MAQSUT NARIKBAYEV UNIVERSITY

International School of Economics

Arsen Issin, Madi Kabdulla, Nazira Dauletova

The Effect of Monetary Policy on Consumption: The Case of Kazakhstan

Thesis submitted

for the degree of Bachelor in

6B04102 Economics, 6B03103 International relations

Supervisor: Saule Kemelbayeva

Astana 2024

ABSTRACT

This research challenges the implications of the monetary policy in Kazakhstan. Major economic variables, including disposable income, interest rates, and CCI, are taken into analysis.

The study investigates the relationship between independent variables and consumption through the OLS regression model. The data were collected quarterly from 2010 to 2023 and were collected from the National Bank of Kazakhstan and The Bureau of National Statistics (secondary data). Based on the result, 1% increase of the REER decreases consumption by 1.81% change, while an increase of income by 1% increases the consumption of households by 0.4%.

These results are of particular importance to subjects who work in the field of finances and banking, and to economic strategists and decision-makers whose job it is to develop an environment for stabilization and growth of the economy. This research will be useful in establishing the current economic landscape and developing a data-grounded basis that future policy formulations can be based on concerning enhancing consumer spending and, consequently, overall economic welfare within Kazakhstan.

The research is recommended for both students and practitioners who are interested in the details of how financial situations impact consumption, and also for the critical insights guiding policy and strategic economic decisions in developing economies such as Kazakhstan.

TABLE OF CONTENT

INTRODUCTION

Consumer behavior is a process in which people choose what to buy or, in other words, what to consume. Households are the last step in the consuming process. Resources are limited; therefore, everyone should make choices, and desires can manipulate this process and how their emotional, mental, and behavioral reactions change. Moreover, it is a component of the gross domestic product (hereinafter - GDP), and consumption is the largest portion of GDP of many nations.

Households pay money to buy anything to consume, they create demand for goods and services. Generally, if the price of any good or service increases, it causes demand to slow down. Growth of price is called inflation. This is like a measure of how healthy an economy is. Again, we need to refer to households because they adjust their inflation expectations about tomorrow. According to the International Monetary Fund (2023), inflation expectations play a critical role in shaping inflation dynamics. If people believe in the growth of prices in the future, it could even affect the current prices. For example, Japan has had declining inflation rates since 2018. Nishizaki et al (2012) concluded that inflation expectations and exchange rate contributed to the impact of chronic deflation in Japan. In our research, we take into account these problems and attempt to apply them to the Kazakhstani case.

To regulate inflation and exchange rates in the economy, central banks implement monetary policy. In 2015, the National Bank of Kazakhstan (hereinafter - NBK) introduced a new approach to monetary policy, which is called inflation targeting. The analytical department of Halyk Research (2023) studied the monetary policy of the NBK. The NBK indicates four channels, which affect the internal economic environment: interest rate, loans, currency, and inflation expectations. In conclusion, it is written that there are better alternatives than Kazakhstan. Nevertheless, at the same time, the economy of Kazakhstan is not stable because high interest rates and the growth of consumer loans prevent the development of the welfare of the population and, in contrast, increase its burden. If a consumer cannot afford to buy any product or service, he or she applies to a second-tier bank and gets a loan for a specific repayment period and a specific interest rate. According to data from the NBK (2024), the share of consumer loans increased from 6% in 2003 to 61% in 2024, and increased 384 times in absolute value (see Fig. 1). Households can get any goods or services they want and pay for it in the future (buy now, pay later). In addition to the consumer loan, there is a payment scheme, which allows the consumer

Figure 1. Share of loans by type, %
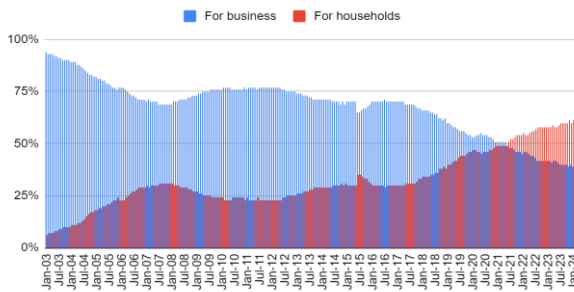
to pay without interest and pay only the principal amount of the loan, but this 'free' loan is a marketing trick because the interest is hidden in the price of a product. Banks are not charitable funds, as such banks should generate revenues. The primary problem here is the risk of credit default.

