Using the Bilateral Trade Model

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What, where, how and why?

- Review of BTM’s central equation
- Independent variables for BTM
- BTM itself
- Radiating BTM data
- Final processing
- BTM within the System
Bilateral Trade Model: The Central Equation

- Shares of imports by originating country
- Prices by exporter
- Production capacity
- Trends
- Tariffs
\[ S_{ijt} = \beta_{ij0} * \left( \frac{P_{eit}}{P_{wjt}} \right) \beta_{ij1} * \left( \frac{K_{eit}}{K_{wjt}} \right) \beta_{ij2} * e^{\beta_{ij3} T_t} \]

- \( S_{ijt} \) = the share of country i in the imports of a given product into a given country j in year t (0 denotes the base year 1995)

- \( P_{eit} \) = the effective price of the good in question in country i (exporter) in year t, defined as a moving average of domestic market prices for the last three years;

- \( P_{wjt} \) = the world price of the good in question as seen from country j (importer) in year t (see fuller description below);
Equation Cont’d

- $K_{eit}$ = an index of effective capital stock in the industry in question in country $i$ in year $t$, defined as a moving average of the capital stock indices for the last three years;
- $K_{wjt}$ = an index of world average capital stock in the industry in question as seen from country $j$ in year $t$ (see fuller description below);
- $T_t$ = Nyhus trend variable, set to zero in the base year.
- $\beta_{ij0}$, $\beta_{ij1}$, $\beta_{ij2}$, $\beta_{ij3}$ are estimated parameters.
The world price, $P_{wjt}$, is defined as a fixed-weighted average of effective prices in all exporting countries of the good in question in year $t$:

$$P_{wjt} = \sum_i S_{ij0} P_{eit}; \quad \sum_i S_{ij0} = 1$$

and the world average capital stock, $K_{wjt}$, is defined as a fixed-weighted average of capital stocks in all exporting countries of the sector in question in year $t$;

$K_{wjt}$ similarly defined as $P_{wjt}$. 

Equation cont’d
Step one:
Creating Independent Variables

- Import levels
- Prices
- Capital stocks
Country Data

Create, using G, the country.vam file

Data from each of the countries in exactly the form from the country model itself

Directory: \link2025\indpdyme

Exchange rate scenarios created separately in \link2025\exrats
**France: An example**

- From country.cfg (portion for France)
  - 1972 2025  # Starting and ending dates of the Vam file
  - frprice 88 1 0  fratit.ttl # Export price indices for France
  - frinvest 38 1 0  fracap.ttl # Capital investment for France
  - frimport 88 1 0  fratit.ttl # imports for France

- From Country.add (portion for France)
  - fdates 1972 2025
  - vam \link2025\daf\fr b
  - do {vf frprice%1 = b.pex%1
  -   vf frimport%1 = b.imp%1
  - } (1-88)
  - do {vf frinvest%1 = b.cap%1
  - } (1-38)
Linking to BTM data

- Dyme type program
- Links country data to BTM. Assuming the country data acts as an index to BTM
- One country sector to one BTM sector is default
- For aggregations/splits of country it uses the equation override feature of Interdyme
- Equation overrides are also used for extending those models not forecasting to 2025
Special Note for Capital Stock Data

- First pass of Dyme (through all years) assigns capital investment to appropriate BTM sector and then cumulates the investment into a capital stock figure (all in national units) using an 8% depreciation rate
  \[ @\text{cum(stock, invest,.08)} \]
- On second pass the capital stock indexes are computed using BTM base year (1995) and the appropriate unit bucket correction
Step two: BTM Model

- Uses the resulting dyme.vam file from indpvam directory as input
- Has a stock set of fixes to correct bad equations—all of them are “mul” fixes to retain some of the structure of the model.
- Model runs over the period 2001-2025
- Output is file of bilateral trade flows and shares (dyme.vam); file of those trade shares and sums by column before any fixes (raw.vam); file of total exports and import prices by BTM sector (indp.vam)
Step Two Continued

- **Batch file for BTM**
- `echo run model`
- `copy dymesav.vam dyme.vam`
- `copy \link2025\indpdyme\dyme.vam indp.vam`
- `call fixes`
- `fixrbild_12000`
- `Dymex`
- `:: these two g files create country totals for trade and prices--`
- `g7 stub\sectors.get`
- `g7 maktotal\finish`
- `copy ws.* dyme.*`
- `call saver %1`
Step 3: Radiating the Results to Country Models

- Create a vam file with BTM results in country specific sectors
- `\link2025\raddyme` directory: `radiate.cfg` for vam file
- Uses the `indp.vam` file from the model as input
- One-to-one correspondence is the default
- Equation fixes for other cases
- For each country creates a file with country imports in current prices; imports in 1995 prices; and exports in 1995 prices
Step 3 Continued

- Take the results of raddyme and use in a model
- G add files
- Create import prices and link to model
- Link BTM exports to model
- Write out files for use as “fixes” when running model
vam \link2025\daf\us b
ba \link2025\indpdyme\dyme a
fdates 1972 2025
add index usexr 95
vam \link2025\raddyme\dyme c
do {f usaimp%1 = (c.usimportcur%1/c.usimport%1)*indusexr} (1-97)
do {
  f ex%1 = b.ex%1
  ls ex%1 c.usexport%1 102
} (1-58,66(4,7,8,25))
do {
  f fpi%1 = b.fpi%1
  ls fpi%1 usaimp%1 102
} (1-58,66(4,7,8,25))
save gfexp.usa
do {
  spr ex%1 102 120
} (1-58,66(4,7,8,25))
save off
save gffpi.usa
do {
  spr fpi%1 102 120
} (1-58,91,(4,5,7,8,25,40,48,91))
save off
**Final Step**

- Put files as written by G into form usable by Interdyme’s Fixer.
- `g7 usa.add`
- `copy gfexp.usa \idlift\model\btm\gfexp.sav`
- `copy gffpi.usa \idlift\model\btm\gffpi.sav`
- `cd \idlift\model\btm`
- `g7todym  gfexp.sav  gfexp.fix`
- `g7todym  gffpi.sav  gffpi.fix`