



CFDS Discussion Paper Series

One Country - Two Monetary
Policies: Evidence from a new
indicator of the PBoC's monetary
policy support for poor regions

Makram El-Shagi, Jiang Lunan, Lin Zhang

AUTHORS

Makram El-Shagi

HenU Center for Financial Development and Stability
Henan University
E-mail: makram.el-shagi@cfds.henucon.education
Tel: +86 155 6511 5281

Lunan Jiang

HenU Center for Financial Development and Stability
Henan University
E-mail: lunan.jiang@vip.henu.edu.cn

Lin Zhang

HenU Center for Financial Development and Stability
Henan University
E-mail: lin.zhang@vip.henu.edu.cn

The responsibility for discussion papers lies solely with the individual authors. The views expressed herein do not necessarily represent those of the CFDS. The papers represent preliminary work and are circulated to encourage discussion with the authors. Citation of the discussion papers should account for their provisional character; a revised version may be available directly from the authors. Comments and suggestions on the methods and results presented are welcome.

IMPRESSUM

© CFDS, 2020

HenU Center for Financial Development and Stability
Dongliuzhai Building, 85 Minglun Street
Henan University, Minglun Campus
Shunhe, Kaifeng, Henan, China
Tel. +86 (30) 897 89-0
<http://cfds.henucon.education>

Papers can be downloaded free of charge from the CFDS website:
<http://cfds.henucon.education/index.php/research>

One Country – Two Monetary Policies: Evidence from a new indicator of the PBoC's monetary policy support for poor regions

Makram El-Shagi^a, Lunan Jiang^{*a}, and Lin Zhang^a

^aCenter for Financial Development and Stability, Henan
University, China.

Abstract

In recent years, one of the PBoC's major issues was to avoid a generally conservative monetary policy that would jeopardize the central government's poverty-alleviation strategy by limiting credit supply in rural areas where it is already scarce. We develop a range of new indicators to measure those aspects of the PBoC's policy and demonstrate that the PBoC has successfully implemented policies targeted at poor counties. That is, we show that a central bank has the general potential to address regional diversity and distributional issues.

Keywords: China, fuzzy regression discontinuity, regional, monetary policy

JEL: E5, C2, I3

*Corresponding author. Email: lunan.jiang@vip.henu.edu.cn. Address: Dongliuzhai Building, Minglun Campus, Henan University, 85 Minglun Street, Shunhe, Kaifeng, Henan, 475001, China; Phone: 0371-23881606

1 Introduction

The Chinese growth miracle that followed the opening up initiated by Deng Xiaoping in 1978 was mostly driven by the major metropolitan areas on China's eastern seaboard. The People's Republic opted for a "gradual policy strategy" or "crossing the river by touching the stones". New policies were initially limited to small confined areas before being implemented in other regions. The opening up policies were initially introduced in Guangdong and then gradually expanded to other eastern coastal provinces due to their convenient location for international trade. As a result, the economy of the coastal provinces took off much earlier than the economy in the hinterlands, leading to increasing discrepancies.

In the initial decades, the implications of the growing spatial inequality were attenuated by the fact that living standards in the rural Chinese hinterlands still increased considerably through trickle-down effects, although these regions benefited to a considerably lesser degree. However, over time, the increasing heterogeneity has become one of the major issues in the Chinese political landscape. Apart from the poverty in the hinterlands being perceived as a more pressing issue in itself as the catching up process slows, the considerable heterogeneity also poses an obstacle for policies that are in their very nature nationwide such as monetary policy. While the first anti-poverty policies targeted at the rural regions of China date back to the 1980s, major steps were initiated in 2000, when the central government proposed the *grand western development program*. Various preferred policies have been implemented in the western and middle-western regions of China since then. In 2013, the new Chinese leadership made poverty alleviation and the development of the hinterlands its primary objective.

Thus, during recent years, it has been a major concern for the People's Bank of China (PBoC) to avoid jeopardizing the success of the national government's strategy for poverty alleviation in the hinterlands by shortening credit supply,

while simultaneously having to prevent the real estate bubble that has been forming in the densely populated eastern areas from inflating any further. To this end, the PBoC has experimented with novel strategies that allow a more targeted monetary policy. In this paper, we use a fuzzy regression discontinuity design to assess whether the PBoC succeeded in its attempt to essentially conduct separate monetary policies for the rich and poor regions of China. We develop a new narrative index for *targeted monetary policy* that is based on text scraping the PBoC's *Monetary Policy Implementation Reports*. Identification is based on the fact that many of the PBoC's policies were specifically targeted towards counties that are explicitly labeled *Key Counties for National Poverty Alleviation and Development*. We show, that counties bearing this label respond to the target policies significantly more strongly in terms of credit growth than counties with a similar GDP per capita that did not receive the label.

Our paper contributes to two strands of literature. First, we add to the literature on the regional effects of monetary policy. In contrast to the majority of the previous literature, we do not, however, assess whether a common policy can have diverse effects, but whether it is possible to deliberately create distinct monetary policies for a single currency. Given the problems that, for example, the euro area has been facing since the Great Recession, with the poor periphery recovering very slowly but the wealthy northern countries booming, this question seems to be highly relevant beyond its implications for China. Second, we contribute to the growing literature on development finance, assessing the role that monetary policy can play in development.

The remainder of this paper is structured as follows. In Section 3, we introduce both our novel policy indicators and some stylized facts from the county-level data that we use. Section 4 presents our econometric specification. In Section 5, we discuss our findings, and Section 6 concludes.

