

ASSESSMENT OF CREDIT IMPACT ON INFLATION PROCESSES IN KAZAKHSTAN

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Annotation

This study is an attempt to assess the long-term and short-term influence of bank lending on inflationary processes in Kazakhstan using econometric approaches - the vector error correction model (VECM) and the vector autoregression model (VAR). The aim of the study is to identify the significant influence of the credit market on the formation of consumer prices and prices for individual product groups in Kazakhstan. Assessing the impact of loans on inflation allows us to assess the extent of the possible consequences of a significant increase in the loan portfolio, and also generally improve the inflation modeling techniques in Kazakhstan. The results of the VECM model illustrated the presence of a long-term dependence of inflation in the long run. While the outcome of the VAR model showed a moderate dependence of consumer prices on loans in the short term.

The key words: credits, consumer credits, vector error correction model (VECM), vector autoregression model (VAR), impulse responses, consumer price index, inflation of selected goods

Classification JEL: E31, E37, E51.

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1. Introduction

Credit is an integral part of the modern financial system. The issuance of loans may cause economic growth in the country, but at the same time, it should be noted that excessive financing by bank assets may cause acceleration of inflation processes. In 2015, the National Bank switched to a new monetary policy regime inflation targeting, which means ensuring price stability. Therefore, a deeper understanding of the credit channel functioning by assessing the impact of lending processes on inflation will help in the future to make balanced decisions on achieving inflation goals.

Studying the work of other authors on the impact of bank lending on inflation, we can conclude that the most popular method of assessing the impact of loans on inflation is the use of the VECM and VAR models. It should also be noted that the majority of foreign authors consider the impact of total lending, but some of the authors focus their attention on considering the impact of lending to individuals, in particular consumer lending. On this basis, within the framework of this work, the impact of lending processes was assessed using models of vector error correction model and vector autoregression model, and also the impact of not only total lending, but also loans for consumer purposes and loans to legal entities was considered.

The results indicate that the impact of loans on prices in the short term is limited, and loans to legal entities have a greater impact on prices than consumer loans. In addition, the authors examined the presence of communication in the long run and concluded that the impact of lending on inflation is in the long term.

The first section is a review of the literature, in which similar works by other authors are reviewed. The second section describes the methodology of the study, as well as a list of predictors used. Next comes the discussion section of the results, in which the authors describe the results of the assessment. The findings of this study are the final section of the work.

2. Literature review

The school of monetarism considers the amount of money in the economy as the main factor in the growth of prices. Milton Friedman argued that inflation is always and everywhere a monetary phenomenon that arises due to a faster increase in the amount of money in the economy. Friedman based his views on the quantitative theory of money (Totonchi, 2011).

Thus, the growth of the money supply caused by the lending processes is capable of influencing the development of the economy, but at the same time causing inflation processes. It should be noted that, in addition to the money supply, there are many other factors that have a significant impact on price increases. (Yampolsky, 2007). These factors include fiscal and monetary policies, the imbalance of supply and demand, changes in the external situation, etc. There are many works, where this issue was studied. It should be noted that the research results are ambiguous and give different results depending on the countries and periods under consideration.

In the studies reviewed, the most popular methods for determining the presence of a relationship are VAR models. For example, Cheong Tang (2001) in its work evaluates Malaysian inflation models, which include bank lending and money supply. The author checks for the long-term relationship between the above variables by creating the Unrestricted Error-Correction Model. The results of the study illustrate that in the long run, the money supply and bank lending influence the inflation processes in Malaysia. But to a greater extent, inflationary processes in Malaysia are influenced by import prices and real incomes of the population.

Liviatan (1985) in his work did not determine the dependence of inflation on the expansion of bank lending in Israel. In contrast, Blinder (1987), having built two macroeconomic models, finds an interconnection between prices and lending rates.

Alessandro (2005) using the VAR model revealed the dynamic response of inflation to changes in the credit market. The impulse responses of the VAR model illustrated that the size of the fluctuation of inflation depends on the credit conditions in the economy. Moreover, changes in lending have a greater impact on inflation, when the credit policy is in a limited mode.

The relevant conclusions, using the model TVAR, made Balke (2000): in the mode of limited crediting, a change in its volumes has a stronger effect on inflation.

