

Estimating the Output Gap for Saudi Arabia

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Agenda

What is the Output Gap?

The Importance of Estimating Potential Output and the Output Gap

The Role of Potential Output in Policymaking

Estimation Methodologies

Results

Conclusion and Policy Implications.

What is the output gap?

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- An economic measure of the difference between the actual output of an economy and its potential output.
- Potential output:
 - The maximum level of output that can be sustained given full utilization of all factors of production under conditions of stable inflation.
 - The level of output that can be achieved by the economy at a constant inflation rate if all its resources were fully employed.

The importance of estimating potential output and output gap

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- Play a critical role in understanding inflationary dynamics and enhancing its measurement.
- This is usually attained by studying the developments in the output gap.
 - A positive output gap creates macroeconomic pressures in the form of excess demand in goods and labor markets, eventually generating upward pressure on the inflation rate.
 - A negative output gap (actual output falling below potential) is usually accompanied by falling prices.

Role of Potential Output in Policymaking

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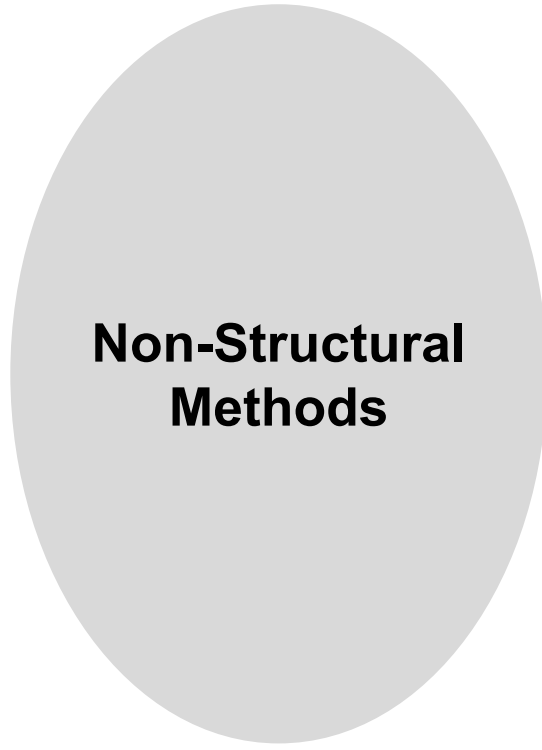
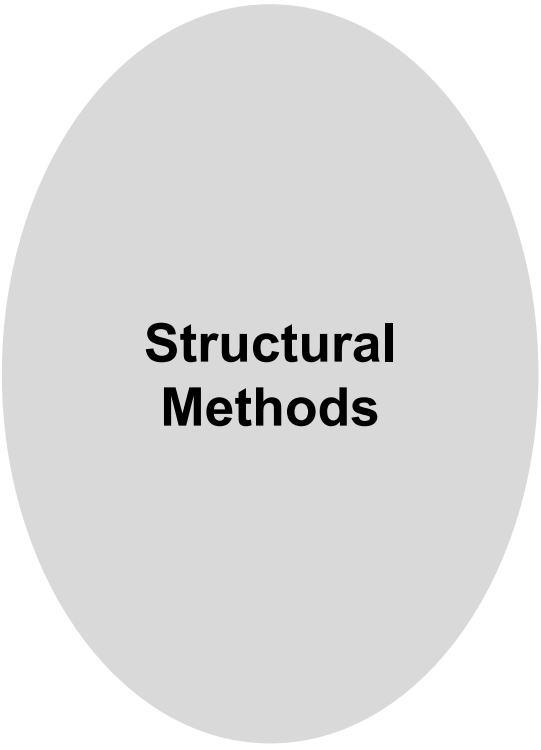
Results

Conclusion and Policy Implications.

- **Monetary policy:** knowing potential output is crucial in order to strike a balance between output and inflation.
- **Fiscal policy:** may promote the government's adoption of cyclically –adjusted fiscal policy.
- **Structural reforms** (e.g., labor market reforms).

