HOW IS KAZAKHSTAN'S STOCK MARKET RESPONDING TO MONETARY AND FISCAL POLICY SIGNALS?

BY

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THESIS

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Abstract

This thesis investigates the impact of monetary and fiscal policies on stock market performance in Kazakhstan, utilizing a Structural Vector Autoregressive (SVAR) framework. The study focuses on key monetary and fiscal policy instruments, such as the base rate and TONIA, money supply, government expenditures, and their relationship with stock market returns. The results suggest that the spread between the base rate and TONIA significantly influences stock market performance, which indicates that market participants respond to liquidity imbalances. Fiscal policy does not have a significant impact on the stock market, potentially due to the pro-cyclical nature of fiscal policy in Kazakhstan. The study also highlights Kazakhstan's vulnerability to external oil price shocks. Overall, findings highlight the challenges of weak policy transmission mechanisms in emerging markets and suggest that improving policy coordination, enhancing fiscal discipline, and diversifying the economy are crucial for improving policy transmission to the equity market.

Introduction

Monetary and fiscal policies as well as their interaction are pivotal in shaping macroeconomic outcomes and influencing financial markets including the stock market. Monetary policy implemented through interest rate changes impacts stock markets by affecting expected cash flows and discount rates. It affects the stock market through several mechanisms, including the interest rate channel, credit channel, wealth effects, and exchange rate movements. Fiscal policy affects financial markets through its effects on aggregate demand, government spending, and taxation. Both policies, while having individual influences, are deeply interdependent, and their interplay adds a level of complexity when analyzing effects on stock markets.

Theoretical and empirical studies on developed economies showed that there are significant effects of monetary and fiscal policies on stock market performance. However, for emerging markets, such as Kazakhstan, monetary and fiscal policy influence on stock prices remains less studied.

As an emerging market heavily reliant on commodity exports, Kazakhstan's financial markets are influenced by factors such as global commodity price fluctuations, exchange rate volatility, and limited financial market development. Monetary policy implemented by the National Bank of Kazakhstan faces challenges in efficiently transmitting policy rate changes to the broader economy. Fiscal policy in Kazakhstan is dependent on oil revenues, with

government spending often influenced by the transfers from the sovereign wealth fund – the National Fund.

This thesis contributes to the literature on monetary and fiscal policy interactions, monetary policy and fiscal policy effects on the stock market, and policy effectiveness in emerging markets. As for practical contributions, it can provide significant insights for Kazakhstan's policymakers by highlighting the limitations of the current policy transmission mechanism. It indicates strong and weak linkages in the financial system's responsiveness to policy signals and can be helpful to understand the relationship between stock market performance and fiscal and monetary policy in Kazakhstan. Using econometric tools, including structural vector autoregression (SVAR), the analysis captures the policy interactions in the model. Additionally, this research considers global oil price shocks as an exogenous variable alongside domestic variables.

Theoretical background and literature review

Theory suggests that expansionary monetary policy, by lowering interest rates, increases stock market returns through higher expected cash flows and reduced discount factors. This relationship is formalized in the discounted cash flow model which stipulates that the stock price is equal to the present value the expected future dividends:

$$S_t = E_t \left[\sum_{i=1}^{K} \left(\frac{1}{1+r} \right)^i D_{t+i} \right]$$

where S_t is stock price at time t, D_{t+i} is the expected future dividend per share at time t +i, r is the rate of return and K is the investor's horizon. The equation suggests that there are two ways in which change in the interest rate can affect stock prices. First, a decrease in the policy rate is followed by a decrease in the interest rates in the money market, so market participants are more willing to accept a lower rate of return in equity investment. Since future cash flows are discounted at a lower rate, the present value increases. Second, the expected future cash flows (dividends) rise in response to the expansionary monetary policy since it is expected to stimulate the economy.

There are several transmission mechanisms through which monetary policy can affect the stock market. The interest rate channel suggests that interest rates affect the firm's cost of capital and, therefore, the present value of future cash flows and market value of the firm, as discussed above. Monetary policy can also act through the credit channel which is characterized by regulation of bank reserves. In this regard, expansionary monetary policy would increase the bank reserves, which would raise the supply of loans and cause corporate spending and investment to rise. This is assumed to raise the future cash flows and increase stock returns, however, it is important to note that this effect will be more pronounced in smaller firms that are dependent on bank loans (Mishkin, 2016). Exchange rate channel suggests that stock prices can be influenced indirectly through currency movements. Rate cuts may lead to currency depreciation because domestic currency-nominated assets become less attractive. This

increases the export competitiveness of the country and hence, positively affects stock prices. Another channel is explained by Tobin's q theory which links the lower interest rates on bonds to an increase in expected returns on equity since the latter becomes more attractive for investors as an alternative to the first. Lastly, the wealth effect suggests that expansionary monetary policy that boosts stock prices can increase the financial wealth of investors, leading to higher consumption and, consequently, further increase in stock prices.

Empirical studies support the theories on the positive effects of expansionary monetary policy on stock prices. Bernanke and Kuttner (2005) assess how unanticipated changes in the federal funds rate influence stock prices. A 25-basis-point reduction in the funds rate was found to increase stock indices by around 1%. Using a VAR model and futures data to isolate policy surprises, the paper finds that the stock market reacts mostly through excess expected returns, with limited impact on expected dividends or real interest rates. The study highlights how monetary policy changes affect the equity premium, suggesting that policy surprises influence risk perceptions in the market. Ehrmann and Fratzscher (2004) focus on how U.S. monetary policy affects individual stocks in the S&P 500, finding heterogeneity in reactions: firms with financial constraints (e.g., low cash flow, poor credit ratings) and those in cyclical sectors (e.g., technology, consumer goods) are more sensitive to monetary policy shocks. Another study focused on the US market, Gürkaynak et al. (2005), highlights the

importance of separating monetary policy actions and forward guidance and shows that stock prices respond to both using intra-day data.

In other developed economies, researchers find similar results: Bohl et al. (2008) found that there is a significant negative relationship between unexpected ECB policy rate decisions and stock market indices of four countries: Germany, France, Spain and Italy and aggregate stock market Euro Stoxx 50. The recent study by Checo et al (2024) explores monetary policy transmission in emerging markets. The authors highlight the inefficiency of the transmission mechanisms in emerging economies due to low financial system development, exposure to global shocks, and low credibility of institutions. They constructed forecast errors of monetary policy rate decisions for 18 emerging market countries and found that contractionary monetary policy decreases the stock prices, although the effect is not persistent and dissipates within a few days.

The relationship between fiscal policy and stock markets is more ambiguous compared to monetary policy. Fiscal tools like government spending and taxation directly affect corporate profitability and investor sentiment but can also lead to unintended consequences such as the crowding-out effect, where increased government borrowing raises interest rates and reduces private investment. Blanchard (1981) argued that the impact of fiscal policy on stocks depends on whether agents expect higher future real interest rates to outweigh the expected increase in profits. Empirical studies, such as Afonso and Sousa (2012), found that fiscal expansion negatively impacts stock prices in developed

economies (US, UK, Germany, and Italy). This suggests that fiscal expansion is interpreted by the market as leading to “deterioration of public finances”.

Monetary and fiscal policies are interconnected, and their interplay influences macroeconomic outcomes and financial markets. Fiscal expansion, particularly through large deficits, can lead to inflationary pressures or crowding out, forcing central banks to adopt tighter monetary stances. Additionally, expectations of persistent budget deficits may destabilize financial markets and undermine confidence in the monetary system (Hilbers, 2006). So, fiscal policy, along with monetary policy, has an important role in achieving macroeconomic stability.

The benchmark study of this thesis is a study by Chatziantoniou, Duffy, and Filis (2013) where they investigate how monetary and fiscal policy shocks affect stock market performance in Germany, the UK, and the US. The study uses a structural VAR (SVAR) model to capture the dynamic effects of monetary and fiscal policies on stock markets. The model incorporates multiple variables, including global economic activity, GDP, inflation, government spending, money supply, interest rates, and stock market returns. The results show that both fiscal and monetary policies influence the stock market performance in the countries under investigation. More importantly, though, the authors find evidence that the interaction between the two policies is important in explaining stock market developments.

Overview of Kazakhstan's monetary policy and fiscal policy

The monetary policy transmission mechanism in Kazakhstan is less efficient compared to the developed economies. In Kazakhstan, the pass-through of changes in the policy rate onto short-term money market rates is relatively quick, but it takes more time for these changes to impact longer-term instruments. Additionally, high credit risks and low lending activity constrain the credit channel – with reduced lending and increased risk aversion among banks, the ability of monetary policy to influence the supply of loans and economic activity is diminished (NBK Monetary Policy Strategy 2030). This inefficiency means that monetary policy signals analyzed in Kazakhstan may have weak and delayed effects on the stock market.

