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The nexus of peer-to-peer lending and monetary policy transmission: Evidence from the People's Republic of China

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THE NEXUS OF PEER-TO-PEER LENDING AND MONETARY POLICY TRANSMISSION

EVIDENCE FROM THE PEOPLE'S REPUBLIC OF CHINA

Nuobu Renzhi and John Beirne

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ABSTRACT

This paper empirically investigates how the level of peer-to-peer (P2P) lending affects monetary policy transmission in the People's Republic of China (PRC). Using statedependent local projection methods, we find that the macroeconomic effects of unanticipated changes in monetary policy are dampened during the boom phase of the P2P lending market. The impulse responses of industrial production and inflation are significantly negative in the non-boom state. In contrast, the responses of industrial production and inflation are muted in the boom state. Set against the context of stricter regulation on P2P lending since 2017, our results indicate that the significant scaling back of P2P lending activity and its gradual decline in the PRC could enhance the effectiveness of monetary policy transmission. Our paper also suggests that further work is needed to study the interaction between financial innovation and monetary policy.

Keywords: peer-to-peer lending, monetary policy transmission, fintech

JEL Codes: E44, E52, F33, F42

1. Introduction

The financial system plays a central role in transmitting monetary policy to the real economy. In recent years, the rapid development in the financial technology (Fintech) industry has greatly influenced the financial system. Taking advantage of digitization and big data techniques, Fintech has played an important role in making progress toward financial inclusion and better access to credit for consumers, entrepreneurs, start-ups, and small and medium-sized enterprises (SMEs) at a lower cost (Philippon, 2016). On the other hand, the Fintech industry may amplify the recent trend that credit intermediation is shifting away from traditional banks to nonbank finance, leading to a more diverse financial system (Bernoth et al., 2017). In this sense, Fintech may also bring new risks to the financial system, which could pose challenges to central banks in achieving their mandates.

Among Fintech businesses, peer-to-peer (P2P) lending, allowing individuals and small businesses to borrow and lend on an online platform without the presence of traditional financial institutions, has been a leading alternative finance format. Benefiting from being a market leader in digital technologies and a lax regulatory environment, the P2P lending industry in the People's Republic of China (PRC) experienced rapid growth and served as a dominant driver of the global nonbank finance market in earlier years. The PRC's P2P lending industry soared from a volume of CNY252 billion in 2014 to CNY2,804 billion by 2017, peaking at around 30% as a share of total new bank lending.

This boom in the P2P lending market turned into a considerable decrease at the end of 2017, when regulators imposed a set of policy measures on the sector. While the regulation was implemented gradually, this was aimed at dramatically reducing risk across the PRC's financial system (Hsu et al., 2021). As noted by Huang et al. (2021), a further strict regulatory policy for the P2P lending market, jointly announced by the People's Bank of China (PBoC) and the China Banking and Insurance Regulatory Commission at the end of 2017, aimed to regulate cash loans, prohibit illegal financing, and abolish the practice of using funds for student loans, investment speculation, and down payments on real estate. Such restrictions have affected the P2P lending market significantly. As regulators repeatedly seek to remedy P2P platforms through platform exit and transformation, the number of normal operating platforms continues to decline and soon disappears (Hsu et al., 2021). In 2019, P2P platforms were converted into small loan creditors or completely shut down, essentially eliminating the P2P lending market as it once existed (Figure 1).



Figure 1: Trends in P2P Lending Market Share in the People's Republic of China

P2P = peer-to-peer.

Notes: The figure shows the dynamics of the ratio of new P2P lending to total new bank lending at monthly frequencies. The sample period is from the first month (M1) of 2014 to M12 2019. Sources: WDZJ and CEIC.

However, P2P lending remains an active industry in the United States (US) and other developed economies. P2P lending has also been growing in many developing economies, including in Asia, notably India, Indonesia, Malaysia, the Republic of Korea, the Philippines, and Viet Nam (see Appendix Figure). The findings in this paper are therefore also relevant for other economies with active P2P lending markets. This is particularly the case for economies where P2P lending and fintech industry is likely to continue to grow in the future. Through a systematic investigation of the impact of P2P lending on the transmission of monetary policy in the PRC, the paper provides insights on the implications for central banks.

Specifically, we employ state-dependent local projections as in Jordà (2005) and Ramey and Zubairy (2018) to estimate impulse responses of key macroeconomic variables to an unanticipated contractionary monetary policy change in the PRC, conditioning on the boom and non-boom states of the P2P lending market.

A key issue is to estimate the PRC's monetary policy change series. To reflect the coexistence of quantity and price targeting in the PRC's monetary policy, this paper follows the concept of "shadow policy rate" (Wu and Xia, 2016), using the monetary supply and real short-term rate to construct the shadow policy rate (Xu and Jia, 2019). To overcome monetary policy endogeneity, we derive a series of identified shadow policy changes, following the approach of Romer and Romer (2004). Using this approach, we orthogonalize shadow policy rate changes against the central bank's responses to current, lagged, and forecastable macroeconomic conditions by assuming a Taylor-type rule to extract the exogenous component. The estimated residuals therefore can be regarded as exogenous monetary policy changes and the basis for the impulse response function

analysis. We estimate the responses of key macroeconomic variables to the estimated unanticipated monetary policy changes and find that industrial production and inflation decline, and the exchange rate increases steadily after a monetary policy tightening. These textbook results suggest the validity of our identification.

