

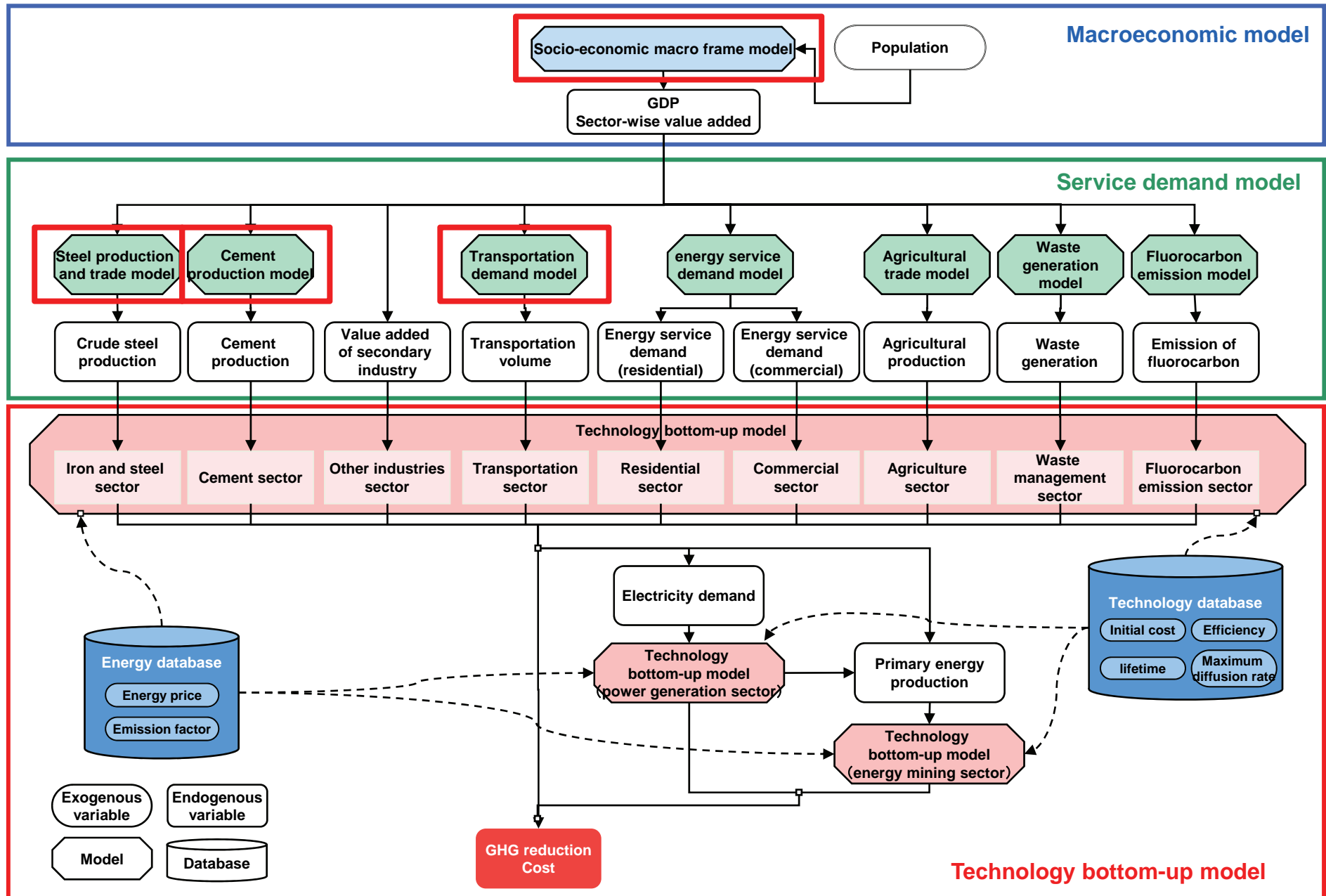
# Modeling on service demands: Industry and Transport

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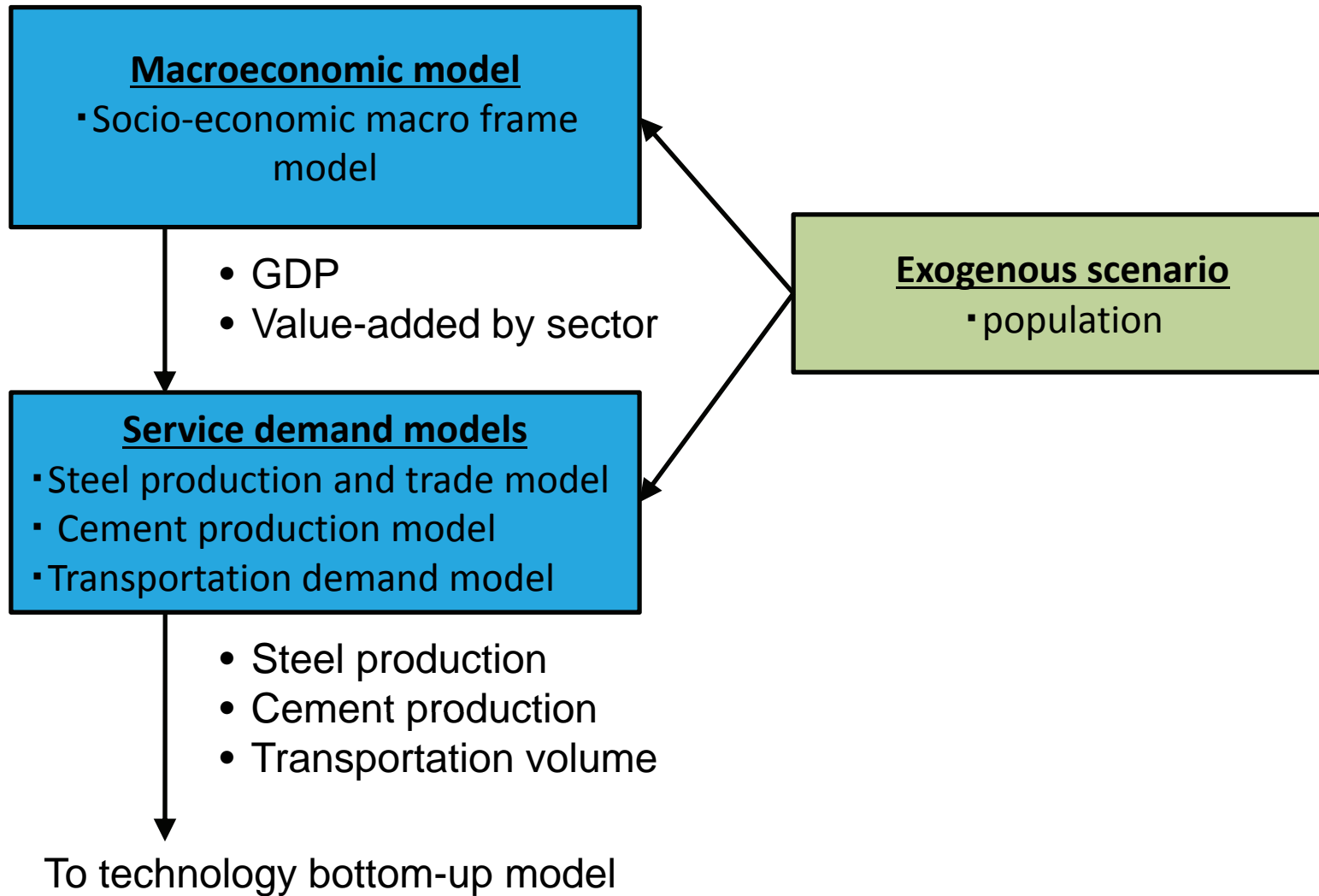
Osamu Akashi (NIES)

