The Linkage between MUDAN and JIDEA

by

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1. The Mechanism of the Linkage between Two Models

Linkage method 1.
Step 1. run MUDAN for whole analysis period, write data for JIDEA
Step 2. with data from MUDAN, run JIDEA for whole analysis period, write out data for MUDAN
Step 3. with data from JIDEA, run MUDAN for whole analysis period, write data for JIDEA

If converge, finish calculation. Otherwise, repeat step 2 to 3.
1. The Mechanism of the Linkage between Two Models

- Linkage method 2
- Step 1. For year t, give assumed data (export to China and import price from China) to JIDEA.
- Step 2. Run JIDEA model. Meanwhile, MUDAN waits.
- Step 3. JIDEA converges and sends data (import from China and export price) to MUDAN. Then waits.
- Step 4. Run MUDAN with data received from JIDEA. After converging, send data (import from Japan and export price) to JIDEA. Then waits.
- Step 5. If both models FTA-converged, t+1=>t. Run from step 1 again. Otherwise, go to step 2 and run JIDEA with received data until both models FTA-converged.
1. The Mechanism of the Linkage between Two Models

The advantage of method 1:
1. Easily to realize through making a DOS batch file to run two models one by one.
2. Just need to add some program for writing and reading data to exchange data between two models.

The disadvantage of method 1:
1. The inter-influence of the two models in one same year cannot be dynamically and immediately simulated.
2. There maybe convergence problem.
1. The Mechanism of the Linkage between Two Models

The advantage of method 2:
1. It overcomes the disadvantage in method 1.
2. We can observe the run of the two models at the same time from two separate DOS windows.

The disadvantage of method 2:
1. It is necessary to compile the two models under C++ Builder.
2. It is necessary to have some modification on model.cpp.
Method 2 was selected. Its details are shown in Fig.1
In MUDAN model, Year = t
Load data and so on.
FTA_AGAIN:
Wait for data from JIDEA……
Receive data from JIDEA
MUDAN iteration calculation
Send data and message to JIDEA
If both MUDAN and JIDEA
FTA convergent, year = t+1, otherwise go to FTA_AGAIN.

In JIDEA model, Year = t
Load data and so on.
Have assumed value for vectors: JAexpCNr and JApimCN
FTA_AGAIN:
JIDEA model Iteration calculation
Send data and message to MUDAN
Wait for data from MUDAN
Receive data from MUDAN
If both MUDAN and JIDEA
FTA convergent, year = t+1, otherwise go to FTA_AGAIN.

FTA_AGAIN:
Wait for data from JIDEA
……
Receive data from JIDEA
MUDAN iteration calculation
Send data and message to JIDEA
If both MUDAN and JIDEA
FTA convergent, year = t+1, otherwise go to FTA_AGAIN.
2. The Data Exchange between Two Models

There are several aspects need to be considered for data exchange between two models:

1. Sector number difference
2. Currency difference
3. Price index base year difference
4. Trade data difference between country model and BTM
2. The Data Exchange between Two Models

(1). Sector number difference:
JIDEA model: 100 sectors (tradable 64)
MUDAN model: 59 sectors (tradable 42)

Solution:

<table>
<thead>
<tr>
<th>JIDEA</th>
<th>BTM</th>
<th>MUDAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>120</td>
<td>59</td>
</tr>
</tbody>
</table>

from 120 to 100/59: aggregate and use weights
From 100/50 to 120: Split and use weights
2. The Data Exchange between Two Models

(2). Currency difference:
Solution: Convert into US dollar for exchange

(3). Price index base year difference
Solution: Nominal data for exchange
2. The Data Exchange between Two Models

(4) There are difference in trade data between country model and BTM due to following reasons:

I. The cost of import goods for insurance, freight and tariff. It means: JAimpCN dose not equal to CNexpJA in monetary, even measured by same currency.

II. The statistical discrepancy between BTM and country statistics.

III. Statistical definition difference, for example, the Hong Kong issue in Chinese foreign trade data.
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>YBK</td>
<td>621</td>
<td>718</td>
<td>849</td>
<td>917</td>
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<tr>
<td>BTM</td>
<td>753</td>
<td>857</td>
<td>971</td>
<td>979</td>
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<td>BTM</td>
<td>1400</td>
<td>1501</td>
<td>1687</td>
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<tr>
<td>YBK</td>
<td>534</td>
<td>638</td>
<td>806</td>
<td>1040</td>
</tr>
<tr>
<td>BTM</td>
<td>635</td>
<td>787</td>
<td>1011</td>
<td>1512</td>
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<tr>
<td>YBK</td>
<td>1156</td>
<td>1321</td>
<td>1388</td>
<td>1424</td>
</tr>
<tr>
<td>BTM</td>
<td>1548</td>
<td>1672</td>
<td>1831</td>
<td>1877</td>
</tr>
</tbody>
</table>
2. The Data Exchange between Two Models

Solution for trade data difference:

(1). Do not add up the import demand for Chinese goods from Japan and from rest of the world as the export demand of China.

(2). A regression was done between Chinese export MUDAN definition and the BTM definition of export demand from Japan and from rest of the world (some other variables, such as exchange rate and time trend, are included in this regression).
In MUDAN model, Year = t
Load data and so on.

FTA_AGAIN:
Wait for data from JIDEA
Receive data from JIDEA
Convert from BTM to MUDAN
MUDAN iteration calculation
convert into BTM definition
Send data and message to JIDEA
If both MUDAN and JIDEA FTA convergent, year = t+1, otherwise go to FTA_AGAIN.

