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

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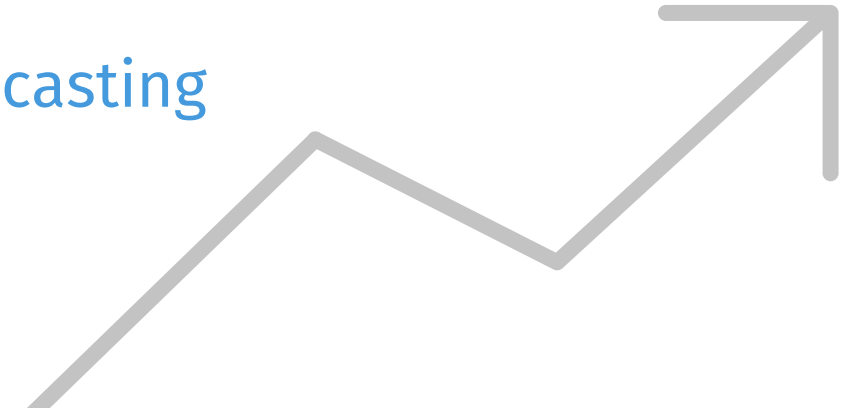
Meeting of the Group of Experts on National Accounts

Session 3: Real time indicators & nowcasting

25-27 April 2023



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

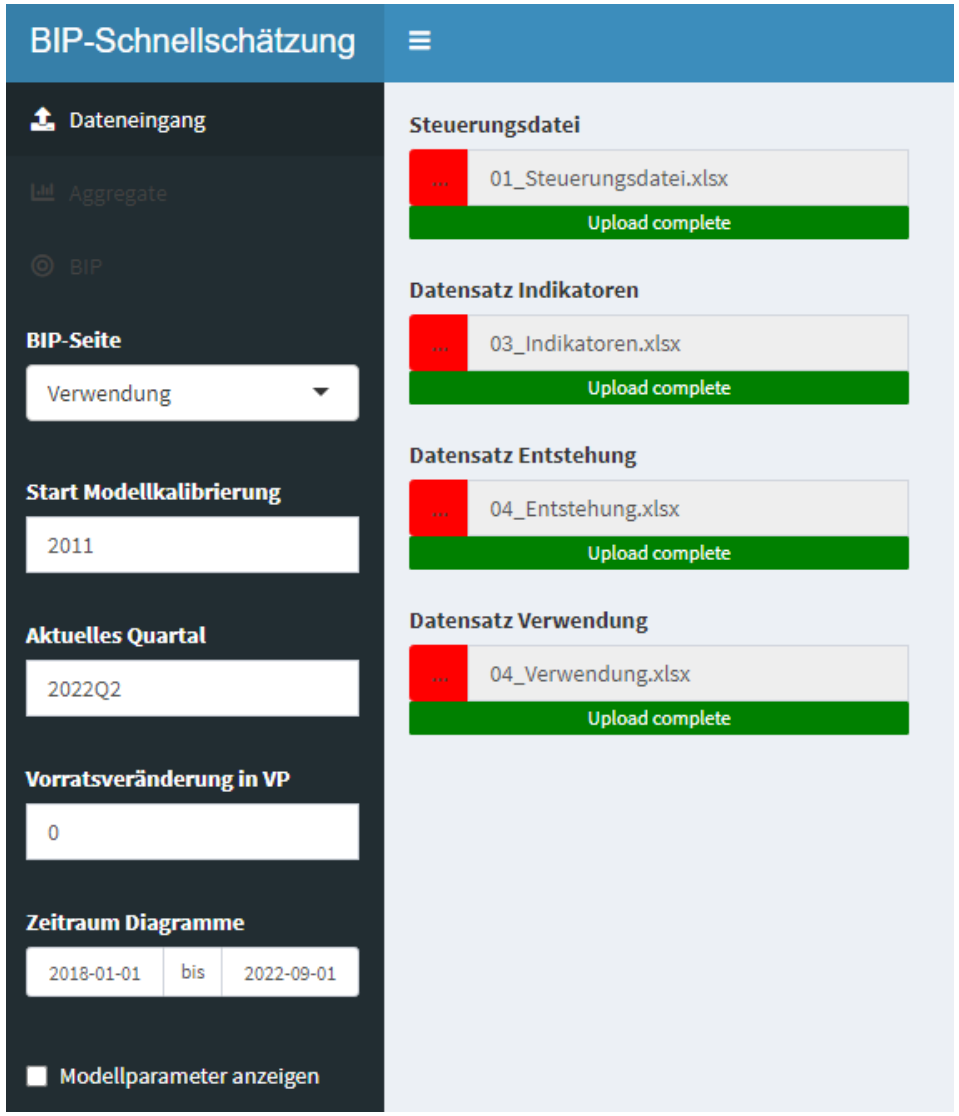
- Economic plausibility checks of estimation results
- Testing and inclusion of new data sources, e.g. new digital data
- Dealing with crises such as the corona pandemic and the Ukraine war