The 15th AIM International Workshop  
20-22, February 2010  
@NIES, Tsukuba, Japan

# Objective



# Methodology



# Socio-economic macro frame model

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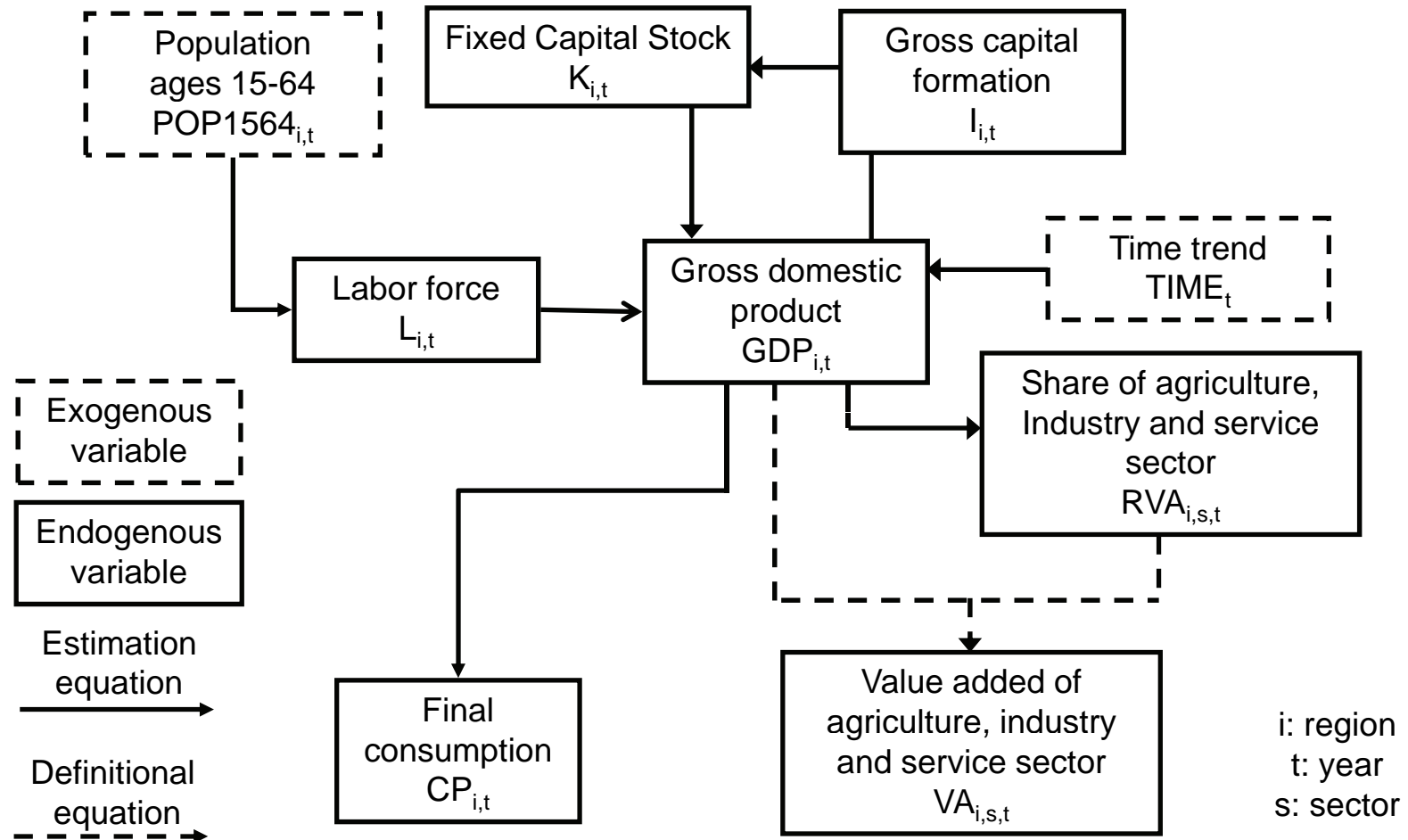
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# Socio-economic macro frame model