In JIDEA model, Year = t,
Load data and so on
Have assumed value for vectors: JAexpCNr and JApimCN

FTA_AGAIN:
JIDEA model Iteration calculation
Convert into BTM definition
Send data and message to MUDAN
Wait for data from MUDAN
………

Receive data from MUDAN
Convert from BTM to JIDEA
If both MUDAN and JIDEA FTA convergent, year = t+1, otherwise go to FTA_AGAIN.
3. C++ code for linkage and exchange of two models

- To use the method 2 for linkage and exchange between two models, it is necessary to compile the country model under C++ builder.
- Since JIDEA and MUDAN run under DOS windows, we got help from Yang Wang for necessary C++ builder code.
- JIDEA and MUDAN can run and communicate in different file folders.
- Show the run of the two models
4. The first glance of the impact on Chinese Economy

• Three different scenarios: 5%, 10% and 15% reduction of the import price from partner country were taken.
• Run models from 1998 to 2008
• For MUDAN model, 2003 is the last data, so show result from 2004 to 2008
Table 2 The Changes of Import from Japan

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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</thead>
<tbody>
<tr>
<td>Base</td>
<td>550</td>
<td>714</td>
<td>869</td>
<td>1005</td>
<td>1179</td>
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<tr>
<td>5% reduction</td>
<td>603</td>
<td>791</td>
<td>967</td>
<td>1122</td>
<td>1320</td>
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<tr>
<td>Ratio to base</td>
<td>1.10</td>
<td>1.11</td>
<td>1.11</td>
<td>1.12</td>
<td>1.12</td>
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<tr>
<td>10% reduction</td>
<td>672</td>
<td>892</td>
<td>1101</td>
<td>1280</td>
<td>1514</td>
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<tr>
<td>Ratio to base</td>
<td>1.22</td>
<td>1.25</td>
<td>1.27</td>
<td>1.27</td>
<td>1.28</td>
</tr>
<tr>
<td>15% reduction</td>
<td>761</td>
<td>1032</td>
<td>1275</td>
<td>1486</td>
<td>1765</td>
</tr>
<tr>
<td>Ratio to base</td>
<td>1.38</td>
<td>1.45</td>
<td>1.47</td>
<td>1.48</td>
<td>1.50</td>
</tr>
</tbody>
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Table 3  The Changes of Export to Japan

<table>
<thead>
<tr>
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<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>517</td>
<td>426</td>
<td>554</td>
<td>562</td>
<td>610</td>
</tr>
<tr>
<td>5% reduction</td>
<td>519</td>
<td>433</td>
<td>565</td>
<td>574</td>
<td>625</td>
</tr>
<tr>
<td>Ratio to base</td>
<td>1.00</td>
<td>1.02</td>
<td>1.02</td>
<td>1.02</td>
<td>1.02</td>
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<tr>
<td>10% reduction</td>
<td>520</td>
<td>442</td>
<td>582</td>
<td>593</td>
<td>648</td>
</tr>
<tr>
<td>Ratio to base</td>
<td>1.00</td>
<td>1.04</td>
<td>1.05</td>
<td>1.06</td>
<td>1.06</td>
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<tr>
<td>15% reduction</td>
<td>529</td>
<td>481</td>
<td>614</td>
<td>617</td>
<td>679</td>
</tr>
<tr>
<td>Ratio to base</td>
<td>1.02</td>
<td>1.13</td>
<td>1.11</td>
<td>1.10</td>
<td>1.11</td>
</tr>
</tbody>
</table>
Table 4. The Changes of Import from the Rest of the World

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>3319</td>
<td>3487</td>
<td>3890</td>
<td>4387</td>
<td>5045</td>
</tr>
<tr>
<td>5% reduction</td>
<td>3270</td>
<td>3439</td>
<td>3832</td>
<td>4324</td>
<td>4961</td>
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<tr>
<td>10% reduction</td>
<td>3219</td>
<td>3387</td>
<td>3770</td>
<td>4251</td>
<td>4868</td>
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<tr>
<td>15% reduction</td>
<td>3171</td>
<td>3337</td>
<td>3710</td>
<td>4183</td>
<td>4784</td>
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## Table 5. The Changes of GDP

<table>
<thead>
<tr>
<th></th>
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<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base</strong></td>
<td>122,472</td>
<td>131,618</td>
<td>144,350</td>
<td>157,965</td>
<td>174,236</td>
</tr>
<tr>
<td><strong>5% reduction</strong></td>
<td>122,473</td>
<td>131,634</td>
<td>144,373</td>
<td>157,992</td>
<td>174,265</td>
</tr>
<tr>
<td><strong>10% reduction</strong></td>
<td>122,480</td>
<td>131,662</td>
<td>144,417</td>
<td>158,039</td>
<td>174,318</td>
</tr>
<tr>
<td><strong>15% reduction</strong></td>
<td>122,501</td>
<td>131,750</td>
<td>144,500</td>
<td>158,115</td>
<td>174,405</td>
</tr>
</tbody>
</table>
4. The first glance of the impact on Chinese Economy

- Tendency that the more reduction of the import price from Japan, the more the increase of import from Japan.
- the more reduction of the import price from China to Japan, the more the increase of the export from China to Japan
4. The first glance of the impact on Chinese Economy

- the range of the increase in import from Japan and export to Japan is quite different.
- Chinese economy has higher sensibility on import price than Japanese economy.
4. The first glance of the impact on Chinese Economy

- The more the reduction of the import price from Japan, the less the Chinese import from the rest of the world
- All reductions on import price have positive effect on GDP increase, even the increase of import itself has negative effect in the definition of GDP.
Thank you!