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Is a consumer loan a catalyst for confidence?

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ABSTRACT

In the context of the global economic downturn, the approach guided by consumer loans (CL) to boost consumer confidence is a feasible way to promote the internal circulation of the Chinese economy. Therefore, we use a time-varying rolling-window approach to identify how CL affects the consumer confidence index (CCI). We find that CL can be seen as vital support for promoting confidence because it can ease liquidity constraints and improve consumption levels. The empirical outcome is supported by the Rational Expectations Perpetual Income Hypothesis (RE-PIH), emphasizing that increasing CL can boost consumer confidence. Conversely, CCI has both positive and negative effects on CL. The positive effects suggest that consumers' optimistic confidence leads them to increase borrowing, which in turn creates a heavier debt burden. This statement cannot be supported by the negative effect due to consumers' blind self-confidence will cause cognitive bias, which is not conducive to the loan market development. Against the backdrop of increased global uncertainty due to the COVID-19 pandemic and the government's continuous adjustment of loan policies, consumers can effectively optimise their consumption decision-making through borrowing. The policymaker can maintain loan stability by effectively promoting consumer confidence and raising the consumption level of the whole society.

1. Introduction

This paper explores whether consumer loans (CL) can promote consumer confidence. Schumpeter (1934) holds that loans are the crux of increasing material investment and promoting long-term economic growth (Yang et al., 2019). CL has also played an essential role in improving consumer welfare and confidence (Song, 2021). However, continuous growth of CL coupled with the fragility of financial system may cause consumers' excessive debt, which is not conducive to the stability of financial market and economic growth (Hodula et al., 2019). Excessive credit expansion has led to severe fluctuations in the housing market and triggered the subprime mortgage crisis.

The crisis spreads to the banking systems of various countries and brings unprecedented consequences to the global economy, dramatically eroding consumers' confidence (Liu et al., 2019). It has been shown that consumers optimism has become a transmission path for credit boom, and it can exacerbate the volatility of asset prices (Malovaná et al., 2021). Consumers' optimistic confidence can enhance their ability to resist future risks and uncertainties (Cochrane, 1991), positively promoting CL growth (Gric et al., 2022). However, even if consumers are rational, excessive optimism can lead them to increase borrowing and underestimate debt risk, which can lead to an economic crisis. Consumer behaviour is a crucial part of analysing macroeconomic dynamics, so it is meaningful to explore CL would change in response to variations in consumer confidence (Ghosh, 2021).

With the development of the market economy, CL has also developed rapidly, but there are also problems such as uneven regional development and an unbalanced loan structure. However, China has a vast consumer group and loan audiences market (Bagonza, 2021), and their potential to use consumer loans for consumption is quite huge. China's economic growth has slowed down and reached a low level after the 2008 global crisis (Yang et al., 2019). To counteract the negative influences of crisis, loan supply has played a significant role in stimulating economic recovery and enhancing consumer confidence. Over the past decade, monetary policy has played a critical role in credit, and CL has experienced a significant increase (Hays, 2018). The balance of CL increases from RMB 3.27 trillion yuan at the end of 2007 to RMB 49.57 trillion yuan (fifteen times increases) at the end of 2020. The expansion of loans makes the relevant monetary and government-related policies extend to various consumption and provides consumers with surplus consumption capacity (Hau et al., 2019). And CL reduces consumers' precautionary saving motivation and acts as an insurance tool that reduces uncertainty (Cochrane, 1991), consumer spending also increases accordingly (Ghosh, 2021). This has led to consumption becoming increasingly prominent in promoting China's economic growth, and CL can contribute to shifting the consumption-driven economy (Yang et al., 2019).

China's credit expansion is much higher than the growth trend of nominal Gross Domestic Product (GDP) since 2007, but the excessive credit prosperity on this scale is unsafe (Maliszewski et al., 2016). Some international experience (e.g. the great depression of the 1930s and Japan's asset price bubble burst in the 1990s) has proved that fast accumulation of CL poses a risk to the financial markets (Gourinchas & Obstfeld, 2012). It also indicates that China's credit growth is hazardous, and the credit boom will cause more damage (Chen & Kang, 2018). China's credit expansion is affected by monetary policy and increased bank financing, which will bring short-term turbulence to the financial system (Yang et al., 2019). Moreover, due to the formation of global integration, China's credit market will also influence the stability of the worldwide market. If China's credit market is severely damaged, it will affect global economic stability and consumer sentiment (Liu et al., 2019). With the proposal of supply-side structural reform, the strategy of expanding domestic demand is crucial to economic development (Ludvigson, 2004). At present, China is seriously affected by the COVID-19 pandemic, thus, its economic growth is facing significant uncertainties. The government's sound

guidance of the economic environment will enhance consumer confidence, which contributes to the transformation of a consumption-driven economy.

This paper makes two significant innovative contributions. First, most research on the relationship between consumer confidence and household borrowing activities has focused on developed economies. China has less experience in coping with the financial crisis and economic recession as an emerging market economy. This paper examines its role in improving consumer confidence by studying CL dynamics in an extreme economic environment, which contributes to filling the gap in literature by addressing the issue of consumer borrowing behaviour in the context of changing consumer confidence in China. Second, due to monetary and credit policy fluctuation, China has experienced some structural changes (Liu et al., 2019). For example, the global financial crisis in 2008 and the purchase restriction policy in 2010 may cause structural impacts on credit supply and consumer confidence (Su et al., 2019), demonstrating that the dynamic relationship between the series is unstable in different periods. The incentive effect of credit affects consumers who will tend to utilize loans to alleviate their liquidity constraints and increase consumption. In turn, the optimistic attitude increases their willingness to use loans to purchase goods and fuel a boom in the consumer market. We use a time-varying rolling-window test to examine the causality between CL and the consumer confidence index (CCI). The results align with the interrelationship between loan and confidence, highlighting the internal relationship between them. CCI has positive and negative effects on CL, indicating that consumers' optimism will promote the loan market development (Caglayan & Xu, 2016). But the rapid growth of CCI is seen as a precursor to the outbreak of an economic bubble, and strong speculative demand from consumers can cause excessive volatility in financial markets. In turn, CL has a positive impact on CCI. In recent years, the Chinese government has gradually opened up the bank interest rate market and established an interest rate mechanism determined by market supply and demand (Chen et al., 2019). As a result, consumers can enjoy lower borrowing costs and increase spending in the consumption and financial markets (Hays, 2018). These findings further confirm that a proper loan supply can act as a catalyst for boosting confidence. The government should strengthen loans management and maintain relative stability of consumer loans flowing into consumers.