The key monetary policy instrument of the NBK is the base rate. The Tenge Overnight Index Average (TONIA) serves as an operating benchmark for monetary policy and is defined as "the weighted average interest rate on opening overnight repo transactions concluded on the stock exchange in the automatic repo market with government securities" (Kazakhstan Stock Exchange, TONIA). In this study, KASE index prices serve as a proxy for stock market performance in Kazakhstan. The dynamics and relationships between these variables can be observed in Figure 1.

The KASE index measured in logarithms, henceforth called either 'logprice' or 'kaselog', shows a generally upward trend over the observed period from February 2016 to October 2024, reflecting growth in the stock market during

inflation targeting regime. TONIA closely tracks the base rate, with increases in the base rate leading to almost immediate rises in TONIA, which indicates effective monetary policy transmission into bank rates. The interaction between monetary policy and the equity market can also be observed: during periods of lower interest rates (for example, 2016–2017), the stock market experienced moderate growth. The increase in interest rates from 2022 onward corresponded with a slowdown in stock market growth. This may indicate the inverse relationship between interest rates and equity market. Later in this study, the relationships between these variables will be analyzed using econometric techniques.

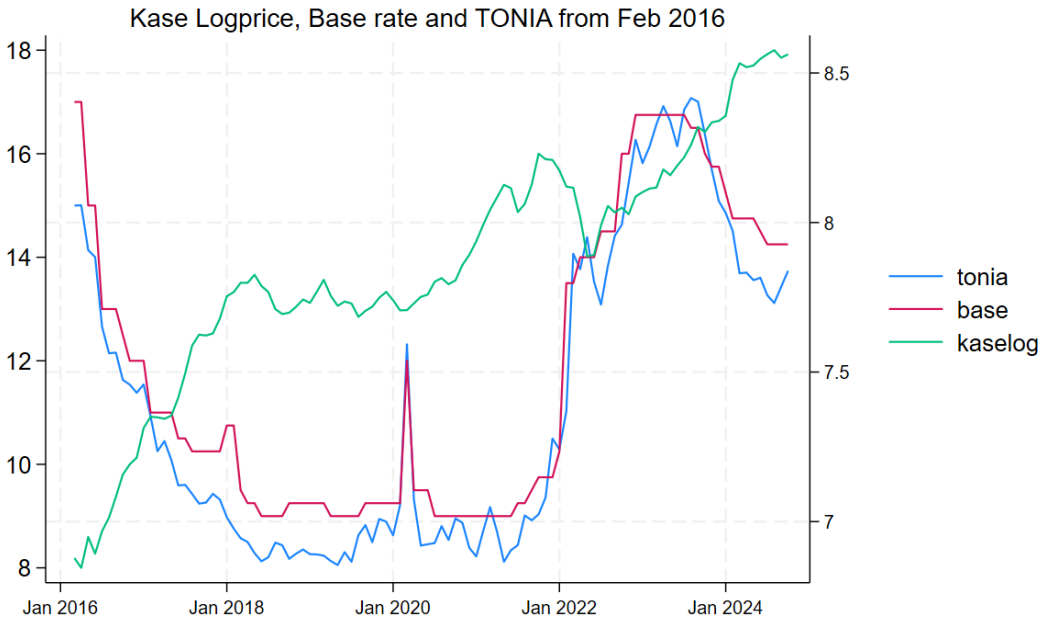

Figure 1. KASE logprice, base rate and TONIA (Feb 2016 – Oct 2024)

A study by Duskaliyeva and Belgibayev (2023) analyzed the stock market channel of the monetary policy transmission in Kazakhstan covering two periods: pre-inflation targeting (2004-2015) and inflation targeting (2015-2023). They

discussed the limitations of this channel highlighting the prevalence of banking products in Kazakhstan's financial market, low level of stock market development, low liquidity and participation of retail investors in the country. Using VARX for two sample periods, they showed that while the stock market's role as a transmission channel remains limited, the shift toward inflation targeting increased the stock returns sensitivity to macroeconomic indicators (inflation, interest rates).

The NBK also reports a lack of coordination between monetary and fiscal policies in Kazakhstan in Monetary Policy Strategy 2030. The government relies on transfers from the National Fund for financing their decisions which contributes to raising government expenditures independently of economic cycles. This creates challenges for NBK in achieving stable inflation.

Since oil revenues constitute a significant share of the budget, the economy is vulnerable to global oil price fluctuations which creates challenges for maintaining fiscal sustainability. A recent paper by Zhakupova and Khanetova (2023) analyzed Kazakhstan's fiscal policy in 2010-2022 and found that fiscal policy during this period has been mostly pro-cyclical, particularly in the non-oil sector. Oil revenues have been shown to smooth fiscal deficits, however, also mask issues in the fiscal discipline by comparing the cyclically adjusted fiscal balance with and without oil revenues. The study also reveals the limited effectiveness of automatic stabilizers and calls for reforms that reduce dependency on discretionary policies and oil revenues.

Given that Kazakhstan's economy experiences frequent fiscal interventions, it is interesting to assess the effect of the interaction between the two types of policy on the stock market rather than individual policy. Pro-cyclical fiscal policy may contribute to economic instability which discourages long-term investments. Additionally, the economy's heavy reliance on the oil and gas sector may make stock prices sensitive to oil prices fluctuations.

Methodology and Data

This study employs a Structural Vector Autoregression (SVAR) model which has been extensively used in research on monetary and fiscal policy transmission. The SVAR model is estimated by imposing restrictions on unrestricted VAR to isolate the structural shocks and trace out the effects of these shocks on the variables included in the VAR.

Generally, the structural representation of the VAR model of order p has the following form:

$$A_0 y_t = a_0 + \sum_{i=1}^{p} A_i y_{t-i} + \varepsilon_t$$

$$E\varepsilon_t \varepsilon_t' = D$$

$$E\varepsilon_t \varepsilon_{t+s}' = 0, \ \ \forall s \neq 0$$

where y_t is a $n \times 1$ vector of variables and ε_t is a $n \times 1$ vector of structural disturbances. A_i is a $n \times n$ matrix of autoregressive coefficients and A_0 is a non-singular $n \times n$ matrix of contemporaneous coefficients.

The model in reduced form is obtained by multiplying both sides of the equation by A_0^{-1}:

$$y_t = b_0 + \sum_{i=1}^{p} B_i y_{t-i} + e_t$$

where $b_0 = A_0^{-1}a_0$, $B_i = A_0^{-1}A_i$ and $e_t = A_0^{-1}\varepsilon_t$. So, the reduced form errors e_t are linear combinations of structural disturbances ε_t and

$$Ee_t e_t' = \Sigma = (A_0^{-1})D(A_0^{-1})'$$

The SVAR needs to be either exactly identified or over-identified to be estimated, so there must be at most the same number of free parameters in A_0 and D (which together have $\mathrm{n}(n-1) + \frac{n(\mathrm{n}+1)}{2} = \frac{n(3\mathrm{n}-1)}{2}$ parameters), as in Σ $\left(\text{which has } \frac{\mathrm{n}(\mathrm{n}+1)}{2} \text{ parameters}\right)$. Usually, D is restricted to be diagonal, so A_0 is required to have at least $\frac{\mathrm{n}(\mathrm{n}-1)}{2}$ restrictions for the structural form of the model to be identified. The SVAR identification involves imposing restrictions on the matrix of contemporaneous coefficients, i.e. short-run restrictions, which are commonly based on economic theory and sensibility of model outcomes. There are other approaches for identification restrictions, such as long-run restrictions, imposed on A_1, however, in this study, only short-run restrictions are imposed.

The model considers the following set of variables:

$$y_t = (oil_t, STEI_t, p_t, gov_t, m_t, i_t, b_t, sm_t)'$$

where oil_t are Brent crude oil prices expressed in KZT per barrel, $STEI_t$ is the Short-Term Economic Indicator, p_t is the monthly inflation rate calculated from

the Consumer Price Index (CPI), gov_t is the total government expenditures, m_t is the monetary aggregate M_1, i_t is the TONIA, b_t is the base rate, and sm_t is the KASE index prices (all variables except TONIA, the base rate, and inflation rate are expressed in logarithms).