3. R-Shiny-App

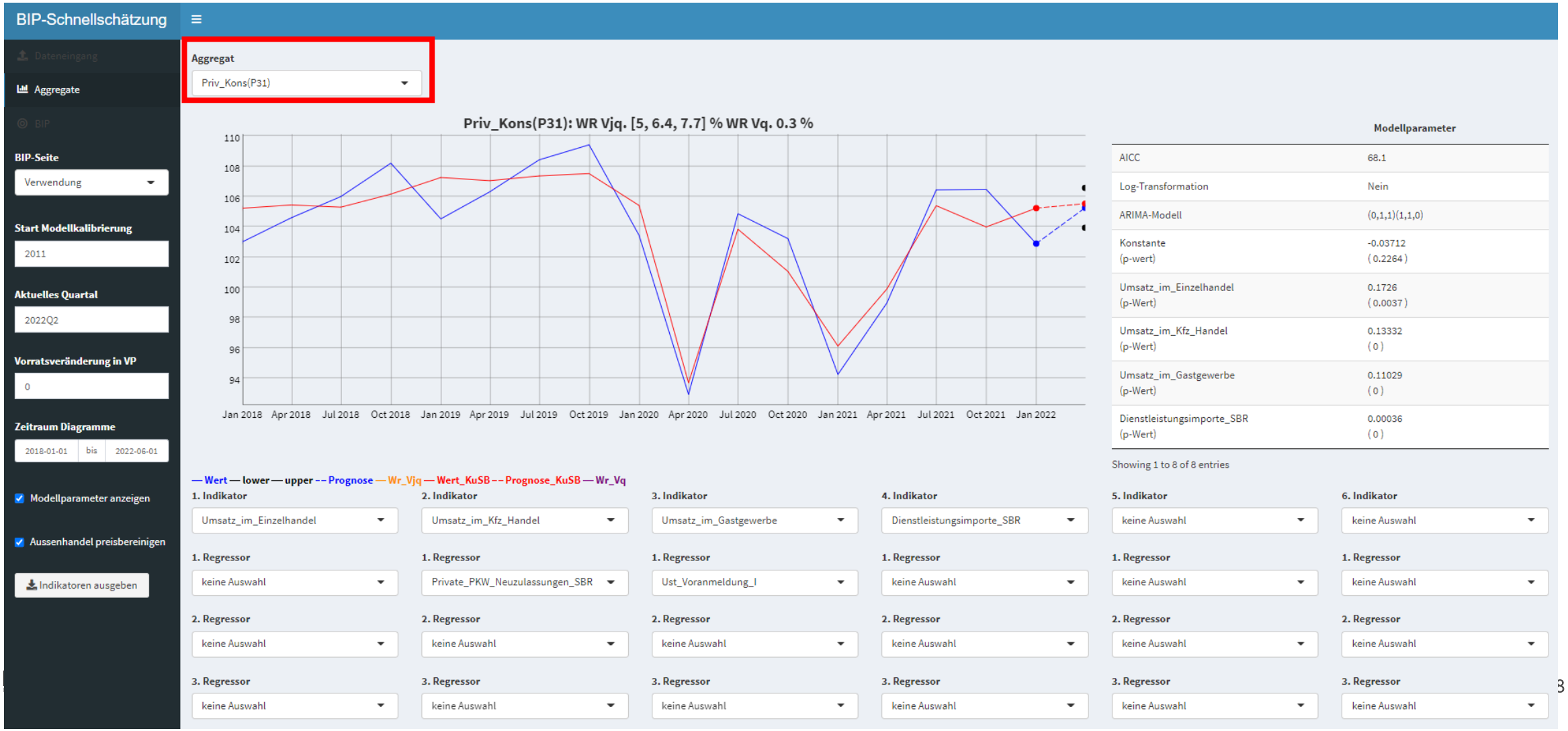
- **Development of an R-Shiny environment for econometric estimation of GDP and its main aggregates**