Our paper is organised as follows: The related literature is presented in Section 2. The Rational Expectations Permanent Income Hypothesis (RE-PIH) model with CL and CCI is explained in Section 3. Section 4 is the Granger causality test. Section 5 introduces the data. Section 6 analyses empirical results, and Section 7 presents our discussion. Section 8 concludes this study.

2. Literature review

2.1. The mechanism of the impact of consumer loans on consumer confidence

Limited medical services, education spending and liquidity constraints may increase consumers' incentive to save and thus reduce their borrowing behaviour (Meng, 2003). Since the early 2000s, emerging economies, including China, have boosted economic development by vigorously increasing loans, causing a sharp increase in

consumer debt (Hays, 2018). Under the given disposable level, consumers solve the problem of insufficient consumption-ability through CL, thereby transforming their potential consumption intention into actual behaviour.

Some proponents indicate that CL can relieve consumers' liquidity constraints, which can improve their confidence. Cochrane (1991) reveals that CL enhances consumers' ability to spend in the future uncertainties, providing them with a security guarantee and greatly improving their confidence. Ludvigson (1999) demonstrates that CL solves the mismatch between consumer demands and limiting purchasing power, broadening credit channels and reducing borrowing costs. It is more convenient for consumers to use loans for financing and improve confidence (Cohen, 2007). In addition, Ponce et al. (2017) stress that consumers are willing to endure high loan interest rates to maintain their liquidity, so CL is critical to consumers and has optimistic effects on their sentiment. Yin (2018) evidences that CL provides enough financial support for consumers to buy commodities (e.g. cars and houses), which helps enhance their confidence and increase consumption. Mian et al. (2020) confirm that CL works through demand, which can increase CCI during a boom. With the development of Internet finance, Han et al. (2019) find that online loan has broken through the geographical and temporal limitations of traditional CL. It has improved the availability of consumers' access to loan financing and greatly enhanced their confidence.

However, opponents claim that CL could increase consumers' interest burden and reduce personal income, depressing their borrowing confidence (Ekici & Dunn, 2010). Deaton (1992) indicates that credit constraints lead consumers to increase their holdings of assets and restrain confidence. The increased debt makes consumers more vulnerable, negatively affecting their confidence (Ekici & Dunn, 2010). Dynan and Edelberg (2013) further find that consumers with high leverage are more worried about the limited availability of their future credit, and the decline in confidence leads them to spend less. Tunc and Yavas (2016) demonstrate that when interest rates rise, consumers' borrowing costs also increase, offsetting their willingness to use a loan. Furthermore, others find that the promotion of CL to CCI is not significant. Van Raaij and Gianotten (1990) highlight that it's a luxury service for high-income consumers, and low-income consumers are excluded from loan services due to poor financial conditions. Hau et al. (2019) also confirm that CL cannot be popularised in the extensive rural areas and satisfy the public's borrowing demand due to the underdeveloped banking system. Hence, the slow development of the consumer financial market has not been able to alleviate the liquidity constraints of most consumers (Kuijs, 2005), and CL has no significant stimulus for low-income people. Ayhan et al. (2019) suggest that there is a long-term relationship between CL and CCI, but this interaction mechanism is not significant in the short term.

2.2. The mechanism of the impact of consumer confidence on consumer loans

Consumer confidence is considered a key indicator of social and macroeconomic conditions that can reflect the strength of consumption (Sandoval & Walsh, 2021). It is influenced by objective and subjective factors, such as income, stock price and

national stability. Consumers' psychological character is the fundamental determinant of the stable property of debt and consumption (Sahin, 2021). Kłopocka (2017) observes that CCI has predictive power, transcending economic fundamentals and is crucial in predicting consumer savings and borrowing behaviour. It has been recognised that CCI contains information related to loan forecasts and is an essential predictor of CL.

Consumers can perceive the changes in market behaviour (Lahiri et al., 2016; Ludvigson, 2004) by acting on CCI to reflect their willingness to use loans. Van Raaij and Gianotten (1990) state that people are more optimistic about their financial situation in times of economic prosperity. Consequently, they prefer to reduce savings and increase purchasing through financial loans. Dynan and Edelberg (2013) find that high-income and younger consumers are more optimistic about their future expectations, so greater confidence spurs them to increase consumption through CL. Meanwhile, optimistic financial expectations can positively impact consumers' loan debt and growth (Brown et al., 2005). Białowolski (2019) notes that the increase in confidence has led them to take fewer precautions and increase borrowing to meet purchasing demand. And this prediction is more reflected in the consumption expenditure of services (Lahiri et al., 2016). On the contrary, Delis et al. (2014) show that consumer anxiety impacts the supply side of CL, thus the supply of loans will decrease with the deterioration of consumer sentiment. Meanwhile, Chen et al. (2019) state that young people have optimistic confidence, but the low asset levels restrict their borrowing demand and even inhibit their desire to use CL. Ghosh (2021) has found that consumers who are pessimistic about financial services will increase savings and decrease loans to overcome future liquidity tightening.

However, others have cast doubt on the effectiveness of CCI in predicting CL, as their correlation often changes over time, thus it is unreliable in forecasting loan policy (Berry & Davey, 2004). Croushore (2005) uses real-time data to examine the impact on consumer confidence forecasts and finds confidence could not predict changes in CL. Similarly, Gric et al. (2022) observe that consumer borrowing behaviour correlates with the economic situation. In a period of economic depression and instability, neither a positive nor a negative impact on consumer confidence will significantly impact the dynamics of consumer loans.

Since China acceded to the World Trade Organization, consumption has stood out as a new key driver, and consumers' role in driving the transformation of credit markets has become more prominent (Bagonza, 2021). Li (2010) argues that CL provides funds for consumers to buy houses, which has raised their purchase confidence. As a new form of consumer loan, Hau et al. (2019) point out that FinTech loan has provided fund support to borrowers excluded from traditional loan by constructing a more inclusive financial system, releasing potential purchasing demand. Li et al. (2021) suggest that CL is conducive to improving the consumption structure, enhancing public's confidence, and for consumers in poor and undeveloped areas, they will benefit more from the development of the consumer loan market. However, Yang et al. (2019) demonstrate that excessive loan debt will make consumers face high-interest costs and repayment pressure, reduce their income and lead them to financial difficulties. Fan and Yavas (2020) indicate that consumers need to use most of their

income to repay loans, which will dampen their confidence and make them more afraid of consumption. Therefore, understanding the changes in consumer confidence is crucial to enhancing the competitiveness of the loan market, providing ideas for the expansion of credit business of financial institutions and government's macro-control of the economy.