Here, the oil price is included as an exogenous variable to capture the influence of external shocks and anticipated inflation given the reliance on oil exports of Kazakhstan's economy. The STEI is an index for monthly output for key sectors: agriculture, industry, construction, trade, transport, and communications, accounting for over 60% of GDP. Given its monthly frequency and substantial coverage of GDP, STEI provides a convenient and accurate measure for variations in economic activity. Total government expenditures serve as an indicator of fiscal policy stance in this model. Data on government expenditures was sourced from the Ministry of Finance reports on state budget execution and interpolated monthly (details are provided in Appendix 2). Monetary aggregate M_1 was used in the model as a proxy for money supply. TONIA, the weighted average overnight interest rate, serves as an operating benchmark of the National Bank's operations in the money market. The NBK affects over 80% of deposits attracted in tenge through its impact on the TONIA rate (Monetary Policy Strategy 2030). Therefore, TONIA is used as a monetary policy indicator in the model along with the base rate. For the base rate, which is announced by the NBK eight times a year, months without an announcement were set to the rate from the previous announcement. Stock market performance is

measured by the KASE index close prices on the last trading day of each month. All variables are described in Appendix 1, including information on the data sources, their measurement units, and transformations.

The short-run restrictions applied in this model are consistent with the benchmark model and are explained as follows: 1) oil price is an exogenous variable, unaffected by contemporaneous movements in domestic variables. 2) The STEI is assumed to respond contemporaneously to oil prices, given the immediate impact of oil price changes on industrial production and other sectors. However, it is not affected by any other variable as it is assumed to respond only slowly to the changes in other variables. Monetary and fiscal policy influence investment decisions and consumer spending, however, the effect on production is delayed due to factors such as delay in implementing new investments or reallocating resources. 3) Similarly, the CPI does not react contemporaneously to any variable except oil prices and output, as changes in production levels influence supply and demand balances. 4) Fiscal policy is assumed to respond contemporaneously to shocks in economic activity (output) and prices. 5) The monetary aggregate is affected by output and prices. It is also affected by government expenditures to allow for the interaction between the two in response to output and price shocks. 6) TONIA, interpreted as the monetary policy tool, adjusts contemporaneously to oil prices and current values of money. Oil prices in the equation of interest rate serve as a measure of anticipated inflation. However, TONIA does not respond contemporaneously to STEI or CPI, due to

lags in data availability: when the policy rate is set by the central bank, it is assumed that measures of output and price levels are not available for the same period (Kim and Roubini, 2000). The official measures for price levels and output are usually published by the National Bureau of Statistics with a lag, so it is unlikely the National Bank observes and reacts to them when making monetary policy decisions within the same month.

The restrictions imposed on A_0 can be expressed as follows:

$$A_0 y_t = \begin{bmatrix} a_{11} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 & 0 & 0 & 0 \\ 0 & a_{42} & a_{43} & a_{44} & 0 & 0 & 0 & 0 \\ 0 & a_{52} & a_{53} & a_{54} & a_{55} & 0 & 0 & 0 \\ a_{61} & 0 & 0 & a_{64} & a_{65} & 1 & a_{67} & a_{68} \\ a_{71} & 0 & 0 & a_{74} & a_{75} & a_{76} & 1 & a_{78} \\ a_{81} & a_{82} & a_{83} & a_{84} & a_{85} & a_{86} & a_{87} & 1 \end{bmatrix} \begin{bmatrix} oil_t \\ STEI_t \\ p_t \\ gov_t \\ m_t \\ i_t \\ b_t \\ sm_t \end{bmatrix}$$

Three diagonal elements of the A_0 were restricted and set equal to 1 (equations of the TONIA, base rate and stock returns) to ensure that all diagonal elements are positive, model converges and can be estimated. Generally, SVAR methodology with short-run restrictions involves setting diagonal elements of the matrix of contemporaneous coefficients to 1 to normalize the coefficients. The benchmark model, however, did not impose such restrictions letting the diagonal elements be freely estimated. In this case, the model is under-identified when keeping the parameters free and fails to converge when imposing restrictions on all diagonal elements. It was sufficient to impose this restriction on the last three equations to ensure the model converges and all coefficients on the matrix

diagonal are positive. Although the model is overidentified with six more restrictions required for exact identification, the LR test of overidentifying restrictions fails to reject the null hypothesis that overidentifying restrictions are valid. The test yields a Chi-squared statistic of 6.16 with a corresponding p-value of 0.41, indicating that the imposed restrictions are consistent with the data.

While this model was not specifically developed for Kazakhstan's economy, this and similar models have been applied across economies demonstrating overall its robustness (the benchmark model is applied to the UK, Germany, the US; Kim and Roubini (2000) - G-7 countries; Brischetto and Voss (1999) – Australia; Haug, Jędrzejowicz and Sznajderskanew (2013) – Poland).

The analysis is conducted for the period of inflation-targeting regime starting to avoid violating the assumption of model stability. Following the transition to the inflation targeting regime in 2015, the National Bank of Kazakhstan abandoned the fixed exchange rate system and adopted a free-floating exchange rate policy. Introduced in September 2015, the base rate replaced the refinancing rate as the main monetary policy instrument, reflecting the shift in the monetary policy regime. Given the availability of the base rate, the analysis covers the period from September 2015 to October 2024.

Variables were examined for seasonality by observing time graphs and correlograms, as well as implementing regression analysis including monthly dummies. Based on the findings, three variables were seasonally adjusted using

the Census Bureau ARIMA-X12 method, implemented through Stata's statistical package *"sax12"*. These are STEI, government expenses and M_1.

The estimation of the VAR model requires meeting the stationarity condition of the used variables. All variables, except TONIA, base rate and inflation rate, were transformed using their natural logarithms, tested for stationarity by the Augmented Dickey-Fuller and differenced accordingly (Table 1).

When testing the base rate's stationarity, it is important to consider its economic nature and behavior. Although the results of the statistical test for stationarity fail to reject the null hypothesis of the unit root, the base rate's bounded nature supports treating it as stationary in this analysis. Central bank policy rates are bound by economic and institutional constraints - they cannot fall significantly below zero and they also are unlikely to rise indefinitely.

To determine the optimal lag length for the model, Akaike (AIC), Hannan-Quinn (HQIC), and Schwarz Bayesian (HQIC) information criteria were used. AIC suggests the optimal lag length of 4, HQIC suggests 2 lags and SBIC suggests 1 lag (Table 2). When implementing the Lagrange Multiplier test for autocorrelation in the residuals, the null hypothesis of no autocorrelation was rejected for models with up to three lags. The model with four lags was implemented to ensure it does not suffer from autocorrelation (Table 3).

Augmented Dickey-Fuller tests p-values					
LogBrent	Level	0.2300	LogM_1	Level	0.7804
	D1	0.0000		D1	0.0000
LogSTEI	Level	0.5223	LogGovExp	Level	0.7931
	D1	0.0000		D1	0.0000
P (inflation rate)	%	0.0000	TONIA	%	0.0001
LogKASE	Level	0.4380	Base rate	%	0.6803
	D1	0.0000			

Table 1. Results of the Augmented Dickey-Fuller tests

Lag	AIC	HQIC	SBIC
0	-31.765	-31.682	-31.561
1	-36.915	-36.173	-35.0841*
2	-38.108	-36.7071*	-34.650
3	-38.498	-36.438	-33.413
4	-38.7489*	-36.029	-32.036

Table 2. AIC, HQIC and SBIC information criteria

Lag	LM Statistic	P-value
1	71.2581	0.2491
2	65.3149	0.4308
3	77.8426	0.1145
4	68.2652	0.3345

Table 3. VAR residual serial correlation LM test results

Results

Contemporaneous relationships

Contemporaneous relationships between variables estimated by the model are the following: $A_0 y_t$ is equal to

$$\begin{bmatrix} 7.67^* & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -0.70 & 30.92^* & 0 & 0 & 0 & 0 & 0 & 0 \\ 0.39 & 4.26 & 422.97^* & 0 & 0 & 0 & 0 & 0 \\ 0 & -3.11 & -14.77 & 41.53^* & 0 & 0 & 0 & 0 \\ 0 & -9.64^* & -19.41 & -0.71 & 30.73^* & 0 & 0 & 0 \\ 0.32 & 0 & 0 & 7.07 & 4.23 & 1 & 79.72^* & 29.41 \\ 4.44^* & 0 & 0 & -2.98 & -9.09^* & 232.97^* & 1 & -8.68^* \\ -0.13 & 2.22 & -21.01 & 6.50 & -1.35 & -206.78^* & 285.97^* & 1 \end{bmatrix} \begin{bmatrix} oil_t \\ STEI_t \\ p_t \\ gov_t \\ m_t \\ i_t \\ b_t \\ sm_t \end{bmatrix}$$

where * corresponds to the significance level of 5%.

Focusing on the monetary policy side, the estimated matrix of the contemporaneous coefficients suggests a positive contemporaneous relationship between the base rate and TONIA which is reasonable given the role of TONIA as an operating target for monetary policy. In the equation of KASE returns, the coefficients for both interest rates are significant, and have opposite signs and similar magnitude. It appears that the spread between two rates influences stock market behavior, rather than the rates individually. The spread between TONIA and the base rate reflects an additional cost for firms to access credit in the money market or inefficiencies in the monetary system. Since TONIA has a negative coefficient and base rate's coefficient is positive, it can be interpreted as follows: a rise in TONIA with base rate remaining unchanged could indicate unexpected tight money market conditions and discourage market participants who rely on

short-term funding; adjustment of the base rate by the NBK may restore investor confidence since it signals the banks' commitment to address imbalances in the market. This adjustment may also open refinancing possibilities for firms that could borrow funds at a reduced cost.

