



# Nowcasting information on global value chains

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## **Overview**

### **What have we done?**

- Motivation and scope
- Methodological approach

### **What have we found?**

- Performance of the models
- Nowcasting TiVA indicators

### **What are the policy uses?**

### **Takeaways**

# What have we done?





## Motivation

### Issue

- Trade in value added (TiVA) indicators are important for monitoring countries' integration into global supply chains
- But OECD's TiVA indicators are published with a 2-3 years lag

### Solution

- Nowcast key TiVA indicators
- Use machine learning: it is sometimes found to outperform standard nowcasting methods



## Scope

- Nowcast **five key TiVA indicators** for **2021-2022**
- Using data on
  - TiVA indicators **1995-2020**
  - Over 170 explanatory variables **1995-2022**
- Coverage
  - 41 countries (37 OECD and China, India, Indonesia, South Africa)
  - Economy-wide and 24 sectors



## How do we do it?

1. Collect and pre-process data
2. Test models
  - Gradient boosted trees (GBM), ridge, lasso, linear regression model
  - A “consensus” model: simple average of the GBM, ridge and lasso
  - Benchmark: autoregressive model of order 1, as the data are annual
3. Use cross-validation to prevent overfitting
4. Compute RMSEs for one-year ahead predictions, select best models
5. Use best models to nowcast indicators for 2021 and 2022

# Model Performance





# Nowcasting models outperform the AR1 benchmark

Percentage of instances selected as best model: Domestic value-added shares

	Benchmark AR1	GBM	Lasso	Ridge	Consensus	OLS
Economy Wide	7	66	15	7	2	2
Agriculture	27	34	17	7	10	5
Manufacturing	20	71	5	2	2	0
Services	15	20	32	32	0	2





# GBM is selected most often as the best model

Percentage of instances selected as best model: Domestic value-added shares

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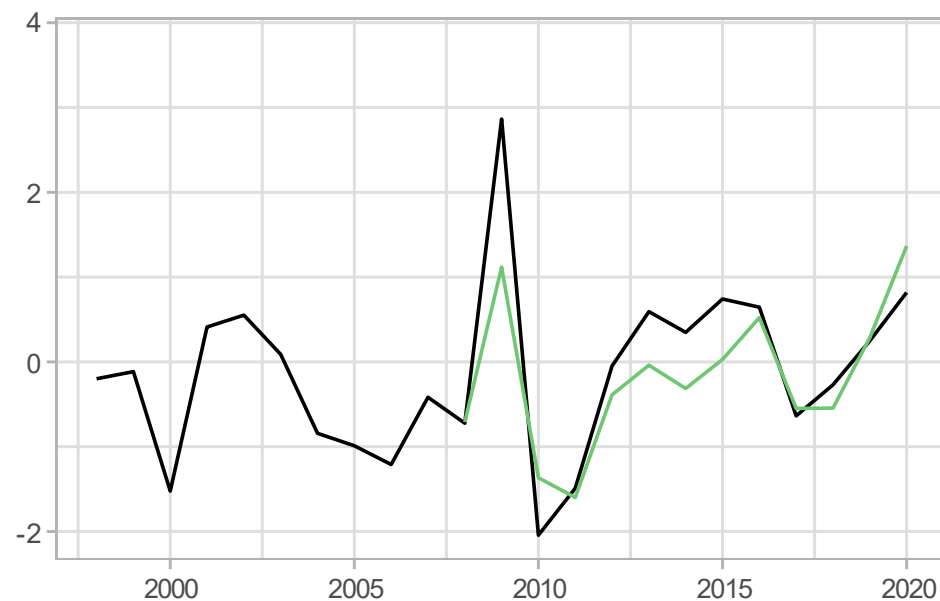
# One-year ahead predictive performance