To investigate whether the boom of P2P lending can have a moderating effect on the transmission of monetary policy, we use the ratio of new P2P lending to total new bank lending as our state variable and estimate impulse responses for the boom and non-boom states of the P2P lending market. The estimation results indicate clear evidence of heterogeneous effects of unexpected contractionary changes in monetary policy across the two states. The impulse responses of industrial production and inflation are significantly negative in the non-boom state. In contrast, in the boom state of the P2P lending market, the responses of industrial production and inflation are muted and not significantly different from zero for most horizons. These results are robust to a set of sensitivity checks that include alternative monetary policy measures, alternative state definitions, and concerns about additional factors that may affect results.

Overall, the estimated state-dependent effects of unanticipated contractionary monetary policy changes suggest that the ongoing development of P2P finance is negatively associated with the effectiveness of monetary policy transmission. As P2P lending functions as an alternative source of external financing, agents are less constrained by the rising cost of bank credits, dampening the overall impact of contractionary monetary policy on the economy.

The paper contributes to various strands of literature. First, our paper complements the recent empirical studies that examine the effectiveness of monetary policy transmission

in the PRC. Chen et al. (2017) show that the transmission of monetary policy in the PRC has become increasingly similar to that in advanced economies in terms of both output growth and inflation. A similar conclusion is obtained by Kamber and Mohanty (2018), finding that a contractionary monetary policy surprise increases interest rates and significantly reduces inflation and economic activity. Chen et al. (2018) investigate the impacts of monetary policy on banks' shadow banking activities in the PRC. They find that unexpected contractionary monetary policy changes significantly increase shadow banking loans, which impedes the overall effectiveness of monetary policy on total bank credit.

Second, our paper contributes to the literature investigating state dependence in the transmission of unexpected contractionary changes in monetary policy. Using state-dependent local projections, Alpanda and Zubairy (2019) find that the effects of the US monetary policy are less powerful during periods of high household debt. Lo and Piger (2005) investigate regime-switching responses of output to the US monetary policy actions. They find that monetary policy actions taken during recessions have larger effects than those taken during expansions. More recently, Alpanda et al. (2021) examine how phases of the business, credit, and interest rate cycles affect the transmission of monetary policy using a sample of 18 advanced economies. They show that the impact of exogenous monetary policy changes on output and other macroeconomic and financial variables is weaker during periods of economic downturns, low household debt, and high interest rates.

Lastly, our paper contributes to a growing literature analyzing the impact of Fintech innovations on monetary policy transmission. There is substantial disagreement

concerning monetary policy's interaction with Fintech development. While some studies find that the presence of Fintech industry may strengthen the effectiveness of monetary policy associated with increased risk-taking behavior in online finance (Chu and Deng, 2019; Huang et al., 2021; Li, 2020), others provide evidence in favor of dampening effect of the presence of nonbank intermediaries on monetary policy transmission (Allen et al., 2019; Beirne et al., 2023; Mazelis, 2016; Pescatori and Sole, 2016; Wong and Eng, 2020). Overall, there is a lack of consensus in theoretical and empirical literature on the extent and direction of the effect of P2P finance on monetary policy transmission. Building on previous studies, with a focus on the PRC, our paper uses a state-dependent local projection approach to examine the response of macroeconomic variables to unanticipated changes in monetary policy based on the boom and non-boom of P2P lending market, enabling an assessment of the influence of P2P lending on monetary policy transmission.

The remainder of this paper is structured as follows. Section 2 describes the data and outlines the empirical strategy. Section 3 presents the baseline estimates with several robustness checks and extensions. Section 4 concludes.

2. Data and empirical methodology

In this section, we first discuss the identification of unanticipated monetary policy changes. We then describe our data source for the P2P lending market and the macroeconomic variables we use. Finally, we present our econometric framework used to produce the empirical results.

2.1 Identification of unanticipated changes in monetary policy

The goal of this paper is to examine whether P2P lending affects the effectiveness of the PRC's monetary policy. As such, we face the usual identification issue for exogenous changes in monetary policy. However, finding an appropriate monetary policy shock series for the PRC remains challenging. It is known that the PBoC uses multiple monetary policy instruments, including the required reserve ratio, the central bank lending rate, and the money supply (Kamber and Mohanty, 2018). Therefore, selecting either a quantity or price instrument is hard to accurately reflect the monetary policy stance.¹ To reflect the coexistence of quantity and price targeting in the PRC's monetary policy, this paper follows the concept of "shadow policy rate" (Wu and Xia, 2016), using the monetary supply and real short-term rate to construct the shadow policy rate (Xu and Jia, 2019).²