There is no evidence to suggest the contemporaneous relationship between fiscal policy and the stock market. There is also no evidence of the interaction of monetary and fiscal policy within one month.

Additionally, money supply is affected negatively by the increase in industrial output. The base rate is positively related to oil prices and negatively related to money supply.

Accumulated impulse response functions

Impulse response functions results (see Appendix 3) suggest that changes in the key monetary policy instrument, base rate, affect the stock market returns significantly and negatively. This is consistent with the theoretical expectations of the negative effect of monetary policy tightening on stock returns based on the discounted cash flow model discussed in the section on theoretical background. The effect, however, vanishes in around a year which highlights that monetary policy impacts the stock market in the short to medium term. TONIA also has a negative effect on stock returns, although lagged and not significant compared to the base rate. There is a slight increase in KASE index returns at initial lags after a positive shock to the money supply, however, in the longer run the effect is negative and this negative effect persists for a long time. This can be explained

by the short-term boost in liquidity due to monetary expansion which may increase stock prices in the short-term, but over time monetary expansion may raise inflationary pressures or lead to misallocation of resources. However, there is a lack of statistical significance in this relationship as zero lies in the confidence bounds.

The effect of the fiscal policy tool is negative initially on the stock returns, which suggests that the market participants perceive increased government expenses negatively. But the effect dissipates after a year and, in general, the relationship is not significant. The short-term negative effect of fiscal expansion on stock prices is also evidenced for the US, the UK, Germany and Italy in the study by Afonso and Sousa (2012) who interpret this effect as market perception of fiscal expansion as “deterioration of public finances”. This reaction could be explained by concerns about fiscal sustainability where increased government expenditures are signaling rising debt or future tax hikes.

Inflation has a negative effect on the stock market in the short term, but in the long term, the relationship becomes positive. Inflation may increase production costs and decrease corporate profits initially, but eventually, firms may pass these costs onto consumers and increase their profits. The industrial output, STEI, appears to have a negative effect on stock performance. However, both macroeconomic indicators do not have a significant relationship with the stock market.

A positive shock to oil prices leads to a significant negative reaction in the KASE index, which is unexpected, given the considerable presence of oil production and transportation companies in the KASE index representative list (KazMunayGas – 12.7% , KazTransOil -1.9% as of December 5, 2024 (Kazakhstan Stock Exchange, KASE index)). A possible interpretation of this surprising result is that the increase in oil price may be perceived as a driver of inflation and, therefore, market participants may expect tighter monetary conditions which can consequently negatively affect stock prices. The impact of the shock dissipates in two years.

As for the influence of the stock market performance on fiscal and monetary policy variables, there is no statistically significant effect on any policy indicator observed. Impulse response functions of the interest rates are flat. Money supply increases temporarily in response to positive stock market shock which may be because positive stock market performance may lead to greater liquidity needs for investment or operational expansions. The central bank might increase the money supply to support these industries or facilitate smoother capital market operations. The effect lasts for less than a year.

Turning attention to the interaction between monetary and fiscal policy, both base rate and TONIA react positively to the increase in inflation and output which corresponds to countercyclical monetary policy. Although the main objective of the NBK is price stability, the policy rate may rise in response to an increase in output too. In particular, when an increase in output is driven by

demand-side factors (fiscal stimulus) rather than higher productivity, this may raise inflation due to higher aggregate demand exceeding aggregate supply. So, the NBK may respond with tighter monetary policy to an increase in output which signals overheating in the economy. In contrast, fiscal policy appears to be pro-cyclical as government spending responds to positive inflation and output shocks with an increase. However, the observed relationship between government spending and inflation may be partially mechanical, as rising prices could naturally inflate nominal government expenditures without reflecting deliberate policy actions.

The results indicate that base rate, TONIA, and money supply increase in response to a positive shock in government expenses, though the effects are not statistically insignificant. This suggests that the central bank may perceive fiscal expansion as potentially inflationary and respond by increasing interest rates. The increase in money supply could reflect an accommodative stance to support liquidity during fiscal expansion. This indicates fiscal dominance, where the NBK accommodates fiscal policy by monetary expansion through liquidity support. However, the lack of significance in these relationships suggests that there is no evidence that the central bank responds systematically to fiscal shocks.

While the base rate does not exert any significant effect on government expenditures, shocks in TONIA influence government expenses positively. A positive shock in money supply also increases government expenses, but there is a lack of statistical significance in this relationship.

Discussion of results

A key observation from the estimated contemporaneous relationships is that the spread between TONIA and the base rate appears to influence the stock market within a month. This relationship may capture the responsiveness of the stock market to the inefficiencies in the monetary system rather than an immediate monetary transmission. To be precise, a negative coefficient of the contemporaneous term of TONIA suggests that a rising TONIA holding the base rate constant may signal unexpected tightening in short-term liquidity which, consequently, negatively affects stock prices. In contrast, the corresponding base rate downward adjustment signals the central bank's action to mitigate this imbalance potentially through opening refinancing opportunities for firms.

Impulse response functions suggest a negative effect of monetary policy tightening on stock returns. This aligns with the theory that higher interest rates reduce stock prices through lower expected cash flows and increased discount factors. It is insightful that the base rate's negative effect on the stock market is significant, in contrast to TONIA. So, base rate has a stronger signal to the stock market although both reflect country's monetary policy stance. This may be because TONIA is influenced by day-to-day market operations rather than deliberate long-term policy operations. So, shocks in TONIA may be perceived as more transient by market participants, compared to the base rate which signals the overall monetary policy stance reflecting the NBK's expectations of

economic conditions. Additionally, shocks in the base rate have a short to medium-term effect.

Government expenditures have no explanatory power for stock market returns. This can be related to pro-cyclical behavior of fiscal policy, evidenced by increase in government spending in response to both inflation and output shocks. This is consistent with the NBK's findings on the disconnect between fiscal policy and market sentiment. Kazakhstani government's low fiscal discipline, that is, excessive spending and reliance on National Fund transfers, undermine the role of fiscal policy as a stabilizing force. In this regard, the lack of responsiveness of the stock market to shocks in fiscal policy is sensible, as the lack of consistent and predictable fiscal rules diminishes investor confidence in the government's ability to manage economic downturns, weakening the transmission of fiscal policy to the financial markets. However, the monthly frequency and short time coverage of the analysis might not fully capture the effects of fiscal policy changes. For example, large infrastructure projects funded by fiscal spending may take years to materialize, and their economic benefits, as well as their impact on investor confidence, may only become apparent over extended periods. Further research could explore fiscal policy effects over longer horizons.

In contrast, the countercyclical manner of monetary policy, indicated by TONIA's positive response to inflation and output, aligns with the NBK's main objective of maintaining price stability.

The interaction between fiscal and monetary policy, although lacking statistical significance, may highlight fiscal dominance in Kazakhstan. The positive impact of government spending shocks on the money supply suggests that the NBK accommodates fiscal policy through monetary expansion. This may occur via liquidity support mechanisms, aligning monetary policy with the financing needs of fiscal authorities rather than maintaining the independence of the NBK. This may contribute to the weakening of credibility and complicate the central bank's initiatives. The positive impact of government expenses on interest rates indicates that NBK responds to an anticipated increase in inflationary pressures driven by public spending.

Interestingly, TONIA shocks positively influence government expenditures. A study by Peña (2023) found a statistically significant positive effect of interest rates on public spending using a sample of 216 countries. He found that there are two transmission channels of this effect. First is increased demand for public goods and services where higher borrowing costs may increase financial pressure on households and firms, so they rely on public goods and services more. Second is the crowding out effect where public expenditure rises as private investment contracts due to higher financing costs. The lack of a significant effect of the base rate on government spending indicates that short-term money market conditions are more closely tied to fiscal operations than broader monetary policy signals. This can also indicate a lack of coordination between monetary and fiscal policy.

The significant negative response of the stock market to positive oil price shocks highlights the limited diversification of Kazakhstan's economy and vulnerability to external oil price shocks. One possible interpretation is that the increase in oil prices may lead to higher inflation expectations. Market participants might anticipate tighter monetary conditions which can negatively affect stock prices. Another possible explanation is the Dutch disease, where rising oil prices lead to currency appreciation in oil-exporting countries, making exports from non-oil sectors less competitive. This can reduce profitability in non-oil sectors which may outweigh the benefits from oil-related companies.

