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Monetary Policy and the Real Economy: A Structural VAR Approach for Kazakhstan

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Abstract

This paper shows monetary policy indicator which better explains Kazakhstani transmission mechanism. The study also discusses how foreign monetary policy or oil prices affect domestic macroeconomic variables. We use a seven variable by utilizing quarterly time series data from Kazakhstan covering the period from January 2005 to December 2017. They are: interest rate, exchange rate, output, reserve money, consumer price index, then, World oil price index and Federal Funds rate.

Keywords: Impulse responses, Monetary Policy, Structural VAR Models

Monetary Policy and the Real Economy: A Structural VAR Approach for Kazakhstan.

Monetary policy is extensively utilized by national banks as an adjustment arrangement toolbox in directing their separate economies, to accomplish supported and high yield development rates and keep up low swelling rates. The adequacy of the financial approach depends on the strategy creators' capacity to make exact evaluations of the impacts of money related arrangements on value soundness and monetary exercises, just as those of the planning of arrangement usage. The current financial writing tends to numerous inquiries in regards to the connection between macroeconomic factors and money related approach. Since the fundamental work of Sims (1980), the VAR model has been comprehensively utilized by specialists to respond to these inquiries. Be that as it may, there is no agreement among researchers as with the impact of money related approach stun on macroeconomic factors. The enthusiasm for observational investigations of money related approach has expanded in the most recent decade, perhaps for the accompanying two reasons. To start with, money related markets have been deregulated and financial strategy, along these lines, more arranged towards open market activities than administrative measures. Second, fiscal arrangement in many — particularly little and moderately open — economies have been progressively and all the more unequivocally dependent on strategy rules and money related targets.

Monetary policy one of the primary headings of monetary strategy of any state, which is directed by an approved association, for example, a national bank, in or-der to guarantee the steadiness of the economy and the parity of cash available for use. Such a job in our nation is performed by the National Bank of the Republic of Kazakhstan, the motivation behind which is to execute a money related strategy planned for furnishing the economy with fundamental fiscal assets and keeping up a worthy degree of financial development and swelling. A successful usage of

financial arrangement is required for the accomplishment of objectives set in the national advancement methodology and for Kazakhstan's joining the 50 most created nations on the planet. Simultaneously, one of the most significant undertakings of the state for the supportable financial advancement is the making of conditions and the selection of suitable measures to lessen the swelling rate in the nation.

VAR analysis presently broadly utilized in a wide range of exact macroeconomic investigations: from generally atheoretical activities and guaging to trial of completely determined monetary models. The paper answers such inquiries: (I) Which approach instrument assumes a noteworthy job in clarifying development in the monetary exercises of Kazakhstan? (ii) Do outside fiscal arrangement stuns—characterized as U.S. FFR stuns—influence the local factors? (iii) Does the incorporation of oil price settle the issue of value riddles, and what amount do varieties in oil value represent yield and value vacillations?

Literature review

After the collapse of the Union state, Kazakhstan remained in the ruble zone and was not able to effectively contain the growth of prices. Only after the introduction of the national currency, the tenge, at the end of 1993, the Republic was able to implement its own monetary policy.

In 1994, the country experienced a significant decline in production, which caused a huge budget deficit, and high inflation. The national Bank sought to suppress inflation by using a squeeze on the money supply. This reduced the rate of inflation from 1158 per cent in 1994 to 60 per cent in 1995. But at the same time, the level of monetization of the economy has decreased by about half, which has caused negative consequences: a shortage of working capital of enterprises, non-payments, barter, delays in payment of wages and pensions. (Figure 1)

In the following years, the regulation of the money supply, as can be seen in the diagram, was carried out mainly by changing the monetary aggregate M0, to which the monetary aggregate M3 reacted relatively poorly. A particularly strong reduction in the cash supply was made in 1998, as a result of which the rate of inflation fell to the lowest level of 1.9 percent. Easing the pressure on the money supply in 1999 again led to a surge in inflation of 17.8 percent.

