Monetary Policy Rate and Loan Performance in Kazakhstan

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Abstract

The purpose of a national currency is to allow the central economic planners and bank managers a measure of control over the economic activity of the country and to provide an effective medium of exchange to promote domestic commerce and foreign trade. The Kazakhstan government has taken key steps to assure that the national currency, Kazakh tenge, is a tradable currency with adequate provisions for clearing and settlements among banking institutions. The National Bank of Kazakhstan (NBK) decided to let Kazakh tenge to free float in August 2015 as part of a shift to an inflation targeting regime, and to improve the monetary policy in Kazakhstan. NBK regulates the one-day repo rate, also known as the base rate, or as the monetary policy rate.

The purpose of this paper is to analyze whether the exchange rate really depends on crude oil prices, exchange rate to Russian ruble, or it mainly depends on monetary policy rate. The sample of monthly data for 38 banks of Kazakhstan during the 2013-2016 years is used for analysis of the influence of base rate, oil prices, inflation rate, international reserves and bank loans on the exchange rate of Kazakh tenge to American dollar.

The empirical results of multiple regressions show that the base rate and cross exchange rate of Russian ruble significantly positively influence on the exchange rate of Kazakh tenge, but the oil price and the amount of bank loans significantly negatively influence on the exchange rate. The amount of international reserves, hold in NBK, insignificantly positively influences on the exchange rate of national currency. Level of non-performed loans (NPL) to total loans insignificantly relates to Exchange rate of KZT to USD, but depends significantly from the base rate of NBK.

Key Words: Base rate, credit risk, exchange rate, monetary policy, loan performance, oil price
JEL Classification: F310, G280, E520
1. Introduction

The national currency of the country, to be as an effective medium for commerce, must be tradable so that buyers and sellers can exchange their goods and services with knowledge that the currency is a reliable medium for exchanging things of value. The marketability of the currency depends upon a system that allows purchasers of the currency to buy it and sell it in accordance with their currency needs. This, in turn, requires that the banking system is arranged in such a way that banks may settle their accounts among themselves and foreign banks on a regular basis, moving the currency of the country and of other countries in response to the demands of the currency users. The Kazakhstan government has taken key steps to assure that the national currency, Kazakh tenge, is a tradable currency with adequate provisions for clearing and settlements among banking institutions. The National Bank of Kazakhstan (NBK) decided to let the tenge to free float in August 2015, as a part of a shift to an inflation targeting regime, and introduced the one-day repo rate, also known as the base rate or as the monetary policy rate on 2 September 2015 and set it at 12.00%. The NBK raised the interest rate further to 16.00%, and then to 17.00% in the February of 2016. According to the NBK, this decision is a continuation of the NBK’s measures to improve monetary policy and achieve its primary tasks, which are the stability of the financial sector, restoration of confidence in the national currency and creation of the preconditions for the formation of the tenge yield curve. Kazakhstan is an economy that neighbors Russia and China, and is the largest oil producer among the former Soviet Republics after Russia, and has been severely hit by the drop in oil prices and the very quick fall in value in Russia’s currency. Moreover, the NBK saw a major overhaul last year when government of Kazakhstan also announced sweeping plans to offer stakes in some of its largest state-owned enterprises to investors, including the national oil, railway and telecommunications companies, in preparation for eventual stock market listings. Despite these changes, the economy continues to slow and the national currency continues to volatile, thus fueling inflation. To explain the real vision of exchange rate influences on real economy of Kazakhstan, we should show overview of banking system in Kazakhstan and latest history of changes in exchange rate of national currency.

Background 1: Overview of Banking System

Kazakhstan has a two-tiered banking system. The first tier is comprised of the National Bank of Kazakhstan, which reports to the president. The second tier includes 38 commercial banks, including one state-owned bank as Bank of Development of Republic of Kazakhstan (RK) and 16 banks in which foreigners hold 30% or more of the bank’s shares, and others local commercial banks.

The National Bank acquired the functions of a financial regulator after merging with the Financial Supervision Agency in April 2011, and is therefore charged with overall supervision of the banking sector. Kazakhstan’s banking sector remains burdened by a legacy of non-
performing loans (NPLs) accumulated before and during the global financial crisis, which were estimated at 33.7% of the sector’s outstanding loan portfolio as of May 2014. Owing to efforts by both the government and the National Bank, the banking sector’s NPLs were reduced by 10.6%, to 23.1% in May 2015.

Provisioning for bad loans is one factor limiting the availability of credit to small- and medium-sized enterprises (SMEs), which the government has identified as a key obstacle to growth in the real economy. In 2014, the government changed its tax legislation, extending income tax relief for write-offs of bad loans. Banking sector recovery therefore remains a top priority for the government, which announced in April 2014 a new $5.5 billion stimulus package aimed in part at resolving the sector’s legacy debts and encouraging new SME lending. The stimulus package is expected to inject approximately $1.4 billion into a Toxic Asset Relief Fund which the NBK will use to purchase bad loans from local banks, and an additional $550 million to increase lending to SMEs. The government announced, in late 2013, the sale of three banks it bailed out during the global financial crisis: BTA Bank, Alliance Bank, and TemirBank. Under the terms of sale, BTA Bank was expected to merge with Kazkommertsbank to become what was projected to be the largest financial institution in Kazakhstan. The deal was completed on July 1, 2015. After exchanging assets and liabilities between two banks, the National Bank cancelled the banking license of BTA bank. As a result, Kazkommertsbank received healthy assets of two banks and BTA bank accumulated bad loans of Kazkommertsbank and BTA bank. Alliance Bank and TemirBank were also merged under the umbrella of ForteBank in 2014. The National Bank in 2014 announced it will implement far more stringent capital and NPL requirements on banks operating in Kazakhstan. The NBK requires each Kazakhstan-based bank’s NPL ratio to be lower than 15% since the end of 2014, and lower than 10% by the end of 2015.

