

Overview and Uses of Economic Models in Saudi Arabia

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Saudi Arabian Monetary Agency (SAMA)

Outline

- 1 Recent Global Outlook
 - An Overview of the Global Economy
 - Monetary Conditions
- 2 Economic Models in Saudi Arabia
 - Types of Forecasting Methods
 - SAMA Economic Models
- 3 Forecasting Outcomes
 - Data Sources/Frequency
 - Results

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An Overview of the Global Economy

- Global activity is expected to improve further in 2014–15.
- Global growth is projected to strengthen from 3 percent in 2013 to 3.6 percent in 2014 and 3.9 percent in 2015.
- Growth rate in *Advanced Economies* is expected to increase to about 2.3 percent in 2014–15, an improvement of about 1 percentage point compared with 2013.

2014-15 Global Outlook

	Real GDP			Consumer Price		
	2013	2014	2015	2013	2014	2015
US	1.9	2.9	3.0	1.5	1.4	1.6
Euro Area	-0.4	1.1	1.4	1.4	1.0	1.2
Japan	1.6	1.5	1.0	0.3	2.8	1.7
China	7.7	7.5	7.3	2.6	3.0	3.0
India	4.4	5.4	6.4	10.5	8.5	7.9
Brazil	2.3	2.3	2.8	6.2	5.9	5.3
Russia	1.3	1.3	2.3	6.8	6.0	5.5

Source: WEO.

2014-15 Global Outlook

	Current Account Balance			Unemployment		
	2013	2014	2015	2013	2014	2015
US	-2.3	-2.1	-2.4	7.4	6.5	6.3
Euro Area	1.8	1.8	2.0	12.0	12.0	11.7
Japan	0.7	1.6	1.8	4.0	4.0	4.0
China	2.1	2.3	2.4	4.1	4.1	4.1
India	-3.3	-3.1	-3.1
Brazil	-3.6	-3.4	-3.6	5.4	5.6	5.8
Russia	1.6	1.9	1.4	5.5	6.2	6.2

Source: WEO.

An Overview of the Global Economy

- Activity in emerging market economies has remained weak in a less favorable external environment.
- Higher financial volatility in late January highlights the challenges for EMEs posed by the changing external environment.

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Monetary Conditions

- **Monetary conditions have stayed mostly supportive in advanced economies.**
- United States: policy rate is expected to increase in the second half of 2015.
- Euro area and Japan: markets continue to expect a prolonged period of low interest rates and supportive monetary policy.

EMEs Tightening of Monetary Conditions

Monetary Conditions

Monetary conditions have tightened in many emerging market economies, reflecting changes in external funding, but also policy rate increases in some economies (including Brazil, Indonesia, South Africa, and Turkey).

Fact

Despite some retrenchment in capital inflows since the Federal Reserve's surprise tapering announcement in May 2013, developments to date do not portend a sustained reversal of capital flows.

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Types of Forecasting Methods

Fact

Some institutions favor a forecasting approach that is structured explicitly within a model framework. Others place much greater emphasis upon the judgments of sector experts and the experience of policy advisers.

Types of Forecasting Methods

Subjective Approach

(Qualitative in nature and usually based on the opinions of people)

Objective Approach

(Quantitative / Mathematical formulations - statistical forecasting)

Qualitative Methods.

Example

Panel Consensus

Definition

Forecasts are obtained from the synergy of a panel of experts in the area.

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Quantitative Methods

Definition

Time-series forecasting is the use of a model to predict future values based on previously observed values.

Model Features

- 1 Historical data
- 2 Prior treatment (missing data, outliers, behavioral examinations... etc)

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Time-Series Forecasting

Examples

- 1 ARIMA Models
- 2 Structural Models
- 3 Input-Output Macroeconometric Model
- 4 State-Space Models
- 5 DSGE Models

Key issues in forecasting...

- Usually forecasting is based on the assumption that the past predicts the future!
- But history is not always a perfect predictor of the future. Right?

