Central Asia Regional Economic Cooperation Institute

MACROECONOMIC MONITORING AND FORECASTING MODEL FOR CAREC MEMBER COUNTRIES

2017

China Finance & Economy Media Group
China Financial & Economic Publishing House

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About the CAREC Institute

The CAREC Institute (CI) is an intergovernmental organization contributing to the Central Asia Regional Economic Cooperation Program through knowledge generation and capacity building. The 5th Ministerial Conference (MC) of CAREC member countries held in 2006 endorsed the establishment of CAREC Institute as an intergovernmental organization with a mandate to provide intellectual underpinnings of the CAREC Program through research, capacity building and knowledge management. The Institute became operational in 2009 and functioned as a virtual entity till 2015. The physical base of CI was inaugurated in March 2015 at Urumqi, Xinjiang Uyghur Autonomous Region, PRC. Intergovernmental Agreement Establishing Central Asia Regional Economic Cooperation Institute (IGA) entered into force on 24th August 2017 following ratification by the Republic of Uzbekistan, Peoples Republic of China and Mongolia. Later the IGA was ratified by Islamic Republic of Afghanistan, Republic of Azerbaijan, Republic of Tajikistan and Islamic Republic of Pakistan.

The **mission** of CI is:

"To enhance the quality and effectiveness of the CAREC Program by providing evidence-based research, capacity building services, dissemination of knowledge products and networking with research institutions."

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"Leading Knowledge Center promoting economic cooperation in the CAREC region for shared and sustainable development. "

CI has following functions:

i. conduct strategic research;

ii. provide innovative solutions;

iii. disseminate research findings and results;

iv. enhance the capabilities of government officials; and

v. develop a network of research institutions in the CAREC region.

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Abbreviations

ADB	Asian Development Bank
ADO	Asian Development Outlook
ARIMA	Autoregressive Moving Average
bbl	Barrel (of oil)
bp	Basis Points
BOP	Balance of payments
BPM	Balance of Payments Manual
CIS	Commonwealth of Independent States
CPI	Consumer Price Index
GDDS	General Data Dissemination System
CAREC	Central Asia Regional Economic Cooperation (Program)
CI	CAREC Institute
DOLS	Dynamic Least Squares
EBRD	European Bank for Reconstruction and Development
EEU	Eurasian Economic Union
EMDE	Emerging Markets and Developing Economies
FDI	Foreign Direct Investment
FSU	Former Soviet Union
GDP	Gross Domestic Product
GEM	Global Economic Monitoring
IMF	International Monetary Fund
NPL	Non-performing Loans
OBOR	One Belt One Road Initiative
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries

OT	Oyu Tolgoi copper and gold mine in Mongolia
PPI	Producer Price Index
q-o-q	Quarter on quarter
PRC	People's Republic of China
SDDS	Special Data Dissemination Standard
SNA	System of National Accounts
SOE	State Owned Enterprise
TPP	Trans-Pacific Partnership
USD	US Dollar
UN	United Nations
WB	World Bank
WDI	World Development Indicators
WEO	World Economic Outlook

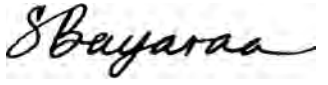
Message from the Director

The "Macroeconomic Monitoring and Forecasting of the CAREC region" (MMF) research study provides a *learning* tool for conducting analysis of state of the economy; forecast near-term challenges and prospects of the Central Asia Regional Economic Cooperation (CAREC) member economies. The CAREC Institute launched the MMF study to establish a solid basis for macroeconomic monitoring and producing short-term forecasting. The primary purpose of the study is to develop the MMF model reflecting the economic structure for each of the CAREC member economies and provide country write-ups on recent economic developments and emerging key policy issues. This research also provides theoretical foundation, model, methodology and econometric codes enabling and equipping researchers and policy makers to experiment, customize their research and build new models commensurate with peculiar domestic economic conditions.

Given the rising economic policy and political uncertainties, challenging regional and international economic settings; MMF research would enhance the capacity and capability of policy makers to learn about the endogenous and exogenous shocks to their domestic economies and assist in designing resilient policy frameworks for macroeconomic stability and sustainable growth. MMF is an essential instrument for sound policy formulation and macroeconomic stability. Knowledge-based resources are linchpins of competitiveness and economic growth. Thus, forecasting of macroeconomic conditions enable policy makers, investors and people to plan and allocate their

resources optimally to minimize the uncertainties and risks.

CAREC Institute continues to provide intellectual resources augmenting the capacity of the CAREC member countries for responding to the emerging policy challenges. CAREC Institute have been partnering with member countries, development institutions and think tanks to achieve the goals of regional cooperation and sustainable growth.



SANJAASUREN BAYARAA

Preface

The CAREC Institute (CI) launched a study on "Macroeconomic Monitoring and Forecasting of the CAREC member countries" (MMF) to establish a solid basis for macroeconomic monitoring and producing shortterm forecasting frameworks. The purpose of the study is to provide assessment, develop the MMF model and country analysis reflecting the economic structure for each of the CAREC member economies on recent economic developments and emerging key policy issues.

This report is first in series of macroeconomic monitoring and forecasting reports for the CAREC region with an objective to encourage further debate, research and capacity building. In the absence of high-frequency data, specific country models were built by using openly available annual data from the World Bank, IMF, and ADB which provided a basis for comparing projections with those of these institutions.

Given the size and scale asymmetries in the CAREC member countries, economic analysis of the CAREC countries as a group poses a special challenge because of the wide disparities in the sizes of the economies. The People's Republic of China in terms of economic size (GDP and Foreign Trade) accounts for more than 94 percent of the region's gross domestic product and foreign trade. In contrast, the Kyrgyz Republic, Mongolia, and Tajikistan each account for about 0. 1 percent of the region's GDP. Because of this asymmetry, indicators such as 'CAREC Total' or 'CAREC Average' need to be interpreted with care. The results of a subgroup, "CAREC excluding the PRC" have been added to most of the tables, but even then Pakistan, Kazakhstan, and

Uzbekistan account for about 80 percent of GDP of the subgroup with 47.2 percent, 22.2 percent and 11.1 percent of subgroup's GDP respectively in 2016.

The report comprises of five chapters. Chapter 1 "Recent Economic Developments" reviews global and regional developments such as growth, inflation, savings, investment, trade and government finances in 2016. The Chapter 2 discusses CAREC prospects and projections which will become the underlying conditions for many of countries in the region for this exercise. Chapter 2 "Country Developments and Prospects" discusses the individual country prospects. Chapter 4 "Short-term Forecasting Techniques and Models" provides the background information about how the MMF study was conducted; proposed methodology for high-frequency modeling and analysis for the CAREC countries[1]. Chapter 5 "Conclusions" recaps main findings, inferences, and concluding remarks. Annex I provides details of underlying econometric models, equations, regression output, results and Methodology to run these models. Annex II presents the results of the Kazakhstan exercise (Model run) for the illustrative purposes[2]. Due to space constraints and publication size, links[3] for Annex II are provided for downloading all the Excel data files, EViews work files and associated EViews program files to run the econometric codes and programs; or modify these codes to build their own MMF models for better understanding and improvements.

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1 Due to data availability constraints, publicly available data from the ADB, IMF, and WB-particularly the Global Economic Monitoring (GEM) were used to produce the uncalibrated projections. For Turkmenistan, no runs were made due to lack of data, and for the PRC, no model was built. Instead, the latest ADO projections were used for these two countries.

2 For Kazakhstan, estimates were made, but results presented in the main volume are from the national consultant's work provided in Annex II. Other country models run are not provided in the print format due to space constriants. However, Econometric codes can be downloaded for select countries for analysis and learning purposes: https://www.carecinstitute.org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries-2017/

3 https://www.carecinstitute.org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec- member-countries-2017/

Chapter 1

Recent Economic Developments

Introduction

Despite lackluster recovery during second half of the 2016, global economy experienced a difficult year with slower economic and trade growth resulting from policy uncertainties and tepid economic recovery. World growth hovered around 3 percent in 2016 and rose to 3.7 percent in 2017 and is expected to grow over 3.8 percent in 2018 – 0.1 percentage point higher in both years than in the April and July forecasts of the IMF WEO[4]. Emerging Markets and Asia have helped to sustain the modest gains and fragile recovery. "Asia and the Pacific Regional output is projected to grow by 5.6 percent in 2017 and 5.5 percent in 2018"[5] – an upward revision of 0.1 percentage point higher than the IMF regional Outlook April 2017, driven by strong consumption and investment. With global trade growth picking-up in first half of the 2017, multilateral institutions like IMF, WB and WTO have upgraded forecast for global trade growth to 3.7 percent from its earlier forecast of 2.4 percent. The positive outlook is mainly driven

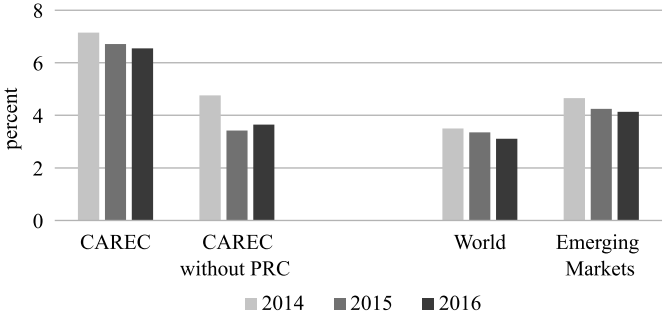
4 IMF, *World Economic Outlook*, October 2017. http://www.imf.org/en/Publications/WEO/Issues/2017/09/19/world-economic-outlook-october-2017(accessed on September 24, 2017).

5 IMF, *Asia Pacific Regional Outlook,* October 13, 2017. http://www.imf.org/en/Publications/REO/APAC/Issues/2017/10/09/areo1013(accessed on October 26, 2017).

by improved trade flows within Asia and amid stronger import demand by North American markets, but possible risks "include the possibility that protectionist rhetoric translates into trade restrictive actions, a worrying rise in global geopolitical tensions and a rising economic toll from natural disasters. Trade growth should moderate to 3.2% in 2018, within a range from 1.4% to 4.4%, as global GDP growth remains stable at 2.8%." [6]

The CAREC countries have also witnessed similar growth pattern in their GDP which stood at 6.5 percent in 2016 from 6.7 percent in 2015 on account of the slower growth in the region (Figure 1). The picture has been mixed for "other CAREC" countries which, as a group, saw a slight increase in GDP to 3.6 percent from 3.4 percent respectively. Except for Afghanistan, Pakistan, and Tajikistan, all countries experienced a slowdown in growth which was more pronounced in hydrocarbon exporting countries (Table 1). The slowdown in 2016 for most of the CAREC countries was the tail end of decelerating growth over the last eight-nine years (Box 1).

Figure 1 GDP Growth(%)



Source: IMF, *WEO* for World and Emerging Markets; CAREC figures are calculated from ADB, *ADO 2017*.

6 Press release "WTO upgrades forecast for 2017 as trade rebounds strongly". https://www.wto.org/english/news_e/pres17_e/pr800_e.htm (accessed on September 22, 2017).

Table 1 GDP Growth (%)

	2014	2015	2016	Share of Total GDP (%)	Total w/out PRC
Afghanistan	1.3	0.8	2.0	0.2	3.1
Azerbaijan	2.8	1.1	−3.8	0.3	6.2
PRC	7.3	6.9	6.7	94.9	0.0
Kazakhstan	4.2	1.2	1.0	1.1	22.2
Kyrgyz Republic	4.0	3.9	3.8	0.1	1.1
Mongolia	7.9	2.4	1.0	0.1	1.8
Pakistan	4.1	4.0	4.7	2.4	47.2
Tajikistan	6.7	6.0	6.9	0.1	1.2
Turkmenistan	10.3	6.5	6.2	0.3	6.0
Uzbekistan	8.1	8.0	7.8	0.6	11.1
CAREC	7.1	6.7	6.5	100.0	
CAREC w/out PRC	4.8	3.4	3.6		100.0

Source: ADB, *ADO 2017*

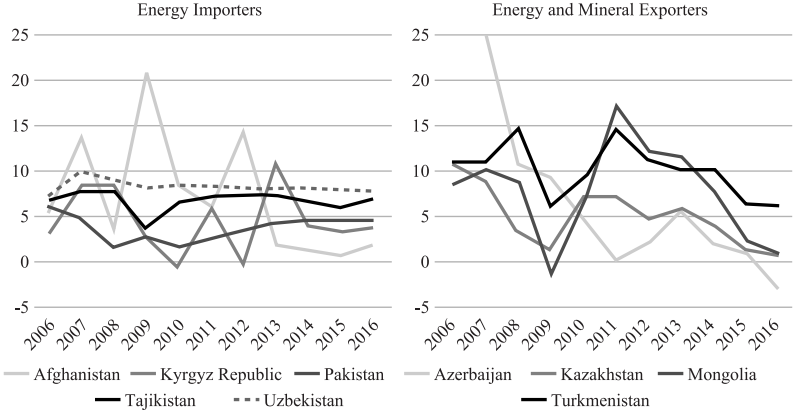
It is, however, important to note that the PRC accounts for nearly 95 percent of the region's GDP in 2016, effectively being the key determinant of economic magnitudes in the CARE region and Pakistan accounted for 47 percent of other CAREC countries excluding PRC. Therefore, slight increase in subgroup reflects mainly the pick-up in Pakistan's growth in 2016.

Box 1 Decade of Decelerating Growth

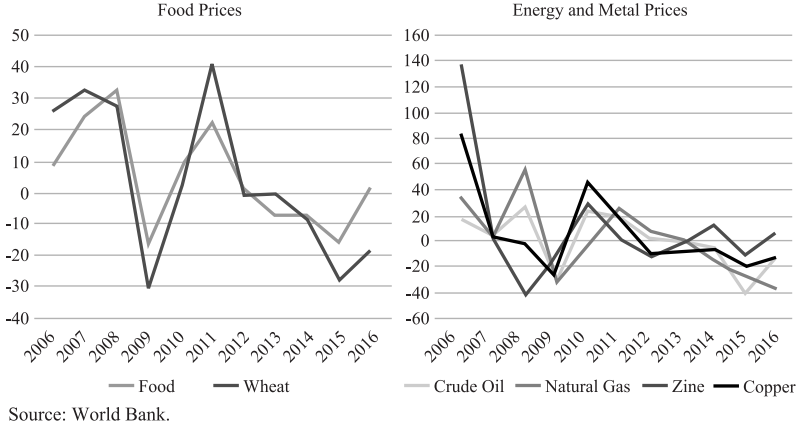
Except for Pakistan and PRC, all other CAREC countries have experienced decelerating growth since 2011. In the case of hydrocarbon or mineral exporting countries, deceleration has been steeper than commodity importers. The impact of hydrocarbon prices which peaked

in 2012 and started to decline in 2014 can be traced in the growth patterns of exporting countries. While political developments contributed to boom and bust episodes in Afghanistan and the Kyrgyz Republic, the impact of food and energy prices can be seen in the lower-income energy importers.

GDP Growth Rates by Country Groups
(real growth, annual percentage)



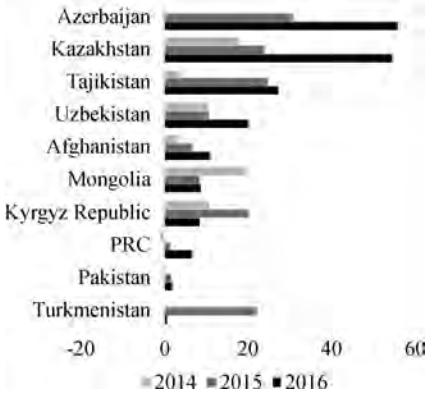
Changes in Commodity Prices
(y-o-y percentage change)



Source: World Bank.

Most of the countries in the CAREC with exception of Pakistan and the PRC experienced significant depreciation of their currencies during the last three years (Figure 2). For other CAREC member countries excluding PRC, financial stability have been vulnerable to exchange rate fluctuations. As a result, their GDP shrunk in nominal USD terms. For instance, Kazakhstan's GDP which grew by 1 percent in real terms in 2016 showed a 28 percent decline in nominal USD terms. This meant a 26 percent decline in GDP in nominal USD corresponding to a 3. 8 percent decline in real terms.

Figure 2 Changes in Exchange Rate (%)

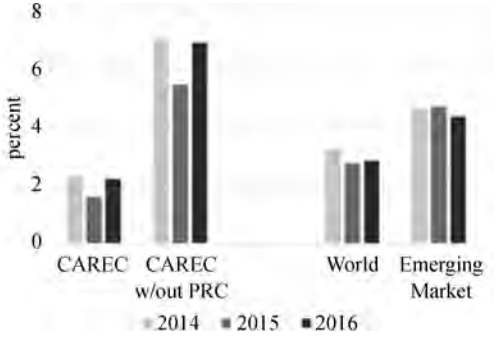


Sources: IMF, *WEO*.

Average inflation for the world hovered around the 2 percent between 2015 and 2016 while average inflation for emerging markets declined from 4. 7 to 4. 3 percent respectively to a large extent reflecting further drops in oil and gas prices in 2016. In contrast, CAREC countries as a group saw an increase in inflation except for the Kyrgyz Republic, Mongolia, and Turkmenistan. While inflation in the PRC slightly went up from 1. 4 percent in 2015 to 2 percent in 2016, the hydrocarbon exporters which experienced significant depreciation of their currencies – Azerbaijan and Kazakhstan – saw notable acceleration in inflation, reaching 12. 4 percent and 14. 6 percent respectively, highest levels for both countries in the last seven years. The Kyrgyz Republic, Mongolia, and Pakistan saw a significant deceleration in inflation

reflecting lower energy prices. In the case of Mongolia, declining meat prices contributed to the slowdown in inflation in 2016. In Pakistan, relatively stable food supply and better fiscal management were other factors in slower inflation. In the Kyrgyz Republic, lower food prices and appreciation of the currency during the second half of the year have resulted in the steep deceleration to 0. 4 percent in 2016 (Table 2).

Figure 3 Inflation (%)



Sources: IMF *WEO* for World and Emerging Markets, CAREC figures are calculated from ADB *ADO 2017*.

Other macroeconomic indicators like savings rate and investment ratio [7] for the CAREC region present a mix picture and overall declined for the CAREC countries as a group. For Oil-exporting countries saw their savings and investment ratios deteriorating while oil importers saw slight improvements (Table 4). This was one of the factors that led to a decline in export earnings and capital goods imports in the oil exporting countries.

7 Refers to the ratio of gross domestic savings to GDP and the ratio of gross capital formation to GDP.

Table 2 Inflation (%)

	2014	2015	2016
Afghanistan	4.7	−1.5	4.5
Azerbaijan	1.4	4.0	12.4
PRC	2.0	1.4	2.0
Kazakhstan	6.7	6.6	14.6
Kyrgyz Republic	7.5	6.5	0.4
Mongolia	12.8	6.6	1.1
Pakistan	8.6	4.5	2.9
Tajikistan	6.1	5.1	6.1
Turkmenistan	6.0	6.4	6.0
Uzbekistan	9.1	8.5	8.4
CAREC	2.3	1.6	2.3
CAREC w/out PRC	7.0	5.4	6.9

Source: ADB, *ADO 2017*.

Changes in trade volumes for the CAREC countries improved in 2016 compared to 2015 in contrast to global trade volumes. Import volume growth was 2.3 percent in 2016 for the region as a whole and 6.9 percent for other CAREC countries other than PRC compared with 1.6 percent and 2.4 percent in 2015 respectively. Decline in export volumes at 2.5 percent in 2015 turned into a growth of 0.9 percent in 2016 for the CAREC region as a whole (Table 3).

Table 3 External Trade and Balances

	2014	2015	2016
Import Volume Growth (%)			
CAREC	2.3	1.6	2.3
CAREC w/out PRC	7.0	5.4	6.9
World	3.9	2.5	2.2
Export Volume Growth (%)			
CAREC	3.9	−2.5	0.9
CAREC w/out PRC	−1.9	−7.2	−3.4
World	3.5	2.9	2.3
Current Account Balance/GDP (%)			
CAREC	2.2	2.4	1.5
CAREC w/out PRC	1.2	−2.3	−3.3

Source: IMF, *WEO*.

Table 4 Savings and Investment Balance (% of GDP)

	Gross Domestic Savings			Investment			S-I Balance		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Afghanistan	19.9	21.5	25.8	17.6	18.6	18.7	2.2	2.9	7.1
Azerbaijan	36.4	26.4	21.4	23.1	26.8	25.1	13.2	−0.4	−3.8
PRC	49.0	47.5	45.8	46.8	44.7	44.1	2.2	2.7	1.8
Kazakhstan	28.5	26.5	22.1	25.8	29.5	28.2	2.7	−3.0	−6.1
Kyrgyz Republic	20.4	18.3	20.7	36.4	29.4	30.1	−16.0	−11.1	−9.4
Mongolia	23.4	21.1	26.5	34.9	25.1	30.6	−11.5	−4.0	−4.1
Pakistan	13.4	14.5	14.1	14.6	15.5	15.2	−1.3	−1.0	−1.1
Tajikistan	13.0	12.5	14.6	15.8	18.5	19.7	−2.8	−6.0	−5.1
Turkmenistan	..	..	..	..	..	..	..	..	..
Uzbekistan	32.5	30.3	32.2	30.8	30.8	30.8	1.7	−0.5	1.4
CAREC[a]	47.3	45.9	44.4	45.1	43.5	42.9	2.2	2.5	1.6
CAREC w/out PRC	22.0	19.9	18.1	20.3	21.4	20.1	1.6	−1.5	−2.0

[a] Excluding Turkmenistan

Source: IMF, *WEO*.

Table 5 Remittance Inflows (USD million)

	2014	2015	2016 *	Percent of GDP in 2016
Afghanistan	268	301	312	1.65
Azerbaijan	1,846	1,270	643	1.71
PRC	62,332	63,938	61,000	0.54
Kazakhstan	229	194	308	0.23
Kyrgyz Republic	2,243	1,688	1,997	30.48
Mongolia	255	261	263	2.38
Pakistan	17,244	19,306	19,847	6.98
Tajikistan	3,384	2,259	1,778	25.69
Turkmenistan	30	16	9	0.02
Uzbekistan	5,828	3,053	2,263	3.4
CAREC	93,659	92,286	88,420	0.75
CAREC w/out PRC	31,327	28,348	27,420	4.56

* Estimates

Source: WB Migration and Remittances Data Base.

Nearly 20 percent drop in oil prices[8] in 2016 coming on heels of a 47 percent decline in 2015 led to significant fall in export revenues for the oil exporting CAREC countries (Azerbaijan, Kazakhstan, Turkmenistan) while declining oil prices helped improve the balance of payments by lowering import bills of the oil importing CAREC countries. Exports declined by 16 percent for Azerbaijan, 20 percent for Kazakhstan and 15.4 percent for Turkmenistan. These countries experienced 13 percent, 18 percent and 18 percent declines in their imports respectively.

While current account surplus for the PRC declined to $196 billion in 2016 from a high $304 billion in 2015, current account balances for CAREC countries excluding the PRC as a group widened in 2016 to 3.3 percent of GDP from 2.3 percent in 2015. In line with the recovery in trade, reserves increased to $3.05 trillion in May 2017. Exceptions were Afghanistan and Uzbekistan which had received current account surpluses resulting from high official transfers and import compression respectively.

External debt of the CAREC region increased slightly in 2016 on account of the increases in outstanding debt of Azerbaijan, Kazakhstan, and Mongolia (Figure 4). PRC's foreign exchange reserves stood to $3.1 trillion, in part resulting from capital outflows. Except Azerbaijan and Kazakhstan which also drew down on their sovereign funds, other countries in the region witnessed small increases in their foreign exchange reserves.

The share of revenues of general budget declined in the PRC as a result of tax cuts provided as stimulus and the share of expenditures rose despite the slowdown in their growth, resulting a widening budget deficit of 3.7 percent in 2016, up from 2.8 percent in 2015 (Table 6). While Azerbaijan and Kazakhstan were able to improve their revenue performance in 2016 from the low levels in 2015, Turkmenistan saw a

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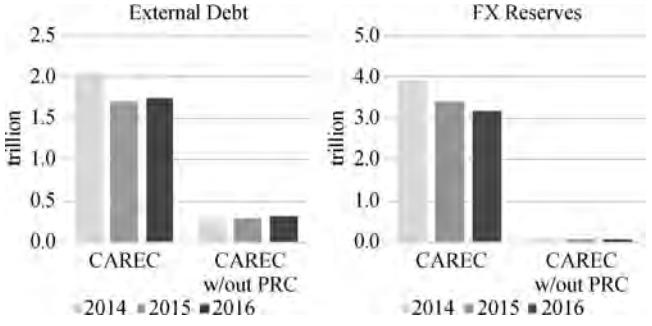
8 Oil prices refer to Dubai crude price which averaged USD 96.7 per barrel in 2014, USD 51.2 per barrel in 2015 and USD 41.2 per barrel in 2016.

Figure 4 External Debt and Foreign Exchange Reserves



Sources: World Bank, Central Banks and Ministries of Finance countries.

rapid decline in the revenue to GDP ratio to 12. 8 percent from 16. 5 percent in 2015. General government expenditures as a share of GDP in all three oil exporters declined in 2016. Afghanistan and Pakistan improved their revenue collection. Mongolia continued to implement an expansionary fiscal policy with the share of expenditures in GDP going up to 40. 7 percent in 2016 from 33. 6 percent in 2015 while the share of revenues declined to 23. 7 percent from 25. 1 percent respectively, resulting in a budget deficit of 17 percent of GDP in 2016.

Despite the slight economic recovery observed in 2016, vulnerabilities of financial sectors in the CAREC region continued to persist. In the PRC, the rapid growth of bank credit and financing from non-bank institutions outpacing the nominal GDP growth contributed to growing debt and associated risk. (ADO 2017). In other oil exporting countries in CAREC, high dollarization, undercapitalization of banks and increase in the share of non-performing loans, weak regulatory framework and non-transparent ownership structures increased the vulnerabilities further.

CAREC countries need to anchor their growth strategy on macroprudential measures, in short-term, and pursue structural reforms to enhance productivity and competitiveness on long-term basis for addressing inherent inefficiencies, and allocating resources optimally. Prospects

for CAREC member countries for the 2017 and 2018 posit well as PRC "continues to enjoy strong growth – projected at 6.7 percent for 2017"[9]; and more favorable global environment (sustaining the commodity prices, export demand, remittance flows, exchange rates, financial conditions and stronger global trade)[10] which will support economic activity in the CAREC region.

Table 6 General Government Revenues, Expenditures and Balances (% of GDP)

	Revenues			Expenditures			Balance		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Afghanistan	24.0	25.0	26.9	25.7	26.4	26.7	-1.7	-1.4	0.1
Azerbaijan	38.9	33.9	34.5	35.7	38.7	35.9	3.2	-4.8	-1.4
PRC	28.1	28.5	28.2	29.0	31.3	32.0	-0.9	-2.8	-3.7
Kazakhstan	23.7	16.6	18.0	21.3	22.9	22.4	2.5	-6.3	-4.4
Kyrgyz Republic	35.3	35.6	36.4	34.3	36.7	40.9	1.0	-1.2	-4.5
Mongolia	27.8	25.1	23.7	39.1	33.6	40.7	-11.3	-8.5	-17.0
Pakistan	15.2	14.5	15.2	20.1	19.7	19.6	-4.9	-5.2	-4.3
Tajikistan	28.4	29.9	27.9	28.4	31.8	32.4	0.0	-1.9	-4.4
Turkmenistan	17.9	16.5	12.8	17.0	17.2	14.1	0.9	-0.7	-1.3
Uzbekistan	34.9	35.2	32.9	32.8	35.7	33.2	2.2	-0.5	-0.3
CAREC	27.8	28.0	27.8	28.6	30.9	31.5	-0.9	-2.9	-3.7
CAREC w/out PRC	23.3	19.7	19.8	23.9	24.3	23.4	-0.6	-4.6	-3.6

Source: IMF, *WEO*.

Global and Regional Prospects

There is a consensus among international financial institutions and other multilateral organizations (World Bank, IMF, WTO, ADB, and OECD)

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9 IMF press. http://www.imf.org/en/Publications/CR/Issues/2017/08/15/People-s-Republic-of-China-2017-Article-IV-Consultation-Press-Release-Staff-Report-and-45170 (accessed on September 24, 2017).

10 IMF, *Regional Economic Outlook 2017*. http://www.imf.org/en/Publications/REO/MECA/Issues/2017/04/18/mreo0517 (Accessed on September 24, 2017).

that global economic activity will pick up following five years of anemic growth and will be likely to maintain the momentum in 2018. Most recent estimates show an acceleration of global growth between 30 bp and 50 bp in 2017 (Table 7).

Table 7 Baseline Scenarios

	2016	2017	2018
GDP Growth (%)			
IMF[1]	3.1	3.5	3.6
World Bank[2]	2.3	2.7	2.9
OECD[3]	3.0	3.3	3.6
Trade Volume Growth (%)			
IMF	2.2	3.8	3.9
World Bank	2.5	3.6	4.0
OECD	1.9	2.9	3.2
Oil Prices (USD/bbl)[4]			
IMF	44.0	56.3	55.9
World Bank[5]	43.0	46.6	48.8
OECD	42.9	45.0	45.0
Memo items:			
GDP Growth for China			
IMF	6.7	6.5	6.2
World Bank	6.7	6.5	6.3
OECD	6.7	6.4	6.1
ADB[6]	6.7	6.5	6.2
GDP Growth for Russian Federation			
IMF	−0.2	1.4	1.4
World Bank	−0.6	1.5	1.7
OECD	−0.8	0.8	1.0
EBRD[7]	−0.2	1.2	1.4

[1] IMF, World Economic Outlook Date Base, April 2007.

[2] World Bank, Global Economic Prospects, January 2017.

[3] OECD Global Interim Economic Outlook, March 2017.

[4] Brent.

[5] Average of Brent, West Texas and Dubai.

[6] ADB, Asian Development Outlook 2017.

[7] EBRD, Regional Economic Prospects in EBRD Counties of Operations, May 2017.

With supportive policy, the growth is expected to continue in the PRC and GDP forecast is robust at more than 6. 5 percent in 2017 and momentum likely to sustain in 2018. Resumption of growth in the Russian Federation would also help a recovery in remittances as well as in their exports to the CAREC countries that emerged from the FSU.

Improving external conditions are expected to sustain modest recoveries in other countries of the region in 2017 and 2018. Increases in commodity prices are expected to stimulate Emerging Markets and Developing Economies (EMDE). After bottoming out in 2015 and the recent OPEC agreement to curtail production, oil prices have risen during the year. Similarly, natural gas prices have also been on the rise in Europe and globally. These developments would provide some relief to oil and gas exporting CAREC countries. For energy importing smaller countries, likely adverse impact by increasing energy prices could be offset by improvements in trade and remittances.

For the United States, the growth forecast has been revised down from 2. 3 percent to 2. 1 percent in 2017 and from 2. 5 percent to 2. 1 percent in 2018. Similarly, United Kingdom has witnessed a tepid growth on weaker-than-expected activity in the first quarter of 2017. Japan, Canada and many euro area countries (France, Germany, Italy, and Spain) showed a bouyant growth momentum. Together with PRC and Russia, these regions are very important trade partners which will have spill-over impact on CAREC economies.

These positive projections should be viewed with some downside risks/ policy challenges:

- The optimistic growth projections in respect of global economy and specially Asia, policy makers need to realize that these projections are still less than pre-crisis level averages especially for commodity-exporting Asian economies. The fragile recovery is susceptible to policy uncertainties and political tensions; and "sudden sharp readjustments" in bigger economies in the CAREC region. Uncertainties about the future direction of global trade,

evidenced by growing disillusionment with globalization (populism) around the world, could derail recovery efforts in EMDE. The withdrawal from the Trans-Pacific Partnership (TPP) and the declaration of intention to reopen existing trade agreements by the United States also pose a risk for disruption of global trade. A series of upcoming elections in Europe and elsewhere could also result in more protectionist trade policies and behavior.

- But the outlook for oil prices remains uncertain and is likely to remain in flux. Higher commodity prices are expected to lifting inflation in both advanced economies and EMDE, but the inflationary pressures would ease up as the impact of large exchange rate depreciations in 2015 and 2016 wanes.

- Anticipated interest rate hikes in the US could strain financial flows in EMDE and tighten external financing conditions. Increases in interest rates could create further financial stress for countries with high levels of external debt and increase their risk premia. Competing fiscal policy incentives may trigger hostile policy responses from host of countries.

- Prudent investment regime and risk management systems at national and regional level may preempt and check unwarranted and unproductive investments. "Capital inflows at favorable borrowing rates, possibly leading to risks of balance of payments reversals later."[11] Under-developed market economies where private sectors are not fully mature to participate and guide the allocation of scare resources further complicate the recovery of the economies of Central Asia, especially FSU. Such risks are voiced aloud especially for Pakistan to take supporting structural, institutional, monetary policy, and macroprudential reforms.

- In countries with vulnerable financial sectors, failure to adopt

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11 Maurice Obstfeld, *A Firming Recovery*, IMF blog. https://blogs.imf.org/2017/07/23/a-firming-recovery/ (accessed on September 24, 2017).

macroprudential policies and effective approaches to managing and resolving non-performing loans could trigger financial crises which could spill over to trading partners and neighboring countries, hampering growth and trade.

Box 2 Belt and Road Initiative

The "One Belt, One Road" Initiative is a mega strategy designed to improve trade and capital flows between the east and the west and foster regional cooperation. One of the trade routes envisioned under the BRI is the overland route, along the old Silk Road, connecting Europe to PRC. The other one is a maritime route that connects PRC, South East Asia, India, and Africa.

Now termed as Belt and Road Initiative, it envision to connect economies in more than 68 countries across Europe, Asia and Africa, interfacing with about two-thirds of world's population and a third of world's GDP.

China, P. R. is planning to spend about USD150 billion a year in the 68 countries that have signed up to the agreement. In addition to the funds transferred to various state banks to finance OBOR projects by the State, a Silk Road Fund with an initial endowment of USD 40 billion was established in 2014. This was followed by the establishment of the Asian Infrastructure Investment Bank (AIIB) in 2015. The AIIB had 80 members as of June 16, 2017, with pending applications from prospective members. Since its establishment, the AIIB lent over US $ 1. 7 billion to support nine infrastructure projects across seven countries, including Pakistan, Bangladesh, Tajikistan, Indonesia, Myanmar, Azerbaijan, and Oman. *

Of the six corridors envisioned under the OBOR, at least four pass through and involve CAREC countries. The first is the New Eurasia Land Bridge which is a railway line running from Lianyungang in Jiangsu province of PRC through Alashankou in Xinjiang, PRC to Rotterdam in Holland. From PRC, the new link passes through

Kazakhstan, Russia, Belarus, and Poland, also connecting with Czechia, Germany and the Netherlands, allowing for "one declaration, one inspection, one cargo release."

The second is the PRC-Mongolia-Russia Economic Corridor would help strengthen rail and highway connectivity and construction, advance customs clearance and transport facilitation, promote cross-national co-operation in transportation in tripartite manner.