The NBK has also indicated it may significantly raise capital requirements on banks to prompt greater consolidation within the sector, although Kazakhstan’s banking sector is already highly concentrated. Kazkommertsbank, Halyk Bank, BTA Bank, Tsesna Bank, and Sberbank-Kazakhstan are the country’s largest and most systemically important banks, controlling 53% of total banking assets as of May 1, 2015. Mergers planned for later in 2015 are projected to raise the share of sector deposits in the top five banks to 63%. The top 10 banks controlled roughly 79.2% of the country's banking assets as of May 1, 2015. In 2014, loans to companies declined by 6.1%, while overall loan growth averaged 6.3% across the entire sector mostly due to the retail portfolio, which grew at 12.5%. While retail lending remained relatively small at 9.6% of GDP, consumer loans were the only driving force of loan growth in 2014. In December 2014, the average weighted interest rate on tenge-denominated loans was 14.4% for non-bank legal entities, and 18.7% for individuals. Total bank assets, as of June 2015, reached 17.8 trillion tenge ($96.1 billion), while total bank equity capital reached two trillion tenge($12.6billion). Although the law forbids them from creating branches in Kazakhstan, foreign banks may
establish subsidiaries, joint ventures, and representative offices. As of May 2015, 27 foreign banks had representative offices in Kazakhstan. National laws mandate equal treatment for foreign and Kazakhstani investors, a position reinforced in 2005 by legislative amendments that lifted restrictions on the participation of foreign capital in the banking sector. Notably, no individual may own more than 10% of a bank’s shares (unless that bank is a subsidiary of another bank) without permission from the National Bank. As of May 2015, the country has 16 banks in which foreigners hold 30% or more of the stock. A number of foreign stockholders entered the banking market from 2008-2012, including Russia’s Sberbank, Israel’s Bank Hapoalim, South Korea’s Kookmin Bank, the Arab investment company Alnair Capital, Russia’s VTB, and Islamic Al-Hilal bank from the United Arab Emirates. After selling 30% of its shares to Kookmin Bank, CenterCredit Bank became the largest bank with foreign participation in Kazakhstan and the fourth largest bank by asset size. Kazakhstan’s subsidiary of Russian Sberbank has grown three years running to become the country’s fifth largest bank by asset size. Citibank established subsidiaries in Almaty in 1998 which offer a wide range of products and services for foreign and local corporate clients, including cash management, working capital and trade finance, electronic banking, foreign exchange and money market products, card services, and personal banking for corporate employees. As of May 2015, Citibank is the only Western bank operating in Kazakhstan as a local entity (rather than a correspondent bank). Turkish, Chinese, Pakistani and Indian banks have also established joint ventures in Kazakhstan.

Background 2: From Fixed to Floating Foreign Exchange Rates

Kazakhstan is an oil exporter. When oil’s price is high, its exchange rate also tends to be high, making its other exports uncompetitive (this is known as “Dutch disease”). So like many oil exporters, Kazakhstan pegged its exchange rate to the U.S. dollar. The Kazakh National bank maintained an exchange rate of about 185 tenge to the dollar, within a band of +3/-15 before 2014. This worked well while the price of oil was high. A National Bank of RK can freely create its own currency, so selling the tenge and buying dollars to maintain the peg was no problem. But the sharp oil price decline starting in the last quarter of 2014 put downwards pressure on the exchange rate: to maintain the tenge within its band, the Kazakh National Bank sold U.S. dollars to buy its own currency, progressively draining Kazakhstan’s dollar reserves. Further, Kazakhstan’s giant neighbor Russia, a fellow oil exporter and principal trading partner, floated the ruble in the fall of 2014, pressuring Kazakhstan to follow suit. On July 15, 2015, the NBK widened the trading band to +13/-15 around 185 to the dollar. But to no avail: the currency exchange rate remained under pressure (NBK Press-release #38, 2015). On August 20, 2015, the NBK floated the tenge (Financial Times, 2015). The tenge’s dollar exchange rate promptly fell sharply, reducing businesses’ earnings expressed in dollars (NBK Press release #2, 2016). Import prices rose, fueling domestic inflation; the Kazakh central bank dampened this by raising interest
rates, which reached 17 percent in February 2016 (Financial Times, 2016). Analysts expressed concerns about the health of the Kazakh banking sector, while politicians severely criticized the NBK’s Governor. Three months later, the Governor was replaced (NBK Press-release #58, 2015). But in fact, Kazakhstan’s move to floating rates proved beneficial in the long run. The NBK stopped routinely selling dollars in November 2016, protecting the country’s precious Foreign Exchange Reserves (Bloomberg, 2016). Despite this, early in 2016 the tenge stabilized at around 336 to the dollar. It has remained there ever since (Fitch Raiting, 2016). In parallel with this, the Kazakh central bank has progressively reduced interest rates since May 2016. The stabilization of the exchange rate, albeit at a much lower level, has encouraged import-export trade, enabling Kazakhstan to emerge quickly from a shallow recession. In October 2016, the ratings agency Fitch described the outlook for Kazakhstan as “stable”. The dynamics of Exchange rate changes for last 5 years is shown in Figure 1, and changes in oil prices for last 5 years is shown in Figure 2.

Figure 1. Exchange rate KZT for one USD for 5 years: 2014-2018

Source: https://www.xe.com/currencycharts/?from=USD&to=KZT&view=5Y

Figure 2. Crude Oil Brent prices for 5 years from 2014 to 2018


2. Literature Review

Kazakhstan, like other oil exporting and middle-income countries, is vulnerable to a variety of possible shocks from changes in oil prices and changes in exchange rates. One possibility is an adverse evolution of global financial conditions, which could lead to decreased availability of capital and higher interest rates in emerging markets. Another possibility is a renewed downturn.
in global demand, originating perhaps in a Chinese hard landing, a return of the euro crisis, or a new breakdown of US budget politics. A third possibility is deterioration in Kazakhstan’s terms of trade, originating in a fall in the global prices for fossil fuels and mineral commodities. Such shocks are some international shocks. Domestic shocks are also possible, as illustrated in Kazakhstan’s recent history by banking troubles, agricultural droughts, and unpredictability in the development of oil resources. Therefore, government will put in place systems designed to be robust under a wide variety of possible future shocks. This includes regimes for exchange rate policy and monetary policy. The literature review includes three parts of scholar’s opinions: exchange rate flexibility, inflation targeting monetary policy and loan performance in banking system.

Exchange Rate Flexibility

Kazakhstan has appropriately been moving away from a fixed exchange rate -- especially away from a rate fixed vis-à-vis the US dollar. This makes the question more interesting. As we review the lessons of the economic literature on exchange rate and monetary regimes, we will underline whether and how they are relevant for Kazakhstan in light of its own structure and circumstances.

As every country is choosing an own currency regime, that is, a systematic exchange rate strategy for the long run, it must to decide: 1) how flexible should be the exchange rate? And 2) to what extent should be the some degree of stabilization of the exchange rate, to what foreign currency should the domestic currency be linked?

Kazakhstan’s choice of fixed or flexible exchange rate should depend on the particular structural aspects of its economy which include vulnerability to trade shocks and supply shocks. Important specific examples of such shocks include changes in the global price of oil and other Kazakh commodity exports, changes in the global price of goods that Kazakhstan imports (such as food and autos), droughts affecting domestic agriculture, and increases in public sector wages(Kazakhstan Ministry of Economy, 2013).