The research *question* is "How does monetary policy affect consumption in Kazakhstan?". Based on this, the *goal* is to understand to what extent monetary policy tools affect consumption in Kazakhstan. The two *hypotheses* that we test with the data are as follows:

- Interest rate should be negatively correlated with consumption.

- Real effective exchange rate should be positively correlated with consumption.

Additionally, we control for (disposable) income as an important determinant of the consumption.

Methodologically, the research employs an Ordinary Least Squares (hereinafter - OLS) regression model to scrutinize the relationship between the variables that reflect monetary policy and other relevant economic variables and consumption. Data was collected quarterly from 2010 to 2023. This approach allows for a detailed exploration of how changes in independent variables influence patterns of households, providing a quantitative approach to the conclusions.

LITERATURE REVIEW

In discussing the purpose of this study, it is worth mentioning a paper by Whalen (2008). This paper describes the causes of the crisis of low-quality mortgages. Whalen (2008) believes that one of the causes of the crisis is to increase the availability of "affordable housing" through the use of "creative financing methods". This means that American citizens with a credit score of less than 600 were given mortgages, thereby increasing the number of defaults on loans. This is one of several factors that contributed to the 2008 crisis. Our research takes into account the mortgage crisis as one of the prejudices associated with the current situation in Kazakhstan and the impact of banks on the purchasing behavior of the population.

A study made by Kalyuzhnova, Y. & Christian N. (2008) is about the impact of oil revenues that affected the financial market in Russia and Kazakhstan. The authors predicted problems in the financial systems of Kazakhstan. The quick loan expansion in those years has not concomitantly driven a comparable development of investments, an issue that is compounded by structural weaknesses within the savings. So, this paper is useful for new studies because it is possible to understand the problems from the past perspective.

Kandil and Mirzaie (2011) examined what influences people's consuming habits in the USA. They looked at factors like how much money people have after taxes (disposable income), how positive or negative people feel about the economy (consumer confidence index), the cost of borrowing money (interest rate), and how the value of the dollar compared to other currencies affects purchasing power (real effective exchange rate). The researchers used a linear model with the addition of denote expectations at the time, they also transformed the variables into log expressions. Changes in private consumption tend to mirror fluctuations in disposable income and consumer behavior, following cyclical patterns. Using a simple model, they found that when the interest rate goes up, people tend to spend less.

This model will be effective for use in our study, thanks to this we will be able to select the necessary variables for Kazakhstan's case and use the regression model to further understand which variables affect consumption to a greater or lesser extent, as well as to get answers to our hypothesis and research question.

Their research could be potentially relevant to the situation in Kazakhstan. Our study involves a similar model for Kazakhstan, using the same variables: consumption, CCI (or inflation expectation), interest rate, exchange rate, and disposable income.

METHODOLOGY

In our research, we use econometric analysis to determine how the monetary policy variables affect the consumption of households in Kazakhstan. In the model, we used the variables: the exchange rate (REER as a modification of the exchange rate) of tenge, the interest rate determined by the NBK, the expected inflation, and income. The data for the first model were collected from 2016 quarterly till 2023 (Annex 1). In total, the model will consist of 32 observations.

1. The key data sources used for this analysis include:

    - Interest rate: the NBK shares the historical data officially.

    - REER represents the value of the home country's currency against a set of foreign pcurrencies, adjusted by changes in prices of goods and services. The NBK calculates and publishes the rate monthly, quarterly.

2. The Bureau of National Statistics of Kazakhstan (hereinafter - Bureau) provides quarterly and annual reports on household expenditure by regions across the country. Additionally, income (salaries) is provided by the Bureau through the GDP perspective.

