



OESTERREICHISCHE NATIONALBANK

EUROSYSTEM

# Austrian central bank's economic forecast: The challenge of forecasting tourism

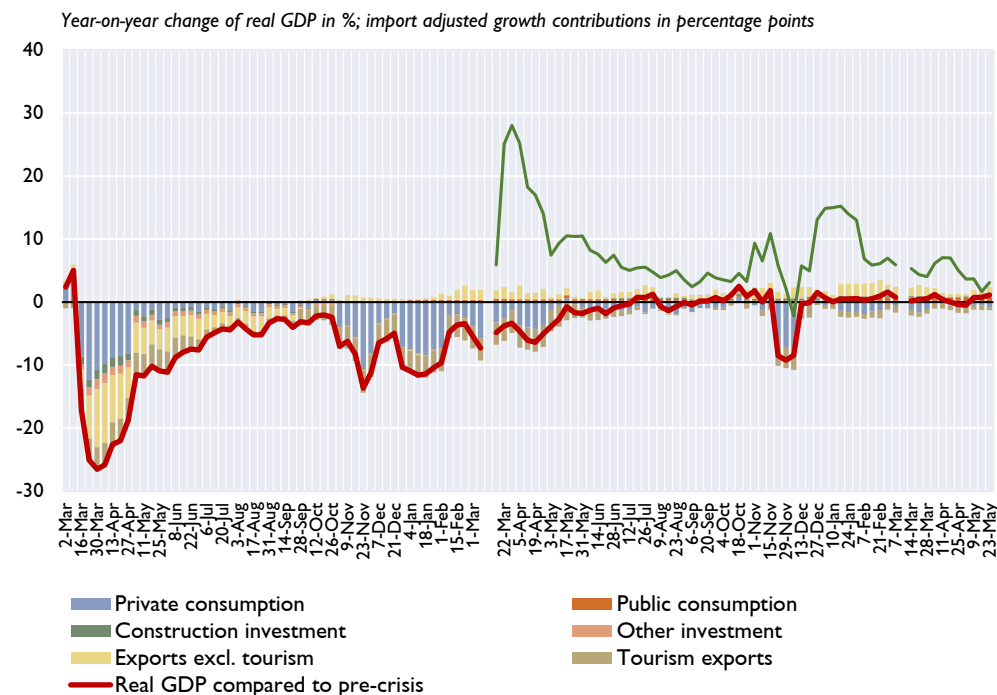
Wien, 4<sup>th</sup> October 2022

Business Cycle Analysis Section  
[www.oenb.at](http://www.oenb.at)



# OeNB Weekly GDP Indicator in times of the COVID-19 pandemic

## Weekly GDP indicator for Austria



Source: OeNB.

- COVID-19 pandemic led to a deep and abrupt slump in economic activity.
- Need for timely estimates of the economic contraction due to the lockdown and the subsequent gradual recovery presents economic research with new challenges.
- Traditional conjunctural indicators are not available on a timely basis (frequency, publication lag)
- Performance of traditional nowcasting models are poor in crises times (changes in behavior, non-linearities... )

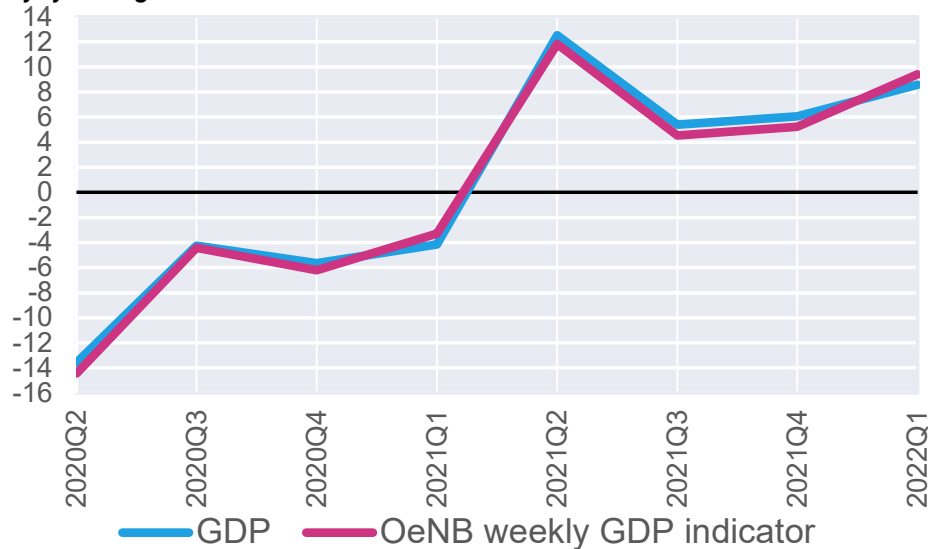
## Real-time data set of weekly or daily indicators

- **Used for estimation:** Labor market indicators, debit and credit card transaction data; information on cash shipments, ATM withdrawals, bank transfers, freight volume
- **Used for plausibility checks:** mobility data, flight data; financial markets data; electricity consumption, air pollution, internet activity

# Outstanding performance of OeNB Weekly GDP Indicator

OeNB weekly GDP indicator and actual GDP

yoy changes in %



Source: OeNB, Statistik Austria.