The third corridor connects PRC (via Alashankou) with the railway networks of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and Turkmenistan) and West Asia (Iran and Turkey) before reaching the Mediterranean coast and the Arabian Peninsula.

The fourth is the China (PRC)-Pakistan Economic Corridor running from Kashgar, Xinjiang to Gwadar Port in Pakistan. Projects in Pakistan include Phase II of the Karakoram Highway (the Thakot-Havelian section), an expressway and a new international airport at Gwadar Port, an expressway from Karachi to Lahore (the Multan-Sukkur section), the Lahore rail transport orange line, the Haier-Ruba economic zone, and the PRC-Pakistan cross-national optic fiber network. (http://beltandroadmedia.com/)

∗ *https://www.aiib2017.org/eng/sub/aiib/about.php*

Chapter 2

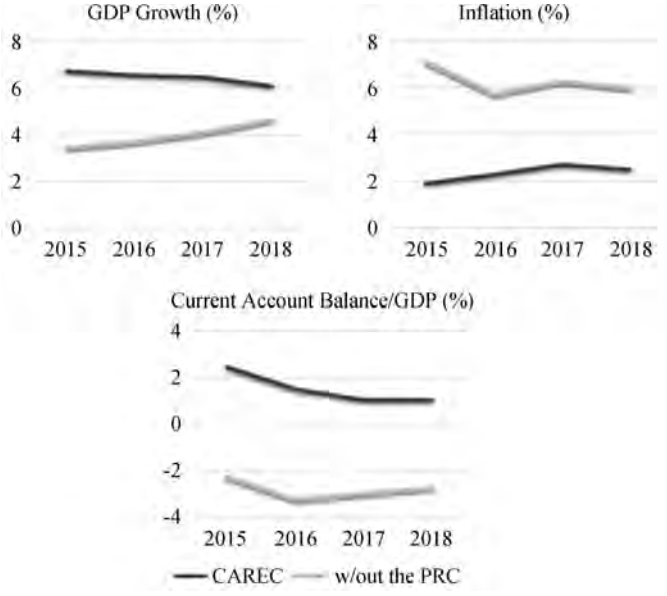
CAREC Institute's Macroeconomic Prospects and Projections

While the PRC dominates the regional outcomes for the CAREC countries with its share of 95 percent of the region's GDP, two distinct patterns emerge from the macroeconomic projections. For the CAREC countries as a whole, GDP growth is expected to decelerate from 6.5 percent in 2016 to 6.1 percent in 2018. Excluding the PRC, the CAREC group would see its (weighted) average GDP to accelerate from 3.7 percent in 2016 to 4.6 percent in 2018, based on the best estimates presented in this report (Figure 5).

Inflation projections follow the same trend. The (weighted) average inflation of the entire CAREC group is projected to go up to 2.7 percent in 2017 and decelerate to 2.5 percent in 2018. Excluding the PRC, the average inflation would go up slightly to 6.2 percent in 2017, mostly reflecting the increase in oil prices anticipated in 2017-18, then slowdown to 5.9 percent.

The group's current account surplus is projected to gradually slowdown from 1.5 percent in 2016 to 1 percent in 2018, on account of the PRC, while the other countries in the group will see declines in their current account deficits from 3.3 percent in 2016 to 2.7 percent in 2018. Overall, current account deficits of the CAREC countries excluding PRC is projected to decline from USD 19.6 billion in 2016 to USD 9.4 billion in 2017 and 2018, reducing external financing requirements significantly.

Figure 5 Prospects for the CAREC Region



Sources: CI consultants' assessment.

The group results, however, mask the diversity of economic structures of individual countries or subgroups of countries. The performance of oil and mineral exporters[12] suffered significantly in 2016 with the drop in oil prices, (weighted) average growth rate declining from 4.9 percent in 2014 to 1.0 percent in 2016 while others, mainly energy importers, saw an increase from 4.7 percent to 5.1 percent respectively. These projections also point out to a recovery of oil and mineral exporters during 2017 and 2018 (Figure 6). Although this forthcoming recovery episode is expected to be significant, it will not bring the growth rates to their 2014 levels.

12 Azerbaijan, Kazakhstan, Turkmenistan and Mongolia.

Figure 6 Growth Rates of Oil and Mineral Exporters and Others Compared (%)

Sources: CI Project Database.

A comparison of the most recent projections and estimates for GDP growth by multilateral institutions like the ADB, EBRD, IMF, and the World Bank show a convergence for 2017 and some variations for 2018, ranging from 1 percent for Azerbaijan to 7 percent for Tajikistan (Table 8).

Inflation estimates vary across most of the CAREC countries and hover around 2 percent for PRC and for Azerbaijan, Kazakhstan, and Uzbekistan, it would be on higher side for 2018 (Table 9). While the current account deficit to GDP ratios for the Kyrgyz Republic and Turkmenistan are projected to increase by 2018, these ratios are expected to improve for the other countries. In the case of the PRC, the current account surplus to GDP ratio will drop slightly in 2018 (Table 10).

Since the *models used were based on a limited data sets* than initially envisaged[13], the uncalibrated results from model runs were reviewed against the projections from other institutions and adjusted accordingly.

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13 Due to data availability constraints, publicly available data from the ADB, IMF and WB – particularly the Global Economic Monitoring (GEM) – were used to produce the uncalibrated projections. For Turkmenistan, no runs were made due to lack of data, and for the PRC, no model was built because of the complexity of the economy and large data requirements. Instead, the latest ADO projections were used for these two countries.

Table 8 GDP Growth Projections for CAREC Countries (%)

	Actual	ADB		IMF		World Bank		EBRD		Uncalibrated Project Estimates		Best Estimate	
	2016	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Afghanistan	2.0	2.5	3.0	3.0	3.5	2.6	3.4	–		0.4	-2.3	3.0	3.3
Azerbaijan	-3.8	-1.1	1.2	-1.0	2.0	-1.4	0.6	-0.5	2.0	2.1	1.8	-0.9	1.0
China (People's Republic of)[a]	6.7	6.5	6.2	6.6	6.2	6.5	6.3	–		–		6.6	6.2
Kazakhstan	1.0	2.4	2.2	2.5	3.4	2.4	2.6	2.4	3.5	2.2	0.2	2.4	2.8
Kyrgyz Republic	3.8	3.0	3.5	3.4	3.8	3.4	4.0	3.9	4.1	7.5	3.2	3.2	3.5
Mongolia	1.0	2.5	2.0	-0.2	1.8	-0.2	1.9	1.4	2.8	-2.1	1.2	1.0	2.0
Pakistan	4.7	5.2	5.5	5.0	5.2	5.2	5.5	–		1.4	4.5	5.0	5.4
Tajikistan	6.9	4.8	5.5	4.5	5.0	5.5	5.9	3.8	4.0	9.5	11.1	4.8	5.4
Turkmenistan[a]	6.2	6.5	7.0	6.5	6.3	6.3	6.5	5.7	6.0	–		6.5	6.3
Uzbekistan	7.8	7.0	7.3	6.0	6.0	7.8	7.7	6.2	6.5	7.5	9.5	7.0	7.0

[a] For PRC and Turkmenistan, ADB/IMF projections have been used.

Source: Asian Development Outlook 2017, Asian Development Bank; World Economic Outlook, April 2017, International Monetary Fund; Global Economic Prospects, June 2017, World Bank; Regional Economic Prospects in EBRD Countries of Operations, May 2017, European Bank for Reconstruction and Development.

Table 9 Inflation Projections for the CAREC Countries

(Annual percentage change of end of period consumer prices)

	Actual	ADB		IMF		Best Estimate	
	2016	2017	2018	2017	2018	2017	2018
Afghanistan	4.6	5.5	5.8	7.2	6.0	5.5	5.8
Azerbaijan	13.3	9.0	8.0	4.2	4.1	10.0	6.0
China (People's Republic of) [a]	2.1	2.4	2.8	2.5	2.3	2.5	2.3
Kazakhstan	8.5	8.0	7.0	7.7	6.8	7.0	6.5
Kyrgyz Republic	−0.5	5.0	4.0	4.7	5.5	4.7	5.5
Mongolia	0.5	3.5	3.9	6.1	6.1	7.0	6.5
Pakistan	3.2	4.0	4.8	5.3	5.0	6.3	6.0
Tajikistan	6.1	8.0	7.0	6.3	6.0	6.8	6.8
Turkmenistan[a]	6.2	6.0	6.0	6.1	6.2	6.0	6.2
Uzbekistan	7.9	9.5	10.0	8.2	9.0	9.0	9.5

[a] For PRC and Turkmenistan, ABD/IMF projections have been used.

Source: Asian Development Outlook 2017, Asian Development Bank; World Economic Outlook, April 2017, International Monetary Fund.

Table 10 Current Account Balance/GDP Projections for the CAREC Countries

(Percent of GDP)

	Actual	ADB		IMF		Best Estimate	
	2016	2017	2018	2017	2018	2017	2018
Afghanistan	1.3	1.4	−0.2	4.5	2.3	4.9	2.8
Azerbaijan	−3.8	5.9	11.4	1.3	3.8	1.3	3.2
China (People's Republic of) [a]	1.8	1.8	1.7	1.3	1.2	1.3	1.2
Kazakhstan	−6.3	−3.4	−3.0	−4.0	−2.8	−3.7	−2.7
Kyrgyz Republic	−9.4	−13.0	13.5	−12.0	−12.1	−11.5	−14.2
Mongolia	−4.1	−2.1	−6.3	−4.4	−9.5	−4.5	−8.1
Pakistan	−1.1	−2.1	−2.5	−2.9	−3.0	−2.7	−2.9
Tajikistan	−5.1	−5.5	−6.0	−5.5	−5.1	−5.3	−4.4
Turkmenistan[a]	−21.0	−15.0	−13.0	−12.8	−11.5	−15.0	−13.0
Uzbekistan	1.4	0.2	0.4	2.1	1.6	2.0	1.5

[a] For PRC and Turkmenistan, ABD/IMF projections have been used.

Source: Asian Development Outlook 2017, Asian Development Bank; World Economic Outlook, April 2017, International Monetary Fund.

Chapter 3

Country Developments and Prospects

This chapter summarizes recent economic developments in the CAREC countries[14] and synthesizes projections with the outcomes of the models and the projections of other development institutions such as the ADB, WB, IMF and EBRD. The links for the underlying econometric MMF model and program execution runs for select countries are indicated in respective country write-ups.

AFGHANISTAN

Recent Developments

With uncertain security situation arising from social strife and political divide, the country's economy is facing numerous challenges to leverage from its geostrategic locations and endowments. Growth has picked up from 0.8 percent in 2015 to 2 percent in 2016, mainly because of a recovery in agriculture and high official transfers. Both public and private investment remained weak despite a strong external support, but hampered by low institutional implementation capacity (Table 11).

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14 Except for Georgia which joined CAREC after the inception of this project.

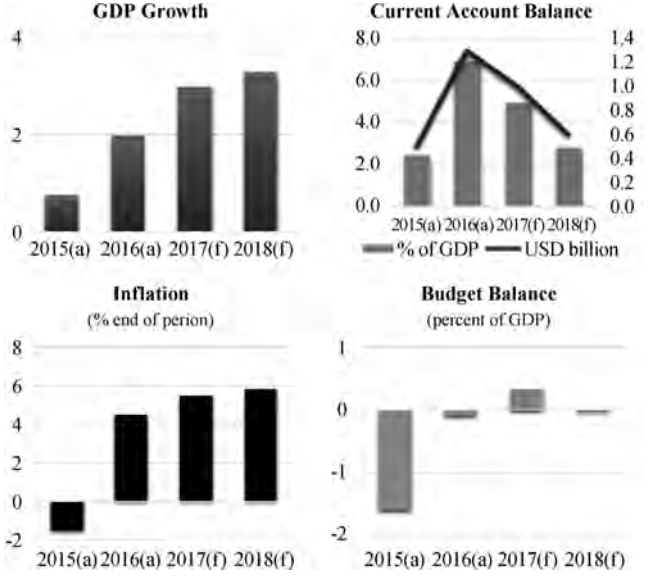
Table 11 Afghanistan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Afghani billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	1,282	0.8	2.0	3.0	3.3
Private consumption	1,117	2.4	8.7	4.9	4.6
Public consumption	164	-3.2	9.3	0.0	7.7
Gross fixed capital formation	240	0.0	-6.1	7.1	2.1
Exports of goods and services	101	4.3	-35.2	-7.9	-9.1
Imports of goods and services	578	-49.1	-19.4	7.5	9.0
(USD million)			*(as prcent of GDP *)*		
Current account balance	1,300	2.5	6.9	4.9	2.8
Exports of goods and services	596	2.8	3.2	3.2	3.3
Imports of goods and services	6,534	38.1	34.9	33.4	32.8
Trade balance	-5,938	-35.3	-31.7	-30.3	-29.5
(Afghani billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	344	24.3	26.9	26.4	27.7
Budget Expenditures	345	25.9	27.0	26.0	27.7
Budget Balance	-1	-1.6	-0.1	0.3	0.0
			(percent end of period)		
Consumer Price Index		-1.5	4.5	5.5	5.8
Remittances (USD million)		301	312	308	314

[a] in constant prices

* in current prices

Source: CI project dotabase.



Inflation has risen from a deflation of 1.5 percent in 2015 to 4.5 percent in 2016, mainly resulting from increases in food prices and global commodity prices as well as lagged effects of Afghani depreciation in 2015.

The Afghani was broadly stable against the US dollar during the first half of 2016, appreciating by about 1% during the second half following a 17% fall in 2015, when gross reserves fell by $300 million on strong demand for foreign currency from people wishing to emigrate.

High official transfers continued to support a current account surplus of about of 6.9 percent in 2016 although the trade deficit declined from 35.3 percent of GDP in 2015 to 31.7 percent in 2016 because of declining imports. Gross international reserves increased to $7.5 billion in 2016 from $7.0 billion in 2015.

On the fiscal side, revenue collection improved in 2016 with a 24 percent in increase year on year (y-o-y). While expenditures increased by 11 percent, the budget deficit, excluding grants declined from 9.4 percent of GDP in 2015 to 8.4 percent in 2016. The overall budget deficit improved from -1.4 percent of GDP in 2015 to a small surplus, equivalent to 0.1 percent of GDP in 2016.

Short-term Prospects

A modest recovery in the economy is expected with GDP growth of 3 percent in 2017 and 3.3 percent in 2018 subject to improvements in broad economic policy areas, security situation and favorable weather conditions.

The current account surplus including grants is expected to decline to 4.9 percent in 2017 and turn into a small deficit in 2018. While y-o-y inflation in May 2017 was 7.5 percent, year-end inflation is projected to be around 5 percent to 6 percent range in 2017 and 2018.

The projections also assume that the execution of the development budget would improve, allowing a faster drawdown of donor financing

and stimulating growth. The overall budget surplus, including grants, is expected to be 0. 5 percent of GDP in 2017 and reach a balance in 2018.

Key Policy Issues

Afghanistan's short-term prospects depend on dealing with key outstanding issues. They include:

- Despite the large volumes of development assistance to Afghanistan, execution rates of the development budget have been low, ranging from 30 percent to 60 percent, depending on the sector. While the precarious security situation has been a hurdle, low capacity to design and prepare projects, lack of accountability are few institutional capacity constraints facing the economy. It is suggested that institutional weaknesses and inefficiencies in designing and implementing development projects may need to be addressed for optimal results.

- Increasing numbers of IDPs returning from Iran and Pakistan have been putting pressure on employment opportunities and social services. Yet this can be an opportunity if channeled in a more inclusive manner. Employment creating growth and development of a sustainable and comprehensive social transfers program may be considered.

- The recent increase in the ratio of Non-performing Loans (NPLs) in the banking system, estimated at 13. 4 percent in September 2016, should be a cause for concern.

- While recent reforms have helped the revenue performance of the budget, there is still room to prudently reform with effective administration and collection mechanisms.

AZERBAIJAN

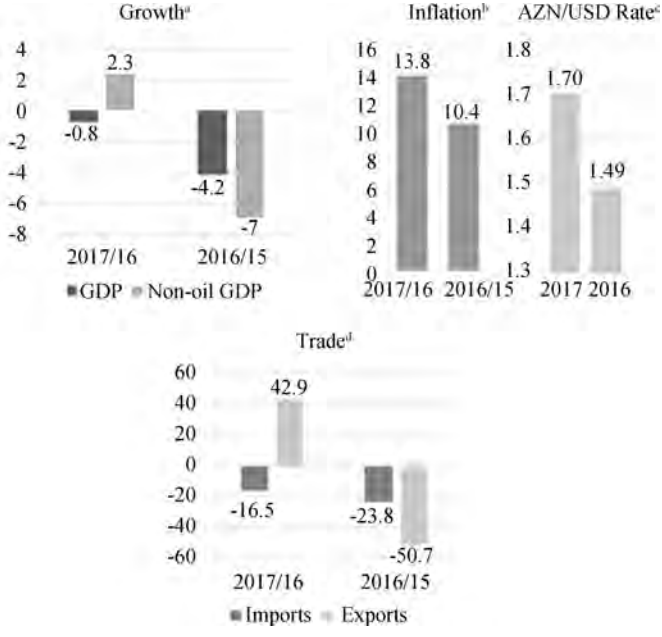
Recent Developments

With the declining oil output (1. 3 percent y-o-y in 2016) and drop in

oil prices, the contractions have been economy wide. Non-oil GDP declined by 5. 3 percent as a result of a 27 percent plunge in construction as the government spending on infrastructure plummeted and domestic demand declined.

During the first five month of 2017, GDP continued to contract by 0. 9 percent over the same period in 2016 because of a 7. 1 percent decline in the oil sector during the same period. Non-oil GDP grew 2. 3 percent during the same period (Figure 7).

Figure 7 Azerbaijan
(January-June periods)



[a] y-o-y in real terms

[b] y-o-y Consumer Price Index

[c] Official rates on June 1, 2016 and 2017

[d] y-o-y in USD terms

Source: The State Statistical Committee of the Republic of Azerbaijan.

Exports earnings declined by 40 percent because of oil prices and lower export volume. The Manat depreciated a further 33 percent in 2016 and imports declined by about the same rate. The current account deficit jumped to 3 percent of GDP in 2016 compared to 0. 4 percent in 2016.

Consumer price inflation flared up to 15. 7 percent in 2016 from 7. 5 percent a year ago reflecting the series of devaluations and the subsequent float of the Manat. The budget deficit went up to 1 percent of GDP in 2016 from 0. 5 percent in 2015 despite sharp expenditure cuts to maintain fiscal balances.

Short-term Prospects

The growth prospects of the economy are modest and is projected to continue in 2017albeit at 0. 9 percent because the declining oil production to be followed by a modest recovery of 1 percent in 2018 with resumption of growth in construction fueled by government programs (Table 12).

Current account balance is expected to turn into a surplus of 1. 3 percent of GDP in 2017 and 3. 2 percent in 2018 as the oil exports recover, and the Shah Deniz gas field starts exporting.

The fiscal deficit is, however, will expand to 8. 3 percent in 2017 and turn into a surplus in 2018. Despite the restraints on public expenditures, government resources will be needed to clean up the overhang of the financial system.

Inflation is expected to slow down to 10 percent and 6 percent in 2017 and 2018 respectively as the depreciation of Manat eased in early 2017 and the currency has been managed and stable since April 2017 (Figure 8).

Key Policy Issues

One of the key short-term issues Azerbaijan faces is the crisis grappling its banking system. The contraction of the economy and the rapid depreciation of Manat led to a sudden rise in non-performing

Figure 8 Azerbaijan: Exchange Rate

Source: Central Bank of Azerbaijan.

loans (NPL), estimated at a quarter of loans to the private sector[15] and forced some smaller lenders to close and the country's largest bank to file for bankruptcy protection. Restructuring banks liabilities and the financial system are crucial to reinstate the tarnished public confidence in the banking system.

While the government has already taken some measure to control public expenditures, fiscal consolidation needs to be continued to maintain macroeconomic balance.

A rapid increase in unemployment took place since 2015 as the economy contracted. The number of unemployed went up by 14. 5 percent in 2016. While earlier economic growth and various government programs brought the unemployment rate from 7. 2 percent in 2005 to 4. 9 percent in 2014, it went up to 5. 6 percent at the end of 2016. Employment creation remains high on the short-term policy agenda.

(The description of the model for Azerbaijan can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

15 At the end of April 2017, loans to the economy (private sector) excluding provisions were 25. 9 percent lower than their end – 2014 levels. Particularly hit was the construction sector where the loan volume was halved.

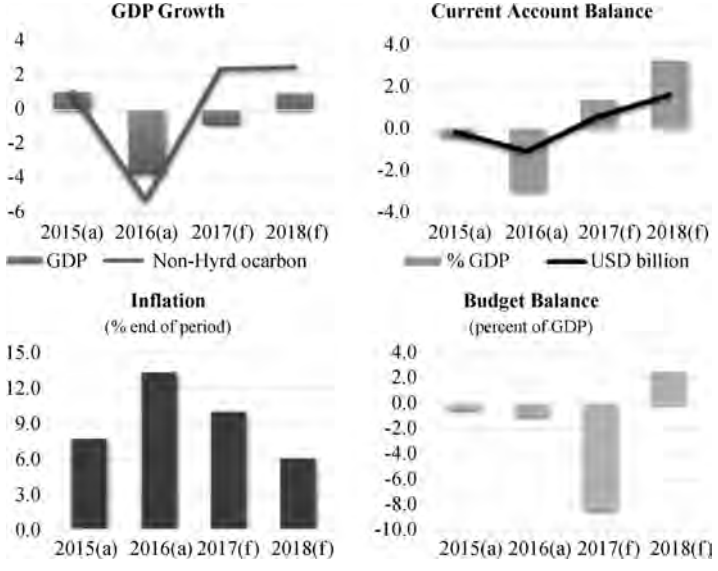
Table 12 Azerbaijan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Manat billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	60.0	1.1	-3.8	-0.9	1.0
Private consumption	35.4	8.5	5.8	-3.9	14.7
Public consumption	7.9	1.0	-13.6	24.3	-22.8
Gross capital formation	15.0	-11.1	-10.2	-11.3	-4.2
Exports of goods and services	28.1	-0.1	-4.7	-5.5	-4.3
Imports of goods and services	26.4	-0.5	0.0	-7.8	3.0
Non-Hydrocarbon GDP	35.8	1.1	-5.3	2.4	2.5
(USD billion)			*(as percent of GDP *)*		
Current account balance	-1.1	-0.4	-3.0	1.3	3.2
Exports	9.4	30.7	25.1	22.9	20.3
Imports	6.6	19.2	17.6	15.6	15.0
Trade balance	2.9	11.4	7.8	7.2	5.4
(Manat billion in current prices)			*(as percent of GDP *)*		
Budget Revenues **	17.2	33.9	28.7	28.8	31.0
Budget Expenditures	17.8	34.4	29.7	37.2	28.4
Budget Balance	-0.6	-0.6	-1.0	-8.4	2.6
			(percent end of period)		
Consumer Price Index		7.7	13.3	10.0	6.0

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



PEOPLE'S REPUBLIC OF CHINA (PRC)

Recent Developments

Following three decades of stellar growth, averaging 10 percent a year and providing a growth engine for the global economy even at the times of financial crises, PRC started to grow at a steady rate by shifting the focus from export-led growth to hybrid innovative growth model (which also focuses on domestic demand) treading on a sustainable trajectory (Table 13).

During the first quarter of 2017, growth picked up to 6.9 percent compared to 6.7 percent during the same period in 2016 pulled by acceleration of growth in industrial value added, recovering global trade and domestic demand manifesting a continued rise in spending on infrastructure and the real estate sector (Figure 9). Consumption growth outpaced the GDP growth and the savings rate. Infrastructure and housing investment which continued despite purchase regulatory requirements and overheated local markets did offset declining industrial investment.

Inflation went up to 2.1 percent in 2016 from 1.6 percent in 2015 because of higher food prices, but slowed down during 2017 after the regulations were introduced on real estate prices in 2016.

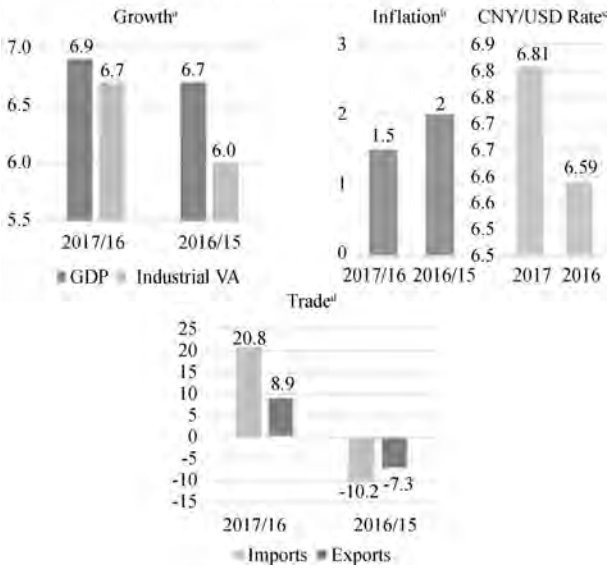
Budget deficit increased slightly from 2.8 percent of GDP in 2015 to 3.7 percent in 2016 despite the stimulus package that took place in 2016. The stimulus package was provided in the form of tax cuts which resulted in a drop in the share of budget revenues from 28.6 percent in 2015 to 28.2 percent in 2016.

External trade continued to face challenges in 2015 and 2016, as did the trade and current account surpluses. Renminbi depreciation helped fuel capital and FDI outflows exceeding inflows in 2016.

During the first five months of 2017, both exports and imports growth picked up, rising at 8.9 percent and 20.8 percent respectively compared to the same period in 2016.

Figure 9 People's Republic of China

(January-June periods)



[a] y-o-y in real terms. Q1 data only
[b] y-o-y Consumer Price Index
[c] Official rates on June 1, 2016 and 2017
[d] y-o-y in current prices
Source: National Bureau of Statistics of China and The People's Bank of China.

PRC's foreign exchange reserves which peaked at $3.84 trillion in 2014, stood at $3.01 trillion at end-December 2016. In line with the recovery in trade, reserves increased to $3.05 trillion in May 2017.

Rapid growth of credit to enterprises and local governments from banks and non-bank financial institutions in recent years has affected the asset quality of these institutions. Government has tightened the regulatory framework, and slowed down credit growth, and put the financial system on a more sustained path and stability. Industrial activity based on market-dynamics cutting excessive surplus, improving efficiency have yielded better results. Similarly, the services sector growth has also contributed to the economic growth and structural transformation. Foreign Policy successes have started to yield more market access for Chinese exports, services and investments.

Short-term Prospects

Targeted economic policies have moderated risk-taking. Stimulus policy measures including fiscal support have successfully rebalanced allocation of resources to more competitive sectors. Policy measures underpin domestic demand particularly for the consumer- and services-sectors. IMF's *Regional Outlook October 2017* projects that PRC is expected to grow at 6. 8% and 6. 5 in 2018. IMF REO maintains that the "country has potential to sustain strong growth over the next 3-5 years, but this will require speeding up reforms to make growth less reliant on debt and investment. "[16] The most recent IMF Article IV mission[17], however, projects GDP to expand by 6. 4 percent annually on average during the years 2018-20. These projections are subject to developments in several areas. Recently policy uncertainties about global trade could dampen export growth, although exports have started to respond well to the renminbi depreciation in 2016 and are diversified both in terms of product portfolio and markets destination.

Both the trade and current account surpluses are expected to decline further; the latter would decline faster because the widening services account, including outward tourism. The overall balance of payments may produce a small surplus if the capital outflows are managed prudently, but the indications from the first five months of the year are that drawdown on reserves may be stemmed in 2017 and 2018.

Budget deficit is expected to remain high at around 3. 7 percent in 2017, reflecting continued increases in public spending on social services and transfers to poorer segments of the society, infrastructure and continued stimulus support through tax breaks. Inflation is projected to pick up to 2. 5 percent in 2017 and moderate to 2. 3 percent in 2018,

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16 IMF, *Asia Pacific Regional Outlook,* October 13, 2017. http://www. imf. org/en/Publications/REO/APAC/Issues/2017/10/09/areo1013 (accessed on October 26, 2017).

17 IMF Staff Completes 2017 Article IV Mission to China (P. R), June 14, 2017. https://www. imf. org/en/News/Articles/2017/06/07/pr17219 – china-imf-staff-completes – 2017 – article-iv-mission

reflecting higher food prices and the lagged impact of renminbi depreciation.

Figure 10 PRC: Exchange Rate

Source: Board of Governors of the Federal Reserve System (US), fred. stlouisfed. org

Key Policy Issues

The transition to a sustainable and consumption driven path may entail and include some policy areas for consideration:

- Continued prudent management and policy responses to address emerging uncertainties from within and outside economic shocks;
- Encourage innovation driven sectors to grduate to higher level of manufacturing-cum-services oriented economy;
- Address excessive risk-taking and debt driven investments; and
- Enhancing competitiveness of domestic firms by engaging in deepening reforms to eliminate entry barriers particularly in the service sectors for firms to compete domestically and globally.

(The description of the model for the PRC can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/) [18]

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18 Due to data availability constraints, publicly available data from the ADB, IMF, and WB – particularly the Global Economic Monitoring (GEM) were used to produce the uncalibrated projections. For the PRC, since no model was built, the latest ADO projections were used.

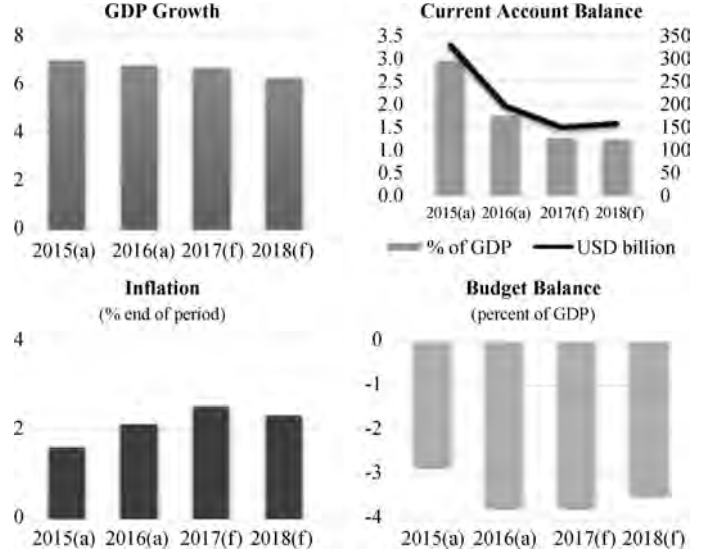
Table 13 People's Republic of China: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Yuan billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	74,540	6.9	6.7	6.6	6.2
Private consumption	29,190	10.2	10.4	8.2	8.4
Public consumption	10,391	9.8	8.4	5.7	6.0
Fixed capital formation	32,861	2.4	4.6	6.4	4.7
Exports of goods and services	15,003	−2.3	1.7	3.1	3.2
Imports of goods and services	12,905	−0.5	4.9	4.6	4.0
(USD billion)			*(as prcent of GDP *)*		
Current account balance	196	3.0	1.8	1.3	1.2
Exports	1,990	19.2	17.7	18.1	17.8
Imports	1,496	14.1	13.3	14.3	14.8
Trade balance	494	5.1	4.4	3.8	3.0
(Yuan billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	21,043	28.6	28.2	27.4	27.5
Budget Expenditures	23,818	31.4	32.0	31.1	30.9
Budget Balance	−2,775	−2.8	−3.7	−3.7	−3.4
			(percent end of period)		
Consumer Price Index		1.6	2.1	2.5	2.3
Remittances (USD billion)		64	61	62	63

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



KAZAKHSTAN

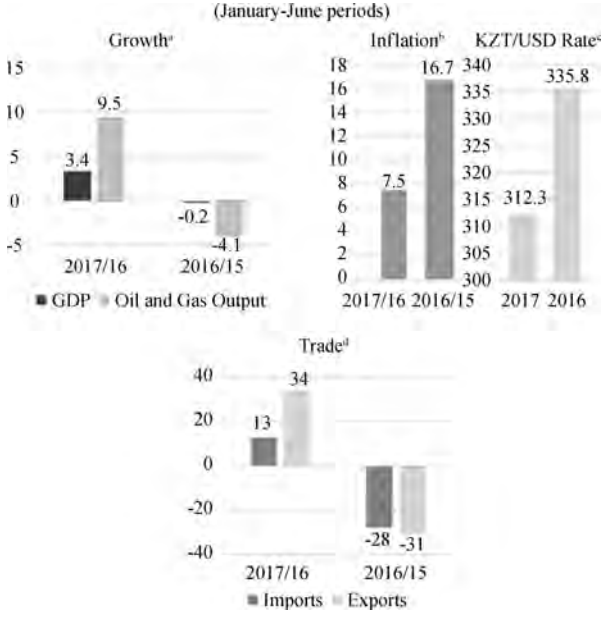
Recent Developments

Despite the ups and downs in the global economy, Kazakhstan's average real GDP growth was 7. 7 percent during 2000-2014. Growth started to decelerate in 2014 and bottomed in 2016 when the real GDP growth came down to one percent (y-o-y) with oil production declining at 1. 8 percent. Non-oil GDP growth of 1. 6 percent was spurred by large government spending mainly in construction.

Signs of recovery started to emerge during 2017 with GDP growth of 3. 4 percent, in part fueled by a 9. 5 percent increase in oil and gas output (Figure 11).

Figure 11 Kazakhstan

(January-June periods)



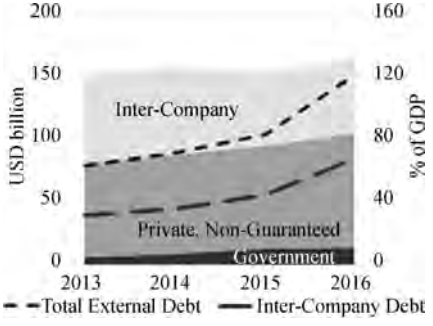
[a] y-o-y in real terms
[b] y-o-y Consumer Price Index
[c] Official rates on June 1, 2016 and 2017
[d] y-o-y in current prices
Source: Agency of the Republic of Kazakstan on Statistics.

Rapid currency depreciation that started in 2015 led to the acceleration of inflation that reached 14. 6 percent y-o-y in 2016. While the year-end inflation decelerated to 8. 5 percent, higher import costs and lower incomes dampened private consumption which only grew by 1. 1 percent. Export of goods and services declined by 4. 4 percent and imports of goods and services by 2. 2 percent in real terms. The surge in inflation which has started to subside – the headline inflation rate which was down to 7. 5 percent y-o-y in May 2017, is projected to be around 7 percent by the end of the year.

The current account balance which increased from USD 5. 4 billion in 2016, but it more than doubled to 6. 3 percent of GDP in 2016. Both exports and imports of goods declined by about 22 percent in USD terms. Central Bank's gross external reserves went up from USD 27. 9 billion in December 2015 to USD 29. 5 billion in December 2016 while the reserves of the National Fund declined by USD 2. 2 billion to USD 61. 2 billion during the same period.

