INTERNATIONAL MONETARY FUND

IMF Country Report No. 24/47

REPUBLIC OF KAZAKHSTAN

SELECTED ISSUES

February 2024

This paper on the Republic of Kazakhstan was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on January 16, 2024.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
PO Box 92780 • Washington, D.C. 20090
Telephone: (202) 623-7430 • Fax: (202) 623-7201
E-mail: publications@imf.org Web: http://www.imf.org

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

REPUBLIC OF KAZAKHSTAN

SELECTED ISSUES

January 16, 2024

Approved By
Middle East and Central Asia Department

Prepared by Alejandro Hajdenberg (MCD), Keiko Honjo (RES), Gregorio Impavido (MCD), and Nadia Mounir (MCD)

CONTENTS

DRIVERS OF INFLATION[1]

In the aftermath of the COVID-19 pandemic, inflation in Kazakhstan climbed to the highest levels in decades, boosted by a series of global shocks and highly accommodative domestic policies. Receding inflation around the world and tighter policies have led to disinflation also in Kazakhstan, although inflation remains elevated. This paper applies a series of statistical and econometric methods to quantify the drivers of inflation, confirming the roles of external and domestic factors. With inflation still above target, unanchored inflation expectations, and a highly uncertain global environment, monetary policy should not be relaxed prematurely while other macroeconomic policies should also support the disinflation process. Administrative measures to control inflation should be avoided. To reduce the volatility of inflation, efforts to strengthen Kazakhstan's inflation targeting framework should continue.

A. Introduction

1. Inflation climbed to the highest level in decades in early 2023 before starting to gradually decline. Inflation declined after the introduction of the inflation targeting regime in 2015 and remained close to the NBK's target during 2016-19. It started climbing during the Covid-19 pandemic and accelerated sharply in 2022.[2] It peaked in early 2023, and then started a gradual decline, ending the year at 9.8 percent. Headline inflation went from 8.5 to 21 percent between January of 2022 and February of 2023. This was the highest level since 1997. Common external shocks including COVID-related supply chain disruptions, the surge in commodity prices (mainly energy and food), and the war in Ukraine resulted in broadly similar dynamics in the other CCA countries, but inflation in Kazakhstan rose substantially more than in its regional peers[3]. The dissipation of these shocks has contributed to the recent inflation slowdown.

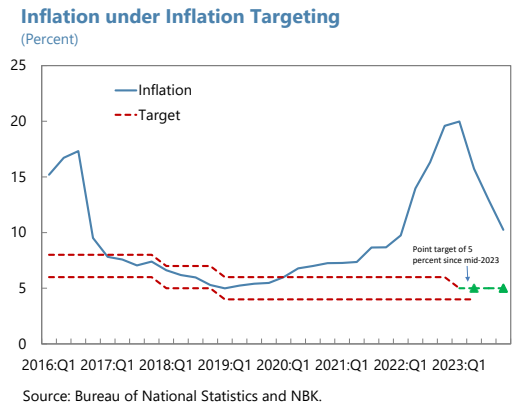
2. This paper applies a range of quantitative methods to explain recent inflation dynamics in Kazakhstan. In the next section we present an overview of recent developments. We then utilize a principal component analysis to decompose inflation in Kazakhstan between global, regional, and domestic sources. Next, we estimate a Phillips curve model, augmented with external variables, to quantify the drivers of inflation. Finally, we estimate a vector autoregressive model to look more closely at dynamic effects. The last section concludes and discusses some policy implications from the analysis.

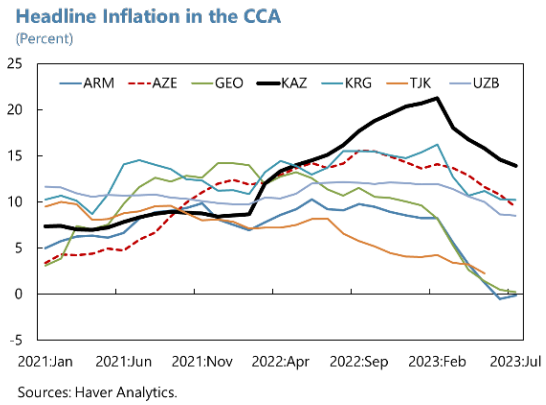
[1] Prepared by Alejandro Hajdenberg.

[2] The target band of 4-5 percent for 2023 was modified in July to a point target of 5 percent, which is also in effect for the medium term.

[3] Due to lack of adequate data, Turkmenistan is omitted from the analysis throughout the paper.

Figure 1. Inflation in Kazakhstan and the CCA

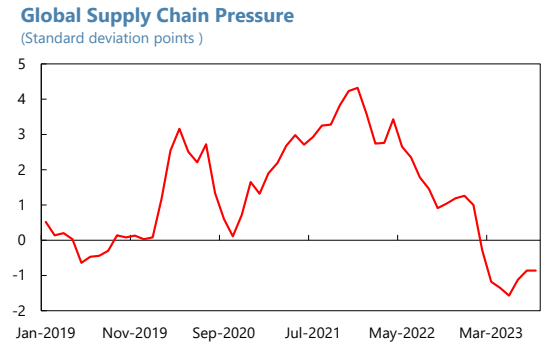




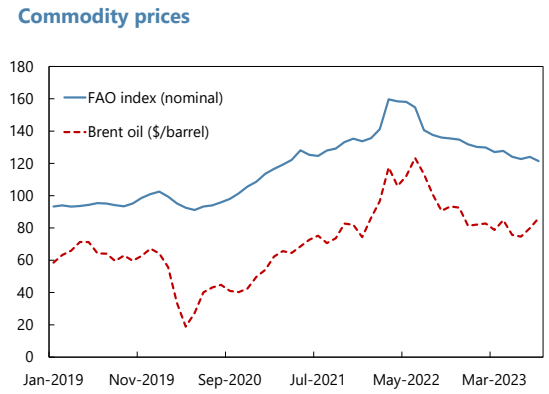
B. Recent Developments

3. In parallel with global developments, inflation in Kazakhstan has been boosted by a series of shocks. The COVID-19 pandemic in 2020 led to large fiscal and monetary stimulus across the globe to support economies and protect livelihoods. The strong post-pandemic recovery and supply chain dislocations resulted in surging energy and food prices. The latter were reinforced by Russia's war in Ukraine in February of 2022. With Russia accounting for over 40 percent of imports prior to the war, the conflict had a particularly strong effect on Kazakhstan, transmitted through the sharp depreciation of the tenge against the ruble as well as a shift to more expensive import sources. The reversal of these developments have contributed to the decline of inflation since the peak in early 2023.

