GDP Flash Estimate and GDP Nowcast: An R-Shiny App for GDP Estimation

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Session 3: Real time indicators & nowcasting
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Outline

1. Background
2. Econometric approach
3. R-Shiny App
4. Outlook
1. Background: Early GDP estimates in Germany

- **Nowcast t+10**
  - Purely econometric approach
  - For internal use only

- **Flash Estimate t+30**
  - Expert and econometric approach
  - Publication of GDP flash

- **1st calculation t+55**
  - Expert approach
  - Publication of detailed results
2. Econometric approach

- **Bottom-up approach**: GDP as sum of its aggregates
- **Production side** (gross value added of 15 sectors), **expenditure side** (9 aggregates)
- **Two-step approach** to estimate aggregates (**bridge equation**)

**Estimation method**: **seasonal ARIMA models with external regressors**
2. Econometric approach: Challenges

- Economic plausibility checks of estimation results
- Testing and inclusion of new data sources, e.g. new digital data
- Dealing with crises such as the corona pandemic and the Ukraine war
3. R-Shiny-App

Development of an R-Shiny environment for econometric estimation of GDP and its main aggregates

Advantages:
- Compact graphical representation of the estimated GDP aggregates including models, indicators and predictors
- Easy inclusion of new (digital) data in the existing data set and estimation models
- Flexible adaption of models and evaluation thanks to mapping of model parameters
- Clear and user-friendly user interface
3. R-Shiny App: Data input

![R-Shiny App interface](image)
3. R-Shiny App: example **private consumption**

An R-Shiny App for GDP Estimation

Priv_Kons(P31): WR Vjqr. [5, 6.4, 7.7] % WR Vq. 0.3 %
### 3. R-Shiny App: example *private consumption*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Indicators</th>
<th>GDP aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>New passenger car registrations of private owners</td>
<td>Turnover retail trade</td>
<td>Private consumption</td>
</tr>
<tr>
<td>Advanced VAT returns in accommodation and food services activities</td>
<td>Turnover trade of motor vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turnover accommodation and food service activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Import of services (NA concept)</td>
<td></td>
</tr>
</tbody>
</table>

**Estimation of missing months**

**Aggregation on quarterly frequency**

**Estimation of GDP aggregate**
3. R-Shiny App: example **private consumption**

An R-Shiny App for GDP Estimation

19.04.2023

Federal Statistical Office (Destatis)
An R-Shiny App for GDP Estimation

3. R-Shiny-App: example
private consumption
3. R-Shiny App: example **private consumption**
3. 3. R-Shiny App: example *private consumption*

### Model parameters

<table>
<thead>
<tr>
<th>Model parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AICC</td>
<td>68.1</td>
</tr>
<tr>
<td>Log-Transformation</td>
<td>Nein</td>
</tr>
<tr>
<td>ARIMA-Modell (0,1,1)(1,1,0)</td>
<td></td>
</tr>
<tr>
<td>Konstante</td>
<td>-0.03712</td>
</tr>
<tr>
<td>(p-Wert)</td>
<td>0.2264</td>
</tr>
<tr>
<td>TO retail trade (p-Wert)</td>
<td>0.1726</td>
</tr>
<tr>
<td></td>
<td>(0.0037)</td>
</tr>
<tr>
<td>TO motor vehicles trade (p-Wert)</td>
<td>0.13332</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
</tr>
<tr>
<td>TO acc. &amp; food services (p-Wert)</td>
<td>0.11029</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
</tr>
<tr>
<td>Import of services (p-Wert)</td>
<td>0.00036</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
</tr>
</tbody>
</table>

Showing 1 to 8 of 8 entries
3. R-Shiny-App: aggregated GDP (expenditure side)
3. R-Shiny-App: example **GVA manufacturing**

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**Industrial production**

**Prod. expectations**

**Truck toll mileage ind.**

**Electricity production**

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**Verarbeitendes Gewerbe(C): WR Vq. [-1.3, -0.7, -0.2] % WR Vq. 1.9 %**

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**Aggregat**

Verarbeitendes_Gewerbe(C)

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**Modellparameter**

- ARCC: 29.1
- Log-Transformation: Ja
- ARIMA-Modell: (0,1,0)(0,1,1)
- Produktion_C_S8 (p-Wert): 0.0076 (0)

Showing 1 to 4 of 4 entries
3. R-Shiny-App: aggregated GDP (production side)
4. Outlook

- **Increase depth of estimation** (divide large or important areas)

- Inclusion of an (pseudo) **out-of-sample analysis** inside the application:
  - Estimation and illustration of **estimation errors**
  - Additional criterion for **model selection**

![Graph](chart.png)
Questions?

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