Moreover, the contemporaneous term of the oil price has a significant coefficient in the equation of the base rate which suggests that the NBK takes into account global oil prices when setting monetary policy stance as a proxy for expected inflation. The last arguments justify the inclusion of the oil prices in the model.

Policy implications

Overall, the findings highlight challenges common to emerging markets, such as weak policy transmission mechanisms and dependence on external factors. The importance of the spread between TONIA and the base rate in explaining the stock performance suggests that policymakers should ensure better alignment between the two rates. Second, the observed fiscal dominance and pro-cyclicality point out the importance of the development of an effective and transparent framework for managing fiscal expenditures. Also, to improve the

monetary and fiscal policy coordination and prevent conflicting objectives, clear communication strategies could be implemented between the government and the central bank. Lastly, the results highlight Kazakhstan's vulnerability to external shocks in oil prices and their importance in setting policy decisions calls for efforts to prioritize economic diversification.

Conclusion

This thesis examined the impact of fiscal and monetary policies on Kazakhstan's stock market. The findings demonstrate that monetary policy plays a significant role in shaping stock market performance. A key finding is the significant influence of the spread between TONIA and the base rate on KASE index returns which reflects the inefficiency of the monetary policy transmission. Impulse response analysis shows that the base rate has a stronger and more sustained effect on stock returns compared to TONIA.

Fiscal policy is found to have a limited influence on stock market returns, possibly attributed to its pro-cyclicality and reliance on National Fund transfers. There is also evidence of fiscal dominance, where monetary expansion accommodates fiscal needs.

The thesis also highlights the importance of an external factor – oil prices – in stock market performance and monetary policy decisions. Positive oil price shocks negatively affect the stock market, underscoring the need for economic diversification. Apparently, oil prices also contemporaneously influence monetary policy decisions.

These findings emphasize the importance of aligning monetary policy tools (base rate and TONIA), establishing a transparent fiscal framework, and improving policy coordination.

Several limitations should be acknowledged. The scope of the analysis is limited to ensure the model stability due to structural change in the monetary policy stance. The SVAR framework itself has limitations, including the reliance on theoretical assumptions to impose short-run restrictions. These assumptions, while grounded in economic theory, are not empirically tested. Moreover, the analysis of fiscal policy responses is restricted to a two-year horizon, which is likely insufficient to capture the long-term effects of fiscal interventions. Lastly, the assumption of normality in the model may not hold, potentially leading to issues in estimations. More robust estimation methods, such as the generalized method of moments, could address this issue, however, the study opted for a simpler approach using standard maximum likelihood regression due to its ease of implementation and interpretability.

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Appendix 1. Data

Variable	Description	Transformation	Source
Oil prices	Brent crude oil spot prices expressed in KZT/barrel, obtained by multiplying the daily price in USD/barrel by corresponding USD/KZT nominal exchange rate and taking the last available observation for a given month	Logarithm, first difference	U.S. Energy Information Administration for Brent crude oil spot prices; National Bank of Kazakhstan for the USD/KZT exchange rate
STEI	Short-term Economic Indicator, KZT	Seasonal adjustment, logarithm, first difference	Bureau of National Statistics
Inflation rate	Consumer Price Index expressed as a monthly inflation rate	No seasonality observed	Bureau of National Statistics
Government expenditures	Revised state budget expenditures, KZT	Seasonal adjustment, logarithm, first difference	Ministry of Finance of Kazakhstan
Money supply	Monetary aggregate M1, KZT	Seasonal adjustment, logarithm, first difference	National Bank of Kazakhstan
TONIA	Tenge overnight index average, expressed as annual rates	No transformations	KASE
Base rate	National Bank’s key monetary policy instrument, policy rate. Expressed as annual rates		National Bank of Kazakhstan
KASE index	KASE index close prices, end of month, KZT	No seasonality observed, logarithm, first difference	KASE

Appendix 2. Backcasting Ministry of Finance Revised Budget Series

This appendix describes the development of a consistent monthly fiscal policy indicator for the whole analysis period (2015 - 2024) using Ministry of Finance of Republic of Kazakhstan (MF RK) annual and monthly reports on the execution of state budget. Monthly data is only available starting from February 2018 on the Ministry's website, and it was essential to extend the dataset to include earlier years to preserve valuable observations, given the complexity of the model. A solution was to use the available monthly data and the seasonality pattern from these years to distribute annual data across months for years prior to 2018.

First, annual reports for 2015-2024 and monthly reports for 2018-2024 were downloaded from the MF RK website. Using Stata, I extracted the total government revenues and expenditures time series as each report on a given date was provided in a separate document (Figure 2).

The monthly time series can be viewed as a monthly breakdown of state budget revisions. The approved budget for any fiscal year is set before the year begins, however, revisions to the budget occur each month and are reported as "revised budget". The monthly revised budget shows how much income (expenses) the government expects for the whole fiscal year considering any changes that happened prior to the end of the corresponding month. To be precise, the Budget Code of the Republic of Kazakhstan states: "revised budget is the approved budget for the relevant financial year taking into account the

amendments and additions adopted by the Parliament of the Republic of Kazakhstan or the relevant Maslikhat during its implementation". The observation for December matches the total expenditures for the year as both represent the finalized yearly totals.

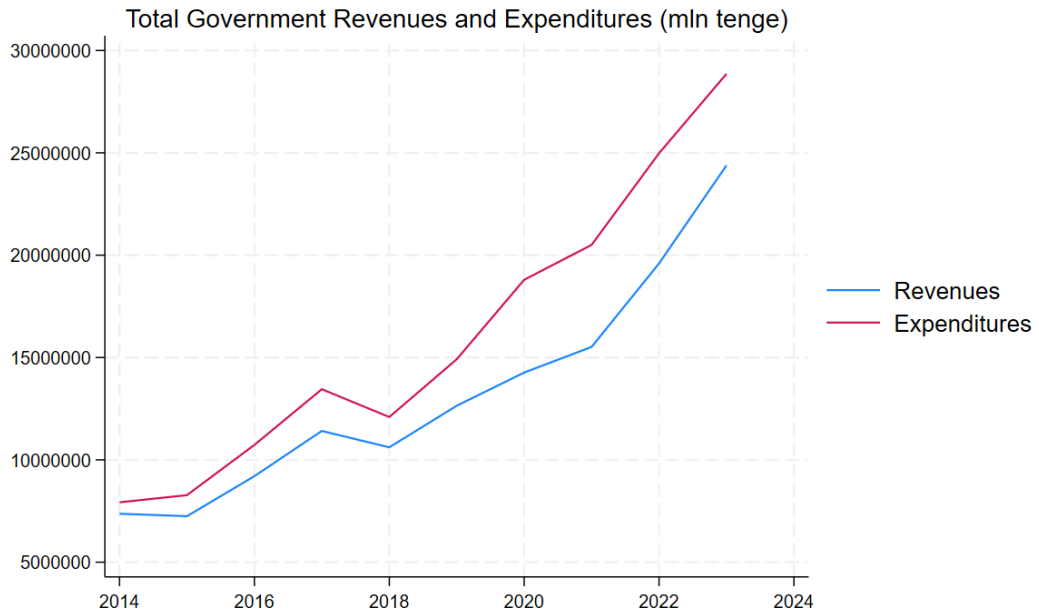


Figure 2. Yearly series for revised income and expenses of state budget (2014-2023)

Next, for each year from 2018 to 2023, monthly proportions of yearly totals were calculated. Since the observation for December matches the total expenditures for the year as both represent the finalized yearly totals, the December monthly proportions were equal to 1 for all fiscal years. These proportions were averaged across years for each month, so the result is a monthly pattern that reflects how the revised budget changes month-by-month relative to the year-end values. To observe whether there is a significant similarity in

monthly seasonality of government revenues and expenditures series, confidence intervals were calculated.

Confidence intervals for both series are wide in the first months and get narrower as months pass. This is because, as discussed above, the original series shows how yearly budget gets revised for the accounting year, so proportions are more “dispersed” for the first month and eventually, by the end of the year, become equal to 1. Also, for most of the months, confidence intervals for revenues and expenditures series largely overlap.