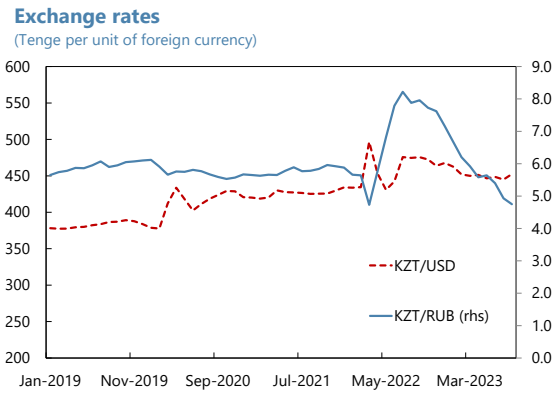
Figure 2. External Drivers of Inflation



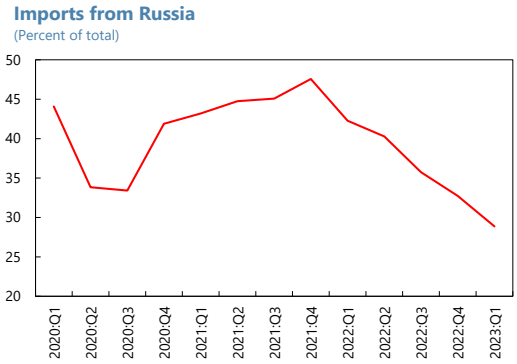
Source: Haver Analytics.
Note: Zero indicates that the index is at its average value with positive values representing how many standard deviations the index is above this average value (and negative values representing the opposite)



Sources: Food and Agriculture Administration of the United Nations and and Haver Analytics.



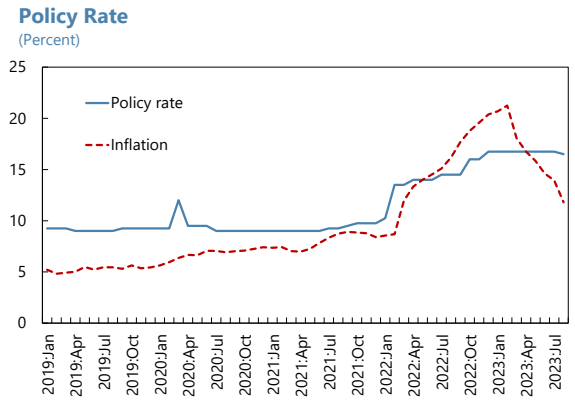
Source: Haver Analytics.



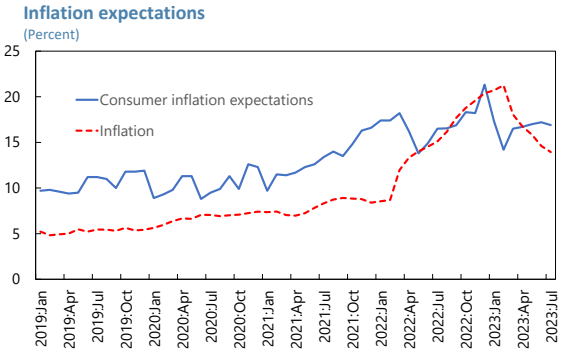
Sources: National Bank of Kazakhstan.

4. Domestic factors have also contributed to recent inflation dynamics. The COVID-19 pandemic led to a marked slowdown of economic activity in 2020 followed by a rapid recovery. The government implemented a package of (on and off-budget) measures estimated at around 9 percent of GDP to support the economy. Some of this stimulus was withdrawn in the following years as Covid-related spending receded and non-oil revenue collections improved. Monetary policy remained accommodative during the height of the pandemic. The NBK started raising the policy rate in 2021 but the most significant policy adjustment (700 basis points) took place in 2022. The rise in inflation was mirrored by consumer inflation expectations, which have also been well above the inflation target. The labor market has remained tight. Unemployment has stayed below 5 percent while real wages saw large gains during 2021–22. Domestic consumption has also been supported by sustained growth in bank consumer lending. Lastly, regulated utility tariffs and energy prices impeded the pass-through from global energy prices to domestic inflation.

Figure 3. Domestic Drivers of Inflation



Sources: NBK.

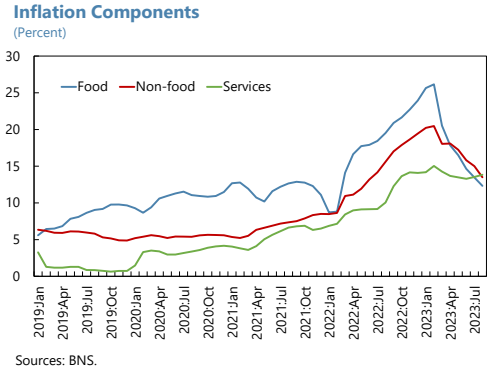


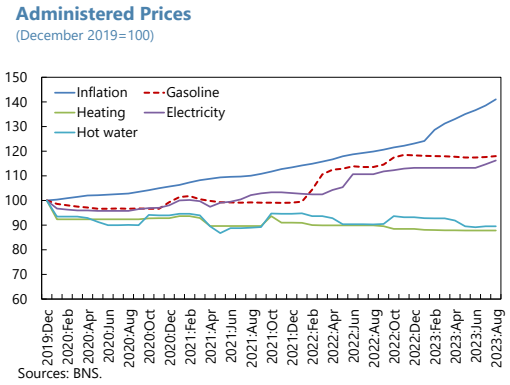
Sources: BNS and NBK.
Real policy rate computed as the nominal rate minus contempraneous inflation.

5. The increase in inflation has been broad based but dominated by food products. Mirroring the rise in global food prices, food inflation in Kazakhstan surged in 2022. However, it remained consistently elevated even though global prices declined significantly, reflecting the large reliance on imports from Russia and exchange rate depreciation against the ruble. Food products represent about 40 percent of the CPI basket and have been the main inflation driver. Certain key products (e.g., bread, sugar, milk, eggs, vegetables) saw particularly large price spikes. Non-food products, also with a large imported component, followed a similar although milder pattern as food products. Finally, services experienced more moderate inflation, but still significantly above the NBK's target, reflecting pressure from wage increases and strong domestic demand, including from Russian migrants. The latter was clearly the case regarding rental prices.

6. The government implemented administrative measures to try to contain inflation. Exports of certain products (cane sugar, fertilizers, oil and coal, gasoline, and diesel via road and rail transportation) were temporarily banned. Other exports were subject to a quota (wheat and wheat flour, sunflower seeds). Exports of sunflower seeds were also subject to a customs duty. These measures aimed at curbing price rises and protect supply to the domestic market. Some products were subject to price caps or markup limits (a list of "socially significant" food products, LPG, diesel, and gasoline). The adjustment of fuel prices was temporarily suspended, and utility tariffs were subject to a price freeze. To increase supply, the government also expanded subsidies to the agricultural sector. The government also adopted other measures to increase import substitution, control monopolistic behavior, reduce the role of intermediaries in the fuel market, and operate state-run stabilization funds for food products.

Figure 4. Contributions to Inflation





C. Roles of Foreign and Domestic Factors

7. An extensive literature has focused on the growing influence of foreign factors on the domestic inflation process resulting from greater global interconnectedness. Cicarelli and Mojon (2010) estimated that 70 percent of the variance of inflation in developed countries was explained by a common factor, with the high level of co-movement attributed to shocks hitting the global economy. Borio and Filardo (2007) find a growing influence of foreign factors on domestic inflation since the early 1990s, with a focus on the role of global slack. Auer et al. (2019) investigate the effects of growing global value chains. Forbes (2019) concludes that the importance of world output gap, commodity prices, and exchange rate movements for domestic inflation increased significantly since the early 1990s, especially for headline and cyclical inflation.[4]

8. We use principal component analysis (PCA) to analyze the role of external and domestic factors in driving inflation in Kazakhstan. We follow Krusper (2012) which carried out a similar exercise for Hungary and EU countries.[5] External and country-specific factors are computed by principal component analysis, where external factors are decomposed into global and regional effects.[6] This is a statistical method that captures correlations between time series and therefore

[4] See Auer, Raphael A., Andrei A. Levchenko, and Philip Sauré, 2019, "International Inflation Spillovers through Input Linkages," The Review of Economics and Statistics, MIT Press, vol. 101(3), pages 507–21, July; Borio, Claudio, and Andrew Filardo, 2007, "Globalization and inflation: New cross-country evidence on the global determinants of domestic inflation," BIS Working Papers 227, (Bank for International Settlements); Ciccarelli, Matteo, and Benoit Mojon, 2010. "Global Inflation," the Review of Economics and Statistics, Vol. 92, No. 3.; Forbes, Kristin J., 2019, "Has globalization changed the inflation process?" BIS Working Paper, No. 791.

