



المركز الإحصائي
لدول مجلس التعاون لدول الخليج العربية
GCC-STAT



Nowcasting GCC Quarterly GDP

(preliminary work)

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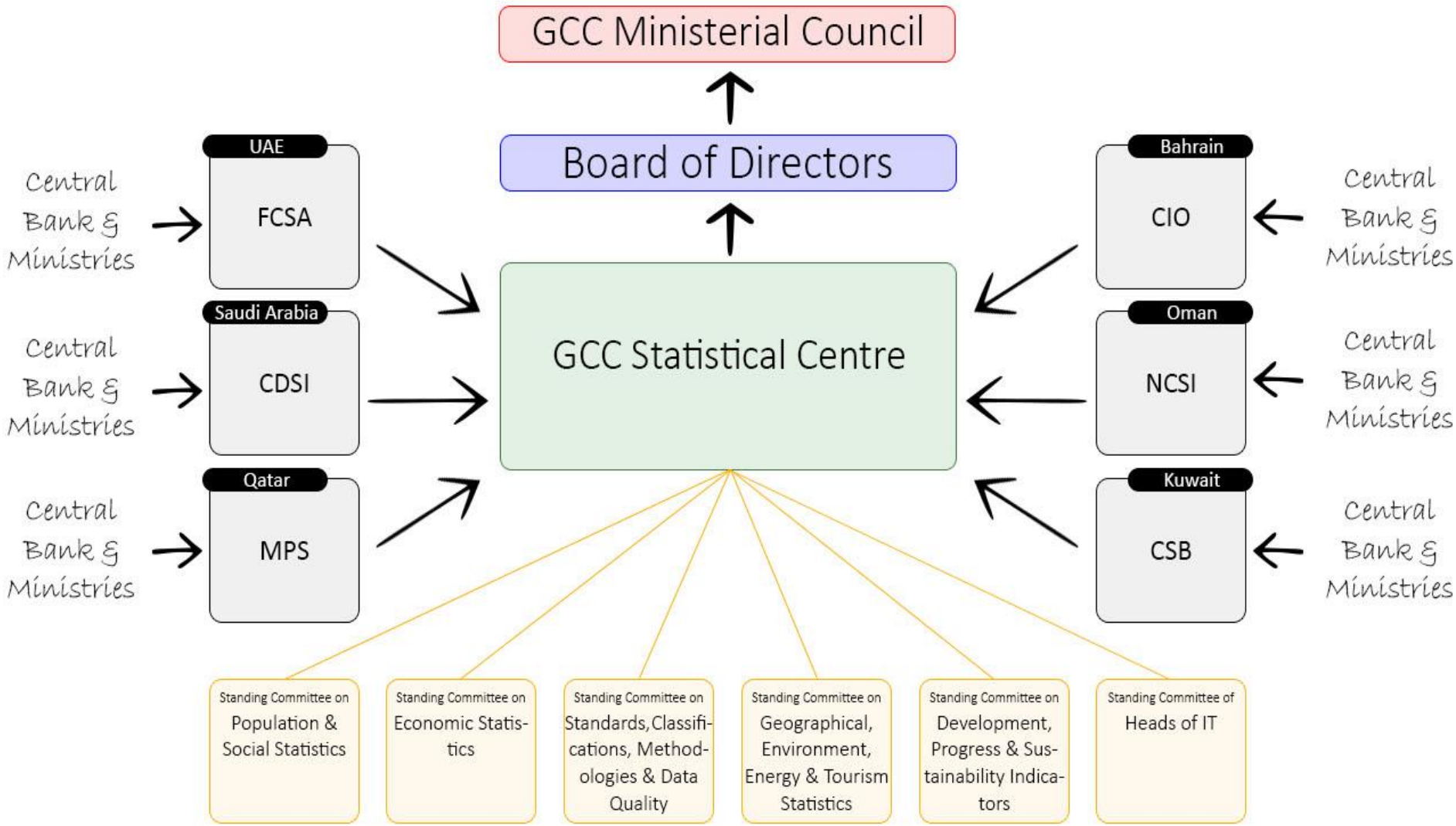
Outline