As most of the variation in the central bank's policy rates is due to the systematic response of monetary policy to current or expected future economic performances, it is therefore necessary to orthogonalize shadow policy rate changes against the central bank's forecasts of its macroeconomic targets. Following the spirit of Romer and Romer (2004), we assume a Taylor-type rule to identify the exogenous part of monetary policy variations. A standard approach is to extract the residuals from a three-variable structural VAR (SVAR), where the policy rate is ordered last after output and inflation using a Cholesky decomposition (Christiano et al., 1999). The estimated residuals serve as a measure of unexpected changes in monetary policy. To highlight the importance of macroeconomic forecasts, we incorporate the leading macroeconomic indicator

¹ On the other hand, the PBoC's monetary policy has gradually moved to interest-based over recent years (Kim and Chen, 2022).

² For the detail of the estimation, please refer to Xu and Jia (2019).

estimated by the CEIC database. The CEIC leading indicator is a composite indicator that covers various important sectors of the economy, such as financial markets, the monetary sector, the labor market, trade, and industry, designed to generate contemporaneous forecasts of economic performance.³ Moreover, to account for the exchange rate channel of the monetary policy transmission, we also include the real effective exchange rate in our identification setup. Specifically, a 5-variable structural VAR (SVAR) framework is used to estimate unanticipated changes in monetary policy, which can be denoted as follows:

$$Y_t = A(L)Y_{t-1} + u_t \tag{1}$$

where Y_t refers to a vector of our selected endogenous variables, including the log of real industrial production, inflation rate, the log of real effective exchange rate, the log of macroeconomic leading indicator, and the shadow policy rate; A(L) is a matrix of polynomials in the lag operator L; and u_t is a vector of disturbances. The SVAR includes four lags, which are selected using the Schwarz information criterion (SIC). The identification strategy is based on a block recursive restriction (Christiano et al., 1999), which results in the following matrix A to fit a just identified model:

$$A = \begin{bmatrix} a_{1,1} & 0 & \dots & 0 \\ a_{2,1} & a_{2,2} & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ a_{m,1} & a_{m,2} & \dots & a_{m,n} \end{bmatrix}$$
(2)

The ordering of the variables imposed in the recursive form implies that the variables at the top will not be affected by the contemporaneous innovations to the lower variables

³ Ideally, we would use central bank forecasts as in Romer and Romer (2004), but these are not available for the PRC.

while the lower variables will be affected by the contemporaneous innovations to the upper variables. We place real industrial production at the top of the ordering, which implies that it will only be affected by contemporaneous innovations to itself. Following real industrial production, we place the inflation rate, which implies that inflation will be affected by real industrial production and itself, but not by contemporaneous innovations to other variables. Finally, we place the macroeconomic leading indicator and the exchange rate before the shadow policy rate in the ordering.

We estimate Eq. (1) with a longer sample period spanning the first month (M1) of 2010 to M12 2019 to identify the monetary policy series. These externally identified series can be employed to estimate impulse responses. Figure 2 plots the related series.



Figure 2: Monthly Series of Unanticipated Monetary Policy Changes

Notes: The figure shows the evolution of unanticipated changes in monetary policy at monthly frequencies. The monetary policy series is estimated with the sample period spanning from the first month (M1) of 2010 to M12 2019.

Source: Authors' calculations.

2.2 Data

Our data set covers monthly time series from M1 2014 to M12 2019 for the PRC. The sample period is restricted by the availability of the P2P lending market data, obtained from Wang Dai Zhi Jia (WDZJ).⁴ WDZJ provides comprehensive statistics on various P2P platforms in the PRC, for the purpose of the study, we choose the following variables of interest. The first variable is the volume of monthly P2P lending transactions, which is a measure of P2P lending activity. Second, we include the P2P lending rate measured as a monthly integrated rate of P2P lending, which reflects the return offered to investors and the cost of borrowing. Our third and fourth variables measure the density of P2P lending market participants, namely, the density of borrowers and lenders. The density of P2P borrowers (lenders) is calculated as a share of the number of borrowers (lenders) to the number of platforms.

In addition to these P2P lending market variables, we include two indicators for the real sector. First, we use the industrial production taken from IMF statistics as a measure of monthly output. Second, we utilize the consumer price index (CPI) in the form of year-onyear change as a measure of the inflation rate. Appendix A.1 provides details of all the variables that we used as well as their sources.