[5] Krusper, Balázs, 2012, "The role of external and country specific factors in Hungarian inflation developments." MNB Working Papers 2012/5, Magyar Nemzeti Bank (Central Bank of Hungary).

[6] PCA is a statistical technique used to reduce the dimensionality of a data set by transforming it into a new set of fewer variables, called principal components, while retaining as much of the original information as possible.

does not provide an explanation for the transmission of inflation, but nevertheless it provides a useful description of inflation dynamics. We estimate the following equation:

$$\pi_{ijt} = \lambda_{ij} f_t + \mu_{ij} g_{jt} + e_{ijt}$$

where π_{ijt} is the standardized annual change of the consumer price index (i.e., subtracting the mean and dividing by the standard deviation) in country i and region j, f_t is the global factor, g_{jt} is the regional factor in region j, and e_{ijt} is the country-specific component. The parameters λ_{ij} and μ_{ij} may differ across countries.

9. The estimation distinguishes between a global factor, a regional factor, and the purely domestic component of inflation. The sample consists of the G20 economies and countries in the Caucasus and Central Asia (CCA) region, using monthly data between January 2017 and September 2023. The analysis focuses on headline inflation. The region is defined as the CCA and Russia, and the remaining countries constitute the global economy. The estimation entails three steps. First, principal components are obtained for inflation of the whole sample of countries. Second, principal components are obtained again from the residuals of the first step (i.e., excluding the global component) for the CCA countries and Russia. Finally, inflation in Kazakhstan is regressed on the estimated global and regional components and the residual from this regression gives us the country-specific component.

10. The decomposition of inflation in Kazakhstan highlights the strong influence of external factors on the recent inflation surge and the persistence of domestic factors. While the estimated principal components cannot be matched to specific variables, they can be associated with common trends subject to interpretation. The results of the exercise are as follows:

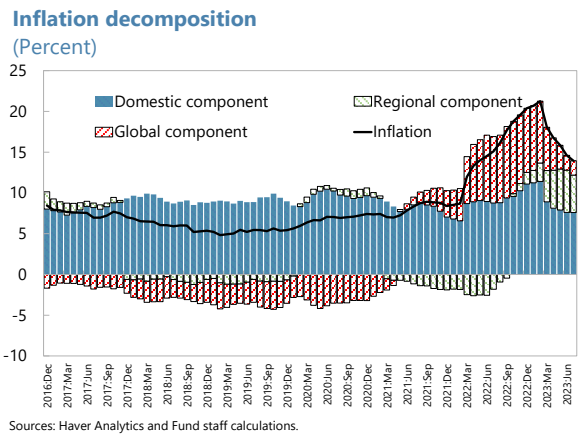
- *Global factor*.[7] In a context of low world inflation, the global factor contributed to moderate inflation in Kazakhstan until early 2021. In May of that year, the global factor started making a positive contribution which increased until February of 2023, when it began to decline rapidly.

- *Regional factor*. The regional component did not play a significant role until 2021. Starting in March 2021, it started contributing negatively until September of 2022. Since then, it has made a positive contribution, offsetting the smaller global factor. As Russia is Kazakhstan's largest trading partner, it is likely that this factor captures the influence of Russia. The war in Ukraine has somewhat reduced the correlation between inflation in Russia and the rest of the world and therefore there is a bigger role for inflation in Russia to contribute separately to inflation in Kazakhstan.

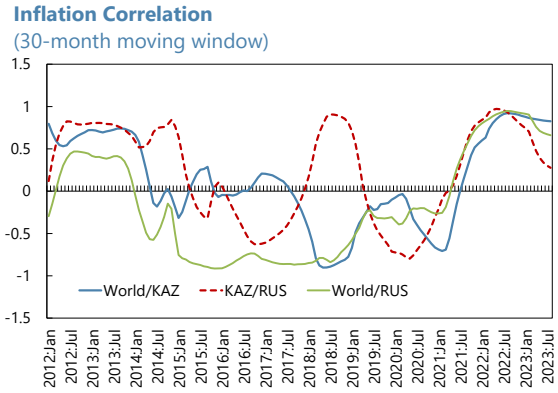
[7] The first component from the PCA for the whole sample is identified as the global inflation component. The first component from the second step described above is identified as the regional component.

- *Domestic factor*. The idiosyncratic Kazakhstani component has been above the NBK's target range during the whole period. While smaller than the global factor's, its contribution was significant as inflation rose in 2022. It has also contributed to the recent inflation moderation.

Figure 5. PCA Results



Sources: Haver Analytics and Fund staff calculations.



Sources: Haver analytics.

D. Role of Inflation Expectations and Persistence

11. We draw on an augmented Phillips Curve (PC) model to estimate the impact of common drivers of inflation. To assess the role played by various external and domestic factors on inflation dynamics, we estimate a standard PC model for headline and core inflation and augment it with foreign variables. Specifically, inflation is regressed on its lag, inflation expectations, a measure of economic slack, foreign inflation, and changes in the nominal effective exchange rate (NEER), global oil prices and global food prices.[8] This literature traces back to the studies of Galí and Gertler (1999). More recent contributions include IMF 2022, Auer et al. (2019), Kamber et al. (2020), Binici

[8] Economic slack is calculated against the trend obtained by applying a Hodrick-Prescott filter to Kazakhstan's short-term economic indicator. Consumer inflation expectations started being published by the NBK in January 2016. Food prices are proxied by the FAO index. Oil prices correspond to Brent oil. Foreign inflation is the average of the G20 countries.

et al., (2022) and Baba et al (2023).[9] The estimated equation is:

$$\pi_{i,t} = \beta_1 \pi_{i,t-1} + \beta_2 \pi^e{}_{i,t} + \beta_3 Y^{(g)}{}_{i,t} + \beta_4 e_{i,t} + \boldsymbol{Z}^f \varphi'_t + \gamma_i + \varepsilon_{i,t}$$

where $\pi_{i,t}$ denotes year-on-year headline or core inflation for country i in quarter *t*; $\pi^e{}_{i,t}$ denotes expected inflation; $Y^{(g)}{}_{i,t}$ is the output gap, $e_{i,t}$ is the annual change in the nominal effective exchange rate; φ'_t is a vector of external factors consisting of oil prices, food prices and foreign inflation; γ_i represents a set of country fixed effects; and $\varepsilon_{i,t}$ is the error term.

12. Estimation results confirm the large role of external factors in driving domestic inflation and point to strong inflation persistence. The model is estimated by least squares with robust standard errors with monthly data for January 2016–July 2023. Inflation is highly persistent.[10] Inflation expectations are significant in the standard model, but not when the global variables are added. The exchange rate is significant and with the right sign, implying that a depreciation translates into higher inflation. Foreign inflation is also significant and with a large coefficient. Oil and food prices do not play a major role. In the first case likely due to the regulation of tariffs, and in the latter because the effect is captured by foreign inflation. Finally, economic slack is not significant, a finding that is consistent with previous studies for countries in the region. The results are mostly consistent for both headline inflation and core inflation.