- **About GCC-Stat**
- **Why nowcasting?**
- **Data: timeliness and predictors**
- **Estimation techniques and evaluation**
- **Results and discussion**
- **Conclusions**

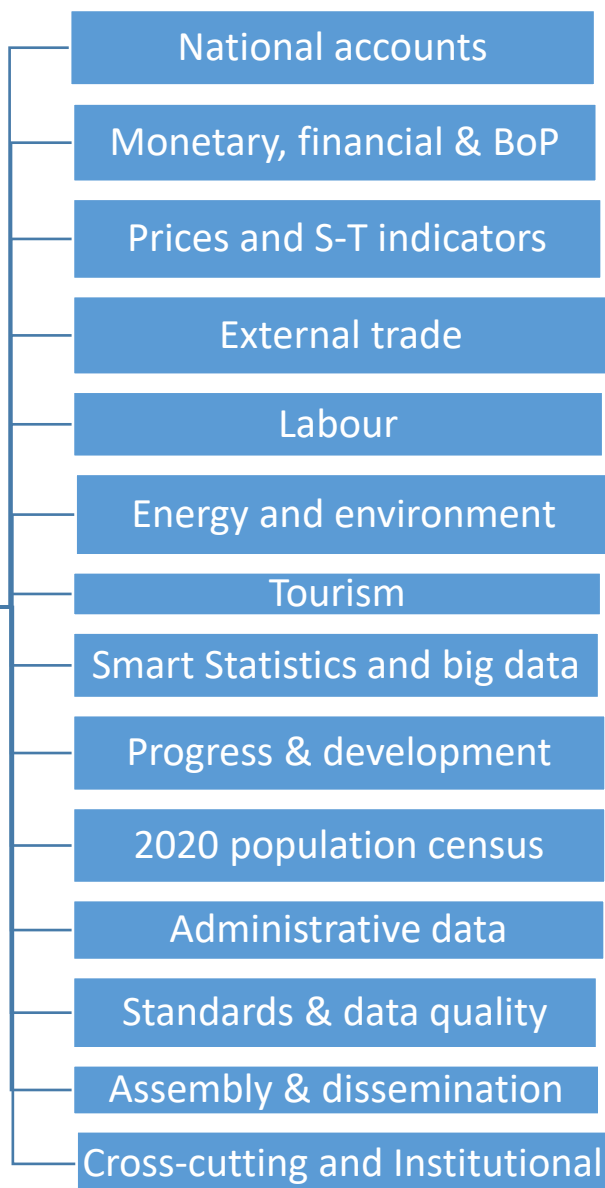
About GCC-Stat

- The Statistical Centre for the Cooperation Council for the Arab Countries of the Gulf (**GCC-Stat**) headquartered in Muscat, stated in 2013
 - **the only official source of statistics for the GCC block.**
- **Key strategic objectives**
 - Project the GCC region as a fully integrated economic and social agglomeration.
 - Support the functioning of GCC's Common Market and Customs Union.
 - Aims to achieve coherence, integration and coordination on statistical work in the Gulf region
 - Implement international standards and classifications in GCC statistics

About GCC-Stat



Statistical Programs



For each, we have:

- objectives over the next five years
- how the datasets will evolve over time
- their frequency and timeliness
- statistical standards to be followed
- role of GCC-Stat in developing the statistics in that field

