Welfare Decomposition
Welfare measures

- Equivalent variation (EV)
  - how much money is a particular change (that had taken place between equilibria) equivalent to
  - the minimum required to accept to forgo the change (or maximum prepared to pay to avoid the change where there is a welfare loss)
  - reference point is the old equilibrium

\[ EV = E(U^N, P^O) - E(U^O, P^O) \]

- where \( E(U^N, P^O) \) is the expenditure necessary to achieve utility level \( U^N \) with prices \( P^O \)
Do all regions gain?

- Look at changes in welfare (The variable is EV):
  - EU loses $2,715 million
  - ROW gains $5,858 million
  - And…
  - SSA loses $223 million
  - Can we explain the EU welfare loss?
Decomposition of welfare effects

- Welfare results can be difficult to understand: decomposition assists understanding of where the gains came from, eg:
  - more favorable terms of trade
  - improved allocation of existing resources
  - additional resources
  - improved technology

- Welfare can be decomposed following Huff and Hertel (1996):
  - allocative efficiency effects
  - terms of trade effects
  - ....
Allocative efficiency effects

- Allocative efficiency gains result when resources are reallocated into areas of more efficient production.
- They can be decomposed to find the allocative efficiency effect attributable to a given commodity and region.
- These can be further decomposed by tax instrument.
Terms of trade effects

terms of trade effects reflect movements in the terms of trade
changes in the terms of trade can be decomposed into three components:
  contribution of changes in world prices
  contribution of changes in regional export prices
  contribution of changes in regional import prices
A welfare decomposition

- View|Updated Data|Welfare decomposition
- That due to changes in allocative efficiency
  - Click on line 2
  - EU gain is $2778, mainly from ‘food’
- That due to changes in ToT
  - Click on line 24
  - ‘All TRAD_COMM’ ‘EU’ ‘Sum prices’ ‘sum form’
  - Loss of $5,589
  - Mainly in manufactures
Still looking at ToT decomposition

- In the 3rd drop-down box
  - Change to ‘All prices’
- World price changes had small positive effects on EU welfare
- As did changes in prices paid by EU for imports
- But welfare losses due to reduced prices received for EU exports
Digger deeper into the ToT contribution to welfare

- Return to GTAP solution
- Look at these variables:
  - tot
  - psw
  - pdw
  - pxw
  - Piw
  - pxwcomm