In summary, the effect of CL on CCI is unclear, and there is the question of whether CL can promote consumer confidence in different economic environments. Hence, this paper attempts to explore whether CL can act as an insurance tool to improve consumer confidence. We can then answer the question about the role of consumer loans in consumer sentiment recovery and purchasing behaviour. However, existing studies neglect the dynamic links between CL and CCI, indicating the Granger causality would not be variable. Hence, we use a time-varying rolling-window approach and try to explain it based on the actual situation in China. Understanding interactions between CL and CCI is conducive to the effective implementation of loan policies and demonstrates the incentive impact of the loan market on consumer confidence.

3. Rational expectations permanent income hypothesis model

We apply the rational expectations permanent income hypothesis (RE-PIH) model, to explain the mechanism between consumer loans and confidence, as expressed by CL and CCI. Assume that there are countless consumers and a finite horizon in the economy and all consumers aim to maximise utility, the loan of all consumers is equivalent when $t = 0$. Moreover, consumers meet their needs through loans, and the total consumer loans amount is arbitrary. Their inter-temporal utility can be expressed by the equation:

$$V_c(CL_t, \ CCI_t) = E_t\big\{\beta(1 + R_t)V_c(\tilde{C}L_{t+1}, \ \tilde{C}CI_{t+1})\big\} \tag{1}$$

where V (CL, CCI) is the consumer's utility function. R_t denotes the real interest rate during $t + 1$. β represents the subjective discount factor $(0 < \beta < 1)$. V_c is the utility function of the partial derivative of consumer loans and '∼' refers to a random variable. Equation (1) implies consumers' inter-temporal consumption optimisation decision criteria is to keep the various periods of consumer spending (by $1 + R$ discount) marginal utility (the β discount).

Assume that the consumer's utility function for the constant relative risk aversion or elastic forms such as:

$$V(CL_t, \ CCI_t) = \frac{1}{1 - r}\left\{\frac{CL}{\alpha(CCI)}\right\}^{1-r} \tag{2}$$

where r is the relative risk aversion coefficient. $\alpha(CCI)$ is a function of the variable to affect the CCI changes; taking Equation (2) into (1), we can obtain:

$$\beta(1 + R_t)\left\{\frac{\alpha(CCI_{t+1})}{\alpha(CCI_t)}\right\}^{\gamma-1}\left\{\frac{CL_{t+1}}{CL_t}\right\}^{-\gamma} = 1 + e_{t+1}, E_t(e_{t+1}) = 0 \qquad (3)$$

where σ^2_{t+1} is the expected variance during the $t+1$ period. Assuming that the change of CCI is an exponential function, then we have $\alpha(CCI) = e^{\alpha(CCI)}$. Taking logarithm on Equation (3), and we use logarithmic approximation, it turns out the linearised equations (Browning & Lusardi, 1996):

$$\Delta \ln CL_{t+1} = \beta_0 + \beta_1 \sigma^2_{t+1} + \beta_2 \Delta CCI_{t+1} + \mu_{t+1} \qquad (4)$$

Equation (4) considers the effect of uncertainty on consumer behaviour, but it ignores the existence of liquidity constraints. In order to study the interaction between personal income and loans, Ludvigson (1999) adds the income variable, Equation (4) can be written as:

$$\Delta \ln CL_{t+1} = \beta_0 + \lambda \Delta \ln y_{t+1} + \beta_1 \sigma^2_{t+1} + \beta_2 \Delta CCI_{t+1} + \mu_{t+1} \qquad (5)$$

Both λ and β_2 represent the elastic coefficients of consumer income and confidence in consumer loans. In Equation (5) the item of $\beta_2 \Delta CCI_{t+1}$ indicates consumers' behaviour can influence the loan market stability. If $\beta_2 > 0$, it essentially reflects consumers are optimistic about the economy and it can promote the development of the consumer loan market. The high CL shows that consumer confidence has soared after the implementation of loose monetary policy and low loan interest rates. When financial crises and local wars break out, CL has become an excellent choice for consumers, who could rely on borrowing to survive economic hardship times, thus achieving the goal of consumption smoothing.

4. Methodology

4.1. Bootstrap full-sample causality test

Due to the times series being non-stationary and not following a standard asymptotic distribution, thus the Granger causality tests of the traditional vector autoregression (VAR) model is inaccurate. We apply the residual-based bootstrap (RB) method, which was developed by Shukur and Mantalos (2004), to avoid biased analysis results and improve the accuracy of causality tests. Meanwhile, the likelihood ratio (LR) tests, proposed by Shukur and Mantalos (2000), can be corrected by the small samples of different power and size.

Therefore, the RB-based modified-LR statistic can be applied to explore the causality between CL and CCI. The bivariate VAR (p) process is constructed as follows:

$$Y_t = \delta_0 + \delta_1 Y_{t-1} + \ldots\ldots + \delta_p Y_{t-p} + \varepsilon_t \qquad t = 1, 2, \ldots\ldots, T \qquad (6)$$

where the optimum lag length p is selected by Schwarz Information Criteria (SIC). We denote Y as CL and CCI, that is $Y_t = (CL_t, CCI_t)'$. Expansionary monetary policy, such as increasing the money supply (M2), has an inducing effect on the total

amount of CL, affecting the relationship between the two variables considered (Bigio & Sannikov, 2021; Cebiroğlu & Unger, 2019). Consequently, we select M2 as a control variable, then Equation (6) can be rewritten as follows:

$$
\begin{bmatrix} CL_t \\ CCI_t \end{bmatrix} = \begin{bmatrix} \delta_{10} \\ \delta_{20} \end{bmatrix} + \begin{bmatrix} \delta_{11}(L) & \delta_{12}(L) & \delta_{13}(L) \\ \delta_{21}(L) & \delta_{22}(L) & \delta_{23}(L) \end{bmatrix} \begin{bmatrix} CL_t \\ CCI_t \\ M2_t \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{7}
$$

where $\varepsilon_t = (\varepsilon_{1t}, \ \varepsilon_{2t})'$ is an independent and identically distributed $(0, \ \sigma^2)$ white noise matrix. $\delta_{ij}(L) = \sum_{k=1}^{p} \delta_{ij, k} L^k$, $i, \ j = 1, \ 2$ and L is a lag operator, and we have $L^k Y_t = Y_{t-k}$.