- **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**



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



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

Predictors
New passenger car registrations of private owners
Advanced VAT returns in accommodation and food services activities

Estimation of missing months

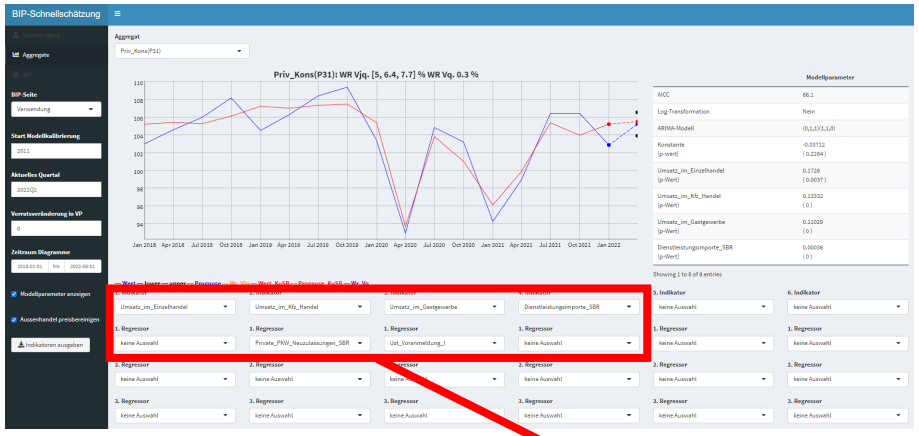
Indicators
Turnover retail trade
Turnover trade of motor vehicles
Turnover accommodation and food service activities
Import of services (NA concept)