In studying the impact of domestic lending processes on economic growth and inflation, Korkmaz (2015) uses the PVAR method to analyze panel data from 10 randomly selected European countries. The results of the author indicate that lending is a significant factor for GDP and insignificant for inflation.

The impact of consumer lending should be considered separately as it could cause demand to exceed supply. Thus, a significant increase in consumer demand of the population has a negative impact on price stability (Efimkina, 2012). For example, Antzoulatos (1996), considering the impact of consumer credits on the price level, concluded that in G7 countries the growth in consumer lending causes consumption growth, which, in turn, affects the acceleration of inflation.

Yunus (2004), in addition to the above mentioned methods, uses the Granger Causality Test (a causal relationship test between variables) along with a VAR model to determine how private sector lending affects inflation and economic growth in Bangladesh. The author concludes that private sector lending does not affect economic growth, but is an inflationary factor.

Timsina Dhungana and Shyam Pradhan (2015) also concluded that bank lending has a positive effect on inflation through increased consumption.

It should be noted that the growth of lending can have an impact on prices with a certain lag, this is due to the fact that loans issued must go through a certain cycle before they affect the final prices. In this regard, the impact of lending on inflation in some countries will probably appear only in the long term, for example, in Iran. Eslamloueyan and Darvishi (2007) in their work examined the effect of various variables on inflation in Iran by building the Unrestricted Error-Correction Model. The authors have concluded that there is no relationship between the volume of loans issued and the price level in the short term. However, on the long-term horizon, the authors were able to identify a direct relationship between two variables. Moreover, the authors found out that a one percent rise in bank loans leads to an increase in inflation of 0.5 percentage points.

3. Credit market analysis

The growth of the loan portfolio of legal entities in 2000-2001 was the main factor in the growth of the total loan portfolio. Business lending, both in national and foreign currencies, has increased significantly (figure 1). This dynamic growth in business lending is due to the provision of free access to foreign capital for banks. The attracted foreign capital was actively used by banks to finance legal entities.



The next significant increase was observed at the time of the mortgage boom between 2006 to 2008. Loans, provided to individuals for the purchase and

construction of real estate, and businesses, operating in the construction industry, have made a significant contribution to the growth of the total loan volume. However, further events revealed that it was just a credit "bubble", which was fueled by a similar "bubble" in the real estate market. After the global financial crisis of 2007–2008, both bubbles burst. As a result, the growth rate of the credit market in Kazakhstan decreased significantly, with a significant increase in the level of non-performing loans till 35% in the total loan portfolio in 2013.

The growth of loans in 2009 in the tenge equivalent was due to the revaluation of foreign currency loans in tenge as a result of the depreciation of the national currency in early 2009. A similar situation occurred in 2015-2016 as a result of the depreciation of the national currency after the transition to a freely floating exchange rate regime.

At the beginning of 2017, the effect of revaluation of loans in foreign currency was exhausted, and the credit market began to show growth, which was provided by consumer credits.

In 2017, the National Bank focused its efforts on solving structural problems of the banking sector. One of the problems was the concealment by the second level banks of the real level of bad loans. In this regard, writing-off the non-performing loans from second-tier banks has been introduced within the program on rehabilitation of the banking system. As a result, the statistics on the credit market of Kazakhstan, which took into account both healthy and problem banks, did not fully reflect the outlined positive changes in lending. Thus, the annual growth of the loan portfolio of banks in June, 2018 amounted to only 1%, while excluding the portfolio of banks that were in the process of restructuring and were deprived of a license - 11.6%.





Source: National Bank, MNE RK

The active development of the banking system of Kazakhstan in 2004–2007 was largely due to the attraction of external funding. This was accompanied by a significant increase in loans, including the construction and purchase of housing by individuals as well as consumer purposes. As a result of the global financial crisis, access for most developing economies, including Kazakhstan, to external borrowing was almost completely closed. Banks sharply reduced lending to the economy, which affected those sectors for which previously bank loans were the main source of funding (construction, trade).

After reaching a peak in 2007, the ratio of loans to GDP began to decline. In the context of the worsening problems of the banking sector and writing-off non-performing loans of banking system, the ratio of loans to GDP returned to the level observed during the pre-boom period, dropping to 24.6% in 2017. Thus, with the exception of the period of the mortgage "boom", the indicator of loans to GDP was at the level of 30% and below.