The Bureau does not have enough data on disposable income, so it was decided to calculate disposable income as income minus consumption to simplify the model. For the first model we use disposable income as used in Kandil and Mirzaie (2011). All variables will be transformed into natural logarithms for unbiased interpretation of results. This adjustment is intended to address any issues related to distribution and heteroscedasticity, ensuring that our findings are reliable.

The methodology employed is the OLS regression model with time-series data collected quarterly. This type of methodology is one of the best for analysis and understanding relationships between variables where the goal is to determine how independent variables influence a dependent variable.

The structure of the first model:

The dependent variable is consumption (log-transformed).

Independent variables are REER (in points), interest rate (in percent), inflation expectation (in percent), and disposable income (log-transformed).

So, the 1st model looks like:

$$ln(Consumption) = \beta_0+\beta_1\ (REER)\ +\beta_2*(Interest\ Rate)+\beta_3*(CCI)+\beta_4*ln(Disposable\ Income)+\epsilon,$$

where β is a slope, ϵ is an error term.

To improve the model, it was decided to expand the data from 2010 to 2022 quarterly (Annex 2), and the CCI variable will be excluded from the second model because the Bureau provides quarterly data on this variable only from 2016. Additionally, disposable income was changed to income as it provides a broader degree of financial resources for individuals or households. The model will now consist of 51 observations. *The structure of the second model:*

The dependent variable is consumption (log-transformed)

Independent variables are REER (in points), interest rate (in percent), and income (log-transformed).

So, the 2nd model looks like:

$$ln(Consumption) = \beta_0+\beta_1*ln(REER)\ +\beta_2*ln(Interest\ Rate)+\beta_3*ln(Income)+\epsilon,$$

where β is a slope, ϵ is an error term.

The transition from collecting data to its analytical interpretation is crucial. This approach increases the reliability of our findings and sets the stage for a broader exploration into the dynamics between economic policies and consumer behavior.

Model Construction. Two OLS regression models are constructed. The first one uses the REER, the interest rate set by the NBK, the Consumer Confidence Index (hereinafter - CCI), and income as independent variables, with consumption as the dependent variable. The second model modifies some variables and expands the dataset range.

1. Data Transformation. The transformation of consumption and income using natural logarithms avoids potential issues of skewed data and heteroscedasticity, influencing the interpretation and reliability of the results.

2. Variable Selection and Hypothesis Testing. The choice of variables like REER, interest rates, and income levels reflects hypothesized economic determinants of consumption behavior. Each variable's impact on consumption is statistically tested, providing insights into their relationships.

3. Statistical Analysis. Statistical significance and the strength of the relationships are quantified using R-squared values, F-statistics, t-statistics, and p-values. It helps to interpret each variable's specific contribution as well as the model's overall fit.

DATA COLLECTION

The data used for this analysis is secondary data.

GDP is an indicator that measures the value of final goods and services. 'Final' means direct consumption by households. There are different approaches for computing GDP. The most frequently used are product, income, and expenditure approaches, for this study, income and expenditure approaches are relevant to use. Taking components of GDP into account, we can extract income and consumption for our calculations.

*Income approach: GDP = **Total National Income** + Sales Taxes + Depreciation + Net Foreign Factor Income*

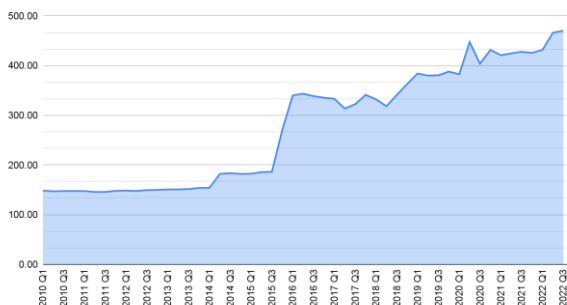*Expenditure approach: GDP = **Consumption** + Investment + Government expenditures + Net export*