Kazakhstan's external debt, including the company debt rose by USD 10. 4 billion to USD 164 billion in 2016 – in terms of GDP, the increase is 121. 3 percent from 83. 2 percent in 2015, mainly because of the Tenge depreciation. While the volume of the inter-company debt did not change during 2016, government and government guaranteed debt increased by USD 1 billion and private non-guaranteed debt by USD 9 billion (Figure 12).

Figure 12 Kazakhstan: External Debt



Source: National Bank of Kazakhstan.

Government revenues increased to 20. 2 percent of GDP from 18. 4 percent in 2015 because of the impact of the depreciation of Tenge in import taxes and hydrocarbon revenues and higher inflation. Despite the increases in public expenditures, the overall budget deficit declined to 1. 6 percent of GDP in 2016 from 2. 2 percent in the previous year.

While the National Bank reduced the policy rate from 17 percent to 12 percent in two steps as the exchange rate stabilized and inflation started to decelerate, the banking system continued to be fragile with the share of non-performing loans going up to 16 percent of banks' portfolio in March 2017. The government support to the banking system may have been a stop-gap measure, and the financial system still faces formidable challenges.

Short-term Prospects

Following a three-year stretch of economic slowdown which seems to have bottomed out in 2016, GDP growth is projected to pick up to 2. 4 percent in 2017 and 2. 6 percent in 2018, resulting from improved oil markets and prices, targeted public expenditures and expected higher FDI inflows (Table 14).

While the National Bank reduced the policy rate from 17 percent to 12 percent in two steps in 2016 and to 11 percent in February 2017 as the exchange rate stabilized, the growth of money supply M3 which decelerated from 38. 3 percent in 2015 to 12. 3 percent in 2016 and turned into negative 3. 1 percent y-t-d by April 2017. A series of structural reforms[19] introduced in 2016 and the active involvement of

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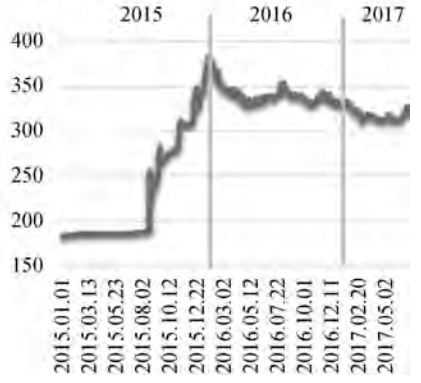
19 The Majilis of the Kazakh Parliament the Minister of National Economy presented the Forecast of social and economic development for 2017-2021, draft laws of the Laws "On guaranteed transfer from the National Fund of Kazakhstan for 2017 – 2019" and "On volumes of transfers between the republican and regional budgets, budgets of the city of republican value, and the capital in 2017 – 2019". http://www. government. kz/en/novosti/1003888-k-bishimbayev-presents-forecast-of-social-and-economic-development-for – 2017 – 2021. html

the National Fund in financing the "Nurly Zhol" state program[20] is expected to help improve the investment climate for both domestic and foreign investment and support the expansion of the non-hydrocarbon economy.

As the oil markets firm up, the current account deficit is projected to narrow down to 3. 7 percent of GDP in 2017 and 2. 7 percent in 2018.

Figure 13 Kazakhstan: Exchange Rate
(KZT/USD)



Source: National Bank of Kazakhstan.

Key Policy Issues

The key short-term policy issue for Kazakhstan is to improve the asset quality of its financial system and boost confidence in its banking system. So far, the government's efforts to address the large stock of

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20 These funds are to be used for the development of transport and logistics infrastructure, industrial infrastructure, modernization of heat and water supply networks, sewerage, construction of engineering and communication infrastructure in housing areas, including individual housing construction, construction of educational facilities for liquidation of emergency schools and three-shift education by the end of 2018. http://www. government. kz/en/novosti/1003888-k-bishimbayev-presents-forecast-of-social-and-economic-development-for-2017-2021. html

Table 14 Kazakhstan: Forecasts of Macroeconomic Indicators

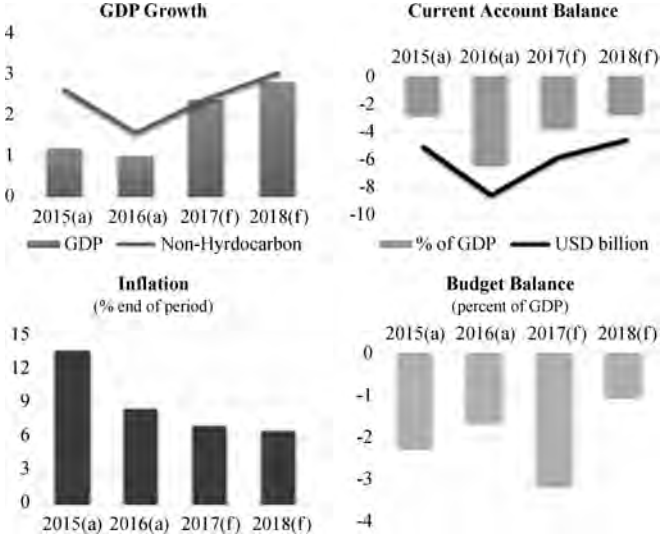
	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Tenge billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	46,193	1.2	1.0	2.4	2.8
Private consumption	24,551	1.8	1.1	1.6	1.8
Public consumption	5,463	2.4	2.4	2.9	2.8
Fixed capital formation	10,333	4.2	3.0	3.8	3.2
Exports of goods and services	14,972	-4.1	-4.4	2.8	1.9
Imports of goods and services	13,304	-0.1	-2.2	1.1	0.8
Non-Hydrocarbon GDP	40,286	2.6	1.6	2.4	3.0
(USD billion)			*(as percent of GDP *)*		
Current account balance	-8.5	-2.8	-6.3	-3.7	-2.7
Exports	37.3	25.2	27.6	28.2	27.2
Imports	27.9	18.4	20.6	19.6	18.7
Trade balance	9.4	6.9	7.0	8.6	8.5
(Tenge billion in current prices)			*(as percent of GDP *)*		
Budget Revenues **	9,309	18.7	20.2	22.8	21.1
Budget Expenditures	9,434	20.1	20.4	25.2	21.8
Budget Balance	-738	-2.2	-1.6	-3.1	-1.0
			(percent end of period)		
Consumer Price Index		13.6	8.5	7.0	6.5

[a] in constant prices

* in current prices

** including transfers from the National Fund

Source: CI Consultants' assessment.



NPLs have focused on providing subsidized loans and making SOEs to buy bank shares which increases risks for a more massive crisis.

- Economic diversification especially focusing on energy value chain integration, metal industry and engineering sectors can stimulate economic opportunities;
- Small and Medium-size entrepreneurs incentive scheme to spur private sector development for sustainable growth and business opportunities will help diversification drive.
- Services sector deepening through reforms and attracting investments especially in potential manufacturing and agricultural global value chains would reduce inherent economic vulnerabilities arising from transmission of exogenous shocks.

(The description of the model for Kazakhstan can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

THE KYRGYZ REPUBLIC

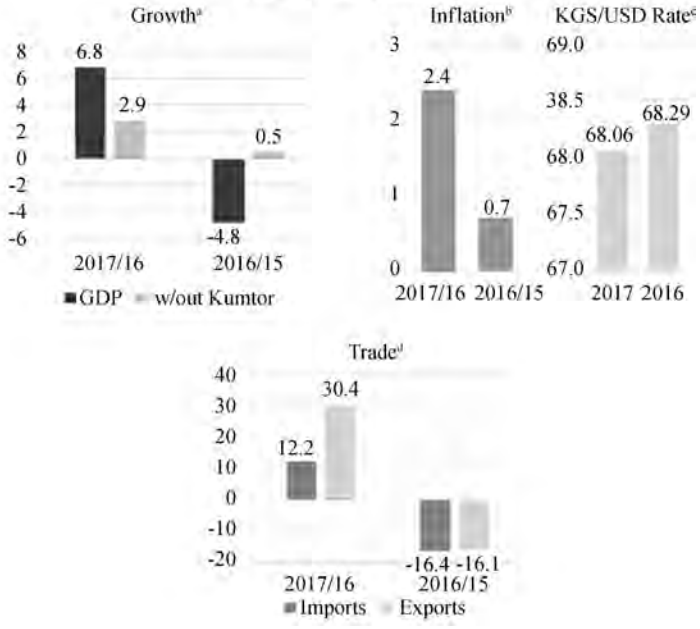
Recent Developments

The Kyrgyz Republic became a full member of the Eurasian Economic Union (EEU) in 2015. During the last two years, the country has been adjusting to the customs union and its policy framework.

Unlike its hydrocarbon exporting neighbors, the economy performed reasonably well with growth picking up to 3. 8 percent in 2016 from 3. 5 percent in 2015. Gold mining which has had its ups and downs registered a 10 percent increase in its value added. Growth in the non-gold economy was slower at an estimated rate of 2. 4 percent after picking up in the second half of the year. The momentum was kept during the first five months of 2017 when the GDP growth was estimated at 6. 8 percent (Figure 14).

Figure 14 The Kyrgyz Republic

(January-June periods)



[a] y-o-y in real terms

[b] y-o-y Consumer Price Index

[c] Official rates on June 1, 2016 and 2017

[d] y-o-y in current prices

Source: National Statistical Committee of the Kyrgyz Republic.

Appreciation of the Som with the relative recovery of remittances helped to bring down inflation from 3. 4 percent in 2015 to a deflation of 0. 5 percent in 2016. Remittances were estimated to go up from USD 1. 7 billion in 2015 to USD 2 billion in 2016. Despite the continued appreciation of the Som during the first five months of 2017, inflation picked up considerably from 0. 5 percent to 2. 4 percent during the same period in 2016 and 2017 respectively.

The current account deficit was reduced from 15. 8 percent in 2015 to 9. 8 percent in 2016 in part by declining imports, reflecting lower imports of vehicles and machinery and, in part, by increased remittances. Both exports and imports have recovered during the first

five months of 2017.

Budget deficit widened from 1. 5 percent of GDP in 2015 to 4. 6 percent in 2016 because of shortfalls in tax revenues and rapid increase in government expenditures.

Short-Term Prospects

Growth is projected to slow to 3 percent in 2017 because of the base effect and an expected decline in output from Kumtor gold mine. It is expected to recover to 3. 5 percent in 2018 reflecting higher growth in the country's main regional partners, Kazakhstan and the Russian Federation and improvements in domestic production (Table 15).

Upcoming presidential elections in October 2017 have increased uncertainties which could dampen new investment, particularly foreign investment compared to those projected in this analysis.

The forecast in inflation of 4. 7 percent assumes that import tariffs would rise to EEU mandates in 2017. The exchange rate seems to have stabilized since the middle of 2016 (Figure 15).

Figure 15 The Kyrgyz Republic: Exchange Rate

Source: National Bank of the Kyrgyz Republic.

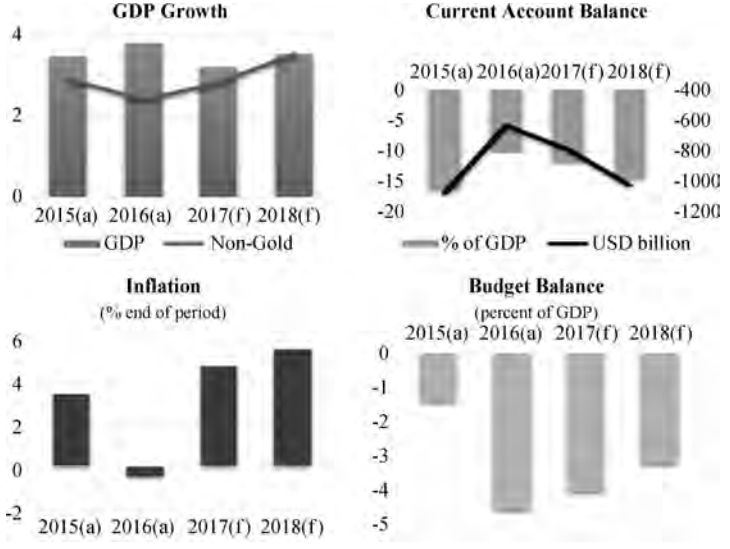
Table 15 The Kyrgyz Republic: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Som billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	452.0	3.5	3.8	3.2	3.5
Private consumption	390.0	-6.5	5.5	4.1	4.7
Public consumption	92.6	0.2	18.6	2.3	2.2
Fixed capital formation	136.2	-10.2	-3.6	11.0	4.5
Exports of goods and services	161.1	-4.0	-4.2	6.0	6.9
Imports of goods and services	336.0	-17.0	6.4	6.0	6.5
Non-Gold GDP	394.1	2.9	2.4	2.8	3.5
(USD billion)			*(as percent of GDP *)*		
Current account balance	-633.2	-15.8	-9.8	-11.5	-14.2
Exports	1,594.0	24.2	24.7	25.6	27.2
Imports	3,680.0	57.7	56.9	63.5	74.1
Trade balance	-2,086.0	-33.5	-32.3	-37.9	-46.9
(Som billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	130.6	29.8	28.9	28.5	27.7
Budget Expenditures	151.5	31.2	33.5	32.6	31.0
Budget Balance	-20.9	-1.5	-4.6	-4.1	-3.3
			(percent end of period)		
Consumer Price Index		3.4	-0.5	4.7	5.5
Remittances (USD million)		1,688	1,997	2,061	2,131

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



Imports are projected to grow faster than exports in 2017 and 2018, widening the trade and current account deficits. The latter increased from 9. 8 percent of GDP in 2016 to 11. 5 percent in 2017 and 14. 2 percent in 2018.

Key Policy Issues

Harmonization with and adaptation to the EEU looms large in the short-term policy agenda of the Kyrgyz Republic. With the relative recovery of demand from other EEU members, the Kyrgyz Republic will need to focus on establishing markets for its agricultural products. This would, in the first instance, require meeting EEU sanitary and phytosanitary standards. Cross-border economic zones for joint ventures for global value chain integration would be an optimal policy to leverage market access advantages of being member of EEU.

Another important issue is the fiscal consolidation and keeping the government's and SOEs' domestic and external borrowing under check. Fiscal consolidation involves eliminating tax exemptions, avoiding issuing new ones, improving tax administration and improving the efficiency of public expenditures.

(The description of the models for the Kyrgyz Republic can be perused by clicking: *https: //www. carecinstitute. org/ publications/ macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/ for Version 1 and Version 2)

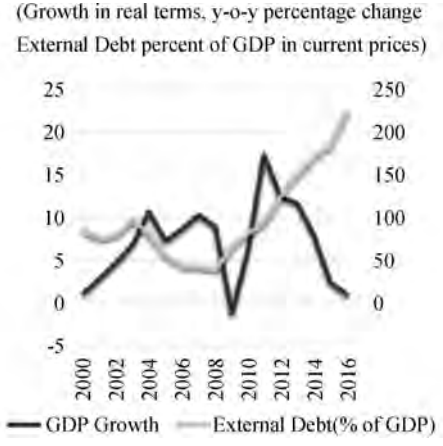
MONGOLIA

Recent Developments

The Mongolian economy has been on a roller coaster ride for the last fifteen years (Figure 16). Each half cycle, peak to trough, seems to have taken about five years. GDP growth decelerated sharply from a peak of 17. 3 percent in 2011 to one percent in 2016 because of declining private consumption and weak mining activity until the last quarter when coal production and exports spiked because of shortages

in the PRC. The second phase of the Oyu Tolgoi (OT) copper and gold mine which was delayed in 2015 started during the second half of 2016. During the first quarter of 2017, mining value-added declined 6. 4 percent y-o-y compared to 13 percent in the previous year, while GDP grew by 4. 2 percent and 3 percent respectively.

Figure 16 Mongolia: GDP Growth and External Debt



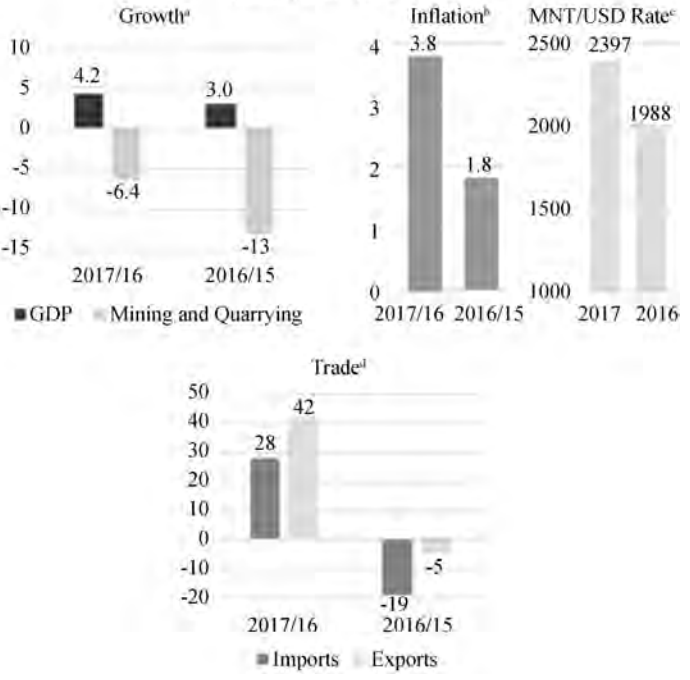
Source: National Statistics Office of Mongolia and World Bank.

Private consumption bore the brunt of the adjustment which declined by 8. 8 percent in 2016. During the first quarter of 2017, it was up by 3 percent y-o-y while the government final consumption declined 6. 3 percent.

Following a 27 percent decline in 2015, imports continued to decline by 11. 6 percent in 2016. Exports recovered in 2016 and increased by 5 percent in 2016. External trade was very vibrant during the first five months of 2017 when exports grew by 28 percent and imports by 42 percent y-o-y in current USD terms (Figure 17). The current account deficit remained at 4 percent of GDP both in 2015 and 2016.

Budget revenues have declined in 2015 and 2016 while budget expenditures increase very rapidly because of high interest payments and election spending in 2016, widening the budget deficit to a very high 17 percent.

Figure 17 Mongolia
(January-June periods)



[a] y-o-y in real terms. Q1 data only
[b] y-o-y Consumer Price Index
[c] Official rates on June 1, 2016 and 2017
[d] y-o-y in current prices
Source: National Statistics Office of Mongolia.

Short-term Prospects

Growth is projected to return gradually in 2017 and 2018 before the large mining projects come on stream and contribute to the economy on a significant scale in 2019 and beyond (Table 16). External trade is expected to recover and the current account deficit is projected at 4. 5 percent of GDP in 2017 and widening to 8 percent in 2018,

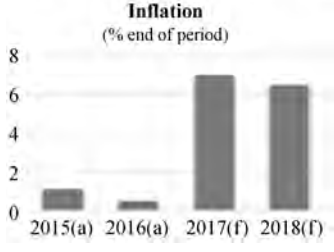
Table 16 Mongolia: Forecasts of Macroeconomic Indicators

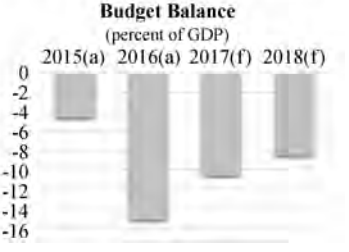
	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Togrog billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	24,180.0	2.5	1.1	1.0	2.0
Private consumption	12,725.2	7.2	-8.8	-2.9	1.1
Public consumption	3,452.5	-4.7	8.9	-8.0	-5.0
Fixed capital formation	7,053.1	-27.2	14.3	12.6	6.4
Exports of goods and services	12,128.7	1.2	14.7	1.0	1.0
Imports of goods and services	11,179.6	-11.5	13.3	1.1	1.1
Non-Mineral GDP	19,118.0	-1.0	1.1	-0.5	0.9
(USD billion)			*(as percent of GDP *)*		
Current account balance	-449.0	-4.0	-4.0	-4.5	-8.1
Exports	4,917.3	39.7	43.6	48.9	48.8
Imports	3,357.9	32.3	29.8	35.2	37.3
Trade balance	1,559.4	7.4	13.8	13.7	11.5
(Togrog billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	5,852.0	26.2	24.2	24.7	26.3
Budget Expenditures	9,519.0	30.8	39.4	35.3	34.8
Budget Balance	-3,667.0	-4.6	-15.2	-10.6	-8.5
			(Percent end of period)		
Consumer Price Index		1.1	0.5	7.0	6.5
Remittances (USD million)		261	263	270	275

[a] in constant prices

* in current prices

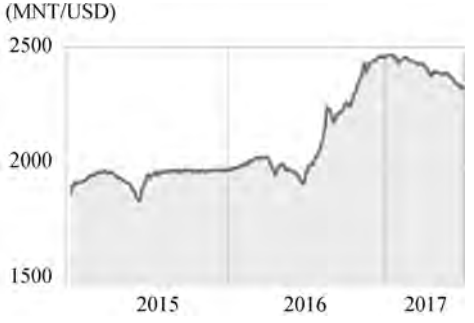
Source: CI Consultants' assessment.





Inflation is projected to pick up from the low level of 0. 5 percent to 7 percent reflecting the depreciation of Togrog (Figure 18) in 2017 and moderate to 6. 5 percent in 2018. The budget deficit is projected to narrow to 10. 6 percent of GDP in 2017 and 8. 5 percent in 2018.

Figure 18 Mongolia: Exchange Rate



Source: Central Bank of Mongolia.

Key Policy Issues

Mongolia signed a three-year agreement for an Extended Fund Facility (EFF) arrangement with the IMF in May 2017. The arrangement calls for "strong fiscal adjustment backed by substantial reforms intended to improve fiscal discipline; prudent monetary policy and a new central bank law to strengthen its independence and governance; a flexible exchange rate; a comprehensive strategy to strengthen the banking sector, starting with an independent Asset Quality Review; and measures to protect the most vulnerable and to diversify the economy. "[21]

In addition to fiscal consolidation, a key short-term issue is the fragility of the banking system which suffers from high ratio of NPLs estimated at 7 percent (excluding restructured loans and loans in early arrears) because of loosely regulated lending by the Central Bank and the downturn of the economy.

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21 IMF, 2017 Article IV Consultation and Request for an Extended Arrangement Under the Extended Fund Facility, IMF Country Report No. 17/140.

Mongolia possesses one of the richest reserves of coal, copper, silver, uranium and zinc. While the mineral resources are likely to last for a long time, a more coherent macro-economic framework would pave the ground work for a diversified economy.

(The description of the model for Mongolia can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

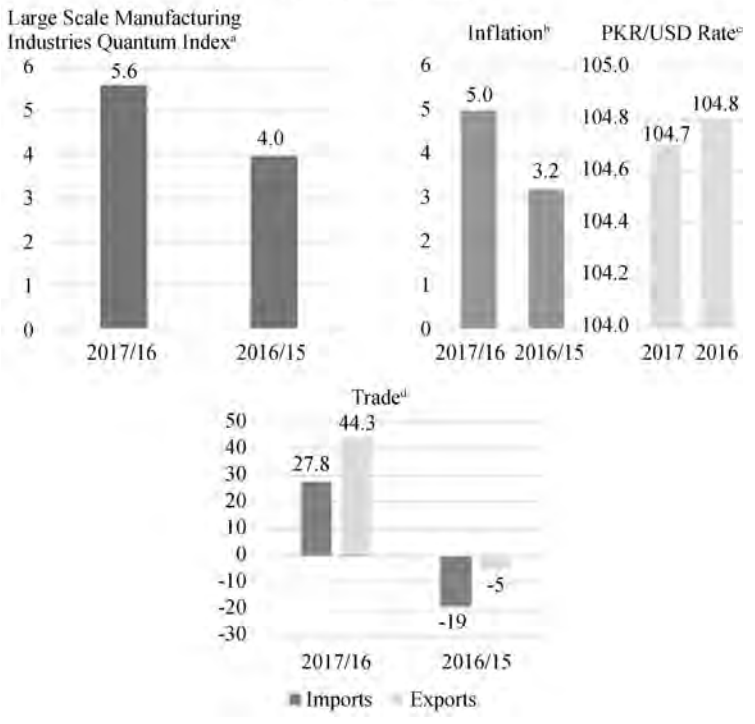
PAKISTAN

Recent Developments

Pakistan is on growth trajectory and is expected to hit decade best growth rate figures of more than 5. 0 per cent in 2017 and can build up the momentum to achieve 5. 4 per cent GDP growth in year 2018. However, GDP growth rates hinges upon the institutional stability (both political and economic), continued reform policy measures and commitment to pursue structural reforms on a medium to long term basis; and balance of position (BOP) management (which may include addressing galloping current account deficit and mismatch of exchange rate on short term). The growth impetus resulted due to improvement in manufacturing sector (Large Scale Manufacturing Index for the year 2017 touches at 5. 6 percent), agriculture sector and surge in services sector, enhanced domestic consumption and investment especially from the PRC need to be anchored on a more sustainable and sound term economic settings. The flip side of the increase in the domestic consumption and investments is already putting pressure on current account deficit which increased to US $ 12. 1 billion in 2017 from US $ 4. 6 billion a year ago.

Trade imbalance is also a policy concern as Pakistan's exports have almost decelerated in past four years. The import bill is increasing and is highly inelastic (comprising mainly of raw materials – petroleum, chemical, metals, food items – and intermediate goods and machinery).

Figure 19 Pakistan
(January-June periods)



[a] July-May period for both years, % growth
[b] y-o-y Consumer Price Index
[c] Official rates on June 1, 2016 and 2017
[d] y-o-y in current prices
Source: Pakistan Bureau of Statistics.

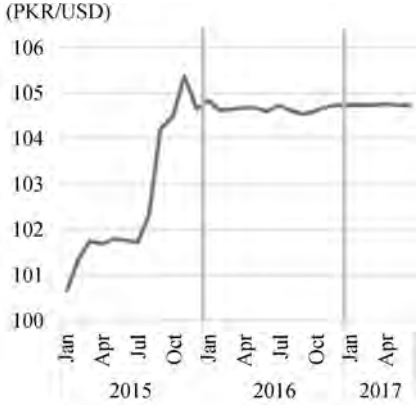
Imports witnessed 17 per cent rise in 2017 and was contributed by higher petroleum bill (26 percent); Machinery and Equipment (20 percent). Declining export trend however slowed down due to export incentive package announced by the Government. Current account deficit is mainly contributed by the trade imbalances and debt servicing. Expatriate Pakistani remittance has traditionally provided buffer to BOP imbalances. Sustained Remittances flow may be at risk due to economic slow-down and fragile security situation in Middle East – the major source of expatriate workers remittances.

Pakistan has kept exchange rate (Pak rupees versus US dollar) almost unchanged in 2016 hovering around Rs. 104 to Rs. 105[22]. The strain on Pakistani currency would likely to increase and may witness a market correction. Such an abrupt exchange rate correction leading to devaluation of Pakistani Rupee if not supported by long term structural and institutional reforms might be counter-productive as it may exacerbate inflation and erode the competitiveness of Pakistani exports as it is import intensive.

The fiscal deficit has also increased to 5. 8 per cent of the GDP in 2017 from 4. 6 per cent in 2016. [23] The fiscal space would also be constrained in 2018 – the election year in Pakistan.

Inflationary pressure was prominent in 2017 which increased to 4. 2 percent from 2. 9 per cent a year earlier[24] and likely to rise even further in 2018 exceeding 6 percent.

Figure 20 Pakistan: Exchange Rate



Source: State Bank of Pakistan.

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22 Pakistani rupee depreciated by 0. 6%, from PRs104. 8 to the US dollar in June to PRs105. 4 in July.

23 State Bank of Pakistan, State of Economy Press Release no. ERD/M& PRD/PR/01 – 2017 – 100. http: //www. sbp. org. pk/press/2017/Pr – 12 – Oct – 17. pdf (October 12, 2017).

24 ADB, *Asian Development Outlook*, update September 2017.

Key Policy Issues

- While Pakistan has attained highest growth rate in a decade, sustained growth momentum can be maintained through improved institutional and market efficiency, good governance, accountability and transparency.
- Policy innovations are needed to create fiscal space where tax collection base can be increased without increasing the tax rate.
- Weeding out inefficiencies and corruption in public sector enterprises by introducing public sector reforms can plug the wastage on national exchequer. Public Private Partnerships instead of privatization may be short term solution to avoid political acrimony and continued public sector losses.
- Exchange Rate flexibility needs to be moderated by the long-term policy reforms.
- External borrowing from global capital market needs to be backed by structural policy adjustments, reducing cost of doing business and improving the competitiveness.
- Pakistan needs to address rising inequality and deteriorating social safety net. Investing to providing basic infrastructure – access to quality education, health, clean and safe drinking water, affordable utilities (energy and internet) – can improve social wellbeing and economic prosperity.
- Prudent investment regime and risk management systems at national and regional level may preempt and check unwarranted and unproductive investments. "Capital inflows at favorable borrowing rates, possibly leading to risks of balance of payments reversals later."[25] Under-developed market economies where

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25 Maurice Obstfeld, *A Firming Recovery,* IMF blog. https://blogs.imf.org/2017/07/23/a-firming-recovery/ (accessed on September 24, 2017).

private sectors are not fully mature to participate and guide the allocation of scare resources further complicate the recovery of developing economies. Such risks are voiced aloud especially for Pakistan to take supporting structural, institutional, monetary policy, and macroprudential reforms.

- Sustainable Investments Management mechanisms needs to developed to encourage transfer of technology, employment generation and global value chain integration to avoid current account deficit and strain on scarce foreign resources.

(The description of the model for Pakistan can be perused by clicking: *https://www.carecinstitute.org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

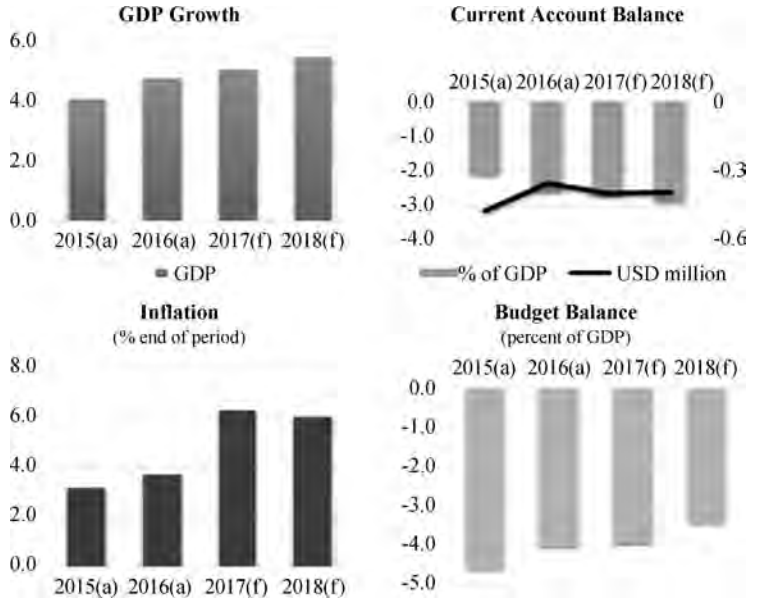
Table 17 Pakistan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Rupee billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	31,862.0	4.0	4.7	5.0	5.4
Private consumption	26,075.0	6.9	5.9	5.5	5.3
Public consumption	3,786.0	8.2	10.7	5.7	5.1
Fixed capital formation	5,026.8	6.6	8.0	4.5	6.4
Exports of goods and services	2,653.2	-1.6	-0.2	-3.4	6.4
Imports of goods and services	5,215.8	11.7	12.0	8.2	4.2
(USD billion)			*(as percent of GDP *)*		
Current account balance	-2.6	-2.1	-2.6	-2.7	-2.9
Exports	22.8	8.6	8.2	7.1	6.3
Imports	39.4	14.9	14.1	13.7	12.1
Trade balance	-16.6	-6.3	-5.9	-6.6	-5.8
(Rupee billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	5,347.0	15.9	16.8	16.6	17.3
Budget Expenditures	6,623.0	20.5	20.8	20.5	20.7
Budget Balance	-1,276.0	-4.6	-4.0	-3.9	-3.4
			(percent end of period)		
Consumer Price Index		3.2	3.7	6.3	6.0
Remittances (USD million)		18,721	19,914	20,551	21,209

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



TAJIKISTAN

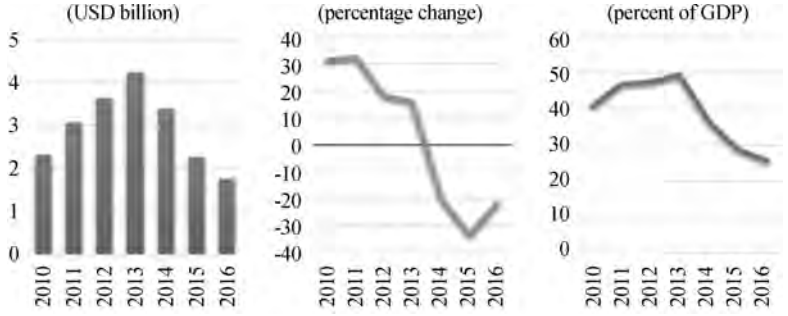
Recent Developments

For a third consecutive year, Tajikistan saw significant declines in remittance inflows, from the peak of $4.2 billion in 2014 to $1.8 billion in 2016 (Figure 21). The ratio of remittance inflows to GDP declined from almost a half (49.6 percent) to about a quarter (25.5 percent) respectively. These are, by any standard, major shocks which reverberate in the entire economy.

GDP growth was strong in 2016 because of high mining and manufacturing growth – 16 percent y-o-y for industry – and a 5.3 percent growth in agriculture. The large drop in remittances resulted in a weak growth in services and private investment.

Imports of goods and services were down by 18.3 percent in 2016, following a 24 percent decline in 2015. Exports of goods and services

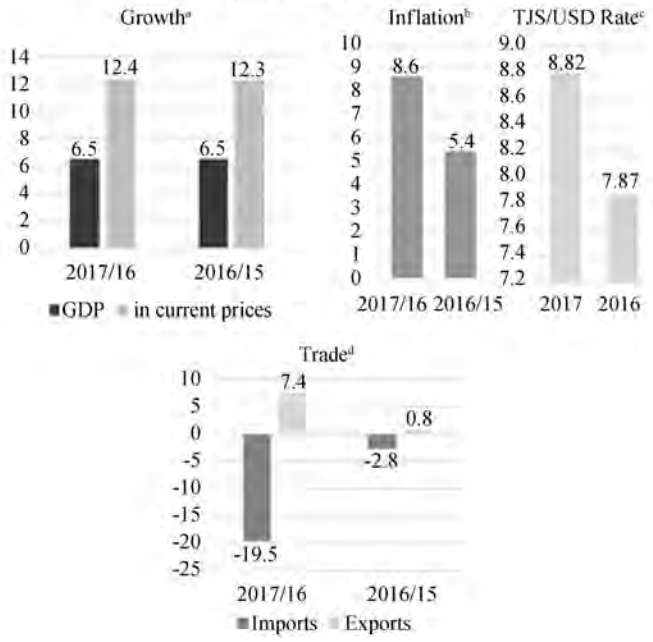
Figure 21 Tajikistan: Remittances



Source: World Bank Remittances Database, ADB.

increased by 13. 9 percent in 2016 following a 3. 1 percent decline in 2015. The current account deficit narrowed from USD 484 million (6. 2 percent of GDP) in 2015 to USD 265 million (3. 4 percent of GDP) in 2016. The downslide in imports continued during the first five months of 2017 with a 19. 9 percent drop, while exports had a 7. 4 percent growth during the same period. Although import prices of wheat and petroleum products declined and the exchange rate was kept unchanged during 2016, inflation went up from 5. 1 percent in 2015 to 6. 1 percent in 2016, in part because of a mid-year public sector wage increase and tariff increase for power. Fueled by the depreciation of Somoni, inflation was up at 8. 6 percent y-o-y at end-May 2017 compared to 5. 4 percent a year ago (Figure 22). Budget deficit declined from 2. 1 percent of GDP in 2015 to 1. 7 percent in 2016 although government's social spending and investment projects increased during the year. The share of government expenditures reached an all-time high of 33. 8 percent in 2016. Significant levels of external borrowing increased the ratio of public and publicly guaranteed debt to GDP to 32. 7 percent of GDP in 2016 from 27. 8 percent in 2015.