2.3 Econometric methodology

Following the framework of Ramey and Zubairy (2018), we use the local projection (LP) proposed in Jordà (2005) to estimate linear as well as state-dependent models and

⁴ The end of the sample is also chosen to avoid possible structural breaks due to the coronavirus disease (COVID-19) pandemic.

calculate impulse responses to exogenous monetary policy changes. LPs have several advantages over the traditional structural vector autoregressive (SVAR) approach. First, LPs are easier to estimate since they simply require the estimation of a series of regressions for each horizon and for each variable of interest. Second, LPs can easily conduct the point or joint-wise inference. Third, using LPs to estimate impulse responses is more robust when a VAR model is misspecified. Last, LPs can be easily extended to a non-linear, state-dependent model by allowing the parameters to change according to the state of the economy.⁵ Our baseline linear model can be given as follows:

$$y_{t+h} = \alpha_h + \Phi_h(L)z_{t-1} + \beta_h shock_t + \varepsilon_{t+h}$$
 $h = 0, 1, 2, \cdots, n$ (3)

where y is the variable of interest, $\Phi_h(L)$ is a polynomial in the lag operator, $shock_t$ is the series of identified unanticipated monetary policy changes, and z is a vector of control variables including contemporaneous and lagged values for y and $shock_t$. Specifically, we let y refer to each of our selected P2P lending market variables (i.e., the log of P2P lending volume, the P2P lending rate, the density of P2P borrowers, and the density of P2P lenders) and the indicators of real sector including the log of industrial production and inflation. Our specification includes 3 months of lagged values of the monetary policy change. The coefficient β_h gives the response of y at time t + h to the change at time t. Thus, one constructs the impulse responses as a sequence of the β_h estimated in a series of separate regressions for each horizon h.

⁵ Unlike regime-switching VARs, state-dependent LPs do not require one to take a stand on the duration of a given state or on the mechanism triggering the transition between regimes.

We can further adapt the LP framework to estimate a state-dependent model given as follows:

$$y_{t+h} = I_{t-1} [\alpha_{A,h} + \Phi_{A,h}(L)z_{t-1} + \beta_{A,h} shock_t] + (1 - I_{t-1}) [\alpha_{B,h} + \Phi_{B,h}(L)z_{t-1} + \beta_{B,h} shock_t] + \varepsilon_{t+h}$$
(4)

where $I_{t-1} \in \{0,1\}$ is a dummy variable that indicates the state of the economy in terms of before the unanticipated change in monetary policy hits. In particular, I_{t-1} takes a value of 1 in the boom state of the P2P lending market and 0 otherwise. We discuss the construction of this dummy variable in more detail in the next subsection. We allow all of the coefficients of the model to vary according to the state of the economy. One particular complication associated with the LP method is the serial correlation in the error terms induced by the successive leading of the dependent variable. Thus, we use the Newey-West correction for our standard errors (Newey and West, 1987).

2.4 Definition of the P2P lending market states

In order to test whether the transmission of monetary policy is affected by the amount of P2P finance activities, we first need to define which periods constitute the boom state of the P2P lending market. We use the ratio of new P2P lending to total new bank lending as our state variable, since this not only reflects the level of P2P lending but also accounts for the relative importance of P2P finance in the credit market. In order to define the boom and non-boom states of the P2P lending market, following Ramey and Zubairy (2018) and Alpanda and Zubairy (2019), we build a gap measure by taking the deviation of the ratio of new P2P lending to total new bank lending from a smooth trend. We construct this trend by running a Hodrick and Prescott (HP) filter with a smoothing parameter, λ =

14,400. We define boom states as periods in which the ratio of new P2P lending to total new bank lending is above the time-varying trend.⁶

3. Empirical results

3.1 Macroeconomic effects of unanticipated changes in monetary policy

To reassure the validity of our identification strategy, we present the responses of key macroeconomic variables to the estimated exogenous monetary policy changes. Figure 3 shows the estimated impulse responses based on the linear model of Eq. (3). The solid line in each graph represents the estimated impulse responses in percentage over the following 10 months to an unexpected contractionary monetary policy change. We normalized the scale of the monetary policy change such that it increases the shadow policy rate by 100 basis points (bps). The dotted lines represent 90% confidence bands based on robust standard errors by Newey and West (1987).





Continued on the next page

⁶ For our sample period, the boom phase corresponds to two distinct intervals: September 2015 to December 2015, and February 2016 to June 2018. The non-boom phase spans the periods from January 2014 to August 2015, January 2016, and from July 2018 to December 2019.

Notes: The figure plots the impulse responses of industrial production, inflation, and real effective exchange rate to a 100-bps unexpected contractionary monetary policy change. 90% confidence bands in dashed lines are reported. The increase in the exchange rate refers to an appreciation of CNY. The horizontal axis represents months. Source: Authors' calculations.

The impulse responses of macroeconomic variables are consistent with the prediction of standard macroeconomic theory, indicating the soundness of our monetary policy series. Following an unexpected contractionary monetary policy change, industrial production decreases persistently with a maximum impact of around 1.8 bps. The inflation rate also shows a dampening and statistically significant effect after the unanticipated tightening. A 100-bps hike is associated with a 0.56% decline in inflation after 10 months. The real effective exchange rate yields similar responses: a monetary policy tightening leads to a persistent increase in the exchange rate (i.e. an appreciation of CNY). Our results are consistent with the findings of other empirical studies dealing specifically with monetary policy transmission in the PRC (Chen et al., 2017; Kamber and Mohanty, 2018).