OeNB weekly GDP indicator and actual GDP

	GDP	OeNB weekly GDP indicator
	yoy growth rates in %	
2020Q2	-13,6	-14,4
2020Q3	-4,2	-4,4
2020Q4	-5,6	-6,2
2021Q1	-4,1	-3,3
2021Q2	12,5	11,8
2021Q3	5,4	4,6
2021Q4	6,1	5,2
2022Q1	8,6	9,4
ME		0,3
MAE		0,7
RMSE		0,7

Source: OeNB.

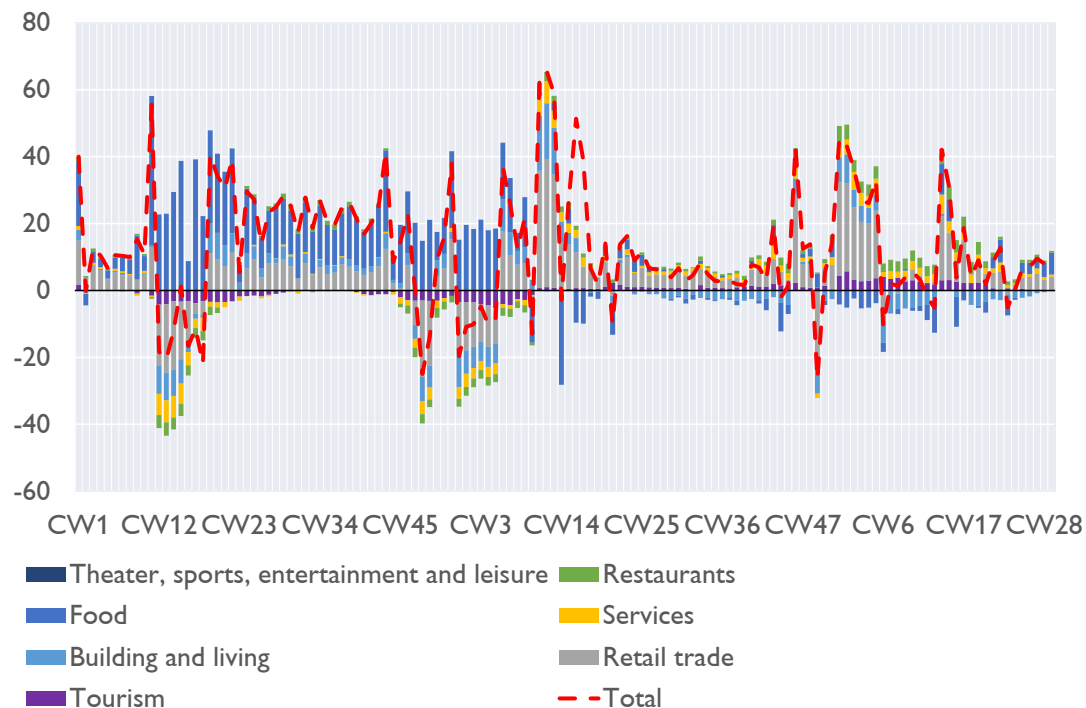
- Accuracy of GDP indicator really astonishing
- However, usefulness only in times of “high” changes, therefore indicator was abandoned in summer 2022

# Private consumption as key variable for weekly indicator

## Estimation based on cash and card spending data

### Expenditures from Austrians in Austria with payment cards (sectoral growth contributions)

Change to previous year in %, growth contributions in %-points



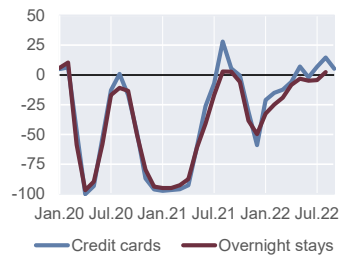
Source: Payment service supplier, OeNB.

- Estimation mainly based on cash and card spending by Austrian residents in Austria (~ 70% of total consumer spending)
- Travel expenses abroad account for almost 5% of total consumer spending – estimated using payment card information
- Card spending data available for 30 categories, on a weekly basis (in nominal terms)  
Graph shows growth contribution of 7 sectors
- Card spending data available includes expenditures in hotels, both from domestic and foreign tourists.