Estimation Methodologies

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Non-Structural Methods

- Output is divided into trend and cyclical growth components as follow:

$$y_t = \tau_t + C_t$$

y : the growth of real GDP

τ : the trend component

C : the cyclical component

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Non-Structural Methods:

- **HP filter minimizes the following objective function:**

$$\text{Min}_{y^*} \sum_{t=1}^T (y_t - y_t^*)^2 + \lambda \sum_{t=2}^{T-1} [(y_{t+1}^* - y_t^*) - (y_t^* - y_{t-1}^*)]^2$$

- **Kalman Filter:**

$$y_t = \tau_t + c_t$$

$$\tau_t = \tau_{t-1} + \varepsilon_t$$

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Structural Method: Production Function (PF):

- **The Cobb-Douglas specification:**

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}$$

Y: actual output in period t,

L: Labor,

K: capital stock,

A: The total factor productivity (TFP),

α is the share of capital in the national economy.

- TFP is unobservable; therefore we calculate it by taking out the contribution of labor and capital to actual output as follow:

$$A_t = \frac{Y_t}{K_t^\alpha * L_t^{(1-\alpha)}}$$

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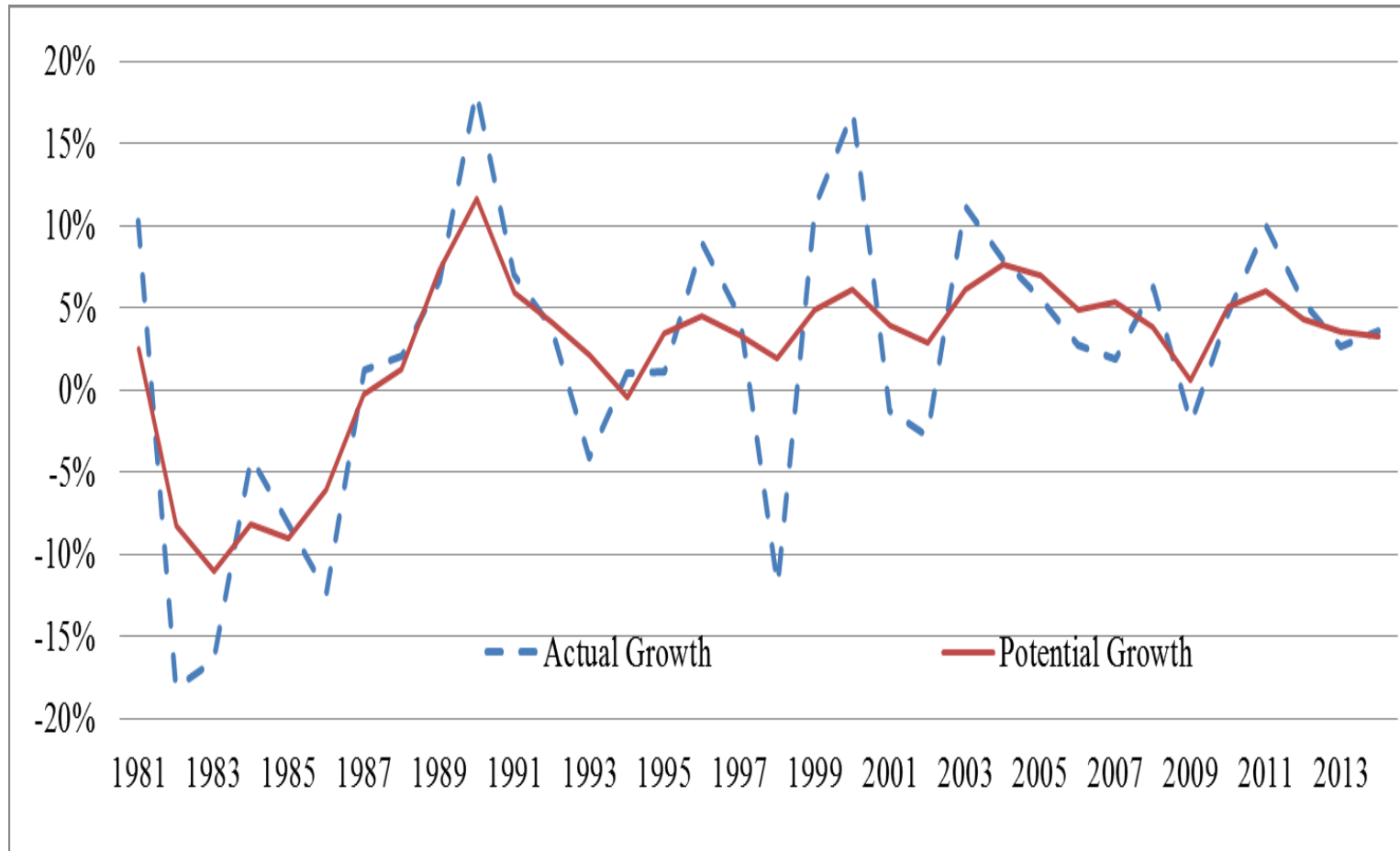
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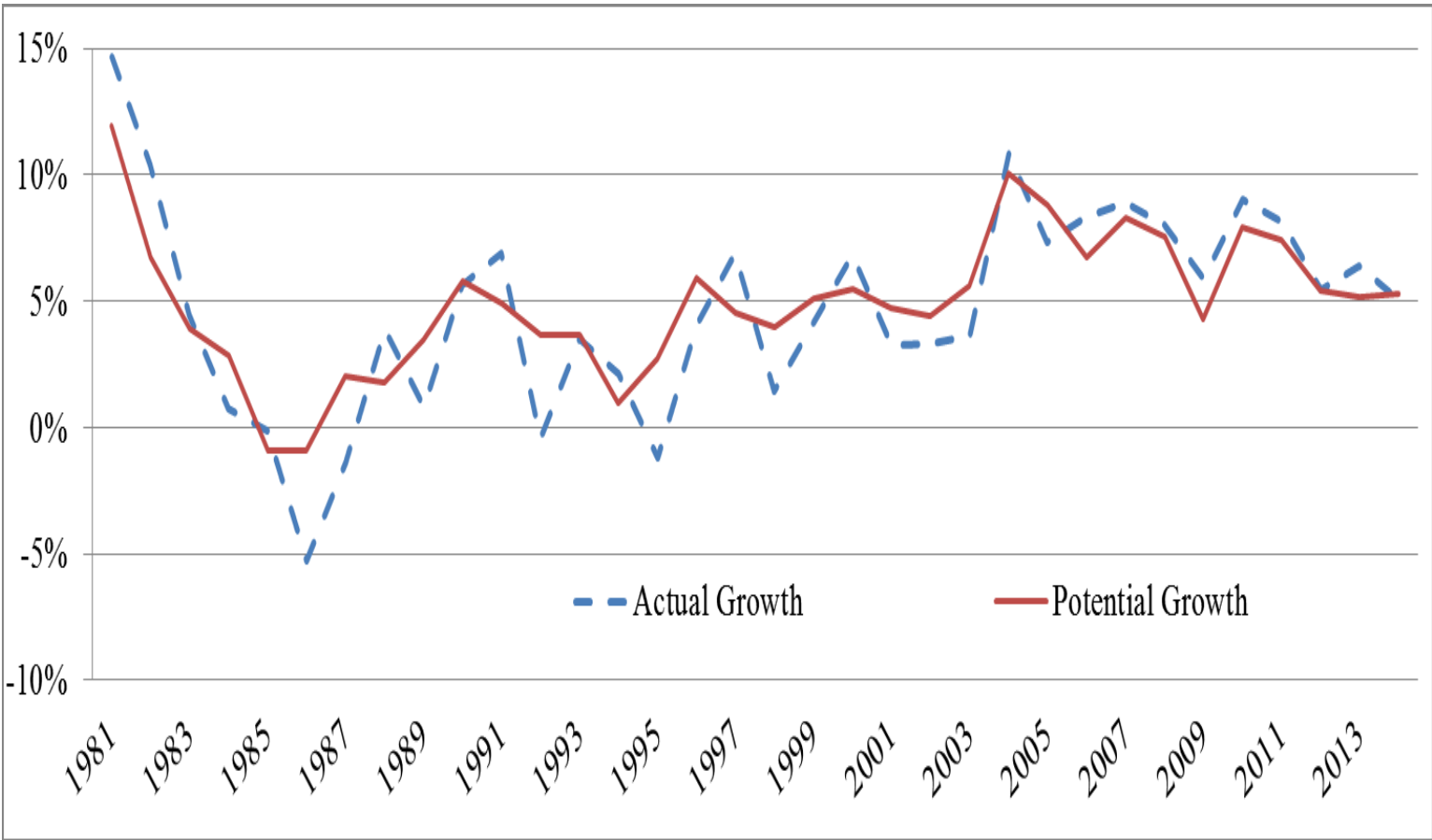
Real GDP Growth (Actual vs. Potential)