2 Literature Background

Since the seminal study on the heterogeneous effects of monetary policy in the US by Carlino and DeFina (1999), who identify regions where monetary policy has smaller or larger effects than it has on the aggregate economy, there has been ample interest in the regional effects of monetary policy. To name just a few examples, Georgopoulos (2009) examines whether monetary policy shocks have differential regional effects in Canada, and in a recent paper, Pizzuto (2020) uses the narrative series of Romer and Romer (2004) to measure monetary policy and provides an empirical re-assessment for the US. For a more complete list, see the survey by Dominguez-Torres and Hierro (2019). What all those studies have in common is their focus on the unintentional regional heterogeneity of a single policy. For many decades, almost all of the world's major central banks have focused the use of the tools at their disposal on manipulating a single intermediate target, usually a short-term interest rate.¹ The PBoC seems to be the only exception, using a variety of tools to achieve a diverse set of objectives. He and Wang (2012) and El-Shagi and Jiang (forthcoming) explicitly distinguish authority-based and market-based monetary policy and find significantly different macroeconomic effects. In a similar vein, Chen and Zha (2018) and Chen et al. (2018) also show that the PBoC tends to use a combination of credit, prices, and regulatory measures to achieve particular goals. Sun (2018) creates indices monitoring four different aspects of policy, ranging from traditional monetary policy to macroprudential policy which became highly important in the years since the Great Recession.² Despite the broad consensus, that the PBoC employs different tools to meet different objectives, and the well-known

¹While the ECB officially has a two-pillar strategy that includes monetary aggregates, in practice its policy was mostly conducted through interest rate policy.

²The former governor of People's Bank of China (PBoC), Xiaochuan Zhou, mentioned his six goals in the 2016 IMF Michel Camdessus Central Banking Lecture, which officially confirmed the hypothesis that the Chinese monetary authority has multiple goals.

importance of supporting the central government's poverty-alleviation-focused strategy, our paper is, to the best of our knowledge, the first that attempts to assess whether the PBoC successfully manages to conduct policies that focus on specific (poor) regions. Even more so than other aspects of Chinese monetary policy, the PBoC's poverty alleviation focused policies are not conducted through a single tool but an agglomeration of a vast number of individual policies, ranging from changes in the required reserve ratio for specific banks, to making new assets permissible as collateral for loans. While the problem is particularly severe in our case, we are not the first to address the fact that the lack of a single intermediate target poses an obstacle to the measurement of monetary policy. We build on the budding literature developing narrative policy indicators for the PBoC that has been inspired by the seminal papers by Romer and Romer (1989) and Romer and Romer (1994). To just give a few highlights, Sun (2013) builds a measure of the general policy stance, while the aforementioned paper by Sun (2018) provides a narrative analysis of different policy aspects based on official PBoC documents; Huang and Luk (2020) creates several newspaper-based economic policy uncertainty indices for Mainland China, including monetary policy uncertainty. Our paper adds to their work by constructing a narrative measurement of the poverty-alleviation-oriented monetary policy from the PBoC Monetary Policy Implementation Reports.

What makes the regionally diverse effects that the PBoC attempts to achieve particularly interesting is the underlying objective to support poverty alleviation. Conventional economic wisdom suggests that monetary policy can – and should – do little to fight poverty and inequality, or – as summarized by then-chairman of the Federal Reserve Ben Bernanke – "monetary policy is too blunt a tool to be routinely used to address possible financial imbalances"; this is a position later confirmed by chairwoman Janet Yellen.³ This consensus has,

³<https://www.federalreserve.gov/newsevents/speech/yellen20130211a.htm>

however, begun to falter in recent years. Since the US subprime mortgage crisis and European sovereign debt crisis, several papers such as Dietrich Domanski (2016), Amaral (2017), and Ampudia et al. (2018), have shown that low interest rates and unconventional monetary policy can increase inequality. Although it appears that monetary policy has thus far been part of the problem rather than the remedy, the existence of a causal link between monetary policy and inequality suggests that inequality should be considered by monetary policy makers. This does not necessarily imply that combating inequality should be an objective for the central bank in itself, but the central bank should at least attempt to conduct policy in a way that avoids the detrimental distributional effects it seems to have had in the recent past. By implementing various measures that counterbalance the negative effects that increasing macroprudential regulation, the eradication of shadow banking, and leaning against a housing bubble might have for poor regions where credit is already scarce, the PBoC is one of the first major central banks to take concrete initial steps in that direction. However, other players might soon follow. ECB president Christine Lagarde has pressed to place issues beyond price stability – including inequality and climate change – on the ECB’s agenda.⁴ Democratic presidential candidate Joe Biden has encouraged the Federal Reserve to move in a similar direction.⁵

We therefore believe that understanding whether the PBoC’s strategy was successful is relevant far beyond the borders of China.

⁴<https://www.ft.com/content/c3d72f52-1834-11ea-9ee4-11f260415385>

⁵<https://www.aier.org/article/can-the-fed-reduce-inequality/>

3 Data

3.1 Key Counties for National Poverty Alleviation and Development

Many China’s policies to foster development in the poorer regions of the country – including the supportive monetary policy conducted by the PBoC – have been focused on counties designated as *Key Counties for National Poverty Alleviation and Development* (which we will simply refer to as “poor” counties for the remainder of the paper). For example, the poor counties benefit from the central government’s Special Fund for Poverty Alleviation, which is extremely important for counties with limited fiscal revenue.

The original designation dates back to 1986. Originally, counties with the net per capita annual income below 150 RMB, minority autonomous counties with per capita annual income below 200 RMB, or old revolutionary base counties with per capita income below 300 RMB were labeled as poor. In 1994 the standards were unified, abandoning the original division between regular, minority and revolutionary base counties, and the threshold per capita income was updated to 400 RMB. However, counties already bearing the label were only removed from the list of Key Counties if they had already reached a per capita income of 700 RMB, yielding a total of 592 poor counties out of approximately 1800 rural counties.⁶ Since then, the list was only changed twice in 2001 and 2011. In both cases counties leaving the pool were replaced on a one-by-one basis. Originally, the number of counties receiving assistance was planned to be reduced in the 2011 reform. However, after considerable resistance from affected provinces, this plan was eventually abandoned. The replacement was not exclusively based on per capita income but on a broader assessment of the

⁶In total there are now close to 3000 counties. However, only rural counties can receive the poverty label.

counties in question without specific thresholds for the underlying factors (that were never officially revealed).