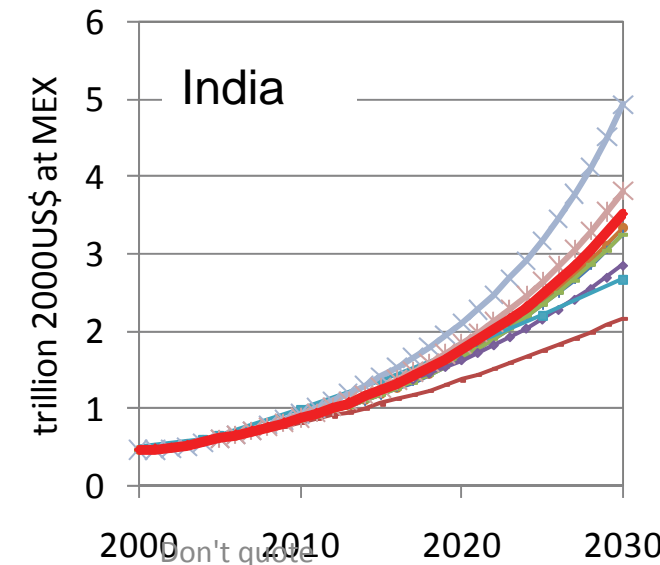
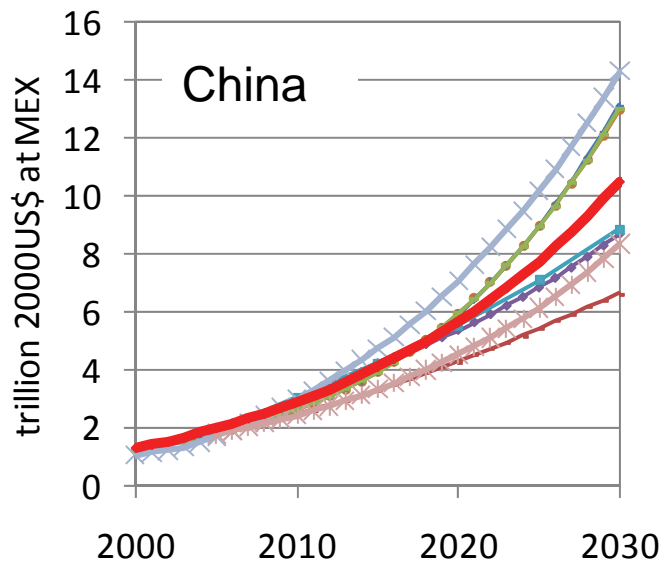
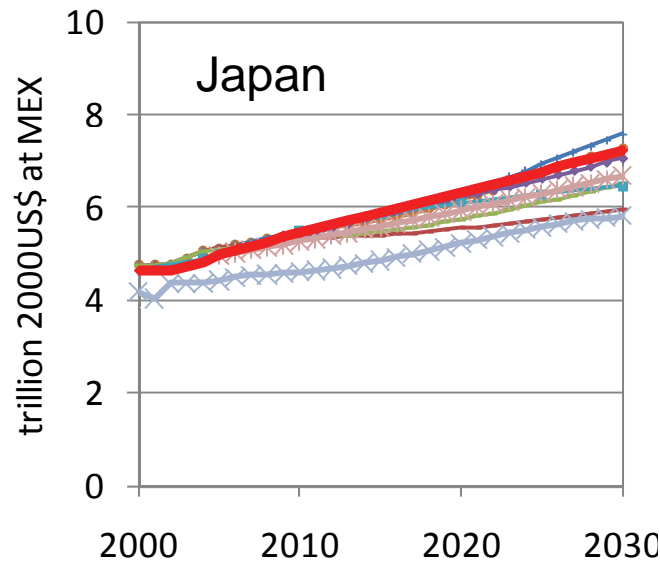
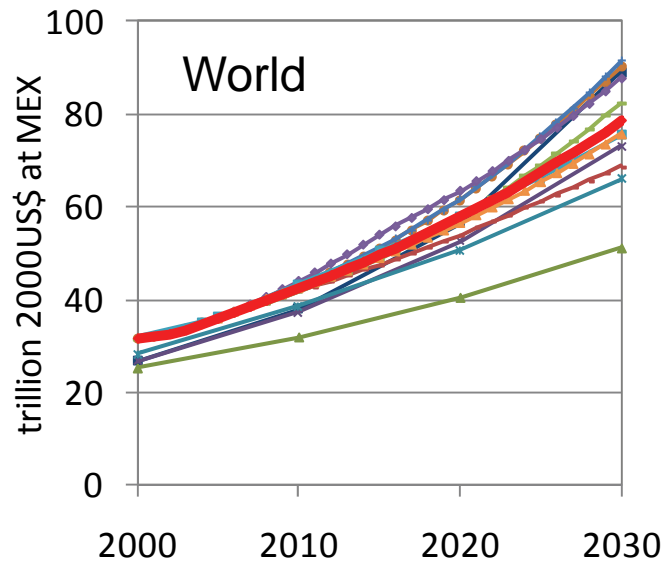
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- To estimate macroeconomic variables in each region
- **Supply-side macro economic model**, which estimates GDP from fixed capital stock and labor force
- Sector-wise value added are estimated based on the GDP
- Econometric approach
- Historical data (1971 – 2005) are used for calibration
- Inputs: **Population**
- Outputs: **GDP**, final consumption, gross capital formation, **sector-wise value added** in US\$ at constant 2000 price

# Model structure



# Estimated GDP



- This study
- SRES-A1 (IPCC,2000)
- SRES-A2 (IPCC,2000)
- SRES-B1 (IPCC,2000)
- SRES-B2 (IPCC,2000)
- GEO4-MK (UNEP,2007)
- GEO4-PL (UNEP,2007)
- GEO4-SC (UNEP,2007)
- GEO4-ST (UNEP,2007)
- WEO07 (IEA,2007)
- IEO08 (EIA,2008)
- GEP07 (WB,2007)
- GS (Wilson,2003)
- PWC (Hawksworth,2006)

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# Steel production and trade model