Results

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Real Non-Oil GDP Growth (Actual vs. Potential)



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Average Estimated Potential GDP Growth

Estimation Method	1980-2014	2010-2014
HP Filter	1.73 %	4.29 %
Kalman Filter	1.72 %	4.61 %
Cobb Douglas	1.54 %	3.42 %
Average	1.66 %	4.11 %

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Average Estimated Potential Non-oil GDP Growth

Estimation Method	1980-2014	2010-2014
HP Filter	4.17 %	5.38 %
Kalman Filter	4.43 %	5.79 %
Cobb Douglas	4.09 %	4.38 %
Average	4.23 %	5.18 %

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Total Factor Productivity Growth Estimates

	1980-2014	2010-2014
Overall Economy	-1.38 %	1.29 %
Non-oil Sector	1.43 %	2.45 %

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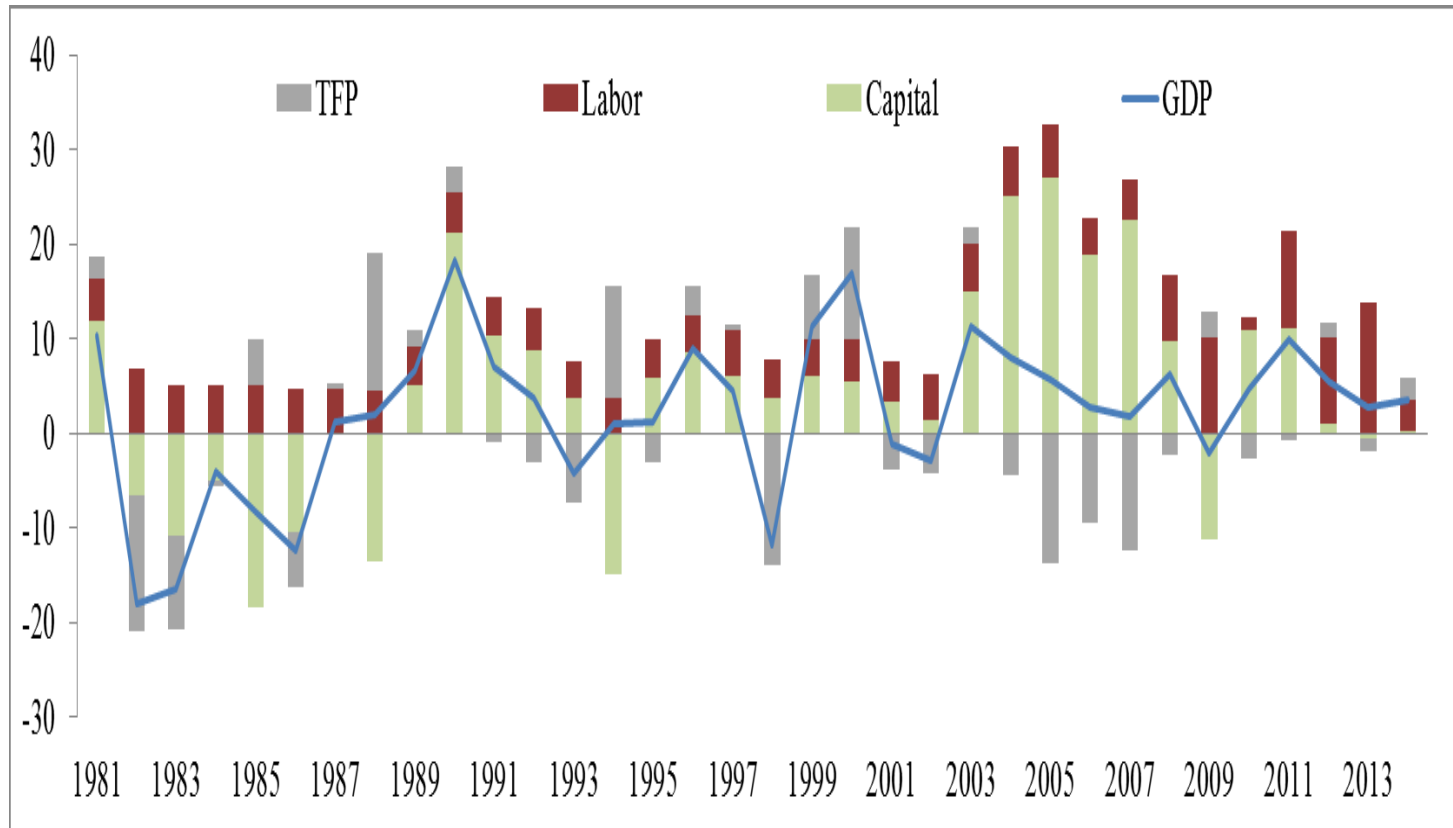
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Real GDP Growth Decomposition