This and the lack of change – in some cases over decades – led to a significant overlap in per capita income of poor and non-poor (henceforth *rich*) counties, as summarized in Table 1. There are cases, where immediately after the revision of the poor county list in provinces that have several poor counties, the actually poorest county (in terms of per capita income) is not assigned the label. However, focusing on those extreme cases yields an inaccurate impression. Per capita income in 2012 is still the key determinant for the label. A simple probit regression intended to predict the poor label based on province fixed effects and (log) per capita income yields an accuracy of more than 70%.⁷

[Table 1 about here.]

[Figure 1 about here.]

Figure 1 shows the share of poor counties by province on the map. There are no data on province-level cities (Beijing, Chongqing, Shanghai and Tianjin), since urban counties are not eligible for the treatment, autonomous regions (such as Tibet) where economic development is supported through different programs, or the areas governed under the “one country - two systems” approach (and thus not participating in the program). Despite that the rich metropolitan areas of the eastern seaboard (in particular Beijing and Shanghai) are excluded, the general trend towards increasing poverty from west to east is clearly visible. Not a single province on the coastal crescent from Beijing to Guangdong has a single poor county. Since our baseline specification will use province-year-

⁷The threshold where we consider a prediction to be accurate is calibrated such that the share of predicted poor labels matches the data. Randomly assigned predictions would yield an accuracy of slightly more than 50% with a corresponding setting. Provinces without any poor counties are excluded from the regression.

specific effects, this essentially means that the coastal area is excluded from most of our analysis.

3.2 Monetary and financial policies to aid rural development

Since the Chinese leadership made poverty alleviation its priority in 2013, the role of finance in reducing poverty has been promoted aggressively.

The policy in this respect rests on two pillars.

First, there is a *government led* policy, where the (central) government or the PBoC actively supports a loan, i.e., by providing guarantees or collateral, by subsidizing loans, or by PBoC's lending to commercial banks that are earmarked for poverty reduction credits.

Second, the government and the PBoC have sought to create a regulatory framework that allows what is often referred to as *banking-led* poverty reduction. Most prominently, additional assets – that are often more easily available to rural households and companies - have been made eligible as collateral, in particular through the clarification and codification of rural property rights known as the *five special rights* (leasing farmland, forestland, water shoal, collectively owned construction land, and rural housing), which can now be used as collateral.

What those few selected examples highlight, is that the PBoC's policy in support of the rural hinterlands was not conducted through a single well-defined policy instrument, but rather a collection of individual policies, rolled out over the past decades. To generate a measure of policy that can easily be used for econometric analysis, we therefore generate a measure that is based on exploiting frequently recurring keywords in the PBoC's *Monetary Policy Implementation Reports*.

Our aim is to minimize the judgment component in our indicator(s) and

perform a fully automated text scraping of the reports from 2001Q1 to 2019Q4. Judgment is thus limited to the inevitable aspects, namely, the selection of terms that are considered relevant.

We search for terms referring to five aspects of monetary policy that match our narrative. For each of those aspects, we find three to eight individual terms that have been frequently used in PBoC communication. The obvious first choices are "poverty" (and "poverty alleviation") and "development", i.e. the main objectives of the policy of interest. Since the policy targets the rural hinterlands, which are still dominated by agriculture, we add a large set of terms referring to the PBoC's support for agriculture, rural areas, farming, etc. Our preliminary screening of the reports indicates that regional policy almost exclusively refers to support for the particularly poor regions (as opposed to targeting specific regions, or even the already richer provinces of the east). We therefore also include a small set of terms referring to "regional" policy. Finally, since it seems that a major part of the PBoC's support for poor regions was provided through regulation that allows for easier credit access of poor households and other subprime borrowers in poor regions, we add a group on "inclusive finance".⁸ For each block, we construct a policy indicator by simply counting the occurrence of any listed term in the PBoC's MPIRs. Rather than producing a compound indicator using all terms from all five categories, we use a search algorithm to find the combination of terms with the highest explanatory power. Details are provided in Subsection 4.2. A complete list of the terms we use, including the combination that produces the best fit, can be found in Table 2.

[Table 2 about here.]

⁸Due to the obvious similarities in the approach, we originally considered adding the terms referring to banks that specialize in rural / agricultural loans (农商行 and 农合行). However, they are barely mentioned in the reports.

Figure 2 shows the development during our sample period from 2001Q2 to 2019Q2. While there seems to be a general increase, some early quarters focused as much on the issues we consider to be the most recent. What is, however, quite clear is the shift in focus from a more "sector specific" policy (as indicated by the frequent use of terms related to agriculture) towards poverty alleviation since the new administration took over in 2013.

[Figure 2 about here.]

With the exception of terms from the *Development* group, all word count indicators are positively correlated with the repo rate, which – although not being an official target – is a very good indicator of the liquidity situation in the Chinese interbank market and thus the general policy stance.⁹ This confirms that the PBoC's strategy to utilize the policy targeting poverty alleviation mostly to compensate for a generally unfavorable financial market/monetary policy environment.

[Table 3 about here.]