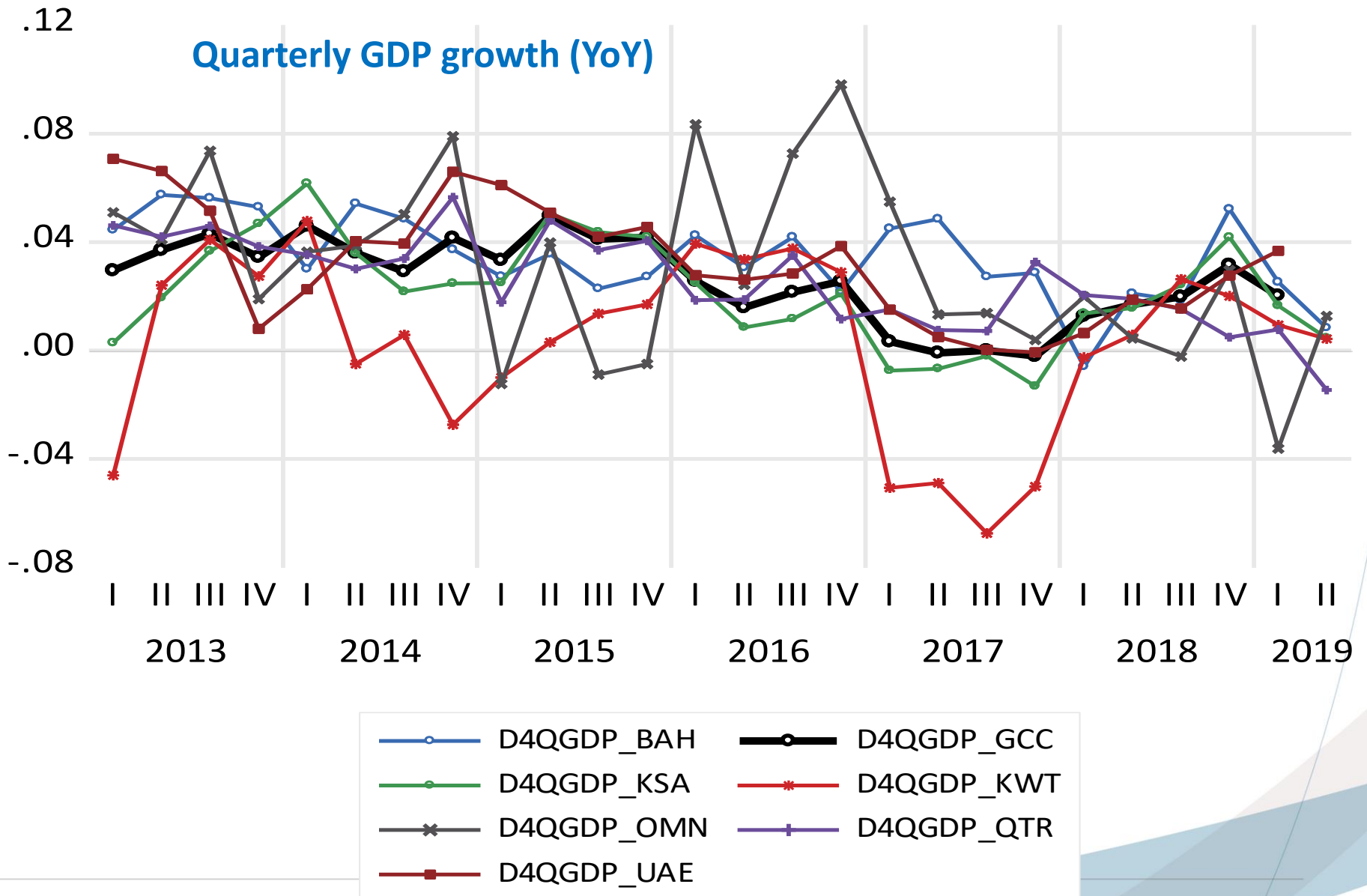
More details:

<http://www.gccstat.org>

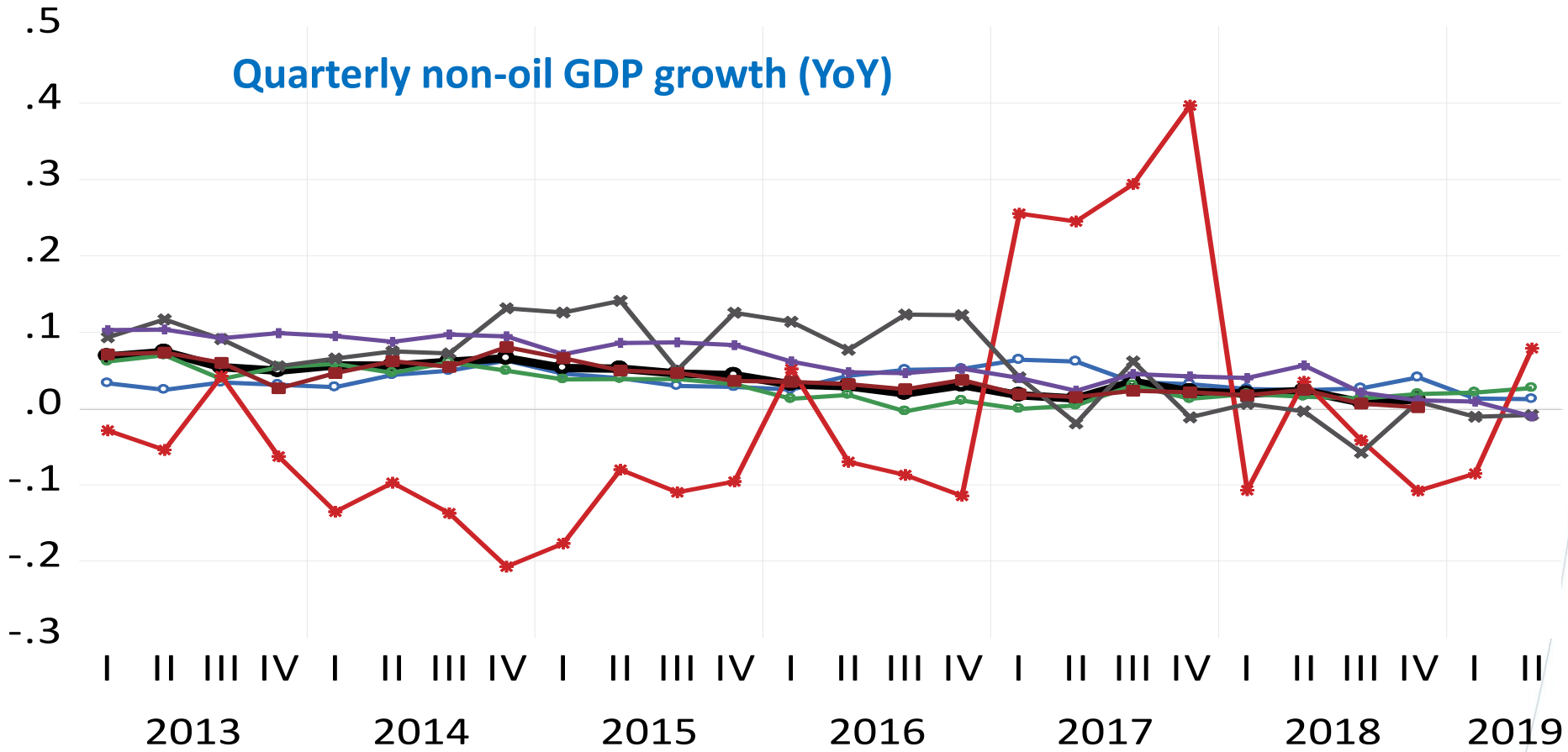
Why nowcasting?

- Monitor current state of economy in a timely manner
- Provide inputs for policy making and evaluations (customs union, common market, etc.)
- Overcome considerable publication delays in reporting QGDP in GCC region
- Quarterly estimates of GDP can then be used to nowcast/forecast annual GDP
- Hardly no previous nowcasting attempts for the GCC countries/region

Why nowcasting?



Why nowcasting?



Data: timeliness

Table 1: Quarterly GDP in GCC Countries

	Available time series	Publication lag	Compilation Method
Bahrain	2010Q1 – 2019Q2	+90 days	production method (current and constant prices) (2010 = 100)
Kuwait	2010Q1 – 2019Q2	+90 days	production method (current and constant prices) (2010 = 100))
Oman	2010Q1 – 2019Q2	+105 days	production method (current prices)
Qatar	2011Q1 – 2019Q2	+90 days	production method (current and constant prices) (2013 = 100)) + GDP by expenditure method (current prices)
Saudi Arabia	2010Q1 – 2019Q2	+90 days	production method (current and constant prices) (2010 = 100)) + Gross domestic product by expenditure method (current and constant prices) 2010 = 100)
United Arab Emirates	2012Q1 – 2019Q2	+90 days	production method (current and constant prices) (2013 = 100)) + GDP by expenditure method (current prices)

Data: possible predictors

Production and Expenditures

- No monthly IPI, Service Index, or Retail Sales / other indicators published with long lags
- Oil production / monthly imports financed by banks