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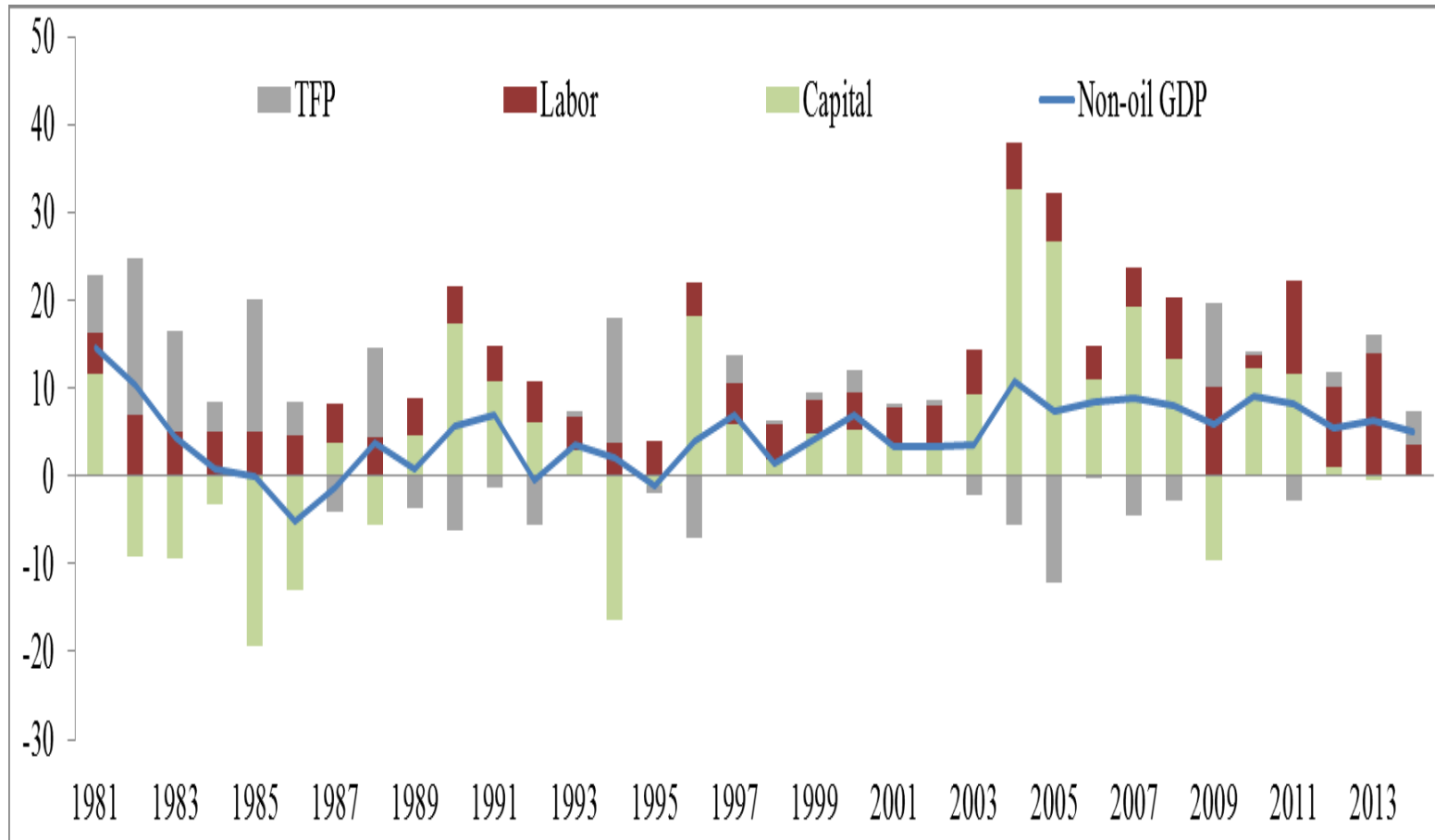