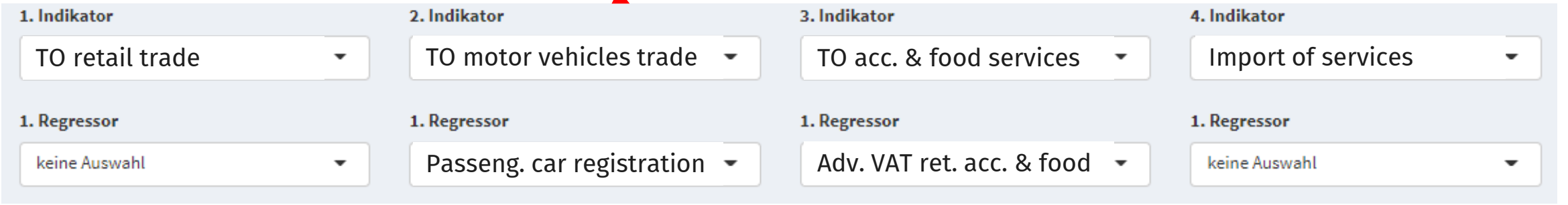
Aggregation on quarterly frequency

Estimation of GDP aggregate

GDP aggregate
Private consumption

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





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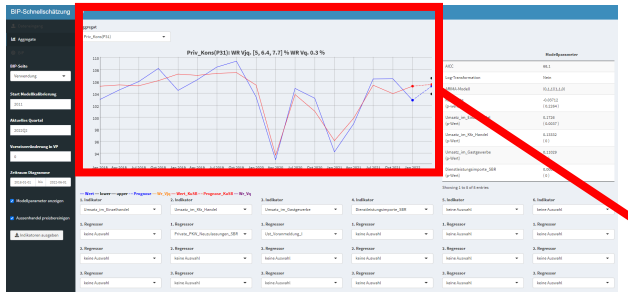
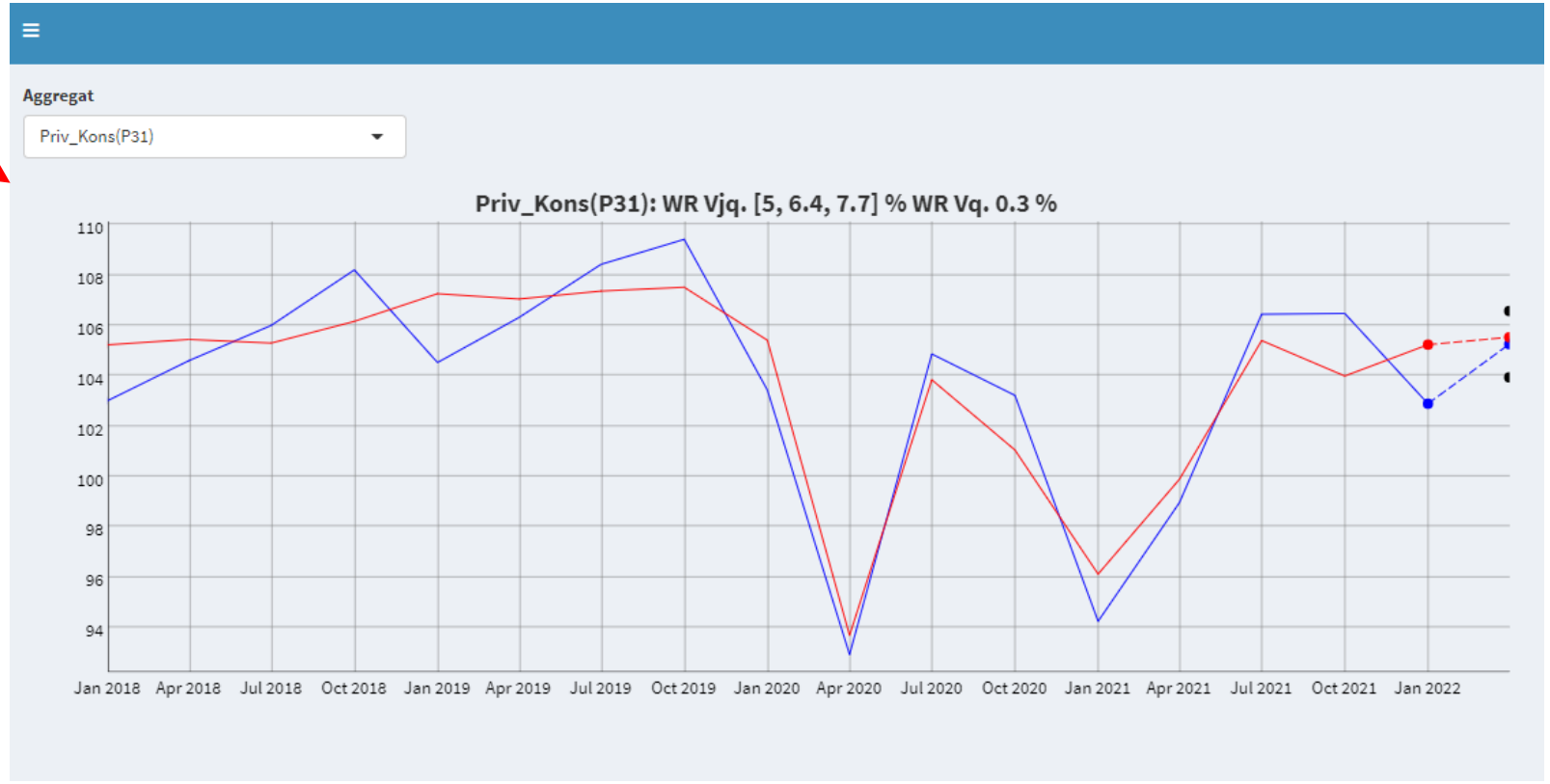
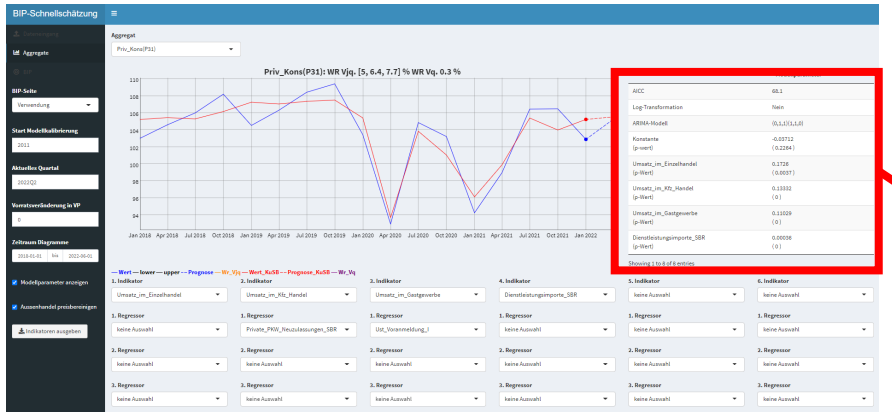