**Domestic value-added shares  
41 countries – Economy Wide**

**OECD countries – Economy Wide**

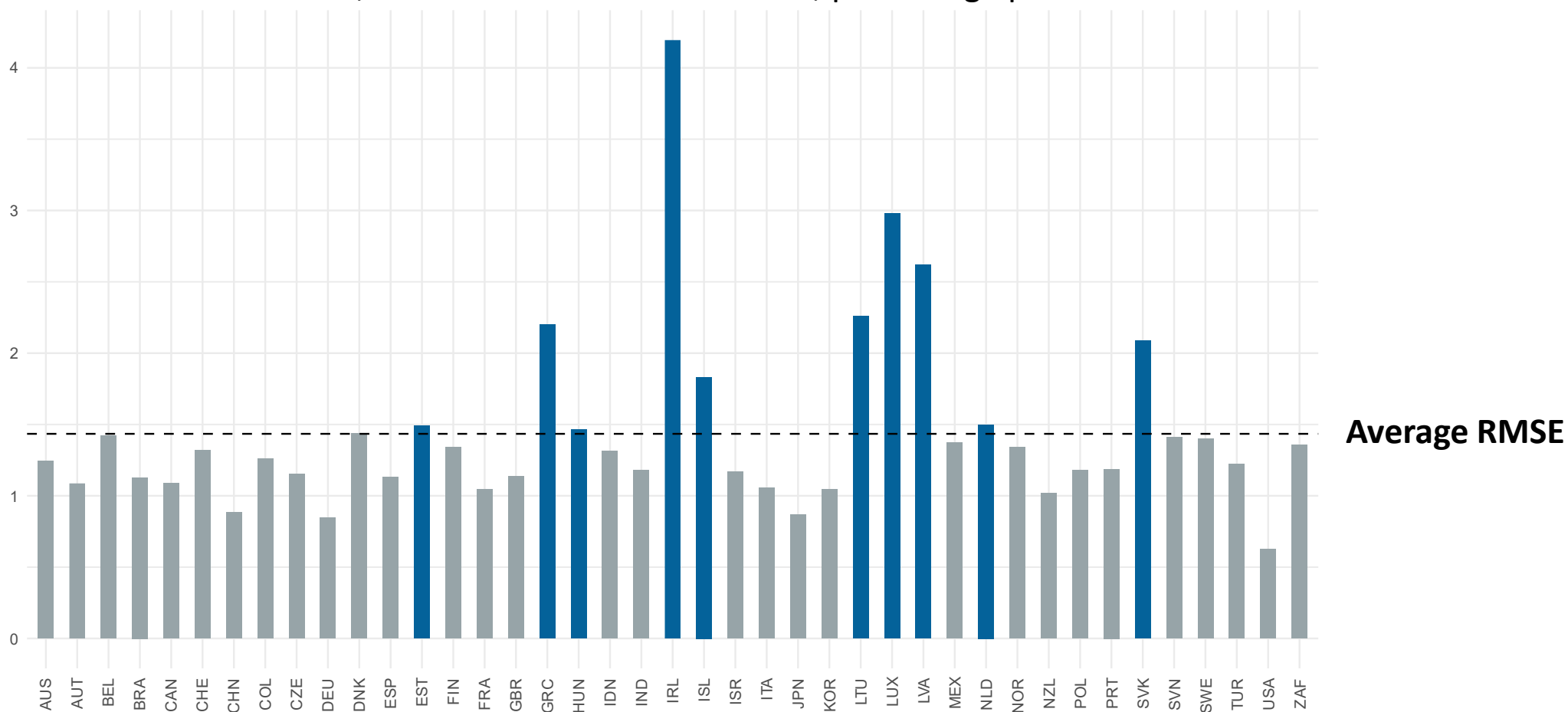
— Actual — Best model





# Performance is better for larger than for smaller economies

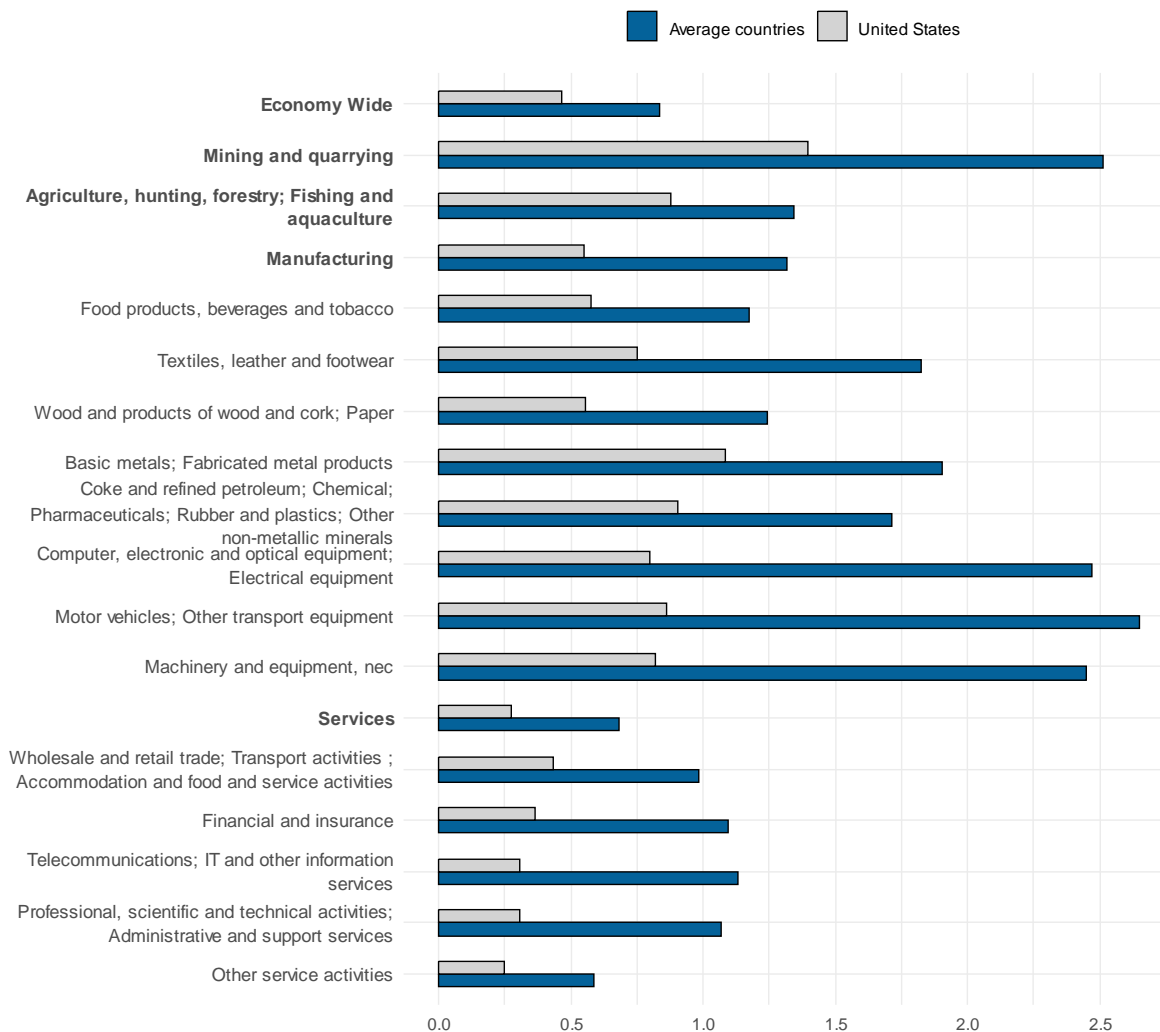
RMSEs, Domestic value-added shares, percentage points



Country-average RMSEs were estimated for one-year ahead predictions and for all indicator-sector instances. The horizontal dashed line corresponds to the overall average absolute RMSE (1.5 percentage points).