However, it should be noted that reducing the share of loans in the economy reduces the impact of loans on inflationary processes (Greef and Haas, 2000). Thus, the effect of the current level of loans on inflation may be more limited than during the boom of mortgage lending.

4. Research methodology and data

An empirical analysis of the impact of loans on inflation in Kazakhstan was carried out by applying a vector error correction model and a vector autoregression model based on monthly data from January, 2008 to June, 2018. The used econometric approaches – VECM and VAR are based on the specification of Alessandro Calza (2003-2005).

Vector error correction model (VECM) is widely used to determine the degree and nature of the long-term relationship between crediting economy and inflation. The model adjusts the short-term dynamics depending on the deviation from the long-term dependence between the variables. The mechanism of residual correction ensures the implementation of a long-term relationship between variables.

The vector correction model is applied exclusively for cointegrated and nonstationary series. The presence of the cointegration vector indicates the presence of a long-term relationship between the variables, and the correction of the cointegration residues reflects the rate of deviation adjustment of the short-term dynamics from the long-run equilibrium. In long-term dynamic equilibrium, the correction term of the cointegration residuals is zero, and the deviation of variables from long-term equilibrium is adjusted to partially restore equilibrium. In total, 12 independent residual vector correction equations were constructed.

In order to identify the cointegration vector, the methodology developed by Johansen (1988) was used. Johansen's cointegration test reveals the presence of stationary linear combinations of time series that are first-order integrated, and is

one of the methods for evaluating systems, that use the maximum likelihood method for vector autoregressive models. The main assumptions of this test are the assumptions that the variables included in the vector autoregressive model are integrated processes of the first order, and the errors are independently and normally distributed. In other words, the purpose of the cointegration test is to determine whether or not the group of non-stationary series is cointegrated. Zero root in this test means the absence of cointegration, whereas the presence of a unit root demonstrates the presence of cointegration vectors or a long-term relationship between variables. Thus, the presence of a long-term equilibrium between nonstationary variables justifies the use of the VECM model.

The most common method for assessing the short-term impact of loans on inflation is the VAR (vector autoregression) model, which was proposed by Sims in 1972.

Vector autoregression model (VAR) was used to identify short-term inflation responses to exposure from the credit market. A detailed breakdown using the VAR model will allow determine, classify and analyze the response of both prices for individual goods and aggregated price indicators to changes in the volume of loans issued in the economy of Kazakhstan.

A VAR model is a system of equations in which each variable (a component of a multidimensional time series) is represented by a linear combination of all variables at previous points in time. In other words, each equation describes the dynamics of one endogenous variable depending on the past values of all endogenous variables of the system. Vector autoregression models allow analyzing the dynamic response of some variables to changes in others.

In general, the mathematical representation of the autoregressive vector model is:

 $y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + B_t x_t + \varepsilon_t,$

where y_t – k-dimensional vector of endogenous variables, x_t – ddimensional vector of exogenous variables, A_1 , ..., A_p and B – coefficient matrices to be estimated, ε_t – residue vector.

The endogenous variables of VAR-models within the framework of this work were loans issued to the economy, the consumer price index (CPI), the broad money supply M3, real incomes of the population, the producer price index (PPI) (table 1). Due to the fact that individual VAR-models were evaluated to assess the impact of business and household loans (consumer loans) on various price indicators, namely 40 consumer price indicators of Kazakhstan (total CPI, food CPI, non-food CPI, service CPI and price index for 36 product groups), a total of 84 independent vector autoregressive equations were built.

An empirical analysis of the impact of loans on inflation processes is implemented on the basis of impulse responses of the VAR model. The impulse response function describes the response of a dynamic series in response to some external shocks. By shock is meant a one-time change in endogenous variables, equal to one standard deviation of fluctuations over the entire observed period. Impulse responses characterize the time it takes for a variable to return to an equilibrium trajectory with a single shock of an endogenous variable. Namely, as the ratio of the cumulative impulse response of inflation to the credit shock to the cumulative impulse response to the credit shock in the amount of one standard deviation in Cholesky (Guerguev, 2006).

To eliminate the effect of revaluation of loans issued in foreign currency, only loans issued in tenge were used. In order to reduce the likelihood of obtaining "imaginary" dependencies when building vector autoregressive models, a preliminary survey of the stochastic properties of the used time series was carried out.

