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An equilibrium level of credits in the economy of Kazakhstan

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Abstract

The article was conducted to assess equilibrium level of credit-to-GDP ratio. The research is based on the fundamental macroeconomic indicators and international comparisons of the similar sized economies. In addition, the paper presents a set of econometric methods for estimating the influence of supply and demand factors on the dynamics of credit aggregates. Namely, the Error Correction Model and Hodrick-Prescott filter were applied, since they are suitable tools to assess long-term relationships between credit demand and supply as well as they can adequately assess the level of credit in the economy. In conclusion, it appears that the current level of this indicator in Kazakhstan is likely to be close to equilibrium or slightly lower it.

JEL classification numbers: E51, C23, G01
Keywords: Credit, Equilibrium level, Error correction model, Hodrick Prescot filter.

1 Introduction

The credit to GDP ratio is useful tool to assess the adequate level of credit in the economy. In general, credit leads to an increase in spending, also increasing income levels in the economy. This leads to higher GDP and thereby faster productivity growth. If credit is consumed to purchase productive resources, it helps to economic growth and increases the national income. Credit further leads to the creation of debt cycles (Mitchell A. and Raghuram G., 1994).

A deep understanding of the actions taking place in credit market is

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important for the development and implementation of effective monetary and macro prudential strategies. Shocks in the demand and supply of loans have different effects on economic activity and, therefore, require a different reaction from the central banks (ECB, 2009). It is necessary to properly identify these shocks and determine reasons of their occurrence. On the one hand, a reduction in the central bank's key rate will stimulate aggregate demand, which will lead to an increase in the value of companies as well as in the volume of bank lending. On the other hand, additional access of credit institutions to the refinancing tools will be required, in order to level out the supply limitation and satisfy the demand for loans from solvent borrowers (Rousseau P. and Wachtel P., 2011).

In addition, credit to GDP ratio is an important indicator to assess stability of the banking system and can serve as a leading indicator for banking crises (Kaminsky G. and Reinhart C., 1999). High level of credit in the economy is also a factor that increases fluctuations in the real sector of the economy, especially during unfavorable periods. According to empirical research conducted by Jean-Louis Arcand, Enrico Berkes and UgoPanizza, there is positive and robust correlation between financial depth and economic growth in countries with small and intermediate financial sectors. Also, there is threshold, which they estimate around 80-100% of GDP, above which finance starts having a negative effect on economic growth. This point was also supported by Easterly, Islam, and Stiglitz (2000). According to the study, there is a convex and non-monotone relationship between financial depth and the volatility of output growth. The research estimates to suggest that output volatility starts increasing when credit to the private sector reaches 100% of GDP.

2 The credit trends analysis

In Kazakhstan, bank loans historically have been actively used to stimulate the national economy. It is still a vital source for legal entities to finance their working capital and long-term investments in fixed assets. Furthermore, credit provides financial support to individuals to keep their day-to-day expenses. Credit serves as the main balance factor in the change in the money supply and the direction of placement by banks of the attracted funds of the population and business entities (Beck T., Levine R. and Loayza, N. 2000).