# Performance is on average better for services than manufacturing



RMSEs, Domestic value-added shares, percentage points

# Nowcasting 2021 and 2022



# Share of domestic VA in gross exports is estimated to have fallen

Evolution of domestic value-added shares at the economy-wide level, per cent

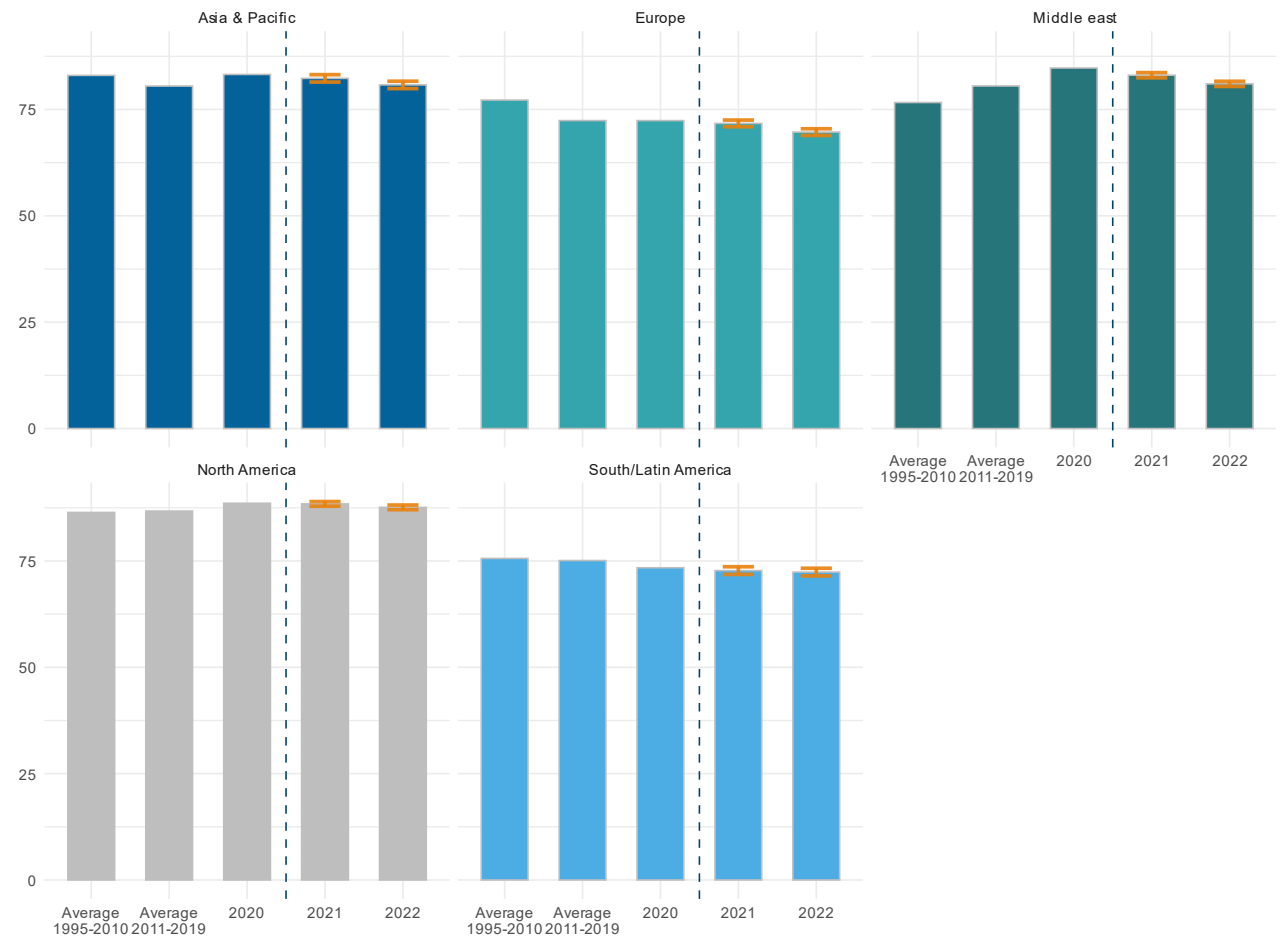




# The fall of domestic value added was wide spread



Change in the domestic value-added shares at the regional level, percentage points



# Policy use cases





## **A lack of timeliness in international trade data**

### **Creating resilience during the COVID-19 crisis**

- Global supply chain disruptions and COVID-19 crisis in 2020
  - OECD Tiva estimates were only available until 2018
- Policy makers need to act promptly to stabilise the economy and minimize the impact of the shock

### **Contribution of our work**

- Provide timely insights into trade in value added to enable fast decision making (especially in times of large shocks hitting the economy)
- Better understand sectoral dependencies to tailor economic policies
- Existing models can be used to estimate 2023 early next year (current OECD ICIO-based estimates are only available until 2020)



## **Nowcasting enables timelier insights into global value chains**

### **TiVA nowcasts can map global trade dependencies in the following dimensions**

- the degree to which a country's exports or domestic consumption are dependent on imported inputs (backward linkages)
  - Domestic and foreign value added as shares of gross exports
- the degree to which foreign export production or consumption is dependent on domestic production (forward linkages)
  - Domestic value added embodied in foreign exports as a share of domestic gross exports
- The value added in exports and imports
  - Domestic value added embodied in foreign final demand