According to Equation (7), the first hypothesis that CL does not Granger cause CCI $\delta_{12, k} = 0$ is rejected if CL has a significant effect on CCI. In turn, the second hypothesis that CCI cannot affect CL $\delta_{21, k} = 0$ is also be verified.

4.2. Parameter stability test

If parameters are non-constant during the sampling period, the full-sample causality test results will be unreliable. Therefore, to test parameter stability, we perform the *Sup-F*, *Ave-F* and *Exp-F* tests, which were developed by Andrews (1993) and Andrews and Ploberger (1994). *Sup-F* can test sudden structural changes, *Ave-F* and *Exp-F* can test whether parameters gradually evolve with time trajectory. In addition, we use the L_c statistics test, which was developed by Nyblom (1989) and Hansen (1992) to test whether the parameters follow the random walk process. If the parameters are unstable, we can apply the sub-sample rolling window test to overcome the parameters' instability.

4.3. Bootstrap Sub-sample rolling-window causality test

Balcilar et al. (2010) divide the whole sample into multiple small parts according to the rolling-window width. We assume the length of time series is T and the rolling-window width is l, then we can gain T-l + 1 sub-samples. The *RB*-based modified-*LR* test is then used for sub-sample. Based on the p-values and *LR*-statistics, we can observe the correlation between the two series over time (Su et al., 2022f). $N_{k=1}^{-1} \sum_{k=1}^{p} \delta_{12, k}^*$ and $N_{k=1}^{-1} \sum_{k=1}^{p} \delta_{12, k}^*$ represent the effect of CL on CCI and the influence from CCI to CL, respectively. This paper uses 90% confidence intervals where the corresponding lower and upper bounds are the 5th and 95th quantiles of sum respectively (Balcilar et al., 2010; Su et al., 2022f).

5. Data

In this article, we select 2007: M1 to 2021: M8 monthly data to examine the causality between Chinese consumer loans and consumer confidence. Since 2007, innovations in loan-related products and services have become more frequent after establishing a modern banking system and cancelling credit plans. In addition, the competition between commercial banks and emerging financial companies has intensified in the

loan market, which also promotes the expansion of CL (Yang et al., 2019). With the further development of commercial banks, they implement more preferential credit policies to compete for customers, and the structure of consumer loans has been further optimised. Consumer confidence is used to capture consumers' psychological motives, reflecting their exceptions to the economic situation (Van Raaij & Gianotten, 1990). Next, we apply the consumer confidence index[1] (CCI) as a measure of consumers' subjective psychological perception and confidence. Since 1997, China has established the CCI index to evaluate consumers' psychological decision-making in forecasting loans and economic development. If the CCI is greater than 100, it refers to consumers who are confident in the current economic prospects, and vice versa (Ghosh, 2021). Cohen (2007) defines CL as provided by commercial banks to consumers to purchase goods and services, to maximise their consumption goals. In addition, Sandoval and Walsh (2021) hold that CL is the main financing channel for consumers, reflecting residents' consumption desire. As China's interest rate liberalization reforms make substantial progress (Liu et al., 2019), loan prices become more transparent and consumers are less constrained to access CL. We then choose consumer loans[2] (Trillion yuan) as an indicator measure to capture the development of Chinese consumer finance (Shen & Yan, 2009). Then, we make adjustments for the seasonal trend in the underlying series.

Additionally, the increase in money supply (M2) has an inducing effect on the growth of CL, which will disturb the interaction mechanism between the two variables. Based on the promotion mechanism of CL on confidence (Bigio & Sannikov, 2021), the government will tend to use M2[3] to cope with the changes in CCI because the fluctuations in M2 will influence interest rates, which in turn affect the bank's loan business (Cebiroğlu & Unger, 2019). Thus, the relationship between CL and CCI can be affected by the M2, and we regard it as a control variable here. The reduction of M2 will affect the overall loan interest rates and directly weaken consumers' balance sheets in two ways (Bernanke & Gertler, 1995). First, if consumers have short-term or floating rate debt, rising interest rates will increase expenditure and weaken their financial position. Second, rising interest rates are associated with declining asset prices, which will shrink the wealth of consumers (Ishioro, 2013).

As shown in Figure 1, CL does not increase even CCI is higher. Since January 2007, affected by sufficient liquidity of banking system and the expansion of loans, consumers' borrowing costs have also decreased (Maliszewski et al., 2016). The rapid growth of income has led to strong domestic demand and confidence is also on the rise. Since March 2007, financial institutions have raised the benchmark deposit and loan interest rate six consecutive times to curb the rising housing prices (Borst, 2013). Therefore, CL showed a slow growth trend in 2007. In January 2008, some areas in Southern China suffered severe low-temperature rain and snow disasters, which caused public panic and affected the consumer market's regular operation. In March 2008, the subprime mortgage crisis transmitted to the Chinese market, the shutdown of enterprises has led to a sharp rise in the unemployment rate, causing fear sentiment among consumers (Chen & Kang, 2018). CCI declined sharply from January 2008 to March 2009. Subsequently, the PBC has asked banks to reduce the benchmark loan interest rate, which helped expand investment in the economy and
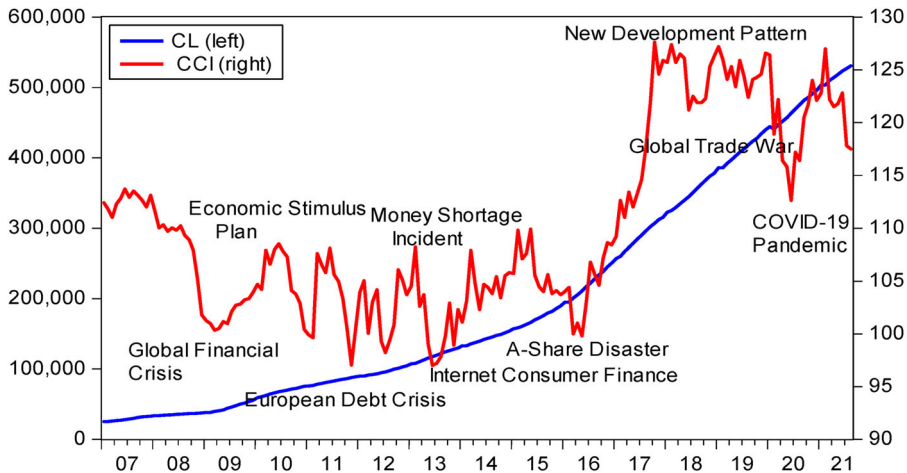
Figure 1. The trends of CL and CCI.
Source: Authors' calculation.

restore consumer vitality. Consequently, CL has skyrocketed by more than 26% within one year. However, changes in national policies and the uncertainty of crisis have led to macroeconomic fluctuations, negatively affecting consumer confidence (Qi et al., 2022). In 2012, under the government's continued regulation of prices, consumers are confident in economic growth. Their active participation in the loan market has spurred banks to accelerate financial innovation and expand other related business, and CCI shows steady growth.