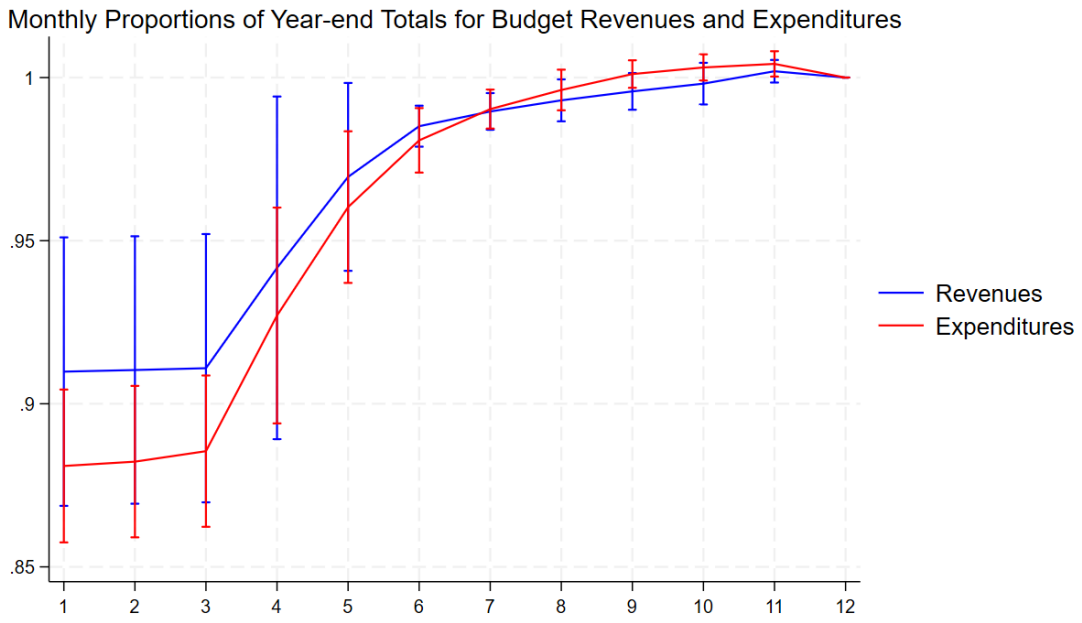


Figure 3. Average monthly proportions for revised income and revised expenses with confidence intervals (2014-2023)

Since the seasonal patterns for revenues and expenditures were similar, it was plausible to combine the monthly proportions by taking their average. The estimates of monthly revenues and expenditures for years 2018-2024 were

calculated by multiplying the total year-end values by the combined average monthly proportions.