[9] See Gali, Jordi, and Mark Gertler Mark, 1999, "Inflation dynamics: A structural econometric analysis," Journal of Monetary Economics, Elsevier, vol. 44(2), pp. 195–222, October; IMF, 2022, "Regional Economic Outlook: Europe – The Fog of War Clouds the European Outlook," (Washington, DC, October); Kamber, G., Mohanty, M., and Morley, J., 2020, "What Drives Inflation in Advanced and Emerging Market Economies?" BIS Working Paper No. 111 (Basel: Bank for International Settlements); Binici, Mahir, Samuele Centorrino, Serhan Cevik, and Gyowon Gwon, 2022, "Here Comes the Change: The Role of Global and Domestic Factors in Post-Pandemic Inflation in Europe," IMF Working Paper No. 22/241; and Baba, Chikako, Romain Duval, Ting Lan, and Petia Topalova, 2023, "The 2020-2022 Inflation Surge Across Europe: A Phillips-Curve-Based Dissection, IMF Working Paper No. 23/30.

[10] The large coefficients on lagged inflation shown in Table 1 reflect the use of annual inflation as the dependent variable. An exercise using monthly inflation produces coefficients between 0.48 and 0.67 which still implies high persistence. These levels are consistent with those found for European countries in IMF, 2023, "Hungary: Selected Issues," IMF Staff Country Reports 2023/004.

Table 1. Kazakhstan: Phillips Curve Estimation Results

Variable	Headline inflation (1)	Core inflation (2)	Headline inflation (3)	Core inflation (4)
Lagged inflation	0.89***	0.90***	0.81***	0.81***
Inflation expectations	0.16***	0.15***	-0.02	-0.06*
Output gap	-0.02	-0.01	-0.03	-0.02
NEER	-0.02***	-0.02***	-0.04***	-0.04***
Foreign inflation			0.18***	0.21***
Oil prices			-0.00**	0.0
Food prices			0.01	0.0
Constant	-1.14***	-1.14***	0.65	0.98**
Observations	90	90	90	90
R square	0.97	0.97	0.98	0.99
Adj. R square	0.97	0.97	0.98	0.99

* p<.1; ** p<.05, *** p<.01

E. Role of Exchange Rate Pass-Through

13. A vector autoregression (VAR) model provides insights into the dynamic relationship among inflation drivers. The VAR methodology, which has been used extensively to examine inflation dynamics, helps get a sense of causality and duration of the different shocks and circumvent the problem of endogeneity (i.e., feedback between the dependent and independent variables) that could lead to biased estimates in the single equation PC approach. Another advantage is that explicit measures of inflation expectations are not needed if the variables included in the VAR approximately span the information set used by agents to form those expectations (Del Negro et al., 2020) or the output gap, which are difficult to measure.[11]

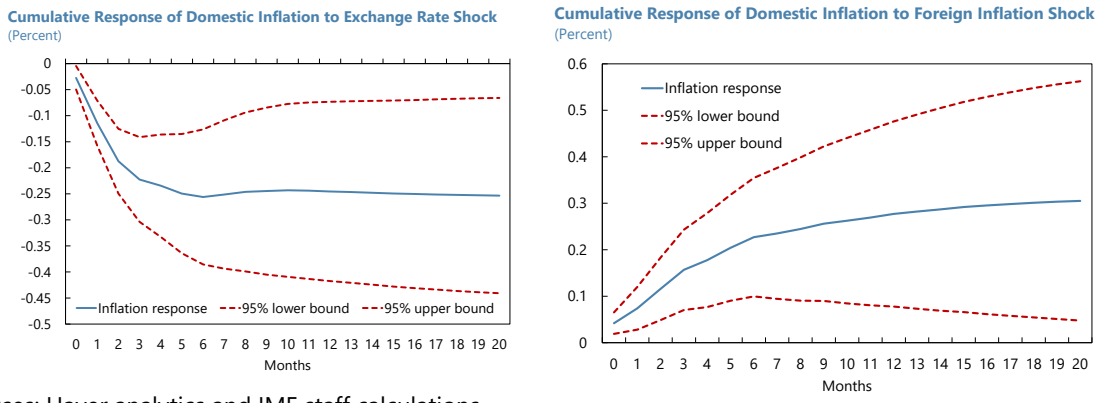
14. We estimate a model with five endogenous variables, namely: foreign inflation, NEER, imports price inflation, Kazakhstan's short-term economic indicator (STI) and domestic inflation (Appendix). Unit root tests indicate that variables in levels (i.e., foreign prices, imports prices, domestic prices, STI, and NEER) are non-stationary, the NEER at a lower level of significance. The same tests applied to first differences strongly reject the null, indicating that all series are likely

[11] This exercise is similar to the one presented in the 2017 Selected Issues Paper for Kazakhstan. Recent studies using the VAR approach include IMF (2021) for the case of Armenia, Finck and Tilman (2022) for emerging Asia, and Minasyan et al. (2023) for the Western Balkans. See also Del Negro, Marco, Michele Lenza, Giorgio E. Primiceri, and Andrea Tambalotti, "What's Up with the Phillips Curve?" Brookings Papers on Economic Activity, 2020, 301–57; IMF, 2021, "Armenia: Staff Report" IMF Staff Country Reports 2021/273; Finck, David, and Peter Tillmann, 2022. "The Macroeconomic Effects of Global Supply Chain Disruptions."; Minasyan, Gohar, Ezgi Ozturk., Pinat Magali., Wang Mengxue, and Zhu Zeju, 2023, "Inflation Dynamics in the Western Balkans", IMF Working Paper, No.23/4.

integrated of order 1. Accordingly, the model is estimated in differences of the log values. Formal lag selection criteria provide different results; the likelihood ratio method suggests 6 lags, the Akaike Information Criteria, 2, and the Bayesian Information Criteria, 1. The results presented below were computed with 4 lags, but the results do not vary significantly with other lag lengths. The sample consists of monthly data for the period January 2010-July 2023. Identification to compute the orthogonalized impulse response functions (IRFs) is achieved by applying the Cholesky decomposition with the ordering of variables as enumerated above.

15. Estimation results indicate that exchange rate pass-through remains a key inflation driver, together with foreign prices. The cumulative IRFs for a one percent shock to foreign inflation and the NEER are presented below. In line with the results for the PC model, the IRFs for the STI is not statistically significant, and neither is the one for imports prices. The results indicate that: (i) a 1 percent shock to foreign inflation translates into a 0.5 percentage point increase in domestic inflation almost immediately, with the effect building up over time[12]; and (ii) a 1 percent depreciation leads to almost 0.25 percentage point increase in domestic prices, with a small initial impact, an almost 0.2 percentage point impact after 3 months, and the effect stabilizes after 6 months. This result is almost identical to the 0.27 percent pass-through estimated by the 2017 SIP.[13]

Figure 6. Impulse Response Functions



Sources: Haver analytics and IMF staff calculations

[12] Estimates are less precise as the time horizon extends, and longer-term effects must be interpreted with caution.

[13] International Monetary Fund, 2017, "Kazakhstan: Selected Issues," IMF Staff Country Reports 2017/19.