Then the situation changed dramatically. Since 2000, a favorable period for the economy of Kazakhstan has begun. High world oil prices have provided a significant GDP growth rate. From 2000 to 2007, GDP growth averaged about 10 percent. Until 2007, it was possible to keep inflation at a relatively low level.

At the same time, the refinancing rate did not play a significant role. Although the dynamics of the refinancing rate had some influence on the processes in the economy, it was not significant. Its changes were rare, and it changed in accordance with expectations, acting as a benchmark, rather than having a direct impact on the financial sector.

An important role in this dynamics of indicators is played by the growth of world oil prices. And this increase in oil revenues should influence the formation of monetary policy, perhaps through the exchange rate. Note that the nominal exchange rate of the tenge in recent years has strengthened from 157 tenge/$ to 125 tenge/$, then again devalued to 147 tenge/$.

Model specifications

The estimation of the reduced-form equation of the structural model can be described as follows**:**

$$Y_t = C(L)Y_t + D(L)X_t + u_t,$$

where C(L) and D (L) are the matrix polynomial of the lag operator and u is a vector of the VAR residuals with a 0 mean and $var(u_t) = \Sigma$.

Data

This section describes the domestic and international variables used to examine the Kazakhstani monetary policy framework. We chose variables similar to those used by Kim and Roubini (2000), that is, we use a seven-variable SVAR model to explain the all-possible interrelations among non-policy and policy variables. Of the seven variables used in the model, two variables are foreign block, which contains the WOP, and the U.S. FFR. The foreign block is assumed to be exogenous in our model set-up. That is, we include these variables to isolate any exogenous change in monetary policy. The remaining five variables such as real GDP, CPI, IR, money and ER represent the Kazakhstani domestic economy that can be devoted to two blocks, such as the policy variables block and the non-policy variables block. Similar to other studies and as discussed earlier, the policy variables included in this model are the nominal ER, the interbank call money market rate, and reserve money (M0). These policy variables are categorized in three broader contexts: ER, IR, and monetary aggregate. The IR and money are commonly used by the central banks of many countries as a stabilization policy toolkit. The ER is taken as an information market variable.

We use quarterly data from Kazakhstan, from the January 2005–December 2017 period. The period used in the study was chosen based on the availability of data. Data on money balances (M0), exchange rate (ER) and consumer price index (CPI) were obtained from the National Bank of Kazakhstan. Domestic interest rates (IR) were taken from Koyfin platform for financial data and analysis. (Table 1)

Empirical Results

Before estimation of the cointegration relationship by VAR limits test, we affirm the reconciliation properties of the seven factors utilizing the Eviews program , which looks at the invalid theory of stationarity. The outcomes are accounted for in Table 2. We couldn't find t-value from eviews, therefore we just found p-values and it is enough for our analysis.

Along these lines , that 1st contrast and log 1st Difference, beginning from M0 and ER WOP FFR, finishing IR equivalent to 0.0000. (Table 2)

Since all the factors in this time arrangement are, there is a likelihood of harmony between them. The multivariate cointegration trial of Johansen (1988) and Johansen-Juselius (1990) was utilized to test whether there is a drawn out balance connection between the factors in the examination. Table 3 gauges the quantity of long haul connections that exist between the stock cost and different macroeconomic factors for the vector Z, where Z = [WOP, IR, CPI, M0, ER, FFR, GDP]. The quantity of slacks ought to be demonstrated in the autoregressive detail while picking the particular of a cointegration model. While determining the length of the slack, it is important to guarantee that the term blunders of all conditions in the framework are successively uncorrelated. The model with seven slacks was picked dependent on the insights of the Eviews program. The results in Table 3 show that both the statistics of the tracks and the statistics of the largest eigenvalues indicate the proximity of the exceptional cointegration vector of 1% and 5% critical value. (Table 3)

The fluctuation decay is another valuable strategy by which to research cooperations among financial factors over the motivation reaction skyline. Table 5 presents extent of varieties in major monetary factors that can be disclosed by stuns to other financial factors in the condition

framework. The deterioration esteems for the 1st, 3rd, 12th, and 20th horizon into the future are displayed in that table. (Table 4)

Conclusion

In this study, we uzed a SVAR system to look at the developments of Kazakhstan financial exercises. Especially, we explored the effect of the household and outside money related arrangement stuns and the oil value stuns on local major monetary factors. The symmetrical arrangement stuns achieved from the SVAR model were utilized to evaluate the accomplishment of money related strategy in influencing the yield, costs, and other major financial exercises in Kazakhstan. In addition, we applied different arrangement factors to distinguish the strategy instrument that most successfully clarifies the Kazakhstani money related approach transmission system. For this reason, we utilized quarterly information from Kazakhstan during the January 2005–December 2017 period.