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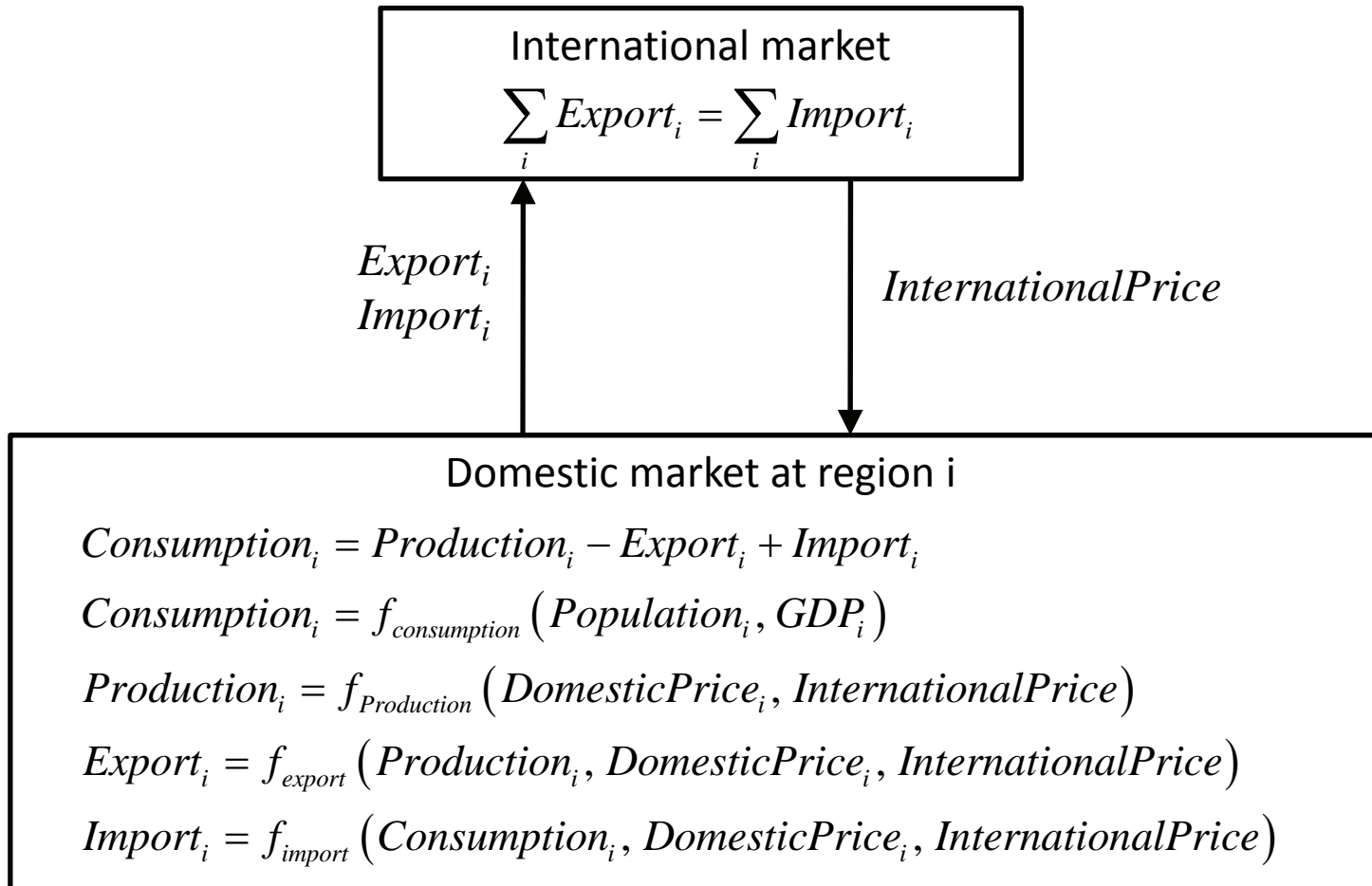


# Steel production and trade model

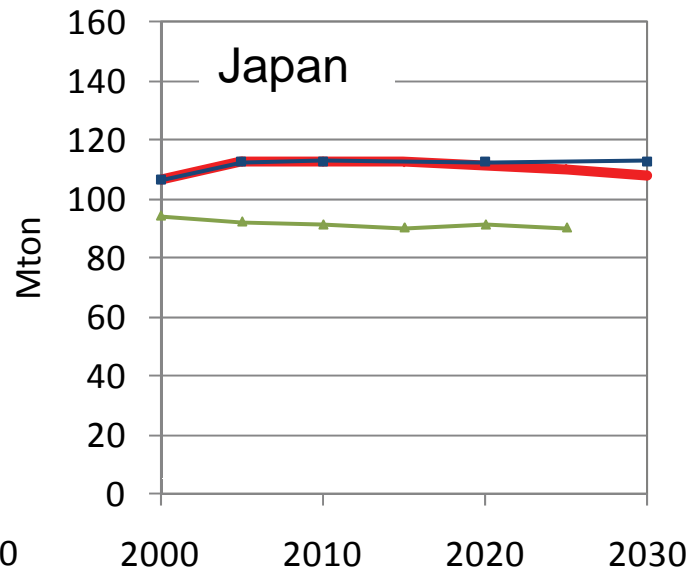
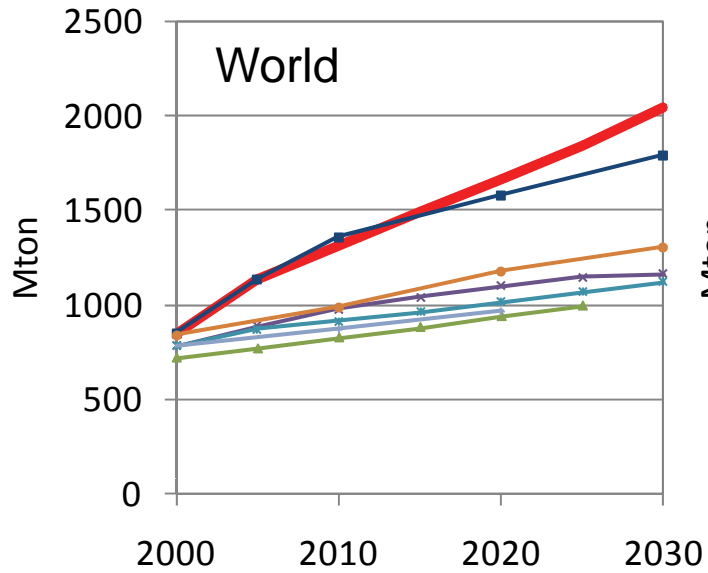
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- To estimate steel production in each region
- **Partial equilibrium model**, which considers demand and supply balance at domestic and international steel market
- **Econometric** approach
- Historical data (1971 – 2005) are used for calibration
- Inputs: **Population, GDP, Industrial value added**
- Outputs: **Production, Consumption, Export, Import**