# Main takeaways





## Key findings

- Nowcasting models add value as they improve the timeliness of official statistics
- Performance of models differs across countries, sectors and indicators
- Nowcasts of TIVA indicators in 2021-22 reveal a decline in the share of domestic value added in export flows, but patterns differ across countries
- For further information and the link to the recent working paper, please contact me at: [Julia.schmidt@oecd.org](mailto:Julia.schmidt@oecd.org)



# THANK YOU

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# ANNEX

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## Data: some examples

### Example variables

National accounts

GDP less imports,  
Gross value added and Gross Output by industry

International trade  
Balance of payments

Exports and Imports of Intermediate Goods (BTDIxE),  
Exports and Imports of Services (TiS),  
Current Account and components

Business activity

Industrial Production Index  
Consumer Price Index

Financial indicators

Long term interest rates  
Real effective exchange rates

Employment

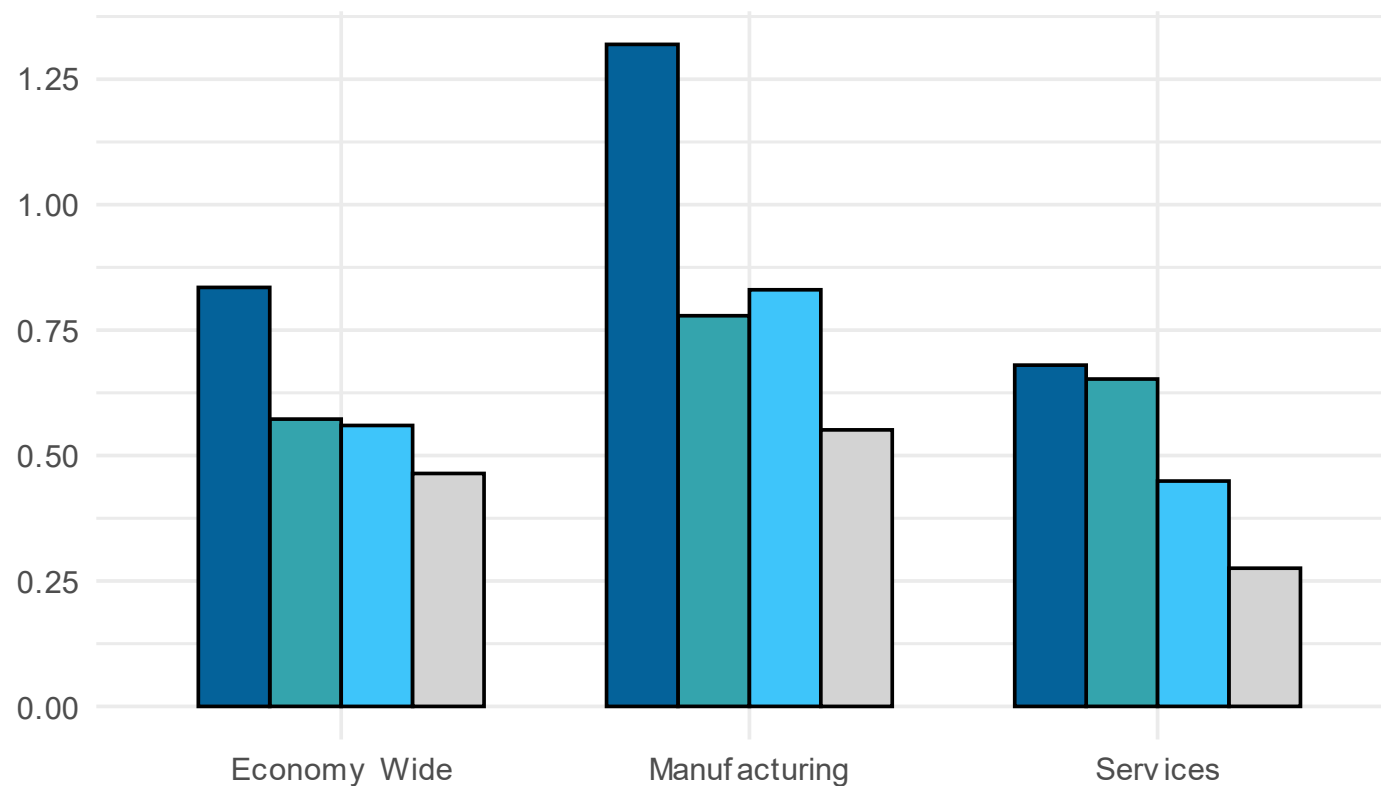
All active people employed (age 15 -64)  
Employment by industry (ALFS, National Accounts)