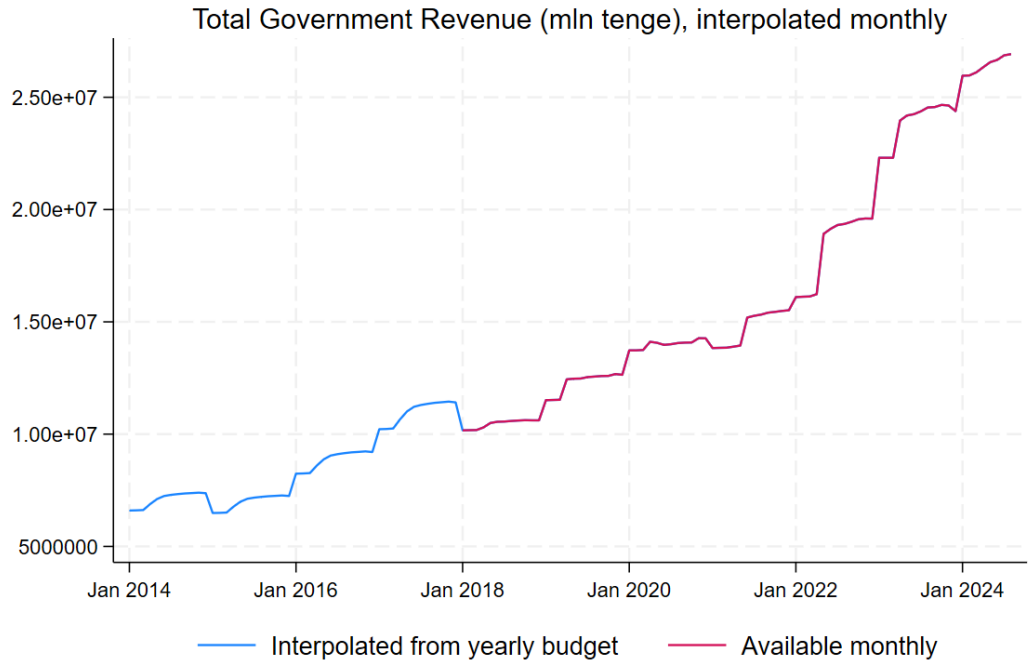


Figure 4. Results of backcasting of revised budget revenues

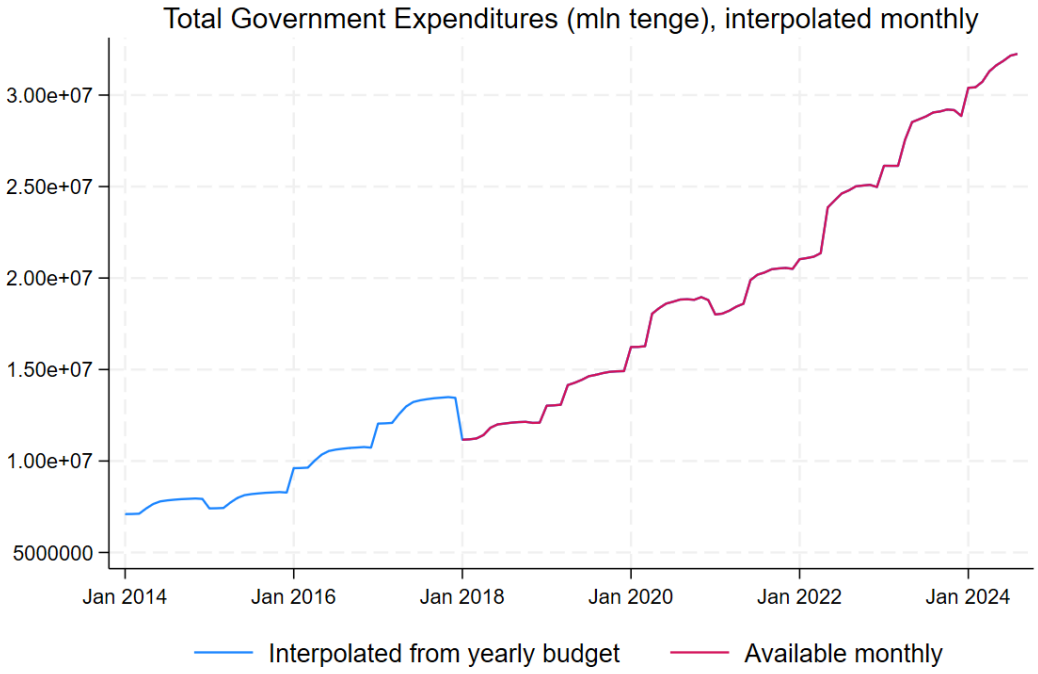
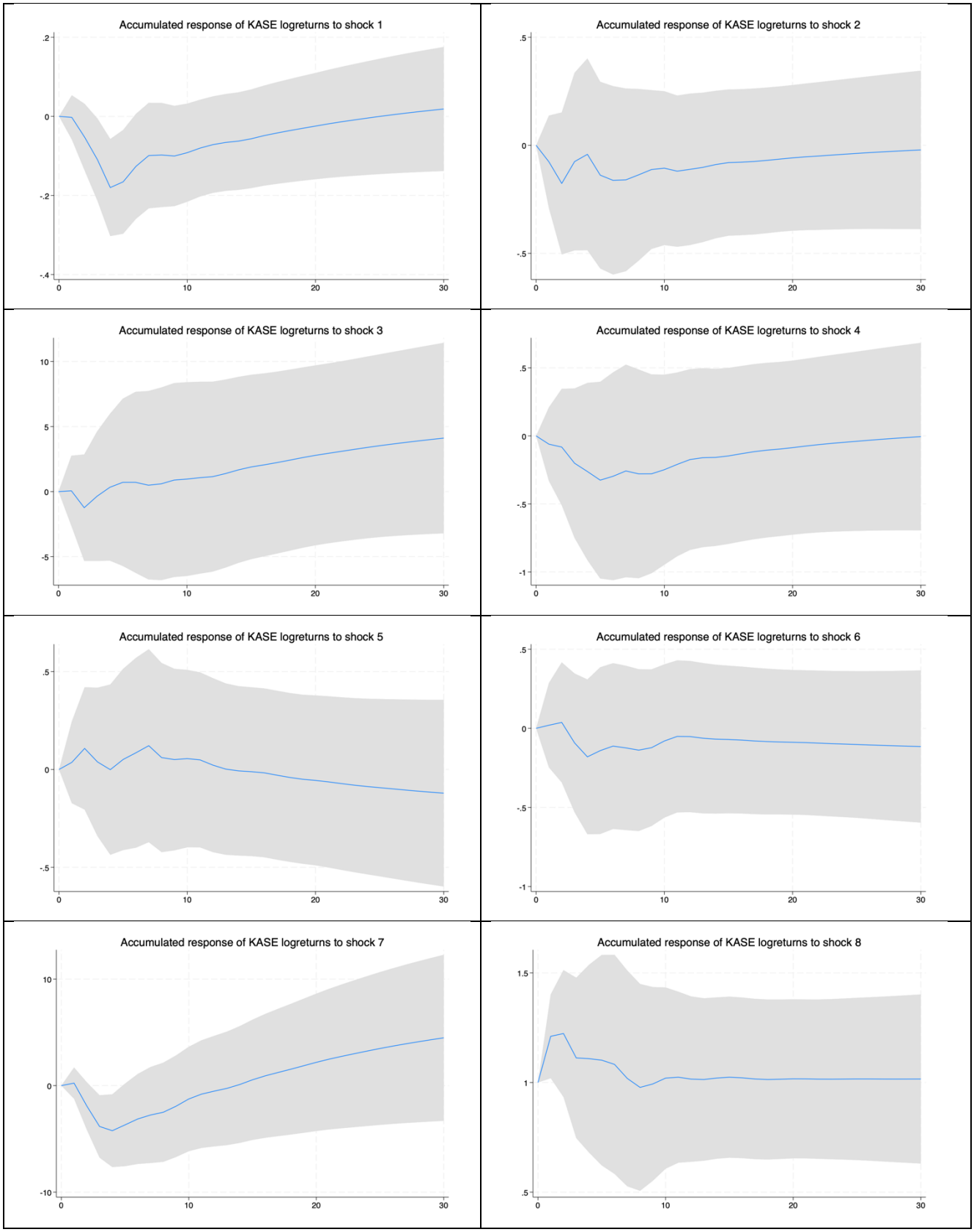
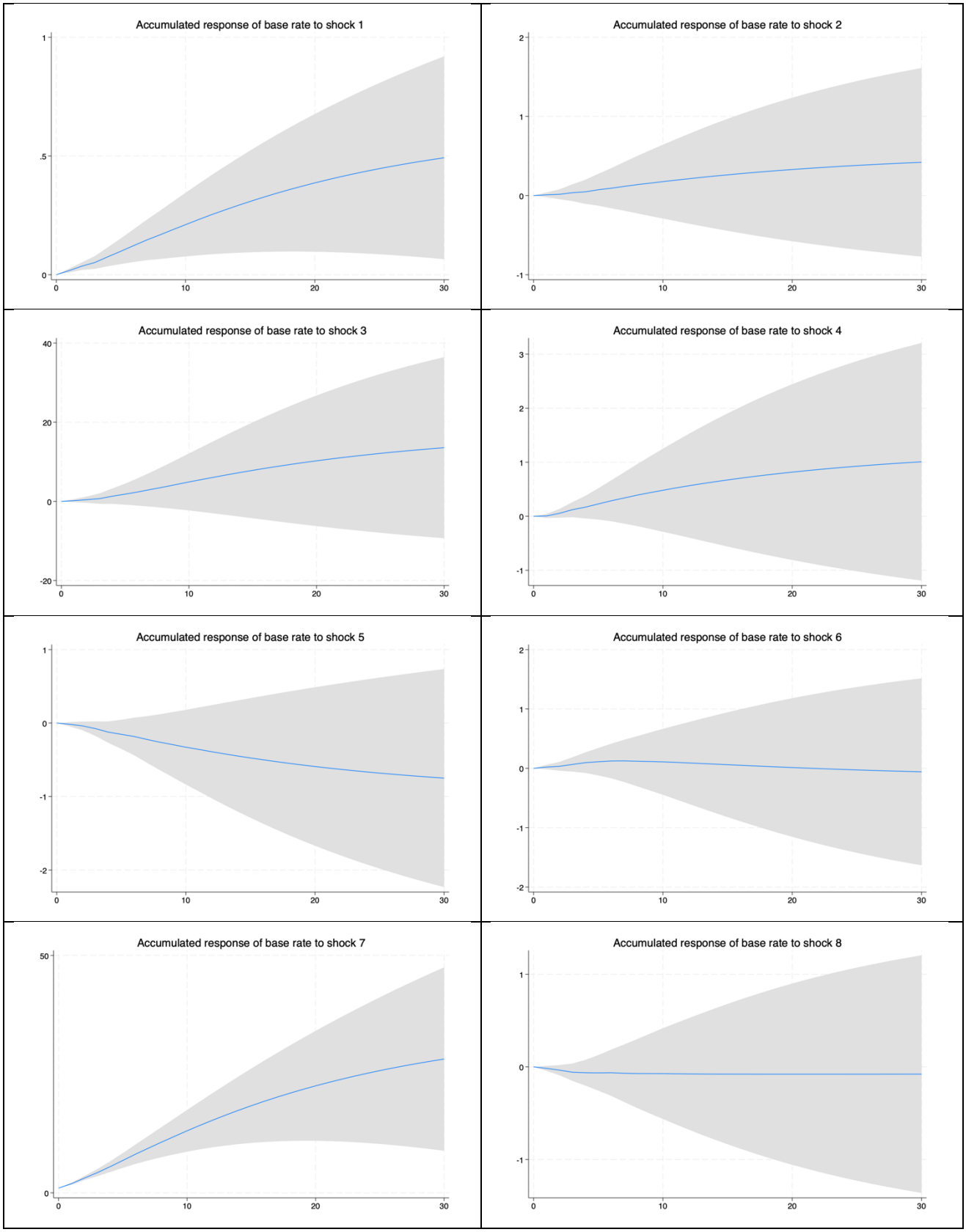


Figure 5. Results of backcasting of revised budget expenditures

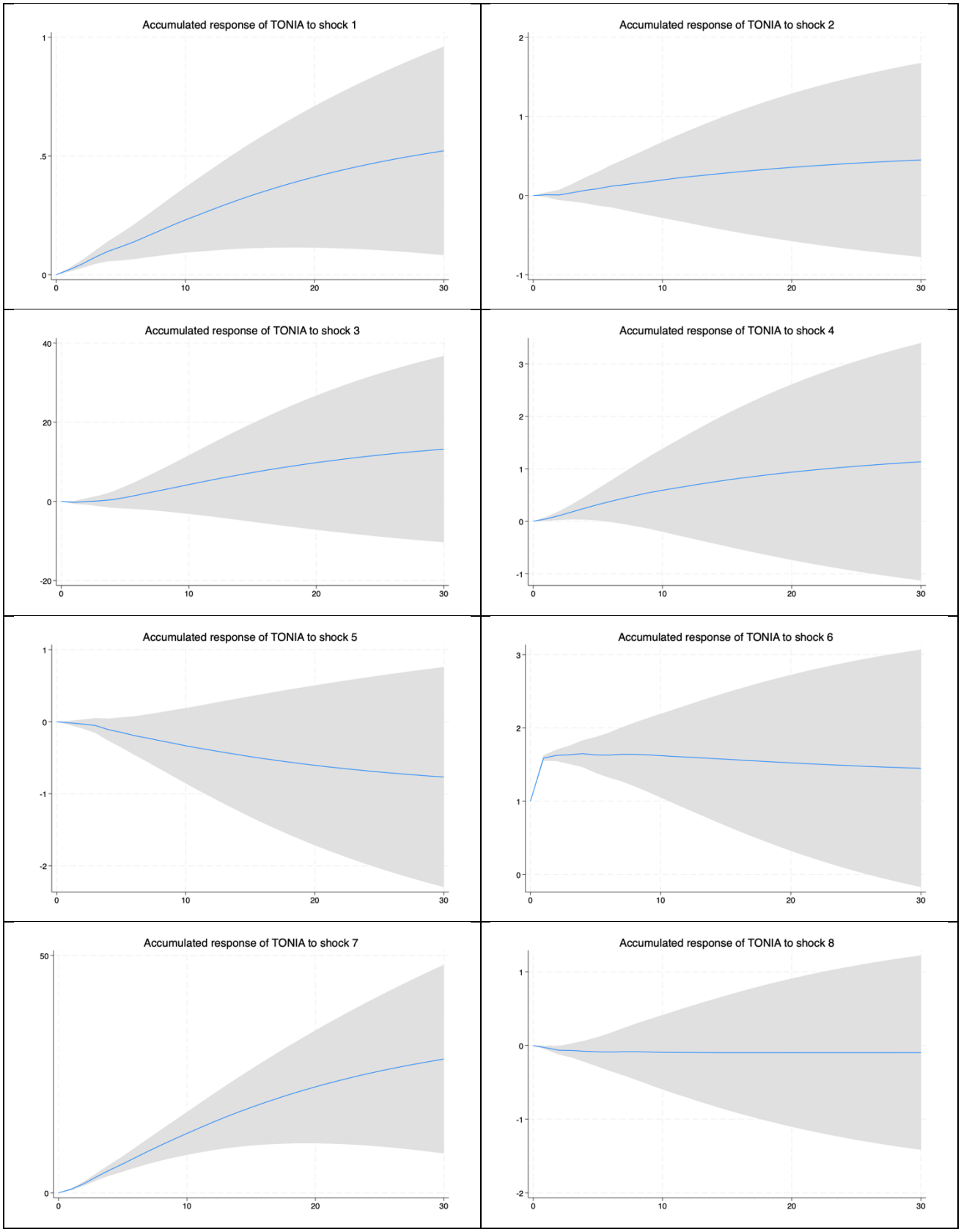
Appendix 3. Accumulated Impulse Response Functions