Eichengreen (1994), Summers (1999), and Fischer (2001) concluded that countries would increasingly be forced to give up intermediate regimes, and to choose between floating and rigid fixing regimes, but over the last ten years, most medium-sized and middle-income countries have in fact chosen heavily-managed floats or other intermediate exchange rate regimes, rather than hard pegs or free floats. Flexibility and stability in the exchange rate each has advantages. Fixed exchange rate has five advantages: (1) providing a nominal anchor to monetary policy, (2) facilitating trade, (3) facilitating investment, (4) precluding competitive depreciation, and (5) avoiding speculative bubbles (Frankel, 2013).

Some exchange rate fluctuations appear utterly unrelated to economic fundamentals. It is not just that tests using standard observable fundamentals such as money supplies and income always find most variation in exchange rates unaccounted for. After all, residual variation can always
tautologically be attributed to unobserved fundamentals (e.g., the much-storied “shifts in tastes and technology”). The most persuasive evidence is a pattern that holds reliably, either across country pairs or across history: whenever a change in exchange rate regime raises nominal exchange rate variability it also raises real exchange rate variability (Mussa (1986); Taylor (2002); Bahmani-Oskooee, Hegerty and Kutan (2008)).

From the other side, there are also five advantages to flexible exchange rates. They are: (i) national independence for monetary policy, (ii) allowing automatic adjustment to trade shocks, (iii) retaining seigniorage (that a makes from its own), (iv) retaining lender-of-last-resort capability, and (v) avoiding speculative attacks (Frankel, 2013).

As well known, the exchange rate flexibility allows the country to pursue an independent monetary policy. The argument in favor of monetary independence, instead of constraining monetary policy by the fixed exchange rate, is the classic argument for discretion, instead of rules. When the economy is hit by a disturbance, such as a fall in demand for the goods it produces, the government would like to be able to respond so that the country does not go into recession. Under fixed exchange rates, monetary policy is always diverted, at least to some extent, to dealing with the balance of payments. This single instrument cannot be used to achieve both internal balance and external balance. Under the combination of fixed exchange rates and complete integration of financial markets, the situation is more extreme: monetary policy becomes altogether powerless to affect internal balance. Under these conditions, the domestic interest rate is tied to the foreign interest rate. An expansion in the money supply has no effect: the new money flows out of the country via a balance-of-payments deficit, just as quickly as it is created. In the face of an adverse disturbance, the country is unable to use monetary policy to counter its effects. After a fall in demand, the recession may last until wages and prices are bid down, or until some other automatic mechanism of adjustment takes hold, which may be a long time, as has been demonstrated by the emerging economies in Europe and in post-soviet countries. By freeing up the currency to float, on the other hand, the country can respond to a recession by means of monetary expansion and depreciation of the currency. This stimulates the demand for domestic products and returns the economy to desired levels of employment and output more rapidly than would be the case under the automatic mechanisms of adjustment on which a fixed-rate country must rely.

The unfortunate reality is that central banks, especially in developing countries, have seldom been able to make good use of independent discretionary monetary policy even when it is available. But even if one does not rely on deliberate changes in monetary policy, there is a second advantage of floating: that it allows automatic adjustment to trade shocks. The currency responds to adverse developments in the country’s export markets or other shifts in the terms of trade by automatically depreciating, thus achieving the necessary real depreciation even in the presence of sticky prices or wages. The argument goes back to Meade (1951) and Friedman (1953). The
advantage of automatic accommodation to terms of trade shocks is much more important in
countries where terms of trade shocks tend to be large, which describes exporters of oil and
minerals, as compared to other countries.

Other advantages of a flexibly managed currency are two important perquisites of a central
bank that the government thereby retains: seigniorage and lender-of-last-resort ability. The
central bank’s ability to earn seigniorage is partially lost if the rates of money creation and
inflation are limited to those of the external currency to which it is pegged and which it must hold
as foreign exchange reserves. Seigniorage is lost entirely under a rigid institutional commitment
such as a currency board, dollarization or – certainly – full monetary union.

The central bank’s ability to act as a lender of last resort for the banking system depends to a
degree on the knowledge that it can create as much money as necessary to bail out banks in
difficulty, which is the case of Kazakhstan’s central bank. In the last argument for a flexible
exchange rate corresponds to the fifth argument in favor of fixed rate regime. Stabilizing the
exchange rate arose from a disadvantage of free floating: occasional speculative bubbles
(possibly rational, possibly not) that eventually burst. However pegged exchange rates are
occasionally subject to unprovoked speculative attacks.

Some studies have attempted to classify countries according to their de facto exchange rate
regime and then to test which categories have superior economic performance, judged by growth
and other measures. This literature is entirely inconclusive. One reason is the difficulty in
agreeing how to classify de facto regimes, which in turn is partly because many countries in fact
do not typically follow any single regime for longer than a year or so without changing
parameters, if not changing regimes altogether. But the more profound reason why econometric
studies do not yield any consensus on which exchange rate regime works best is that the question
depends on the circumstances of the particular country. No single exchange rate regime is right
for all countries. This proposition may sound obvious, but there are some who tend to
recommend hard pegs for all, some who tend to recommend floating for all, and some who tend
to recommend intermediate regimes such as target zones for all (Frankel, 2013).

Concerning the degree of exchange rate flexibility, Kazakhstan is neither as small and open
as to require a firmly fixed exchange rate nor so large and self-sufficient as to mandate a free
float (Frankel, 2005), Hussain (2006)). The most important Kazakh exports include oil, of course,
and also natural gas, coal, uranium, iron, copper, chromium, and other minerals. The big swings
in the world prices of these commodities – including sharp peaks in 2008 and 2011 -- has
reinforced the need for the exchange rate to be able to move to accommodate trade fluctuations.
The Kazakh authorities made the decision to move away from a fixed exchange rate in 2003. The
tenge experienced a trend appreciation from 2003 to 2007 (Gissy, 2009), a period of rising world
oil prices. But it was re-stabilized in terms of the dollar in 2008 when the oil price was at (what
turned out to be) a temporary peak, within an implicit band of plus-or-minus 2 per cent. This
near-fixed exchange rate ended abruptly in February 2009, with a devaluation of about 25% (National Bank of Kazakhstan (2009)). The devaluation came during a severe banking crisis. But it is also relevant that oil prices at the time had fallen rapidly from their 2008 peak (and that the Russian ruble had gone into freefall in January 2009). The tenge’s cycle of a five-year upswing followed by the 2009 devaluation thus matched the Dutch Disease pattern familiar to many an oil-exporting country: a prolonged real appreciation when oil is booming, accompanied by a boom in construction and other non-traded goods and services, followed by an abrupt crash (Égert and Leonard, 2008; Alexeev and Conrad, 2009; and Ross, 2012).