4 Model and identification

4.1 Estimating the impact of policy on poor counties

We use a standard fuzzy regression discontinuity design to assess the impact of our policy indicators on loan growth (or more precisely the log difference of loans). Reliable data at the county (and even at the province) level are scarce, so we attempt to account for as much of the unobserved heterogeneity as possible through various fixed effects. In our baseline specification we use both county

⁹For a detailed discussion, see El-Shagi and Jiang (forthcoming).

fixed effects and province/year-specific effects, yielding the following baseline model:

$$\Delta l_{ijt} = \beta_0 \text{poor}_{ijt} \text{policy}_t + \beta_1 y_{ijt} \text{policy}_t + \beta_2 y_{ijt} + v_j t + u_i + \varepsilon_{ijt}, \quad (1)$$

where i , j and t are county, province and time indices respectively. l and y are log loans and log GDP per capita, *poor* the poverty label (which only bears the time label due to the changes in 2011), and *policy* is one of our policy indicators. v and u are the country and province/year-specific effects mentioned above, and ε is the idiosyncratic component of the error term.

We run two alternative specifications. The first adds GDP growth as a control variable. This might create endogeneity issues, since loans can drive GDP and vice versa. However, auxiliary regressions¹⁰ showed that there is no contemporaneous effect of our policy indicator on GDP. Thus, the endogeneity issues only pertain to the coefficient on GDP growth itself, while the coefficient of interest remains unbiased. In the second robustness test, we drop GDP as a control variable, since it is insignificant in our initial specification.

4.2 Finding the best policy indicator

In addition to testing our hypothesis that the PBoC has successfully managed to implement a differentiated policy across the country, we aim to provide the best possible measure of this regionally focused policy. To this end, we consider every possible combination of our 22 candidate terms identified in the PBoC's reports. Since this yields about 4 million different specifications to search over, our search is applied to a stripped-down version of the model, which only includes the fixed effects and the term of interest, namely:

¹⁰The results are available on request.

$$\Delta l_{ijt} = \beta_0 \text{poor}_{ijt} \text{policy}_t + v_{jt} + u_i + \varepsilon_{ijt}. \quad (2)$$

This simplification allows further steps to drastically increase computational efficiency that are outlined in the appendix for the interested reader. Although the indicator is searched based on the simplified model, the results for the optimal indicator reported in the following sections are based on the full model, showing that our policy indicators still perform well under "fair" conditions. It should be noted that those results are mostly reported for comparability reasons. Being optimized to fit our sample, the indicator we get is not suited for hypothesis testing using the exact same data. Rather, our aim is to extract information from past PBoC reports, that allows us to create an indicator that is useful to better understand future reports.¹¹

5 Results

5.1 Full sample

All five preconstructed indicators – *Agriculture*, *Poverty*, *Financial*, *Development*, and *Regional* – indicate that the impact of monetary policy that focuses on poverty alleviation does indeed scale significantly with GDP per capita. The impact, however, is economically small. Typically, an increase in any of the word count indicators by one standard deviation, creates a one to two percentage points of reduction in loan growth in counties where log GDP per capita is 1.0 higher, i.e., counties with almost triple the income (2.71 times higher to be precise).

Only *Agriculture* and *Poverty* interact significantly with the *poor* label. Offi-

¹¹The indicators will be updated continuously and made available online by the Center for Financial Development and Stability at Henan University.

cially poor counties with the same per capita income benefit from the respective policies with 0.5 to 1 percentage points additional loan growth, which is an economically meaningful order of magnitude.

The words selected for the optimized indicator – 支农 (Agriculture, word 3), 农民 (Agriculture, word 7) and 贫困 (Poverty, word 1) - come from the same groups. Interestingly, the optimized indicator does not capture the most frequently used words (that are also most volatile in their use), especially 三农 (Agriculture, word 1) which has by far the highest number of occurrences. A one standard deviation increase in the optimized word count indicator increases loan growth in *poor* counties by 1.5 percentage points additional loan growth. For the complete results see Table 4. The alternative specifications yield largely the same results both qualitatively and quantitatively. Some indicators that did not show significant interaction with the *poor* label in the baseline specification have marginally significant results in the alternative setup. However, given the lack of robustness for those results, we feel it would be premature to place excessive weight on those results. The full results for the alternative specifications are found in the appendix.

[Table 4 about here.]

5.2 Sample splits

To determine whether the results are driven by a specific subsample, we divide our sample in several ways repeating the analysis for each subsample. The division is done by province rather than by county, mostly because some of the data we use for the sample splits are not available at the county level. We start with the traditional division of China into the wealthy eastern seaboard, the developing center and the still fairly poor far west. We then move to a set of subdivisions based on economic factors that might drive the impact of policy,

namely, the intensity of fiscal policy in general, the number of small and medium enterprises (SMEs) that many of the development policies are targeted at, and the number of state-owned enterprises, since they are often assumed to benefit more from government policies. The divisions are visualized in the maps shown in Figure 3.

[Figure 3 about here.]

For ease of presentation we focused on our optimized indicator in these subsample analyses. Generally our results – summarized in Table 5 – are robust. For the three subdivisions based on specific indicators (fiscal policy, and SME and SOE density), the results in all subgroups still have the correct sign, are mostly of similar magnitude and are mostly still significant. The exception in all three cases is the smallest group, which still shows the correct sign but where the interaction of the policy indicator and the poverty dummy becomes insignificant. It should be noted, that evidence of absence is not an absence of evidence. Indeed, the fact that the insignificant result typically is just the smallest sample rather than one of the extreme subgroups makes it seem more likely that this is mostly a sample-size-driven difference rather than an indication of a structural break.

Regarding the geographical subdivision we find our results robust in the Western and Central China groups. The interaction of policy and poverty is insignificant in the East, which is unsurprising given the extremely low number of poor counties in that region.

[Table 5 about here.]