Example

The black swan theory

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Motivation

Motivation

- 1 Forecasts are at the heart of policy making.
- 2 Forecasting is a tool used for predicting future outcomes based on past information.
- 3 SAMA staff can use forecasts' outcomes to carry out research in various topics.

SAMA Forecasting Approaches

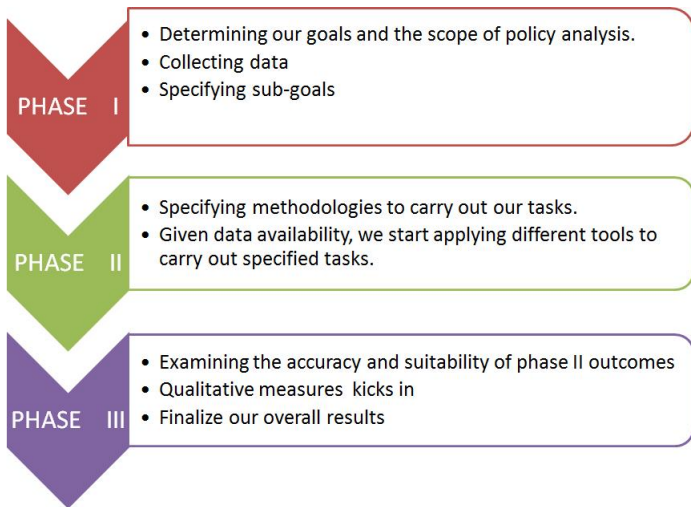
Qualitative methods

Rely on subjective opinions from one or more experts.

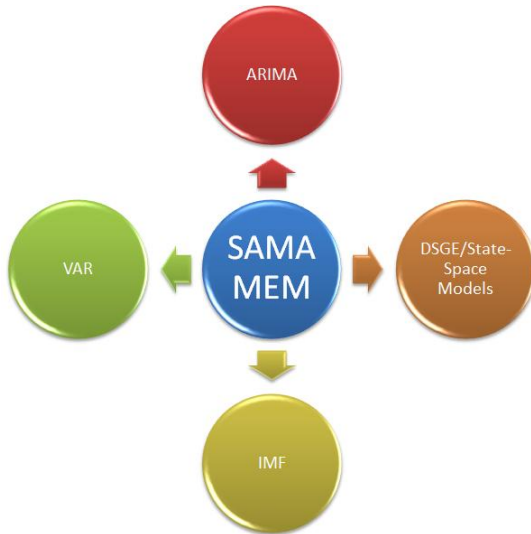
Quantitative methods

Rely on data and analytical techniques.

Our Strategy



Overview of SAMA Economic Models



SAMA'S MACROECONOMETRIC MODEL

- The model is simultaneous and dynamic in nature.
- The main sectors of the economy have been inter-linked via instantaneous (and lagged) feedback mechanism.
- The model solves for the values of all endogenous variables simultaneously.

SAMA'S MACROECONOMETRIC MODEL (cnt.)



SAMA'S MACROECONOMETRIC MODEL (cnt.)

- The SAMA-MEM contains 81 equations divided into 5 blocks;
- 31 of them are behavioral and the remaining 50 are identities and definitions;
- There are 31 exogenous variables;
- 33 lagged or pre-determined variables making the model reasonably dynamic;
- Only 4 out of the 81 equations are recursive supporting the premise that the model is highly interlinked or simultaneous in character.

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Data Sources/Frequency

- SAMA
- Ministry of Petroleum/OPEC
- Central Department of Statistics and Information
- Other local/international sources
- Frequency: Annual, quarterly, & monthly.