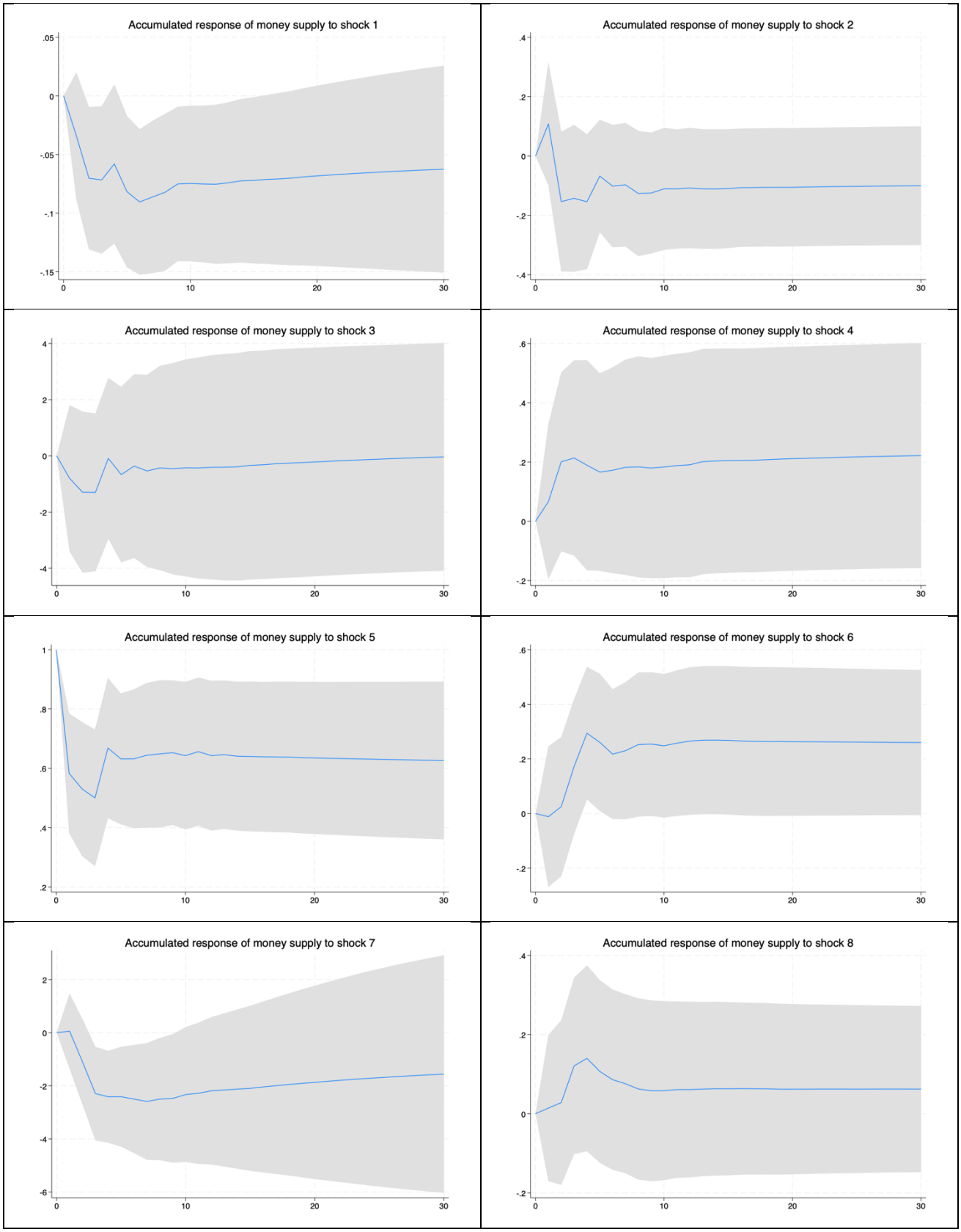
Accumulated Responses of KASE logreturns to shocks*



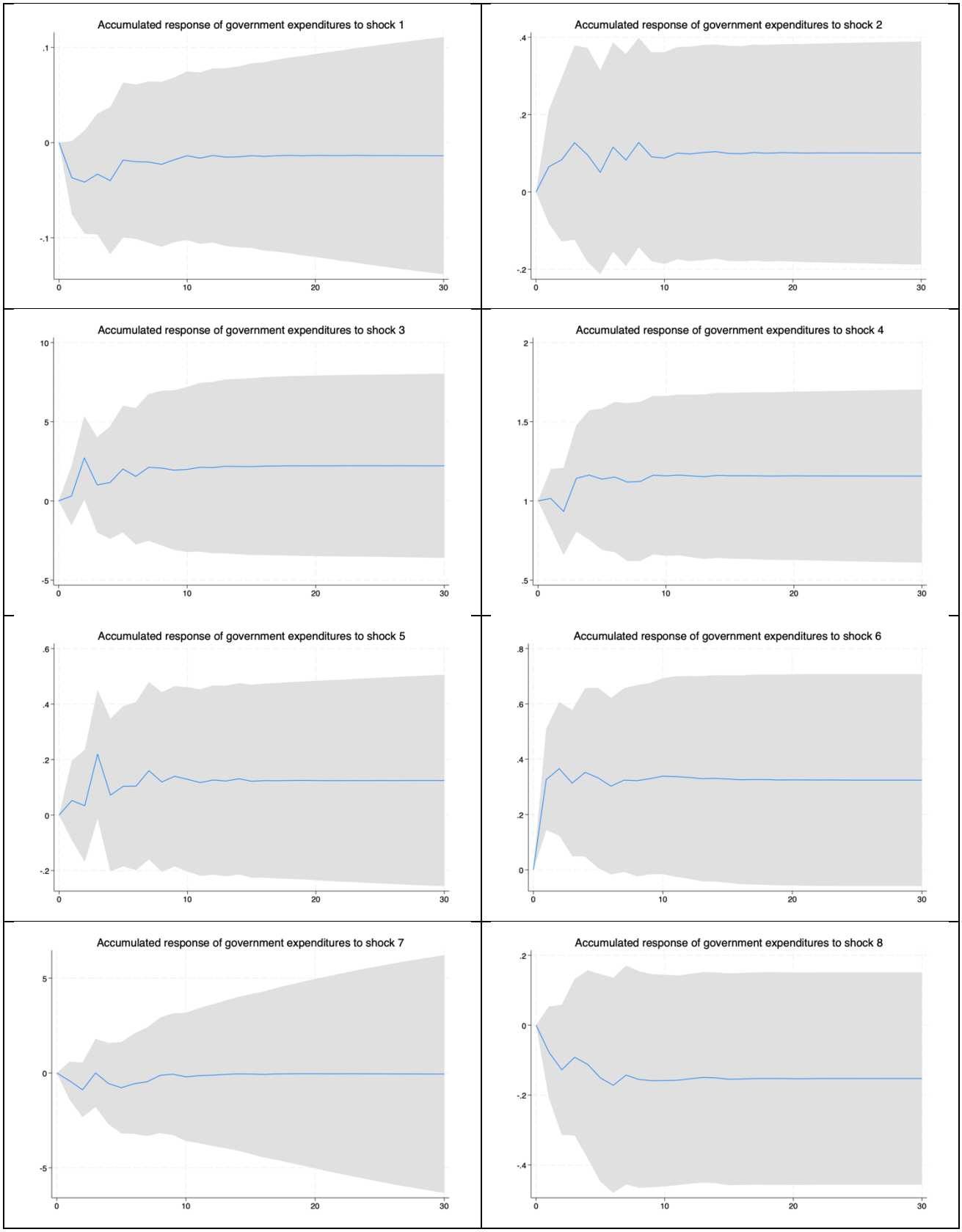
Accumulated Responses of base rate to shocks*



Accumulated Responses of TONIA to shocks*



Accumulated Responses of money supply to shocks*



Accumulated Responses of government expenditures to shocks*

*shocks: 1 – Oil price; 2 – STEI; 3 – Inflation; 4 – Government Expenses; 5 – Money Supply; 6 – TONIA; 7 – Base rate; 8 – KASE returns.