6 Conclusion

Our findings show that the PBoC has successfully implemented a regionally diversified policy. The measures it implemented were scaled in regional development and able to target specifically selected counties. To the best of our knowledge, this is the first paper to show both that a central bank has effectively been able to address distributional issues and deliberately create regionally diverse outcomes. While this has potentially very substantial implications, there is one caveat to generalizing this result. While the PBoC has become more similar to its Western counterparts to some degree, it still has by far more direct control over the banking system. Since we can only speculate regarding the precise transmission mechanism that the PBoC exploits in its new endeavors, it is by no means certain that other central banks could replicate this approach.

References

- Amaral, P., 2017. Monetary Policy and Inequality. Technical Report. Federal Reserve Bank of Cleveland.
- Ampudia, M., Georgarakos, D., Slacalek, J., Tristani, O., Vermeulen, P., Violante, G.L., 2018. Monetary Policy and Household Inequality. resreport 2170. European Central Bank.
- Carlino, G., DeFina, R., 1999. The differential regional effects of monetary policy: Evidence from the u.s. states. *Journal of Regional Science* 39, 339–358.
- Chen, K., Ren, J., Zha, T., 2018. The Nexus of Monetary Policy and Shadow Banking in China. *American Economic Review* 108, 3891–3936.
- Chen, K., Zha, T., 2018. Macroeconomic Effects of China’s Financial Policies. FRB Atlanta Working Paper 2018-12. Federal Reserve Bank of Atlanta.
- Dietrich Domanski, Michela Scatigna, A.Z., 2016. Wealth inequality and monetary policy. Technical Report.
- Dominguez-Torres, H., Hierro, L.A., 2019. The regional effects of monetary policy: A survey of the empirical literature. *Journal of Economic Surveys* 33, 604–638.
- El-Shagi, M., Jiang, L., forthcoming. China monetary policy transmission in china: Dual shocks with dual bond markets. *Macroeconomic Dynamics* .
- Georgopoulos, G., 2009. Measuring regional effects of monetary policy in canada. *Applied Economics* 41, 2093–2113.
- He, D., Wang, H., 2012. Dual-Track Interest Rates and the Conduct of Monetary Policy in China. *China Economic Review* 23, 928–947.
- Huang, Y., Luk, P., 2020. Measuring economic policy uncertainty in China. *China Economic Review* 59.
- Pizzuto, P., 2020. Regional effects of monetary policy in the u.s.: An empirical re-assessment. *Economics Letters* 190, 109062.
- Romer, C.D., Romer, D.H., 1989. Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz. Working Paper 2966. National Bureau of Economic Research. doi:10.3386/w2966.
- Romer, C.D., Romer, D.H., 1994. Monetary policy matters. *Journal of Monetary Economics* 34, 75–88.
- Romer, C.D., Romer, D.H., 2004. A new measure of monetary shocks: Derivation and implications. *American Economic Review* 94, 1055–1084.

Sun, R., 2013. Does monetary policy matter in china? a narrative approach. *China Economic Review* 26, 56 – 74.

Sun, R., 2018. A Narrative indicator of Monetary Conditions in China. *International Journal of Central Banking* 14, 1–42.

Appendix

Appendix A: Search algorithm

While standard panel software deals with individual and time fixed effects through demeaning, group-time fixed effects (such as our province/year fixed effects) are typically included as dummy variables, yielding fairly large correlation matrices that have to be inverted. A single run of the model takes several seconds. To avoid this issue, we remove all fixed effects before estimation.

Defining $p_{zijt} = \text{poor}_{ijt} \text{term}_{zt}$, where z is the index for the term in question, we estimate:

$$\Delta l_{ijt} = v_{jt} + u_i + \varepsilon_{ijt}. \quad (3)$$

and for each word z :

$$p_{zijt} = \phi_{zjt} + \psi_z i + \eta_{zijt}. \quad (4)$$

We then define $\ddot{l}_{ijt} = \hat{\varepsilon}_{ijt}$ and $\ddot{p}_{zijt} = \hat{\varepsilon}_{zijt}$.

Based on the adjusted word indicator interactions with the poverty label it is trivial to produce the corresponding adjusted interactions of any policy indicator and the poverty label through:

$$\ddot{P}(Z)_{ijt} = \sum_{z \in Z} \ddot{p}_{zijt}, \quad (5)$$

where Z is the set of terms used for candidate policy index $\ddot{P}(Z)$.

A simple one-coefficient OLS model runs in approximately 2 milliseconds on our equipment, increasing the computational speed a thousandfold.

We can, however, increase speed further. Our coefficient estimate for β_0 based on the set of words Z is then given by:

$$\hat{\beta}_0(Z) = \frac{\sum_{t=1}^T \sum_{i=1}^N \ddot{P}(Z)_{ijt} \ddot{l}_{ijt}}{\sum_{t=1}^T \sum_{i=1}^N \ddot{P}(Z)_{ijt} \ddot{P}(Z)_{ijt}} \quad (6)$$

or

$$\hat{\beta}_0(Z) = \frac{\sum_{t=1}^T \sum_{i=1}^N \sum_{z \in Z} \ddot{p}_{pijt} \ddot{l}_{ijt}}{\sum_{t=1}^T \sum_{i=1}^N \sum_{z_1 \in Z} \sum_{z_2 \in Z} \ddot{p}_{z_1ijt} \ddot{p}_{z_2ijt}}. \quad (7)$$

The latter notation shows that all coefficients can trivially be computed from elements of the covariance matrix of all \ddot{p}_z and the matrix products of \ddot{l} and the various \ddot{p}_z .

In other words, rather than summing over our almost 14,000 observations (indicated by the $\sum_{t=1}^T \sum_{i=1}^N$ component of the equation) 4 million times for our 4 million regressions, we can do it once based on the individual words. Then, for each regressions, we merely have to add the few selected elements from the matrices described above, doubling the computational speed compared to running the single-coefficient OLS model.

Appendix B: Robustness test

[Table 6 about here.]

[Table 7 about here.]