F. Conclusions and Policy Implications

16. External factors have had a strong impact on inflation dynamics in Kazakhstan in the recent period, but domestic factors remained important. The above empirical analyses show that Kazakhstan's inflation surge in the aftermath of the Covid-19 pandemic reflected to a large extent inflation imported from the rest of the world due to higher commodity prices, value chain disruptions, and currency depreciation, which were amplified by the war in Ukraine. However, expansionary fiscal policy to mitigate the Covid-19 shock and delayed monetary policy tightening also played a role, as did rapid wage and credit growth. Strong persistence reinforced these inflation dynamics. Conversely, the ongoing disinflationary process mirrors the global trend but also tighter fiscal and monetary policies. However, the transmission of the decline in global inflation has been partially offset by regional inflation related to the war in Ukraine and a decoupling of Russia's economy from the rest of the world.

17. Looking ahead, inflation in Kazakhstan will depend significantly on the global environment but will also be shaped by domestic policy decisions. The evolution of the war in Ukraine, the pace of global disinflation, and developments in China will remain key drivers of inflation as well as sources of uncertainty. Geopolitical fragmentation and the disruption of supply chains also continue to pose risks. Domestically, in addition to macroeconomic policy calibration, the expected reduction of energy and utility subsidies will be an important factor in the coming years.[14]

18. In the near term, premature monetary policy loosening should be avoided. The volatile external environment, strong inflation persistence, and stubbornly high inflation expectations point to the need to maintain a cautious approach and avoid a premature loosening of the monetary policy stance – which does not imply that the policy rate should not be reduced in the period ahead, but that such adjustments should be consistent with a policy stance remaining contractionary.

19. In the medium term, efforts to strengthen the monetary policy framework should continue to help moderate the volatility of inflation and reach the inflation target. The surge of inflation to levels substantially higher to those seen in the rest of the region point to idiosyncratic factors in Kazakhstan. Some of these are structural and are difficult to address, especially the reliance on Russia as a source of imports. Other aspects, such as the relatively high exchange rate pass-through, strong inflation persistence, and unanchored inflation expectations, could be tackled with stronger policies. The NBK should continue to implement its "Monetary Policy Strategy 2030," which constitutes a roadmap to improve the conduct of monetary policy, including to consolidate the inflation targeting regime, strengthen the transmission of monetary policy, and further improve policy transparency.

[14] Since 2023, the government has launched a new program "Tariff in exchange for investment". Accordingly, prices for regulated utilities were raised in the second half of 2023 (unevenly across regions). Moreover, prices for gasoline and diesel were raised in April 2023 as price limit on these goods was increased.

20. Fiscal policy should remain supportive of price stability. It is important to preserve the credibility and independence of the central bank, avoid political pressure, and support NBK policies needed to comply with its mandate. Fiscal policy has an important role in facilitating this, including by being countercyclical, letting automatic stabilizers operate over the business cycle, providing stimulus if necessary to support domestic demand during downturns, and building up savings during upswings. Kazakhstan's substantial fiscal buffers provide ample policy space for this.

21. Administrative policies to control inflation are costly, ineffective, and counterproductive. Measures such as caps on energy and utility prices are fiscally costly (and most often not transparently reported) and distortionary. By preventing price adjustments to reflect market conditions, production may be discouraged and demand stimulated, potentially exacerbating the problem. Limits on markups and trade restrictions (e.g., bans and quotas) have similar consequences, and the latter can also result in spillovers to the rest of the world. Efforts should instead focus on improving the business environment, eliminating monopolistic behaviors, and strengthening social safety nets to ensure adequate assistance to those that need it.

Appendix I. Data Definitions and Sources

Country groupings for the PCA analysis. The G20 countries are Argentina, Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, and the European Union. The CCA countries are Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan. Given lack of adequate data, Turkmenistan was not included.

Table 1. Kazakhstan: Definition and Source of Data used in the Empirical Analysis

Variable	Definition	Source
Headline inflation	Month on the same month of the previous year (PCA, PC), month-on-month, seasonally adjusted (PC alternative specification and VAR). All CPI items	Haver analytics
Core inflation	Month on the same month of the previous year (PC), month-on-month, seasonally adjusted (PC alternative specification) CPI excluding fruits, vegetables, gasoline, and coal	Haver analytics
Inflation expectations	Expected inflation in the next 12 months	NBK household survey
Output gap	Difference between the 3-month moving average of actual and trend levels of the short-term indicator computed with the Hodrick-Prescott filter	Haver analytics and Fund staff calculations
Foreign inflation	Average of the seasonally adjusted inflation of Kazakhstan's main trading partners weighted by trade shares	Haver analytics, BNS, and Fund staff calculations
NEER	Average of indexed nominal bilateral rates weighted by trade shares	IMF
Oil price	Brent oil price	Haver analytics

Variable	Definition	Source
Food prices	FAO food price index	Food and Agriculture Organization of the United Nations
Import prices	Average price of goods and services imported by Kazakhstan, seasonally adjusted	Haver analytics
Short term economic indicator	Change in output indexes for agriculture, industry, construction, trade, transport, and communications, constituting over 60% of Kazakhstan's GDP	Haver analytics

THE KAZAKHSTAN DIGITAL TENGE PROJECT[1]

In recent years, the NBK conducted a series of studies on the benefits and macroeconomic and financial stability implications of, and regulatory barriers to, the introduction of the digital tenge (DT). An initial launch of the DT took place on November 15, 2023, with off-line and cross border transactions planned by 2025. Technical challenges and uncertainties remain in several areas. These include the desired level of anonymity, the feasibility of unlimited off-line transactions and low-cost payments, the needed legal and regulatory amendments, and additional analyses of the DT's macroeconomic and financial stability implications.

1. The NBK has been exploring the feasibility of issuing a digital tenge (DT) since 2021.[2] As part of its decision-making framework for implementation,[3] the NBK is currently conducting a technical project to evaluate the feasibility of alternative payment scenarios and design choices. The DT would be another liability of the NBK coexisting with existing cash and non-cash money.

2. The DT is expected to complement existing national and private payment platforms. The *Interbank System of Money Transfer* is a real time gross settlement system for large payments managed by the NBK and supported by five systemically important payment system providers. The *Interbank Clearing System* is a net settlement system for small payments also managed by the NBK. In addition, there are about thirty private platforms managed by second-tier banks (STBs) where electronic money is the liability of the private sector providers. The DT would complement all these systems with additional functionality in terms of accessibility, variable and controllable anonymity, digital bearer instrument, independence, operational efficiency, and programmability.

3. Other stated objectives of the DT are to foster competition among STBs; promote financial innovation; develop a wider set of payment services through remote biometric identification, programmability, and smart contracts; and increase financial inclusion and penetration of non-cash payments due to the possibility of offline payments (like cash).

4. The DT is still in its testing phase. The 2021 project tested key characteristics of the DT as a r*etail currency*, token based, operating on a *distributed ledger* technology, and distributed following a two-tiered, hybrid operational model.[4] In this model, the NBK issues tokens to STBs in exchange of reserves at the NBK, monitors the security of the system, ensures the connection of participants, is responsible for the distributed ledger, keeps a record of transactions and the balance

[1] Prepared by Gregorio Impavido, with the benefit of comments in particular from Ashley Lanquist, Manisha Patel, and Kateryna Zhabska (IMF).