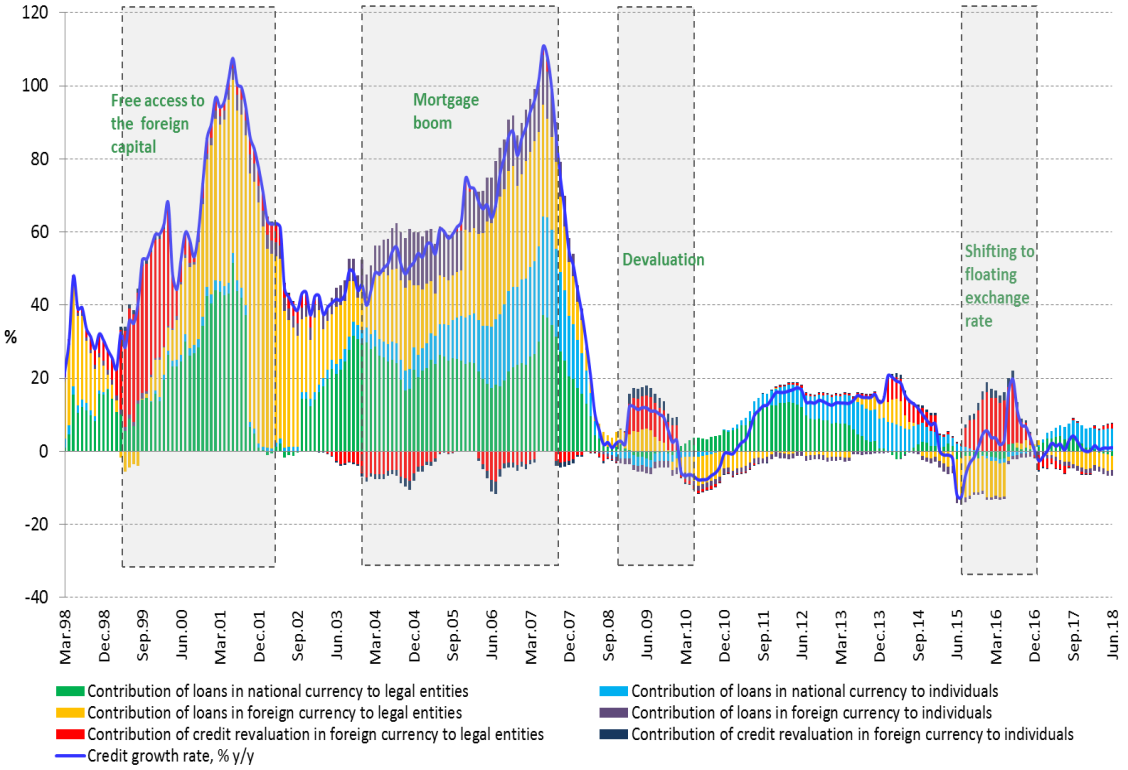

Figure 1: Main trends of credit market in Kazakhstan (1998-2018)

At the beginning of 2000, credit volume of non-legal entities, both, in national and foreign currencies, increased significantly. Such a dynamic growth in lending volumes is explained by providing free access to the foreign capital to the banks. Attracted foreign capital was actively used by banks to finance legal entities in both national and foreign currencies. The following substantial growth was observed from 2006 to 2008. It occurred due to the mortgage boom. Namely, a growth in the level of credit provided to individuals for property purchase and construction as well as credits to legal entities in construction industry. However, further events illustrated that it was only a credit "bubble", which was fueled by similar "bubble" in the real estate market. After the global financial crisis of 2007-2008, both bubbles were quickly deflated. As a result, the growth rate of credit market in Kazakhstan decreased significantly up to 5% and then the level of non-performing loans has increased significantly (up to 35% in 2013).

Furthermore, the credit volume has artificially increased due to devaluation of national currency at the beginning of 2009. In addition, switch to the floating regime of national currency had significant impact on the credit volume in the middle of 2015.

At the beginning of 2017, revaluation effect of credits in foreign currency disappeared and credit market started presenting a healthy growth. The growth was mostly contributed by consumer credits of individuals, who were motivated by postponed demand for durable goods.

In 2017, the National Bank concentrated its efforts on solving the structural problems of the banking sector. The main structural problems included concealing the real picture of the level of bad loans in the financial statements and the low quality of independent audit, low level of risk management systems as well as internal control. In details, because of taking measures, Kazkommertsbank claims to BTA Bank were transferred to the Fund for Problem Loans. The problem loans of Bank RBK were transferred to LLP "Special Financial Company DSFK" in the amount of 600 billion tenge and also deprivation of license of Delta Bank led to cease about 271 billion tenge from financial statements of the banking system. However, without taking into account the indicators of Kazkommertsbank and Bank RBK, which underwent a significant transformation in terms of clearing the balance sheets, and deprivation of license of the Delta Bank, the aggregate annual growth in the loan portfolio of banks in June 2018 was 11.6%.