Some rise and fall in the currency to match the rise and fall in oil prices is desirable. That is what accommodating terms of trade shocks implies. But it is not desirable that the depreciation take the form of abrupt abandonment of a previously declared link to the dollar, which undermines central bank credibility. Better to have an exchange rate regime that is robust enough that the country can live with it more than two years in a row. (The February 2009 devaluation was followed by a corridor for the dollar/tenge exchange rate, and then in March 2011 by a managed float centered on the dollar, and then in September 2013 by the target vis-à-vis a basket of foreign currencies.) One implication is that Kazakhstan should move toward a more flexible exchange rate, to better accommodate shocks. The credibility of the central bank would be enhanced if, instead of switching exchange rate regimes every couple of years, it could adopt a regime that was likely to be robust to future shocks, particularly the supply shocks and trade shocks that Kazakhstan often faces. Robustness means that the central bank doesn’t need to abandon its target ex post. Thus its credibility is enhanced by the existence of the rule rather than damaged.

**Inflation Targeting Monetary Policy**

Inflation targeting was initially best known as a rule that told central banks to set a target range for the yearly rate of change of the Consumer Price Index (CPI) and to try their best to attain it. If the governor of the central bank failed in that objective, he would be required to explain why. At first the idea was that he might even be personally penalized in some way.

There were also, increasingly, proponents of *flexible* inflation targeting, who held that it was fine to put some weight on real GDP growth in the short run, as in a Taylor rule, so long as there was a clear target for CPI inflation in the longer term (Svensson, 2000, 2009). Variants included targeting the price *level* instead of the inflation rate and targeting the core inflation rate (that is, excluding the volatile food and energy components of prices) instead of the headline number. In many ways, inflation targeting functioned well, both among industrialized countries and among others. Among the many studies of inflation targeting for emerging market and developing countries, most of the judgments were favorable. Savastano (2000) offered a concise summary of much of the research as of that date. Amato and Gerlach (2002) and Masson, Savastano, and Sharma (1997) argued that inflation targeting can be good for emerging markets, but only after
certain conditions such as freedom from fiscal dominance are satisfied, while Batini and Laxton (2006) argued that pre-conditions have not been necessary. Laxton and Pesenti (2003) concluded that because central banks in emerging market countries (such as Czechoslovakia) tend to have lower credibility, they need to move the interest rate more strongly in response to movements in forecasted inflation than a rich country would. Other studies of inflation targeting monetary policies include Prasad (2009); Mishkin (2000; 2008); and Mishkin and Schmidt-Hebbel (2007). Gonçalves and Salles (2008) found that emerging market countries that had adopted inflation targeting had enjoyed greater declines in inflation and less growth volatility.

**Loan performance in Banking Industry**

Over the past decade, the credit quality of loan portfolios across most countries in the world remained relatively stable until the financial crises hit the global economy in 2007-2008. Since then, average bank asset quality deteriorated sharply due to the global economic recession. Yet the deterioration of loan performance was very uneven across countries. Beck, Petr and Piloiu (2013) showed that real GDP growth was the main driver of nonperforming loan ratios during the past decade. Therefore, a drop in global economic activity remains the most important risk for bank asset quality. At the same time, economic activity is not able to fully explain the evolution of non-performing loans across countries and over time. In fact, our empirical results suggest that additional factors may negatively affect asset quality in countries with specific vulnerabilities. In particular, exchange rate depreciations lead to an increase of non-performing in countries with a high degree of lending in foreign currencies to unhedged borrowers which we approximate by international claims which are mostly denominated in foreign currencies. It was shown also that an increase in lending interest rates tends to increase nonperforming loans.

In another research Balgova, Nies and Plekhanov (2016) showed that active policies to resolve NPLs are associated with short-term costs. They rely on sufficient capitalization of banks allowing for full provisioning of non-performing exposures and their write-off or sale at discounted prices. Centralized solutions involving well-capitalized state-backed bad banks, asset management companies, or significant tax incentives for NPL resolution also carry a fiscal cost. Active policies also require strong administrative capacity and legal regimes supportive of NPL resolution. For these reasons, in many cases authorities lack capacity (administrative or fiscal) or willingness to deploy active policies to address NPLs. Yet systematic analysis of the past episodes of high and persistent NPLs suggests that the short-term price of active NPL resolution is well worth paying.

Aiyar, Ilyina, and Jobst (2015) examined the channels through which persistently high NPLs hold down credit growth and economic activity in Europe. High NPLs tie up bank capital that could otherwise be used to increase lending, reduce bank profitability, and raise funding costs – thereby dampening credit supply. Reducing NPLs expeditiously will therefore be crucial to supporting credit growth, especially to small and medium enterprises (SMEs) that are more
reliant on bank financing. Further, ‘unclogging’ the bank lending channel would enhance the transmission of monetary policy to the real economy. Resolving impaired loans would also stimulate demand for new loans, as it would facilitate debt restructuring for viable firms, while promoting the winding-down of unviable firms.

Moreover, Klein (2013) showed the significant empirical evidence regarding the anti-cyclical behavior of the NPLs. The general explanation is that higher real GDP growth usually translates into more income which improves the debt servicing capacity of borrowers. Conversely, Salas & Suarina (2002), Rajan and Dhal (2003), Fofack (2005), and Jimenez & Saurina (2005) showed that when there is a slowdown in the economy the level of NPLs is likely to increase as unemployment rises and borrowers face greater difficulties to repay their debt. Other macroeconomic variables, which were found to affect banks’ asset quality, include the exchange rate, interest rate, and inflation. In this regard, Louzis, Vouldis and Metaxas (2010) showed that exchange rate depreciation might have a negative impact on asset quality, particularly in countries with a large amount of lending in foreign currency to unhedged borrowers, and interest rate hikes affect the ability to service the debt, particularly in case of floating rate loans. Concerning the inflation, higher inflation can make debt servicing easier by reducing the real value of outstanding loan, but on the other hand, it can also reduce the borrowers’ real income when wages are sticky. As was shown by Nkusu (2011), in countries where loan rates are variable, higher inflation can also lead to higher rates resulting from the monetary policy actions to combat inflation. Baboučak and Jančar (2005) found evidence of positive correlation between the NPLs, unemployment rate and consumer price inflation, whereas GDP growth decelerates the NPL ratio. They also found that the real effective exchange rate appreciation does not exacerbate the NPL ratio. Finally, Beck, Jakubík and Piliou (2013), who used a panel of 75 countries, showed that share prices, exchange rate and lending interest rate significantly affect NPL ratios. Overall, it can be stated that a considerable amount of empirical evidence regarding the anti-cyclical behavior of NPLs can be found. The common finding of all these studies is that when there is a slowdown in the economy, the NPL level is likely to increase, as unemployment rises and borrowers face greater difficulties in repaying their debt.