# Card expenditures are an excellent data source for nowcasting overnight stays

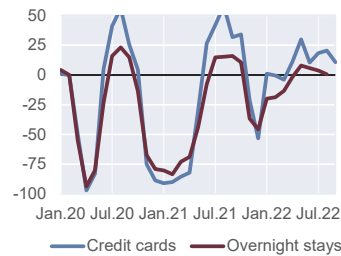
## Tourists - total development

Chance to pre-crisis level in %



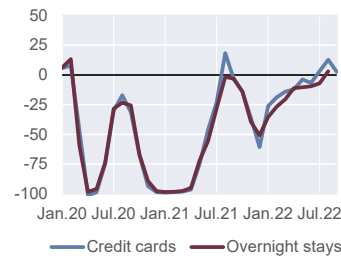
## Domestic tourists

Chance to pre-crisis level in %



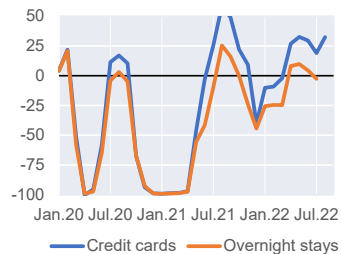
## Foreign tourists

Chance to pre-crisis level in %



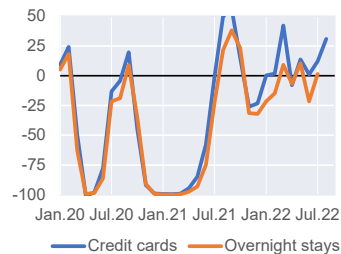
## Germany

Chance to pre-crisis level in %



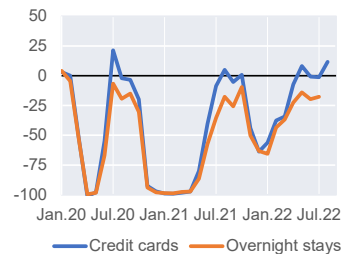
## Netherlands

Chance to pre-crisis level in %



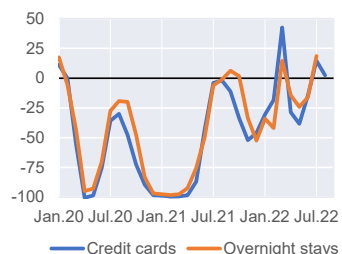
## Switzerland

Chance to pre-crisis level in %



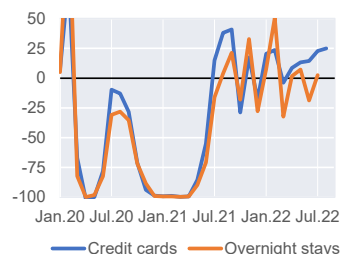
## Czech Republic

Chance to pre-crisis level in %



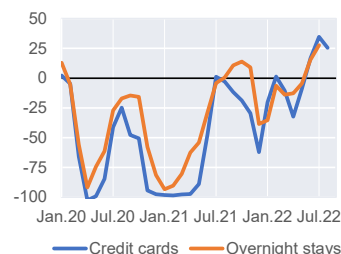
## Belgium

Chance to pre-crisis level in %



## Poland

Chance to pre-crisis level in %



- Credit card expenditures (measured in yoy-growth) almost perfectly match the domestic, foreign and total overnight stays
- Credit card data offer the possibility to nowcast overnights stays, as they are available on a weekly basis; overnight stays are only published around 25 days after the end of the month: a gain of almost a month
- Back in 2021 nominal data were used, since early 2022 we deflate credit card expenditures with the HCIP subindex for restaurants and hotels to deal with high inflation
- One card provider even offers data disaggregated by the country of origin => good fit for most countries

## From simple OLS estimates (via Eviews) to an almost fully automated R-routine

### Econometric problems:

- very short time series
- strong seasonal pattern
- structural breaks due to lockdowns

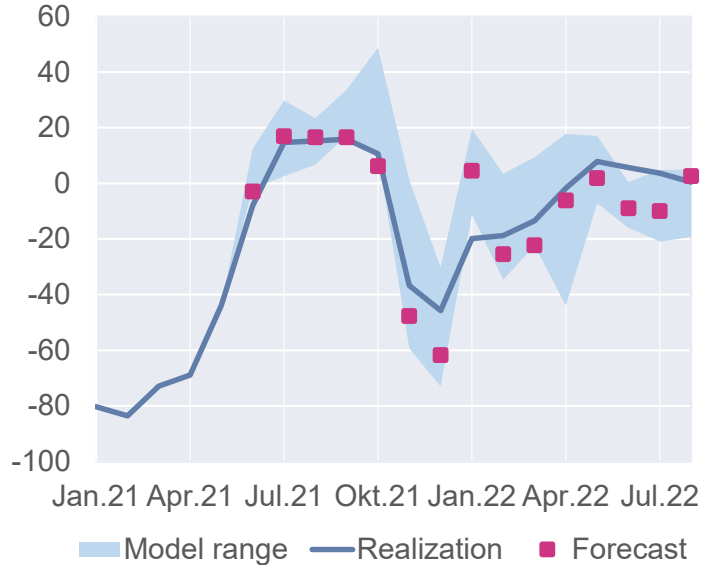
### Econometric approach:

- **Spring 2021:** simple OLS in levels, with and without AR-term, strong expert judgment
- **Late-summer 2021:** Extension of prediction to 16 specifications for domestic / foreign; including levels, differences, logs, dummies; with and without constant / AR12-term  
 → model selection with expert judgment
  - Outcome in almost all months within the model-range; no single best model
- **Summer 2022:** automatized data processing within R-routine;  
 → number of models extended to 12 specifications and 23 forecast combinations for domestic / foreign  
 → expert judgment becomes less important (model choice driven by forecast errors in T-1 and T-12)

# Forecast results and outlook

## Overnight stays domestic guests

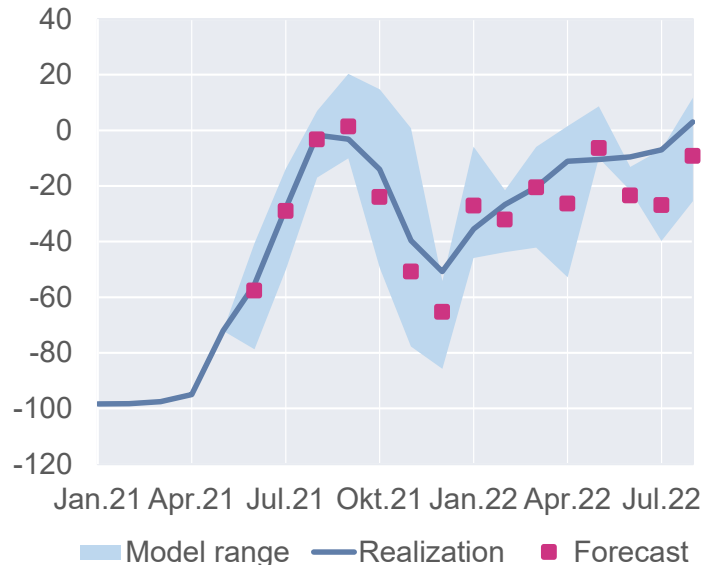
Change to pre-crisis level in %



Source: OeNB, Statistics Austria.

## Overnight stays foreign guests

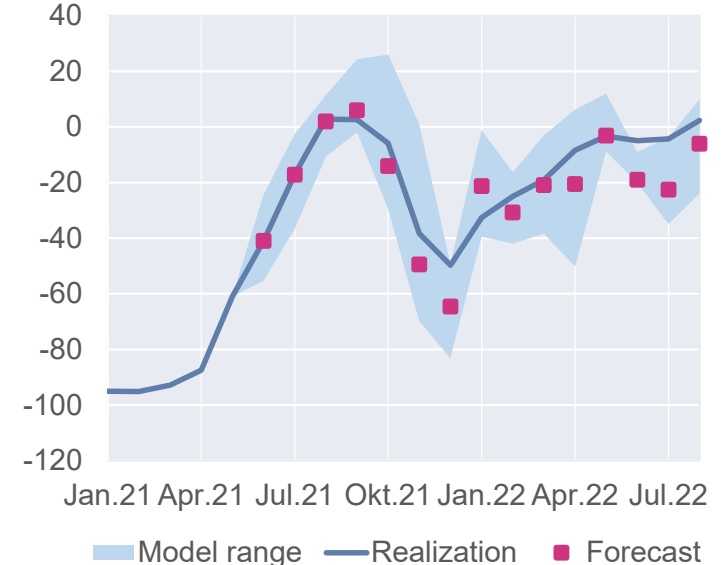
Change to pre-crisis level in %



Source: OeNB, Statistics Austria.

## Overnight stays dom. and foreign guests

Change to pre-crisis level in %



Source: OeNB, Statistics Austria.

- Tourism sector plays a crucial role for the Austrian economy (around 8% of value added – above EA-average)
- Tourism sector especially hit during and after the COVID-19 pandemic
- Credit-card data unique opportunity to nowcast overnight stays
- Automated tourism nowcast can easily be integration into regular nowcasting assessment of the OeNB



**Danke für Ihre Aufmerksamkeit**

**Thank you for your attention**

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