Along these lines, our discoveries shows that the IR assumes a noteworthy job in clarifying the money related strategy transmission system of Kazakhstan; this discovering appears differently in relation to those of some past observational examinations that proposed the transmission component of financial approach is driven by the ER, not the IR. Second, outside financial approach stuns and oil value stuns appear not to be touchy to residential monetary exercises. At last, the consideration of the oil cost in the SVAR model helped us defeat the riddles that are ordinarily impossible to miss in the money related writing. The results of the variance decomposition and the various identification restrictions used here also support these findings.

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Tables

Table 1**:** Variables Included in the Kazakhstani Monetary Policy Model

Variable	Definition	Abbreviation
Foreign		
Oil Price	World oil price index (log)	WOP
US interest rate	Federal Funds rate (%)	FFR
Domestic (Non-Policy)		
Output	Gross domestic product	GDP
Price Index		CPI
Domestic (Policy)		
Exchange rate	Exchange rate	ER
Interest Rate	Inter-bank call money market rate (%)	IR
Money Reserve		M0

Table 2**:** Unit root test

Series	Level	Log	1st difference	Log 1st Difference
	p-value	p-value	p-value	p-value
CPI	1.0000	1.0000	0.2995	0.1434
GDP	0.9996	0.9997	0.1539	0.0013
M0	0.9991	0.9990	0.0000	0.0000
ER	0.5095	0.5152	0.0000	0.0000
WOP	0.4656	0.6564	0.0000	0.0000
FFR	0.0031	0.0122	0.0000	0.0000
IR	0.0148	0.0814	0.0000	0.0000

Table 3: Johansen's cointegration test

Hypothesized		Trace	5 Percent	1 Percent		
No. of CE(	Eigenvalu	Statistic	Critical Va	Critical Value		
None **	0.851064	253.6471	124.24	133.57		
At most 1	0.812536	183.1904	94.15	103.18		
At most 2	0.748814	121.2462	68.52	76.07		
At most 3	0.590570	70.12841	47.21	54.46		
At most 4	0.570735	37.08782	29.68	35.65		
At most 5	0.133957	5.797664	15.41	20.04		
At most 6	0.012791	0.476302	3.76	6.65		

Table 4: Forecast Error Variance Decomposition of Major Economic Variables

Variance Decomposition of IR:

Period	S.E.	IR	GDP	CPI	ER	M0
1	136.4990	100.0000	0.000000	0.000000	0.000000	0.000000
3	31011.16	99.98215	0.009622	0.000505	0.003277	0.004443
12	1.32E+15	99.98202	0.009719	0.000510	0.003281	0.004471
20	3.70E+24	99.98202	0.009719	0.000510	0.003281	0.004471

Variance Decomposition of

GDP:

Period	S.E.	IR	GDP	CPI	ER	M0
1	3124.161	0.082316	99.91768	0.000000	0.000000	0.000000
3	999413.8	99.97164	0.019649	0.000528	0.003024	0.005156
12	4.27E+16	99.98202	0.009719	0.000510	0.003281	0.004471
20	1.20E+26	99.98202	0.009719	0.000510	0.003281	0.004471

Variance Decomposition of CPI:

Period	S.E.	IR	GDP	CPI	ER	M0
1	6.190031	1.341218	17.41220	81.24658	0.000000	0.000000
3	2831.156	99.97328	0.013926	0.002771	0.004095	0.005926
12	1.21E+14	99.98202	0.009719	0.000510	0.003281	0.004471
20	3.40E+23	99.98202	0.009719	0.000510	0.003281	0.004471