Table 1: Income distribution by province in 2012

Province	counties	share of poor	Per capita income in the ... county			
			poorest	richest	richest poor	poorest rich
Yunnan	75	0.61	6111	78927	24537	12792
Inner Mongolia	57	0.28	14950	393885	34441	21826
Jilin	36	0.22	21814	60280	39491	22819
Sichuan	94	0.24	6410	55174	24031	9425
Ningxia	11	0.55	7335	104620	29562	40572
Anhui	55	0.27	5049	59935	18830	7888
Shandong	26	0.00	23283	119413		23283
Shanxi	94	0.37	5804	85830	44646	8486
Guangdong	58	0.00	6924	100296		6924
Guangxi	46	0.28	6980	44607	26295	8941
Xinjiang	61	0.33	4697	200058	35722	9688
Jiangsu	48	0.00	19617	369502		19617
Jiangxi	74	0.28	7236	44880	27915	7770
Hebei	120	0.29	8078	121746	41798	9248
Henan	104	0.29	9682	95156	46370	9682
Zhejiang	49	0.00	13471	139583		13471
Hainan	9	0.22	8961	29865	20145	8961
Hubei	57	0.37	8984	86184	28264	10277
Hunan	71	0.24	7728	107854	21481	9719
Gansu	60	0.6	3691	81410	59478	3691
Fujian	51	0.00	15017	156295	0	15017
Guizhou	55	0.62	5576	48451	15608	7475
Liaoning	28	0.00	10393	105930		10393
Shaanxi	72	0.58	11684	173277	85591	11684
Heilongjiang	61	0.23	4587	159029	79940	4587

Table 2: Keywords for monetary policy related to poor regions

Chinese	English	Optimized ¹
<i>Agriculture</i>		
三农	short for agricultural sector, rural areas and rural residents ²	
农村	rural/rural areas	
涉农	agro-linked	X
支农	support agricultural sector, rural areas and rural residents	
农业	agriculture	
农林牧渔	agriculture, forestry, animal husbandry and fishery	
农民	farmer/rural residents	X
农户	rural households	
<i>Poverty</i>		
贫困	impoverished	X
脱贫	poverty alleviation/poverty reduction	
扶贫	poverty alleviation/poverty reduction	
<i>Finance</i>		
普惠金融	inclusive finance	
<i>Development</i>		
政策性	policy ³	
开发性	development oriented/develop	
欠发达	less-developed	
<i>Regional</i>		
区域性	regional	
区域发展	regional development	
区域协调	balanced regional development	
区域经济	regional/regional economy	

Note: ¹ In addition to the economic groupings, we run search algorithm (described in subsection 4.2) to derive the indicator with the highest explanatory power.

² 三农 is a neologism, describing a wide range of issues related to agriculture. There is no similarly short English translation.

³ Although 政策性 is typically merely translated as “policy” it is clear from the use in PBoC documents, that it refers almost exclusively to policies aiming to promote the catching up of rural regions.

Table 3: Correlation of development policy and “regular” monetary policy

Annual Data							
	Agriculture	Poverty	Development	Financial	Regional	Optimized	Repo
Agriculture	1.00						
Poverty	0.12	1.00					
Development	0.14	0.46	1.00				
Financial	-0.06	0.80	0.60	1.00			
Regional	0.81	-0.03	0.17	-0.12	1.00		
Optimized	0.62	0.70	0.31	0.47	0.59	1.00	
Repo	0.57	0.20	-0.01	0.23	0.62	0.62	1.00

Quarterly Data							
	Agriculture	Poverty	Development	Financial	Regional	Optimized	Repo
Agriculture	1.00						
Poverty	0.09	1.00					
Development	0.16	0.42	1.00				
Financial	0.01	0.63	0.41	1.00			
Regional	0.59	0.00	0.13	-0.06	1.00		
Optimized	0.56	0.61	0.27	0.33	0.46	1.00	
Repo	0.38	0.18	0.00	0.17	0.50	0.48	1.00

Note: Our measure for the general monetary policy stance is the 7-day interbank repo rate. Significant correlations of word count indicators with the repo rate at the 5% level are highlighted bold. All further analysis is done based on annual data. The quarterly data are available on request.

Table 4: Results

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Loan growth (in %)					
IGDPpc	8.758*** (3.121)	-0.556 (1.831)	1.263 (1.889)	-0.660 (1.826)	2.333 (1.940)	2.647 (1.920)
Agriculture×poor	0.0296** (0.0134)					
Agriculture×IGDPpc	-0.0788*** (0.0201)					
Poverty×poor		0.0614** (0.0241)				
Poverty×IGDPpc		-0.104*** (0.0185)				
Development×poor			0.0635 (0.0388)			
Development×IGDPpc			-0.112*** (0.0273)			
Financial×poor				0.246 (0.168)		
Financial×IGDPpc				-0.887*** (0.125)		
Regional×poor					0.0897 (0.0590)	
Regional×IGDPpc					-0.245*** (0.0454)	
Optimized×poor						0.196*** (0.0450)
Optimized×IGDPpc						-0.246*** (0.0401)
Constant	19.78 (18.79)	65.93*** (20.48)	29.95 (19.20)	63.01*** (19.83)	6.310 (19.09)	59.87*** (19.52)
Observations	13,413	13,413	13,413	13,413	13,413	13,413
R-squared	0.243	0.244	0.243	0.245	0.244	0.249
Number of countyID	1,669	1,669	1,669	1,669	1,669	1,669
Province/Time Effects	YES	YES	YES	YES	YES	YES
CountyFE	YES	YES	YES	YES	YES	YES
SD(policy)	17.54	13.29	8.804	1.990	6.072	8.392