Outline

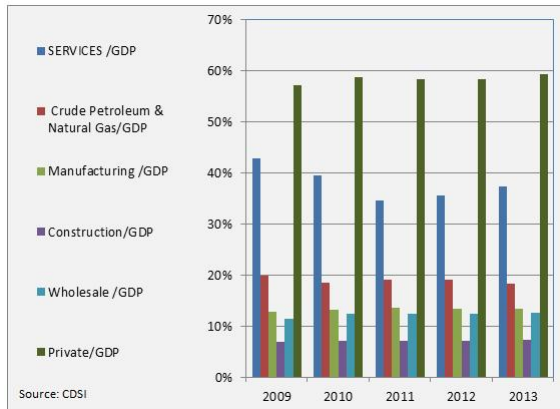
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Main Forecasting Outcomes

SAMA's Forecasts for Macroeconomic Variables in 2014

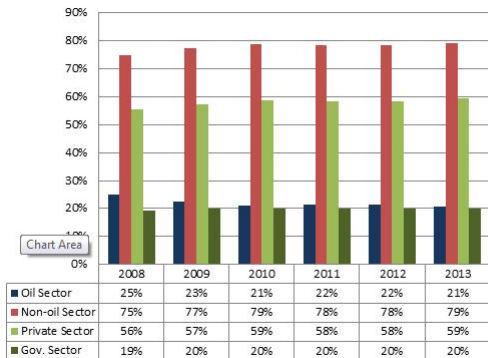
		Scenarios			
		Scenario I	Scenario II Most Likely	Scenario III	
Main Underlying Assumptions		2013	2014F		
▶ Oil Production (daily average in million barrels)		9.6	9.40	9.50	9.70
▶ Oil Price (annual average of OPEC Basket in U.S. dollars)		105.9	100.00	105.00	108.00
1	GDP at constant prices, growth rate in percent per annum				
1.1	Gross Domestic Product	3.80	3.7	3.9	4.2
1.2	Oil Sector	-0.60	-1.4	-0.7	0.2
1.3	Non-Oil Sector	5.00	5.2	5.6	5.8
1.4	Non-Oil Government Sector	3.70	3.8	4.0	4.3
1.5	Non-Oil Private Sector	5.50	5.8	6.2	6.4
2	Prices, annual percentage change				
2.1	inflation	3.5	2.8	2.9	3.0
3	Fiscal Sector, billion Riyals				
3.1	Total Government Revenues (billion Riyals)	1156.4	1057.9	1112.4	1174.6
3.2	Total Government Expenditure (billion Riyals)	976	971.0	988.0	990.4
3.3	Non-Oil Revenues (billion Riyals)	121.3	129.5	132.1	135.4
3.4	Budget Balance (billion Riyals)	180.3	86.9	124.4	184.2
3.5	Budget Balance-to-GDP Ratio (percent)	6.5	5.6	6.1	6.7

Contribution to GDP



Contribution to GDP

Contribution of Each Sector in Real GDP



Source: CDSI

Communications Sector Insights

- 1 The contribution of communication activity in GDP has increased significantly due to the growth in capital investments, and expansion of communications networks.
- 2 According to Communications and Information Technology Commission (CITC), the telecommunications sector's contribution is estimated at about 8% of non-oil GDP and 2.8% of the total GDP.
- 3 In addition, statistics indicate that increasing the telecommunications services by 10 % on average leads to a real growth up to 1.3% of GDP.

Main Forecasting Outcomes

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4	Trade Sector and Balance of Payments				
4.1	Oil Exports (billion Riyals)	1376.2	1102.9	1169.5	1219.6
4.2	Non-oil Exports (billion Riyals)	198.4	199.1	205.9	210.8
4.3	Non-oil Exports (annual growth rate, percent)	3.9	0.3	3.8	6.2
4.4	Import of Goods (billion Riyals)	574.1	590.8	596.2	604.7
4.5	Remittances (billion Riyals)	128.8	130.1	131.6	132.4
4.6	Investment Income (billion Riyals)	96.8	97.9	101.8	103.7
4.7	Current Account Balance (billion Riyals)	486.8	393.5	419.6	502.4
4.8	Current Account-to-GDP Ratio (percent)	17.4	14.8	15.3	16.5
5	Monetary Sector				
5.1	Money Supply M3 (annual growth rate, percent)	10.9	10.5	11.8	12.1
5.2	Private sector Deposits (annual growth rate, percent)	10.1	9.7	10.6	11.3
5.3	Comm. Banks Credit to Private Sector (growth rate, percent)	12.1	11.7	13.1	14.2

Q&A