Figure 22 Tajikistan
(January-June periods)



[a] y-o-y both current and constant prices Q1 only

[b] y-o-y Consumer Price Index

[c] Official rates on June 1, 2016 and 2017

[d] y-o-y in current prices

Source: Statistics Agency under the Govemment the Republic of Tajikistan and National Bank of Tajikistan.

The fragility of the banking system which has been beset by a plethora of problems since 2014 worsened in 2016. The share of NPLs of the banks' portfolio was estimated at 54 percent at end-2016, up from 30 percent in 2015. The government injected capital into four banks during December 2016 to the tune of USD 375 million.

Faced with rapid monetary expansion, National Bank raised the policy rate to 16 percent from 11 percent and increased the reserve requirements in March 2017.

Short-term Prospects

GDP growth is projected to slow down to 4. 8 percent in 2017 and to pick up slightly to 5. 4 percent in 2018. Private consumption which is estimated to have declined in 2016 is expected to recover to 3. 9 percent in 2017.

The official exchange rate for the Somoni which was kept unchanged by exchange controls during 2016 depreciated 12 percent during the first five months of 2017 (Figures 22 and 23). While the depreciation would help improve the competitiveness of Tajikistan's exports, it would curb the growth of imports.

Figure 23 Tajikistan: Exchange Rate

Source: National Bank of Tajikistan.

Remittances from the Russian Federation seem to have been recovering; they increased by 39. 6 percent y-o-y in during the first quarter of 2017. In part because of the depreciation of the currency, inflation is projected to rise to 8 percent in 2017 and remain around that level in 2018 as well. The current account deficit is expected to widen to 5. 3 percent of GDP in 2017 and decline to 4. 4 percent in 2018.

While several public investment projects have been financed by external borrowing in the recent years, there is not much fiscal space to run expansionary policies in 2017 and 2018.

Key Policy Issues

The most important short-term policy issue for Tajikistan is the restructuring of its ailing banking system. The share of NPLs in the banks' portfolio has risen to very high levels and eroded the adequacy of their capital base. The State has been injecting resources and propping up a very pool of bad loans. Measures need to be taken to eliminate insider lending and cronyism in lending, to improve risk assessment and management and to strengthen banking supervision and regulation. Unless the confidence in the banking system is reestablished, the economy will suffer from slower overall activity, weak investment and high transaction costs and inefficiency.

The second key policy issue is sustainability of public- and publicly-guaranteed domestic and external debt. The ratio of domestic and external public debt went up from 30 percent to 43. 3 percent in 2016. A medium-term fiscal framework is needed to ensure sustainability and design macroeconomic policies that would create an environment for employment friendly growth.

Exploiting natural resources and attracting investments into mining, agricultural and energy sectors would diversify economic structure. Improving business prospects in Russian Federation would improve forecasts for the remittances. Human development especially focusing on marginalized gender would improve the development of private sector and entrepreneurial activities.

(The description of the model for Tajikistan can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

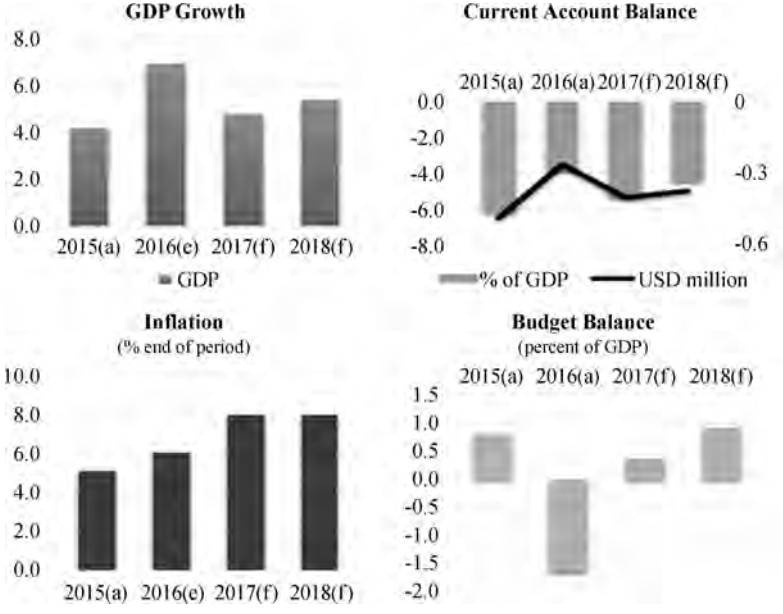
Table 18 Tajikistan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Somoni billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	54.5	4.2	6.9	4.8	5.4
Private consumption	49.3	4.0	-7.7	3.9	6.3
Public consumption	8.0	5.3	10.5	4.0	6.0
Fixed capital formation	18.5	-4.4	17.0	5.0	5.0
Exports of goods and services	9.2	16.0	13.9	6.0	9.0
Imports of goods and services	30.5	10.4	-10.4	3.5	8.0
(USD billion)			*(as percent of GDP *)*		
Current account balance	-0.3	-6.2	-3.8	-5.3	-4.4
Exports	0.9	10.3	13.3	13.0	12.8
Imports	3.0	42.2	42.7	40.9	39.8
Trade balance	-2.1	-31.9	-29.5	-27.9	-27.0
(Somoni billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	17.5	33.3	32.1	30.5	29.4
Budget Expenditures	18.4	32.4	33.8	30.1	28.5
Budget Balance	-0.9	0.8	-1.7	0.4	0.9
			(percent end of period)		
Consumer Price Index		5.1	6.1	8.0	8.0
Remittances (USD million)		2,259	1,778	1,885	1,998

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



TURKMENISTAN

Recent Developments[26]

Following several years of double digit growth, GDP growth slowed down to 6.5 percent because of the fall in hydrocarbon prices. According to official data, GDP growth further decelerated to 6.2 percent in 2016. The official estimate for growth during the first half of 2017 was 6.5 percent y-o-y.

Declining export earnings estimated at 15 percent y-o-y in 2016 has led to current account deficit to jump to 21 percent of GDP despite the contraction of imports estimated at 17 percent. The fixed exchange rates (pegged to the USD at 3.50 Manats) have been maintained by strict exchange controls and the proliferation of a parallel market which reached as low as 7-8 Manats to the USD.

An IMF Article IV mission that visited Turkmenistan in March 2017 estimated for inflation at 3.6 percent in 2016, it is likely to be based on officially controlled prices rather than market prices. [27]

Faced with declining budget revenues, the government has started to phase out subsidies for public utilities and increased their tariffs.

Short-term Prospects

The IMF mission projects GDP growth at 6.5 percent in 2017 and 6.3 percent in 2018. With the relative recovery of hydrocarbon markets, the current account deficit is projected to narrow to 15 percent in 2017 and 13 percent in 2018.

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26 The scarcity of economic data makes the analysis of Turkmenistan's economy extremely difficult.

27 A back of an envelope calculation shows 50 percent to 70 percent increase in imported food prices between May 2015 and May 2016 by using the data available on Turkmen Stat website. http://www.stat.gov.tm/main/info/social-econ/month-price/

Key Policy Issues

The heavy dependence of the economy on hydrocarbon exports which allowed high rates of growth in the past has also proven to be a major constraining factor since the oil prices started to decline in 2015. Hydrocarbons account for about 30 percent of GDP and more than 90 percent of export earnings. More improvements in FDI and privatization policy to develop the non-hydrocarbon economy set in "the National Program of Socio-Economic Development, 2011-2030" emerge as a key strategic policy objective.

- Another policy issue is the deepening of financial markets to facilitate a more market-based intermediation than using directed credit to state-led enterprises.
- Gradual removal of exchange restrictions for trade would also help improve efficiency.
- Private Sector Development through SME incentives and GVC oriented policy.

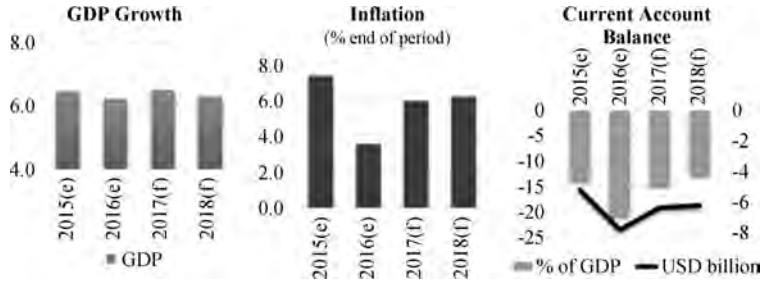
Table 19 Turkmenistan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Manat billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	127	6.5	6.2	6.5	6.3
(USD billion)			*(as percent of GDP *)*		
Current account balance	−8	−14	−21	−15	−13
(Manat billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	16	16.5	12.8	12.4	13.1
Budget Expenditures	18	17.2	14.1	13.1	12.9
Budget Balance	−2	−0.7	−1.3	−0.7	0.2
Consumer Price Index		7.4	3.6	6.0	6.2

[a] in constant prices

* in current prices

Source: IMF.



(No model was estimated due to lack of data to have statistically meaningful results).

UZBEKISTAN

Recent Developments

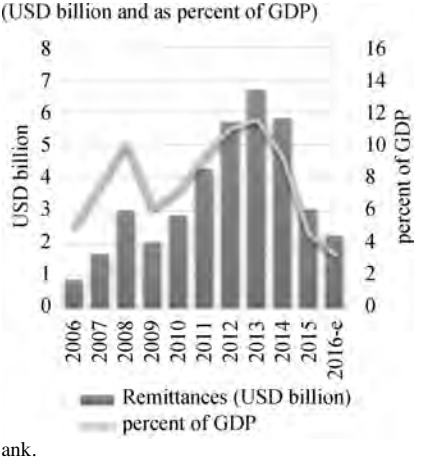
According to official data, Uzbekistan's economy has been growing at an average rate of 8. 1 percent, ranging between 7 percent and 9. 5 percent since 2004, notwithstanding the series of economic and financial crises that affected its neighbors and trading partners. It has also maintained an average current account surplus of 2. 7 percent of GDP and budget surplus of 0. 3 percent of GDP and annual average inflation rate of 7 percent without much fluctuation since 2009 (Figure 24).

Figure 24 Uzbekistan: Economy over Time
(GDP, annual real growth; inflation annual percentage end-year, budget deficit as percent of GDP)

Source: ADB.

The reported GDP growth was 7. 8 percent in 2016, slightly below 8. 0 percent in 2015. Growth was driven by investment (and construction of the supply side) which grew by 9. 4 percent in 2016. Exports of goods declined by 2. 4 percent because of a slowdown in gas exports to PRC and food exports in 2016. Imports declined by 1. 2 percent reflecting low energy prices in 2016. The current account surplus was USD 907 million or although there was a significant drop in remittance inflows (Figure 25).

Figure 25 Uzbekistan Remittances



Source: World Bank.

Because of the slowdown in the economies of the Russian Federation and Kazakhstan, remittance inflows to Uzbekistan which reached USD 6. 7 billon (11. 6 percent of GDP) in 2013 declined to an estimated USD 2. 3 billion (3. 4 percent of GDP) in 2016.

The reported inflation rate for 2016 was 5. 7 percent, below the 8. 4 percent estimated by the IMF using the same data but a different methodology.

Short-term Prospects

GDP growth is projected to grow at 7 percent in 2017 and 2018 which is less than 2016 growth rates. Industry is highly dependent on export

of machinery and equipment and susceptible to demand variation in neighbouring countries especially Russian Federation. Remittances are expected to pick up from the low level observed in 2016. Inflation is estimated to be 9. 0 percent in 2017 and 9. 5 percent in 2018.

Central government budget revenues and expenditures increased 18 percent y-o-y during the first quarter of 2017. Current account and budget are both expected to produce small surpluses in 2017 and 2018.

Key Policy Issues

- Economic disparity, lack of infrastructure and public services stifle competitiveness and entrepreneurship in the country. Urban-Rural balanced development, encouraging horticultural export clusters and improved connectivity can generate economic activities and help in diversify business portfolio.

- Opening of economy and liberalizing investment regime (like Public private partnerships) can meet the investment deficit and improve the sustainability of the financial sector.

- Uzbekistan's economy has been operating with dual exchange rates – the official rate and the parallel market rate – for some time. Reforming the financial system would require greater exchange rate flexibility. The latter would also help eliminate distortions in resource allocation.

(The description of the model for Uzbekistan can be perused by clicking: *https://www. carecinstitute. org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries*-2017/)

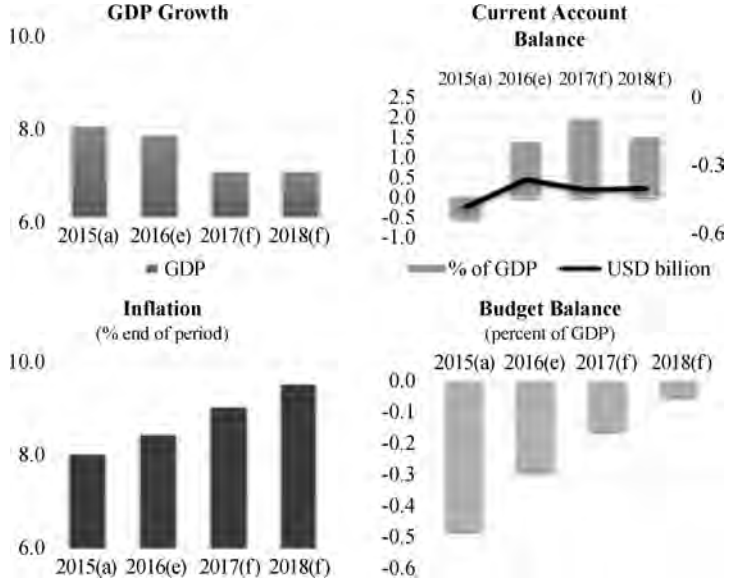
Table 20 Uzbekistan: Forecasts of Macroeconomic Indicators

	2016 (a) *	2015 (a)	2016 (a)	2017 (f)	2018 (f)
(Sum billion in current prices)			*(Growth rate, percent)* [a]		
Gross Domestic Product	198,303	8.0	7.8	7.0	7.0
Private consumption	107,562	6.5	3.6	7.9	7.5
Public consumption	29,460	6.7	0.2	4.5	4.8
Fixed capital formation	61,133	6.8	9.4	7.3	7.1
Exports of goods and services	36,697	1.4	-2.4	3.0	4.0
Imports of goods and services	36,550	1.4	1.2	4.0	4.0
(USD billion)			*(as prcent of GDP *)*		
Current account balance	907	-0.5	1.4	2.0	1.5
Exports	12,570	18.3	18.9	18.0	18.3
Imports	12,011	18.2	18.1	17.4	17.8
Trade balance	559	0.1	0.8	0.6	0.5
(Sum billion in current prices)			*(as percent of GDP *)*		
Budget Revenues	65,263	34.3	32.9	32.6	32.3
Budget Expenditures	65,834	34.7	33.2	32.7	32.4
Budget Balance	-571	-0.5	-0.3	-0.2	0.0
Consumer Price Index		8.0	8.4	9.0	9.5
Remittances (USD millon)		2,584	2,982	3,200	3,600

[a] in constant prices

* in current prices

Source: CI Consultants' assessment.



Chapter 4

Short-term Forecasting Techniques and Models

This chapter discusses the methodologies used in building short-term forecasting models for the CAREC countries. An illustrative dataset for the Kyrgyz Republic is used for learning purposes. The illustrative dataset presents, to the extent possible, actual data available online, but it is not up-to-date and it should not be used as the basis for building the models for that country. A real dataset for Kazakhstan and structural model was built under this project and provided as Annex II[28] for learning and analysis purposes.

Short-term monitoring of the economy requires availability of reliable data with a short release lag and at highest frequency; ideally, real time, if not, hourly, daily, weekly, monthly, quarterly, or annual. Obviously, finding these are not possible in all the countries and/or in all the time. This necessitates following two important principles:

- Data at different frequencies are to be used. For example, if a monthly index of industrial production is available, it may be used with quarterly employment numbers to explain quarterly or even annual gross domestic product.
- Use available data at its highest frequency. For example, if gross domestic product series is available quarterly and annually, then

28 https://www.carecinstitute.org/publications/macroeconomic-monitoring-and-forecasting-model-for-carec-member-countries-2017/

use the quarterly one. If annual industrial production data are available in more detail with many sub-sectors but released a year after the end of the year, it may be better to use a quarterly index with a limited coverage but released a few days following the end of the quarter.

In addition to the econometric processes which are discussed below, there is an element of art involved in developing and analysis of the Models – professional judgment by the economists who know the country and its policies matter much in improving the modeling performance. Having local researchers is a major improvement and contribution in econometric modeling. This was the driving force behind Project LINK[29] initiated by Lawrence R. Klein and Bert Hickman.

National Statistics And Dataset Structure

There has been a significant progress to establishing and implementing standards for dissemination of economic and financial data in the last decade. The International Monetary Fund (IMF) has taken the lead in

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29 "Project LINK is a large cooperative, non-governmental, international research consortium. It is based on a world-wide network of participants in more than 60 countries in the industrial and developing world, and it is internationally recognized as a leading center of quantitative international economic analysis. The activities of Project LINK are coordinated jointly by the Project LINK Research Centre at the University of Toronto and the Department for Economic and Social Affairs of the United Nations. Project LINK's principal achievement has been to integrate independently developed national econometric models into a world econometric model (LINK). Initiated in 1968 under the auspices of the U. S. Social Science Research Council and the leadership of Nobel Laureate Lawrence Klein, the project has expanded from a core of 11 researchers and seven country models to more than 250 participants and 78 models at present time for a comprehensive coverage of the global economy. The national centers of the project include universities private research organizations, government agencies, and central banks. A further expansion of the system to approximately 120 countries and regions is currently under way." http://projects. chass. utoronto. ca/link/desc0305. htm

developing these standards[30] in addition to the subject-specific collection standards developed by various institutions such as the System of National Accounts (SNA) by the United Nations (UN), the Balance of Payments and International Investment Position Manual (BPM6) by the IMF.

While most of the CAREC countries, particularly those emerged from the former Soviet Union (FSU), have made strides in improving their statistical systems and adopting to international standards responding to the emergence of a large private sector and declining role of the State in production and economic management, over-reliance on census data collection methods, the old Soviet-type accounting standards in enterprises and financial institutions as well as an inadequate legal basis for statistical services have posed challenges during the transition. Most of the countries have had to develop new datasets such as household budget surveys and poverty indicators to meet the demands of the economies in transition. Nevertheless, the successors to the State Committee for Statistics (Goskomstat) are significant depositaries of economic and social data.

The availability, quality, frequency, and presentation of economic data vary widely among the CAREC countries. Bearing that in mind, the database template to be used in this project has been customized to accommodate all the CI countries. To make the collection and build-up stages easier, the template uses an Excel workbook where there are

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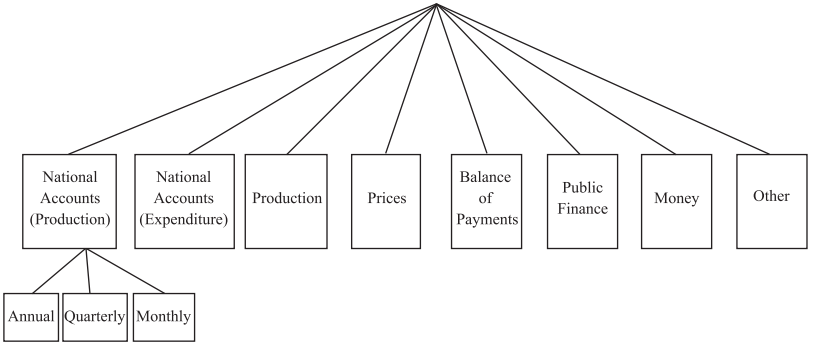
30 "The Special Data Dissemination Standard (SDDS) was established in 1996 to guide members that have, or might seek, access to international capital markets in providing their economic and financial data to the public. The General Data Dissemination System (GDDS) was established in 1997 for member countries with less developed statistical systems as a framework for evaluating their needs for data improvement and setting priorities. In 2012, the SDDS Plus was created as an upper tier of the IMF's Data Standards Initiatives to help address data gaps identified during the global financial crisis. In 2015 the enhanced GDDS (e-GDDS) replaced the GDDS. More than 97 percent of IMF member countries participate in the e-GDDS, SDDS, or SDDS Plus." https://www.imf.org/en/About/Factsheets/Sheets/2016/07/27/15/45/Standards-for-Data-Dissemination

three sheets for each of the nine subject areas, representing monthly, quarterly and annual frequencies. They include variables that are required at a minimum at least in one the three frequencies. The objective of collection is to obtain the highest frequency series and let the system calculate for the lower frequency values. In other words, if a variable is available monthly, the project team members should only collect the monthly series. For the variables for which there are no monthly or quarterly series available, annual series was required. The template workbook is structured with eight subject sections with each section having three sheets for annual, quarterly and monthly data (Figure 26). For the analytical work, data was transformed into e-views data sets.

Figure 26 Structure of the Data Template

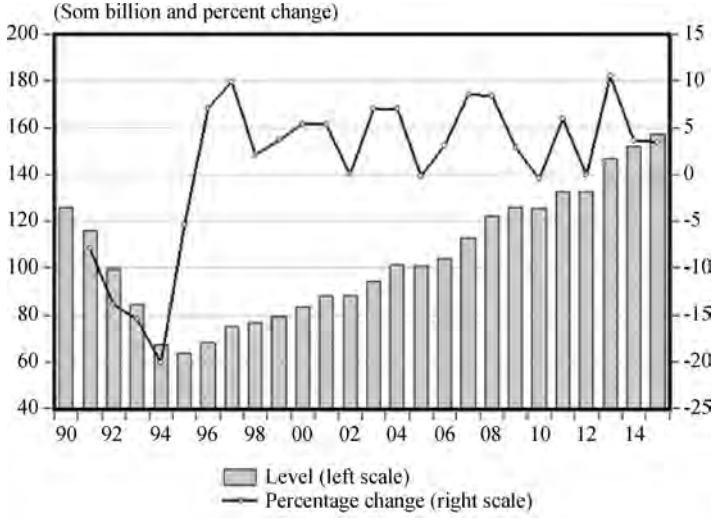


Statistical Properties of Variables in the Model

It is necessary to study time series properties of every series (variables) in models, and preferably also in the database. Several tools (such as graphs) and statistics have been used to this end. It is very easy to see the pattern in a typical line graph. For example, the dramatic decline in real gross domestic product (GDP) from 1990 to 1995 can be easily seen in a line diagram or a bar chart. It is even better to have both the level of real GDP and its change or percentage change in the same diagram. Just a visual inspection can help to decide

on the kind of model to be used for the specific issue, in this case growth (Figure 27). Histogram of a series is another tool that was used in this analysis. The mean level of real GDP was 104. 8 for 1990-2015. The median was 101. 0 for the same period. A maximum of 157. 2 was reached in 2015, and a minimum of 63. 8 was realized in 1995. The variation in the level of real GDP was significant with a standard deviation of 27. 2. The distribution of real GDP was skewed to the right with a coefficient of skewness of 0. 28, and a kurtosis of 2. 03. Jarque-Bera and associated probability statistics indicate that real GDP distribution was not statistically different from a Normal distribu-tion.

Figure 27 Kyrgyz Republic: GDP and Its Changes



It is probably better and more instructive to study the distribution of the growth rate rather than the level of real GDP. The average of annual growth rates was 1. 22% for 1990-2015. It should be noted that this is the mean of growth rates, and not necessarily equal to growth from 1990 to 2015. It is included here just to make a point regarding the distribution of a series. There are twelve years with a growth rate above 3. 47% and twelve years with a growth rate below 3. 47%. A maximum growth rate of 10. 5% was observed in 2013, and a minimum of negative 20. 01% (a very significant decline) was realized

in 1994. This large range of 30.6 was reflected in the standard deviation of 8.02, and a coefficient of variation of 6.57. The distribution is skewed to the left with a skewness coefficient of negative 1.29. This leptokurtic distribution has a kurtosis of 3.85 indicating that more of the variance is possibly a result of a few large deviations. Jarque-Bera also point to a distribution that is statistically different than a Normal distribution with a level of confidence of 95%.

Figure 28 Histogram of GDP

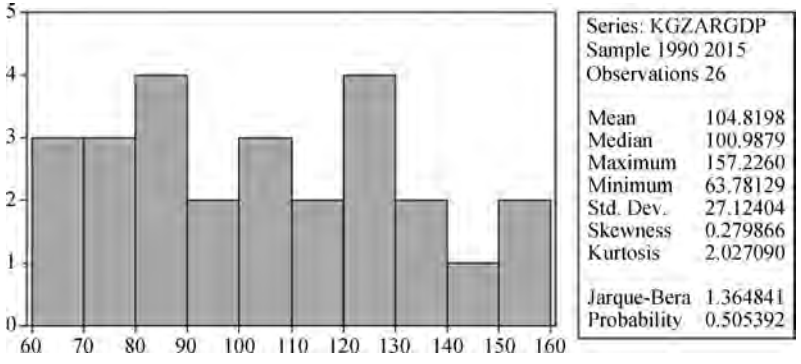
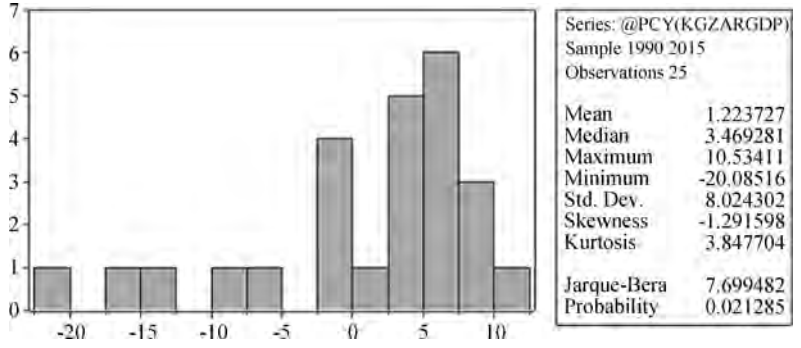


Figure 29 Histogram of Percent Change of GDP



Autocorrelation and partial autocorrelation functions (Correlogram) are useful in identifying the order of the time series model to be used in a Box-Jenkins framework. For example, real GDP has a trend indicated by a significant first order partial autocorrelation of 0. 87 (variance of 1/n or 1/26) and a decreasing autocorrelation. First difference in real GDP, D (KGZARGDP), also has a trend. Second difference, difference of difference, D (KGZARGDP, 2), does not seem to have a trend. Both autocorrelation and partial autocorrelation are low for all the lags up to 12, and they are all insignificant. These results suggest that real GDP is integrated of order 2, or simply I (2) in Engle-Granger terminology. This may be the preliminary model to be used (or initial model in Box-Jenkins terminology). It should be stressed that here the number of observations is relatively low (n = 26) because these statistics are based on asymptotic distributions which require a very large number of observations. Therefore, these results may be taken as suggestive models. Furthermore, there is a significant decline in real GDP in early years of the Republic, followed by relatively high growth rates. This possible structural change, in a statistical sense, may be another contributing factor to I (2) nature of the series.

Correlogram of Real GDP (KGZARGDP)
Sample: 1990 2015
Included observations: 26

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | ****** |	. | ****** |	1	0. 870	0. 870	22. 043	0. 000
. | ***** |	. * | . |	2	0. 708	−0. 200	37. 264	0. 000
. | **** |	. * | . |	3	0. 540	−0. 108	46. 505	0. 000
. | *** |	. | . |	4	0. 412	0. 067	52. 122	0. 000
. | ** |	. * | . |	5	0. 293	−0. 090	55. 092	0. 000
. | * . |	. | . |	6	0. 195	−0. 015	56. 475	0. 000
. | * . |	. * | . |	7	0. 085	−0. 136	56. 755	0. 000
. | . |	. * | . |	8	−0. 030	−0. 121	56. 791	0. 000
. * | . |	. | . |	9	−0. 121	0. 016	57. 420	0. 000
. * | . |	. | . |	10	−0. 187	−0. 036	59. 016	0. 000
. ** | . |	. * | . |	11	−0. 249	−0. 116	62. 035	0. 000
. ** | . |	. * | . |	12	−0. 317	−0. 121	67. 259	0. 000

Correlogram of Change in Real GDP D (KGZARGDP)

Sample: 1990 2015
Included observations: 25

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | *****	. | *****	1	0.659	0.659	12.201	0.000
. | ***	. | .	2	0.431	-0.005	17.660	0.000
. | * .	. * | .	3	0.168	-0.202	18.529	0.000
. | .	. | .	4	0.061	0.051	18.651	0.001
. | .	. | .	5	-0.008	-0.003	18.653	0.002
. | .	. | .	6	0.004	0.038	18.653	0.005
. | .	. | .	7	0.048	0.073	18.741	0.009
. | .	. * | .	8	-0.016	-0.171	18.751	0.016
. * | .	. | .	9	-0.069	-0.054	18.954	0.026
. | .	. | * .	10	-0.025	0.183	18.981	0.040
. | .	. * | .	11	-0.023	-0.071	19.007	0.061
. | .	. * | .	12	-0.062	-0.140	19.209	0.084

Correlogram of 2nd difference of Real GDP D (KGZARGDP, 2)

Sample: 1990 2015
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. ** | .	. ** | .	1	-0.285	-0.285	2.2075	0.137
. | .	. * | .	2	0.008	-0.079	2.2094	0.331
. ** | .	. ** | .	3	-0.237	-0.281	3.8753	0.275
. | .	. * | .	4	0.058	-0.118	3.9791	0.409
. | .	. * | .	5	-0.001	-0.066	3.9791	0.552
. | .	. * | .	6	-0.046	-0.159	4.0522	0.670
. | * .	. | .	7	0.087	0.007	4.3286	0.741
. | .	. | .	8	-0.009	-0.004	4.3318	0.826
. * | .	. * | .	9	-0.127	-0.198	4.9992	0.834
. | * .	. | .	10	0.089	0.018	5.3527	0.866
. | .	. | .	11	-0.026	-0.031	5.3842	0.911
. | * .	. | .	12	0.123	0.042	6.1719	0.907

Unit root tests help to identify whether the series is stationary or not. Here, augmented Dickey -Fuller tests for real GDP (KGZARGDP) are reported. Tests are conducted for the first and second differences as well as levels. According to these tests, the null hypothesis of a unit root is not rejected at the five percent level. Since Student's t-statistic is misleading in case of unit roots, MacKinnon critical values are used (t = . 41, p-value = . 98). The null hypothesis of the presence of a unit root in first differences of real GDP D (KGZARGDP) cannot be rejected at the five percent level (t = − 2. 25, p-value = 0. 19). On the other hand, the null hypothesis of a unit root in second difference of real GDP (D (KGZARGDP, 2)) is rejected even at the 1% level of significance (t = − 3. 81, p-value = . 0091). Both correlogram and unit root tests indicate that real GDP is integrated of order 2, I (2) variable, which suggests the use of second differences in real GDP in a time series model. These two methods do not necessarily give the same result. They are generally used as complements since these tests are asymptotic in nature and require very large number of observations. The decline in real GDP in early years, which may be a contributing factor to the presence of I (2) series should be studied carefully.

For the other variables in the illustrative dataset, please see Annex I.

Null Hypothesis: KGZARGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag = 5)

		t-Statistic	Prob. *
Augmented Dickey-Fuller test statistic		0. 413439	0. 9795
Test critical values:	1% level	− 3. 724070	
	5% level	− 2. 986225	
	10% level	− 2. 632604	

* MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D (KGZARGDP)
Method: Least Squares
Date: 11/15/16 Time: 18: 38
Sample (adjusted): 1991 2015
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KGZARGDP (– 1)	0. 027152	0. 065673	0. 413439	0. 6831
C	– 1. 534052	6. 942006	– 0. 220981	0. 8271

R-squared	0. 007377	Mean dependent var	1. 255084
Adjusted R-squared	– 0. 035781	S. D. dependent var	8. 043263
S. E. of regression	8. 185895	Akaike info criterion	7. 119321
Sum squared resid	1541. 204	Schwarz criterion	7. 216831
Log likelihood	– 86. 99151	Hannan-Quinn criteria.	7. 146366
F-statistic	0. 170932	Durbin-Watson stat	0. 613314
Prob (F-statistic)	0. 683115		

Null Hypothesis: D (KGZARGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag = 5)

		t-Statistic	Prob. *
Augmented Dickey-Fuller test statistic		– 2. 253673	0. 1940
Test critical values:	1% level	– 3. 737853	
	5% level	– 2. 991878	
	10% level	– 2. 635542	

* MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D (KGZARGDP, 2)
Method: Least Squares
Date: 11/15/16 Time: 18: 40
Sample (adjusted): 1992 2015
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (KGZARGDP (– 1))	– 0. 332909	0. 147718	– 2. 253673	0. 0345
C	0. 998324	1. 192564	0. 837124	0. 4115
R-squared	0. 187564	Mean dependent var		0. 636211
Adjusted R-squared	0. 150635	S. D. dependent var		6. 281481
S. E. of regression	5. 789077	Akaike info criterion		6. 429478
Sum squared resid	737. 2950	Schwarz criterion		6. 527649
Log likelihood	– 75. 15374	Hannan-Quinn criteria.		6. 455523
F-statistic	5. 079044	Durbin-Watson stat		2. 191426
Prob (F-statistic)	0. 034517			

Null Hypothesis: D (KGZARGDP, 2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag = 5)

		t-Statistic	Prob. *
Augmented Dickey-Fuller test statistic		– 3. 811799	0. 0091
Test critical values:	1% level	– 3. 769597	
	5% level	– 3. 004861	
	10% level	– 2. 642242	

* MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D (KGZARGDP, 3)
Method: Least Squares
Date: 11/15/16 Time: 18:44
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (KGZARGDP (– 1) , 2)	– 1. 441715	0. 378224	– 3. 811799	0. 0012
D (KGZARGDP (– 1) , 3)	0. 105114	0. 235848	0. 445686	0. 6609
C	1. 381743	1. 415150	0. 976394	0. 3411
R-squared	0. 655279	Mean dependent var		– 0. 027848
Adjusted R-squared	0. 618993	S. D. dependent var		10. 33673
S. E. of regression	6. 380427	Akaike info criterion		6. 670471
Sum squared resid	773. 4872	Schwarz criterion		6. 819250
Log likelihood	– 70. 37518	Hannan-Quinn criteria.		6. 705519
F-statistic	18. 05855	Durbin-Watson stat		2. 059333
Prob (F-statistic)	0. 000040			

Autoregressive Moving Average (ARIMA) Models

After studying statistical properties of all the series, Box-Jenkins auto-regressive moving average (ARIMA) models are built. These models are very useful and relatively easy to implement, but requires very long-time series data. Essentially, empirical probabilities observed in the past are projected into the future. A long-time series data will include all possible events with associated probabilities. If there is a crisis, long time ago, data which include that observation will incorporate that likelihood in estimations and therefore in forecasts. A rule of thumb on data requirement is a minimum of 5-6 economic cycles (or 30-40 years of data). If an economy had 5 consecutive years of decline in real GDP, and total number of observations for an analysis is only 10, those years surely dominate forecasts based on that data. The effect of those 5 consecutive declines will diminish if there

are 50 " normal " years following those declines. As a first approximation, ARIMA models are very useful, provided there is large number of observations.