[2] See Digital Tenge Public Discussion Report (May 2021) https://www.nationalbank.kz/file/download/67111

[3] See Decision-Making Framework for Digital Tenge Issuance. https://www.nationalbank.kz/file/download/78802

[4] See "NBK (2021) Report on the Results of the Digital Tenge Technical Project (White Paper)." https://www.nationalbank.kz/file/download/72203

sheets of both STBs and their clients, discharges notary node responsibilities, and can halt, transfer balances, and restart the payment system in the event of an intermediary failure. STBs provide retail payment services to their clients by distributing the DT through digital account wallets and are responsible for implementing AML/CFT preventive measures, including customer due diligence.

5. The full implementation of the DT is expected by 2025. An initial launch of the DT took place in Almaty on November 15, 2023, for online-only transactions by residents. Off-line and cross border transactions are planned to be available by 2025. The authorities expect a take up of the DT of about 5-10 percent of GDP. In the meantime, the authorities plan to evaluate more scenarios including the integration with international payment systems and other CBDCs, increasing the efficiency of settlements, integrating the DT platform with the existing payment infrastructure (including wholesale use cases), and conducting other tests with real customers and merchants in an open environment.[5]

6. Uncertainties remain in relation to several design choices and preconditions for the DT launch. For instance, the feasibility of safe and unlimited off-line transactions has not been proven and the introduction of quantitative limits for offline transactions may be needed to limit fraud risks. Similarly, the feasibility of unlimited low-cost payments has not been established, as periodic reissuance of tokens may be required. Design choices on anonymity, privacy, and consumer protection are still under consideration. Finally, several laws will need to be updated to accommodate CBDC issuance, including laws on banking activities, AML/CFT, data protection, taxation, and the Criminal Code.[6]

7. The NBK assessed the macro implications of the DT through a series of studies.[7] These studies indicate that: (i) DT demand is limited and estimated at about 10-25 percent of customers liquid assets; (ii) a nonremunerated DT would reduce demand to 5–6 percent of GDP; (iii) the DT introduction would not increase the monetary base but only change the money supply structure; (iv) the potential crowding out of bank deposits can be mitigated through quantitative restrictions on the conversions of current accounts in DT wallets or other price measures; and (v) the interest channel of monetary policy transmission would be strengthened due to the complementarity of DT and cash.

[5] See "NBK (2023) Status report on the implementation of the national digital currency" https://nationalbank.kz/file/download/95205.

[6] At a minimum, the NBK Act and/or the civil code would need to be amended to authorize the NBK to issue the DT and to ensure its full convertibility with other forms of payment. See Bossu W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga (2020) Legal Aspects of CBDC: Central Bank and Monetary Law Considerations. IMF Working Paper WP/20/254.

[7] See "NAC (2022) Report on CBDC research. NAC Analytica Economic Modelling Center" https://nacanalytica.com/en/

8. Some of the macro-financial implications of the DT are likely to become evident only over time and further analysis is needed. The NBK research focuses on specific design aspects and the limited scope of the 2023 technical project, but the introduction of a CBDC can have a broad range of macroeconomic and financial stability implications.[8] Given that existing CBDCs have yet to establish user demand at scale, an empirical assessment of such implications is currently largely missing. The NBK could nonetheless consider additional user demand scenarios under both steady-state and stress conditions (e.g., shocks to confidence in the banking system triggering flight to safety).

[8] See for example "Infante S., K. Kim, A. Orlik, A.F. Silva, and R.J. Tetlow (2022) The Macroeconomic Implications of CBDC: A Review of the Literature. Federal Reserve Board Finance and Economics Discussion Series 2022-076."

ECONOMIC IMPACT OF OIL EXPORTS DISRUPTIONS[1]

Kazakhstan may withstand a two-year closure of the CPC pipeline under an orderly scenario with continued market access. In such a scenario, additional external and fiscal financing needs of about 8-9 percent of GDP per year could be filled by issuing debt or drawing down on NFRK assets. Under a disorderly scenario, including sudden capital outflows and widespread flight from tenge into dollar assets, available buffers would be depleted more rapidly.

A. Introduction

1. This selected issue paper assesses the impact of an oil export shock on Kazakhstan's economy. Kazakhstan is a land-locked oil-exporting country servicing about 1.2 percent of global oil demand. The country exports about 66 million tons of crude per year (about 50 percent of the value of exports of goods, or 15 percent of GDP) through a series of pipelines. The most important pipeline is the Caspian Pipeline Consortium (CPC) that takes oil from the Tengiz, Karachaganak, and Kashagan fields in the Caspian region through Russia to the Russian Black Sea port of Novorossiysk. The CPC pipeline carries about 80 percent of the country's total oil exports. Disruptions of this pipeline would critically hamper Kazakhstan export capacity.

2. We use the IMF's Flexible System of Global Models (FSGM) to assess the impact of such a disruption.[2] The FSGM is an annual, multi-region general equilibrium model of the global economy widely used at the IMF to analyze risk scenarios and a wide range of policies with their implications for growth, inflation, and the public and external accounts. The model is semi-structural with some key elements, like private consumption and investment, having micro-foundations, and other elements, like trade, labor supply, and inflation having reduced-form representations. The Middle East and Central Asia Department Module (MCDMOD) of the FSGM is used to simulate the impact of an oil production shock in Kazakhstan with direct implications on exports as one of the three commodities incorporated in this model (the other two being food and metals).

3. The remainder of the paper is structured as follows: section B discusses the shock modelled and the interpretation of the simulation results. Section C discusses the impact of relaxing some of the assumptions that underpin the model. Conclusions follow in section D.

B. The Shock and Interpretation of Results

We consider the following two scenarios:

- **Decline in oil production** (M1). The first scenario consists in a two-year temporary decline in domestic oil production and exports. The shock is calibrated at 100 percent of annual oil real exports through the CPC pipeline with an immediate redirection of 10 percent of oil exports. For

[1] Prepared by Keiko Honjo, Gregorio Impavido, and Nadia Mounir.

[2] See Andrle, M., P. Blagrave, P. Espaillat, K. Honjo, B. Hunt, M. Kortelainen, R. Lalonde, D. Laxton, E. Mavroeidi, D. Muir, S. Mursula, and S. Snudden (2015), *The Flexible System of Global Models – FSGM*, IMF, WP/15/64.

simplicity, the assessment focuses on first-round effects, and incorporates the following assumptions: no storage capacity for non-exported oil, no permanent impact on oil production capacity from the interruption of production, no exogenous changes in risk premia, continued market access, orderly functioning of all sectors, and an exogenous drop in private investment reflecting foreign investors' unwillingness to invest in the oil sector until exports resume. In section C, we consider the implications of relaxing some of these assumptions.

- **Additional exchange rate pressures** (M2). In addition to the oil production shock described in M1, the second scenario incorporates additional exchange rate pressures due to agents switching from tenge to dollar assets—as was observed in past bouts of severe exchange rate volatility.

Simulation Results[3]

4. Output. With a large decline in oil production over two years, GDP decreases initially by about 11 percent relative to the baseline. In addition to falling exports, the decline in output is driven by a decrease in investment and private consumption (M2 scenario) but limited by a decrease in imports and the impact of the fiscal response. In the third year, full oil export capacity is regained, and growth is above trend only to re-converge back to trend in the fourth year.

- **Exports**. Nominal oil exports through the CPC pipeline amount to about 82 percent of total oil exports. In period one, real oil exports decrease by about 75 percent implying a decrease in total real exports by about 45 percent. Real exports remain depressed at this level until they converge back to trend in period three.