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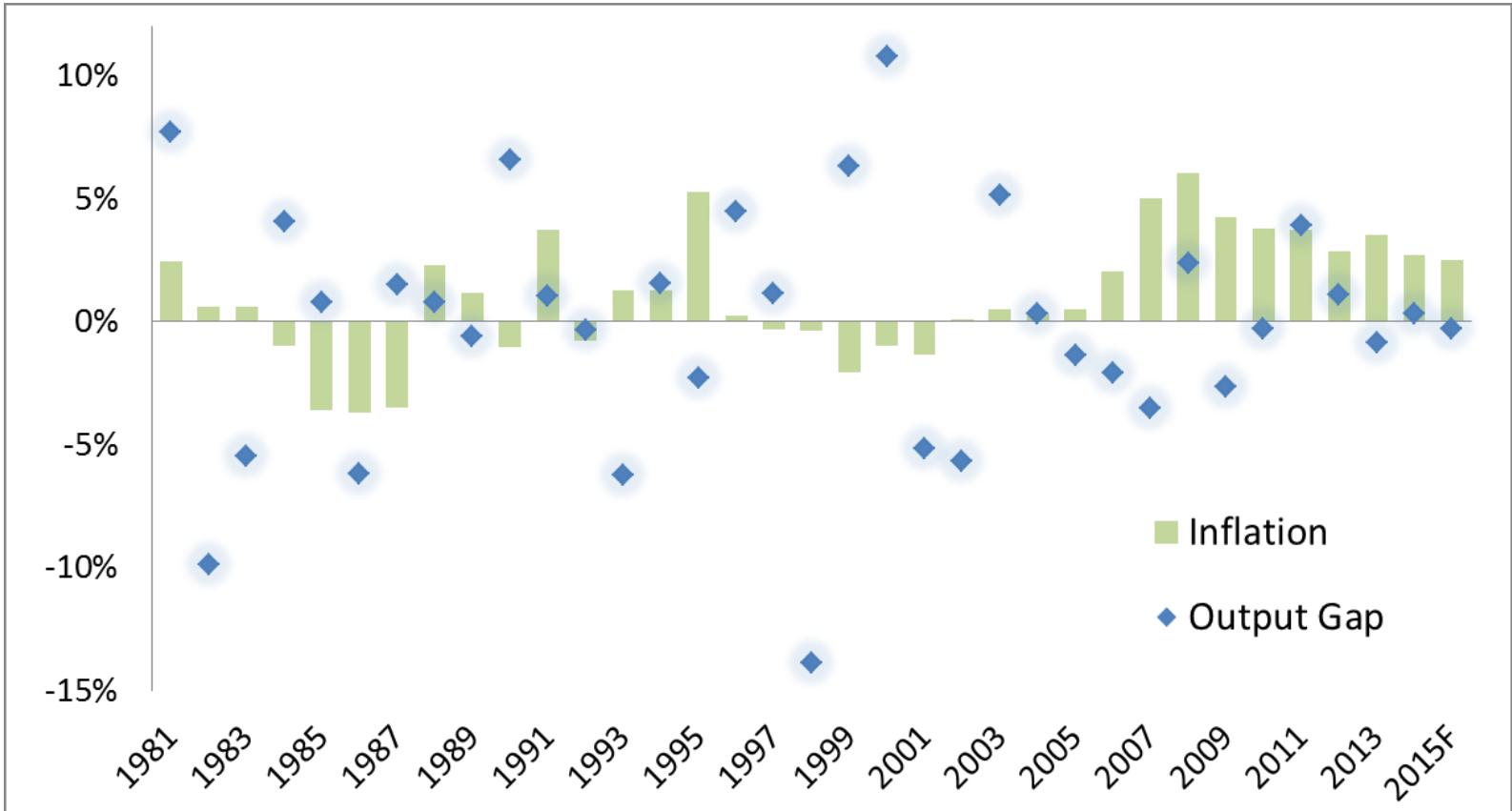
Real Non-oil GDP Growth Decomposition