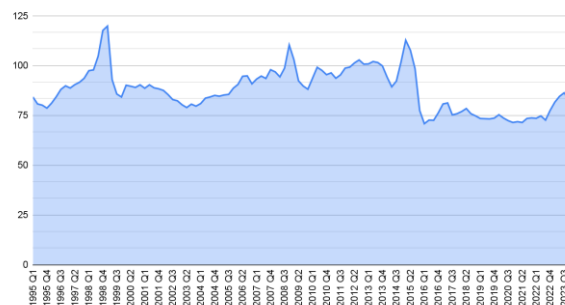Figure 2. Income and Consumption, k'KZT
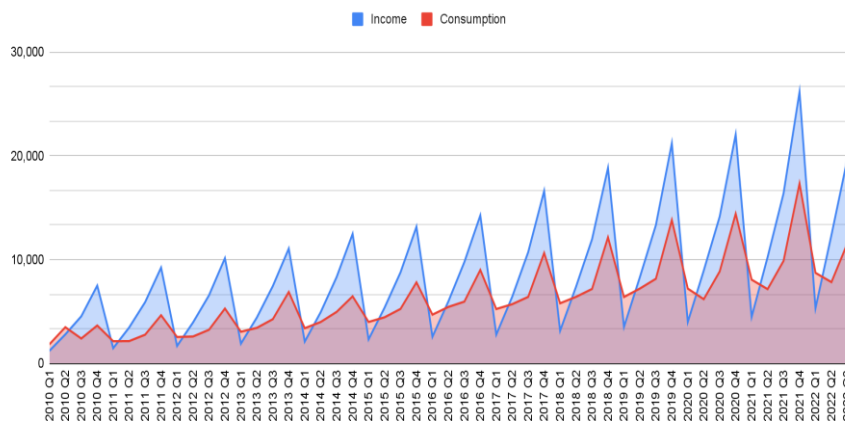
A sharp increase in incomes and consumption each fourth quarter (fig. 2) can be explained by premiums and bonuses to salaries.

As was mentioned earlier, the exchange rate impacts consumer behavior.

Figure 3. Exchange rate KZT/USD

Figure 4. REER, base year is 2013

Tenge depreciated against the US dollar by 84% in the second half of 2015 (fig. 3). The main reason for depreciation is the change of the NBK policy to a floating tenge instead of a fixed exchange rate. There is a term 'anchoring', which means sustainable expectations of business and population regarding inflation, and the NBK (2023) mentions that high sensitivity to short-term fluctuations identifies weak 'anchoring'. On the one

10

hand, a weak tenge is better for the government budget because the economy of Kazakhstan is oil-oriented, and the budget may receive more tenge after the exchange. On the other hand, weak tenge disrupts expectations of business and population.

Additionally, there is one more indicator related to the exchange rate (fig. 4). According to the methodology of the NBK, real effective exchange rate (hereinafter - REER) is a measure calculated as a weighted average product of changes in the real exchange rates of tenge and the currencies of trading partner countries. The NBK has published REER since 1995 calculated with the following formula:

$$REER = \prod_{k=1}^{nk} \ (RER\ k)wk * 100,$$

where $\prod_{k=1}^{nk} \ (RER\ k)wk$ is a product of changes in the Real Exchange Rate Index to the currencies of trading partner countries weighted by specific weights in Kazakhstan's trade turnover. The w (weight) for each country is calculated based on trading turnover for three years.

Such as the NBK is the regulator of monetary policy. Such a policy is a tool to monitor and control the money supply in the economy. There are two types of policies, which are either expansionary (low-interest rate, and attraction to consume more) or contractionary (high-interest rate, attraction to save more money). The NBK sets the interest rate with a corridor for loans and deposits.
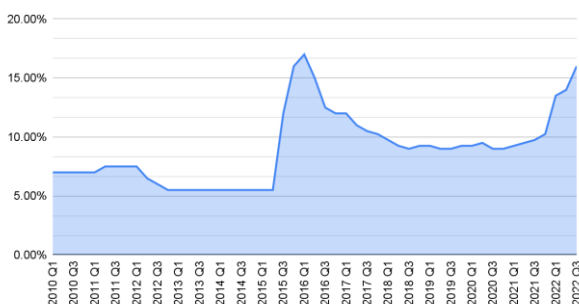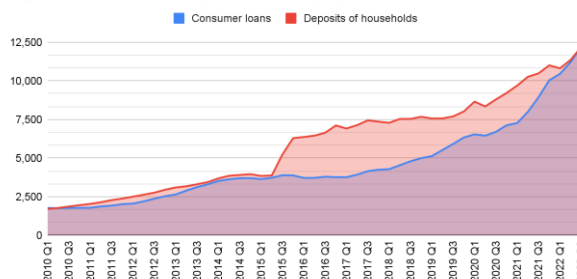