In August 2015, the plunge in the Shanghai stock market exacerbated financial market instability and greatly damaged consumer wealth, leading to a sharp decline in the CCI (Guo, 2015). Hence, the Chinese government implemented continuous policy adjustment, such as expansionary monetary policy and the expansion of consumer finance companies to restore consumer confidence (Qi et al., 2022; Qin et al., 2022). In 2017, with the development of new consumption formats, CL gradually penetrated into the fields of culture, tourism and education. As the large-scale COVID-19 pandemic began to spread in March 2020, it brought enormous panic to residents worldwide, and consumers needed to adapt to drastic changes (e.g. business closed and limited trips outside). Furthermore, due to the oil plunge and the U.S. stock indexes falling, the CCI has fallen by nearly 11% compared with 2017. To provide sufficient liquidity for enterprises and consumers, the PBC injected 1.7 trillion yuan into the financial market on February 3, 2020, sending a signal of strengthening economic policy adjustments to boost market participants' confidence. As a result, China's CL has reached 49.57 trillion yuan, accounting for 28.7% of the balance of the RMB loan. As we can see, the relationship between CL and CCI is changeable and mixed.

In Table 1, we notice that the means of CL, CCI and M2 are 195304.9, 110.266 and 1209638 respectively. Their skewness is positive, thus, the three series are right-skewed. Moreover, the kurtosis of CL, CCI and M2 have a platykurtic distribution[4] (Su et al., 2022a, 2022b, 2022c, 2022d, 2022e), since their kurtosis is less than 3. Furthermore, the Jarque-Bera test shows that they are significantly non-normal distribution at the 1% level. We find that the traditional Granger causality test is not

Table 1. Descriptive statistics.

	CL	CCI	M2
Observations	176	176	176
Mean	195304.900	110.266	1209638.000
Median	138456.200	107.850	1175553.000
Maximum	530892.000	127.600	2317788.000
Minimum	24721.770	97.000	351498.800
Standard Deviation	154367.000	8.820	583117.500
Skewness	10.747	2.126	0.217
Kurtosis	2.205	2.048	1.837
Jarque-Bera	21.0016***	16.768***	11.3034***

Notes: *** denotes significance at 1 percent.
Source: Authors' calculation.

Table 2. Unit root test results.

Series	Level			First difference		
	ADF	PP	KPSS	ADF	PP	KPSS
CL	−0.125(3)	−1.132(3)	1.587(2)***	−2.983(2)**	−3.127(2)***	0.423(3)
CCI	−1.409(1)	−1.573(3)	1.939(3)***	−5.467(1)***	−5.329(2)***	0.107(2)
M2	−1.278(2)	1.187(2)	1.697(2)***	−2.457(11)**	−3.462(5)***	0.380(4)

Notes: *** and ** denote significance at the 1 and 5 percent, respectively. The numbers in parentheses are selected according to the recursive t-statistic (Perron, 1989).
Source: Authors' calculation.

applicable through the above analysis (Su et al., 2022a, 2022b, 2022c, 2022d, 2022e). Therefore, we use a bootstrap rolling-window approach to examine the causal relationship between them. In order to eliminate the possibility of heteroscedasticity and uniform dimensions (Su et al., 2022f; Yuan et al., 2022), CL, CCI and M2 are transformed into natural logarithms.

6. Empirical results

We apply unit root tests such as Augmented Dickey-Fuller (ADF, Dickey & Fuller, 1979) test, Phillips-Perron (PP, Phillips & Perron, 1988) and Kwiatkowski Phillips Schmidt Shin (KPSS, Kwiatkowski et al., 1992) test to check the stationarity of the raw data. Table 2 shows that CL, CCI and M2 are all stationary at the first difference level. Based on this stationarity, we take the first-order differences of all variables and build a VAR model to reveal the Granger causality.

In this paper, CL and CCI are used to construct a bivariate VAR model, and the causality of the overall sample period is tested based on Equation (7). We choose the optimal lag order based on SIC to be 2. Table 3 evidences the full-sample causality results. Based on the *p*-values, we can observe that the relationship between CCI and CL is not significant, which means that there is no correlation between them. These findings contradict previous studies (Ludvigson, 1999) and the RE-PIH deduction, which highlights that CCI is affected by CL.

We treat CL and CCI as a full sample estimate in the VAR model, assuming that the parameters are stable and have just one causal relationship throughout the whole time series. If the VAR bivariate model shows structural changes, the parameters may no longer be stable, and the causality between them will also change over time (Balcilar & Ozdemir, 2013). To test the stability of parameters, we use the *Sup-F*,

Table 3. Full-sample Granger causality tests.

Tests	H_0: CL does not Granger cause CCI		H_0: CCI does not Granger cause CL	
	Statistics	p-values	Statistics	p-values
Bootstrap *LR* test	5.310	0.132	0.744	0.854

Notes: Using 10,000 bootstrapping to calculate the p-value.
Source: Authors' calculation.

Table 4. Parameter stability test.