3. Methodology

3.1 Research Questions

There are a huge studies of relationship between the country exchange rates and macroeconomics variables, but very few of them have analyzed the interdependence of base rate and external factors, influencing on exchange rate, as cross rates, world oil prices and bank’s performance risks. In the presented research our prime interest was that whether the main exchange rate of Kazakhstan really depends from external factors, or it really depends from monetary policy of NBK. We have explored the monthly data during the period of January 2013
to September 2016 for 38 commercials banks in Kazakhstan, and data of NBK to analyze the influence the bank’s regulations variables on the exchange rate. The data were collected from the IMF resources, NBK resources, and generated data for the analysis by authors. The followed sections of this research refer to the methodology of research, presented models, and empirical findings.

3.2 The Methodology of Panel Data Analysis

In a panel data set the various variables of interest are observed both across banks and over several time-periods - (t). It is a time series of cross-sectional data. Typically, t < n, n being the number of individual units (which in this case are banks) observed. As the number of time periods involved is not very large, the data set is not quite suited to the econometric techniques appropriate to time-series data. At the same time such a data set does not qualify for analysis as a cross-section data set. A simple pooling of the data will require strong assumptions. All observations will have to be presumed to be homogenous. Thus, if i firms are observed over t number of years and there are k exogenous variables x1, x2, ......, xk, and a dependent variable yit, then a panel data model in its most general form will be:

\[ y_{it} = \beta_{1i} + \beta_{2i} * x_{2it} + \ldots + \beta_{ki} * x_{kit} + \mu_i \]

(1)

In effect the implications of homogeneity are:
\[ \beta_{ki} = \beta_k, \text{ for all } i \text{ and } t; \text{ where } k > 1 \]  

(i)

\[ \text{var}(\mu_i) = \sigma^2, \text{ a constant} \]

and \[ \text{Cov}(\mu_i, \mu_{js}) = 0, \text{ where } i \neq j \text{ and } s \neq t. \]

(ii)

The use of panel data has a number of advantages. There are \( n \times t \) observations. Thus the efficiency of the estimators is improved because of the increase in the number of observations. Panel data sets also alleviate the problem of multicollinearity as the explanatory variables vary in two dimensions. In principle, panel data techniques allow for more sophisticated models with less restrictive assumptions. When choosing the econometric methodology and econometric specification, an important consideration is to allow for the aggregative nature of the information represented by secondary data. The advantage of panel data techniques is that it makes a distinction between residual heterogeneity associated with changes over time (period effects) and across firms (group effects). This allows for a better identification of the factors leading to changes in exchange rate.

We have identified the model for specification with ignored banks specific effect and with ignored specific period’s effect or the fixed effects model. The fixed effects model is the same as the dummy variable model. It is easily estimated using OLS with a set of additive dummies. This is possible if the number of observations are only a few thousands (Greene,
In our all three cases of presented study we have the number of observations, suitable to adopt the fixed effects model.

Since all variables have time series properties, we conducted tests for stationarity in the variables for the panel data. Recent literature suggests that panel-based unit root tests have higher power than unit root tests based on individual time series. The main advantage of using panel unit root tests is that their power is significantly greater compared to the low power of the standard time-series unit root tests in finite samples against alternative hypotheses with highly persistent deviations from equilibrium. While these tests are commonly termed “panel unit root” tests, theoretically, they are simply multiple-series unit root tests that have been applied to panel data structures (where the presence of cross-sections generates “multiple series” out of a single series). Panel unit root tests are similar, but not identical, to unit root tests carried out on a single series. Let us briefly describe the three panel unit root tests, supported in EViews, which were applied to our data of nominal exchange rate to USD, exchange rate to Russian Ruble, oil prices, inflation rate, base rate, and ratio of non-performed loans to total loans (NPL/TL).

We begin by classifying our unit root tests on the basis of whether there are restrictions on the autoregressive process across cross-sections or series. Consider a following AR (1) process for panel data:

$$y_{it} = \rho_i y_{i,t-1} + X_{it} \delta_i + \epsilon_{it}$$  (2)

where i = 1,2,...,N cross-section units or series, that are observed over periods t = 1,2,...,T_i. The X_i represent the exogenous variables in the model, including any fixed effects or individual trends, \(\rho_i\) are the autoregressive coefficients, and the errors \(\epsilon_{it}\) are assumed to be mutually independent idiosyncratic disturbance. If |\(\rho_i\)| < 1, \(y_i\) is said to be weakly (trend-) stationary. On the other hand, if |\(\rho_i\)| = 1 then \(y_i\) contains a unit root. For purposes of testing, there are two natural assumptions that we can make about \(\rho_i\). First, one can assume that the persistence parameters are common across cross-sections so that \(\rho_i = \rho\) for all i. The Levin, Lin, and Chu (LLC), Breitung, and Hadri tests all employ this assumption (Levin, Lin and Chu (2002); Breitung (1999); Hadri (2000)). All three tests fail to reject the null hypothesis of unit root in the variables in their level form, suggesting that variables are stationary in their first differenced form. The results of these tests are presented in Table 1. Thus, the stationarity in variables and independent behavior of them in different levels of panel study allowed us to apply the fixed effects model in the study.
Table 1. Panel Unit Root tests

<table>
<thead>
<tr>
<th>Tests</th>
<th>Null hypothesis in level form</th>
<th>Null hypothesis in first difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>P-value**</td>
</tr>
<tr>
<td>LLC</td>
<td>8.95321</td>
<td>1.0000</td>
</tr>
<tr>
<td>Breitung</td>
<td>-10.0054</td>
<td>0.0000</td>
</tr>
<tr>
<td>Hadri</td>
<td>1.88519</td>
<td>0.0297</td>
</tr>
</tbody>
</table>

* Pooled data by 38 sectors with N=43 time periods, total observations = 1634
**All three tests are distributed as N (0, 1) asymptotically. The one-sided critical values are

$$0.10 \pm 1.28, 0.05 \pm 1.64, 0.01 \pm 2.33$$

***: significant at the 1% level.

The Empirical Models

To analyze the influence of Base rate, Oil price, NPL/L, inflation rate, total banks loan amount, International reserves amount in NBK and Exchange rate of KZT/RR on Exchange rate of KZT/$ across 38 Kazakh banks the next regression models with fixed effects, discussed above, were used 4 models.