There are at least two reasons for building time series models:

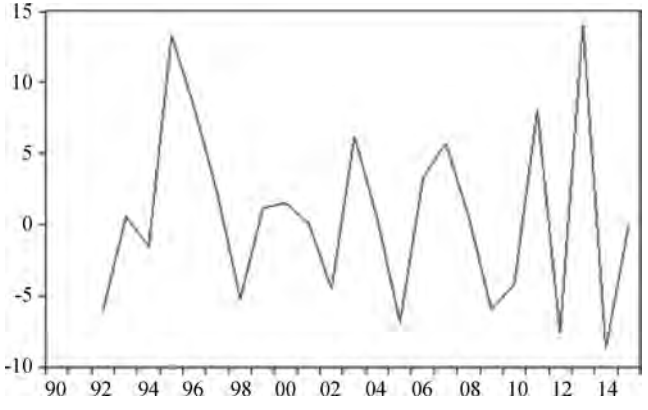
i. They do not require any information on other variables. One just needs a long series for the variable at hand.

ii. In a model framework, there are exogenous variables which are fed into the model. If there is no prior information, or no information on policy, ARIMA forecasts for these exogenous variables may be used in such models. Once, forecasts of those variable are made available, they may replace ARIMA models, without making any changes in the model.

Although, in principle ARIMA models are very easy to implement, there may be more than one model giving similar forecasts. Here, an example on real GDP will be given. Unit root tests and correlogram suggested the use of second difference of real GDP (that transformation led to a stationary series). Therefore, D (KGZARGDP, 2) may be used in the initial model. However, correlogram indicates that none of the autocorrelations and partial autocorrelations is significant. This may be a warning that lowers orders model may be better. One of the basic principles of ARIMA modeling is parsimonious parametrization, using the lowest number of parameters to be estimated or the lowest order of model. If ARIMA (1, 1, 1) is as good as ARIMA (2, 1, 2), use the former model. An example may help to explain this point. The starting model has autoregressive component of 2, moving average component of 2 and the second difference of the variable (integrated of order 2), hence ARIMA (2, 2, 2). Although all variables are significant at the ten percent level in this model, F statistics for the equation is not significant. As a summary statistic for the entire equation, this is not a good result. A more important problem is that the roots of MA and AR components are very close to 1 in absolute value. Although, this model is stationary, any unit root (or very close to unity) will be a potential

source of a problem in forecasting period. Furthermore, ARIMA (2, 2, 1), ARIMA (1, 2, 2), and ARIMA (1, 2, 1) also give unsatisfactory results (not shown here). These indicate that it may be better not to use the second differences. As an alternative model ARIMA (2, 1, 2) is used. Moving average components are not significant, and roots are close to 1. Therefore, ARIMA (2, 1, 0) will be used. This equation is better, but AR (2) is not significant. It will be taken out, and ARIMA (1, 1, 0) will be used. It is a satisfactory model. Adjusted determination coefficient is 0. 43, F statistic = 10, and p-value for F-statistics is smaller than 0. 01. All other statistics are also satisfactory. Durbin-Watson statistics indicate no serial correlation. The coefficient associated with AR (1) has a high t-value and significant at the one percent level. To complete the ARIMA model building exercise, diagnostic checking is required. This can be done by adding higher order components to ARIMA (1, 1, 0) and checking if any one of them is better. ARIMA (2, 1, 0) and ARIMA (1, 1, 1) also estimated for that purpose, but none of the added components were significant. In summary, all of these indicate that ARIMA (1, 1, 0) is a relatively satisfactory model which may be used in forecasting.

Figure 30 Estimates of D (KGZARGDP, 2)



Correlogram of D (KGZARGDP, 2)
Date: 11/15/16 Time: 20:38
Sample: 1990 2015
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. **| . |	. **| . |	1	−0.285	−0.285	2.2075	0.137
. | . |	. *| . |	2	0.008	−0.079	2.2094	0.331
. **| . |	. **| . |	3	−0.237	−0.281	3.8753	0.275
. | . |	. *| . |	4	0.058	−0.118	3.9791	0.409
. | . |	. *| . |	5	−0.001	−0.066	3.9791	0.552
. | . |	. *| . |	6	−0.046	−0.159	4.0522	0.670
. |* . |	. | . |	7	0.087	0.007	4.3286	0.741
. | . |	. | . |	8	−0.009	−0.004	4.3318	0.826
. *| . |	. *| . |	9	−0.127	−0.198	4.9992	0.834
. |* . |	. | . |	10	0.089	0.018	5.3527	0.866
. | . |	. | . |	11	−0.026	−0.031	5.3842	0.911
. |* . |	. | . |	12	0.123	0.042	6.1719	0.907

Dependent Variable: D (KGZARGDP, 2)
Method: ARMA Maximum Likelihood (BFGS)
Date: 11/15/16 Time: 20:42
Sample: 1992 2015
Included observations: 24
Convergence achieved after 36 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.708931	0.298111	2.378076	0.0287
AR (1)	−0.430636	0.210902	−2.041876	0.0561
AR (2)	0.569364	0.312199	1.823723	0.0848
MA (1)	−0.000202	1.68E-05	−12.00865	0.0000
MA (2)	−0.999798	0.094676	−10.56024	0.0000
SIGMASQ	25.55797	10.39943	2.457631	0.0244

R-squared	0. 324095	Mean dependent var	0. 636211
Adjusted R-squared	0. 136344	S. D. dependent var	6. 281481
S. E. of regression	5. 837576	Akaike info criterion	6. 717024
Sum squared resid	613. 3912	Schwarz criterion	7. 011537
Log likelihood	– 74. 60429	Hannan-Quinn criteria.	6. 795158
F-statistic	1. 726193	Durbin-Watson stat	1. 895160
Prob (F-statistic)	0. 179610		
Inverted AR Roots	. 57	– 1. 00	
Inverted MA Roots	1. 00	– 1. 00	

Dependent Variable: D (KGZARGDP)
Method: ARMA Maximum Likelihood (BFGS)
Date: 11/15/16 Time: 21: 07
Sample: 1991 2015
Included observations: 25
Convergence achieved after 57 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0. 988869	4. 038331	0. 244871	0. 8092
AR (1)	1. 766869	0. 227495	7. 766639	0. 0000
AR (2)	– 0. 806803	0. 210549	– 3. 831894	0. 0011
MA (1)	– 1. 207923	780. 2425	– 0. 001548	0. 9988
MA (2)	0. 207923	210. 0545	0. 000990	0. 9992
SIGMASQ	29. 42884	12590. 66	0. 002337	0. 9982
R-squared	0. 526154	Mean dependent var		1. 255084
Adjusted R-squared	0. 401458	S. D. dependent var		8. 043263
S. E. of regression	6. 222713	Akaike info criterion		6. 779732
Sum squared resid	735. 7210	Schwarz criterion		7. 072263
Log likelihood	– 78. 74666	Hannan-Quinn criteria.		6. 860868
F-statistic	4. 219481	Durbin-Watson stat		1. 938439
Prob (F-statistic)	0. 009503			
Inverted AR Roots	. 88 + . 16i	. 88 – . 16i		
Inverted MA Roots	1. 00	. 21		

Dependent Variable: D (KGZARGDP)
Method: ARMA Maximum Likelihood (BFGS)
Date: 11/15/16 Time: 21: 10
Sample: 1991 2015
Included observations: 25
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0. 430142	4. 111903	0. 104609	0. 9177
AR (1)	0. 625892	0. 211942	2. 953131	0. 0076
AR (2)	0. 111572	0. 185426	0. 601706	0. 5538
SIGMASQ	32. 03786	12. 07142	2. 654027	0. 0148

R-squared	0. 484145	Mean dependent var	1. 255084
Adjusted R-squared	0. 410451	S. D. dependent var	8. 043263
S. E. of regression	6. 175784	Akaike info criterion	6. 653229
Sum squared resid	800. 9466	Schwarz criterion	6. 848250
Log likelihood	– 79. 16537	Hannan-Quinn criteria.	6. 707320
F-statistic	6. 569702	Durbin-Watson stat	1. 900739
Prob (F-statistic)	0. 002637		

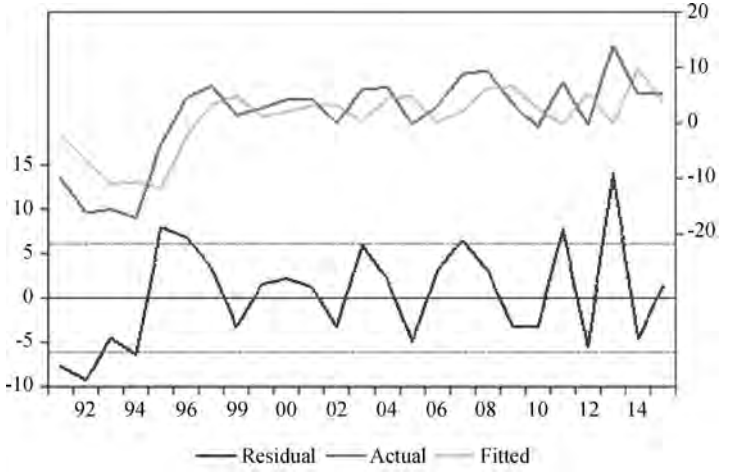
Inverted AR Roots	. 77	– . 14

Dependent Variable: D (KGZARGDP)
Method: ARMA Maximum Likelihood (BFGS)
Date: 11/15/16 Time: 21: 12
Sample: 1991 2015
Included observations: 25
Convergence achieved after 5 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0. 697142	3. 673031	0. 189800	0. 8512
AR (1)	0. 695048	0. 148320	4. 686142	0. 0001
SIGMASQ	32. 45229	11. 17932	2. 902886	0. 0083

R-squared	0. 477472	Mean dependent var	1. 255084
Adjusted R-squared	0. 429969	S. D. dependent var	8. 043263
S. E. of regression	6. 072694	Akaike info criterion	6. 584044
Sum squared resid	811. 3074	Schwarz criterion	6. 730309
Log likelihood	– 79. 30055	Hannan-Quinn criteria.	6. 624612
F-statistic	10. 05150	Durbin-Watson stat	2. 054622
Prob (F-statistic)	0. 000793		
Inverted AR Roots	. 70		

Figure 31 ARIMA Estimates of D (KGZARGDP, 2)



Econometric Models, Co-integration and Error Correction

Econometric models in the tradition of Tinbergen and Klein are very useful in looking at the system as a whole and working with a simpler representation of the entire economic system. They were used extensively in 1960 and 1970. However, economic crises which were primarily associated with oil shocks in 1970s pointed to problems with these models. These models tried to capture the workings of the economy with the help of statistical techniques developed earlier. It was implicitly assumed in these models that the structural relationships in the economy will not change in the future. Oil price hikes proved

that this assumption was not supported in real life. The credibility of econometric models diminished during that time. Later efforts, have been trying to resolve some of the issues associated with the full economic system models. There are alternative approaches which address issues related to early econometric models. One alternative was advocated by Engle and Granger. They make a distinction between the long-run equilibrium and the short one. They propose a method which determines the long-run relationship between two or more variables, based on theory and on data. The short-run movements are fluctuations around that long-run equilibrium relationship, and there is reversion to that long-run relationship.

Macro modeling framework used here is based on Engle-Granger co-integrating regressions and error correction models coupled with Mixed Data Sampling (MIDAS) regressions to allow for the possibility of making use of all available data. All these are then put into a Keynes-Klein type of macro model to represent the full economic system. At this point, there is a monthly model and an annual model. Forecasts from the monthly model are utilized in the annual model. Mixed frequency approach enables one to use most up to date data. If monthly data for the January 2016 through September 2016 are available, there is a value in using these in an annual model with data ending for the year 2015. Engle and Granger noted that if two variables which are non-stationary are used in a regression, then the estimated equation may have a very high determination coefficient and highly significant coefficient (spurious correlation). In such a situation, regular test statistics are misleading.

It is recommended to use a modified version of classical least squares which alleviates the problem of the correlation with the disturbance term. It is a two-step procedure where co-integrating regression is estimated first using a method such as fully modified least squares or dynamic least squares, and then residuals from this regression are used in the error correction model (ECM).

Co-integrating regression:

$Y = a + bX + e,$

Error correction model:

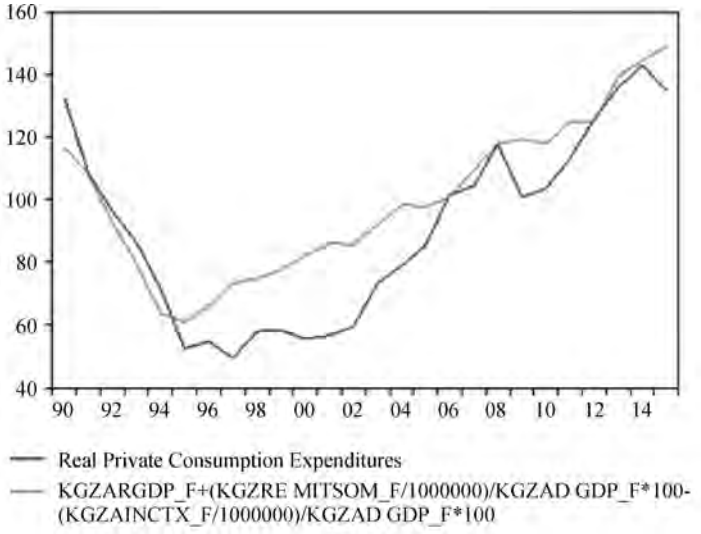
$D(Y) = cD(X) + ge(t-1)$ or $D(Y) = cD(X) + g(Y(t-1) - a - bX(t-1))$, where a, b, c, and g are constants.

Here, private consumption equation is given as an example. A line diagram and a scatter diagram, given below, show the close relationship between real private consumption and real disposable income. Other equations, including regressions using monthly data, are given in the Annex. Real private consumption (KGZARCONPR) is related to real disposable income, measured as the sum of real GDP and real remittances (KGZREMITSOM divided by GDP deflator KGZADGDP) minus real income and profit taxes (KGZAINCTX divided by GDP deflator). The co-integrating regression using dynamic least squares indicate a marginal propensity to consume (mpc) of 1.26. In the short-run, mpc = 0.57, with the correction coefficient of negative 0.51. Error correction coefficient is expected to be negative and significant for mean reversion. It should be noted that in general, it is assumed that mpc = 1 in the long-run (a = 0, b = 1 in the above equation), estimation of the co-integrating equation is skipped and the error correction model takes the form: $D(Y) = cD(X) + g(Y(t-1) - X(t-1))$. The general form is advocated here. Estimated equations can be summarized:

KGZARCONPR_F = -35.628 + 1.264 * (KGZARGDP_F + (KGZREMITSOM_F/1000000)/KGZADGDP_F * 100 - (KGZAINCTX_F/1000000)/KGZADGDP_F * 100)

D(KGZARCONPR_F) = 0.569 * D((KGZARGDP_F + (KGZREMITSOM_F/1000000)/KGZADGDP_F * 100 - (KGZAINCTX_F/1000000)/KGZADGDP_F * 100)) - 0.506 * (KGZARCONPR_F(-1) - EQ_KGZARCONPR.C(1) * (KGZARGDP_F(-1) + (KGZREMITSOM_F(-1)/1000000)/KGZADGDP_F(-1) * 100 - (KGZAINCTX_F(-1)/1000000)/KGZADGDP_F(-1) * 100) - EQ_KGZARCONPR.C(2))

Figure 32 Real Private Consumption Estimates



Dependent Variable: KGZARCONPR_F
; Method: Dynamic Least Squares (DOLS)
Date: 11/16/16 Time: 08:18
Sample (adjusted): 1992 2015
Included observations: 24 after adjustments
Co-integrating equation deterministic: C
Fixed leads and lags specification (lead = 1, lag = 1)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KGZARGDP_F + (KGZREMITSOM_F/1000000)/KGZADGDP_F * 100-(KGZAINCTX_F/1000000)/KGZADGDP_F * 100	1.264071	0.099004	12.76792	0.0000
C	-35.62815	9.883240	-3.604906	0.0019
R-squared	0.932640	Mean dependent var		88.25968
Adjusted R-squared	0.918459	S.D. dependent var		29.85129
S.E. of regression	8.524174	Sum squared resid		1380.569
Long-run variance	104.6309			

Figure 33 Scattergram of Real Consumption and GDP

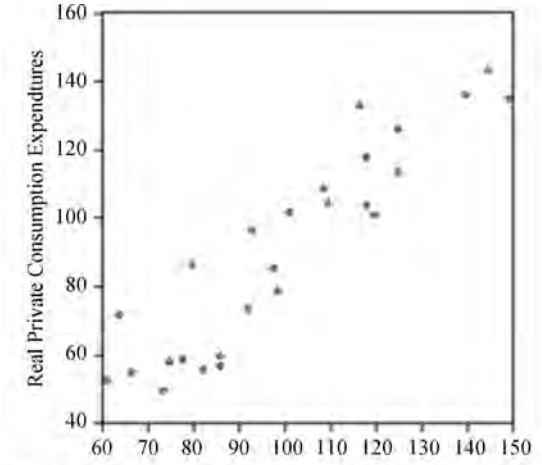
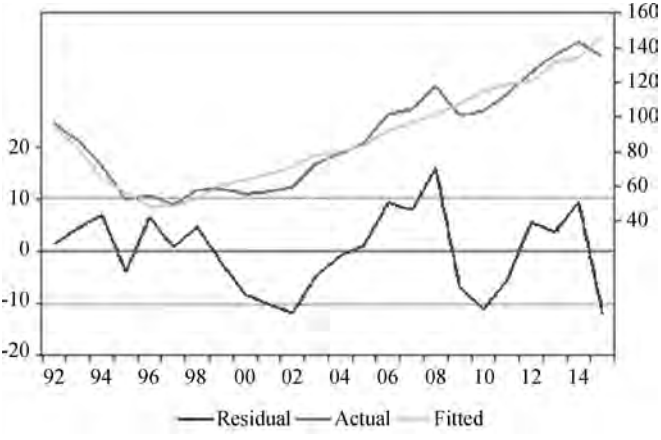


Figure 34 Real Consumption Estimates (Dynamic Least Squares)

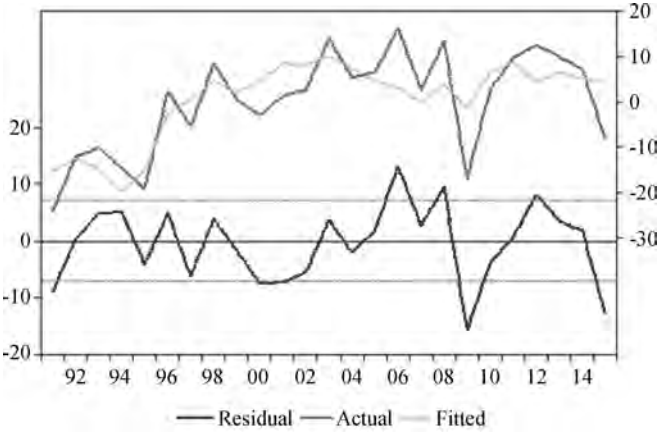


Dependent Variable: D (KGZARCONPR_F)
Method: Least Squares
Date: 11/16/16 Time: 08:24
Sample (adjusted): 1991 2015
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D ((KGZARGDP_F + (KGZREMITSOM_F/1000000)/KGZADGDP _ F * 100 - (KGZAINCTX_F/1000000)/KGZADGDP _F * 100))	0. 569299	0. 206982	2. 750470	0. 0114
KGZARCONPR _ F (- 1) - EQ _ KGZARCONPR. C (1) * (KGZARGDP_F (- 1) + (KGZREMITSOM _ F (- 1)/1000000)/KGZADGDP_F (- 1) * 100 - (KGZAINCTX _ F (- 1)/1000000)/ KGZADGDP _ F (- 1) * 100)-EQ _ KGZARCONPR. C (2)	- 0. 506489	0. 133269	- 3. 800495	0. 0009

R-squared	0. 616653	Mean dependent var	0. 086877
Adjusted R-squared	0. 599986	S. D. dependent var	11. 23269
S. E. of regression	7. 104299	Akaike info criterion	6. 835896
Sum squared resid	1160. 835	Schwarz criterion	6. 933406
Log likelihood	- 83. 44870	Hannan-Quinn criteria.	6. 862941
Durbin-Watson stat	1. 767055		

Figure 35 Real Consumption Estimates (Least Squares)



Equations estimated in a similar way are grouped in a model, and solved for the forecasting period. Please explain how model will forecast-theoretical underpinning of the model. Annual model has 56 variables. 38 of these variables are endogenous, and 18 of them are exogenous. On the other hand, monthly model has 6 variables, primarily to estimate monthly consumer price index, which appears as an input in the annual model also. The list is given below:

Model Variables 56 (38 Endogenous, and 18 exogenous variables)

KGZACGDP_F	Endog	Eq1	Gross Domestic Product
KGZARGDP_F	Endog	Eq2	Real Gross Domestic Product
KGZACCONS_F	Endog	Eq3	Final consumption expenditures
KGZARCONS_F	Endog	Eq4	Real Final consumption expenditures
KGZARCONPR_F	Endog	Eq5	Real Private Consumption Expenditures
KGZACCONPR_F	Endog	Eq6	Private Consumption
KGZARCONPU_F	Endog	Eq7	Real Public Consumption
KGZACCONPU_F	Endog	Eq8	Public Consumption
KGZARGFCF_F	Endog	Eq9	Real Gross fixed capital formation
KGZACGFCF_F	Endog	Eq10	Gross fixed capital formation
KGZACSTOCKS_F	Endog	Eq11	Change in Stocks
KGZARSTOCKS_F	Endog	Eq12	Real Change in Stocks
KGZARYEXGNFS_F	Endog	Eq13	Real Exports of goods and services
KGZACYEXGNFS_F	Endog	Eq14	Exports of goods and services
KGZARYIMGNFS_F	Endog	Eq15	Real Imports of goods and services
KGZACYIMGNFS_F	Endog	Eq16	Imports of goods and services
KGZACAB_F	Endog	Eq17	Current account balance
KGZAGSBAL_F	Endog	Eq18	Goods and Services Balance
KGZATB_F	Endog	Eq19	Trade Balance
KGZACEXPXGOLD_F	Endog	Eq20	BOP, exports excluding gold
KGZACEXP_F	Endog	Eq21	BOP, Exports
KGZACIMP_F	Endog	Eq22	BOP, Imports
KGZACURTRN_F	Endog	Eq23	BOP, Current Transfers
KGZREMITSOM_F	Endog	Eq24	Remittances, SOM
KGZADCONPR_F	Endog	Eq25	Private Consumption Deflator

KGZADCONPU_F	Endog	Eq26	Public Consumption Deflator
KGZADCONS_F	Endog	Eq27	Final consumption expenditures Deflator
KGZADGFCF_F	Endog	Eq28	Gross fixed capital formation Deflator
KGZADYEXGNFS_F	Endog	Eq29	Exports of goods and services Deflator
KGZADYIMGNFS_F	Endog	Eq30	Imports of goods and services Deflator
KGZADGDP_F	Endog	Eq31	Gross Domestic Product Deflator
KGZAINCTX_F	Endog	Eq32	Taxes on income and profits
KGZATAXGS_F	Endog	Eq33	General taxes on goods and services
KGZATAXREV_F	Endog	Eq34	Tax revenues
KGZAGOVREV_F	Endog	Eq35	Government Revenues
KGZABEXP_F	Endog	Eq36	Budget Expenditures
KGZABUDBAL_F	Endog	Eq37	Budget Balance
KGZAFIN_F	Endog	Eq38	Financing
KGZACAPEXP_F	Exog	Exog	Capital Expenditures
KGZACUREXP_F	Exog	Exog	Current Expenditures
KGZADOMFIN_F	Exog	Exog	Domestic financing
KGZAEXTFIN_F	Exog	Exog	External financing
KGZAGOLEXP_F	Exog	Exog	Exports of Gold (USD million)
KGZANINC_F	Exog	Exog	BOP, Net Income
KGZANONTAX_F	Exog	Exog	Non-tax revenues
KGZASERBAL_F	Exog	Exog	BOP, Services Balance
KGZATRANSF_F	Exog	Exog	Transfers from abroad
KGZAUSDERAV_F	Exog	Exog	Exchange rate per USD, average for the period
KGZAUSDEREP_F	Exog	Exog	Exchange Rate per USD, end of period
KGZMCPI_F_0	Exog	Exog	Consumer Price Index (2005 = 100)
KGZREMITUSD_F	Exog	Exog	Remittances, USD
L74_D_C001_F	Exog	Exog	World Export Prices
L75_D_C001_F	Exog	Exog	World Import Prices
MKTGDPKZA646NWDB_F	Exog	Exog	Gross Domestic Product for Kazakhstan
MKTGDPRUA646NWDB_F	Exog	Exog	Gross Domestic Product for Russian Federation

The model has 3 blocks. The first block has 16 recursive equations. The second block has 9 simultaneous equations, and the third block has 13 equations. These are listed below:

Block Structure of the Model
Number of equations: 38
Number of independent blocks: 3
Number of simultaneous blocks: 1
Number of recursive blocks: 2

Block 1: 16 Recursive Equations

kgzadconpu_f (26)	kgzarconpu_f (7)	kgzadgfcf_f (28)	kgzargfcf_f (9)
kgzarstocks_f (12)	kgzadyexgnfs_f (29)	kgzadconpr_f (25)	kgzadcons_f (27)
kgzadyimgnfs_f (30)	kgzadgdp_f (31)	kgzaryexgnfs_f (13)	kgzremitsom_f (24)
kgzacconpu_f (8)	kgzacgfcf_f (10)	kgzacstocks_f (11)	kgzacyexgnfs_f (14)

Block 2: 9 Simultaneous Equations (2 feedback vars)

kgzaryimgnfs_f (15)	kgzacyimgnfs_f (16)	kgzacgdp_f (1)	kgzainctx_f (32)
kgzarconpr_f (5)	kgzarcons_f (4)	kgzacconpr_f (6)	kgzaccons_f (3)
kgzargdp_f (2)			

Block 3: 13 Recursive Equations

kgzacexpxgold_f (20)	kgzacexp_f (21)	kgzacimp_f (22)	kgzatb_f (19)
kgzagsbal_f (18)	kgzacurtrn_f (23)	kgzacab_f (17)	kgzataxgs_f (33)
kgzataxrev_f (34)	kgzagovrev_f (35)	kgzabexp_f (36)	kgzabudbal_f (37)
kgzafin_f (38)			

Model Equations (including Identities)

```
' NATIONAL INCOME ACCOUNTS
'
'NOMINAL AND REAL GDP

KGZAcgdp_f = KGZAcCONS_f + KGZAcGFCF_f + KGZAcSTOCKS_f + KGZAcYEXGNFS_
f – KGZAcYIMGNFS_f

KGZArgdp_f = KGZArCONS_f + KGZArGFCF_f + KGZArSTOCKS_f + KGZArYEXGNFS_f
 – KGZArYIMGNFS_f

'NOMINAL TOTAL CONSUMPTION

KGZAcCONS_f = KGZAcCONPR_f + KGZAcCONPU_f

KGZArCONS_f = KGZArCONPR_f + KGZArCONPU_f
```

```
'NOMINAL AND REAL PRIVATE CONSUMPTION
'
': EQ_KGZARCONPR

D(KGZARCONPR_F) = 0.900544559854711 * D((KGZARGDP_F + (KGZREMITSOM_F/
1000000)/KGZADGDP_F * 100 - (KGZAINCTX_F/1000000)/KGZADGDP_F * 100)) -
0.304859469046807 * (KGZARCONPR_F(-1) - EQ_KGZARCONPR. @ COEF(1) *
(KGZARGDP_F(-1) + (KGZREMITSOM_F(-1)/1000000)/KGZADGDP_F(-1) * 100 -
(KGZAINCTX_F(-1)/1000000)/KGZADGDP_F(-1) * 100) - EQ_KGZARCONPR. @
COEF(2))
@ INNOV KGZARCONPR_F 7.9711771

KGZAcCONPR_f = KGZArCONPR_f * KGZAdCONPR_f/100

'NOMINAL AND REAL PUBLIC CONSUMPTION
'
': EQ_KGZARCONPU

D(KGZARCONPU_F) = 1.43990437528884e-07 * D(KGZACUREXP_F/KGZADCONPU_
F * 100) - 0.414959284822586 - 0.35608702323083 * (KGZARCONPU_F(-1) - EQ_
KGZARCONPU. @ COEF(1) * (KGZACUREXP_F(-1)/KGZADCONPU_F(-1) * 100) -
EQ_KGZARCONPU. @ COEF(2))
@ INNOV KGZARCONPU_F 1.3591735

KGZAcCONPU_f = KGZArCONPU_f * KGZAdCONPU_f / 100

'NOMINAL AND REAL FIXED INVESTMENT
'
': EQ_KGZARGFCF

D(KGZARGFCF_F) = 1.96986671899261e-06 * D(KGZACAPEXP_F/KGZADGFCF_F *
100) + 0.13373519138071 * D(KGZARGDP_F(-1)) - 0.573431970800606 *
(KGZARGFCF_F(-1) - EQ_KGZARGFCF. @ COEF(1) * KGZACAPEXP_F(-1)/
KGZADGFCF_F(-1) * 100 - EQ_KGZARGFCF. @ COEF(2) * KGZARGDP_F(-1) - EQ_
KGZARGFCF. @ COEF(3))
@ INNOV KGZARGFCF_F 4.02786641085028

KGZAcGFCF_f = KGZArGFCF_f * KGZAdGFCF_f/100

'NOMINAL AND REAL CHANGE IN STOCKS
```

KGZACSTOCKS_F = 0. 8614907007842 + [AR (1) = 0. 880511529685643, AR (2) = −0. 881289589359337, UNCOND, ESTSMPL = "19902016"]
@ INNOVKGZACSTOCKS_F4. 10222963472927

KGZARSTOCKS_F = −0. 553840042410421 + [AR (1) = 0. 427677284125813, UNCOND, ESTSMPL = "1990 2016"]
@ INNOV KGZARSTOCKS_F 2. 22562856599405

'KGZAcSTOCKS_f = KGZArSTOCKS_f * KGZAdSTOCKS_f
'
'NOMINAL AND REAL EXPORTS OF GOODS AND SERVICES
'
': EQ_KGZARYEXGNFS

DLOG (KGZARYEXGNFS_F) = 0. 124980934244879 * DLOG ((MKTGDPKZA646NWDB_F + MKTGDPUZA646NWDB_F + MKTGDPRUA646NWDB_F)/KGZAUSDEREP_F) + 0. 626681167620942 * DLOG (KGZADYEXGNFS _ F/KGZADGDP _ F) − 0. 670127373936976 * (LOG (KGZARYEXGNFS_F (− 1)) − EQ_KGZARYEXGNFS. @ COEF (1) * LOG ((MKTGDPKZA646NWDB_F (− 1) + MKTGDPUZA646NWDB_F (− 1) + MKTGDPRUA646NWDB _ F (− 1))/KGZAUSDEREP _ F (− 1)) − EQ _ KGZARYEXGNFS. @ COEF (2) * LOG (KGZADYEXGNFS_F (− 1)/KGZADGDP_F (− 1)) − EQ_KGZARYEXGNFS. @ COEF (3))
@ INNOV KGZARYEXGNFS_F 0. 0953382707353694

KGZAcYEXGNFS_f = KGZArYEXGNFS_f * KGZAdYEXGNFS_f / 100

'NOMINAL AND REAL IMPORTS OF GOODS AND SERVICES
'
': EQ_KGZARYIMGNFS

DLOG (KGZARYIMGNFS_F) = −0. 00837905539303477 + 1. 28204320249902 * DLOG (KGZARGDP_F) − 0. 455896997101909 * DLOG (KGZADYIMGNFS_F/KGZADGDP_F) − 0. 106527965273387 * (LOG (KGZARYIMGNFS_F (− 1)) − EQ_KGZARYIMGNFS. @ COEF (1) * LOG (KGZARGDP_F (− 1)) − EQ_KGZARYIMGNFS. @ COEF (2) * LOG (KGZADYIMGNFS_F (− 1)/KGZADGDP_F (− 1)) − EQ_KGZARYIMGNFS. @ COEF (3))
@ INNOV KGZARYIMGNFS_F 0. 154762487785503