Local goods prices

- CPI / PPI

Financial and monetary

- Monetary aggregates / bank credit/ Interest rates / Exchange rates / Stock prices

Global activity

- Oil prices / commodity prices / uncertainty index / MCSI_World / US_IPI / OECD LCI

Soft data (surveys)

- No monthly confidence indicators
- Only quarterly for few countries

Labor data

- No monthly labor statistics
- Only quarterly, published with long lags

Estimation Strategy



- Nowcasting preliminary estimates of quarterly GDP using most recent monthly indicators that measure economic activity
- We take the growth rate over 4 quarters to eliminate the seasonality within the data
- Compare two mixed frequency approaches: Mixed-Data Sampling (MIDAS); and dynamic factor, and also discuss the usefulness of forecast combination.
- Monthly predictors would be available within 5-6 weeks after the last day of the reference quarter (3-4 weeks before the official QGDP is released)
 - We could nowcast GDP well before, either by smoothing missing data or by simply leaving the data with later publication dates out of the sample.
- Prepare a **nowcast for each country**, then combine the nowcasts for the GCC block using GDP weights

The Models

- **MIDAS: Mixed Data Sampling**
- **directly estimates the current quarter using a lag structure**, Ghysels, Santa-Clara, and Valkanov (2004); Clements and Galvão (2008).
- **Parsimonious and works for ragged-edge data structure**

$$y_t = \alpha + \sum_{i=1}^k \sum_{j=0}^{l_i} \beta_{i,j} x_{i,3t-j}^M + \epsilon_t$$

- y_t denotes a GDP growth in quarter t .
- x^M denotes a monthly economic indicator i in $3t-j$ th month.
- k stands for the number of indicators, and l denotes the number of lags for the indicator i in terms of month j

- **DFM: Dynamic Factor Model**

- Dynamic factor models summarize the information contained in the monthly dataset using a limited number of factors
 - Factors are specified as vector autoregressive processes.
- Kalman filter generates estimates of the unobserved monthly factors (Stock and Watson (2002a, 2002b))