3.2 Responses of P2P lending markets to unanticipated monetary policy changes

Turning to P2P lending market variables, the impulse responses shown in Figure 4 are strongly in line with the related literature, particularly, the theoretical framework of Wong and Eng (2020). With an unexpected monetary policy tightening that temporarily increases the policy rate by 100 bps, agents' access to traditional bank finance is constrained, incentivizing agents to seek financing toward P2P lending markets (Hsu et al., 2021). As more agents flow into P2P lending markets, the borrowers' density increases persistently, with a maximum of around 0.2%. Moreover, with a denser pool of borrowers in the P2P lending market, implying there are more investment options, the density of P2P lenders increases steadily with a peak effect of 0.17%. Given the

processing fee (Hsu et al., 2021), P2P lenders are willing to accept a lower lending rate as long as the pool of borrowers is denser. We can observe that there is a short-term drop in the P2P lending rate right after the unanticipated tightening in monetary policy, peaking at –0.3%. In addition, the P2P lending volume rises steadily and significantly with a peak effect of around 0.15%.

While it may be expected that P2P lending rates should rise following a tightening in monetary policy, given the rise in demand for P2P lending, a lowering in P2P rates can also occur for several reasons. For example, searching for yield by investors in a higher interest rate environment could lead to portfolio reallocation towards fixed income investment, thereby lowering the supply of funds available for P2P lending and potentially leading to lower P2P lending rates. In addition, in a higher interest rate environment where the risk of default is higher, P2P lenders may lower rates to attract high-quality borrowers. This can also help to lower the risk exposure of the P2P lenders' portfolio. It can also be the case that a tightening in monetary policy triggers a contraction in economic activity and overall lending, such that P2P lenders may offer lower rates to incentivize borrowing (e.g. Wong and Eng, 2020).



Figure 4: Impulse Responses of P2P Lending Market Variables to an Unexpected Contractionary Monetary Policy Change

P2P = peer-to-peer.

Notes: The figure plots the impulse responses of P2P lending market variables to a 100-bps unexpected contractionary monetary policy change. 90% confidence bands in dashed lines are reported. The horizontal axis represents months. Source: Authors' calculations.

Hence, we find that contractionary exogenous monetary policy changes may trigger an increase in P2P finance activities, which could potentially become a source of financial distress and have implications for monetary policy transmission.

3.3 State-dependent effects of unanticipated monetary policy changes

In this part of the analysis, we allow the responses of industrial production and inflation to unanticipated monetary policy changes to vary across states of the P2P lending market.

Figure 5 shows the impulse responses to a contractionary monetary policy change for the two states of the P2P lending market, namely the non-boom (left panel) and the boom (right panel). A comparison of these two panels reveals the impact of P2P finance on monetary policy transmission. Note that the responses of industrial production and inflation are significantly negative in the non-boom state. They are also shaped similarly to the baseline linear case and are typically of a larger magnitude relative to the baseline linear model. In particular, the inflation rate response peaks at 0.75% in response to an unanticipated 100 bps monetary policy tightening in the non-boom state, relative to 0.56% in the baseline model. Industrial production also significantly declines in the non-boom state relative to the baseline case, especially for the initial periods. In contrast, in the boom of the P2P lending market, we find that the negative response of inflation becomes statistically significant only after 10 months, while the responses of industrial production are also muted and are not significantly different from zero for most horizons.





Notes: The figure plots the impulse responses of industrial production and inflation to an unexpected 100bps contractionary monetary policy change for the boom and non-boom states of the P2P lending market. We define boom states as periods in which the ratio of new P2P lending to total new bank lending is above the time-varying trend constructed by running a HP filter with a smoothing parameter, λ = 14,400. 90% confidence bands in dashed lines are reported. The horizontal axis represents months. Source: Authors' calculations.

The estimated state-dependent effects of exogenous monetary policy tightening suggest that the ongoing development of P2P finance is negatively associated with the effectiveness of monetary policy transmission. As P2P lending functions as an alternative

source of external financing, agents are less constrained by the rising cost of bank credits, dampening the overall impact of contractionary monetary policy on the economy.

3.4 Robustness

3.4.1 Alternative measure of unanticipated monetary policy changes

Thus far, we have followed the standard approach by assuming a Taylor-type rule to extract the exogenous components of policy rate variations as a measure of unexpected monetary policy changes. Next, we conduct the same analysis as in the previous subsection but use a narrative series as an alternative measure to capture the PBoC's policy stance. In this paper, we rely on the approach by Sun (2018), using a narrative monetary policy stance index to measure the PBoC's policy stance based on the information from the PBoC's policy announcements.⁷ We convert the series of monetary policy stance from a meeting frequency into a monthly time series by assigning indexes to the month in which it occurred. If there are multiple meetings within a period, then we aggregate the associated index by summing up indexes within that time period. If there are no policy meetings, the corresponding index is set to zero.

Figure 6 reports state-dependent impulse responses based on the monetary policy stance index. We also normalized the scale of the monetary policy stance unanticipated change such that it increases the shadow policy rate by 100 bps. The results are very similar when using alternative measurements of unexpected changes in monetary policy.