3. 3. R-Shiny App: example **private consumption**



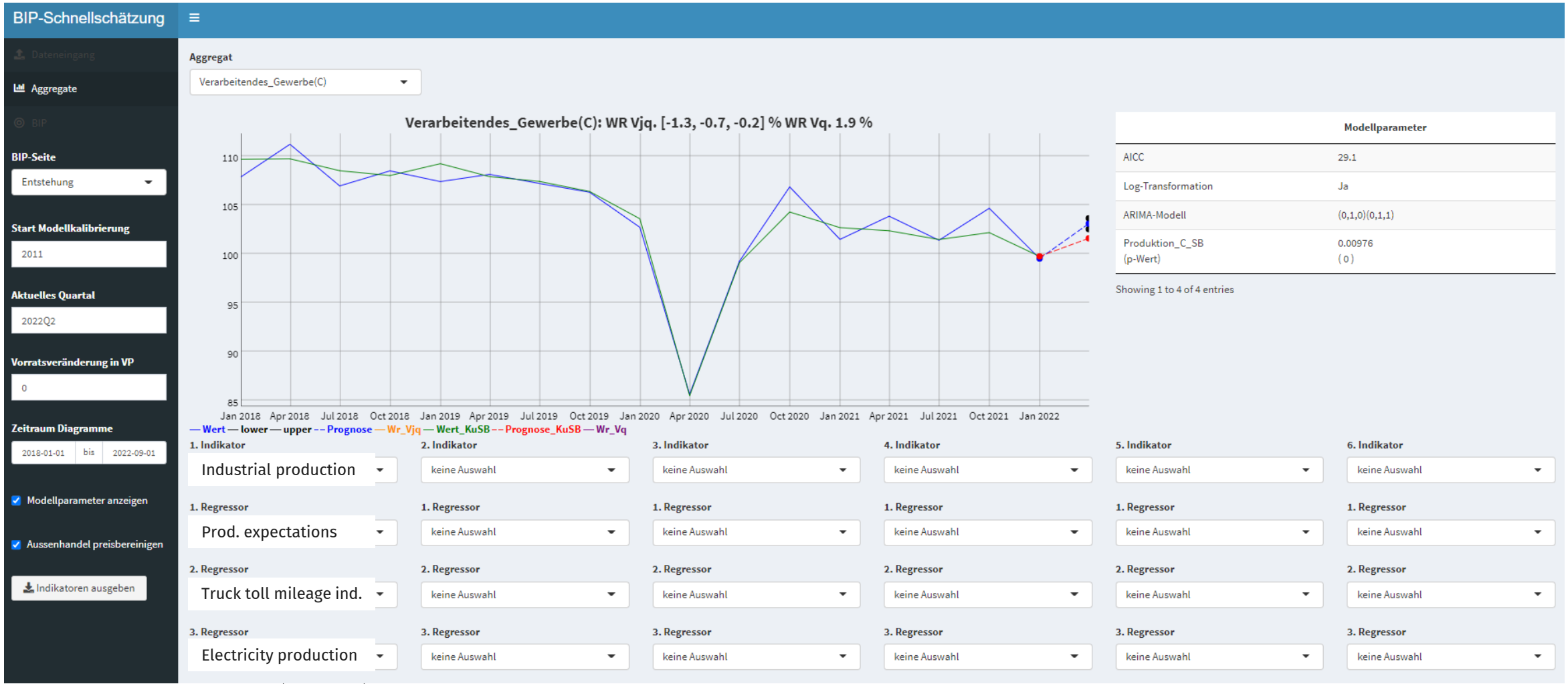
	Modellparameter
AICC	68.1
Log-Transformation	Nein
ARIMA-Modell	(0,1,1)(1,1,0)
Konstante (p-wert)	-0.03712 (0.2264)
TO retail trade (p-Wert)	0.1726 (0.0037)
TO motor vehicles trade (p-Wert)	0.13332 (0)
TO acc. & food services (p-Wert)	0.11029 (0)
Import of services (p-Wert)	0.00036 (0)