Variance Decomposition of ER:

Period	S.E.	IR	GDP	CPI	ER	M0
1	4.834308	0.049561	8.258438	9.769950	81.92205	0.000000
3	1194.943	99.97187	0.015118	0.001171	0.006668	0.005172
12	5.11E+13	99.98202	0.009719	0.000510	0.003281	0.004471

20	1.43E+23	99.98202	0.009719	0.000510	0.003281	0.004471

Variance Decomposition of M0:

Period	S.E.	IR	GDP	CPI	ER	M0
1	261274.4	1.314351	6.867183	3.197949	19.23029	69.39023
3	10752678	99.84208	0.038508	0.008397	0.018944	0.092072
12	4.63E+17	99.98202	0.009719	0.000510	0.003281	0.004471
20	1.30E+27	99.98202	0.009719	0.000510	0.003281	0.004471

Cholesky Ordering: IR GDP CPI ER M0

Figures

Figure 1: GDP and inflation rate in Kazakhstan.

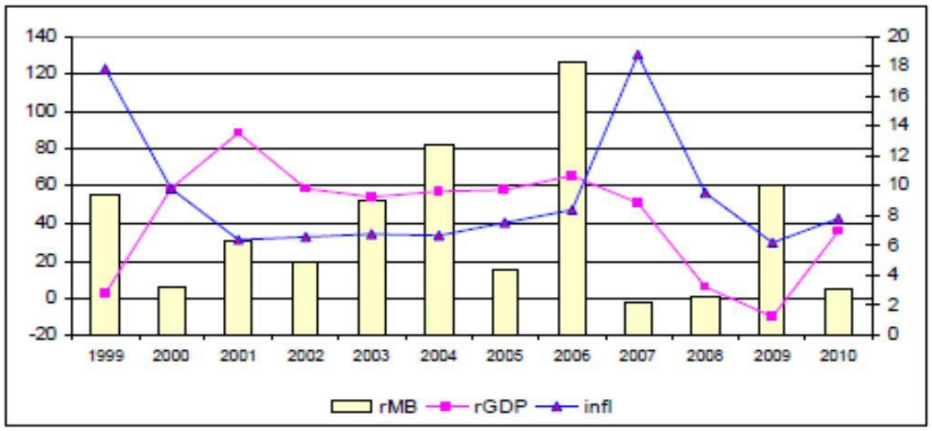

Figure 2: Trend of Key Economic Indicators.

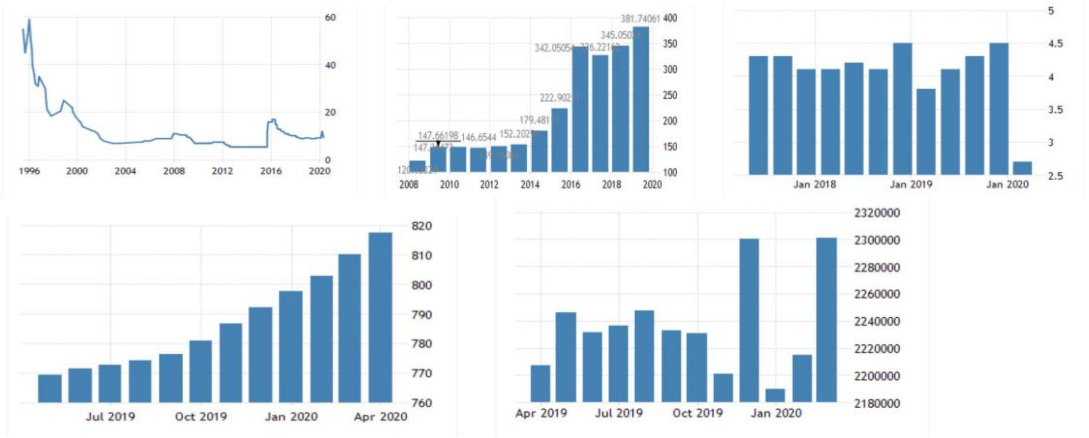

Figure 3: Impulse Responses