The interest rate decreased in 2012-2013 but it doubled in 2014-2016 (fig. 5). Such movements are explained by the political and economic situation. Russia invaded Crimea in 2014, Covid-19 pandemic was spread worldwide in 2020. To avoid tenge depreciation, the NBK increases the interest rate.

To understand what happens with consumer behavior during these shocks, we examine the amount of deposits and received consumer loans allowing us to assess the attitude of the population (fig. 6). Until 2015, the amounts of loans and deposits were equal but after 84% depreciation of tenge against US dollar and sharp increase of the interest rate, the amount of deposits was almost doubled. Households started to save money for

the future instead of consuming it and another reason is a policy of the NBK related to dedollarization of the economy. 2014-2015 was a shock period for Kazakhstan's economy.

Figure 7. Did you save money last month?
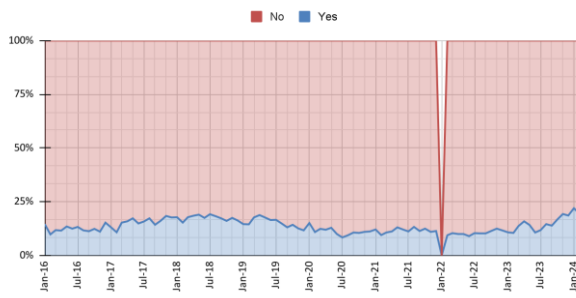
Figure 8. To what extent will the price be changed next month?
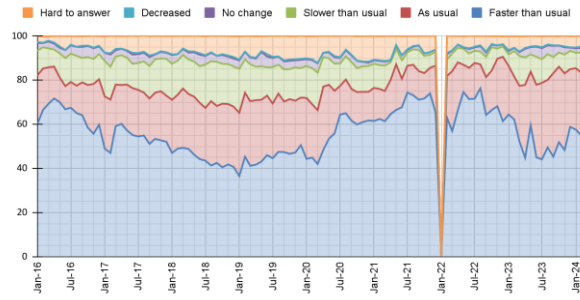
So, each shock affects consumer's expectations. The NBK provides quarterly surveys of 1,500 people via phone (there is no data available for January 2022 due to January unrest). Figure 7 describes the result for the question 'Did you save money last month?'. The range of answer 'no' is from 78% to 92%. Figure 8 demonstrates the result for the question 'To what extent will the price be changed next month?'. The highest point was 80%, which means 80% of the sample believes that prices for goods and services will increase. Therefore, there exists a significant correlation between the financial circumstances and the behavior of households.

RESULTS

As we can see (see Table 1) the results (F-statistics and its p-value), the model is statistically significant, and independent variables do affect consumption. All variables except disposable income are not statistically significant. Only disposable income is significant in the model and has an impact on consumption. The coefficient of 1.27 suggests that disposable income has a positive effect on consumption. In other words, when disposable income increases by 1%, consumption also increases by 1.27%.

Table 1. The result of 1st OLS model

Dependent variable	ln(Consumption)
Observations	32
R-squared	0.804
F-statistics	17.45
Prob. F-stat	7.51*10^(-6)

	coefficient	std.error	t-statistic	p-value
Intercept	–0.0265	1.146	-0.023	0.982
REER	0.0003	0.017	0.016	0.987
Interest Rate	-0.0085	0.029	-0.289	0.776
Inflation expectation	0.0122	0.032	0.376	0.711
ln(Disposable income)*	1.2724	0.177	7.203	0.000

The result of the 2 model estimations shows that the model is statistically significant, and it effectively explains the dynamic of consumption.