⁷ However, using policy announcements as the policy instrument may also call into question. When the central bank makes announcements, it does not only present pure monetary policy news, but also private information on the economy, causing the private sector to switch its outlook on macroeconomic developments (Bu et al., 2021). Thus, monetary policy news may still reflect changes in economic fundamentals not related to monetary policy. For these concerns, we only use narrative monetary policy index as a robustness check.

Our key findings remain robust as responses of both industrial production and inflation in the non-boom state of the P2P lending market tend to be stronger than the responses in the boom state.





(b) Inflation Rate



Notes: The figure plots the impulse responses of industrial production and inflation to an unexpected 100bps contractionary monetary policy change for the boom and non-boom states of the P2P lending market, using the monetary policy stance index. 90% confidence bands in dashed lines are reported. The horizontal axis represents months.

Source: Authors' calculations.

3.4.2 Alternative measure of the P2P lending market states

Our second experiment is to conduct a robustness check of our state-dependent impulse responses using an alternative state variable of the P2P lending market. We base our state variable on the number of new P2P platforms since this not only reflects the level of P2P lending activities but also accounts for the impacts of regulation policies. As noted by Huang et al. (2021), a set of strict regulatory policies for the P2P lending market, jointly announced by the PBoC and the China Banking and Insurance Regulatory Commission, have significantly affected the P2P lending market. As regulators repeatedly seek to remedy P2P platforms through platform exit and transformation, the number of normal operating platforms continues to decline and soon disappear (Hsu et al., 2021). To define the boom and non-boom states of the P2P lending market, following the approach by Auerbach and Gorodnichenko (2012), we construct a threshold measured by the average number of new P2P platforms over the sample period.⁸ The threshold is therefore dividing the data into the boom and non-boom states of the P2P lending market.

Figure 7 shows the impulse responses to an unanticipated contractionary monetary policy change for the boom and non-boom states of the P2P lending market, using the number of new P2P platforms as an alternative measure of the state variable. Once again, the impulse responses of industrial production and inflation are significantly negative in the non-boom state. In contrast, the effects of monetary policy on industrial production and inflation are more muted and statistically insignificant in the boom state of the P2P lending market.

⁸ The threshold of 79.94 is applied to the number of new P2P platforms.

Figure 7: State-Dependent Impulse Responses to an Unexpected Contractionary Monetary Policy Change: Alternative State Variable of P2P Lending Market



(a) Industrial Production

P2P = peer-to-peer.

Notes: The figure plots the impulse responses of industrial production and inflation to an unexpected 100bps contractionary monetary policy change for the boom and non-boom states of the P2P lending market, using the number of new P2P platforms as the state variable. Alternative boom states are defined as periods in which the number of new P2P platforms is above the threshold of 79.94. 90% confidence bands in dashed lines are reported. The horizontal axis represents months. Source: Authors' calculations.

3.4.2 Impulse responses conditioning on economic policy uncertainty

Thus far, we have focused on the effects of an unanticipated tightening in monetary policy, which refers to a first-moment innovation that captures exogenous variations in the expected path of the policy rate. On the other hand, a second-moment innovation, namely the economic policy uncertainty also has potential impacts on the monetary policy transmission (De Pooter et al., 2021). To explore whether monetary policy uncertainty may alter the findings of state-dependent effects of monetary policy, we modify the specification of Eq. (4) by including contemporaneous and lagged values of economic policy uncertainty in z as extra controls. We use monthly PRC economic policy uncertainty (EPU) index series compiled by Huang and Luk (2020), which uses the information from a large number of Chinese newspapers.⁹

Figure 8 reports the impulse responses to an unexpected contractionary monetary policy change for the boom and non-boom states of the P2P lending market, controlling for economic policy uncertainty. The results are very similar to our baseline findings above. The estimated results show that the impulse responses of industrial production and inflation in the non-boom state are significantly larger than the responses in a boom state. Overall, our findings further provide evidence of state dependence on the macroeconomic effects of monetary policy shock based on the state of the P2P lending market.

⁹ Huang and Luk (2020)'s index has two main advantages over a similar PRC EPU index constructed by Baker et al. (2016). First, it averages out idiosyncrasies in individual newspapers and gets a better measure of uncertainty. Second, taking advantage of the large number of newspapers, it is less affected by potential media bias.

Figure 8: State-Dependent Impulse Responses to an Unexpected Contractionary Monetary Policy Change: Conditioning on Economic Policy Uncertainty



(a) Industrial Production

Notes: The figure plots the impulse responses of industrial production and inflation to an unexpected 100 bps contractionary monetary policy change for the boom and non-boom states of P2P lending market, controlling for economic policy uncertainty. 90% confidence bands in dashed lines are reported. The horizontal axis represents months. Source: Authors' calculations.

To sum up, we find that our estimated state-dependent effects of unanticipated changes in monetary policy are robust, using an alternative measure of monetary policy changes and the state variable of the P2P lending market as well as controlling for economic policy uncertainty. These robustness checks lead us to conclude that the role of monetary policy in cooling the economy could be affected when the P2P lending market is booming.