Showing 1 to 8 of 8 entries

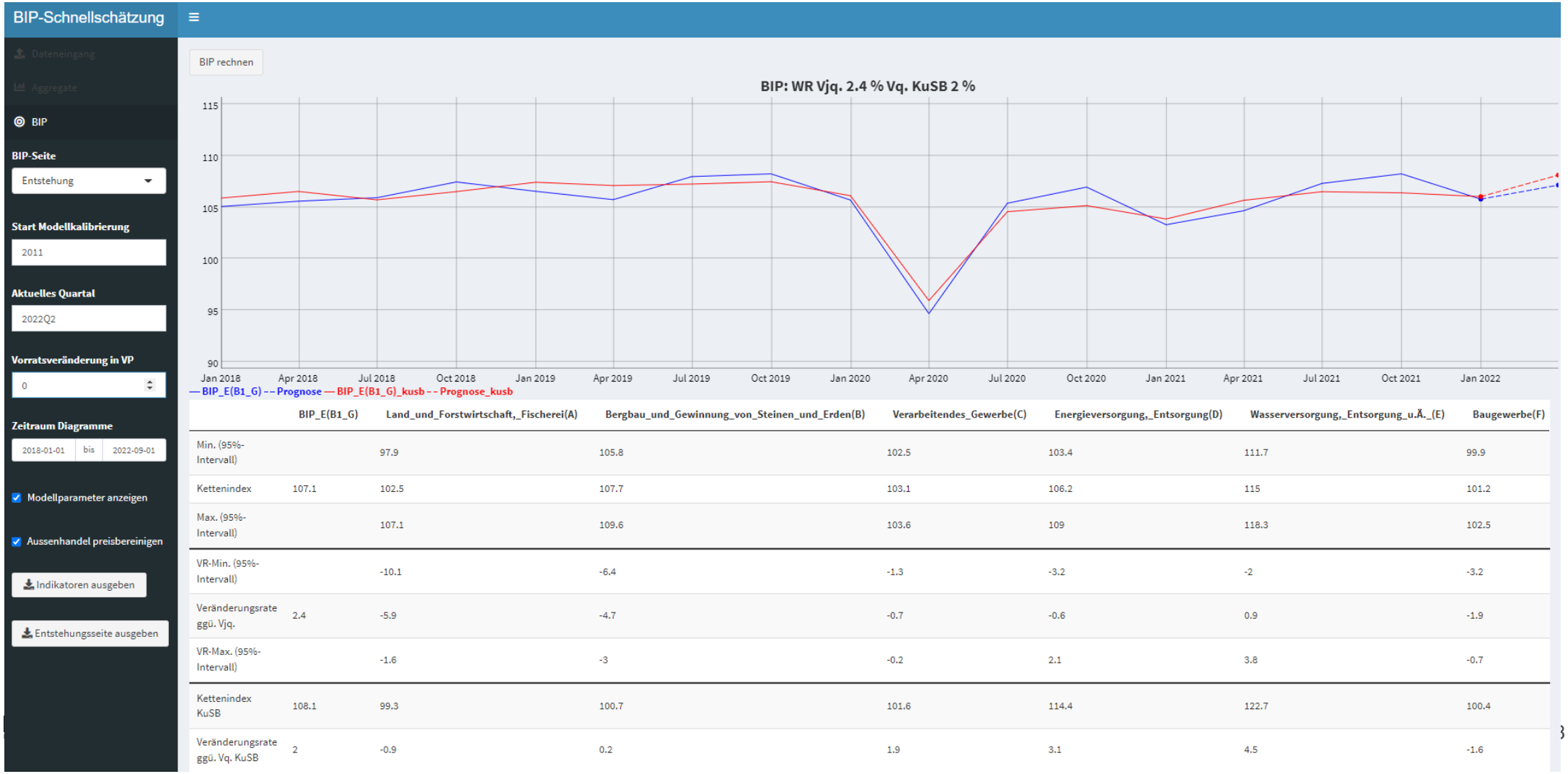
3. R-Shiny-App: **aggregated GDP** (expenditure side)