First model intended to analyze the influence of only external factors as crude oil price, exchange rate of Kazakh Tenge to Russian Ruble and macroeconomic factors as inflation rate, amount of international reserves, and amount of total banks loan in NBK on the exchange rate of Kazakh Tenge to USD. It is presented by equation (3).

$$ER_j = \alpha + \gamma_1 * BR_j + \gamma_2 * OP_j + \gamma_3 * ERRR_j + \gamma_4 * INF_j + \gamma_5 * INRES_j + \gamma_6 * BTL_j + \epsilon_j$$

(3)

where:

ER is exchange rate of KZT to USD,
BR is base rate of NBK,
OP is crude oil price, ERRR is exchange rate if KZT to RR,
INF is inflation rate in KZ,
INRES is amount of international reserves in NBK,
ERRR is exchange rate of KZT to Russian Ruble and
BTL is total amount of loans of NBK to 38 commercial banks

The empirical findings of this model will be described in followed section. The second model excludes the international reserves in NBK and total amount of banks loans, and, instead, includes the variable, responsible for the quality of bank loans across the all 38 commercial banks in Kazakhstan. This model is presented by equation (2).

$$ER_j = \alpha + \beta_1 * BR_j + \beta_2 * OP_j + \beta_3 * NPLtoTL_j + \beta_4 * ERRR_j + \beta_5 * INF_j + \epsilon_j$$

(4)

where now the NPLtoTL is the ratio of amount of non-performed loans to amount of total loans.
The empirical findings are explained also in the next followed section. As found results showed the very significant relationship between the exchange rate of KZT to USD and monetary base rate, we decided to deliver the reverse regression (5) to analyze the factors, influencing on monetary base rate.

\[ BaseRate_j = \alpha + \gamma_1 \times ERUSD_j + \gamma_2 \times ERRR_j + \gamma_3 \times OilPrice_j + \gamma_4 \times InflRate_j + \gamma_5 \times NPLtoTL_j + \varepsilon_j \]

(5)

And, finally, we have excluded the exchange rates, and have remained in regression (6) only NPL/L and inflation rate as only internal factors, which influence on base rate.

\[ BaseRate_j = \alpha + \gamma_1 \times NPLtoTL_j + \gamma_2 \times InflRate_j + \varepsilon_j \]

(6)

The GLM Model

The GLM Multivariate procedure provides regression analysis and analysis of variance for multiple dependent variables by one or more factor variables or covariates. Using this general linear model procedure, we have tested null hypotheses about the effects of factor variables on the means of various groupings of a joint distribution of dependent variables. The balanced model was tested, that is each cell in the model contains the same number of cases. The multivariate analysis of variance using Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root criterion with approximate F statistic, and , in addition to testing hypotheses, GLM 's estimation of parameters are presented in Table 2. The regression model represented by dependent variable ER to USD, and by four subject factors as: 1. Oil price, 2. Base rate, 3. ERtoRR, and 4. NPL/L.

### Table 2. GLM Multivariate Testsa

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.174</td>
<td>180.309b</td>
<td>0.000</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.826</td>
<td>180.309b</td>
<td>0.000</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>.211</td>
<td>180.309b</td>
<td>0.000</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>.211</td>
<td>180.309b</td>
<td>0.000</td>
</tr>
<tr>
<td>ERtoRR</td>
<td>.091</td>
<td>85.822b</td>
<td>0.000</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.909</td>
<td>85.822b</td>
<td>0.000</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>.101</td>
<td>85.822b</td>
<td>0.000</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>.101</td>
<td>85.822b</td>
<td>0.000</td>
</tr>
</tbody>
</table>

a. Design: Intercept + ERtoRR

b. Exact statistic

As was resulted by GLM model the main factor influencing significantly on Exchange rate of Kazakh Tenge to US dollar is the cross rate of Kazakh Tenge to Russian Ruble.
3.3 Data

Data for the nominal exchange rates of Kazakh tenge to US dollar and Kazakh tenge to Russian ruble were collected from IMF data base, NBK resources, and from the data base of Kazakh Stock Exchange (KASE) for the period from January 2013 to September 2016, since in that period the NBK started radically implement the regulation of monetary policy to lower of the highest level of non-performed loans (NPL) in Kazakhstan’s banking system. The data for bank performance were collected from the data base of financial statements of 38 commercial banks, and, finally, macroeconomic data, as inflation rates, National Bank ‘Foreign Reserves, and bank loans amounts, were collected from the data base of NBK. The total number of observations include 1710 observations of monthly data of 2013-2016 years.

4. Results and Discussion

Outlook for Kazakhstan’s Banking Sector Today

1. Kazakhstan’s banking sector remains burdened by a legacy of non-performing loans (NPLs)
   
<table>
<thead>
<tr>
<th>Year</th>
<th>NPL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2013</td>
<td>30.37%</td>
</tr>
<tr>
<td>May 2014</td>
<td>33.50%</td>
</tr>
<tr>
<td>May 2015</td>
<td>22.82%</td>
</tr>
<tr>
<td>May 2016</td>
<td>8.21%</td>
</tr>
</tbody>
</table>

Even that 10% was set by NBK for non-performing loans as a prudential ratio from January 1, 2016, some banks still have NPLs more than 10% to September of 2016:

- JSC Subsidiary of National Bank of Pakistan in Kazakhstan - 28.38%
- JSC Subsidiary of Russian Bank VTB in Kazakhstan - 17.48%
- JSC "ATF Bank" - 12.90%
- JSC "Halyk" Bank of Kazakhstan - 10.37%
- JSC Subsidiary "Sberbank" of Russian Bank in Kazakhstan - 10.04%

As shown in Figure 3, the NPL level has decreased to 1.01 2017 to around 6%, but again is increasing to 10 and more percentages.

Figure 3. Dynamics of the loan portfolio, non-performing loans over 90 days in the banking sector of Kazakhstan to 1.07.2017

Source: NBK: Current State of The banking sector of Kazakhstan 1.07.2017
2. Kazakhstan’s banking sector is already highly concentrated as of May 2015. 