KGZAcYIMGNFS_f = KGZArYIMGNFS_f * KGZAdYIMGNFS_f / 100

''
'

```
'BALANCE OF PAYMENTS (IN US DOLLARS, EXCEPT KGZREMITSOM)
'
'CURRENT ACCOUNT BALANCE

KGZACAB_F = KGZAGSBAL_F + KGZANINC_F + KGZACURTRN_F

'GOODS AND SERVICES BALANCE

KGZAGSBAL_F = KGZATB_F + KGZASERBAL_F

'TRADE BALANCE

KGZATB_F = KGZACEXP_F - KGZACIMP_F

'EXPORTS AND IMPORTS

LOG(KGZACEXPXGOLD_F * KGZAUSDEREP_F/(KGZADYEXGNFS_F/100)) =
0.760144502417726 * LOG((MKTGDPRUA646NWDB_F + MKTGDPUZA646NWDB_F +
MKTGDPKZA646NWDB_F) * KGZAUSDEREP_F/(KGZADYEXGNFS_F/100)) +
0.150705592056509 * LOG(L74_D_C001_F/KGZADGDP_F) - 13.5816121984353
@INNOV KGZACEXPXGOLD_F 0.179048907989341

KGZACEXP_f = KGZACEXPxgold_f + KGZAgolexp_f

': EQ_KGZACEXP
'
': EQ_KGZACIMP

DLOG(KGZACIMP_F) = -0.701908848008015 * DLOG(KGZARGDP_F) +
1.33270124966013 * DLOG(L75_D_C001_F/KGZADGDP_F) - 0.052287718703498 *
(LOG(KGZACIMP_F(-1)) - EQ_KGZACIMP.@COEF(1) * LOG(KGZARGDP_F(-1)
) - EQ_KGZACIMP.@COEF(1) * LOG(L75_D_C001_F(-1)/KGZADGDP_F(-1)) -
EQ_KGZACIMP.@COEF(3)) + 0.333607997537808
@INNOV KGZACIMP_F 0.209837329769601

'REMITTANCES AND TRANSFERS

KGZACURTRN_F = 104.68076590162 + 1.06678727284254 * KGZREMITUSD_F
@INNOV KGZACURTRN_F 190.950889245563

KGZREMITSOM_F = 36.4196542872464 + 0.998571457016269 * KGZREMITUSD_F *
KGZAUSDERAV_F
```

```
@ INNOV KGZREMITSOM_F 157. 656920966728

''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
'
'DEFLATORS
'
'PRIVATE CONSUMPTION DEFLATOR
'
': EQ_KGZADCONPR

DLOG ( KGZADCONPR _ F) = 0. 210467831539122 + 1. 08371953172973 * DLOG (KGZMCPI_F_0) - 0. 377258619560691 * (LOG (KGZADCONPR_F ( - 1)) - EQ_ KGZADCONPR. @ COEF (1) * LOG (KGZMCPI_F_0 ( - 1)) - EQ_KGZADCONPR. @ COEF(2)) + @ MIDAS (MONTHLY \ DLOG (KGZMCPI _ F _ 0), 3, ALMON, @ FILL (6. 32413667691, - 9. 23006608984, 2. 45413204109), 3, 2, "1960 2025")
@ INNOV KGZADCONPR_F 0. 0665386717213058

'PUBLIC CONSUMPTION DEFLATOR
'
': EQ_KGZADCONPU

DLOG ( KGZADCONPU _ F) = 2. 05576905469168 * DLOG ( KGZMCPI _ F _ 0) - 0. 442663607162329 * (LOG (KGZADCONPU_F ( - 1)) - EQ_KGZADCONPU. @ COEF (1) * LOG (KGZMCPI _ F _0 ( - 1)) - EQ _ KGZADCONPU. @ COEF (2)) + @ MIDAS (MONTHLY \ DLOG ( KGZMCPI _ F _ 0), 4, ALMON, @ FILL (21. 4981914262, - 16. 4585055268, 3. 19547594113), 3, 2, "1960 2025")
@ INNOV KGZADCONPU_F 0. 1584496

'TOTAL CONSUMPTION DEFLATOR

DLOG (KGZADCONS_F) = -0. 00210710745660827 + 1. 00032257609708 * DLOG ((85. 3 * KGZADCONPR_F + 17. 7 * KGZADCONPU_F) / (85. 3 + 17. 7))
@ INNOV KGZADCONS_F 0. 00604159983399976

'TOTAL FIXED INVESTMENT DEFLATOR
'
': EQ_KGZADGFCF

DLOG (KGZADGFCF_F) = 1. 02977436950092 * DLOG (KGZAUSDEREP_F * L74_D_ C001_F) - 6. 02101605422027 - 0. 423424516699589 * (LOG (KGZADGFCF_F ( - 1)) - EQ_KGZADGFCF. @ COEF (1) * LOG (KGZAUSDEREP_F ( - 1) * L74_D_C001_F ( - 1)) + EQ_KGZADGFCF. @ COEF (2))
```

@ INNOV KGZADGFCF_F 0. 168538595897705

'EXPORTS OF GOODS AND SERVICES DEFLATOR
'
': EQ_KGZADYEXGNFS

DLOG (KGZADYEXGNFS_F) = 1. 04946998743962 * DLOG (KGZAUSDEREP_F * L75_D _C001_F) + 0. 0761254068379278 - 0. 430248863358829 * (LOG (KGZADYEXGNFS_F (- 1)) - EQ_KGZADYEXGNFS. @ COEF (1) * LOG (KGZAUSDEREP_F (- 1) * L75_D_ C001_F (- 1)) - EQ_KGZADYEXGNFS. @ COEF (2))
@ INNOV KGZADYEXGNFS_F 0. 17401127882346

'IMPORTS OF GOODS AND SERVICES DEFLATOR
'
': EQ_KGZADYIMGNFS

DLOG (KGZADYIMGNFS_F) = 1. 24067713063355 * DLOG (KGZAUSDEREP_F * L74_D _C001_F) + 0. 0904851468665376 - 0. 370164070457482 * (LOG (KGZADYIMGNFS_F (- 1)) - EQ_KGZADYIMGNFS. @ COEF (1) * LOG (KGZAUSDEREP_F (- 1) * L74_D_ C001_F (- 1)) - EQ_KGZADYIMGNFS. @ COEF (2))
@ INNOV KGZADYIMGNFS_F 0. 172691973111219

'GDP DEFLATOR

D (KGZADGDP_F) = 0. 50628463452896 + 0. 80738766573782 * D ((103 * KGZADCONS_ F + 16 * KGZADGFCF_F + 38 * KGZADYEXGNFS_F + 57 * KGZADYIMGNFS_F) / (103 + 16 + 38 + 57))
@ INNOV KGZADGDP_F 4. 25104325030311

'
'
''
'
'PUBLIC FINANCE
'
'TAXES ON INCOME AND PROFITS
'
': EQ_KGZAINCTX

DLOG (KGZAINCTX _ F) = 0. 684540418586255 * DLOG (KGZACGDP _ F) - 0. 39446874149237 * (LOG (KGZAINCTX_F (- 1)) - EQ_KGZAINCTX. @ COEF (1) * LOG (KGZACGDP_F (- 1)) - EQ_KGZAINCTX. @ COEF (2)) + 0. 161600912484915

```
@ INNOV KGZAINCTX_F 0. 124338950490915

'TAXES ON GOODS AND SERVICES
'
': EQ_KGZATAXGS

DLOG ( KGZATAXGS _ F) = 0. 51174784924785 * DLOG ( KGZACCONS _ F) -
0. 564405192084765 * (LOG (KGZATAXGS_F ( - 1)) - EQ_KGZATAXGS. @ COEF (1) *
LOG (KGZACCONS_F ( - 1)) - EQ_KGZATAXGS. @ COEF (2))
@ INNOV KGZATAXGS_F 0. 0751175527956397

'tax revenue = taxes on income and profit + taxes on goods and services + transfers — to be an
equation because components do not add up to total
'
'KGZATAXREV = KGZAINCTX + KGZATAXGS

KGZATAXREV_F = - 741953. 595190319 + 1. 21651593440508 * (KGZAINCTX_F +
KGZATAXGS_F)
@ INNOV KGZATAXREV_F 1088408. 20477069

'government revenue = tax revenue + non-tax revenue — to be an equation because components
do not add up to total
'
'KGZAGOVREV = KGZATAXREV + KGZATRANSF + KGZANONTAX

KGZAGOVREV_F = - 2428544. 37481236 + 1. 26331749811653 * (KGZATAXREV_F +
KGZATRANSF_F + KGZANONTAX_F)
@ INNOV KGZAGOVREV_F 4885155. 33448244

'total government expenditures = current expenditures + capital expenditures - - to be an
equation because components do not add up to total
'
'KGZABEXP = KGZACUREXP + KGZACAPEXP

KGZABEXP _ F = 6740. 06378869337 + 0. 999875692501591 * (KGZACUREXP _ F +
KGZACAPEXP_F)
@ INNOV KGZABEXP_F 15547. 1410977659

'Budget Balance — to be an equation because components do not add up to total
'
'KGZABUDBAL = KGZAGOVREV - KGZABEXP
```

```
D (KGZABUDBAL_F) = 6538. 48220645944 + 1. 00049469687563 * D (KGZAGOVREV_F
– KGZABEXP_F)
@ INNOV KGZABUDBAL_F 151126. 98086296

'budget financing = domestic financing + external financing — to be an equation because
components do not add up to total
'
'KGZAFIN = KGZADOMFIN + KGZAEXTFIN

KGZAFIN_ F = 0. 225225267907721 + 0. 999999978413372 * (KGZADOMFIN _ F +
KGZAEXTFIN_F)
@ INNOV KGZAFIN_F 0. 526998576027328
```

Dynamic Factor Analysis Model for Short-term Forecasting: An Illustrative Example for The Kyrgyz Republic

Dynamic factor analysis with mixed data sampling regressions is the preferred method here. This enables the use of all possible data (daily, weekly, monthly, quarterly, and annual). If the goal is to obtain forecasts more frequently, these methods generally perform better than other models. It is essential to have a usable and regularly updated data base for such an analysis.

There are several steps to be taken after securing a good data base.

i. Selection of variables. This involves two criteria. First, there should be an economic theory behind the selection of variable which necessitates its use in the model. Second, there should be data on that variable with enough number of observations, say a minimum of 120 for monthly data.

ii. Study time series properties of every single variable considered for this analysis. This will help to determine the transformations needed, such as difference, log difference, etc. It may be necessary to do interpolations at this stage if a single observation is missing from otherwise a complete series. Both steps (1) and (2) are common to any econometric analysis.

iii. Conduct factor analysis using monthly indicators. This involves extensive calculations, and determining the number of factors affecting all those monthly indicators.

iv. Form a vector autoregressive (VAR) system using factors extracted from factor analysis. This step also involves extensive calculations, including determining the number of lags to be used in the system, checking for serial correlation, and obtaining forecasts from the model. If this step is skipped, and factors are used directly, as they are, then the method is called the static factor modeling.

v. Using forecasts from the VAR model, form the relationship between these forecasts and so-called target variables, in this case monthly consumer price index, monthly real GDP and monthly nominal GDP. In general, state space models are used to determine these relationships. However, recent studies show that MIDAS models may be a good alternative, especially the ease of use of such models.

vi. Determine the relationship between quarterly real GDP and monthly real GDP forecasts, and obtain forecasts for quarterly real GDP.

There are 55 monthly indicators selected for this analysis. For majority of variables data are available from January 2007 to June 2017. Missing data points were interpolated or extrapolated. At this point, the goal here is just to show the methodology and not necessarily to get the best forecasts. Obviously, in a real forecasting situation, these extrapolations and interpolations will be done more carefully. It was also necessary to take differences of variables to eliminate non-stationarity.

Five factors were selected. One lag was sufficient for the VAR system with these five factors. The nominal GDP equation related to five common factors was relatively better than equations for real GDP and the consumer price index. A very good fit was obtained for real quarterly GDP with the help of MIDAS methodology and monthly real

GDP. The same is true for factors, also. This was encouraging. It is also possible to have quarterly forecasts up to 2019Q4. Although, it is technically possible to have forecasts up to 2019Q4 and beyond, a one or a maximum of two quarter ahead forecasts should be the longest time horizon with this methodology. The methodology of principal components is also considered. Although factor analysis and principal components look similar as data reduction techniques, they are very different in a very fundamental way. In factor analysis, left hand variables are observed, but right hand variables are unobserved. In a model: $X = A + BF + u$, X's are observed and collected data on economic indicators, and F's are unobserved common factors bringing about those X's. On the other hand, in principal components, right hand variables are unobserved, but right hand variables are observed. $Z = C + DX + v$. In these models, A, B, C, and D are all matrices of constants, and u and v are stochastic disturbance terms. Principal components analysis indicated that there needs to be 19 components if one wants to explain 90% of the variance in data. However, this number may be on the high side. In macroeconomic analysis, it is rather customary to select variables which can explain 60% or 65% of variance. In that case, 7 or 8 components should be sufficient. This is similar to step (3) in factor analysis. One can use these selected 8 components in a regression on GDP. Here, the first component is used. Other 10 are selected using stepwise method on all 55 components. There are studies using first 3 components. The choice of 10 is also subject to change. If more variables are included, degrees of freedom decreases, and statistical test results become questionable. In general, 5 to 10 variables may be a satisfactory start.

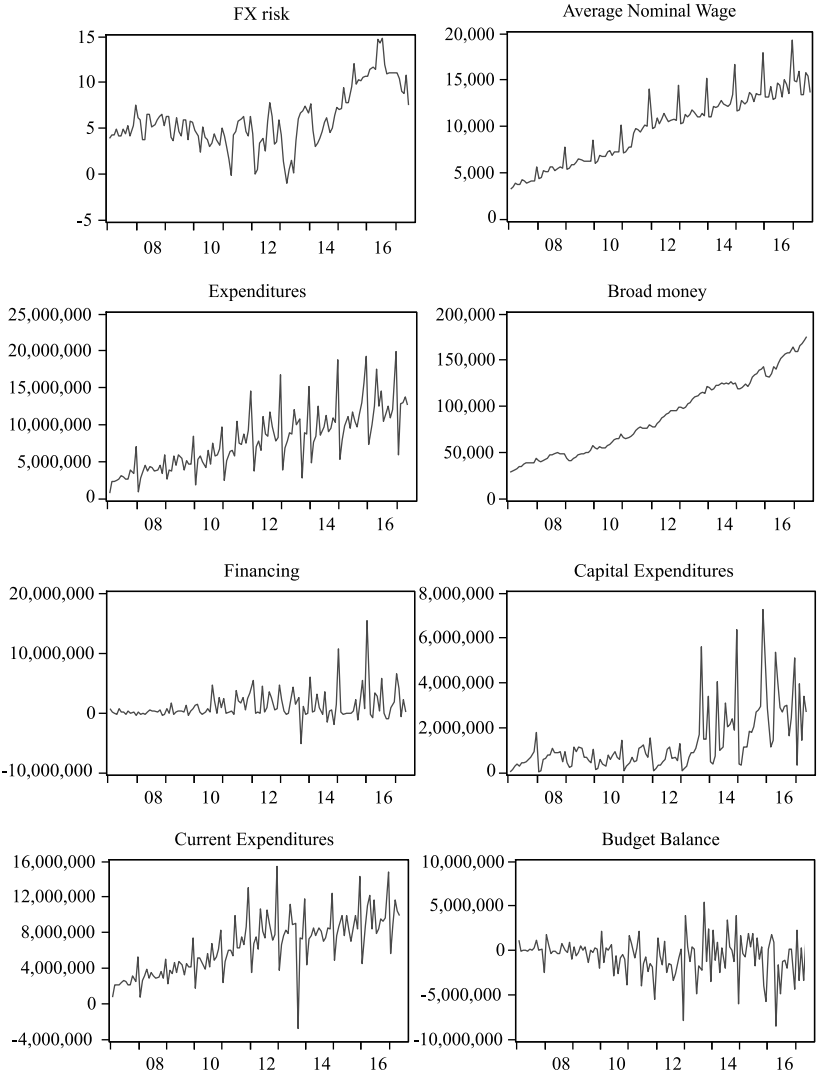
The fit looks better. The primary reason for a better fit is using the contemporaneous components, as opposed to lagged factors used in the other model. All of these can be changed. The comparison is just for expository purposes.

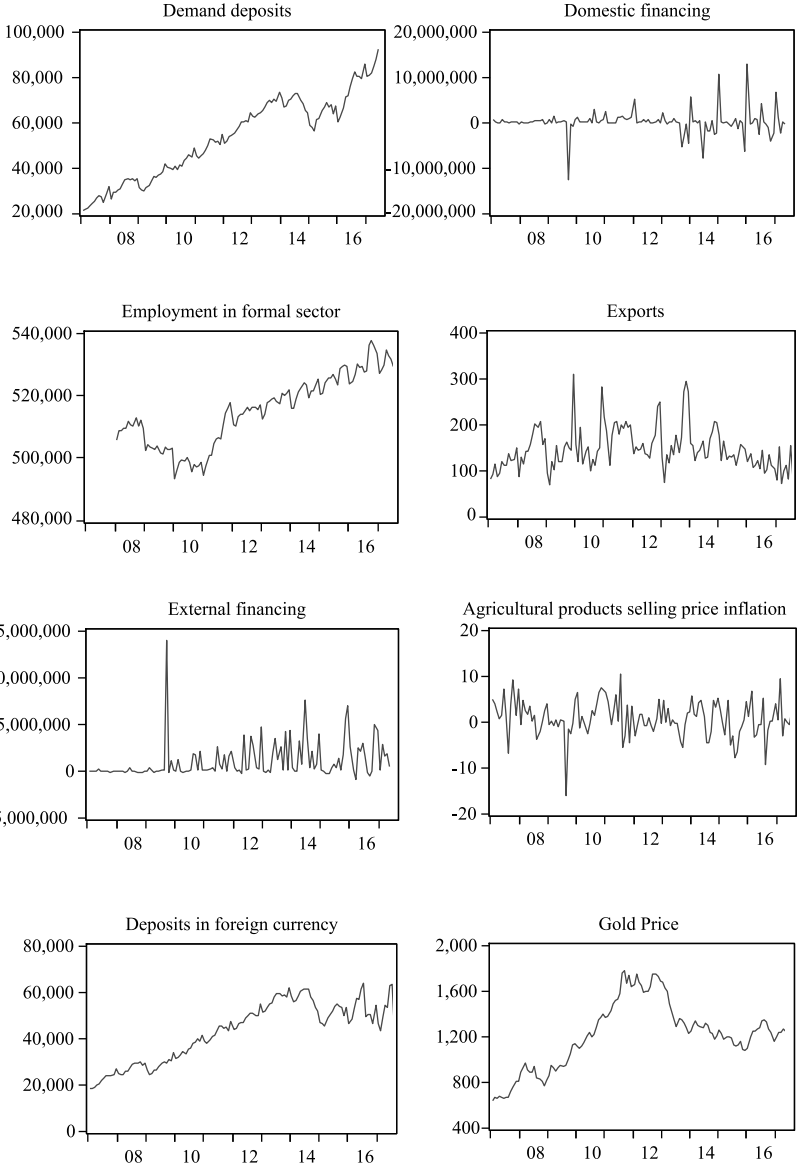
MONTHLY INDICATORS

#	Name	Description
1	kgzfxrisk	FX risk
2	kgzmanw	Average Nominal Wage
3	kgzmbexp	Expenditures
4	kgzmbroad	Broad money
5	kgzmbudfin	Financing
6	kgzmcapexp	Capital Expenditures
7	kgzmcurexp	Current Expenditures
8	kgzmdeficit	Budget Balance
9	kgzmdemdep	Demand deposits
10	kgzmdomfin	Domestic financing
11	kgzmempl	Employment in formal sector
12	kgzmexports	Exports
13	kgzmextfin	External financing
14	kgzmfarmg	Agricultural products
15	kgzmfxdep	Deposits in foreign currency
16	kgzmgoldpri	Gold Price
17	kgzmgolexp	Gold
18	kgzmgovrev	Revenues
19	kgzmimports	Imports
20	kgzminctx	Taxes on income and profits
21	kgzminlofx	Interest rates of commercial banks on loans extended in foreign currency (for the period)
22	kgzminlolc	Interest rates of commercial banks on loans extended in national currency (for the period)
23	kgzmlofx	Loans extended by commercial banks in foreign currency (for the period)
24	kgzmm2x	Money supply (M2X)
25	kgzmmditrn	From international organizations
26	kgzmmonbas	Monetary base
27	kgzmmonout	Money outside banks
28	kgzmnetfa	Net foreign assets
29	kgzmnontax	Non-tax revenues
30	kgzmoilimp	Oil

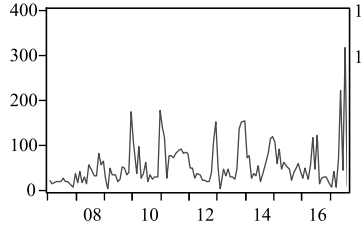
31	kgzmoilpri	Oil Price (spot)
32	kgzmpelec	Electricity (million kWh)
33	kgzmppi	PPI Inflation (composite)
34	kgzmppii	Producer Price Index for Industry (2010 = 100)
35	kgzmreslev	Reserve Level (USD million)
36	kgzmruberav	average for the period
37	kgzmruberep	end of period
38	kgzmtagr	Agriculture
39	kgzmtaxgs	General taxes on goods and services
40	kgzmtaxrev	Tax revenues
41	kgzmtexlexp	Textiles
42	kgzmtimdep	Time deposits
43	kgzmtransf	Transfers from abroad
44	kgzmtratx	o. w. Taxes on international trade and transactions
45	kgzmusderav	average for the period
46	kgzmusderep	end of period
47	kgzmvat	o. w. Value added tax
48	kgzmvifood	Production of food, including beverages and and tobacco
49	kgzmvimanuf	Manufacturing
50	kgzmvimetal	Metallurgy and manufacture of fabricated metal products
51	kgzmvimining	Mining
52	kgzmvindpro	Total
53	kgzmvitext	Textile and wearing apparel industry
54	kgzmviutil	Production and distribution of electricity gas nad water
55	kgzpolrate	Discount (Policy) rate (end of period)

MONTHLY INDICATORS

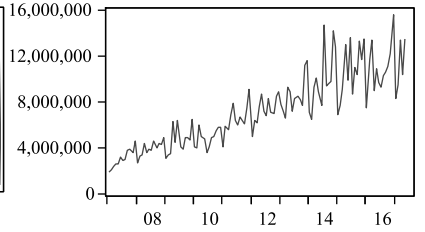



Demand deposits
100,000
80,000
60,000
40,000
20,000
08
10
12
14
16
Domestic financing
20,000,000
10,000,000
0
-10,000,000
-20,000,000
08
10
12
14
16
Employment in formal sector
540,000
520,000
500,000
480,000
08
10
12
14
16
Exports
400
300
200
100
0
08
10
12
14
16
External financing
15,000,000
10,000,000
5,000,000
0
-5,000,000
08
10
12
14
16
Agricultural products selling price inflation
20
10
0
-10
-20
08
10
12
14
16
Deposits in foreign currency
80,000
60,000
40,000
20,000
0
08
10
12
14
16
Gold Price
2,000
1,600
1,200
800
400
08
10
12
14
16

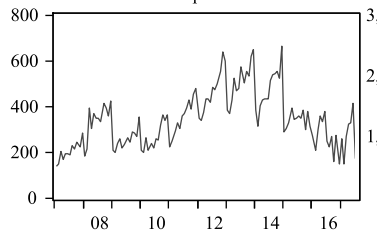
Gold



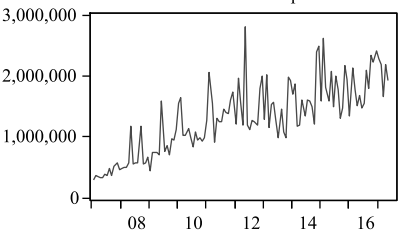
Revenues



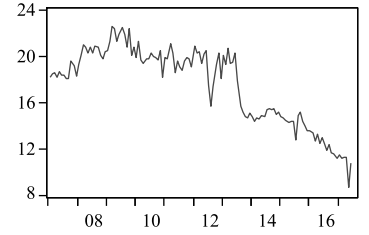
Imports



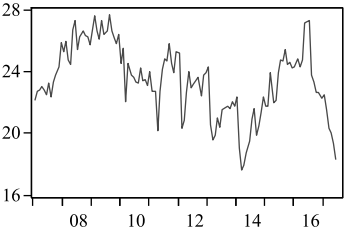
Taxes on income and profits



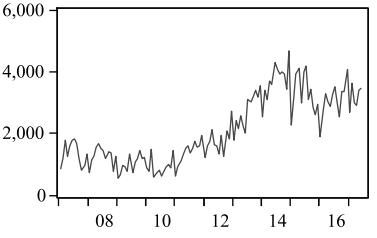
Interest rates of commercial banks on loans extended in foreign currency (for the period)



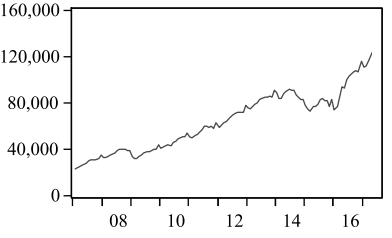
Interest rates of commercial banks on loans extended in national currency (for the period)

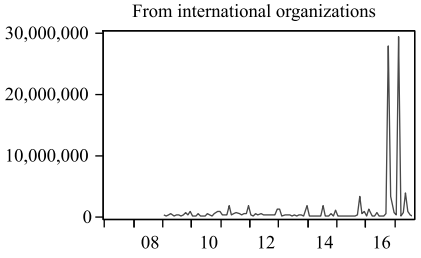


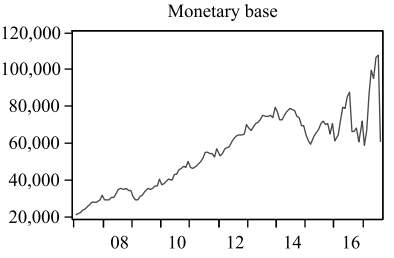
Loans extended by commercial banks in foreign currency (for the period)

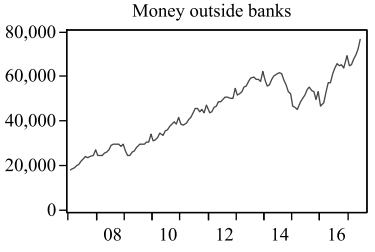


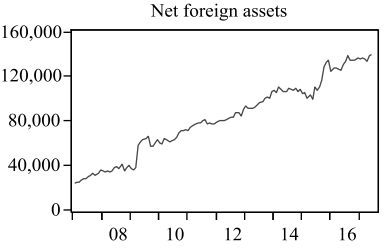
Money supply (M2X)

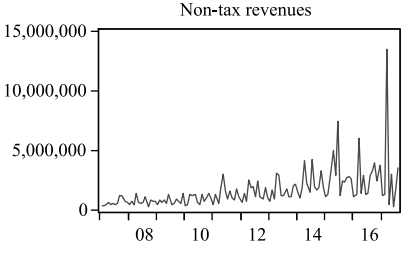


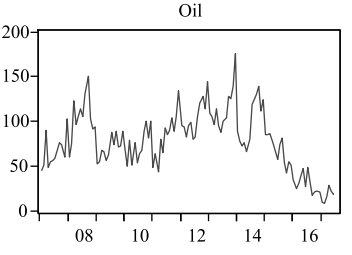

From international organizations
30,000,000
20,000,000
10,000,000
0
08
10
12
14
16

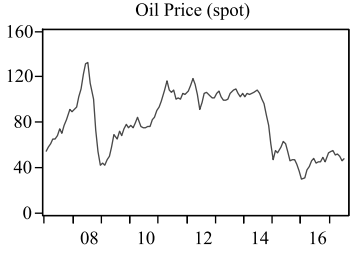

Monetary base
120,000
100,000
80,000
60,000
40,000
20,000
08
10
12
14
16

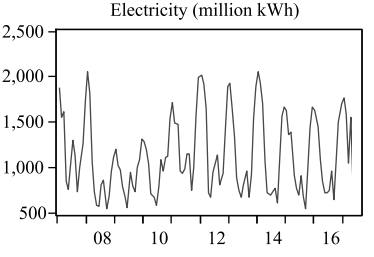

Money outside banks
80,000
60,000
40,000
20,000
0
08
10
12
14
16

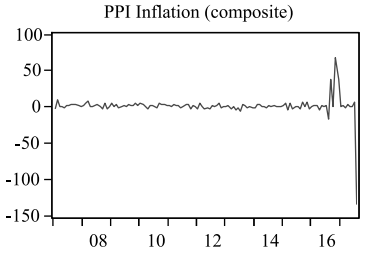

Net foreign assets
160,000
120,000
80,000
40,000
0
08
10
12
14
16

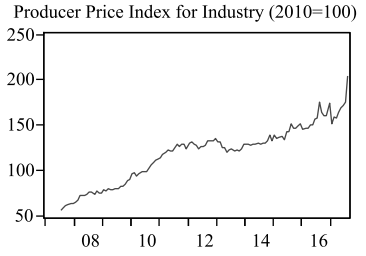

Non-tax revenues
15,000,000
10,000,000
5,000,000
0
08
10
12
14
16

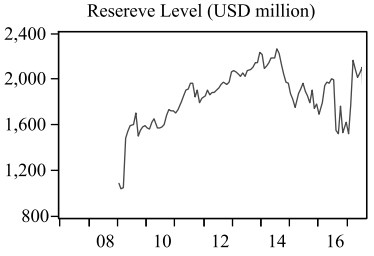

Oil
200
150
100
50
0
08
10
12
14
16

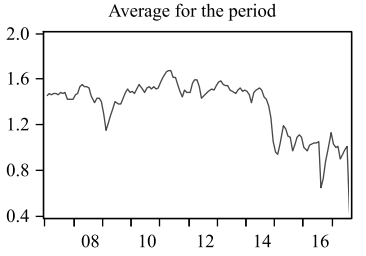

Oil Price (spot)
160
120
80
40
0
08
10
12
14
16

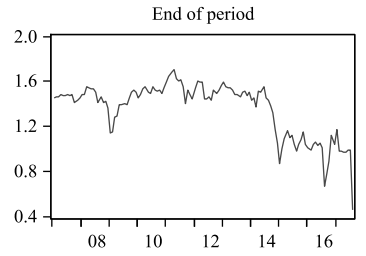

Electricity (million kWh)
2,500
2,000
1,500
1,000
500
08
10
12
14
16

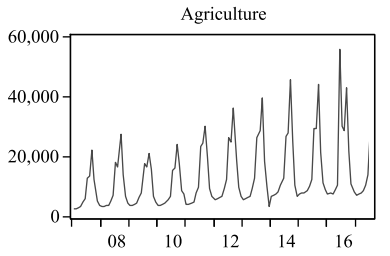

PPI Inflation (composite)
100
50
0
-50
-100
-150
08
10
12
14
16

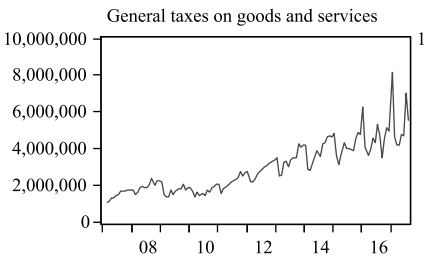

Producer Price Index for Industry (2010=100)
250
200
150
100
50
08
10
12
14
16

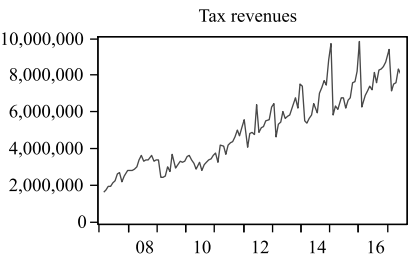

Resereve Level (USD million)
2,400
2,000
1,600
1,200
800
08
10
12
14
16


Average for the period
2.0
1.6
1.2
0.8
0.4
08
10
12
14
16

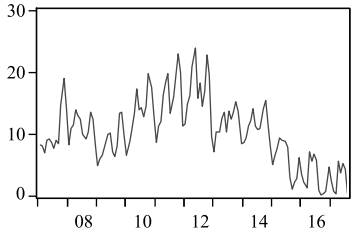

End of period
2.0
1.6
1.2
0.8
0.4
08
10
12
14
16


Agriculture
60,000
40,000
20,000
0
08
10
12
14
16

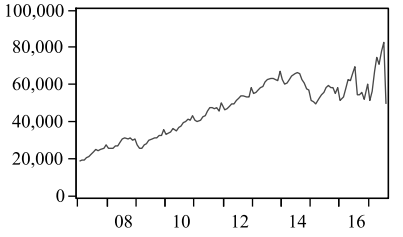

General taxes on goods and services
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
08
10
12
14
16


Tax revenues
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
08
10
12
14
16

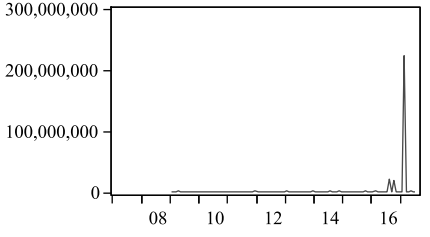
Textiles



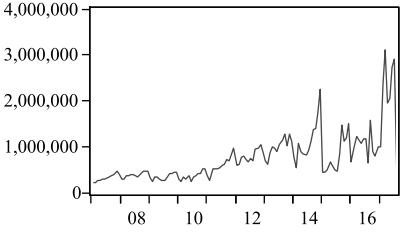
Time deposits



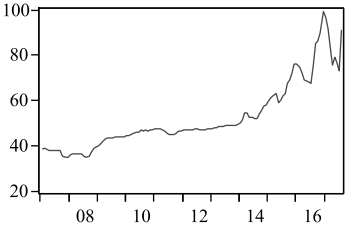
Transfers from abroad



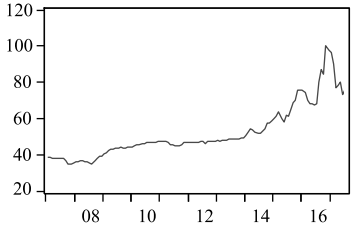
o.w. Taxes on international trade and transactions



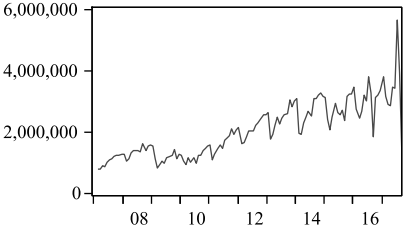
Average for the period



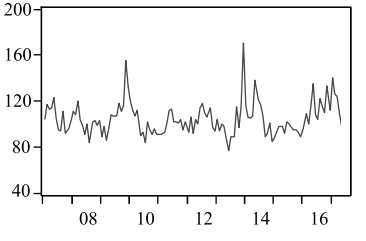
End of period

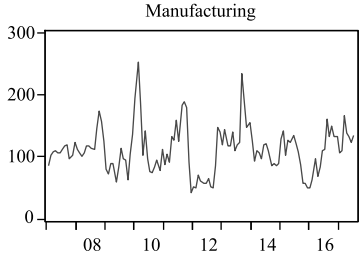


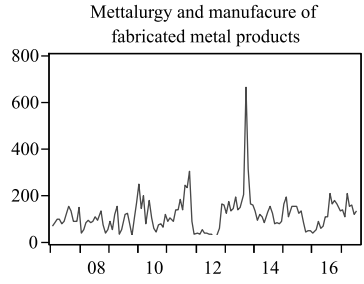
o.w. Value added tax

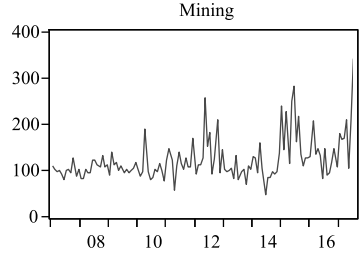


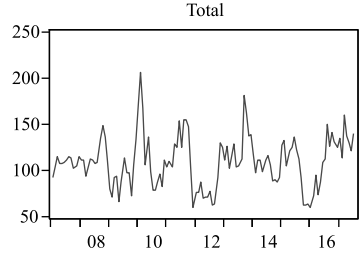
Production of food,including beverages and and tobacco

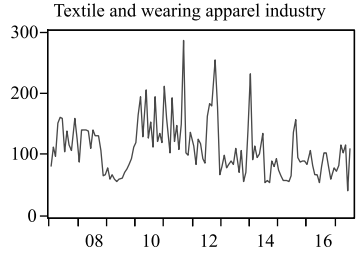


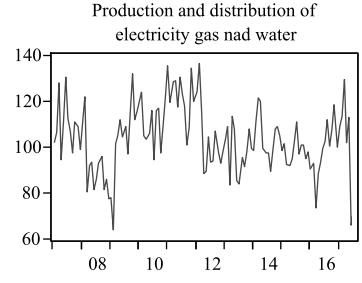

Manufacturing
300
200
100
0
08
10
12
14
16

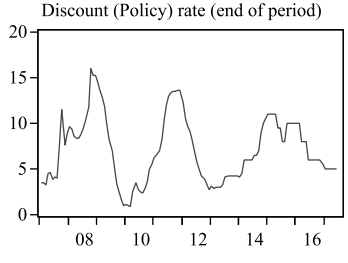

Mettalurgy and manufacure of
fabricated metal products
800
600
400
200
0
08
10
12
14
16