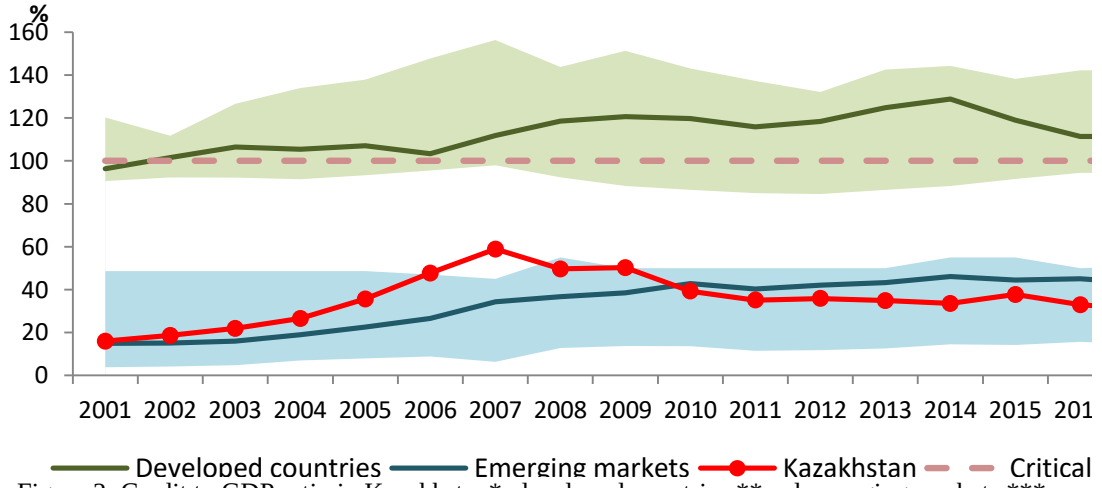

Figure 2: Credit to GDP ratio in Kazakhstan*, developed countries **and emerging markets *** (median values and range based on 25 and 75 percentiles)

*As a measure of credit, the volume of loans to the private sector of the economy is used. The data source is the IMF IFS database.
** Australia, Austria, Belgium, Switzerland, Germany, Denmark, Spain, France, United Kingdom, Israel, Italy, Netherlands, Norway, Singapore, Sweden, United States.
*** Armenia, Azerbaijan, Algeria, Belarus, Estonia, Georgia, Kyrgyz Republic, Lithuania, Morocco, Moldova, Nigeria, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Turkey, Ukraine.

The graph is comparing three markets. According to IMF IFS database Kazakhstan could outperform merging markets between 2003-2009. Especially, in 2007 when credit to GDP in Kazakhstan was around 60%, while other developing countries' ratio was below 40%. Nonetheless, after the financial crisis in 2008, the ratio started declining and achieved 30% by the end of 2017. The peak period was achieved by the mortgage boom, which created a bubble in the Kazakhstan's credit market. As a result, the credit to GDP ratio in Kazakhstan decreased till

24.2% at the end of 2017, which is observed to be the lowest point from 2004.

The picture is considerably different by comparing Kazakhstan and developed countries. Particularly, the developed countries' ratio in general has been above 100%. This tendency in developed countries was contributed by stable macroeconomic conditions as well as developed banking and financial sectors. However, according to Jean-Louis Arcand, Enrico Berkes and UgoPanizza the high level of credits in the economy can cause negative effect on economic growth.

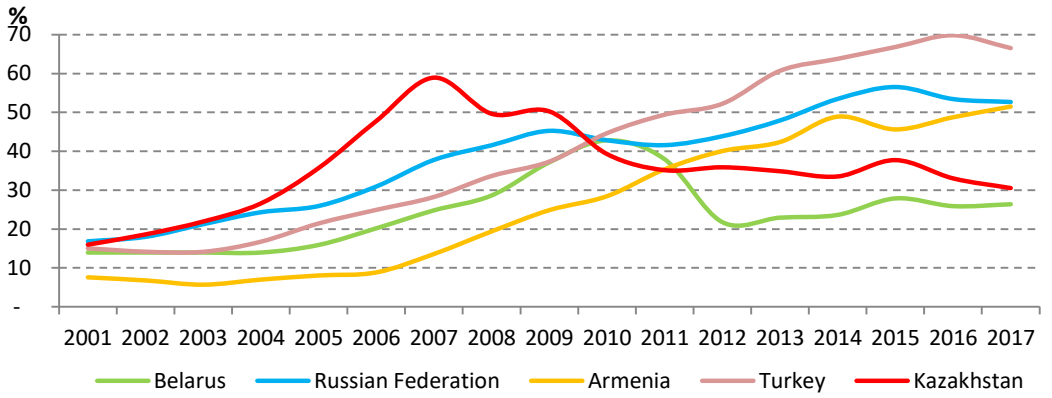

Figure 3: Credit to GDP ratio in Kazakhstan and selected comparable emerging countries

However, in comparison to developing countries, we can see similar results or range, where credit to GDP ratio is located close to each other. According to the IMF data, average credit to GDP ratio for selected developing countries was 47% at the end of 2016. Kazakhstan could outperform selected developing countries from 2001-2009. However, after exploding the mortgage bubble, bank credits started moderately declining and developing countries started outperforming Kazakhstan. By examining the similar sized countries, Kazakhstan has lower rate compared to Russia, Belarus, Armenia and Turkey.