$53\%$ - Kazkommertsbank, Halyk Bank, BTA Bank, Tsesna Bank, and Sberbank-Kazakhstan are largest and most systemically important banks which control roughly of the country's banking assets 

$79.2\%$ - The top 10 banks controlled roughly of the country's banking assets

3. Tenge-denominated loans was $14.4\%$ for non-bank legal entities, and $18.7\%$ for individuals.

4. Total bank assets, as of June 2015, reached $17.8$ trillion tenge ($$96.1$ billion), while total bank Equity capital reached two trillion tenge ($$12.6$ billion).

5. As of May 2015, the country has 16 banks ($42\%$) in which foreigners hold $30\%$ or more of the stock:

Russia's Sberbank, Israel's Bank Hapoalim, South Korea's Kookmin Bank, the Arab investment company Alnair Capital, Russia's VTB, Islamic Al-Hilal (United Arab Emirates), Citibank (USA), Turkish, Chinese, Pakistani and Indian banks have also established joint ventures in Kazakhstan.

**Actions of National Bank of Kazakhstan**

1. The NBK required each Kazakhstan-based bank’s NPL ratio to be lower than $15\%$ since the end of 2014, and lower than $10\%$ from 1 January of 2016.

2. Significantly raise capital requirements.

3. Planned Mergers of banks:

   - Forte Bank with Allianse and Temir banks => Forte bank
   - HSBC branch with Halyk Bank => Altyn Bank
   - Kazkommertsbank with BTA Bank => Kazkommertsbank
   - Kazkommertsbank with Halyk Bank => Halyk bank
   - Tengri Bank with Capital Bank => still unknown.

4. Let the tenge to free float in August 2015 as part of a shift to an inflation targeting regime.

5. Introduced the one-day repo rate—also known as the base rate—as the monetary policy rate: Figure 4 shows the actions of NBK on decreasing of base rate.

<table>
<thead>
<tr>
<th>Decision on the Base rate (Effective from)</th>
<th>Rates, %</th>
<th>Corridor, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>02.09.2015</td>
<td>12.0</td>
<td>7.0 - 17.0</td>
</tr>
<tr>
<td>02.10.2015</td>
<td>16.0</td>
<td>15.0 - 17.0</td>
</tr>
<tr>
<td>02.02.2016</td>
<td>17.0</td>
<td>15.0 - 19.0</td>
</tr>
<tr>
<td>15.03.2016</td>
<td>17.0</td>
<td>15.0 - 19.0</td>
</tr>
<tr>
<td>06.05.2016</td>
<td>15.0</td>
<td>14.0 - 16.0</td>
</tr>
<tr>
<td>07.06.2016</td>
<td>15.0</td>
<td>14.0 - 16.0</td>
</tr>
<tr>
<td>12.07.2016</td>
<td>13.0</td>
<td>12.0 - 14.0</td>
</tr>
</tbody>
</table>
In the last press release of the National Bank of Kazakhstan (NBK) it was announced that NBK has decided to keep the base rate at 9% with a corridor of +/-1%. Annual inflation remains within the target range of 2018 and, according to the National Bank’s estimates, its further dynamics will be formed within the target range of 2018 and 2019. However, on the background of possible realization of inflation risks in both short-term and medium-term, especially from the external sector and budgetary policy, the potential to ease monetary conditions further this year is limited.

The inflation continued downward trend in accordance with the estimates of the National Bank. In the first half of 2018, lower rate of inflation (2.6%) compared to the same period of the previous year (3.7%) is being observed, which contributed to the downward slide in inflation to 5.9% in June. A slowdown in the inflation rate is due to the influence of favorable seasonal factors in food and agricultural markets and the continuing decline in the price levels for consumer goods by domestic producers.

However, due to the low rate of inflation in the 3rd quarter of last year, which is taken into account in statistical calculations, the prominent deceleration of annual inflation by the end of this year, according to the National Bank’ estimates, is not expected.

Households have relatively stable inflation expectations. The quantitative assessment of the inflation for a year ahead in June remained at the level of February and May this year – 6.0%.
Changes in expectations in March (lower) and April (higher) reflected the impact of current market conditions.

The perceivable inflation of households continues to improve. The share of the responders, who believe that “in the past 12 months the price of goods and services has increased with the faster rate than before”, reached a minimum level for the entire observation period and amounted to 44.2% in June. The maximum historical value is shown by the share of respondents who noted the lowest level or declining dynamics of consumer prices over the past year – 22.5%.

The economic activity continues to demonstrate the positive dynamics. In January-May of 2018 the short-term economic indicator amounted to 5.1% in the annual terms. A positive contribution to growth was made by all major industries – mining and manufacturing, communications, trade, transportation and agriculture.

Empirical Results of Facts in Banking System

The next results show the implications of facts and actions on NBK:

1. Notable, that behavior of Exchange rate and Base rate is the same since August 2015 (Exhibit 1).

2. Notable, that NPL/L and Exchange rate are reversal in trends (Exhibit 2).

**) Here, the NPL/L is shown in left vertical axes in %, and Exchange rate in KZT/$ in right vertical axes.
3. More interesting, that Exchange rate is the mirror reflect of the amount of bank loans, shown in Exhibit 3.

*) Here, the Exchange rate in KZT/$ is shown in left vertical axes, and Base rate in % in right vertical axes, amounts of bank loans in numbers are not shown in axes.

Source: created by authors

4. Now mainly Kazakhstan’s subsidiary of foreign banks still have NPLs more than 10% to September of 2016:

JSC Subsidiary of National Bank of Pakistan in Kazakhstan - 28.38%,
JSC Subsidiary of Russian Bank VTB in Kazakhstan - 17.48%, JSC "ATF Bank" - 12.90%,
JSC "Halyk" Bank of Kazakhstan - 10.37%, JSC Subsidiary "Sberbank" of Russian Bank in Kazakhstan - 10.04% (Exhibit 4).
5. And, finally, to conclude to empirical facts in banking system in Kazakhstan, we put together the all factors influenced on Exchange rate of KZT/$ in Exhibit 5:

*) Here, the Exchange rate in KZT/$ and oil prices in $ are shown in left vertical axes, whereas inflation rate and base rate in % in right vertical axes.

Source: created by authors

Empirical Findings of Regression Models

The sample of monthly data for 38 commercial banks in Kazakhstan during the 2013-2016 years was used for analysis of the influence of base rate, oil prices, inflation rate, international reserves, bank loans and NPL/L on the exchange rate of national currency to American dollar.

1. Empirical Results of Model (3)

\[
ER_j = \alpha + \gamma_1 * BR_j + \gamma_2 * OP_j + \gamma_3 * ERRR_j + \gamma_4 * INF_j + \gamma_5 * INRES_j + \gamma_6 * BTL_j + \varepsilon_j
\]

For this model the sample from 45 time series of monthly data from January 2013 to September 2016 is used to analyses the empirical facts of influence of six macroeconomic variables on exchange rate KZT/$. The correlation matrix is shown in Table 3.