# Performance varies across countries

RMSEs, EXGR\_DVASH, percentage points

Average countries China Germany United States



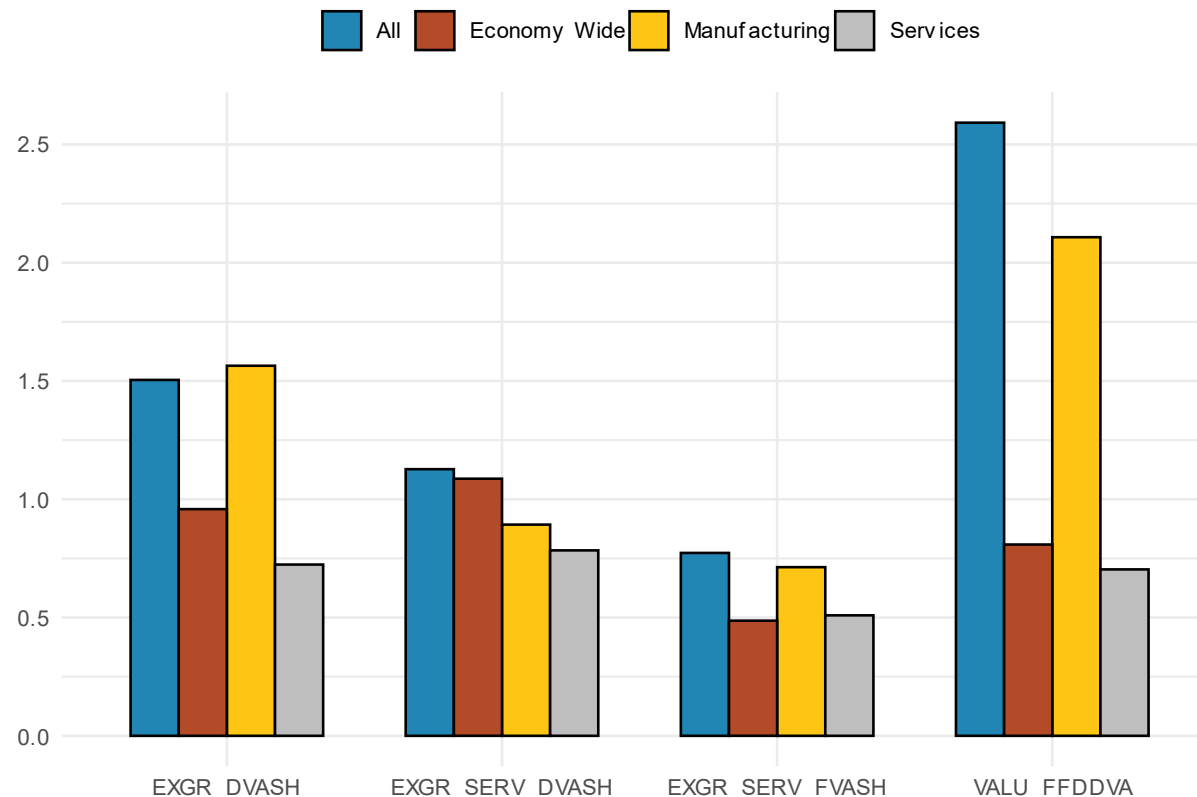
Note: RMSEs were averaged for the 41 countries at economy wide, manufacturing and services level.





# Export-related indicators exhibit better nowcasting performance

RMSEs, percentage points



Note: EXGR\_DVASH: domestic value-added share of exports; EXGR\_SERV\_DVASH: domestic services value-added share of exports; EXGR\_SERV\_FVASH: foreign services value-added share of exports; VALU\_FFDDVA: share of domestic value added embodied in foreign final demand.



# But growth patterns differ across countries

Change in the EXGR\_DVASH at the economy-wide level, percentage points