Table 1

Indicator	Reference		
Monthly volume of bank loans in kzt	nationalbank.kz		
Banks credit volume in kzt	nationalbank.kz		
Nominal exchange rate index of the USD to KZT	nationalbank.kz		
The total CPI in Kazakhstan	stat.gov.kz		
Food CPI in Kazakhstan	stat.gov.kz		
Non-food CPI in Kazakhstan	stat.gov.kz		
Service CPI in Kazakhstan	stat.gov.kz		
Price index for 36 separate product groups in Kazakhstan	stat.gov.kz		
Real Income Index in Kazakhstan	stat.gov.kz		
Broad Money Index in Kazakhstan	nationalbank.kz		
Industrial Production PPI in Kazakhstan	stat.gov.kz		
CPI in Russia	gks.ru		
The FAO Cereals Index	www.fao.org		
Brent Crude Oil Price Index	eia.gov		

Data used

Source: compiled by the authors

5. Discussion of the results

According to the results of the cointegration test (table 6), it can be concluded that there is a long-term dependence of inflation on loans. VECM estimates in Table 2 indicate that loans granted to legal entities are most affected by inflation in the long term: a 10% increase in the volume of loans issued will lead to a general increase in prices by 1.0 percentage point. Although consumer lending shows a long-term relationship with inflation, elasticity is statistically small in the long run.

If we consider the impact of lending shocks on inflation component by component, then we can see that food inflation is most strongly affected by lending shocks in the long run. This fact is due to the fact that the share of domestic production of food products (about 80%) in Kazakhstan is higher than the share of production of non-food products (about 40%), moreover, more than half of all

Long term elasticity of inflation in Kazakhstan at 1% shock of the volume of loans issued

	All credits	Credits to legal	Consumer credits								
		entities									
All products and service (CPI)	0.08	0.10	0.01								
Food products	0.19	0.24	0.05								
Non-food products	0.04	0.02	0.02								
Service	0.01	0.06	0.02								

Source: compiled by the authors

According to Johansen's test, non-food products have a long-term cointegration relationship with credit volumes, but the coefficients obtained using vector error correction models make it clear that this relationship is poorly interacted.

Inflation of services in the long term does not demonstrate an obvious dependence on credit shocks.

According to the study, it can be concluded that the dependence of inflation on loans in the short term is limited (table 3).

Table 3

Short-term cumulative elasticity of the price level in Kazakhstan by 1-% shock of the monthly volume of loans issued

Month	All credits										
after the	All credits and										
shock	service (CPI)	Food products	Non-food products	Service							
1	0	0	0	0							
2	0.008	0.008	0.033	0.002							
3	0.014	0.018	0.038	0.004							
6	0.029	0.042	0.051	0.005							
9	0.040	0.057	0.051	0.005							
12	0.049	0.066	0.051	0.005							
18	0.058	0.075	0.051	0.005							
24	0.062	0.079	0.051	0.005							

Source: compiled by the authors

The accumulated impulse responses of general inflation to the shock of one percent change in the volumes of loans issued after 24 months are equal to 0.06 pp. It should be noted that, to a greater extent, the shock of total lending is reflected in the food component of inflation, the accumulated impulse of which after 24 months is 0.08 percentage points. Non-food products respond to a similar shock with a growth of 0.05 percentage points, prices for services demonstrate weak responses to the lending shock.

It should be noted that the shock of changes in the volume of lending for non-food products is already damping after the fourth month after the realization of

Table 2

the shock, while the accumulated impulse responses of the food component show an increase until the end of the analyzed period. The damping of the accumulated impulses of non-food products four months after the realization of the shock is explained by the fact that the products of this group are mainly of import origin and are not produced domestically. Basically, these goods are purchased for resale, which is a one-time action that does not require such a long time to use the funds, in contrast to the production of food products, which is reflected in one-step sharp reaction to shock.

Table 4 presents the effect of a one percent shock on the volume of loans issued to legal entities on the prices of the consumer basket.