Figure 4: Credit to GDP ratio related to legal entities and individuals

According to the graph, the following tendency can be observed: the level of credits to both, individuals and non-banking business entities, rose when mortgage boom happened and declined after this point. However, credit to GDP ratio for the non-banking legal entities decreased more than to individuals. In other words, the main contributor of decrease in credit to GDP ratio is non-legal entities.

In terms of the non-banking legal entities credit level, it appears that the main drivers of growth in 2007 were credits provided to the construction, trade and non-production industries. After the financial crisis, credits in construction industry decreased from 10% until 2%, and trade from 11% to 4% as well as non-production industry from 8% to 4%. To sum up, high growth rate of credit in 2007 generated by construction, trade and non-production industry was only bubble.

When it comes to individuals, it can be seen that the peak of credit to GDP ratio was achieved in 2007 during the boom of mortgage and economy. In details, main contributor of decrease of individuals' credit was mortgage that decreased from 7% until 2%. In addition, consumer credits also decreased from 10% until 6%. Nevertheless, it is believed that currently consumer credits stay at the optimal level.

2 Models

It is widely believed that one of the most effective methods for identifying imbalances in the economy is to determine the equilibrium level of credits by calculating the deviation from high-frequency fluctuations of demand and supply.

However, the equilibrium level considered as unobservable variables, and widely assessed by filtration methods and cointegration analysis. Usually, the gaps are calculated by using simple one-dimensional filters and cointegrations in error correction models (Mironchik N. and Devbltyrj M. 2012). The study has applied two econometric methods in order to analyze the optimal level of credits in the economy.

2.1 Error correction model

The first approach is based on the cointegration analysis, which assesses long-term relationships and defined as functions of demand and supply. This approach has a number of advantages as well as disadvantages. The main advantages are transparency and ease of interpretation. Drawbacks of the method include the controversy assumption that the variables, used in the model, fully reflect all the fundamental factors, explaining the dynamics of credit volumes.

The analysis covers the following time interval: the first quarter of 2001 to the fourth quarter of 2017. It seems inappropriate to include earlier periods to the analysis due to the structural changes in Kazakhstan economy. This study uses information from the National Bank of Kazakhstan as the main source. In addition, all used time series data is seasonally adjusted.

It is necessary to obtain two cointegration ratios that are characterized as a demand and supply of loans in the calculations. The study is carried out in two stages similar to S.N. Brissimis et. al (2014) works. In the first stage, using the modified least squares method (Phillips P.C.B., Hansen B.E., 1990), two cointegration ratios are estimated according to their specification, corresponding to the functions of supply and demand of credits. The second stage is construction of an error correction model, including the remnants of the cointegration relations, as defined in the previous step.

The first cointegration relation is formed on the concept of the equilibrium ratio of credit to GDP (Cottarelli C. et al, 2005; Coudert V., Pouvelle C ., 2010). Kazakhstan experienced several devaluations that had significant impact on credits in foreign currency in recent years. Actual amount of credit in foreign currency has not changed, but when converted to tenge they become twice bigger than actual shape. As a result, this study uses the amount of corporate and individuals' borrowings in national currency. In other words, credits in foreign currency were not considered due to revaluation effect. In addition, GDP and inflation were selected as indicators. The former illustrates the economic activity, the latter – an uncertainty in the economy.

Moreover, the study attempted to apply interest rates, but it illustrated insignificant results. At the end, the equation of demand of loans as follows:

$$\frac{credL}{GDP} + \frac{credI}{GDP} = 5.18_{(0.72)} * Y_t - 3.02_{(0.54)} * infl_t + \varepsilon_t$$

credL – credits to the non-banking legal entities in national currency
credI – credits to individuals in national currency
GDP – nominal annual GDP
Yt – log of real GDP
inflt – annual change in the logarithm of the GDP deflator
The coefficients in brackets are standard errors.