Results

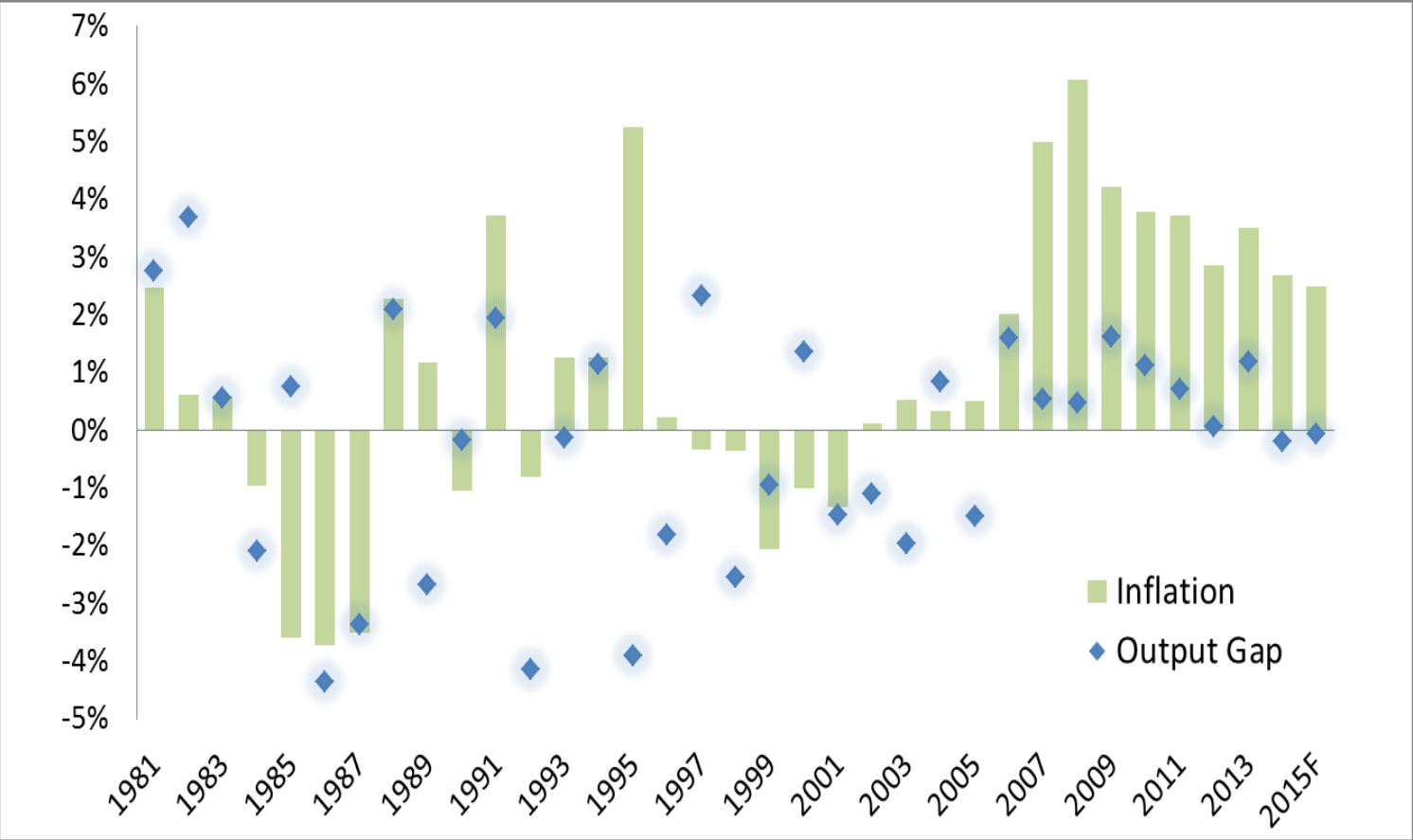
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Inflation vs. Output Gap for the Overall Economy



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Inflation vs. Output Gap for the Non-oil Sector



Conclusion and policy implications

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- Output gap is an important concept for policymakers seeking to stabilize an economy.
- In Saudi Arabia, fiscal policy is essential for aligning actual output with that of potential output.
- Economic policies should focus on improving labor market efficiency.
- Monetary policymakers ought to scrutinize the relationship between inflation and output gap.
- Further diversification of the Saudi economy is needed.