Tests	CL		CCI		VAR system	
	Statistics	p-value	Statistics	p-value	Statistics	p-value
Sup-F	46.611***	0.000	14.570**	0.038	39.938**	0.011
Ave-F	14.770***	0.043	8.225**	0.011	18.710**	0.034
Exp-F	19.265***	0.020	4.890**	0.029	15.611***	0.005
L_c					1.832	0.396

Notes: To calculate p-values using 10,000 bootstrap repetitions.
*** and ** indicate significance at the 1 and 5 percent, respectively.
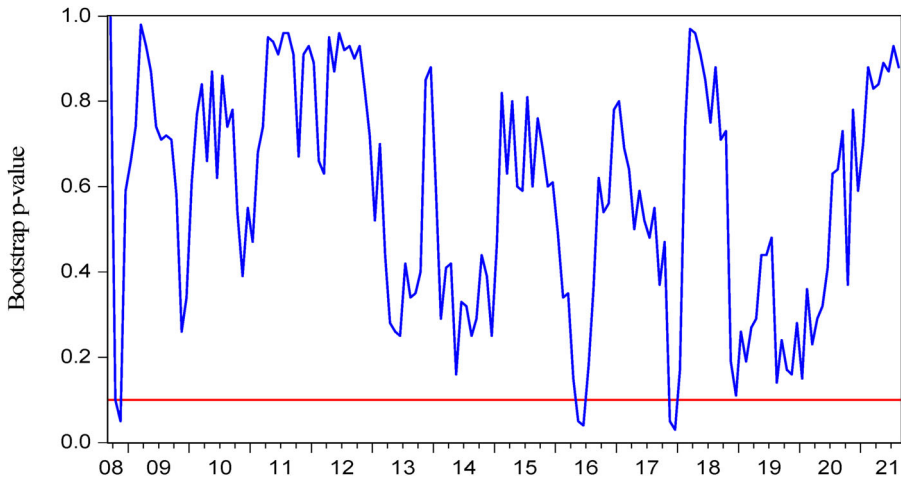Source: Authors' calculation.

Ave-F and *Exp-F* tests (Andrews,1993; Andrews & Ploberger, 1994). Meanwhile, the L_c statistical test (Hansen, 1992; Nyblom, 1989) is undertaken to examine the stability of all parameters. Table 4 presents the above test results.

The *Sup-F* test indicates a one-time sharp shift in CL at a 1% level, while a 5% significance level for CCI and the VAR system. According to the *Ave-F* test, we find the CCI and VAR model have time-varying characteristics at 5%, while CL is at a 1% level. Moreover, the *Exp-F* test shows that the CL and VAR system exhibit time-varying features at 1%, while CCI is at a 5% level. Based on the parameter stability tests, we observe no significant constant relationship between CL and CCI, thus, the causality test results are unreliable. Hence, we apply a bootstrap sub-sample rolling-window causality approach to examine the time variations relationship between CL and CCI. Besides, we select 24-months[5] as the rolling window width, which can increase the robustness of causality analysis.

6.1. The causal influence of CCI to CL

Figures 2 and 3 exhibit the degree and direction of the effect of CCI on CL. CCI Granger causes CL in the periods of 2016: M4-2016: M7, 2017: M10-2018: M1 at the 10% significance level and has a significantly negative influence on CL. Moreover, the effect from CCI to CL is positive in 2008: M10-2008: M12.

The positive effect confirms that CCI can increase consumers' demands for loans in a crisis. In September 2008, the Lehman Brothers went bankrupt, and the global financial crisis broke out, causing a worldwide recession and financial risk. The crisis results in mass unemployment of workers, and dramatically weakens Chinese consumer confidence, leading to consumer spending shrinking. Affected by the unstable economic environment, CCI shows a downward trend in 2008: M10-2008: M12. Two ways to explain the influence of CCI on CL. First, the PBC launched an interest rate cut in September 2008, and consumer confidence quickly recovered after five consecutive rate cuts. In November 2008, the government has introduced 4 trillion fiscal

Figure 2. Bootstrap *p*-values of test statistic testing the null that CCI has no effect on CL.
Source: Authors' calculation.
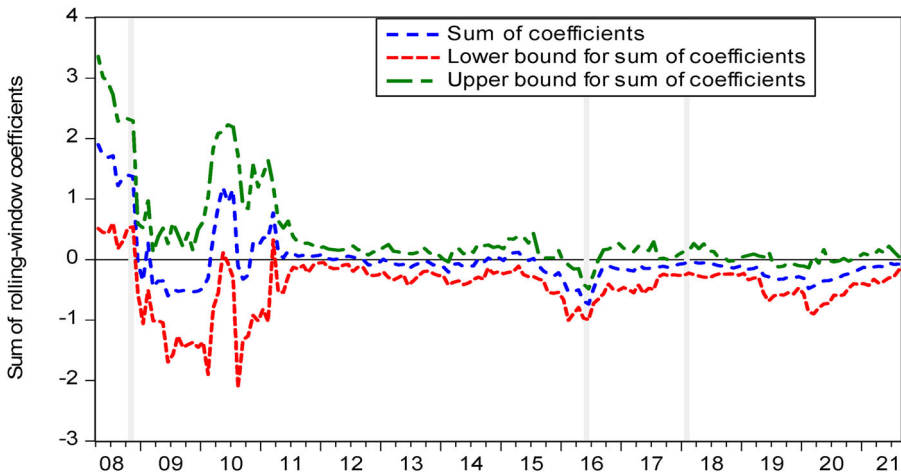
Figure 3. Bootstrap estimates of the sum of the rolling-window coefficients for the impact of CCI on CL.
Source: Authors' calculation.

stimuli to enhance the demand for low-income groups and promote stable economic growth (Liu et al., 2019). Moderate loose monetary policy and sharp interest rate cuts imply a sizable decrease in mortgagors' debt cost (Agarwal et al., 2019), which generates a positive disposable-income shock and increases consumer demand (Issing, 2009). Second, rising confidence has prompted the central bank to continuously cut borrowing rates and increase the supply of consumer loans (Yin, 2018). Based on the guidance of social security policies and the improvement of income levels, consumers are more daring to increase their consumption level through borrowing.

Since January 2016, the global commodity, gold and oil prices have plummeted, and financial markets have fallen into turmoil. China's stock market plunged twice after the 2015 crash, then the stock market value declined by 45% in two months.

Violent fluctuations damaged Chinese investors' wealth, and sparked consumer panic over stock market stability (Guo, 2015). Moreover, the announcement of Brexit referendum results and the downward trend of RMB exchange rate fluctuations caused the CCI to fall sharply. Fluctuations in the international market have exacerbated the uncertainty of future economic conditions, leading consumers to reduce borrowing behaviour and increase savings desire. In addition, the liberalisation of the two-child policy has prompted consumers to increase savings and reduce their willingness to use loans for consumption (Zeng & Hesketh, 2016). Therefore, the increased incentive to save has dampened the rise in consumer confidence. Furthermore, the increase in corporate credit has led to more speculation on real estate, and overall credit risk has also risen significantly. This dampens consumer confidence in borrowing and has a significant negative influence on CL.