The second cointegration relation characterized as a supply equation, which is based on the variables of the banking sector. According to the research conducted by to S.B. Carpenter et al. (2014), supply equation was built by applying several variables (lending volume, liquidity and interest rate risk) from consolidated balance sheet of banks. As an integral indicator of the structure of the balance, pure stable funding is used. The concept has similar idea of utilizing the core liabilities, which is necessary for financing the growth of bank loans (Shin H.S, Shin K., 2011).

Similar to F. Vazquez, P. Federico (2012) work, $CoreLiab$ was calculated, where tenge deposits of individuals and non-financial organizations were included. Theoretically, the indicator $CoreLiab$ should be positively correlated to the volume of loans to the real sector of the economy, and if it is close to 1, then it can be argued that the indicator of pure stable funding adequately reflects the supply of bank loans.

In addition, as a proxy for the level of credit risk, the study applied non-performing loans (NPL), but statistical data was not significant. As a result, equation of credits supply is as follows:

$$\frac{credL}{GDP} + \frac{credI}{GDP} = 1.09_{(0.08)} * \frac{Coreliab}{GDP}$$

Coreliab – deposits of non-banking legal entities and individuals in tenge
The coefficients in brackets are standard errors.

Equations of demand and supply of loans are statistically significant and generally correspond to economic logic. Furthermore, after receiving the errors of these equations ($ECT\ D$ and $ECT\ S$), they were used in modeling the short-term dynamics of the volume of bank loans to the real sector of the economy (corrected for the GDP deflator, denoted by P) by using error correction model with lagged values of the dependent variables (Table 1). First, the error correction components $ECT\ D$ and $ECT\ S$ are included in the model separately (models 1 and 2), then they are used simultaneously (model 3). The coefficients are statistically significant and have the correct signs in terms of economic interpretation. In the second equation of error correction model, the supply equation has a small statistical significance, but the coefficient has the correct sign and its value is generally in line with expectations (Derugina E., Kovalenko O., Pantina I. and Ponomarenko A. 2017).

Table 1: Estimates of the error correction model

Dependent variable: $\Delta\log(\frac{Cred}{GDP})$

	Model 1	**Model 2**	**Model 3**
ECT^D	$-0.06_{(0.04)}$	-	$-0.12_{(0.06)}$
ECT^S	-	$-0.05_{(0.03)}$	$-0.11_{(0.04)}$
$\Delta\log(\frac{Cred\,(t-1)}{GDP\,(t-1)})$	$0.35_{(0.13)}$	$0.30_{(0.21)}$	$0.24_{(0.20)}$
$\Delta\log(\frac{Cred\,(t-1)}{GDP\,(t-1)})$	$0.14_{(0.12)}$	$0.19_{(0.21)}$	$0.05_{(0.20)}$
constant	$-0.002_{(0.01)}$	$-0.01_{(0.07)}$	$0.02_{(0.01)}$
R^2	0.26	0.32	0.43
p-value from LM test with 1(4) lags	$0.07_{(0.21)}$	$0.05_{(0.24)}$	$0.18_{(0.36)}$
p-value from ARCH LM-test with 1(4) lags	$0.08_{(0.12)}$	$0.31_{(0.08)}$	$0.27_{(0.28)}$

Note. The coefficients in brackets are standard errors.

To assess the impact of supply and demand factors on the dynamics of the volume of bank loans to the real sector of the economy, the relative contribution determines the corresponding error correction components in model 3 for short-term loans. Based on the results of the calculations, it was concluded that the growth of tenge credits in Kazakhstan from 2012 to 2017 were in line with long-term equilibrium level. There were high fluctuations in 2015 when the National Bank switched to the floating exchange rate. The growth of loans to the real sector of the economy at the beginning of 2015 was below the equilibrium level elaborated by fundamental macroeconomic factors. In other words, the participants of financial market had high anticipation of tenge devaluation. Consequently, banks significantly decreased issuing new credits to the economy (supply factor) and the demand to the new credits from non-banking legal entities decreased. In 2016 real credit growth was at the equilibrium level and from the fourth quarter of 2016 started growing until third quarter of 2017. Decrease of real credit growth in the middle of 2017 was contributed by cleaning bank balances from non-performing loans (restructuring the assets and liabilities of Kazkommertsbank JSC and RBK Bank JSC, as well as depriving the license of Delta Bank JSC) under the Program of Enhancing Financial Sustainability of the Banking Sector.