Table 3. Correlation Matrix for model (3)

<table>
<thead>
<tr>
<th>2013 -2016</th>
<th>ExcR to USD</th>
<th>Oil Price</th>
<th>BaseRate</th>
<th>ExcRtoRR</th>
<th>InflatiionRate</th>
<th>BankLoans</th>
<th>InternReserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExcRtoUSD</td>
<td>1</td>
<td>-.767**</td>
<td>.954**</td>
<td>.287*</td>
<td>.294*</td>
<td>-.973**</td>
<td>.449**</td>
</tr>
<tr>
<td>OilPrice</td>
<td>1</td>
<td>-.730**</td>
<td>.362**</td>
<td>-.239</td>
<td>.767**</td>
<td>-.607**</td>
<td></td>
</tr>
</tbody>
</table>
As we can see all the macroeconomics factors significantly influence on exchange rate KZT/$. The results of multiple regression are presented in Table 4 below.

Table 4. Regression results of model (3)

<table>
<thead>
<tr>
<th>Model (3)</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td>BaseRate</td>
<td>.283</td>
<td>3.154</td>
<td></td>
</tr>
<tr>
<td>OilPrice</td>
<td>-.378</td>
<td>2.342</td>
<td>.025</td>
</tr>
<tr>
<td>ExcRtoRR</td>
<td>.252</td>
<td>3.177</td>
<td>.003</td>
</tr>
<tr>
<td>InflationRate</td>
<td>-.061</td>
<td>1.733</td>
<td>.091</td>
</tr>
<tr>
<td>InternReserves</td>
<td>.013</td>
<td>2.941</td>
<td>.006</td>
</tr>
<tr>
<td>BankLoans</td>
<td>-.365 the oil</td>
<td>3.753</td>
<td>.001</td>
</tr>
</tbody>
</table>

R²=0.976, N=45
Significance at the 5 % levels is bolded.
Source: created by authors

As we can see from Table 4, the oil price and amount of banks loans significantly negatively influence on exchange rate KZT/$, but base rate and exchange rate KZT/RR significantly positively influence on exchange rate KZT/$ at the level of significance of 5%. Inflation rate and International reserves amount at NBK insignificantly relate to Exchange rate of KZT to USD.

2. Empirical results of regression model (4).

In this model we have replaced variable of total banks loan amount from NBK by bank loan quality variable as NPL/L used across all the 38 commercial banks with the sample of 1710 observations to verify the empirical fact of reverse relationship between the ratio of NPL/L and exchange rate KZT/$. We have also excluded International Reserves of NBK from regression because of its insignificant relation to exchange rate KZT/$. This model is represented by equation (4).

\[
ER_j = \alpha + \beta_1 * BR_j + \beta_2 * OP_j + \beta_3 * NPLtoTL_j + \beta_4 * ERRR_j + \beta_5 * INF_j + \zeta_j
\]

The regression results of model (4) are presented by Table 5.
From Table 5 we can conclude, that:

1. Base rate significantly (at 5%) positively influence on exchange rate of KZT/$
2. Exchange rate of KZT/RR also significantly positively influence almost in same level to Exchange rate of KZT$.
3. But oil price and inflation rate significantly negatively relates to exchange rate of KZT/$.
4. The results reveal the negative relation between oil price and exchange rate of KZT/$ given by other experts and NBK specialists.
5. What is interesting, level of NPL/L does not relates significantly to exchange rate of KZT $/$, but Exhibit 2 shows the inverse relationship between them.

3. Empirical results of regression model (5).

\[ BaseRate_j = \alpha + \gamma_1 * ERUSD_j + \gamma_2 * ERRR_j + \gamma_3 * OilPrice_j + \gamma_4 * InflRate_j + \gamma_5 * NPLtoTL_j + \epsilon_j \]

In Model (5) we have decided to check significant relationship between Base rate and Exchange rate of KZT to USD, and have delivered the reverse regression, replacing the dependent variable exchange rate to USD by base rate. The results are shown in Table 6.

### Table 6: Reversed Regression Model (6)

<table>
<thead>
<tr>
<th>Model (5)</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-7.612</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>ERUSD</td>
<td>.640</td>
<td>24.052</td>
<td>.000</td>
</tr>
<tr>
<td>ERRR</td>
<td>.192</td>
<td>10.515</td>
<td>.000</td>
</tr>
</tbody>
</table>
The results have revealed the results of Model 4 here also. 64% of change in Exchange rate of KZT to USD will led to 1% change in Base rate.

4. Empirical results of regression model (6).

As we see, that there is significant relationship between Base rate and Exchange rate of KZT to USD, we, finally, decided to analyze simply the relationship between base rate, amount of NPL to TL and inflation rate as NBK put in its primary goals to stabilize financial sector.

$$\text{Dependent Variable: Base Rate}$$

$$R^2 = 0.774; N = 1710$$

Significance level at 5%

<table>
<thead>
<tr>
<th></th>
<th>OilPrice</th>
<th>InflRate</th>
<th>NPLtoTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>-.264</td>
<td>.181</td>
<td>-.002</td>
</tr>
<tr>
<td>t</td>
<td>-9.690</td>
<td>29.613</td>
<td>-.340</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
<td>.000</td>
<td>.734</td>
</tr>
</tbody>
</table>

$$\text{BaseRate}_j = \alpha + \gamma_1 \cdot \text{NPLtoTL}_j + \gamma_2 \cdot \text{InflRate}_j + \epsilon_j$$

Empirical results in Table 6 show that Base Rate of NBK is determined by actions of decrease the NPL/L and by regulation of inflation rate.

5. Conclusions and Recommendations

- Exchange rate of KZT to USD definitely depends from Base Rate of NBK for purposes to implement the monetary policy rate and to stabilize financial system in KZ;
- Base rate significantly positively influence on Exchange rate of KZT to USD;
- Exchange rate of KZT to RR also significantly positively influence almost in same level to Exchange rate of KZT to USD.
• But Oil Price and Inflation rate significantly negatively relates to Exchange rate of KZT to USD. The results reveal the negative relation between Oil price and Exchange rate of KZT to USD of other experts and NBK.

• Level of NPL to TL insignificantly relates to Exchange rate of KZT to USD, and depends significantly from the base rate of NBK.

This research can help to analyze what are the real actions of NBK in monitoring of base rate and exchange rate of KZT to USD.

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