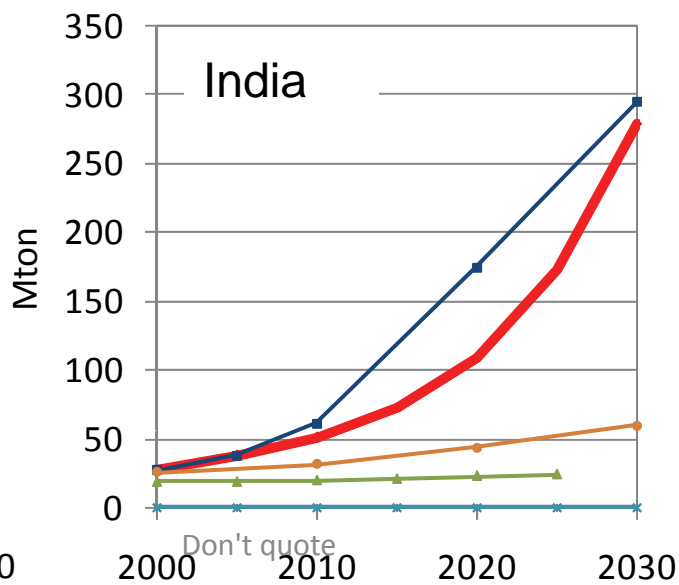
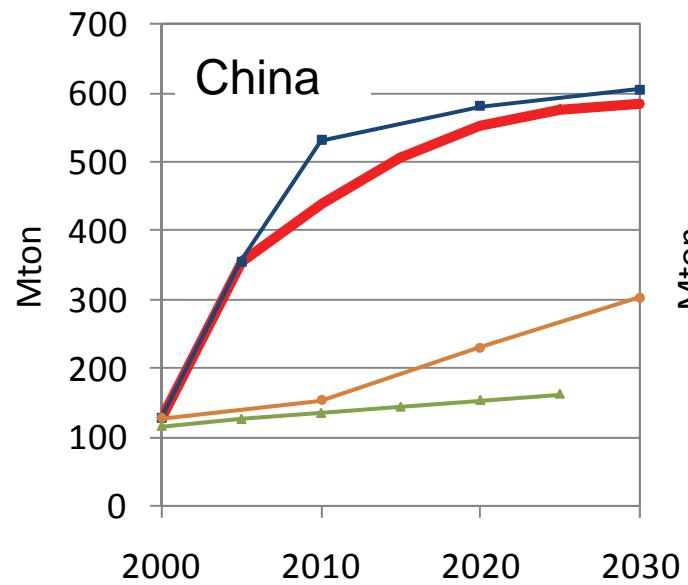
# Model structure



# Estimated steel production



- This study
- Oda (Oda,2007)
- ▲ SAGE (DOE,2003)
- × Price-A1 (Price,2006)
- \* Price-B2 (Price,2006)
- Hidalgo (Hidalgo,2003)
- + DeBeer(de Beer,2003)