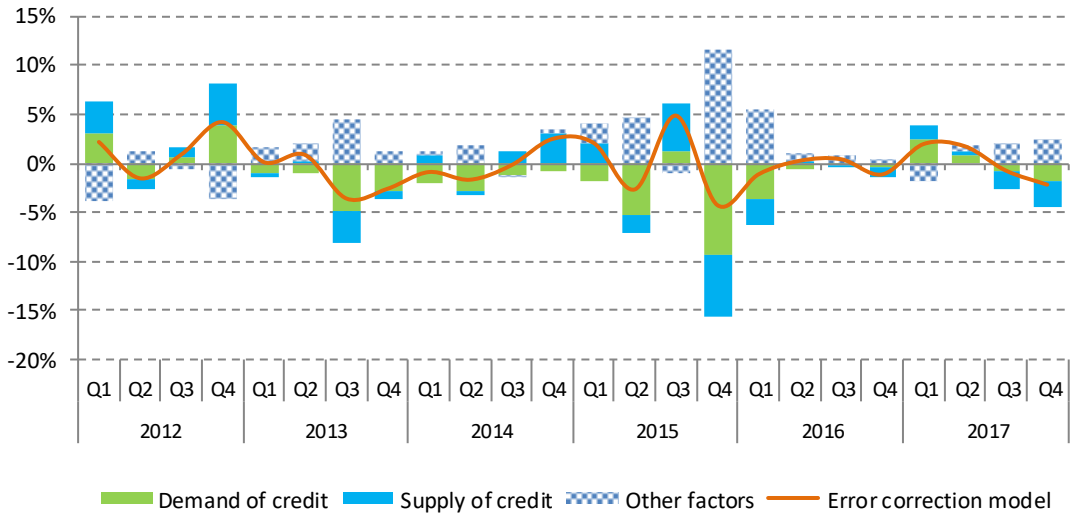

Figure 5: Deviations in the growth rates of real credits from the equilibrium level caused by demand and supply shocks

2.2 Hodrick-Prescott filter

The one-dimensional Hodrick-Prescott filter is purely statistical tool, since it only considers the values of one filtered time series. It is easy to use one-dimensional Hodrick-Prescott filter and it allows to quickly calculating the trend and the cyclic component in the dynamics of the indicator. At the same time, one-dimensional filter has serious drawbacks. For instance, one-dimensional filter has a problem with assessing endpoint correctly. In other words, the trend for the several last observations of the sample is determined incorrectly since they are sensitive to the length of the time series, and has a lack of justification for its use in terms of economic theory. One-dimensional filters are more suitable for decomposition of long time series, including when the values of the last periods are not important for the results of the study. In addition, the Basel Committee on Banking Supervision in December 2010 proposed the use of the Hodrick-Prescott filter to estimate the excess credit in order to calculate the value of the countercyclical buffer of bank credits (Basel Committee on Banking Supervision, 2010).

By comparing the results of Hodrick-Prescott filter and Error correction model, it can be seen that both of them have similar trends. Both methods of assessing equilibrium level of credits in the economy demonstrated that real credit growth gap was positive from third quarter of 2012 until second quarter of 2013. In addition, the growth of loans to the real sector of the economy from second quarter of 2013 to third quarter of 2014 was below the equilibrium level. Both models highlighted instability in 2015 because of shifting to floating exchange rate policy and recovery of real credit growth rate from first quarter of 2016 to

second quarter of 2017. Finally, ECM and HP filter showed that credit growth was declined from third to fourth quarter of 2017 due to cleaning non-performing loans from banks' balances.