An important note is the result of t-statistics for all independent variables except interest rate, as can be seen, all variables have statically significant results. As can be seen, the p-value for REER and income is 0. This means that these variables explain the impact on consumer behavior quite well.

The analysis of the model coefficients makes it clear that when REER increases by 1 %, consumption tends to decrease by 1.81% which leads to the conclusion that there is also a negative correlation. It can be assumed that a depreciation of the national currency in relation to other currencies may lead to a decrease in consumption levels.

Income turned out to have a positive coefficient, just as in the previous disposable income model. We can conclude that an increase in income by 1% leads to an increase in consumption by 0.4%.

Table 2. The result of 2nd OLS model

Dependent variable	ln(Consumption)
Observations	51
R-squared	0.852
F-statistics	59.36
Prob. F-stat	5.98*10^(-13)

	coefficient	std. error	t-statistic	p-value
Intercept*	13.2746	2.284	5.812	0.000
ln(REER)*	-1.8122	0.405	-4.472	0.000
ln(Interest Rate)	-0.0633	0.169	-0.375	0.710
ln(Income)*	0.4017	0.052	7.666	0.000

In general, these findings may have important implications for the study of consumption in Kazakhstan. They suggest that while income positively influences consumption, changes in the REER can have a negative impact on purchasing power.

Specifics of the Models:

- The first model focuses on the impact of REER, interest rates, inflation expectation, and income on consumption, identifying only income as statistically significant.

- The second model is adjusted by removing the inflation expectation. It extends the dataset for a longer period (from 2016 to 2010) and shows significant relationships between income and consumption, and a negative impact of REER on consumption.

To test the long-run relationship between time series, a cointegration test should be conducted. The result of the test shows the statistical significance for each variable:

Variables	Cointegration test statistic	p-value
REER	-1.825341	0.617333
Interest rate	-2.945080	0.123843
Income	-3.169452	0.075186

Based on the results of the cointegration test, it can be stated that all variables have no relationship in the long-run or cointegration with consumption.

Another test was made during the research. The Augmented Dickey-Fuller test is a check of unit root and stationarity.

Variables	ADF statistics	p-value
Consumption	-3.347861	0.012870
REER	-0.848588	0.804431
Interest rate	-1.999483	0.286800
Income	1.498913	0.997520

Based on the results, only consumption is stationary while other variables are non-stationary. For further research it is crucial to understand that data does not have constant mean, variance and covariance. Consequently, it may affect the result of the research.

CONCLUSION

The goal of the research is to understand to what extent monetary policy affects consumption in Kazakhstan.

Based on the results of the regression, we can conclude that REER increases by 1% consumption decreases by 1.81%, and when income increases by 1% consumption increases by 0.4%. The REER as a variable of monetary policy impacts consumption (the variable is significant in the model) negatively. The first hypothesis that the interest rate correlated negatively with consumption in Kazakhstan is not rejected, but statistically the result of output model is insignificant. The second hypothesis that the REER related positively with consumption is rejected because strong tenge affects import and export and after that income effect outweigh negatively. Income is not a variable of the monetary policy, but it is still significant and affects positively, which is expected. Nevertheless, REER (exchange rate, in simple words), interest rate, and inflation affect the income and behavior (expectations) of the households. The result of the cointegration test shows that variables do not have significant evidence of cointegration.

Overall, the equation provides insights into the factors that affect consumption. Policymakers and analysts can use this equation to understand how changes in monetary policy impact consumption and make proper decisions based on these insights. However, it is important to note that this equation is based on a specific dataset and may not be generalizable to other contexts without further analysis.

The research is limited to the available data from the NBK and Bureau from the Kazakhstani perspective. Neither the Bureau nor the NBK provides disposable income, take into account that taxation of households is not high and stable in Kazakhstan, we use income as a substitution for disposable income. The OLS regression's assumptions (linearity, normality, homoscedasticity) did not hold, which could bias the results. The interpretation of monetary policy effects on consumer behavior might not fully capture the complexity of consumption as a variable influenced by numerous factors including consumer expectations, loan availability, and broader economic indicators. Future research could enhance the robustness of findings by implementing more detailed macroeconomic data, employing advanced econometric techniques like panel data analysis or instrumental variables to address potential endogeneity, and periodically updating the study to capture the evolving impacts of monetary policy on consumption.