Table 4

Month	Credits of legal entities												
after the	All credits and												
shock	service (CPI)	Food products	Non-food products	Service									
1	0	0	0	0									
2	0.007	0.009	0.023	0.002									
3	0.012	0.017	0.024	0.003									
6	0.027	0.051	0.034	0.004									
9	0.037	0.070	0.034	0.004									
12	0.044	0.082	0.034	0.004									
18	0.052	0.093	0.034	0.004									
24	0.055	0.098	0.034	0.004									

Short-term cumulative elasticity of the price level in Kazakhstan at 1% shock of the monthly volume of loans to legal entities

Source: compiled by the authors

A one percent increase in the volume of loans to legal entities will lead to an acceleration of the food and non-food components of inflation by 0.1 p.p. and 0.03 p.p., 24 months after the shock, respectively. Shocks on the corporate lending market do not lead to significant price changes for services.

Table 5 shows the results of evaluating the accumulated impulse responses to consumer lending shocks. As can be seen from the results of the assessment, the most sensitive to shocks in the consumer lending market are non-food components of inflation. This fact is due to the fact that consumer loans are mainly taken to purchase durable goods (household appliances, cars, building materials, furniture, etc.). The rising cost of these goods is associated with an increase in demand from customers, which is supported and strengthened by the issuance of consumer loans. It should be noted that the prices for services show, although statistically small, but still a greater response to shocks in the consumer lending market, rather than lending to legal entities. Most likely, this is affected by the possibility of issuing a consumer loan for the purchase of various types of services, such as tourist trips, etc.

Month	Consumer credits											
after the	All credits and											
shock	service (CPI)	Food products	Non-food products	Service								
1	0	0	0	0								
2	0.002	0.005	0.009	0.004								
3	0.004	0.009	0.022	0.005								
6	0.013	0.015	0.048	0.008								
9	0.020	0.018	0.069	0.010								
12	0.027	0.019	0.085	0.011								
18	0.037	0.020	0.107	0.012								
24	0.044	0.020	0.122	0.012								

Short-term cumulative elasticity of the price level in Kazakhstan by 1-% shock of the monthly volume of consumer loans issued

Source: compiled by the authors

In addition to assessing the impact of lending shocks on inflation and its components, the authors calculated the short-term cumulative price elasticity of commodity groups in Kazakhstan at 1% shock of an increase in lending volumes. However, in the further analysis, service product groups were excluded due to the weak link with loans. The evaluation results presented in Table 9 provide an opportunity to examine in more detail the changes in prices, which products react most strongly to changes in the volume of loans issued.

So, the maximum impact of lending shocks of legal entities, as expected, falls on groups of goods of the food component, it's explained by the fact that most of the products of this group are produced domestically and the effect of business financing by credit resources is reflected in the final price of goods.

Groups of goods of the non-food component of the consumer price index show a weak dependence on the increase in lending to legal entities. The maximum elasticity among non-food items is 0.07 ppt. accounted for the purchase of motor vehicles. Perhaps this is due to the fact that 37% of passenger cars are produced domestically. Since the domestic production of goods requires the availability of sources of financing, which are loans, in particular to legal entities.

The elasticity of prices for groups of goods to consumer lending shocks demonstrates the opposite situation in contrast to legal lending shocks. In general, consumer lending does not have a significant impact on food products. Despite this, the "coffee, tea and cocoa" product group shows a moderate elasticity to changes in consumer lending, since only 28%³ of these goods are produced domestically. The impact of consumer lending on durable goods is more pronounced in comparison with food products. So, the maximum elasticity to the shocks of consumer lending falls on such goods as shoes (0.24 pp.) and materials for making clothes (0.23 pp.).As for the goods most popular as the main motives for consumer lending, the price elasticity of household goods and automobiles was 0.06 pp. and 0.14 pp., respectively.

³Resources and use of certain types of products and raw materials for 2017. http://stat.gov.kz

6. Conclusion

As part of analysis on the impact of loans to inflationary processes in Kazakhstan, the vector error correction model was used to identify long-term relationships, as well as a vector autoregression model to assess the short-term relationships using impulse responses.

According to the long-term relationship assessment model, loans in the longterm lead to an acceleration of inflation processes in Kazakhstan. In particular, the loans illustrated a significant relationship with the prices of food products, also a moderate relationship with the prices of non-food products. The impact of loans on service inflation was insignificant.

With regard to the dependence of lending and inflation in the short term, from the obtained estimates of the impulse responses of vector autoregression, we can conclude that the elasticity of the level of prices to changes in lending in the short term is weak. In particular, the change in the volume of loans issued in national currency has a restraint impact on food and non-food inflation, while prices for services show weak responses.