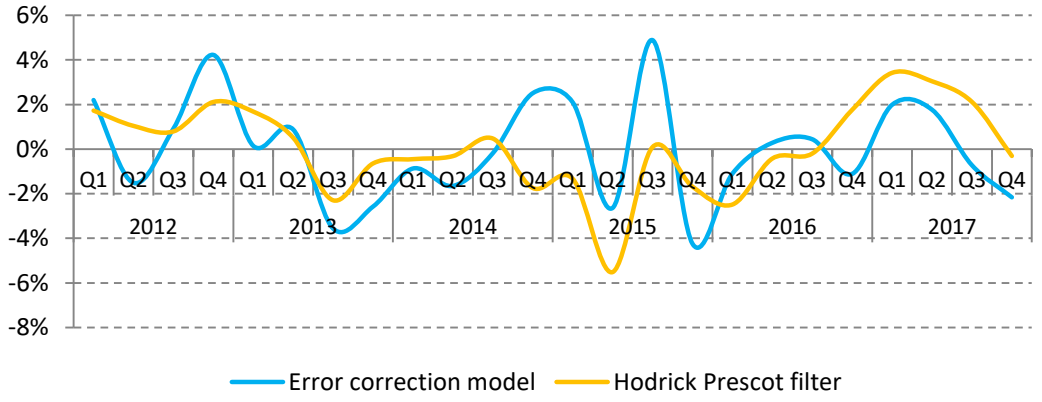

Figure 6: Comparison of error correction model and Hodrick Prescott filter

5 Conclusion

The paper proposed a few models that can be used to assess and interpret the dynamics of supply and demand factors of loans in the Kazakhstan's economy. Both Error correction model and Hodrick-Prescott filter illustrated similar results during the assessment of the adequate level of credits in Kazakhstan's economy. According to the study, it was concluded that the real credit growth in Kazakhstan converges to the long-term equilibrium level or slightly below, which is determined by indicators of real sector. Thus, the dynamics of credits were mostly affected by a decrease in the deposit base that indicates serious irregularities in the functioning of the banking system. On the other hands, the main positive contributor of the growth of real credits was other factor. In this situation, emergency measures to support the banking sector, adopted by the National Bank seemed to be justified. In addition, the situation in the credit market in 2015 was extraordinary due to slowdown in the credits growth in the first half of 2015 and rapid growth after shifting to floating exchange rate policy, which is fully explained by the effect of factors on the demand side.

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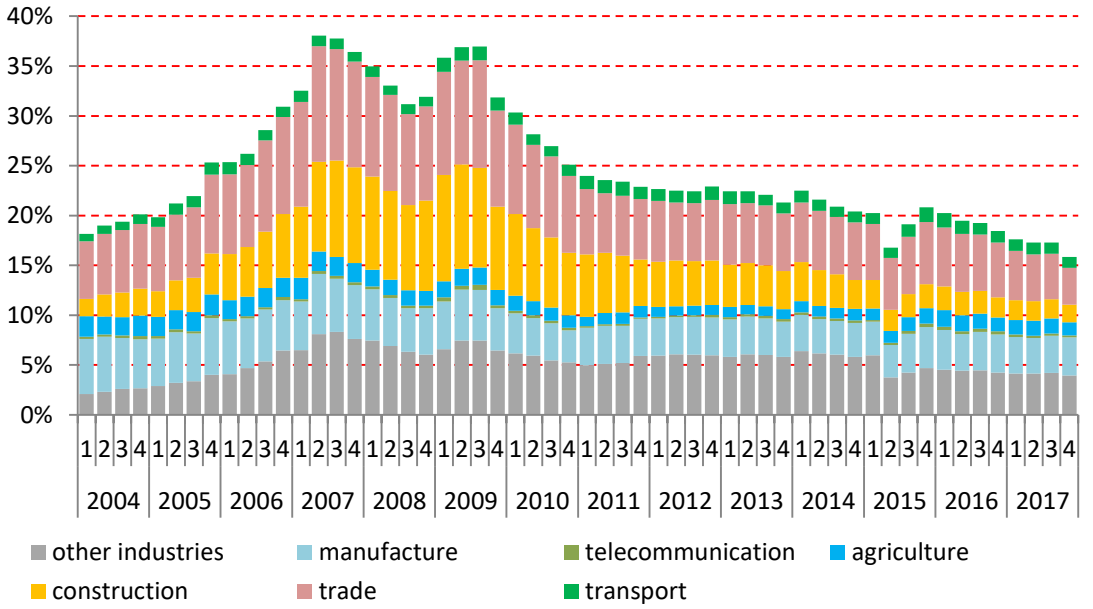
Appendix

Appendix 1: Credit to GDP ratio of non-banking legal entities



Appendix 2: Credit to GDP ratio of individuals