On August 14, 2017, U.S. president Trump officially conducted section 301 trade investigations into China, then the Sino-U.S. trade frictions began to occur frequently (Sun et al., 2021). Hence, the net exports in the 'troika'[6] drive China's economic growth to decrease and bring downward economic growth pressure (Shen & Yan, 2009). In addition, the continued appreciation of the U.S. dollar has led to a weakening of the purchasing power of the RMB (Su et al., 2022d), and the rise in domestic prices has also greatly inhibited consumer consumption. Meanwhile, trade friction dramatically shrinks consumers' financial assets (e.g. houses and stocks), making it challenging to repay previous loan debt. The weak confidence also reduces their willingness to borrow, which has a negative effect on CL. In January 2018, to prevent financial risks and rectify Internet financial chaos, the government strictly supervised the borrowing business of Internet platforms and severely cracked down on unfair competition (Bagonza, 2021; Xu et al., 2022). Restricted by the tight monetary policy, consumers' willingness to use CL for consumption is declining (Ghosh, 2021). Hence, we can conclude that CCI negatively impacts CL during 2017: M10-2018: M1.

6.2. The causal influence of CL to CCI

Based on the *p*-value in Figure 4, we can determine the degree and coefficient of the effect from CL to CCI, as displayed in Figure 5. CL has no effect on CCI can be accepted, except 2010: M3-2011: M2, 2013: M2-2013: M4, 2017: M1-2017: M10 when 10% level, and has a positive influence on CCI.

In November 2008, the PBC announced that the HPF[7] benchmark rate decreased by 135 bps, from 5.22 to 3.87%, and the policy continued until October 2010 (Agarwal et al., 2019), thus this favourable policy stimulated consumers' desire to purchase houses. Under the development of technology, technological innovation in the financial field has greatly changed the pattern of the financial market (Tao et al., 2022). In 2010, four consumer finance companies were established and pilot projects were carried out in related financial services. Due to its features of pure credit without collateral and shorter maturity, it bridges the gap in financial demand that traditional loans cannot cover and is favored by consumers (Yin, 2018). Besides, to stimulate consumers' auto demand, the Ministry of Finance issued subsidy policies to promote energy-saving vehicles in June 2010. With the popularisation of auto finance
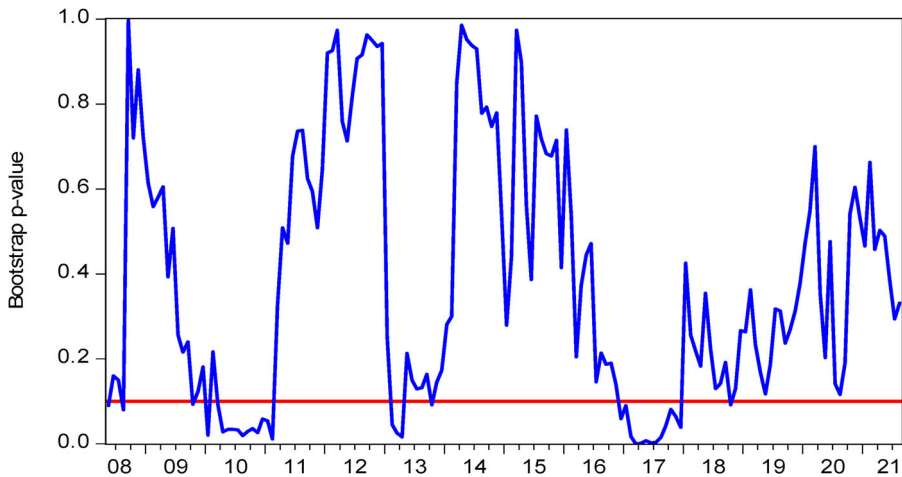
Figure 4. Bootstrap *p*-values of test statistic testing the null that CL has no effect on CCI.
Source: Authors' calculation.
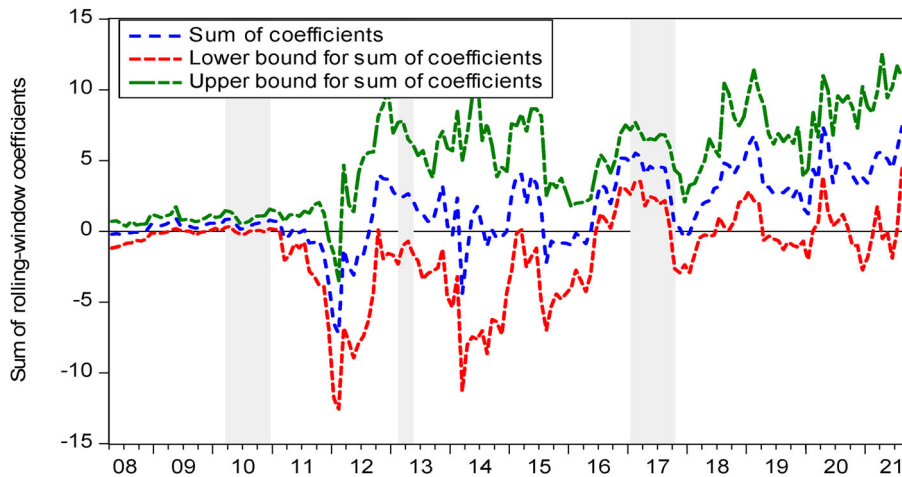
Figure 5. Bootstrap estimates of the sum of the rolling-window coefficients for the impact of CL on CCI.
Source: Authors' calculation.

with flexible design, and banks lowering the interest rate of automobile consumer loans (Song, 2021), consumers' willingness to buy cars can be realised through loans, which significantly enhance their borrowing demand (Chen et al., 2019). In August 2010, to support the reconstruction of disaster areas, the government actively provided credit support, implemented preferential housing credit policies, and made consumers full of confidence (Yang et al., 2017). In addition, with the rebound in China's economy and the rise in residents' demand, they are willing to use CL to buy goods and services (Li, 2010). These events lead to 2010: M3-2011: M2 CL positively promotes consumer confidence.

During the period of 2013: M2-2013:M4, as China has entered a new stage of economic development, namely the 'new normal[8]', CL shows a slowing trend. With the

establishment of consumer finance companies, digital technologies have reduced the financial service costs and enabled consumers to access financing. In February 2013, PBC required banks and financial institutions to promote consumption upgrading and support consumers' credit needs in education, tourism and other aspects, which significantly stimulated consumer confidence. On March 5, 2013, the report of the first session of the 12th National People's Congress of the people's Republic of China stressed that a variety of monetary policy tools should be comprehensively used to adjust market liquidity and expand social credit demand. Accordingly, as consumers' uncertainty about the future economy decreases and their expectations of economic improvement increase, which drives their purchasing demand (Chen et al., 2019).