	BIP_V(B1_G)	Priv_Kons(P31)	Kons_Staat(P3S13)	Bruttoanlageinv_Ausrüstungen(PI6263)	Bruttoanlageinv_Bauten(PI6465)	Bruttoanlageinv_Sonstige_Anlagen(PI6166)	Vorratsveränderung_VP(N1MG)	Exporte_Waren(P61)
Min. (95%-Intervall)		103.9	117.1	98.8	116.4	112.3		111.1
Kettenindex	106	105.2	118.3	103.1	118.2	114.9	0	113.3
Max. (95%-Intervall)		106.5	119.4	107.3	120	117.6		115.5
VR-Min. (95%-Intervall)		5	-1.3	-6.2	-3	-1.2		-0.3
Veränderungsrate ggü. Vjq.	1.3	6.3	-0.3	-2.1	-1.6	1.1		1.7
VR-Max. (95%-Intervall)		7.6	0.7	1.9	-0.1	3.4		3.7
Kettenindex KuSB	107	105.5	121.7	102.7	112.8	118.2		112.4
Veränderungsrate ggü. Vq. KuSB	0.9	0.2	1.6	-1.9	-1.2	0.6		2.4

3. R-Shiny-App: example **GVA manufacturing**



3. R-Shiny-App: **aggregated GDP** (production side)

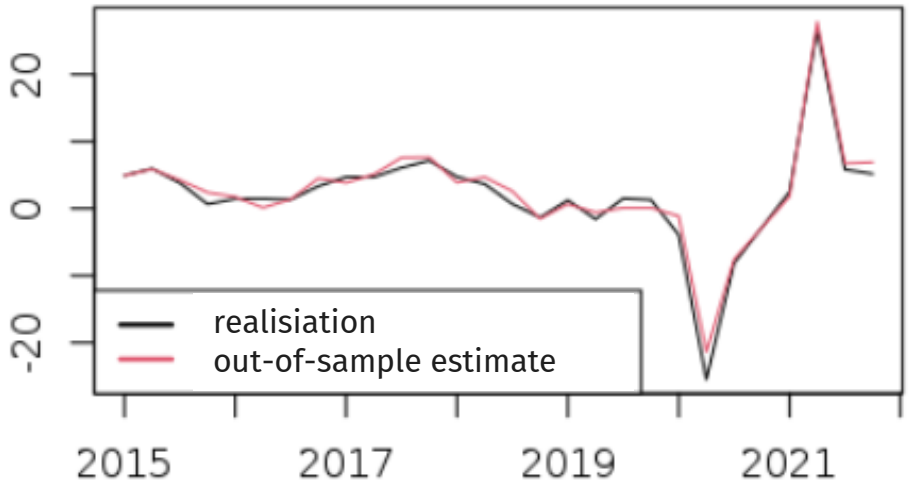


	BIP_E(B1_G)	Land_und_Forstwirtschaft,_Fischerei(A)	Bergbau_und_Gewinnung_von_Steinen_und_Erden(B)	Verarbeitendes_Gewerbe(C)	Energieversorgung,_Entsorgung(D)	Wasserversorgung,_Entsorgung_u.Ä._(E)	Baugewerbe(F)
Min. (95%-Intervall)		97.9	105.8	102.5	103.4	111.7	99.9
Kettenindex	107.1	102.5	107.7	103.1	106.2	115	101.2
Max. (95%-Intervall)		107.1	109.6	103.6	109	118.3	102.5
VR-Min. (95%-Intervall)		-10.1	-6.4	-1.3	-3.2	-2	-3.2
Veränderungsrate ggü. Vjq.	2.4	-5.9	-4.7	-0.7	-0.6	0.9	-1.9
VR-Max. (95%-Intervall)		-1.6	-3	-0.2	2.1	3.8	-0.7
Kettenindex KuSB	108.1	99.3	100.7	101.6	114.4	122.7	100.4
Veränderungsrate ggü. Vq. KuSB	2	-0.9	0.2	1.9	3.1	4.5	-1.6

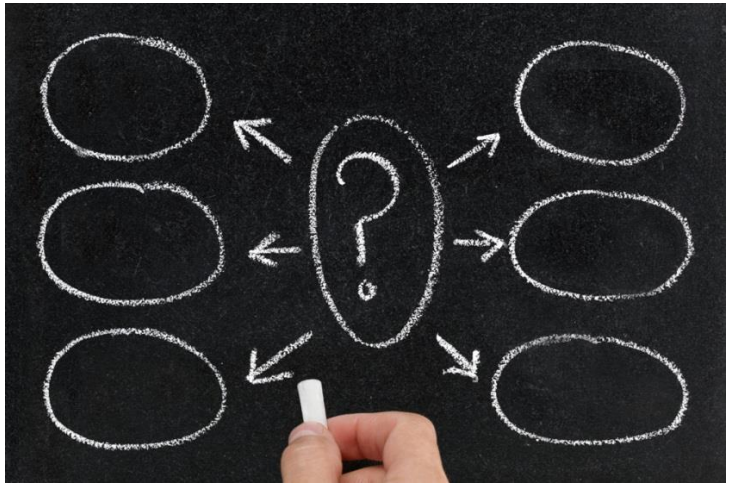
4. Outlook

- **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**



Questions?



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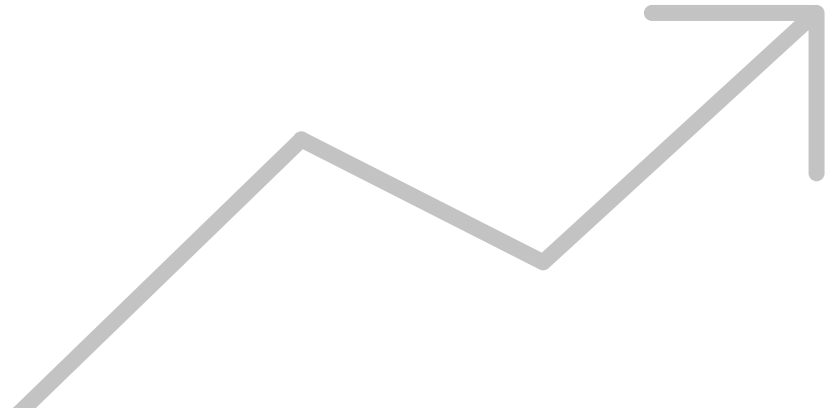
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