In terms of borrowers, business lending showed a more significant correlation as compared to consumer lending. Lending to businesses has a direct significant impact on the final prices of food products, however, the businesses take credit for a long time and, accordingly, affects final prices with a certain lag.

At the same time, prices for non-food products are the most sensitive to changes in the volumes of consumer lending. Individuals take loans mainly for the purchase of durable goods. In this regard, the growth of consumer lending increases the demand from buyers, which leads to an increase in the value of these goods.

In further studies as the banking sector recovers and credit increases in the economy, it is necessary to analyze in more detail the impact of loans on inflation. There should be a particular attention to the analysis on impact of business lending by industry and region in addition to this analysis.

Further research on this topic will help to improve the inflation forecast process, as well as help to explore the possibilities of improvement on effectiveness of the transmission mechanism of monetary policy.

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Appendix

Table 6

Test results on the cointegration of inflation and its component with the total volume of loans.

	All products	and service (CPI)		Food products							
Hypothesized		Trace	0.05 Critical		Hypothesized		Trace	0.05 Critical				
No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**			
None *	0.386265	96.56916	47.85613	0	None *	0.336138	80.51523	47.85613	0			
At most 1 *	0.177537	40.42713	29.79707	0.0021	At most 1 *	0.210309	33.40192	29.79707	0.0184			
At most 2 *	0.116507	17.95018	15.49471	0.0209	At most 2	0.046235	6.248867	15.49471	0.6661			
At most 3	0.031704	3.704953	3.841466	0.0542	At most 3	0.006976	0.805026	3.841466	0.3696			
Non-food products												
	Non-fo	od products				S	ervice					
Hypothesized	Non-fo	ood products Trace	0.05 Critical		Hypothesized	S	ervice Trace	0.05 Critical				
Hypothesized No. of CE(s)	Non-fo Eigenvalue	ood products Trace Statistic	0.05 Critical Value	Prob.**	Hypothesized No. of CE(s)	S Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**			
Hypothesized No. of CE(s) None *	Non-fo Eigenvalue 0.319639	Trace Statistic 85.31288	0.05 Critical Value 47.85613	Prob.** 0	Hypothesized No. of CE(s) None *	S Eigenvalue 0.243981	Trace Statistic 84.50009	0.05 Critical Value 47.85613	Prob.** 0			
Hypothesized No. of CE(s) None * At most 1 *	Non-fc Eigenvalue 0.319639 0.163948	Trace Statistic 85.31288 36.40121	0.05 Critical Value 47.85613 29.79707	Prob.** 0 0.0075	Hypothesized No. of CE(s) None * At most 1 *	S Eigenvalue 0.243981 0.195155	Trace Statistic 84.50009 48.9797	0.05 Critical Value 47.85613 29.79707	Prob.** 0 0.0001			
Hypothesized No. of CE(s) None * At most 1 * At most 2	Non-fc Eigenvalue 0.319639 0.163948 0.088906	bod products Trace Statistic 85.31288 36.40121 13.66	0.05 Critical Value 47.85613 29.79707 15.49471	Prob.** 0 0.0075 0.0928	Hypothesized No. of CE(s) None * At most 1 * At most 2 *	Eigenvalue 0.243981 0.195155 0.105292	Statistic 84.50009 48.9797 21.40732	0.05 Critical Value 47.85613 29.79707 15.49471	Prob.** 0 0.0001 0.0057			

Table 7

Test results on the cointegration of inflation and its component with the total amount of loans to legal entities.

	All products	and service (CPI)		Food products							
Hypothesized		Trace	0.05 Critical		Hypothesized		Trace	0.05 Critical				
No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**			
None *	0.218528	81.76858	47.85613	0	None *	0.289464	83.72236	47.85613	0			
At most 1 *	0.190712	44.53562	29.79707	0.0005	At most 1 *	0.192975	40.32188	29.79707	0.0022			
At most 2	0.056558	12.58403	15.49471	0.131	At most 2	0.074033	13.09295	15.49471	0.1114			
At most 3	0.024805	3.792748	3.841466	0.0515	At most 3	0.025838	3.324525	3.841466	0.0682			
	Non-fo	ood products				S	ervice					
Hypothesized		Trace	0.05 Critical		Hypothesized		Trace	0.05 Critical				
No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**			
None *	0.328946	90.87871	47.85613	0	None *	0.256767	80.8356	47.85613	0			
At most 1 *	0.192663	40.21777	29.79707	0.0022	At most 1 *	0.142715	39.58796	29.79707	0.0027			
At most 2	0.09631	13.03794	15.49471	0.1134	At most 2 *	0.116417	18.18414	15.49471	0.0192			
At most 3	0.001391	0.176821	3.841466	0.6741	At most 3	0.007026	0.980126	3.841466	0.3222			