BIBLIOGRAPHY

Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. (2022). Methodology for Calculating the Gross Domestic Product by Income Method.

Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. (2022). The Dynamic of Salaries.

Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. (2023). Gross domestic product by final use, at current prices

Ellingsen, T., & Söderström, U. (2001b). Monetary policy and market interest rates. *The American Economic Review*, *91*(5), 1594–1607. https://doi.org/10.1257/aer.91.5.1594

Halyk Finance. (2023). Monetary Policy Review, p. 1-9. https://halykfinance.kz/download/files/analytics/monetary_policy.pdf

International Monetary Fund. (2023). MANAGING EXPECTATIONS: INFLATION AND MONETARY POLICY. WORLD ECONOMIC OUTLOOK: Navigating Global Divergences, p.49. https://www.imf.org/-/media/Files/Publications/WEO/2023/October/English/ch2.ashx

Kalyuzhnova, Y., & Nygaard, C. (2009). Oil, credit growth and state-owned financial intermediaries in Russia and Kazakhstan. Centre for Euro-Asian Studies, UK: University of Reading.

Kandil, M., & Mirzaie, I. A. (2011). Consumption, Credit, and Macroeconomic Policies: Theory and Evidence from the United States. Global Economic Review, 40(3), 323–360. https://doi.org/10.1080/1226508x.2011.601645

Kozlov, R. The Effect of Interest Rate Changes on Consumption: An Age-Structured Approach. *Economies* 2023, *11*, 23. https://doi.org/10.3390/economies11010023.

National Bank of Kazakhstan. (2023). Daily official (market) exchange rates. https://www.nationalbank.kz/ru/exchangerates/ezhednevnye-oficialnye-rynochnye-kursy-valyut

National Bank of Kazakhstan. (2024). Loans to the economy from second-tier banks. Loans from the banking sector to the economy. https://nationalbank.kz/en/news/kredity-bankovskogo-sektora-ekonomike

National Bank of the Republic of Kazakhstan. (2023). METHODOLOGY FOR CALCULATION OF THE

REAL AND EFFECTIVE EXCHANGE RATES INDEXES OF TENGE.

https://nationalbank.kz/file/download/88829

National Bank of the Republic of Kazakhstan. (2023). Assessing the anchoring of inflation expectations in

Kazakhstan. *Economic Study No. 2023-1*. https://nationalbank.kz/file/download/88096

Nishizaki, K. et al. (2012). Chronic deflation in Japan, p.10-12 https://www.bis.org/publ/bppdf/bispap70c.pdf

Whalen, R. C. (2008). The Subprime Crisis—Cause, Effect and Consequences. Journal of Affordable Housing

& Community Development Law, 17(3), 219–235. http://www.jstor.org/stable/25782816

Williamson, S. (2016). Macroeconomics. Sixth Edition. New York: Pearson Education, p.309.

Annex 1. Dataset for the first model.

Period	Consumption, ln	Income, ln	REER	Rate, %	CCI, %
2016 Q1	6.67164474	6.35347513	70.77841291	18.1	13.8
2016 Q2	6.73569215	6.476817417	72.55128516	19.2	9.2
2016 Q3	6.77448048	6.522653784	72.50033554	20.1	9.7
2016 Q4	6.95432323	6.597398423	76.31633146	19.2	12.2
2017 Q1	6.71923233	6.387049291	80.71652808	18.6	11.1
…					

Annex 2. Dataset for the second model.

Period	Consumption, ln	REER, ln	Interest rate, ln	Income, ln
2010 Q1	7.515181976	4.539030383	1.945910149	7.097858149
2010 Q2	8.157044492	4.59129441	1.945910149	7.935517007
2010 Q3	7.782368484	4.580877493	1.945910149	8.419929475
2010 Q4	8.202953267	4.558078578	1.945910149	8.921659788
2011 Q1	7.667544236	4.567468319	1.945910149	7.292647271
…				