$$x_t = \mu + \Lambda f_t + \varepsilon_t,$$

$$f_t = A_1 f_{t-1} + \dots + A_p f_{t-p} + u_t, \quad u_t \sim i.i.d. N(0, Q)$$

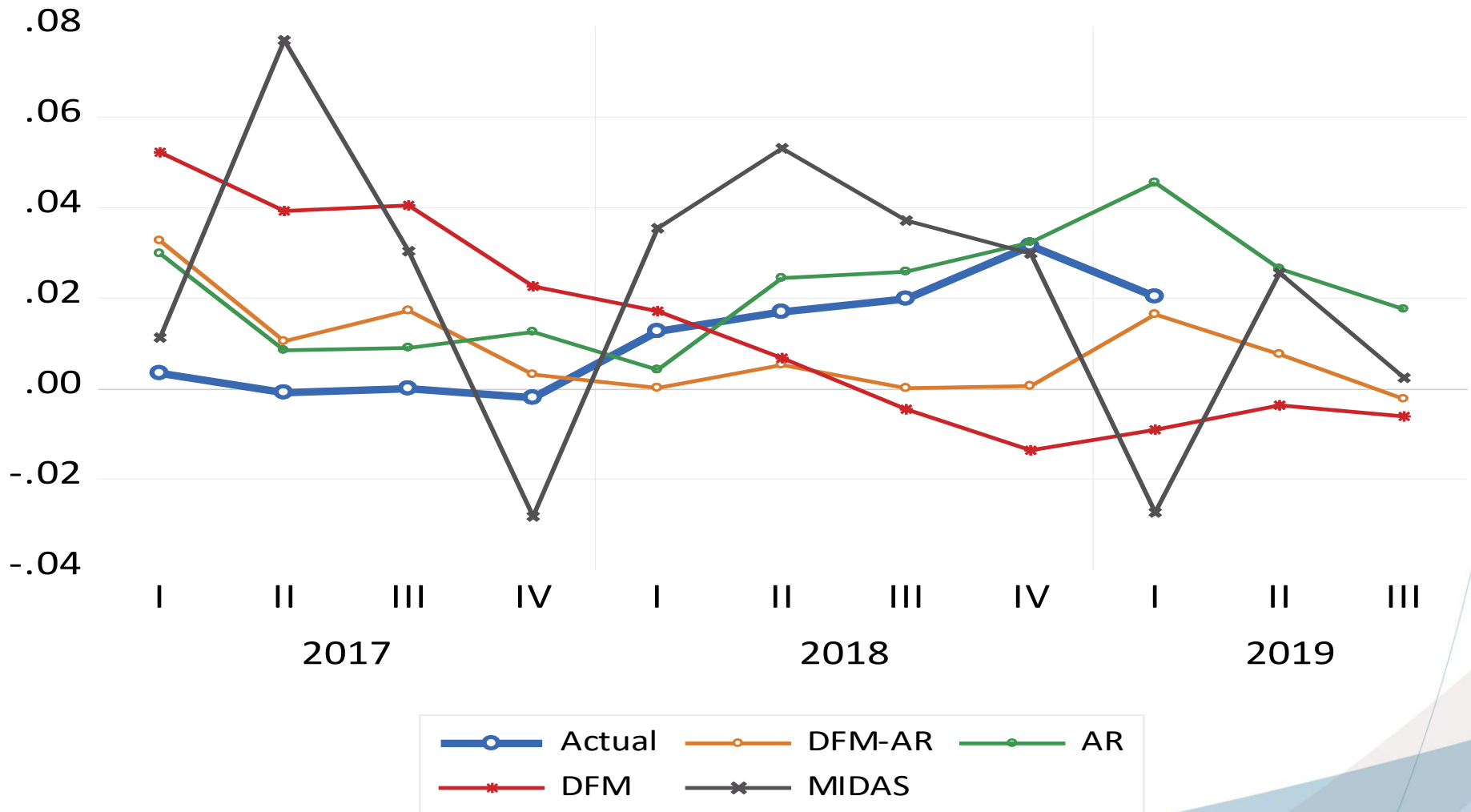
$$\varepsilon_{i,t} = \alpha_i \varepsilon_{i,t-1} + e_{i,t}, \quad e_{i,t} \sim i.i.d. N(0, \sigma_i^2)$$

- x_t is a vector of observed monthly indicators
- f_t is a vector of (unobserved) common factors
- ε_t is a vector of idiosyncratic components
- Λ denotes the factor loadings for the monthly variables.

- We split the sample in two parts and use data starting from 2017Q1 for the out-of-sample analysis
- Out-of-sample forecasts are obtained as follows. We first estimate the various models from 2010Q1 to 2016Q4 and obtain forecasts for 2017Q1.
- We then expand the estimation window forward by one quarter (as more information become available), re-estimate the models and calculate forecasts for 2017Q2.
- We compare forecast performances of different models using the root mean square forecast error (RMSFE)