4. Conclusions

In this paper, we examine the impacts of P2P lending on monetary policy transmission in the People's Republic of China (PRC) by employing a state-dependent local projection method. The estimated results show that the impulse responses of macroeconomic variables in the non-boom state of the P2P lending market are significantly larger than the responses in the boom state, implying that the ongoing development of P2P finance is negatively associated with the effectiveness of monetary policy transmission.

Our findings are set against the context of a gradual decline of P2P lending activity in the PRC since 2017, following the introduction of regulatory measures aimed at addressing financial stability risks associated with the practice. While P2P lending could benefit the wider economy through the well-documented financial inclusion channel, regulatory arbitrage vis-a-vis the traditional banking sector could have implications on the effectiveness of monetary policy transmission. Under this latter case, a tightening in monetary policy may not be necessarily reflected in the P2P market. Recognizing that the sharp growth of P2P lending as a financing mechanism, measures introduced by financial supervisors effectively regulated P2P lending. Only a few P2P lending operators exist in the market, transformed under more licensed conditions, while strict regulation ensures that financial stability risks are mitigated.

Our paper suggests that recent developments as regards the P2P lending market in the PRC, while helping to address financial exposures linked to regulatory arbitrage, can

be beneficial to effective transmission of traditional monetary policy. From a wider policy perspective, however, supporting longer-term productive capacity and promoting financial inclusion should be taken into account. The paper's state-dependent analysis is also relevant for other economies with active P2P lending markets and how the effectiveness of monetary policy transmission can differ across boom and non-boom phases of P2P lending activity. Going forward, it will be important for policy makers to explore further mechanisms that would enable the growth of financial innovation to enhance access to finance in a manner that is consistent with the effectiveness of monetary policy transmission while at the same time being sufficiently robust to potential financial stability disturbances. Research on tailoring the design of regulatory sandboxes, including comprehensive scenario analyses and simulations across alternative states of the economy, would be an important avenue of future research.

APPENDIX

A.1 Data definitions and sources

Industrial Production: Monthly industrial production index with seasonally-adjusted, IMF Statistics. Variation from the inflation changes is adjusted.

Inflation Rate: Monthly consumer price index in the form of year-on-year change, National Bureau of Statistics of the People's Republic of China.

P2P Lending Volume: Monthly P2P lending transaction volume, Wang Dai Zhi Jia.

P2P Lending Rate: Monthly integrated rate of P2P lending, Wang Dai Zhi Jia.

Density of P2P Borrowers: Share of the number of borrowers to the number of platforms in a monthly frequency, Wang Dai Zhi Jia.

Density of P2P Lenders: Share of the number of lenders to the number of platforms in a monthly frequency, Wang Dai Zhi Jia.

Shadow policy rate: Monthly shadow short rate series constructed by using monetary supply and real short-term interest rate, Xu and Jia (2019).

Economic policy uncertainty: Monthly PRC economic policy uncertainty index series constructed by Huang and Luk (2020).

A.2 P2P lending in selected Asian economies





IND = India, INO = Indonesia, KOR = Republic of Korea, MAL = Malaysia, P2P = peer-to-peer, PAK = Pakistan, PHI = Philippines, SIN = Singapore, VIE = Viet Nam.

Notes: The figure shows the dynamics of P2P lending volumes (in logarithm) in emerging Asian economies. The sample period is from 2013 to 2020. The data come from the Cambridge Centre for Alternative Finance. Source: Authors' calculations.

REFERENCES

- Allen, F., Qian, Y., Tu, G., and Yu, F. (2019). Entrusted loans: A close look at China's shadow banking system. Journal of Financial Economics, 133(1), 18–41.
- Alpanda, S., Granziera, E., and Zubairy, S. (2021). State dependence of monetary policy across business, credit and interest rate cycles. European Economic Review, 140, 103936.
- Alpanda, S., and Zubairy, S. (2019). Household debt overhang and transmission of monetary policy. Journal of Money, Credit and Banking, 51(5), 1265–1307.
- Auerbach, A. J., and Gorodnichenko, Y. (2012). Measuring the output responses to fiscal policy. American Economic Journal: Economic Policy, 4(2), 1-27.
- Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. The Quarterly Journal of Economics, 131(4), 1593–1636.
- Beirne, J., Renzhi, N., and Volz, U. (2023). Non-bank finance and monetary policy transmission in Asia. Emerging Markets Finance and Trade, 59(6), 1976–1991.
- Bernoth, K., Gebauer, S., and Schafer, D. (2017). Monetary policy implications of financial innovation. Monetary Policy Implication of Financial Innovation.
- Bu, C., Rogers, J., and Wu, W. (2021). A unified measure of fed monetary policy shocks. Journal of Monetary Economics, 118, 331–349.
- Buchak, G., Matvos, G., Piskorski, T., and Seru, A. (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. Journal of Financial Economics, 130(3), 453–483.
- Chen, H., Chow, K., and Tillmann, P. (2017). The effectiveness of monetary policy in china: Evidence from a qual var. China Economic Review, 43, 216–231.
- Chen, K., Ren, J., and Zha, T. (2018). The nexus of monetary policy and shadow banking in China. American Economic Review, 108(12), 3891–3936.
- Christiano, L. J., Eichenbaum, M., and Evans, C. L. (1999). Monetary policy shocks: What have we learned and to what end? Handbook of Macroeconomics, 1, 65–148.
- Chu, Y., and Deng, X. (2019). The risk-taking channel of monetary policy: Evidence from individual investors in the peer-to-peer lending market. Available at SSRN 3171676.
- De Pooter, M., Favara, G., Modugno, M., and Wu, J. (2021). Reprint: Monetary policy uncertainty and monetary policy surprises. Journal of International Money and Finance, 114, 102401.

