3. The APERC Macroeconomic Model

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Contents

1. Background
2. Model Structure
3. Results and Discussions
1. Background

- The role of macroeconomic model in the APEC Energy Demand and Supply Outlook

Macroeconomic model
(Population, GDP, Savings rate, Investment rate, Employment rate, Education, etc.)

- Industry demand model
- Transport demand model
- Residential & Commercial demand model
- Electricity supply model
- Other models...
Example of using macroeconomic model

How can the macroeconomic model be used to project steel energy demand?
Why do we need a new macroeconomic model?

- Previously we used the IHS Global Insight data as our macroeconomic assumptions.

- Reasons not to use it anymore:
  - We cannot explain (Models not available)
  - Data not available for Brunei and PNG
  - Some strange results (bias toward small economies such as Singapore and Hong Kong)
  - Expensive...
Why do we need a new macroeconomic model?

- There are currently many other macroeconomic projections. However, it is difficult to use their results directly due to data, document and source code availability, as well as time and economy coverage problems.

<table>
<thead>
<tr>
<th>Projections</th>
<th>Time coverage</th>
<th>Economy coverage</th>
<th>Detailed Document</th>
<th>Database</th>
<th>Source Code</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEPII</td>
<td>1980-2050, annual</td>
<td>worldwide, 147 economies</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>using energy as input</td>
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<tr>
<td>EIA</td>
<td>2006-2035, 5-year intervals</td>
<td>22 selected economies</td>
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<td>USDA</td>
<td>1969-2030, annual</td>
<td>worldwide, 190 economies</td>
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<td>worldwide, 188 economies</td>
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<tr>
<td>OECD</td>
<td>2011, 2030, 2060</td>
<td>42 selected economies</td>
<td>O</td>
<td>X</td>
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</table>
The model we are pursuing...

Based on proven, widely adopted approach

Easy to understand, including only the necessary elements

Using open, published research and authoritative data sources

Covering all 21 APEC economies

Producing acceptable results for long-term projection
2. Model structure

Total GDP \[ Y = A(t)K^\alpha L^\beta \]
Three main factors in the model

- **Capital** accumulation is determined by *investment rate* (the share of investment in GDP) and *capital depreciation rate*. Investment rate is estimated based on the relationship between savings rate and investment rate.

- **Labour** is measured by the total economically active population. For each age group, we have population and economic activity rate data from the ILO database.

- **TFP growth** can be explained by a catch-up effect, an education effect and an interaction term between education and catch up.
3. Results and Discussions

Projection of GDP per capita

GDP per capita (2005 USD PPP)

- Australia
- Brunei
- Canada
- Chile
- China
- Hong Kong
- Indonesia
- Japan
- Korea
- Malaysia
- Mexico
- New Zealand
- PNG
- Peru
- Philippines
- Russia
- Singapore
- Viet Nam
- Thailand
- United States
Total GDP growth rate

Annual GDP growth rate for various countries from 1980-2012 and 2012-2035.
Comparison with the CEPII projection

GDP per capita (2005 USD PPP)

- APERC 2035
- CEPII 2035
Thanks for your attention!

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