of an ordered probit approach.

In addition, to study the relationship between the monetary policy stance and the PBC's own interpretations of the state of the economy, we attempt to extract information on the PBC's assessment of the outlook from statements in the PBC's *Quarterly Monetary Policy Executive Report* since its first issue in 2001Q1. It seems that this is the first time such an exercise has been done for China. Given the less than transparent process of monetary policy making, we hope this approach may shed some light on China's monetary policy reactions and help us understand the making of monetary policy by the authorities.

The structure of this paper is as follows. Section 2 provides a review of the literature on the monetary policy stance, and the role of policy stance measures in examining monetary policy operations. Section 3 explains the construction of an index for measuring the change in the stance of monetary policy in China from 1986Q4 to 2010Q3. Section 4 presents some empirical results on the relationship between the policy index and key economic variables in an ordered probit model. We then examine the links between the policy index and the PBC's interpretations of the state of the economy between 2001Q1 and 2010Q3 as represented by some narrative indicator variables. Section 5 gives a summary of the paper's findings.

## 2. Literature review

In order to find the type of policy stance measure we need, various variables and approaches are reviewed in different studies. Initially, when some major central banks focused on money supply growth in the 1970s and 1980s (the United States, Germany, the United Kingdom, Japan, etc.), a straightforward measure of the policy stance was the rate of growth of monetary aggregates (M1, M2 or the monetary base). Following this traditional measure, monetary policy strategies were explained through looking at monetary growth, in terms of either actual or targeted growth rates. Sims (1972) also uses the innovations to nominal M1 money supply as the measure of monetary policy. These so-called 'innovations' come from the disturbances in a VAR model, and are interpreted as unanticipated shocks to monetary policy. However, this simple and straightforward method is subject to some major criticisms. One of these argues that using this method to identify monetary policy has to assume that changes in money growth reflect changes only in money supply. But in practice, the monetary authority's accommodation of shocks to money demand can also be reflected in the growth of monetary aggregates (Bernanke & Mihov, 1998). This kind of 'non-policy influences' on a monetary aggregate makes the growth rate not a suitable indicator as a measure of the stance of monetary policy. Another criticism, which is also a criticism of the targeting of monetary aggregates by central banks, is that there may be a weak or unstable relationship between the targeted monetary aggregate and the ultimate policy goal variable (inflation, nominal income, etc.). If that is the case, then focusing on the monetary aggregate (actual or targeted) makes no sense because the monetary aggregate will no longer provide adequate signals about the stance of monetary policy (Mishkin, 2010, p. 399).

When central banks turned to targeting inflation from the early 1990s, another strategy of measuring stance of monetary policy was proposed: to look at the interest rates. As central banks began to shift from monetary aggregates to several variables in their monetary policy decisions, this measure focused on changes in short-term interest rates, for example, the federal funds rate in the United States, the repo rate in the European Central Bank, and the Bank rate in the United Kingdom. An important feature of those interest rates is that they can be effectively influenced by the monetary authorities and can in turn affect various interest rates throughout the economy. One application of the use of the interest rate as a measure of policy stance is in the Taylor rule proposed by Taylor (1993). The Taylor rule indicates that the federal funds rate should respond to changes in price level and changes in real income, so the federal funds rate can then be regarded as an important indicator of the monetary policy stance. To further develop this measure by eliminating the endogenous response of the funds rate (the same criticism as that from which the monetary growth rate suffers) the innovations of the federal funds rate are then used to measure the Fed's monetary policy stance. In addition, the federal funds rate, when compared with monetary growth, is a more informative variable with respect to future real economic variables such as income, consumption and employment (Bernanke & Blinder, 1992; Christiano & Eichenbaum, 1992). Using the changes in the repo rate, Gerlach and Svensson (2002) and Gerlach(2004) measures the stance of monetary policy of the European Central Bank (ECB), where a 0.25% rise (cut) of the repo rate is considered as a small rise (cut), and a 0.5% rise (cut) as a large rise (cut) one.

Meanwhile, an additional measure of monetary policy stance, in the context of the United States after 1979, is the nonborrowed reserves (NBR) which are the reserves supplied by the Fed to banks through open market operations (Christiano et al., 1996; Christiano & Eichenbaum, 1992). An increase in NBR through the Fed's open market purchases increases the total supply of reserves, and can therefore cause the federal funds rate to fall. One remarkable feature of NBR is that it can be directly controlled by the Fed. So as with the federal funds rate, the innovations to NBR in a VAR model are also regarded as exogenous shocks to monetary policy. In addition, because NBR has a sharp and robust negative correlation with the federal funds rate it can also act as an information variable with respect to future real economic variables (Christiano & Eichenbaum, 1992). In an innovative paper, Bernanke and Mihov (1998) use both reserves and the federal funds rate in their measure of policy stance, in order to cope with the problem caused by the variations in the Fed's operating procedures over time. They incorporate total reserves, nonborrowed