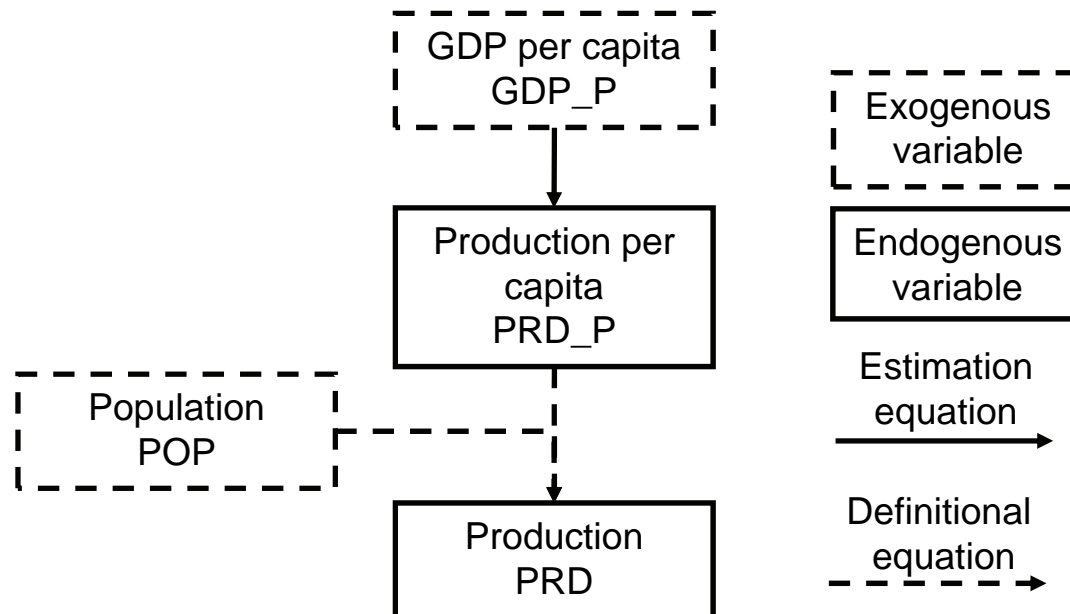


# Cement production model



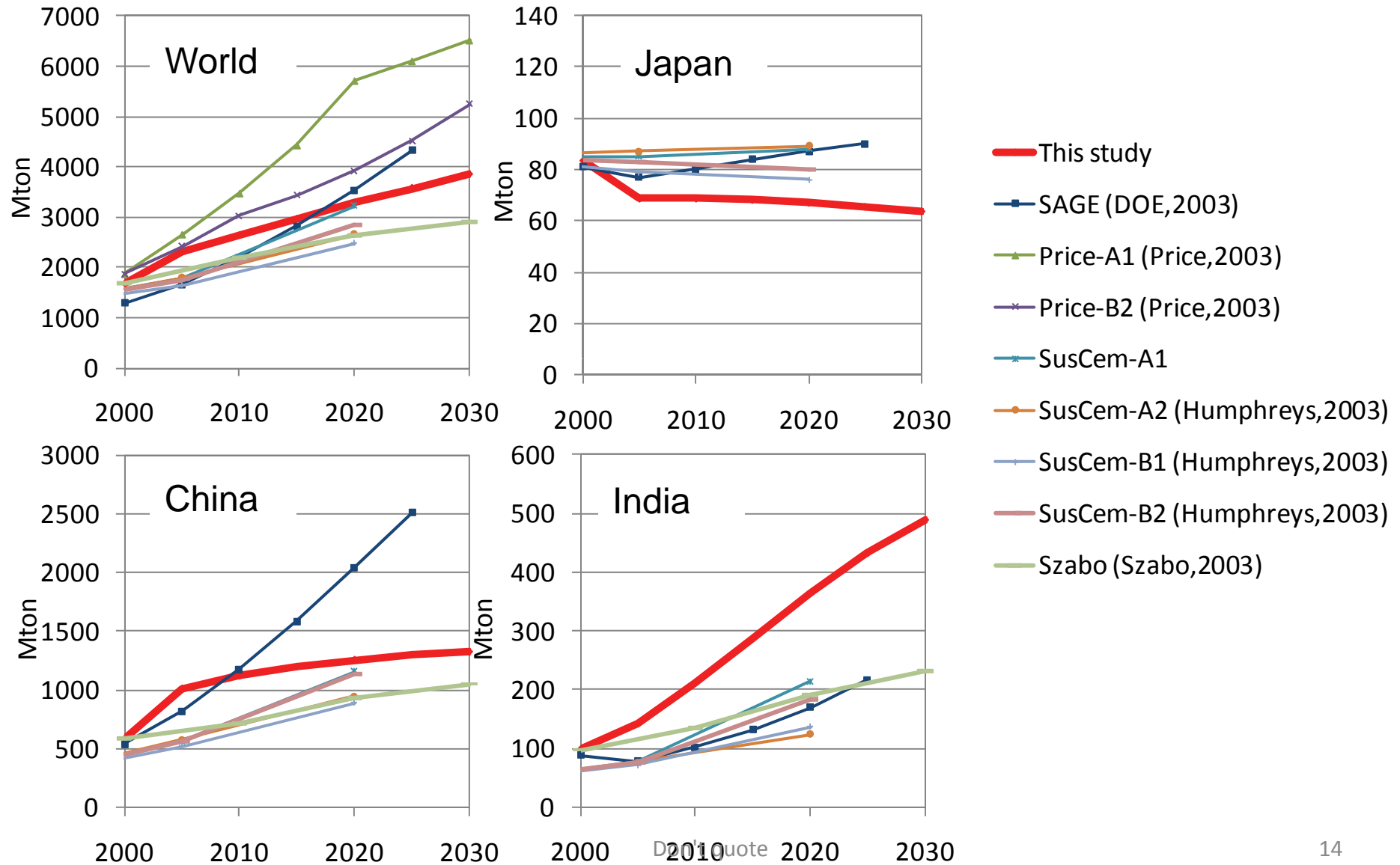
# Cement production model

- To estimate cement production in each region
- Statistical model
- Historical data (1971 – 2005) are used for calibration
- Inputs: Population, GDP
- Outputs: Production



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# Estimated cement production



# Transportation demand model



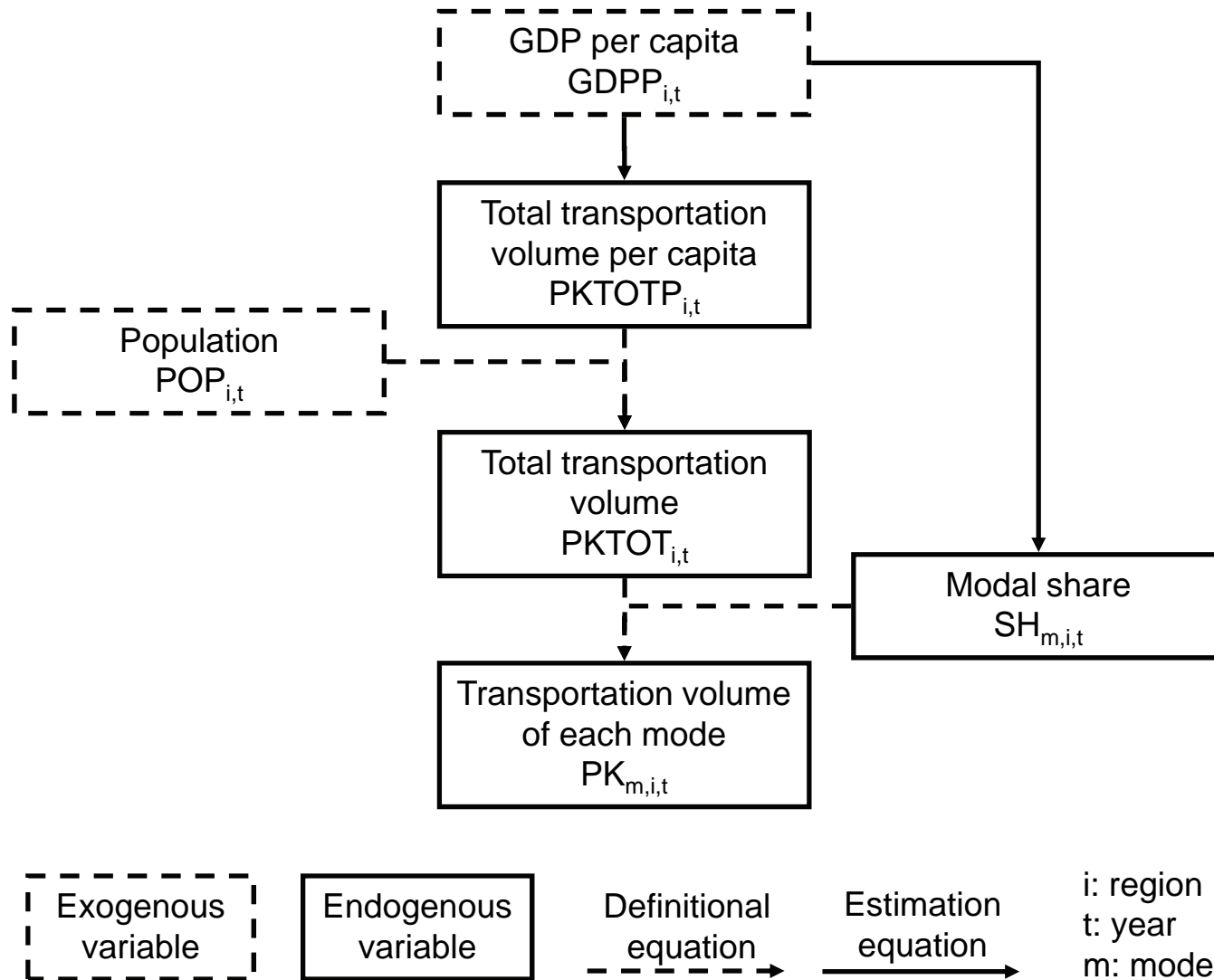
# Transportation demand model

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- To estimate both **passenger** and **freight** transportation volume
- Statistical model
- Inputs: **Population, GDP**
- Outputs:  
**Passenger transportation volume** by mode ( Car, Bus, Rail, Domestic air, International air) in passenger- km,  
**Freight transportation volume** by mode ( truck, rail, ship) in ton-km
- Historical data (1971 – 2005) are used for calibration