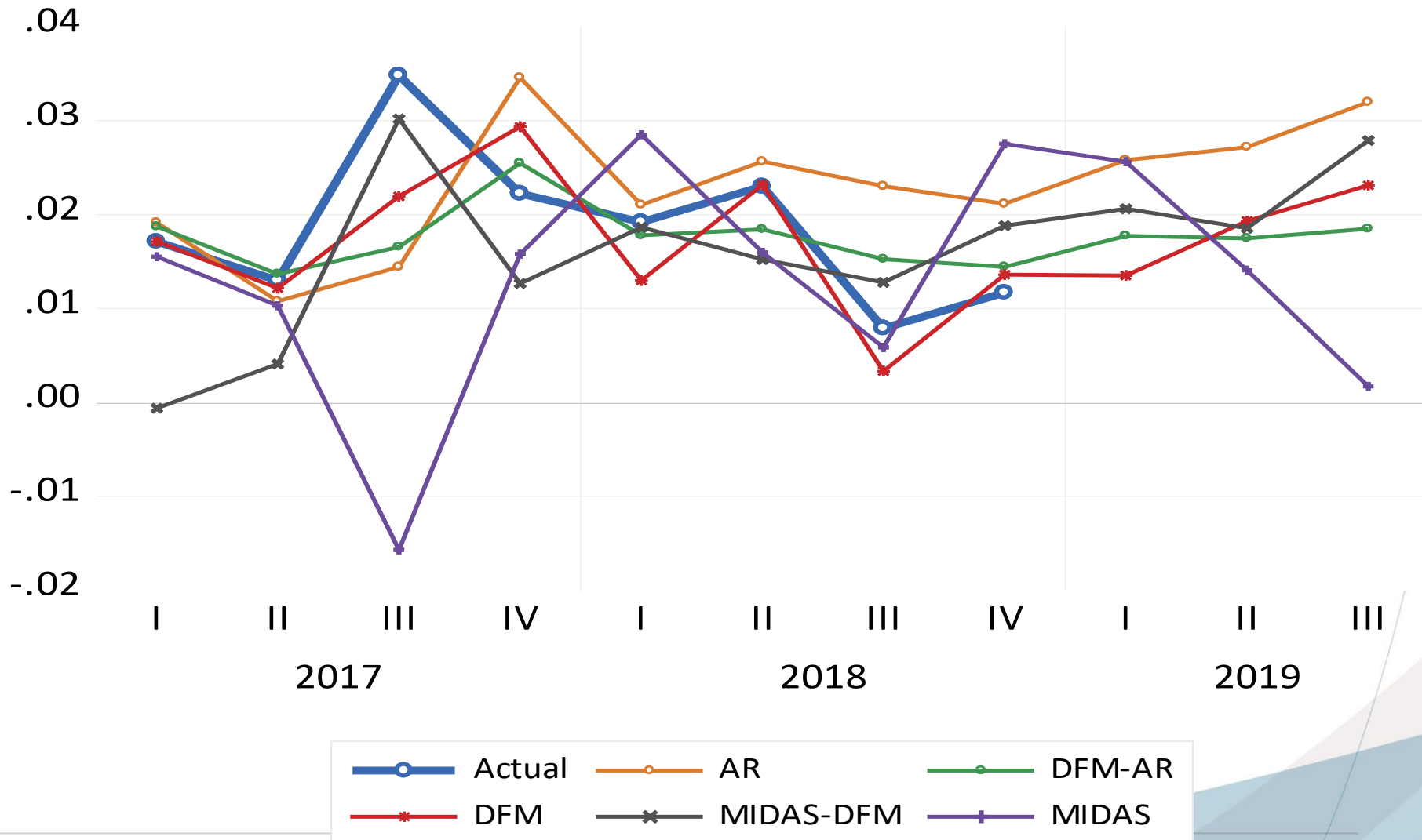
Results

GCC quarterly GDP growth rate (YoY): Actual and various nowcasts



Results

GCC Quarterly non-oil GDP growth (YoY): Actual and various nowcasts



Results

Table 3: Quarterly GDP Forecast performance of all models measured by RMSFE for the out-of-sample (2017Q1 – 2019Q1)

	Benchmark		Pooling Nowcasts	Pooling Information		
	AR	MIDAS	MIDAS_AR	DFM	F-MIDAS	F-AR
Bahrain	1.00	1.25	1.30	1.01	1.24	0.99
Kuwait	1.00	1.40	1.55	1.05	1.07	0.93
Oman	1.00	1.65	1.40	0.95	1.24	0.95
Qatar	1.00	1.55	1.38	0.97	1.10	1.01
Saudi Arabia	1.00	1.18	1.06	0.99	1.05	0.91
UAE	1.00	1.22	1.15	1.01	1.09	0.94
GCC	1.00	1.30	1.12	0.98	1.13	0.93

- Superior nowcasts using YoY growth compared to QoQ growth
- DFM and MIDAS give less accurate predication compared to other economies
 - Lack of timely economic activity measures
- findings suggest that mixed frequency models record out-of-sample performance when augmented to AR model. Also, there is a gain from combining model nowcasts
 - large body of literature that suggests that forecast combinations can provide more accurate forecasts by combining multiple models rather than relying on a specific model (see Hendry and Clements, 2004; and Timmermann, 2006)

- This paper presents a QGDP nowcasting exercise in a limited-data environment.
- Incorporation of monthly information in nowcasting procedures pays off partially in terms of forecasting accuracy
 - Underscore the importance of publishing high frequency leading indicators in GCC region
- Models proposed should be regularly reviewed and updated
- Future steps: nowcast other components of National Accounts



Thank you

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