As China's economic growth develops rapidly, the GDP in the first three quarters is higher than the expected target of 6.5% for the whole year, causing an increase in consumer income. Hence, consumers are more willing to purchase various goods and services through borrowing, which boosts their consumption confidence. Moreover, commercial banks actively cooperate with Internet platforms to provide convenient microfinance services for consumers (Hau et al., 2019). Based on the expansion of the Internet, online consumer loan is easier to access, and it has increased the financial availability of consumers, enabling them to release demand for borrowing and promote consumption (Chen et al., 2019). Since September 2017, the government has implemented the house-purchasing restriction policy to control overheating housing prices. Under the government's regulation, consumers' desire to purchase houses is stronger because prices are decreased. Therefore, we can evidence that CL positively affects CCI in 2017: M1-2017: M10.

7. Discussion

The outcomes of the bootstrap-sample causality approach reveal that there is no significant causal relationship between CL and CCI. This can be inaccurate due to the instability of the parameters in the VAR system that can affect the results' reliability. On the basis of the bootstrap sub-sample causality test, we examine the time-varying causal relationship between CL and CCI, and further explore the feasibility of using CL to enhance consumer confidence. Through the above empirical findings, we have found that CL has a positive effect on CCI, indicating that CL can alleviate consumers' limited purchasing power and help them get through periods of declining incomes. Moreover, CL can solve the mismatch between demands of consumers, which can act as a vital force to promote the CCI (Ponce et al., 2017). This finding is consistent with the statement that CL can enhance consumer confidence and meet their diverse needs (Hau et al., 2019; Li et al., 2021). The correlation between them is consistent with the RE-PIH. In turn, CCI shows both positive and negative associations with CL. On the one hand, the growing consumer confidence will boost their willingness to spend, then the demand for CL shows a growing trend (Gric et al., 2022). On the other hand, CCI is also determined by changes in monetary policy, and the increase in interest burden will decrease consumers' proposal income and depress confidence (Tunc & Yavas, 2016). Hence, the pessimism of consumers will adversely impact national economic and loan policies (Yang et al., 2019), for seeking

to maximise utility, they will use all available information to form expectations and determine their borrowing and consumption levels.

8. Conclusion

This paper investigates the causality between CL and CCI and examines whether CL can serve as a catalyst for enhancing consumer confidence. As China is expected to become the world's largest consumer market, studying the relationship between CL and CCI is conducive to better formulating credit policies, which in turn boosts consumer confidence and consumption desire through CL and promotes the internal circulation of China's economy. For this purpose, we perform a bootstrap sub-sample causality test to investigate the time-varying influence between them. The positive influences from CL on CCI indicate that CL can act as a vital force to promote consumer confidence, CL has broadened credit channels and reduced borrowing costs, helping consumers to alleviate the consumption liquidity constraints and smooth income restrictions. These results support the assumptions of RE-PIH, which ascertains that high CL will boost consumers' confidence. Conversely, CCI has both positive and negative effects on CL. The positive impact demonstrates that continued spending by consumers will facilitate the circulation of loans and enable the market to develop stably. However, the negative effect of CCI on CL evidence that the frequent changes in loan policies will influence consumer borrowing needs, causing market chaos and destabilising the financial system.

In general, investigating the interaction mechanism of CCI and CL provides some implications for banks and monetary authorities in order to facilitate the loan market. CL is becoming a significant engine for boosting consumer confidence and economic growth. Although CL plays an important role in enhancing consumer confidence and optimizing the consumption structure, consumers' borrowing needs are also plagued by high loan interest rates. In this regard, banks should cut down the loan interest rate and strive to expand the coverage of consumer loan services. It should also improve business transparency, strengthen loan risk supervision and moderate regulation to guard against huge losses caused by consumers' excessive speculation. Second, confidence is essential for economic development and financial stability, and by influencing consumers' behaviour, it causes fluctuations in total social output and consumption. Moreover, consumer confidence can measure the effectiveness of monetary policy, changes in confidence will strengthen or offset the policy effects. This indicates that consumer confidence should be considered in loan policy planning and economic growth. Lack of confidence suggests that the loan market faces severe distress, which should serve as a warning signal for bank operations. Hence, it is necessary for banks to obtain sufficient feedback on consumers' loan experience and strengthen their confidence by providing different sets of loans. Third, the monetary authorities need to make effective decisions based on consumers' attitudes and perceptions, promptly adjusting the loan guidelines and policies. Furthermore, the government should focus on the emotional changes of consumers towards loan policies, correctly guide consumers' consumption behaviour, and

improve the quantity and quality of Chinese consumption to promote stable economic development.

Finally, although we use monthly data and find some noticeable outcomes, we are also conscious that this paper has the following limitations. First, we use time series data instead of panel data and do not consider the differences between provinces. As a result, regional differences in CL and consumer confidence have been overlooked. Future research could conduct different provinces and put forward clearer policy recommendations based on regional differences, so as to achieve a 'win-win' situation of loans development and consumer confidence enhancement. Second, our study is based solely on a dataset in China. Under the change of consumption concept, the consumer loan market continues to prosper. CL has stimulated consumer confidence, which in turn has driven the continued expansion and growth of CL. Hence, in the study of CL with country differences, we can focus on its stimulating effect on consumer confidence. This helps us to understand the differences between each country from credit policies to confidence enhancement, which in turn plays a vital role in driving economic development.

Notes

1. The data is published by the Oriental Wealth Network.
2. The data is drawn from the Wind database.
3. We obtain the M2 from the National Bureau of Statistics of China.
4. The platykurtic distribution can be described as having a narrower or steeper shape with fatter tails resulting in a less chance of extreme events. The opposite is leptokurtic distribution.
5. To prove the reliability of the test results, this paper also uses the rolling-window widths of 20-, 28-and 32- months to explore the causality, and the results are consistent with the 24-months rolling-window.
6. Growth in China's economy is driven by the troika: consumption, investment and exports.
7. China employs the Housing Provident Fund (HPF) to provide long-term financing to contribute employees to purchase a house. The funding of HPF comes from the mandatory contribution of employees and employers. The total contribution rate generally ranges from 10% to 20%.
8. The new normal emphasizes the economy with stable growth structure. GDP growth has become an integral part of the regenerative growth mode and productivity development mode, so as to increase the per capita GDP and expand the economic scale.

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