Mining
400
300
200
100
0
08
10
12
14
16

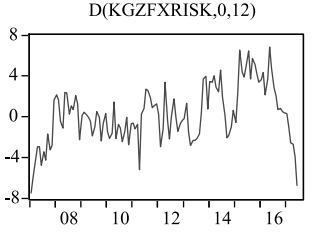

Total
250
200
150
100
50
08
10
12
14
16

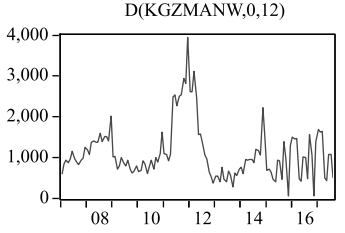

Textile and wearing apparel industry
300
200
100
0
08
10
12
14
16

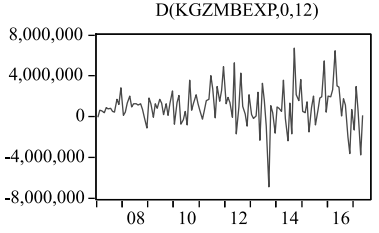

Production and distribution of
electricity gas nad water
140
120
100
80
60
08
10
12
14
16

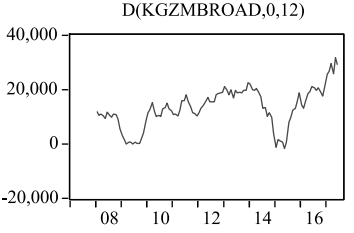

Discount (Policy) rate (end of period)
20
15
10
5
0
08
10
12
14
16

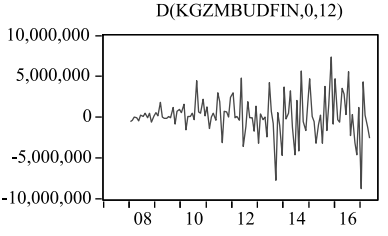
MONTHLY INDICATORS (CHANGE FROM THE SAME MONTH A YEAR AGO)

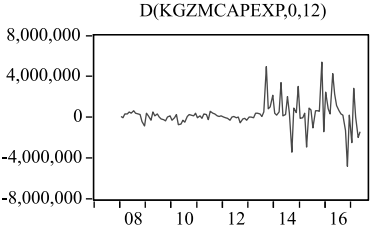


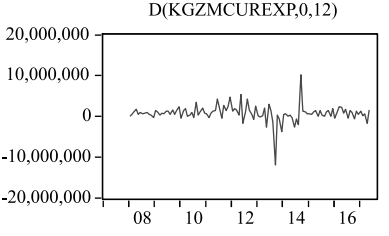


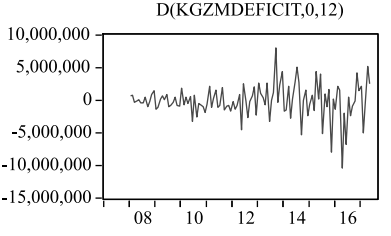


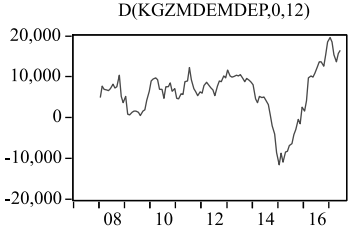


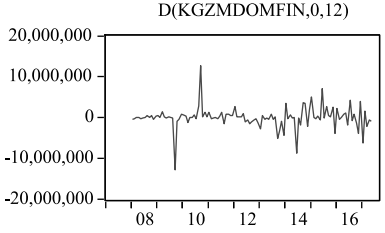


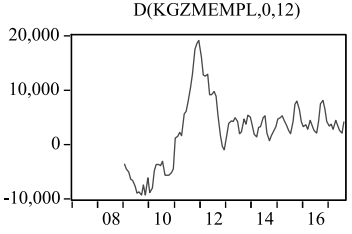


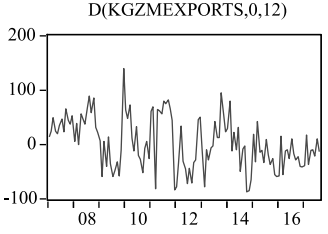


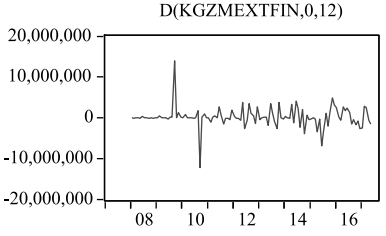


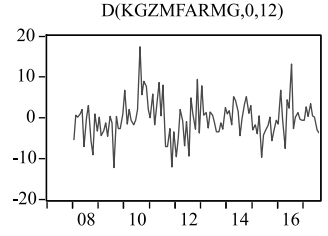

D(KGZMDEMDEP,0,12)
20,000
10,000
0
-10,000
-20,000
08
10
12
14
16

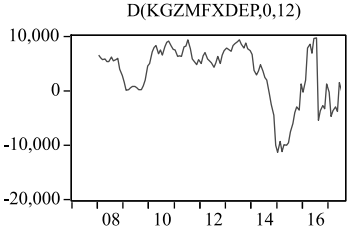

D(KGZMDOMFIN,0,12)
20,000,000
10,000,000
0
-10,000,000
-20,000,000
08
10
12
14
16

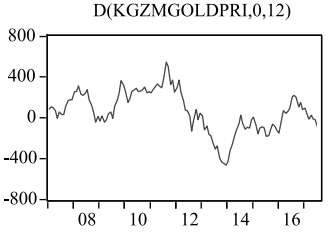

D(KGZMEMPL,0,12)
20,000
10,000
0
-10,000
08
10
12
14
16

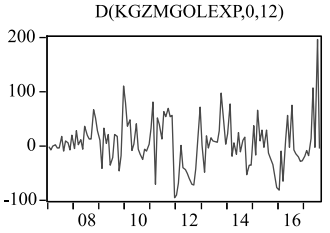

D(KGZMEXPORTS,0,12)
200
100
0
-100
08
10
12
14
16

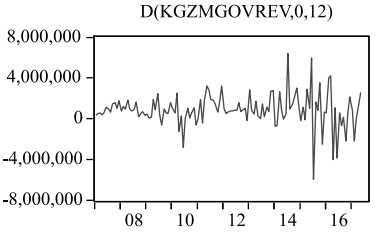

D(KGZMEXTFIN,0,12)
20,000,000
10,000,000
0
-10,000,000
-20,000,000
08
10
12
14
16

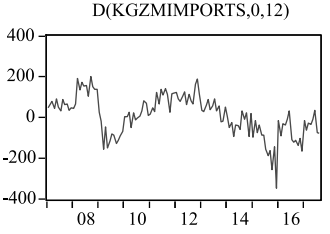

D(KGZMFARMG,0,12)
20
10
0
-10
-20
08
10
12
14
16

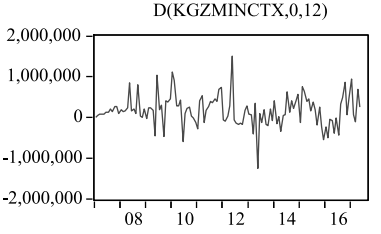

D(KGZMFXDEP,0,12)
10,000
0
-10,000
-20,000
08
10
12
14
16

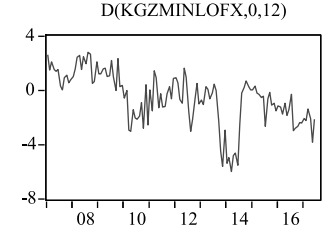

D(KGZMGOLDPRI,0,12)
800
400
0
-400
-800
08
10
12
14
16

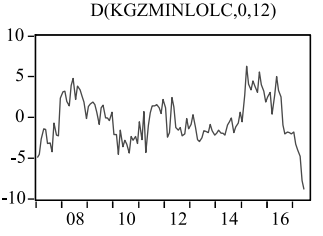

D(KGZMGOLEXP,0,12)
200
100
0
-100
08
10
12
14
16

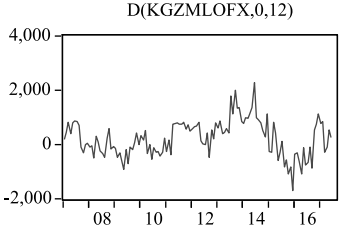

D(KGZMGOVREV,0,12)
8,000,000
4,000,000
0
-4,000,000
-8,000,000
08
10
12
14
16

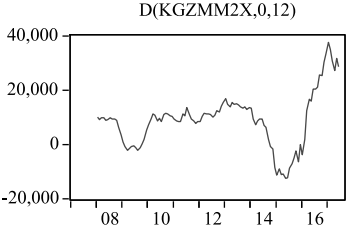

D(KGZMIMPORTS,0,12)
400
200
0
-200
-400
08
10
12
14
16

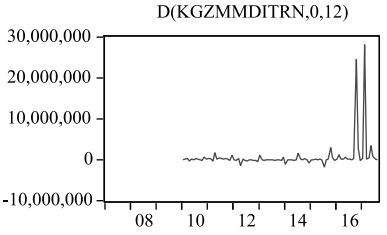

D(KGZMINCTX,0,12)
2,000,000
1,000,000
0
-1,000,000
-2,000,000
08
10
12
14
16

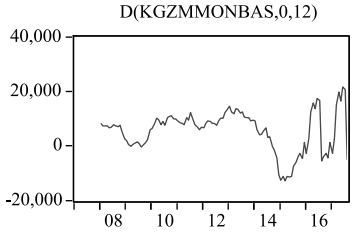

D(KGZMINLOFX,0,12)
4
0
-4
-8
08
10
12
14
16

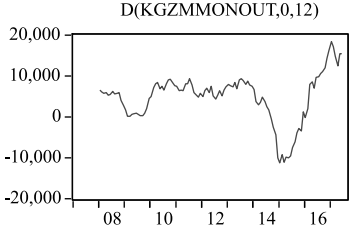

D(KGZMINLOLC,0,12)
10
5
0
-5
-10
08
10
12
14
16

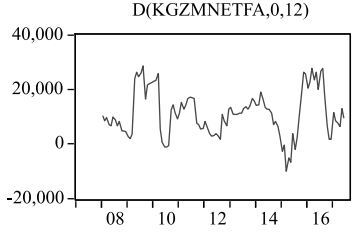

D(KGZMLOFX,0,12)
4,000
2,000
0
-2,000
08
10
12
14
16

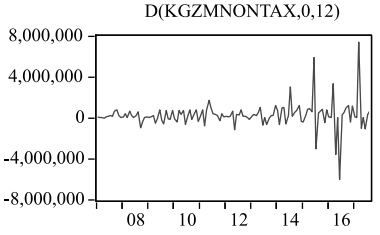

D(KGZMM2X,0,12)
40,000
20,000
0
-20,000
08
10
12
14
16

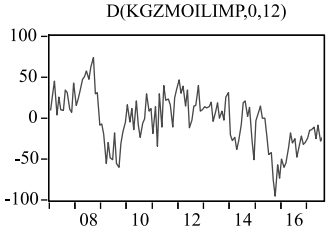

D(KGZMMDITRN,0,12)
30,000,000
20,000,000
10,000,000
0
-10,000,000
08
10
12
14
16

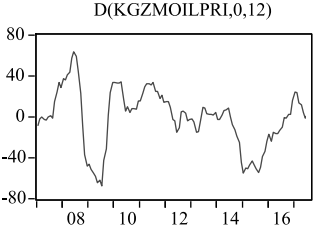

D(KGZMMONBAS,0,12)
40,000
20,000
0
-20,000
08
10
12
14
16

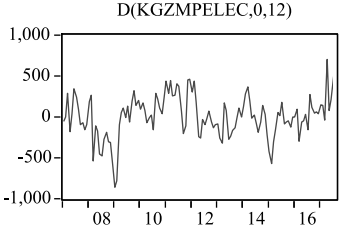

D(KGZMMONOUT,0,12)
20,000
10,000
0
-10,000
-20,000
08
10
12
14
16


D(KGZMNETFA,0,12)
40,000
20,000
0
-20,000
08
10
12
14
16

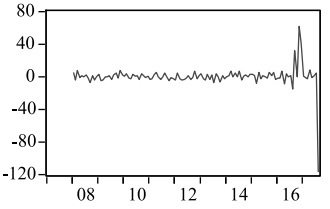

D(KGZMNONTAX,0,12)
8,000,000
4,000,000
0
-4,000,000
-8,000,000
08
10
12
14
16


D(KGZMOILIMP,0,12)
100
50
0
-50
-100
08
10
12
14
16

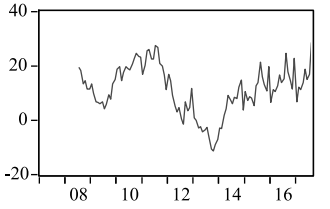

D(KGZMOILPRI,0,12)
80
40
0
-40
-80
08
10
12
14
16


D(KGZMPELEC,0,12)
1,000
500
0
-500
-1,000
08
10
12
14
16

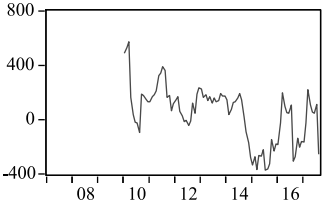
D(KGZMPPI,0,12)



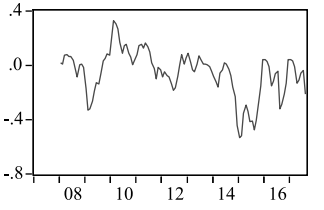
D(KGZMPPII,0,12)



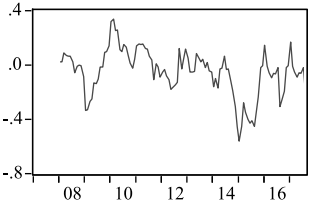
D(KGZMRESLEV,0,12)



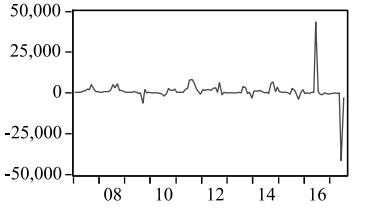
D(KGZMRUBERAV,0,12)



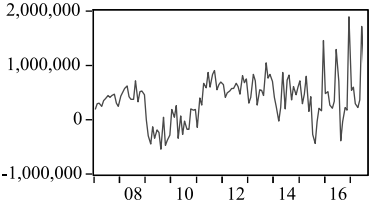
D(KGZMRUBEREP,0,12)



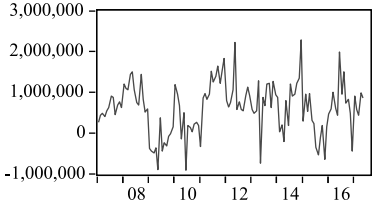
D(KGZMTAGR,0,12)

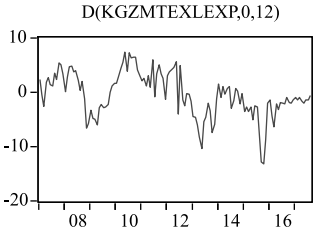


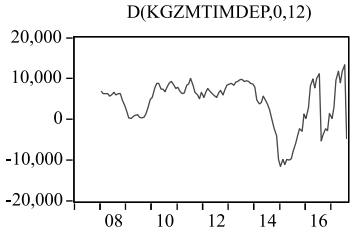
D(KGZMTAXGS,0,12)

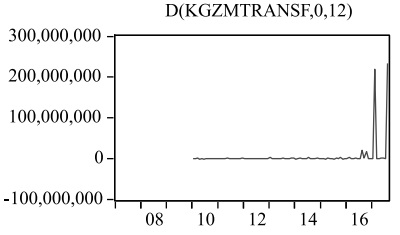


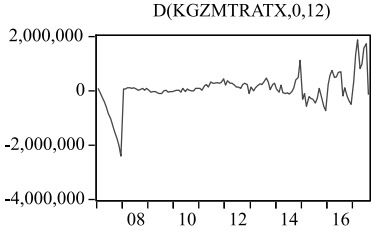
D(KGZMTAXREV,0,12)

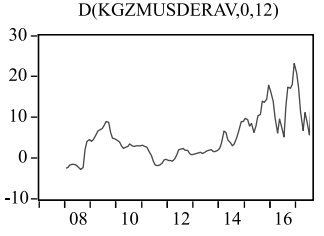


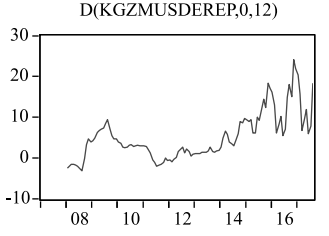

D(KGZMTEXLEXP,0,12)
10
0
-10
-20
08
10
12
14
16

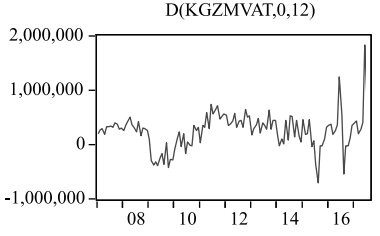

D(KGZMTIMDEP,0,12)
20,000
10,000
0
-10,000
-20,000
08
10
12
14
16


D(KGZMTRANSF,0,12)
300,000,000
200,000,000
100,000,000
0
-100,000,000
08
10
12
14
16

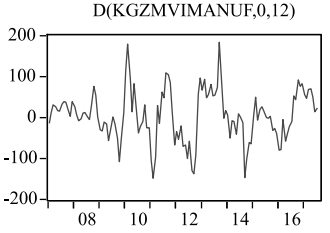

D(KGZMTRATX,0,12)
2,000,000
0
-2,000,000
-4,000,000
08
10
12
14
16

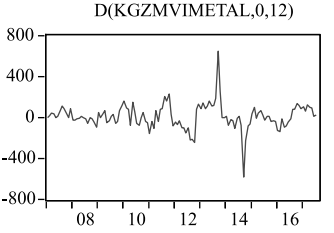

D(KGZMUSDERAV,0,12)
30
20
10
0
-10
08
10
12
14
16

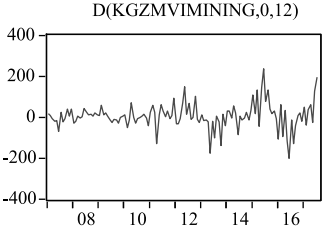

D(KGZMUSDEREP,0,12)
30
20
10
0
-10
08
10
12
14
16

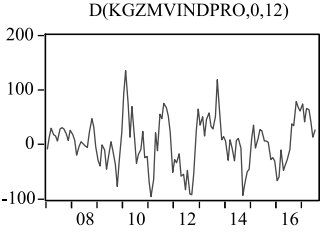

D(KGZMVAT,0,12)
2,000,000
1,000,000
0
-1,000,000
08
10
12
14
16

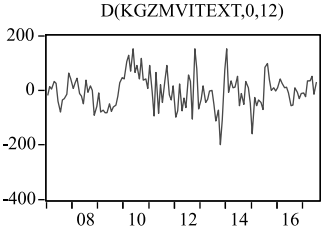

D(KGZMVIFOOD,0,12)
100
50
0
-50
-100
08
10
12
14
16

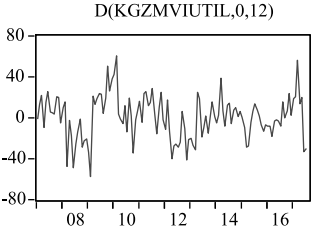

D(KGZMVIMANUF,0,12)
200
100
0
-100
-200
08
10
12
14
16

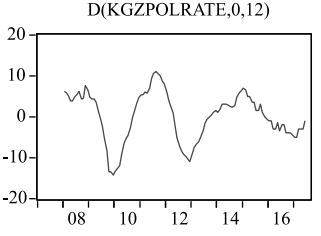

D(KGZMVIMETAL,0,12)
800
400
0
-400
-800
08
10
12
14
16


D(KGZMVIMINING,0,12)
400
200
0
-200
-400
08
10
12
14
16


D(KGZMVINDPRO,0,12)
200
100
0
-100
08
10
12
14
16


D(KGZMVITEXT,0,12)
200
0
-200
-400
08
10
12
14
16


D(KGZMVIUTIL,0,12)
80
40
0
-40
-80
08
10
12
14
16


D(KGZPOLRATE,0,12)
20
10
0
-10
-20
08
10
12
14
16

Factor Method: Principal Factors

Date: 09/06/17 Time: 14:43

Covariance Analysis: Ordinary Correlation

Sample: 2007M01 2017M06

Included observations: 126

Pairwise samples (pairwise missing deletion)

Minimum pairwise obs: 89

Number of factors: Minimum average partial

Prior communalities: Squared multiple correlation

Note: Calculations employ generalized inverse of covariance matrix

	Unrotated Loadings						
	F1	F2	F3	F4	F5	Communality	Uniqueness
D(KGZFXRISK,0,12)	-0.42635	-0.01542	0.04956	0.26169	-0.07960	0.25928	0.74072
D(KGZMANW,0,12)	0.18984	0.45129	0.14710	0.24882	0.39516	0.47940	0.52060
D(KGZMBEXP,0,12)	-0.11196	0.47087	0.57268	-0.17859	0.15119	0.61696	0.38304
D(KGZMBROAD,0,12)	0.62818	-0.44336	0.19093	0.19286	0.13637	0.68343	0.31657
D(KGZMBUDFIN,0,12)	-0.12879	0.35751	0.52360	-0.24672	0.04046	0.48106	0.51894
D(KGZMCAPEXP,0,12)	-0.02853	0.01031	0.17189	0.14237	-0.27524	0.12649	0.87351
D(KGZMCUREXP,0,12)	-0.08694	0.44678	0.46218	-0.25502	0.32012	0.58829	0.41171
D(KGZMDEFICIT,0,12)	0.12067	-0.28853	-0.59572	0.29967	-0.09066	0.55071	0.44929
D(KGZMDEMDEP,0,12)	0.81577	-0.35021	0.13371	-0.04728	0.17169	0.83772	0.16228

Con.

	Unrotated Loadings						
	F1	F2	F3	F4	F5	Communality	Uniqueness
D(KGZMDOMFIN,0,12)	-0.17219	0.31755	0.18611	-0.08235	0.22148	0.22096	0.77904
D(KGZMEMPL,0,12)	0.08812	0.20143	0.01418	0.63452	0.35907	0.58009	0.41991
D(KGZMEXPORTS,0,12)	0.40900	0.17998	-0.33696	-0.08558	-0.02460	0.32115	0.67885
D(KGZMEXTFIN,0,12)	0.05509	0.01943	0.32955	-0.15825	-0.19153	0.17374	0.82626
D(KGZMFARMG,0,12)	0.25265	-0.12637	0.15818	-0.20715	-0.04935	0.15017	0.84983
D(KGZMFXDEP,0,12)	0.79663	0.22901	0.04932	-0.17501	-0.32270	0.82426	0.17574
D(KGZMGOLDPRI,0,12)	0.30566	0.39049	0.08751	-0.33949	0.40238	0.53073	0.46927
D(KGZMGOLEXP,0,12)	0.24706	-0.01748	-0.30984	-0.03651	-0.12408	0.17408	0.82592
D(KGZMGOVREV,0,12)	0.05229	0.11619	-0.22362	0.24397	0.03623	0.12707	0.87293
D(KGZMIMPORTS,0,12)	0.61575	0.57151	-0.15251	0.22034	-0.00804	0.77764	0.22236
D(KGZMINCTX,0,12)	-0.01962	0.17350	-0.13710	0.06584	0.46765	0.27232	0.72768
D(KGZMINLOFX,0,12)	-0.13868	0.59347	-0.08025	-0.09178	0.01189	0.38644	0.61356
D(KGZMINLOLC,0,12)	-0.50974	0.37021	0.00584	0.20053	-0.07445	0.44268	0.55732
D(KGZMLOFX,0,12)	0.38612	-0.10785	-0.29960	0.33298	0.04773	0.36363	0.63637
D(KGZMM2X,0,12)	0.73187	-0.43595	0.14050	0.06126	0.28588	0.83091	0.16909
D(KGZMMDITRN,0,12)	0.04469	-0.35012	0.17398	0.02234	0.44875	0.35672	0.64328

Con.

	Unrotated Loadings						
	F1	F2	F3	F4	F5	Communality	Uniqueness
D(KGZMMONBAS,0,12)	0.86397	0.03052	0.16932	-0.04423	-0.26185	0.84657	0.15343
D(KGZMMONOUT,0,12)	0.83028	-0.32345	0.15056	-0.07940	0.19565	0.86124	0.13876
D(KGZMNETFA,0,12)	0.19202	-0.27354	0.21547	-0.36926	-0.28231	0.37417	0.62583
D(KGZMNONTAX,0,12)	-0.04788	-0.09685	-0.13789	0.10868	0.11355	0.05539	0.94461
D(KGZMOILIMP,0,12)	0.54098	0.54084	-0.30598	0.20341	0.09716	0.72961	0.27039
D(KGZMOILPRI,0,12)	0.78589	0.17405	-0.06668	-0.13361	0.25879	0.73719	0.26281
D(KGZMPELEC,0,12)	0.25095	-0.17197	0.15295	-0.25560	0.19678	0.22000	0.78000
D(KGZMPPI,0,12)	-0.02214	-0.33647	-0.10508	-0.05162	0.31240	0.22500	0.77500
D(KGZMPPII,0,12)	0.07888	0.20674	0.15567	-0.34731	0.48288	0.42700	0.57300
D(KGZMRESLEV,0,12)	0.82307	0.13314	-0.05344	-0.15482	-0.21075	0.76640	0.23360
D(KGZMRUBERAV,0,12)	0.80562	0.04549	0.03267	-0.35153	-0.09197	0.78419	0.21581
D(KGZMRUBEREP,0,12)	0.77289	-0.02012	0.02318	-0.40003	-0.09986	0.76830	0.23170
D(KGZMTAGR,0,12)	0.01358	0.23271	0.05770	-0.03944	-0.00634	0.05926	0.94074
D(KGZMTAXGS,0,12)	0.34023	0.07656	-0.06062	0.54732	0.18025	0.45734	0.54266
D(KGZMTAXREV,0,12)	0.38570	0.32834	-0.05064	0.46549	0.31561	0.57543	0.42457
D(KGZMTEXLEXP,0,12)	0.45476	0.41514	-0.02333	-0.27692	0.30472	0.54924	0.45076

Con.

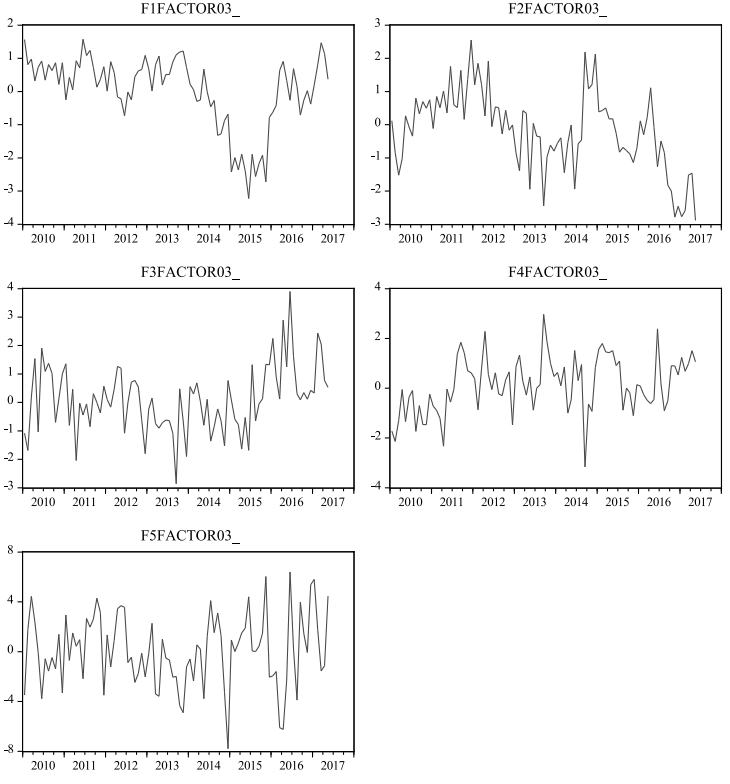
	Unrotated Loadings						
	F1	F2	F3	F4	F5	Communality	Uniqueness
D(KGZMTIMDEP,0,12)	0.90164	0.06346	0.12781	-0.08723	-0.25490	0.90591	0.09409
D(KGZMTRANSF,0,12)	0.07114	-0.36954	0.39371	0.04499	0.68031	0.76147	0.23853
D(KGZMTRATX,0,12)	0.47084	-0.35401	1.26819	1.04109	-0.39544	3.19555	-2.19555
D(KGZMUSDERAV,0,12)	-0.50450	-0.67637	0.19164	-0.09083	0.31802	0.85810	0.14190
D(KGZMUSDEREP,0,12)	-0.53746	-0.65064	0.16143	-0.10469	0.31786	0.85026	0.14974
D(KGZMVAT,0,12)	0.52516	0.20804	0.01789	0.45830	0.16072	0.55526	0.44474
D(KGZMVIFOOD,0,12)	0.22510	-0.36684	-0.01793	-0.04591	0.04309	0.18953	0.81047
D(KGZMVIMANUF,0,12)	0.34880	-0.35974	-0.51007	0.14347	0.13698	0.55059	0.44941
D(KGZMVIMETAL,0,12)	0.25024	-0.38881	-0.52438	0.16918	0.00060	0.51739	0.48261
D(KGZMVIMINING,0,12)	-0.32697	0.23172	-0.05313	0.17014	0.20896	0.23604	0.76396
D(KGZMVINDPRO,0,12)	0.34111	-0.39719	-0.50660	0.11281	0.20455	0.58533	0.41467
D(KGZMVITEXT,0,12)	0.21530	-0.02196	0.06034	-0.27074	0.08668	0.13129	0.86871
D(KGZMVIUTIL,0,12)	0.06257	-0.29995	0.02703	-0.39035	0.15768	0.27185	0.72815
D(KGZPOLRATE,0,12)	-0.17718	0.48195	-0.09350	0.40483	0.18115	0.46912	0.53088

Factor	Variance	Cumulative	Difference	Proportion	Cumulative
F1	10. 98770	10. 98770	5. 05518	0. 37033	0. 37033
F2	5. 93252	16. 92023	1. 08863	0. 19995	0. 57028
F3	4. 84389	21. 76412	0. 38653	0. 16326	0. 73354
F4	4. 45736	26. 22148	1. 00890	0. 15023	0. 88377
F5	3. 44846	29. 66994	—	0. 11623	1. 00000
Total	29. 66994	29. 66994		1. 00000	

	Model	Independence	Saturated
Discrepancy	14. 06632	93. 57184	0. 00000
Parameters	320. 00000	55. 00000	1540. 00000
Degrees-of-freedom	1220. 00000	1485. 00000	—

Warning: Heywood solution (uniqueness estimates are non-positive).
Results should be interpreted with caution.
Note: unbalanced sample - results use minimum pairwise number of observations.

FACTOR SCORES



VAR Lag Order Selection Criteria
Endogenous variables: F1 F2 F3 F4 F5
Exogenous variables: C
Date: 09/06/17 Time: 14:51
Sample: 2007M01 2017M12
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-682.2938	NA	16.13255	16.97022	17.11802	17.02952
1	-520.4374	299.7342 *	0.550472 *	13.59105 *	14.47788 *	13.94686 *
2	-501.7094	32.36932	0.647244	13.74591	15.37177	14.39823
3	-487.0018	23.60484	0.849564	14.00004	16.36493	14.94887
4	-470.0058	25.17917	1.071263	14.19768	17.30159	15.44301
5	-445.3778	33.44553	1.144622	14.20686	18.04980	15.74870
6	-420.0013	31.32897	1.237875	14.19756	18.77953	16.03591
7	-403.3826	18.46520	1.730199	14.40451	19.72551	16.53936
8	-382.6467	20.47992	2.303407	14.50980	20.56982	16.94116

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Vector Autoregression Estimates
Date: 09/06/17 Time: 14:53
Sample (adjusted): 2010M02 2017M05
Included observations: 88 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	F1	F2	F3	F4	F5
F1(-1)	0.8967	0.0293	0.0150	-0.0006	0.1378
	(0.0572)	(0.0935)	(0.1161)	(0.1073)	(0.3034)
	[15.6678]	[0.31310]	[0.12919]	[-0.00529]	[0.45407]
F2(-1)	-0.0952	0.7768	-0.1618	0.0513	0.1160
	(0.0539)	(0.0881)	(0.1094)	(0.1011)	(0.2859)
	[-1.76496]	[8.81896]	[-1.47961]	[0.50702]	[0.40584]

Con.