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 5: Subgroup regressions

VARIABLES	Dependent Variable: Loan growth (in %)			
	Geographic division			
Group	East	Middle	West	
IGDPPc	2.516 (4.190)	5.652* (2.972)	0.684 (3.339)	
Selection × poor	0.114 (0.0921)	0.159** (0.0616)	0.231*** (0.0825)	
Selection × IGDPPc	-0.150** (0.0591)	-0.352*** (0.0631)	-0.224*** (0.0807)	
Constant	28.06 (51.68)	59.37** (25.82)	66.82** (31.03)	
Observations	3,635	5,224	4,554	
R-squared	0.354	0.307	0.168	
Number of countyID	469	640	560	
Fiscal division				
Group	Low spending	High spending
IGDPPc	-0.0652 (4.851)	5.651* (3.133)	2.732 (5.537)	-1.869 (3.227)
Selection × poor	0.283* (0.154)	0.209*** (0.0720)	0.113 (0.0799)	0.191** (0.0835)
Selection × IGDPPc	-0.0840 (0.127)	-0.351*** (0.0776)	-0.236*** (0.0868)	-0.235*** (0.0550)
Constant	33.78 (45.42)	47.62* (27.66)	53.97 (51.73)	99.79*** (37.54)
Observations	2,362	4,093	2,742	4,216
R-squared	0.260	0.203	0.248	0.345
Number of countyID	295	490	342	542
SME-based division				
Group	Few SME	Many SME
IGDPPc	-0.252 (3.585)	-0.502 (4.549)	5.230* (3.046)	4.400 (3.395)
Selection × poor	0.270*** (0.0807)	0.228*** (0.0860)	0.00429 (0.0816)	0.239** (0.105)
Selection × IGDPPc	-0.146* (0.0792)	-0.267*** (0.0662)	-0.317*** (0.0830)	-0.257*** (0.0877)
Constant	53.57* (32.08)	84.67* (48.31)	45.24 (30.92)	25.70 (31.37)
Observations	3,284	3,981	3,097	3,051
R-squared	0.336	0.246	0.275	0.190
Number of countyID	407	521	376	365
SOE-based division				
Group	Few SOE	Many SOE
IGDPPc	3.975 (3.598)	9.225** (4.591)	1.328 (3.159)	-5.555 (3.753)
Selection × poor	0.218** (0.0993)	0.0431 (0.137)	0.162*** (0.0616)	0.229** (0.111)
Selection × IGDPPc	-0.152 (0.0928)	-0.334*** (0.101)	-0.389*** (0.0750)	-0.152*** (0.0558)
Constant	12.39 (33.24)	5.830 (44.96)	108.6*** (29.31)	113.3*** (42.39)
Observations	3,376	1,943	4,388	3,706
R-squared	0.199	0.219	0.266	0.368
Number of countyID	410	236	532	491

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Results of robustness test 1 – simplified model

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Loan growth (in %)					
Rural×poor	0.0404*** (0.0126)					
Rural×IGDPpc	-0.0278** (0.0120)					
Poverty×poor		0.0604** (0.0239)				
Poverty×IGDPpc		-0.105*** (0.0186)				
Develop×poor			0.0697* (0.0382)			
Develop×IGDPpc			-0.101*** (0.0282)			
ruralFinancial×poor				0.238 (0.167)		
ruralFinancial×IGDPpc				-0.890*** (0.125)		
RegionalDev×poor					0.108* (0.0585)	
RegionalDev×IGDPpc					-0.216*** (0.0432)	
Selection×poor						0.213*** (0.0442)
Selection×IGDPpc						-0.221*** (0.0380)
Constant	46.07*** (15.07)	60.53*** (8.752)	40.10*** (7.842)	56.42*** (6.275)	28.21*** (3.164)	79.28*** (11.86)
Observations	13,413	13,413	13,413	13,413	13,413	13,413
R-squared	0.243	0.244	0.242	0.245	0.244	0.249
Number of countyID	1,669	1,669	1,669	1,669	1,669	1,669
Province/Time Effects	YES	YES	YES	YES	YES	YES
CountyFE	YES	YES	YES	YES	YES	YES
SD(policy)	17.54	13.29	8.804	1.990	6.072	8.392

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 7: Results of robustness test 2 – model including GDP growth

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Loan growth (in %)					
growth	0.0766*** (0.0208)	0.0774*** (0.0209)	0.0773*** (0.0209)	0.0728*** (0.0209)	0.0744*** (0.0208)	0.0770*** (0.0206)
IGDPpc	6.510** (3.301)	-2.600 (2.039)	-0.905 (2.104)	-2.588 (2.034)	0.264 (2.150)	0.493 (2.124)
Rural×poor	0.0296** (0.0134)					
Rural×IGDPpc	-0.0766*** (0.0203)					
Poverty×poor		0.0662*** (0.0242)				
Poverty×IGDPpc		-0.0986*** (0.0185)				
Develop×poor			0.0668* (0.0388)			
Develop×IGDPpc			-0.104*** (0.0274)			
ruralFinancial×poor				0.286* (0.169)		
ruralFinancial×IGDPpc				-0.835*** (0.125)		
RegionalDev×poor					0.0944 (0.0590)	
RegionalDev×IGDPpc					-0.234*** (0.0455)	
Selection×poor						0.205*** (0.0450)
Selection×IGDPpc						-0.238*** (0.0401)
Constant	39.67* (20.80)	83.89*** (22.06)	49.60** (21.16)	79.72*** (21.48)	26.31 (21.16)	78.89*** (21.22)
Observations	13,315	13,315	13,315	13,315	13,315	13,315
R-squared	0.245	0.246	0.244	0.247	0.246	0.251
Number of countyID	1,669	1,669	1,669	1,669	1,669	1,669
Province/Time Effects	YES	YES	YES	YES	YES	YES
CountyFE	YES	YES	YES	YES	YES	YES
SD(policy)	17.54	13.29	8.804	1.990	6.072	8.392