- Fernald, J. G., Spiegel, M. M., and Swanson, E. T. (2014). Monetary policy effectiveness in China: Evidence from a FAVAR model. Journal of International Money and Finance, 49, 83–103.
- Funke, M., Li, X., and Tsang, A. (2019). Monetary policy shocks and peer-to-peer lending in China (tech. rep.).
- Gertler, M., and Karadi, P. (2015). Monetary policy surprises, credit costs, and economic activity. American Economic Journal: Macroeconomics, 7(1), 44–76.
- Hsu, S., Li, J., and Bao, H. (2021). P2P lending in China: Role and prospects for the future. The Manchester School, 89(5), 526–540.
- Huang, Y., Li, X., and Wang, C. (2021). What does peer-to-peer lending evidence say about the risk-taking channel of monetary policy? Journal of Corporate Finance, 66, 101845.
- Huang, Y., and Luk, P. (2020). Measuring economic policy uncertainty in China. China Economic Review, 59, 101367.
- Jordà, O. (2005). Estimation and inference of impulse responses by local projections. American Economic Review, 95(1), 161–182.
- Kamber, G., and Mohanty, M. S. (2018). Do interest rates play a major role in monetary policy transmission in China? BIS Working Paper.
- Kim, S., and Chen, H. (2022). From a quantity to an interest rate-based framework: Multiple monetary policy instruments and their effects in China. Journal of Money, Credit and Banking, 54(7), 2103–2123.
- Li, C. (2020). Monetary policies versus regulatory policies: Management of peer-to-peer market interest rates. China and World Economy, 28(1), 41–63.
- Lo, M. C., and Piger, J. (2005). Is the response of output to monetary policy asymmetric? Evidence from a regime-switching coefficients model. Journal of Money, credit and Banking, 865–886.
- Mazelis, F. (2016). Implications of shadow ban regulation for monetary policy at the zero lower bound (tech. rep.). SFB 649 Discussion Paper.
- Newey, W. K., and West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. International Economic Review, 777–787.
- Pescatori, M. A., and Sole, M. J. (2016). Credit, securitization and monetary policy: Watch out for unintended consequences. International Monetary Fund.
- Philippon, T. (2016). The fintech opportunity (tech. rep.). National Bureau of Economic Research.

- Ramey, V. A., and Zubairy, S. (2018). Government spending multipliers in good times and in bad: Evidence from US historical data. Journal of political economy, 126(2), 850–901.
- Romer, C. D., and Romer, D. H. (2004). A new measure of monetary shocks: Derivation and implications. American economic review, 94(4), 1055–1084.
- Stock, J. H., and Watson, M. W. (2018). Identification and estimation of dynamic causal effects in macroeconomics using external instruments. The Economic Journal, 128(610), 917–948.
- Stock, J. H., Wright, J. H., and Yogo, M. (2002). A survey of weak instruments and weak identification in generalized method of moments. Journal of Business and Economic Statistics, 20(4), 518–529.
- Sun, R. (2018). A narrative indicator of monetary conditions in China. International Journal of Central Banking, 14(4), 1–42.
- Tang, H. (2019). Peer-to-peer lenders versus banks: Substitutes or complements?

The Review of Financial Studies, 32(5), 1900–1938.

- Wong, C. Y., and Eng, Y. K. (2020). P2p finance and the effectiveness of monetary controls. The Manchester School, 88(4), 617–639.
- Wu, J. C., and Xia, F. D. (2016). Measuring the macroeconomic impact of monetary policy at the zero lower bound. Journal of Money, Credit and Banking, 48(2-3), 253–291.
- Xiao, K. (2020). Monetary transmission through shadow banks. The Review of Financial Studies, 33(6), 2379–2420.
- Xu, Z., and Jia, Y. (2019). Natural interest rate and choice of the macro policies in China. Economic Research Journal, 6.

The Nexus of Peer-to-Peer Lending and Monetary Policy Transmission

Evidence from the People's Republic of China

This paper examines how booms and busts in peer-to-peer (P2P) lending in the People's Republic of China (PRC) affect monetary policy transmission to inflation and output. Using state-dependent local projection methods, the results of the paper indicate a weaker transmission during boom phases. Stricter regulation on P2P lending since 2017 in the PRC and the substantial scaling back of P2P lending could positively impact the monetary management of the economy.

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