- **Consumption**. Real consumption remains above the baseline by about 1 percent despite the large fall in output. It is supported by an increase in government expenditure in excess of the shortfall in revenues (see below) owing to fiscal transfers supporting liquidity constrained (LIQ) households who cannot engage in consumption smoothing for lack of savings,[4] by the presence of overlapping generations (OLG) consumers who expect tax liabilities to fall in part on future generations, and by the fact that the shock is expected to be temporary. Despite fiscal support, consumption falls below the baseline in the second scenario (M2) because of a larger negative wealth effect stemming from a significant increase in the real interest rate affecting OLG consumers.

- **Investment**. In the short term, real investment decreases by about 10 percent relative to the baseline. With demand falling below the economy's supply potential, a negative output gap opens up, putting downward pressure on inflation and raising real interest rates. Higher real corporate rates reduce private investment and firm profitability. Public investment is considered

[3] This section focuses mainly on M1 and discusses the impact of additional exchange rate pressures selectively, where needed.

[4] The model assumes 60 percent of consumers to be liquidity constrained.

exogenous and does not change. In the longer term, real investment is temporarily above baseline driven by lower corporate real interest rate and supporting a positive output gap.

5. Current account balance. The current account balance deteriorates by about 4 percentage points of GDP relative to the baseline, with nominal exports decreasing more than nominal imports. The drop in nominal exports is caused by the collapse of oil exports while the decline of nominal imports is driven by a decrease of about 13 percent in real imports in response to the negative output gap. The real effective exchange rate depreciates by 4–5 percent each year and helps contain the current account deterioration.

6. Monetary response and inflation. In the M1 scenario, inflation decreases by about 1½ percentage points below the baseline due to the negative output gap and tighter monetary policy. On the one hand, the policy stance is expected to be accommodative as the policy rate responds to inflation deviations from target and the output gap. On the other hand, it is forward-looking and anchored somewhat to the exchange rate. Dollarization in Kazakhstan is high, and the model is calibrated to reflect the authorities' sensitivity to exchange rate volatility.[5] In scenario M2, an exogenous exchange rate pressure is added to capture the impact of households' and corporates' historical tendency to convert savings into dollars during crisis times. In this scenario, the monetary policy tightens to contain exchange rate volatility and capital outflows.

7. Fiscal response, budget deficit, and net debt. The shock on oil exports, together with the overall decrease in GDP, reduce oil and non-oil public revenues. To limit unemployment and support consumption, the government increases public expenditure in excess of the revenue loss.[6] Consequently, the overall fiscal balance decreases by about 9 percentage points of GDP per year during the recession or about 10 percentage points in scenario M2 with deeper recession. The related additional requirements are financed by issuing debt.

C. Additional Assumptions

8. The model makes several simplifying assumptions that do not affect the key results. It assumes that additional gross financing needs are filled by new debt, that the country has no spare oil storage capacity, that oil production is not permanently affected by the interruption in production, that agents can smooth consumption up to a certain extent, and that the shock is known to be temporary. These assumptions do not materially affect the results, i.e., under the assumption of orderly functioning of sectors and continued market access, Kazakhstan has ample buffers used to dampen the impact of the temporary CPC pipeline closure. These assumptions simply affect the relative importance of available buffers as follows:

[5] Another version of M1 was tested with lower exchange passthrough. The monetary policy response would be more accommodative, and the exchange rate would depreciate more, but the overall results would not change.

[6] Automatic stabilizers in Kazakhstan are small. At the same time, the government has a large footprint in the economy and already subsidizes private consumption in the steady state. During a recession of the magnitude considered here, it is expected to drastically increase demand support. Rather than layering an additional ad hoc (exogenous) fiscal response, we modeled this by increasing the automatic stabilizers from 0.25 to 0.5.

- **How to fill the financing needs**. The general government gross debt is about 23 percent of GDP and NFRK foreign assets are about 26 percent of GDP (or slightly less than twice the financing needs in the two scenarios presented). As an alternative to issuing new debt, the additional gross financing needs could be filled by drawing down NFRK assets. Both options would reduce buffers and likely, increase risk premia in the same way. However, the use of NFRK assets appears more desirable as, other things equal, it would not increase interest payments and it would likely imply a smaller exchange rate depreciation.

- **Impact on oil production capacity**. In these simulations, the country is assumed to flare the oil production that it cannot export to maintain intact its drilling infrastructure. A permanent impact on production capacity would negatively affect trend GDP and alter the convergence path of variables back towards the new steady state. The lower trend GDP would likely exacerbate the positive output gap that opens in period 3 unless the macro policy response is not calibrated ex ante to account for such deterioration in production capacity. Other things equal and with lower permanent production capacity, the relative size of the fiscal buffers would be reduced.

- **Storage capacity**. With spare storage capacity, production could continue until this is exhausted and, in this way, the country would be able to smooth the impact of the shock on real GDP. With a shallower recession and other things equal, gross financing needs would be lower and hence, available fiscal buffers would be relatively larger.

- **Consumption smoothing**. In the model, there are two sets of consumers: liquidity constrained (LIQ) and overlapping generation (OLG) consumers. LIQ consumers do not have access to financial markets, do not save, and consume all their income each period. Hence, they cannot engage in consumption smoothing and drastically curtail consumption when the shock hits. The share of LIQ consumers in the economy is assumed at 60 percent, similar to Iran and Saudi Arabia.[7] Non-Ricardian OLG consumers treat government debt as wealth and expect associated tax liabilities to fall on future generations. They have access to financial markets, engage in consumption smoothing, and thus support private consumption during the recession.[8]

- **Temporary shock and expectations**. OLG consumers know that the shock is temporary and therefore continue to consume. They have no reason to assume the shock to be permanent as, even if the pipeline infrastructure is physically destroyed, this can be reconstructed sometime in the future. However, especially at the beginning, it is plausible to assume that uncertainties exist regarding the duration of the shock. Other things equal and with higher uncertainty about the duration of the shock, the extent of consumption smoothing would be reduced, the recession would be deeper, and the relative size of fiscal buffers reduced.

[7] As a comparator, the share of LIQ consumers in the model calibrated for the US and other advanced economies is 35 percent.

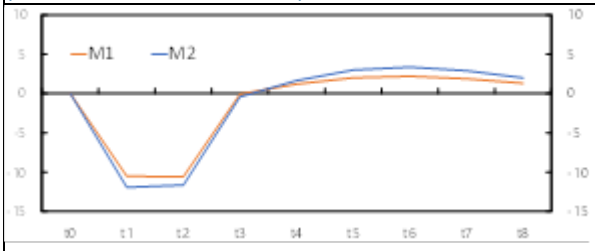
[8] Other things equal, a lower share of LIQ consumers would increase consumption smoothing in the economy, the recession would be less pronounced, and the relative size of fiscal buffers would be larger.