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

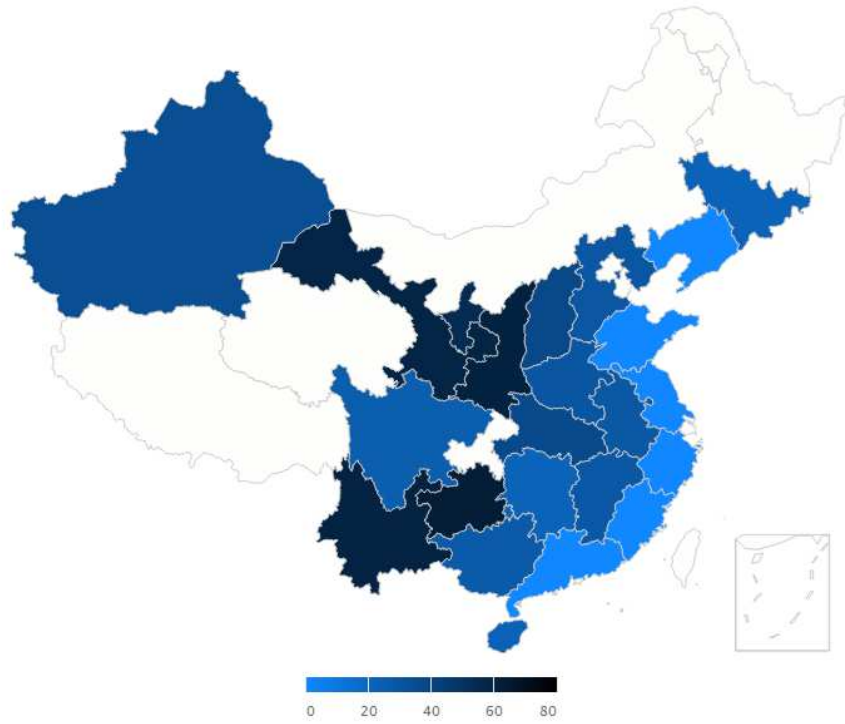


Figure 1: The share of poor counties in Chinese provinces

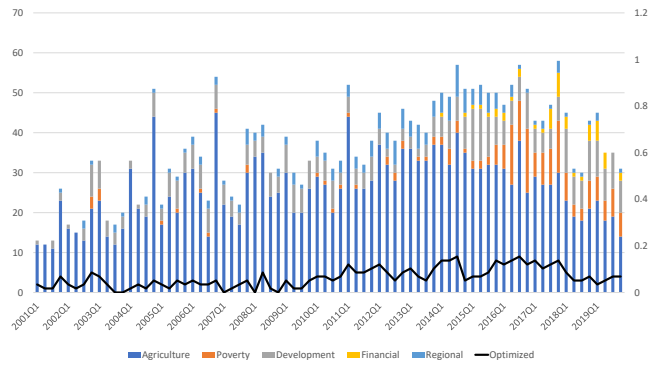


Figure 2: Keyword occurrences by report

Note: The solid line represents the optimized indicator using the words 支农 (Agriculture, word 3), 农民 (Agriculture, word 7) and 贫困 (Poverty, word 1).

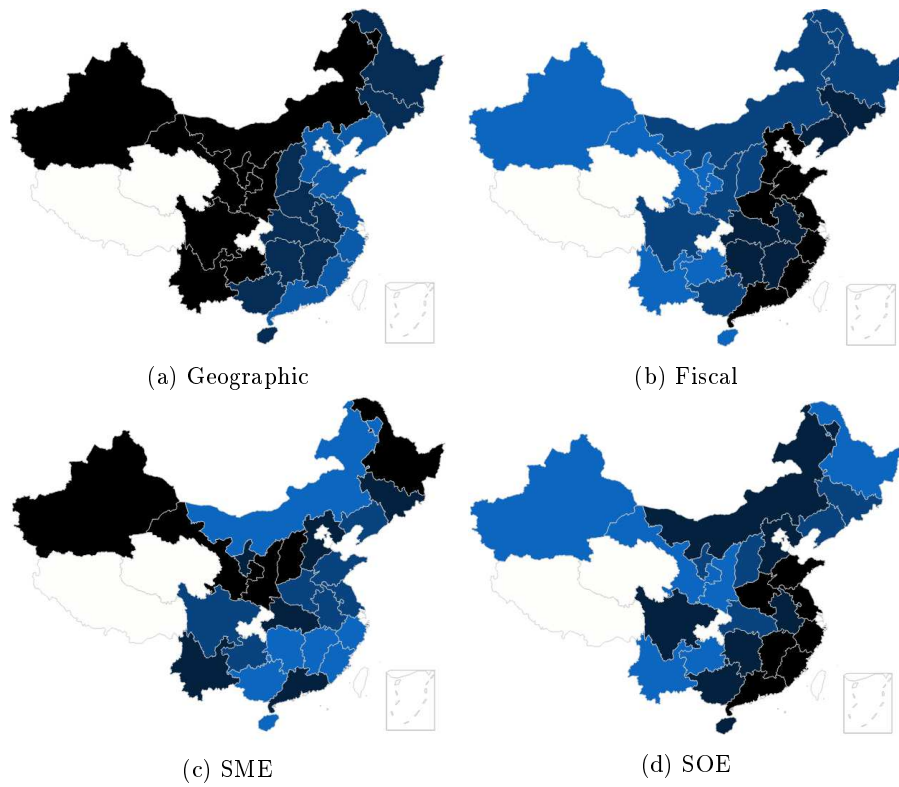


Figure 3: Regional sample split by different criteria

Note: Geographic is from East to West, the other divisions are by fiscal expenditure, share of small and medium enterprises (SMEs), and state-owned enterprises (SOEs) from light blue for low values to dark blue for high values.