Test results on the cointegration of inflation and its component with the total amount of consumer loans.

	All products	and service (CPI)		Food products							
Hypothesized		Trace	0.05 Critical		Hypothesized		Trace	0.05 Critical				
No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**			
None *	0.327098	88.86698	47.85613	0	None *	0.305742	73.84937	47.85613	0			
At most 1 *	0.219504	43.30911	29.79707	0.0008	At most 1 *	0.196511	31.8846	29.79707	0.0283			
At most 2	0.108521	14.80917	15.49471	0.0632	At most 2	0.04259	6.723563	15.49471	0.61			
At most 3	0.013806	1.598716	3.841466	0.2061	At most 3	0.014831	1.718299	3.841466	0.1899			
	Non-fo	od products				S	ervice					
Hypothesized	Non-fo	ood products Trace	0.05 Critical		Hypothesized	S	ervice Trace	0.05 Critical				
Hypothesized No. of CE(s)	Non-fo	ood products Trace Statistic	0.05 Critical Value	Prob.**	Hypothesized No. of CE(s)	S Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**			
Hypothesized No. of CE(s) None *	Non-fo Eigenvalue 0.369831	Trace Statistic 88.66675	0.05 Critical Value 47.85613	Prob.**	Hypothesized No. of CE(s) None *	Eigenvalue 0.284108	Trace Statistic 93.88728	0.05 Critical Value 47.85613	Prob.**			
Hypothesized No. of CE(s) None * At most 1 *	Non-fc Eigenvalue 0.369831 0.172592	Trace Statistic 88.66675 30.0223	0.05 Critical Value 47.85613 29.79707	Prob.** 0 0.0471	Hypothesized No. of CE(s) None * At most 1 *	Eigenvalue 0.284108 0.185764	Trace Statistic 93.88728 47.42989	0.05 Critical Value 47.85613 29.79707	Prob.** 0 0.0002			
Hypothesized No. of CE(s) None * At most 1 * At most 2	Non-fc Eigenvalue 0.369831 0.172592 0.038564	bood products Trace Statistic 88.66675 30.0223 5.961272	0.05 Critical Value 47.85613 29.79707 15.49471	Prob.** 0 0.0471 0.7001	Hypothesized No. of CE(s) None * At most 1 * At most 2 *	Eigenvalue 0.284108 0.185764 0.12448	Eervice Trace Statistic 93.88728 47.42989 18.86475	0.05 Critical Value 47.85613 29.79707 15.49471	Prob.** 0 0.0002 0.0149			
Hypothesized No. of CE(s) None * At most 1 * At most 2 At most 3	Non-fc Eigenvalue 0.369831 0.172592 0.038564 0.007583	bod products Trace Statistic 88.66675 30.0223 5.961272 0.966743	0.05 Critical Value 47.85613 29.79707 15.49471 3.841466	Prob.** 0 0.0471 0.7001 0.3255	Hypothesized No. of CE(s) None * At most 1 * At most 2 * At most 3	Eigenvalue 0.284108 0.185764 0.12448 0.002777	Statistic 93.88728 47.42989 18.86475 0.386516	0.05 Critical Value 47.85613 29.79707 15.49471 3.841466	Prob.** 0 0.0002 0.0149 0.5341			

Figure 3

Short-term cumulative elasticity of the price level in Kazakhstan by 1-% shock of the monthly volume of loans issued





Short-term cumulative elasticity of the price level in Kazakhstan for a 1-% shock of the monthly volume of loans to legal entities

Figure 5

Figure 4

Short-term cumulative elasticity of the price level in Kazakhstan by 1-% shock of the monthly volume of consumer loans issued



Short-term cumulative elasticity of the price level in the context of prices of commodity groups for 1-% shock of the monthly volume of loans issued