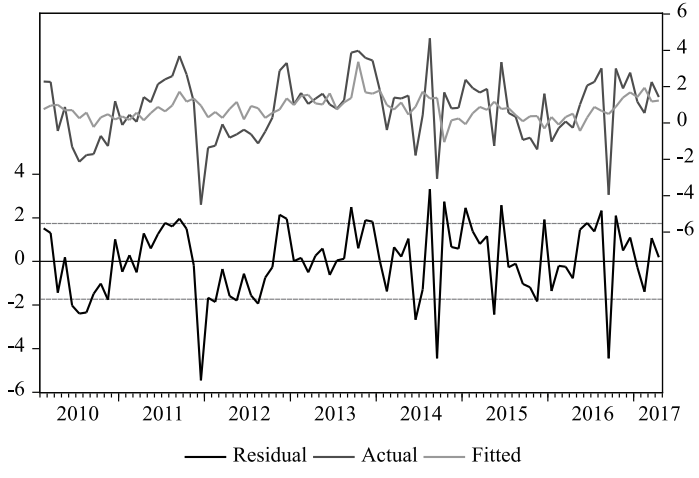
	F1	F2	F3	F4	F5
F3 (– 1)	0. 0422	– 0. 0103	0. 3503	– 0. 1722	– 0. 0599
	(0. 0502)	(0. 0821)	(0. 1019)	(0. 0942)	(0. 2664)
	[0. 83966]	[– 0. 12573]	[3. 43768]	[– 1. 82757]	[– 0. 22494]
F4 (– 1)	– 0. 1143	0. 1302	– 0. 1405	0. 4829	0. 2181
	(0. 0539)	(0. 0881)	(0. 1094)	(0. 1011)	(0. 2860)
	[– 2. 11994]	[1. 47808]	[– 1. 28438]	[4. 77472]	[0. 76276]
F5 (– 1)	0. 0893	0. 0906	– 0. 0152	– 0. 0180	0. 3012
	(0. 0224)	(0. 0366)	(0. 0455)	(0. 0421)	(0. 1189)
	[3. 98259]	[2. 47494]	[– 0. 33521]	[– 0. 42883]	[2. 53352]
C	– 0. 0185	– 0. 0860	0. 0772	0. 1230	0. 1113
	(0. 0577)	(0. 0943)	(0. 1170)	(0. 1082)	(0. 3060)
	[– 0. 32138]	[– 0. 91243]	[0. 65920]	[1. 13670]	[0. 36377]
R-squared	0. 7681	0. 4920	0. 1551	0. 2370	0. 0868
Adj. R-squared	0. 7540	0. 4610	0. 1036	0. 1905	0. 0311
Sum sq. resids	23. 3850	62. 3882	96. 1853	82. 2424	657. 3690
S. E. equation	0. 5340	0. 8723	1. 0830	1. 0015	2. 8314
F-statistic	54. 3264	15. 8816	3. 0103	5. 0938	1. 5594
Log likelihood	– 66. 5560	– 109. 7324	– 128. 7799	– 121. 8893	– 213. 3466
Akaike AIC	1. 6490	2. 6303	3. 0632	2. 9066	4. 9851
Schwarz SC	1. 8179	2. 7992	3. 2321	3. 0755	5. 1541
Mean dependent	0. 0032	– 0. 1769	0. 1160	0. 1602	0. 1317
S. D. dependent	1. 0767	1. 1881	1. 1439	1. 1131	2. 8765

Determinant resid covariance (dof adj.)	0. 4355
Determinant resid covariance	0. 3060
Log likelihood	– 572. 2231
Akaike information criterion	13. 6869
Schwarz criterion	14. 5314

Dependent Variable: D (KGZMRGDP, 0, 12)
Method: Least Squares
Date: 09/06/17 Time: 15:02
Sample (adjusted): 2010M02 2017M04
Included observations: 87 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.751200	0.188075	3.994152	0.0001
F1_F(-1)	0.271201	0.186985	1.450389	0.1508
F2_F(-1)	-0.235148	0.176018	-1.335930	0.1853
F3_F(-1)	-0.275388	0.163385	-1.685518	0.0957
F4_F(-1)	0.339444	0.176410	1.924177	0.0578
F5_F(-1)	0.026821	0.072928	0.367777	0.7140

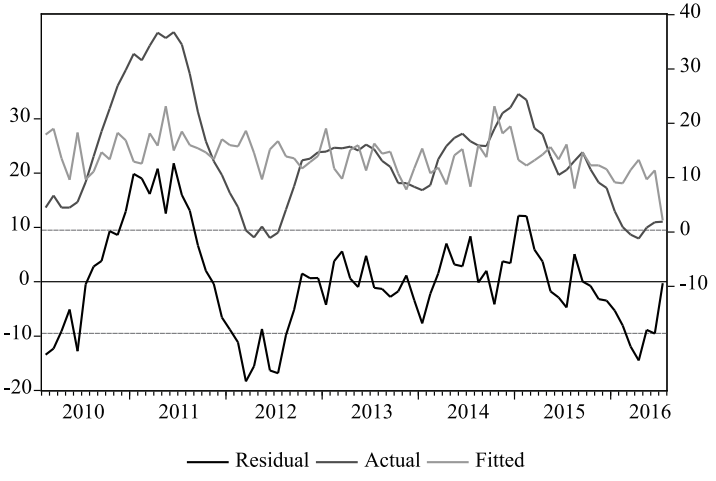
R-squared	0.119988	Mean dependent var	0.797157
Adjusted R-squared	0.065666	S.D. dependent var	1.795043
S.E. of regression	1.735106	Akaike info criterion	4.006486
Sum squared resid	243.8580	Schwarz criterion	4.176549
Log likelihood	-168.2821	Hannan-Quinn criter.	4.074965
F-statistic	2.208841	Durbin-Watson stat	1.883554
Prob (F-statistic)	0.061262		



Dependent Variable: D (KGZMCPI, 0, 12)
Method: Least Squares
Date: 09/06/17 Time: 15:08
Sample (adjusted): 2010M02 2016M07
Included observations: 78 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.87975	1.083971	12.80454	0.0000
F1_F(-1)	0.154574	1.052598	0.146850	0.8837
F2_F(-1)	1.876080	1.146297	1.636643	0.1061
F3_F(-1)	-1.984704	0.945465	-2.099184	0.0393
F4_F(-1)	-1.311462	0.983868	-1.332966	0.1867
F5_F(-1)	0.242273	0.422792	0.573032	0.5684

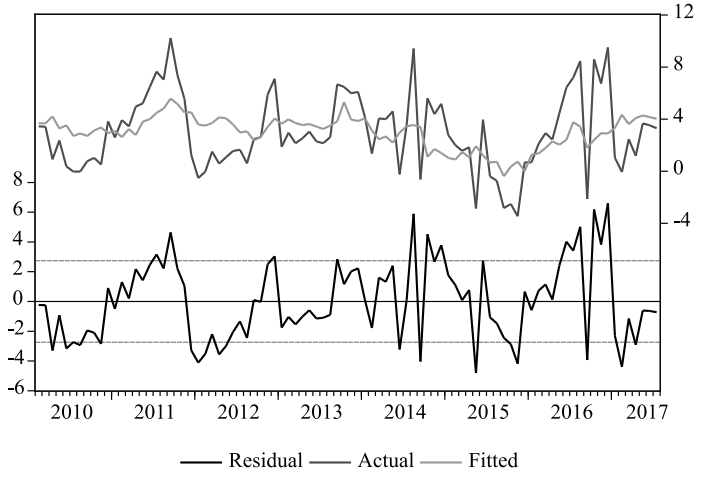
R-squared	0.128479	Mean dependent var	13.89872
Adjusted R-squared	0.067957	S. D. dependent var	9.838164
S. E. of regression	9.497998	Akaike info criterion	7.413842
Sum squared resid	6495.261	Schwarz criterion	7.595128
Log likelihood	-283.1399	Hannan-Quinn criter.	7.486414
F-statistic	2.122843	Durbin-Watson stat	0.299193
Prob (F-statistic)	0.072358		



Dependent Variable: D (KGZMCGDP, 0, 12)
Method: Least Squares
Date: 09/06/17 Time: 15: 10
Sample (adjusted): 2010M02 2017M07
Included observations: 90 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2. 929920	0. 294847	9. 937093	0. 0000
F1_F (– 1)	1. 182749	0. 291713	4. 054496	0. 0001
F2_F (– 1)	0. 133322	0. 269936	0. 493900	0. 6227
F3_F (– 1)	– 0. 222080	0. 258056	– 0. 860590	0. 3919
F4_F (– 1)	0. 389777	0. 276993	1. 407171	0. 1631
F5_F (– 1)	0. 196671	0. 114278	1. 720988	0. 0889

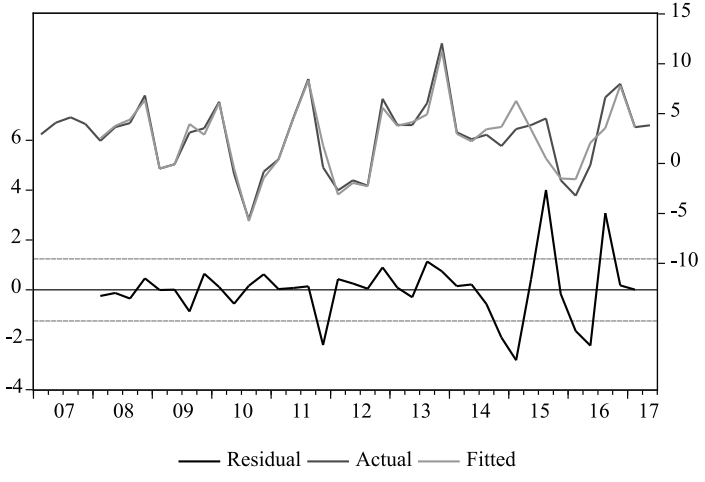
R-squared	0. 175292	Mean dependent var	2. 992206
Adjusted R-squared	0. 126202	S. D. dependent var	2. 934911
S. E. of regression	2. 743471	Akaike info criterion	4. 920666
Sum squared resid	632. 2374	Schwarz criterion	5. 087320
Log likelihood	– 215. 4300	Hannan-Quinn criter.	4. 987870
F-statistic	3. 570850	Durbin-Watson stat	1. 371916
Prob (F-statistic)	0. 005619		

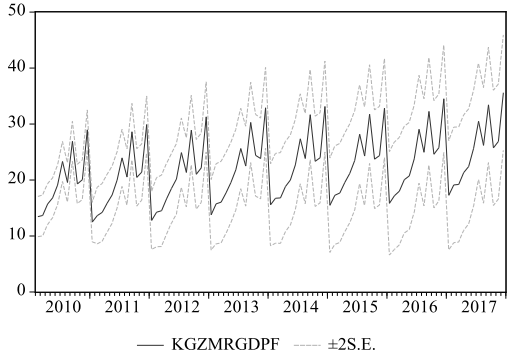


Dependent Variable: D(KGZQRGDP, 0, 4)
Method: MIDAS
Date: 09/06/17 Time: 15:20
Sample(adjusted): 2008Q1 2017Q1
Included observations: 37 after adjustments
Method: U-MIDAS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027398	0.265805	0.103074	0.9185
Page: M_20170905 Series: D(KGZMRGDP, 0, 12) Lags: 3				
LAG1	0.658676	0.111550	5.904751	0.0000
LAG2	1.040563	0.179841	5.786017	0.0000
LAG3	1.328698	0.216036	6.150364	0.0000

R-squared	0.888219	Mean dependent var	2.588147
Adjusted R-squared	0.888219	S.D. dependent var	3.721106
S.E. of regression	1.244100	Akaike info criterion	3.463519
Sum squared resid	55.72024	Schwarz criterion	3.637672
Log likelihood	-60.07510	Hannan-Quinn criter.	3.524916
Durbin-Watson stat	1.897578		



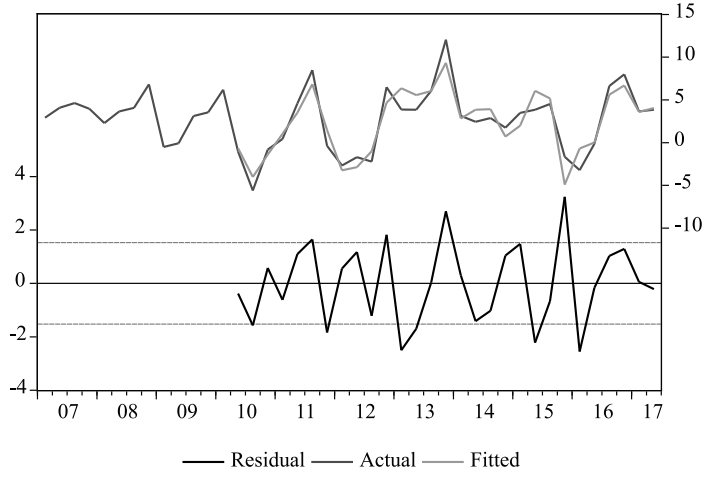


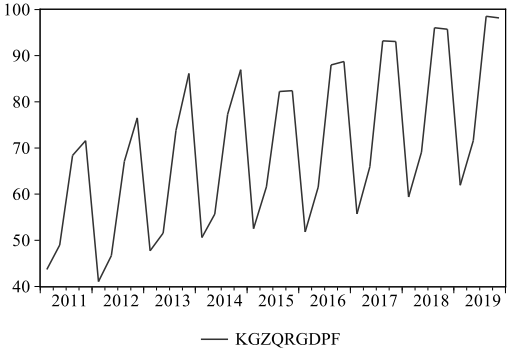
Forecast: KGZMRGDPF	
Actual: KGZMRGDP	
Forecast sample: 2010M01 2017M12	
Adjusted sample: 2010M02 2017M12	
Included observations: 95	
Root Mean Squared Error	2.000778
Mean Absolute Error	1.546086
Mean Abs. Percent Error	7.406921
Theil Inequality Coefficient	0.045259
Bias Proportion	0.061054
Variance Proportion	0.003504
Covariance Proportion	0.935442
Theil U2 Coefficient	0.349540
Symmetric MAPE	7.185253

Dependent Variable: D (KGZQRGDP, 0, 4)
Method: MIDAS
Date: 09/06/17 Time: 15:21
Sample (adjusted): 2010Q2 2017Q2
Included observations: 29 after adjustments
Method: U-MIDAS

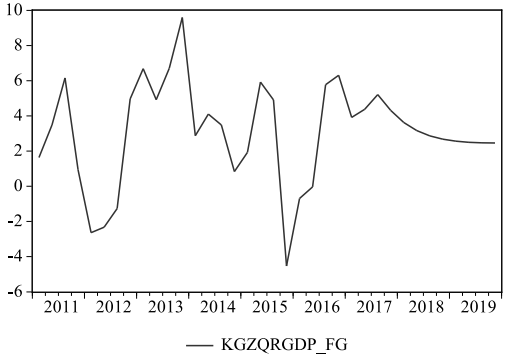
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1. 849190	0. 586561	3. 152598	0. 0076
Page: M_20170905 Series: F1_F (– 1) Lags: 3				
LAG1	– 2. 822281	1. 830664	– 1. 541671	0. 1471
LAG2	7. 422557	2. 995548	2. 477863	0. 0277
LAG3	– 3. 632045	1. 805865	– 2. 011249	0. 0655
LAG1	0. 769119	1. 237293	0. 621614	0. 5449
LAG2	– 3. 529731	2. 147819	– 1. 643402	0. 1243
LAG3	0. 743500	0. 922753	0. 805740	0. 4349
LAG1	– 2. 133957	0. 703758	– 3. 032232	0. 0096
LAG2	0. 270713	0. 594035	0. 455718	0. 6561
LAG3	0. 181024	0. 473589	0. 382239	0. 7085
LAG1	2. 845754	1. 048999	2. 712828	0. 0178
LAG2	– 0. 710374	1. 233715	– 0. 575801	0. 5746
LAG3	0. 053895	0. 597991	0. 090127	0. 9296
LAG1	– 0. 737387	0. 366919	– 2. 009672	0. 0657
LAG2	0. 509930	0. 683310	0. 746265	0. 4688
LAG3	– 0. 456496	0. 444837	– 1. 026211	0. 3235
Page: M_20170905 Series: F2_F (– 1) Lags: 3				

R-squared	0. 854365	Mean dependent var	2. 432354
Adjusted R-squared	0. 854365	S. D. dependent var	3. 996605
S. E. of regression	1. 525188	Akaike info criterion	4. 750470
Sum squared resid	65. 13359	Schwarz criterion	5. 504840
Log likelihood	– 52. 88181	Hannan-Quinn criter.	4. 986729
Durbin-Watson stat	2. 461778		





Forecast: KGZQRGDPF	
Actual: KGZQRGDP	
Forecast sample: 2011Q1 2019Q4	
Included observations: 36	
Root Mean Squared Error	3.188382
Mean Absolute Error	2.486687
Mean Abs. Percent Error	4.070645
Theil Inequality Coefficient	0.023918
Bias Proportion	0.003915
Variance Proportion	0.435676
Covariance Proportion	0.560409
Theil U2 Coefficient	0.134449
Symmetric MAPE	4.016080



Forecast: KGZQRGDP_FG	
Actual: D(KGZQRGDP,0,4)	
Forecast sample: 2011Q1 2019Q4	
Included observations: 36	
Root Mean Squared Error	1.498501
Mean Absolute Error	1.245516
Mean Abs. Percent Error	60.21252
Theil Inequality Coefficient	0.162003
Bias Proportion	0.000000
Variance Proportion	0.045344
Covariance Proportion	0.954656
Theil U2 Coefficient	0.142685
Symmetric MAPE	48.32213

Principal Components Analysis
Date: 09/06/17 Time: 16:50
Sample: 2007M01 2017M08
Included observations: 128
Pairwise samples (pairwise missing deletion)
Computed using: Ordinary correlations
Extracting 55 of 55 possible components

Eigenvalues: (Sum = 55, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	11. 0094	5. 1736	0. 2002	11. 0094	0. 2002
2	5. 8358	1. 1648	0. 1061	16. 8453	0. 3063
3	4. 6711	0. 8566	0. 0849	21. 5163	0. 3912
4	3. 8145	0. 4712	0. 0694	25. 3308	0. 4606
5	3. 3432	0. 5441	0. 0608	28. 6740	0. 5213
6	2. 7992	0. 5388	0. 0509	31. 4732	0. 5722
7	2. 2604	0. 2624	0. 0411	33. 7336	0. 6133
8	1. 9980	0. 1524	0. 0363	35. 7315	0. 6497
9	1. 8456	0. 1750	0. 0336	37. 5771	0. 6832
10	1. 6706	0. 0809	0. 0304	39. 2477	0. 7136
11	1. 5897	0. 1359	0. 0289	40. 8374	0. 7425
12	1. 4538	0. 1214	0. 0264	42. 2911	0. 7689
13	1. 3324	0. 0569	0. 0242	43. 6235	0. 7932
14	1. 2755	0. 1294	0. 0232	44. 8990	0. 8163

Con.

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
15	1. 1461	0. 0755	0. 0208	46. 0452	0. 8372
16	1. 0706	0. 1576	0. 0195	47. 1158	0. 8567
17	0. 9130	0. 0234	0. 0166	48. 0288	0. 8733
18	0. 8896	0. 2556	0. 0162	48. 9184	0. 8894
19	0. 6340	0. 0274	0. 0115	49. 5525	0. 9010
20	0. 6066	0. 0651	0. 0110	50. 1591	0. 9120
21	0. 5415	0. 0405	0. 0098	50. 7006	0. 9218
22	0. 5010	0. 0443	0. 0091	51. 2015	0. 9309
23	0. 4567	0. 0186	0. 0083	51. 6582	0. 9392
24	0. 4381	0. 0422	0. 0080	52. 0963	0. 9472
25	0. 3959	0. 0211	0. 0072	52. 4922	0. 9544
26	0. 3748	0. 0254	0. 0068	52. 8671	0. 9612
27	0. 3494	0. 0538	0. 0064	53. 2165	0. 9676
28	0. 2956	0. 0277	0. 0054	53. 5121	0. 9729
29	0. 2679	0. 0311	0. 0049	53. 7799	0. 9778
30	0. 2368	0. 0158	0. 0043	54. 0167	0. 9821
31	0. 2209	0. 0176	0. 0040	54. 2376	0. 9861
32	0. 2033	0. 0504	0. 0037	54. 4409	0. 9898
33	0. 1529	0. 0260	0. 0028	54. 5938	0. 9926
34	0. 1269	0. 0047	0. 0023	54. 7207	0. 9949
35	0. 1222	0. 0140	0. 0022	54. 8429	0. 9971
36	0. 1082	0. 0150	0. 0020	54. 9511	0. 9991
37	0. 0932	0. 0041	0. 0017	55. 0443	1. 0008
38	0. 0890	0. 0309	0. 0016	55. 1333	1. 0024
39	0. 0582	0. 0241	0. 0011	55. 1915	1. 0035
40	0. 0340	0. 0060	0. 0006	55. 2255	1. 0041
41	0. 0281	0. 0097	0. 0005	55. 2535	1. 0046
42	0. 0184	0. 0033	0. 0003	55. 2719	1. 0049
43	0. 0151	0. 0057	0. 0003	55. 2870	1. 0052
44	0. 0094	0. 0030	0. 0002	55. 2965	1. 0054
45	0. 0064	0. 0019	0. 0001	55. 3028	1. 0055

Con.

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
46	0. 0045	0. 0014	0. 0001	55. 3073	1. 0056
47	0. 0030	0. 0028	0. 0001	55. 3104	1. 0056
48	0. 0003	0. 0001	0. 0000	55. 3106	1. 0056
49	0. 0001	0. 0026	0. 0000	55. 3107	1. 0056
50	-0. 0025	0. 0031	-0. 0000	55. 3083	1. 0056
51	-0. 0055	0. 0129	-0. 0001	55. 3027	1. 0055
52	-0. 0185	0. 0120	-0. 0003	55. 2843	1. 0052
53	-0. 0305	0. 0466	-0. 0006	55. 2538	1. 0046
54	-0. 0770	0. 0997	-0. 0014	55. 1767	1. 0032
55	-0. 1767	—	-0. 0032	55. 0000	1. 0000

Dependent Variable: D (KGZMRGDP, 0, 12)
Method: Stepwise Regression
Date: 09/06/17 Time: 16:48
Sample (adjusted): 2010M01 2017M04
Included observations: 88 after adjustments
Number of always included regressors: 2
Number of search regressors: 54
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0. 05/0. 05
Stopping criterion: Number of search regressors = 10

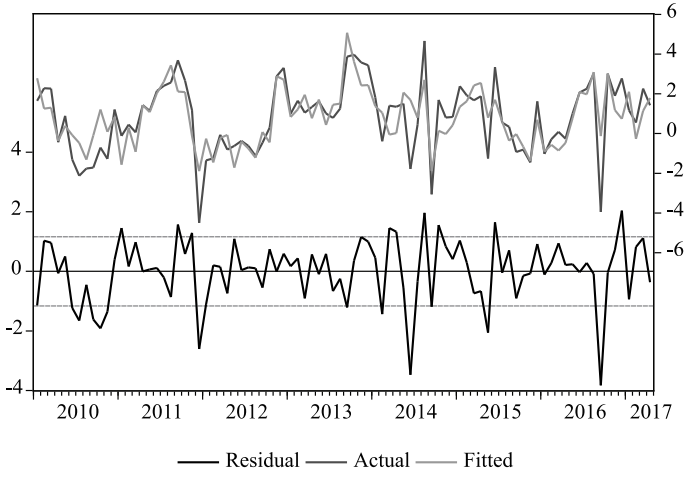
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Z01	0. 133751	0. 038102	3. 510369	0. 0008
C	0. 707255	0. 129753	5. 450791	0. 0000
Z03	-0. 415126	0. 056453	-7. 353430	0. 0000
Z06	0. 278086	0. 072790	3. 820374	0. 0003
Z27	-0. 627816	0. 214412	-2. 928077	0. 0045
Z15	0. 394479	0. 116633	3. 382228	0. 0011
Z02	-0. 111647	0. 052277	-2. 135706	0. 0359
Z14	0. 267979	0. 112006	2. 392536	0. 0192
Z54	-1. 128984	0. 443100	-2. 547923	0. 0128
Z43	-2. 033493	0. 835527	-2. 433784	0. 0173
Z09	0. 223576	0. 108591	2. 058876	0. 0429

Con.

R-squared	0. 626660	Mean dependent var	0. 806775
Adjusted R-squared	0. 578174	S. D. dependent var	1. 786977
S. E. of regression	1. 160608	Akaike info criterion	3. 252233
Sum squared resid	103. 7198	Schwarz criterion	3. 561900
Log likelihood	– 132. 0983	Hannan-Quinn criter.	3. 376990
F-statistic	12. 92463	Durbin-Watson stat	1. 894045
Prob (F-statistic)	0. 000000		

Selection Summary
Added Z03
Added Z06
Added Z27
Added Z15
Added Z02
Added Z14
Added Z54
Added Z43
Added Z09

∗ Note: p-values and subsequent tests do not account for stepwise selection.



Dependent Variable: D (KGZMCPI, 0, 12)
Method: Stepwise Regression
Date: 09/06/17 Time: 16:55
Sample (adjusted): 2010M01 2016M07
Included observations: 79 after adjustments
Number of always included regressors: 2
Number of search regressors: 54
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0.05/0.05
Stopping criterion: Number of search regressors = 10

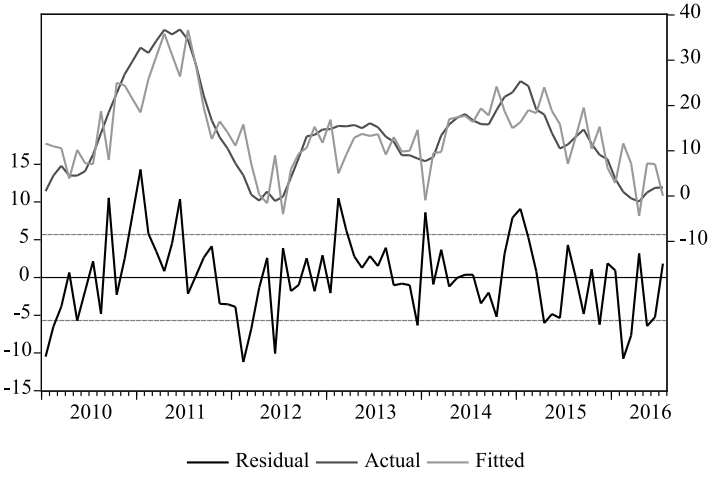
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
C	15.86898	0.712740	22.26477	0.0000
Z01	0.697228	0.193386	3.605377	0.0006
Z14	4.531224	0.583802	7.761583	0.0000
Z05	3.116224	0.421731	7.389130	0.0000
Z28	5.080845	1.221488	4.159553	0.0001
Z29	-5.355223	1.382532	-3.873490	0.0002
Z25	4.713348	1.177930	4.001383	0.0002
Z03	-1.437878	0.284147	-5.060325	0.0000
Z24	4.404126	1.172741	3.755412	0.0004
Z35	-6.303187	1.884061	-3.345533	0.0013
Z21	3.082496	1.118878	2.754990	0.0076
Z27	-2.684493	1.258814	-2.132557	0.0366

R-squared	0.714585	Mean dependent var	13.73671
Adjusted R-squared	0.667726	S. D. dependent var	9.880390
S. E. of regression	5.695372	Akaike info criterion	6.456227
Sum squared resid	2173.296	Schwarz criterion	6.816143
Log likelihood	-243.0210	Hannan-Quinn criter.	6.600421
F-statistic	15.24965	Durbin-Watson stat	1.438386
Prob (F-statistic)	0.000000		

Con.

Selection Summary
Added Z14
Added Z05
Added Z28
Added Z29
Added Z25
Added Z03
Added Z24
Added Z35
Added Z21
Added Z27

* Note: p-values and subsequent tests do not account for stepwise selection.



Dependent Variable: D (KGZMCGDP, 0, 12)
Method: Stepwise Regression
Date: 09/06/17 Time: 16:57
Sample (adjusted): 2010M01 2017M05
Included observations: 89 after adjustments
Number of always included regressors: 2
Number of search regressors: 54
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0.05/0.05
Stopping criterion: Number of search regressors = 10

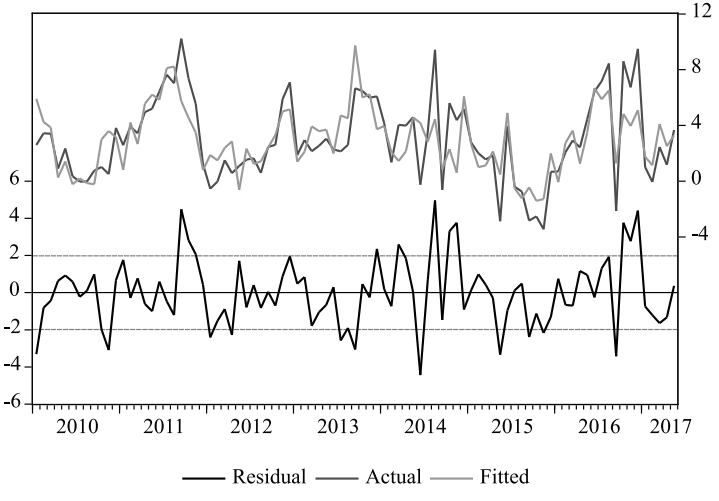
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
C	2.939719	0.214353	13.71437	0.0000
Z01	0.318486	0.062559	5.090947	0.0000
Z03	-0.427927	0.093434	-4.580016	0.0000
Z14	0.613061	0.192833	3.179225	0.0021
Z34	1.987744	0.544788	3.648656	0.0005
Z40	-3.026589	0.968300	-3.125674	0.0025
Z12	0.423544	0.190021	2.228934	0.0287
Z22	0.722248	0.280196	2.577649	0.0119
Z06	0.334457	0.122529	2.729611	0.0079
Z07	0.310920	0.138305	2.248070	0.0274
Z15	0.476013	0.195775	2.431425	0.0174
Z43	-2.826565	1.385909	-2.039504	0.0448

R-squared	0.605779	Mean dependent var	2.978317
Adjusted R-squared	0.549462	S. D. dependent var	2.951078
S. E. of regression	1.980827	Akaike info criterion	4.329738
Sum squared resid	302.1230	Schwarz criterion	4.665284
Log likelihood	-180.6733	Hannan-Quinn criter.	4.464987
F-statistic	10.75654	Durbin-Watson stat	1.641228
Prob (F-statistic)	0.000000		

Con.

Selection Summary
Added Z03
Added Z14
Added Z34
Added Z40
Added Z12
Added Z22
Added Z06
Added Z07
Added Z15
Added Z43

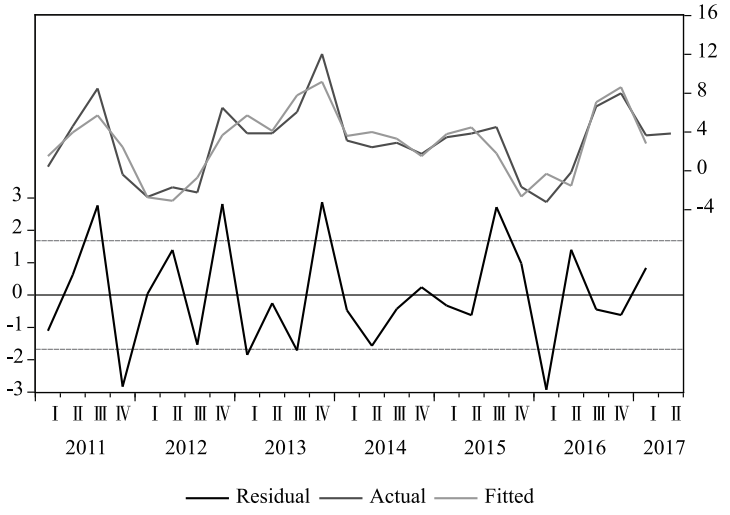
∗ Note: p-values and subsequent tests do not account for stepwise selection.



Dependent Variable: D (KGZQRGDP, 0, 4)
Method: MIDAS
Date: 09/06/17 Time: 17:03
Sample (adjusted): 2011Q1 2017Q1
Included observations: 25 after adjustments
Method: U-MIDAS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.742620	1.278079	1.363468	0.2059
Page: M_20170905 Series: Z01 Lags: 3				
LAG1	0.194618	0.935952	0.207936	0.8399
LAG2	−0.433782	1.798738	−0.241159	0.8148
LAG3	0.458842	1.009929	0.454331	0.6603
LAG1	−0.906483	1.101673	−0.822824	0.4319
LAG2	−0.914726	0.876950	−1.043077	0.3241
LAG3	0.957761	1.674512	0.571964	0.5813
LAG1	0.309713	0.793569	0.390279	0.7054
LAG2	−2.131324	1.438412	−1.481720	0.1726
LAG3	0.329634	0.682616	0.482899	0.6407
LAG1	0.330658	0.950671	0.347816	0.7360
LAG2	1.721250	1.682312	1.023146	0.3330
LAG3	−1.781544	1.504329	−1.184278	0.2666
LAG1	0.959807	1.053778	0.910824	0.3861
LAG2	−0.619202	1.041620	−0.594460	0.5668
LAG3	−0.096544	0.989883	−0.097531	0.9244
Page: M_20170905 Series: Z02 Lags: 3				

R-squared	0.807165	Mean dependent var	2.966111
Adjusted R-squared	0.807165	S. D. dependent var	3.824281
S. E. of regression	1.679354	Akaike info criterion	5.113873
Sum squared resid	67.68552	Schwarz criterion	5.893954
Log likelihood	−47.92342	Hannan-Quinn criter.	5.330235
Durbin-Watson stat	2.836957		


16
12
8
4
0
-4
3
2
1
0
-1
-2
-3
I II III IV I II III IV I II III IV I II III IV I II III IV I II III IV I II III IV I II
2011
2012
2013
2014
2015
2016
2017
Residual
Actual
Fitted

Chapter 5

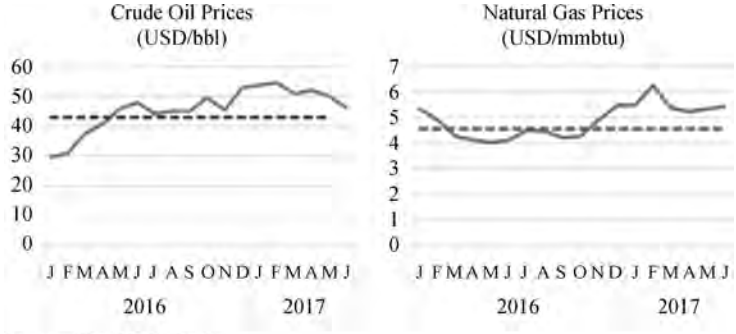
Conclusions

A review of the CAREC member countries recent performance and prospects showed that growth in PRC will hover at slightly higher rates in 2017 and 2018, other countries are also likely to see also better growth performance than in 2016. Azerbaijan which was the only CAREC country with a 3. 8 percent GDP decline in 2016 is expected to bring down its rate of decline to 0. 9 percent in 2017 and resume growth in 2018.

Average oil prices during the first half of 2017 (USD 51. 11/bbl) was 32 percent higher than the average (USD 38. 75/bbl) for the first half of 2016. While the uncertainties about global trade and finances have intensified in recent months and there are questions about the latest OPEC agreement, it is very likely that oil and gas exporters will see higher export earnings and government revenues in 2017 and in 2018 than they did in 2016, resulting in narrowing current account and budget deficits (or widening surpluses). Most of the CAREC countries are also expected to see increased investment, in part financed by the Belt and Road initiative and other sources.

Another area that review showed is that the key short-term economic issue in most of the CAREC countries is the fragility of their financial systems at varying degrees. Azerbaijan and Kazakhstan suffer high NPLs followed by Mongolia, Tajikistan and Uzbekistan with significant NPLs. They have been using budgetary (or Sovereign Fund's) resources to prop up banks' portfolios but these efforts may not achieve their

Figure 36 Energy Prices in 2016 and 2017



Source: The World Bank.

objectives unless accompanied by policies to tighten banking regulation and supervision, eliminate dicey lending and improve risk assessment and management. More flexible exchange rate policies would also help strengthen the banking systems. Not unlike the smaller CAREC countries, the PRC faces rapid credit growth by non-bank financial institutions which can be prudently moderated through active policy intervention. Besides these policy measures, the size and resilience of PRC economy provides more cushion for innovative risk taking and entrepreneurial experimentation than other CAREC member economies.

One of the important short-term issues common to many CAREC countries is the sustainability of external debt in the face of unpredictable global environment. Smaller and lower income countries like the Kyrgyz Republic and Tajikistan which rely on remittances and have limited export capacity are more vulnerable to rapid growth of external debt and repayment difficulties.

These areas require close attention of policymakers and agencies involved in development assistance and cooperation. The region can benefit from a regional cooperation by scaling up value chain integration and improving trade facilitation, and economic connectivity. CAREC member countries need to diversify their agricultural, manpower and services exports to regional demand centers especially PRC and European

countries.

Private sector development focussing SMEs in energy, mining and agri-sector through policy incentives (like concessionary financing schemes) and regional investments cooperation can boost their competitiveness; create employment opportunities and ensure inclusive development. CAREC Program which envisages regional economic connectivity can leverage other development partners and initiatives like Belt and Road Initiative to synergize global and regional efforts to achieve shared prosperity, inclusive growth and minimize risks and vulnerabilities.

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