Nowcasting TiVA indicators

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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

Takeaways
What have we done?
Motivation

Issue

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

Solution

• Nowcast TiVA indicators
• Use machine learning: it is sometimes found to outperform standard nowcasting methods (Chapman and Desai 2021, Hopp 2022)
Scope

• Nowcast **five 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 (EXGR_DVASH)

<table>
<thead>
<tr>
<th></th>
<th>Benchmark AR1</th>
<th>GBM</th>
<th>Lasso</th>
<th>Ridge</th>
<th>Consensus</th>
<th>OLS</th>
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<td>Agriculture</td>
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<td>5</td>
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<td>Manufacturing</td>
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<td>20</td>
<td>32</td>
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</tbody>
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GBM is selected most often as the best model

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

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Performance varies across countries
Performance varies across sectors

RMSEs, EXGR_DVASH, percentage points

Economy Wide | Manufacturing | Services

Average countries | CHN | DEU | USA
Performance varies across indicators

RMSEs, EXGR_DVASH, percentage points
Nowcasting 2021 and 2022
Share of domestic VA in gross exports is estimated to have fallen.

Evolution of EXGR_DIRASH at the economy-wide level.
But growth patterns differ across countries
Main takeaways
Key findings

• Nowcasting models add value
• 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
THANK YOU
## Data: some examples

### Example variables

<table>
<thead>
<tr>
<th>National accounts</th>
<th>GDP less imports, Gross value added and Gross Output by industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>International trade</td>
<td>Exports and Imports of Intermediate Goods (BTDIxE), Exports and Imports of Services (TiS), Current Account and components</td>
</tr>
<tr>
<td>Balance of payments</td>
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</tr>
<tr>
<td>Business activity</td>
<td>Industrial Production Index, Consumer Price Index</td>
</tr>
<tr>
<td>Financial indicators</td>
<td>Long term interest rates, Real effective exchange rates</td>
</tr>
<tr>
<td>Employment</td>
<td>All active people employed (age 15 -64), Employment by industry (ALFS, National Accounts)</td>
</tr>
</tbody>
</table>
Change in the EXGR_DVASH by sector
Share of domestic VA in exports at the economy-wide level by region