		Credits of legal entities								Consumer credits							
	Name of product groups		Months of after shock Months of after sho									nock					
	Name of product groups	1	2	3	6	9	12	18	24	1	2	3	6	9	12	18	24
	Bakery products and cereals	0.00	0.01	0.03	0.07	0.10	0.12	0.15	0.16	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	Meat	0.00	0.01	0.02	0.05	0.07	0.08	0.11	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fish and seafood	0.00	0.04	0.05	0.12	0.16	0.19	0.21	0.22	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	Dairy, cheese and eggs	0.00	0.03	0.04	0.09	0.12	0.13	0.16	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cts	Oils and fats	0.00	0.03	0.04	0.12	0.15	0.17	0.17	0.17	0.00	0.02	0.02	0.03	0.04	0.04	0.04	0.04
np	Fruits	0.00	0.01	0.05	0.12	0.16	0.18	0.20	0.21	0.00	0.02	0.02	0.03	0.03	0.04	0.04	0.04
pro	Vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
p	Sugar, jam, honey, chocolate and pastry	0.00	0.07	0.07	0.16	0.20	0.21	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ĕ	Foodstuffs, not elsewhere classified	0.00	0.02	0.03	0.09	0.14	0.17	0.22	0.25	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
	Coffee, tea and cocoa	0.00	0.00	0.00	0.02	0.03	0.04	0.05	0.06	0.00	0.02	0.03	0.05	0.06	0.07	0.07	0.07
	Mineral water, soft drinks, fruit and vegetable juices	0.00	0.01	0.03	0.05	0.08	0.09	0.11	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Alcoholic drinks	0.00	0.01	0.01	0.03	0.04	0.06	0.08	0.09	0.00	0.01	0.01	0.03	0.03	0.03	0.04	0.04
	Tobacco products	0.00	0.01	0.01	0.03	0.04	0.04	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Materials for making clothes	0.00	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.03	0.07	0.12	0.16	0.19	0.21	0.23
	Outerwear	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.03	0.06	0.08	0.10	0.12	0.14
	Other articles of clothing and clothing accessories	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.09	0.12	0.14	0.16	0.17
	Boots, shoes and other shoes	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.03	0.05	0.10	0.15	0.18	0.22	0.24
	Materials for maintenance and repair of residential premises	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Furniture, household items, carpets and other floor coverings	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.02	0.02	0.05	0.06	0.07	0.08	0.08
	Textiles used in the household	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.00	0.04	0.06	0.11	0.15	0.18	0.21	0.22
	Household appliances	0.00	0.01	0.02	0.03	0.03	0.03	0.04	0.04	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06
ts	Glassware, cutlery and household utensils	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.00	0.02	0.03	0.06	0.07	0.08	0.09	0.09
puc	Tools and devices used in everyday life and gardening	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.00	0.03	0.04	0.08	0.10	0.11	0.12	0.13
ē	Products and services used for housekeeping	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ğ	Medicines, medical equipment and apparatus	0.00	0.01	0.01	0.03	0.03	0.03	0.03	0.03	0.00	0.02	0.03	0.06	0.08	0.10	0.12	0.13
ę	Purchase of vehicles	0.00	0.01	0.04	0.07	0.07	0.07	0.07	0.07	0.00	0.02	0.04	0.08	0.10	0.12	0.14	0.14
ģ	Spare parts and accessories for personal vehicles	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.03	0.04	0.07	0.08	0.09	0.09	0.09
ž	Fuel and lubricants for personal vehicles	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.04	0.09	0.11	0.12	0.12	0.12	0.12
	Telecommunication	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Audiovisual equipment and photographic equipment, equipment for information processing	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02
	Other large durable goods for recreation and cultural events	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.06	0.07	0.11	0.12	0.12	0.12	0.12
	Other products and equipment for recreation, sports, gardening and pets	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.05	0.06	0.06	0.06	0.06
	Leisure, entertainment and culture services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.06	0.07	0.08	0.08
	Newspapers, books and stationery	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.01	0.03	0.03	0.04	0.05	0.05
	Household goods and services	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.00	0.01	0.03	0.07	0.09	0.11	0.12	0.13
	Personal care, not included in other categories.	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.02	0.02	0.04	0.05	0.06	0.08	0.08