D. Conclusions

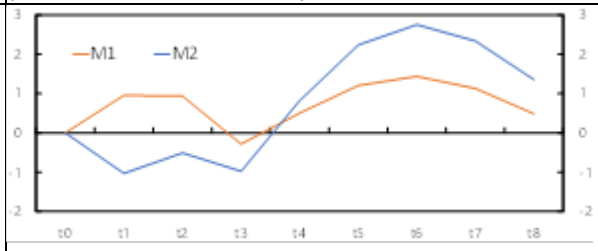
9. Our simulations suggest that Kazakhstan has sufficient buffers to withstand a two-year closure of the CPC pipeline, assuming an orderly functioning of all sectors and continued market access. A full closure of the CPC pipeline for a known period of two years, with an immediate redirection of exports of 10 percent of CPC capacity is estimated to generate additional financing needs of about 8–9 percent of GDP per year. With general government debt at about 23 percent of GDP and NFRK foreign assets of about 26 percent of GDP, buffers are sufficiently large to absorb the shock and sustain demand. However, the assumptions of orderly functioning of all sectors and continued market access underpinning these results may not hold true: losing market access would drastically reduce the government's ability to fill additional gross financing needs by issuing debt, while disorderly behavioral responses and capital flight would also greatly aggravate the magnitude and domestic impact of the shock and reduce the importance of available buffers.

Appendix I. Simulation Results

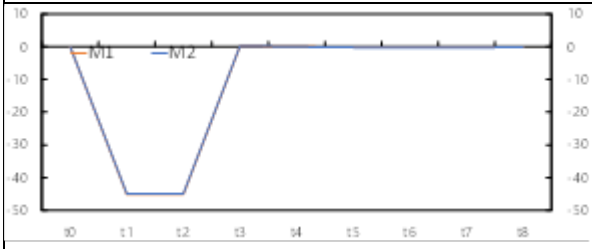
Real GDP
(Percent difference from s.s.)



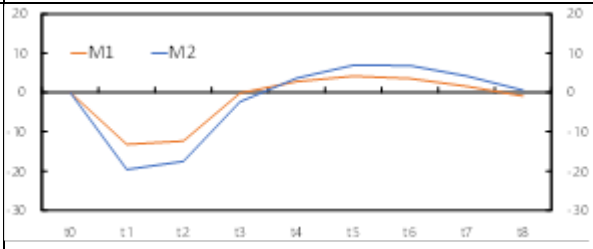
Real Consumption
(Percent difference from s.s.)



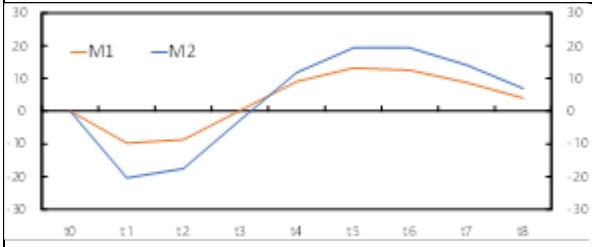
Real Exports
(Percent difference from s.s.)



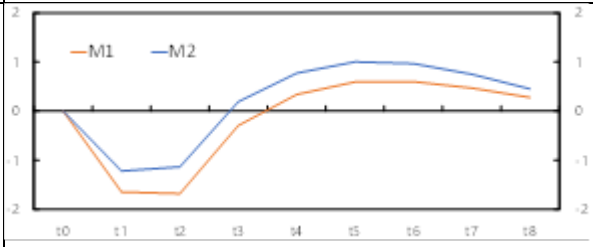
Real Imports
(Percent difference from s.s.)



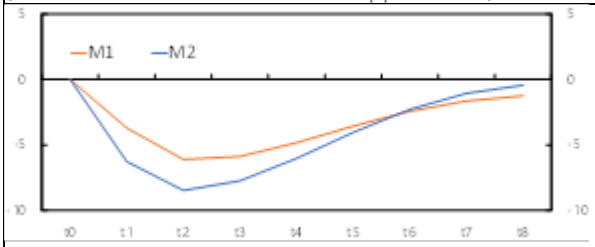
Real Investment
(Percent difference from s.s.)



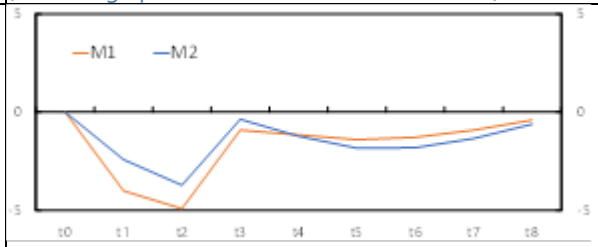
Core Inflation
(Percent difference from s.s.)



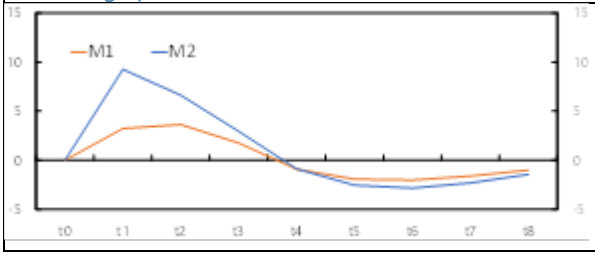
REER
(Percent difference from s.s.; + = appreciation)



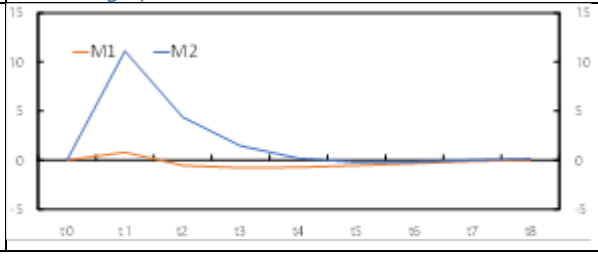
Current Account Balance
(Percentage points of GDP difference from s.s.)



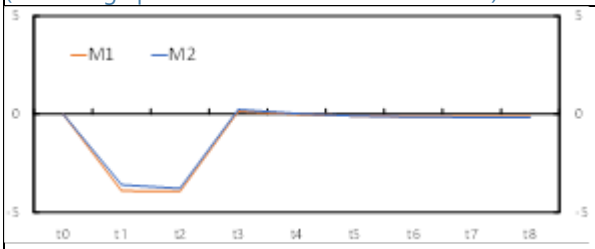
Real Corporate Interest Rate
(Percentage points difference from s.s.)



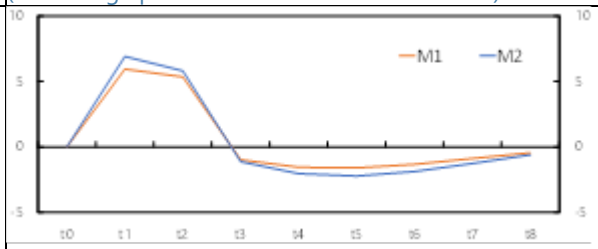
Policy Interest Rate
(Percentage points difference from s.s.)



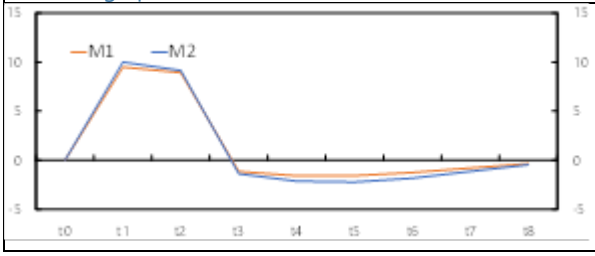
General Government Revenues
(Percentage points of GDP difference from s.s.)



Government Expenditures
(Percentage points of GDP difference from s.s.)



General Government Overall Deficit
(Percentage points of GDP difference from s.s.)



Government Net Debt
(Percentage points of GDP difference from s.s.)