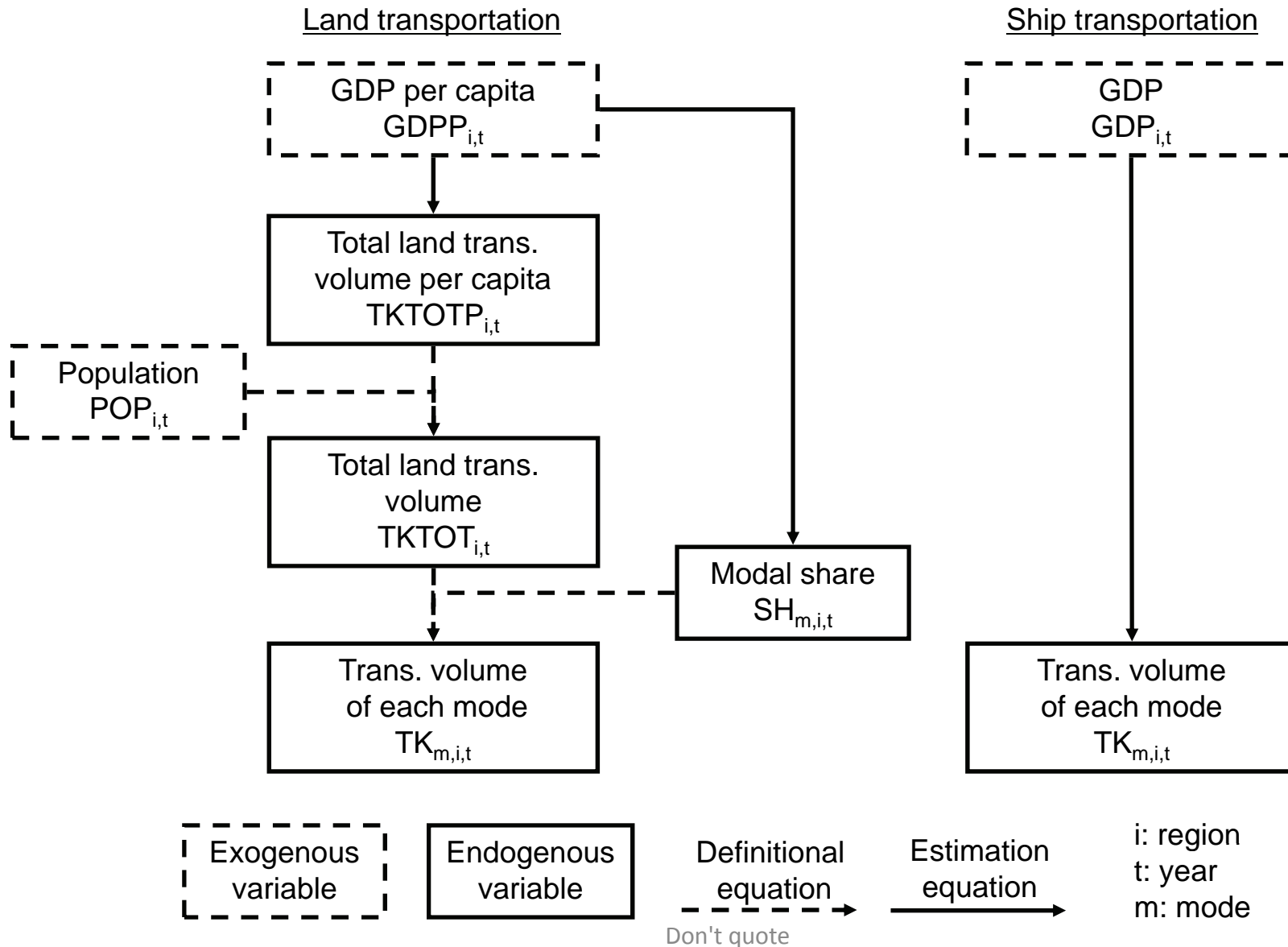


# Passenger transportation model

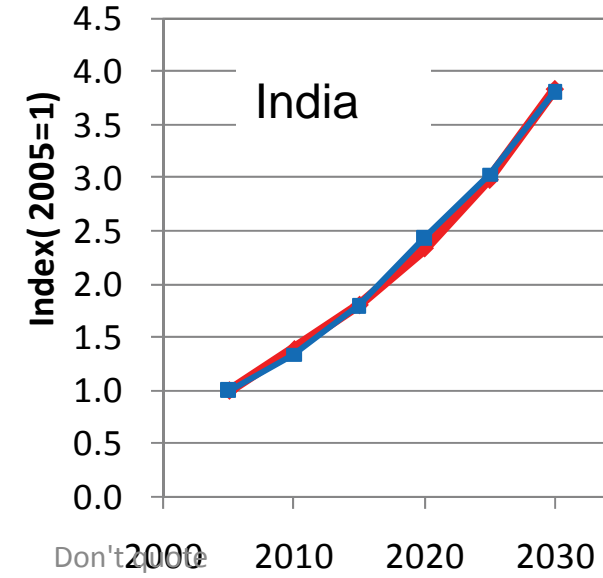
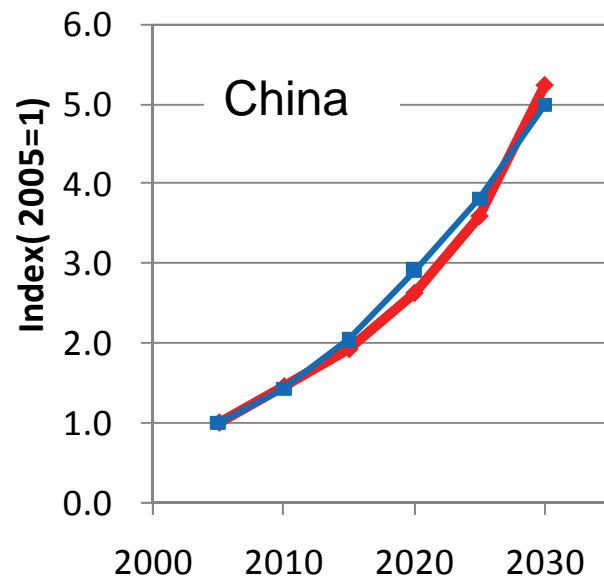
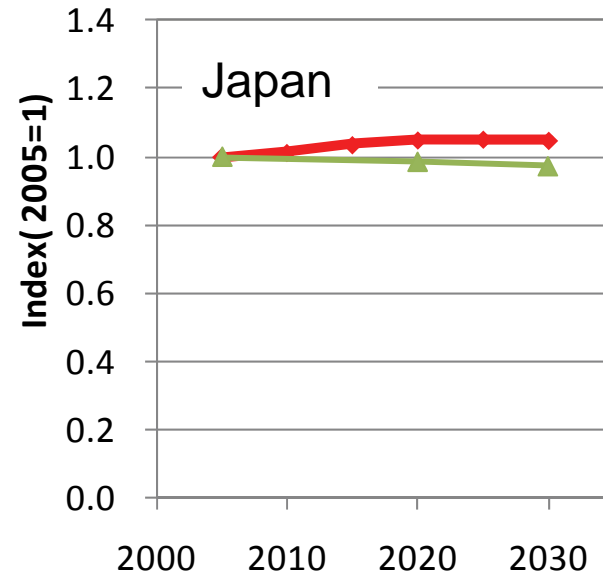
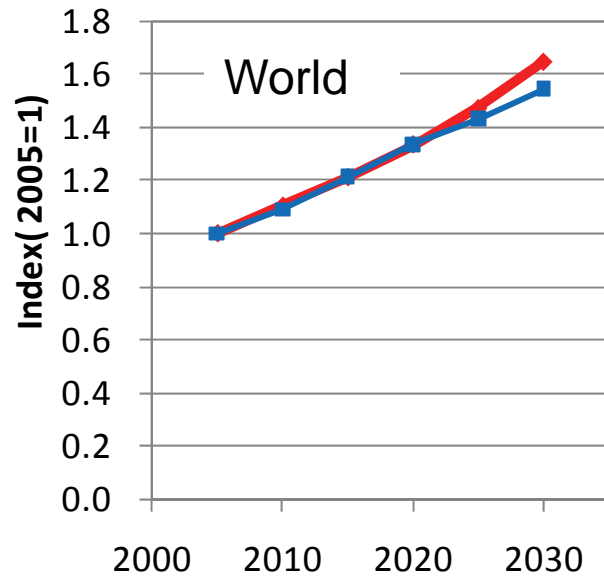


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# Freight transportation model

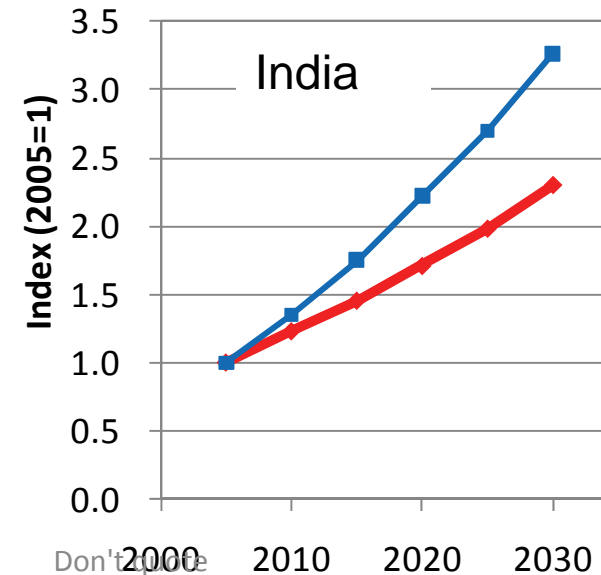
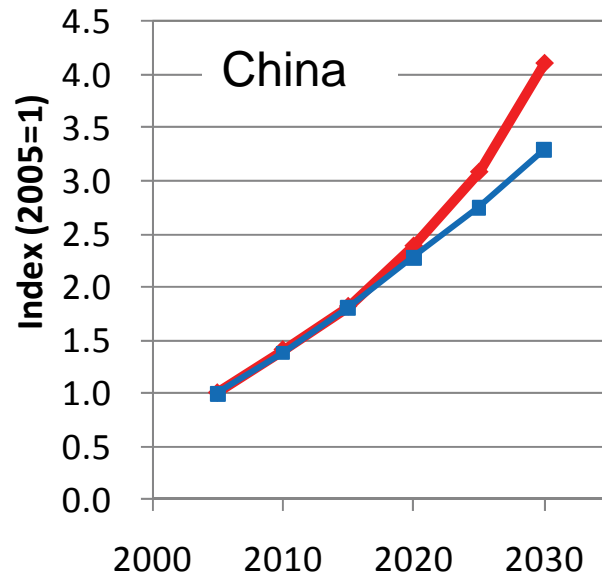
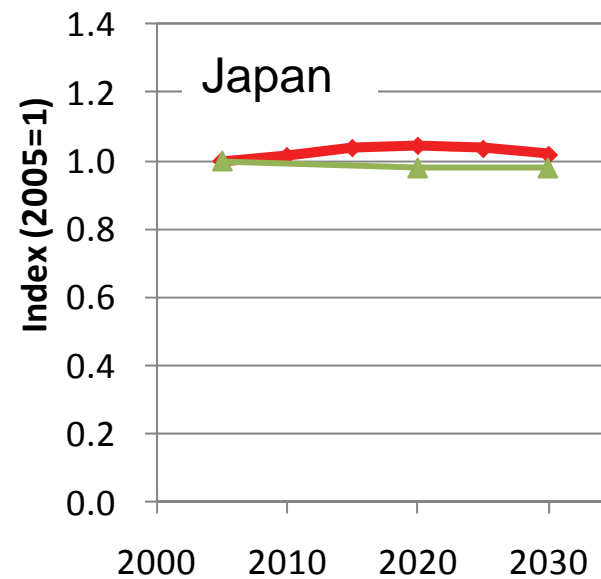
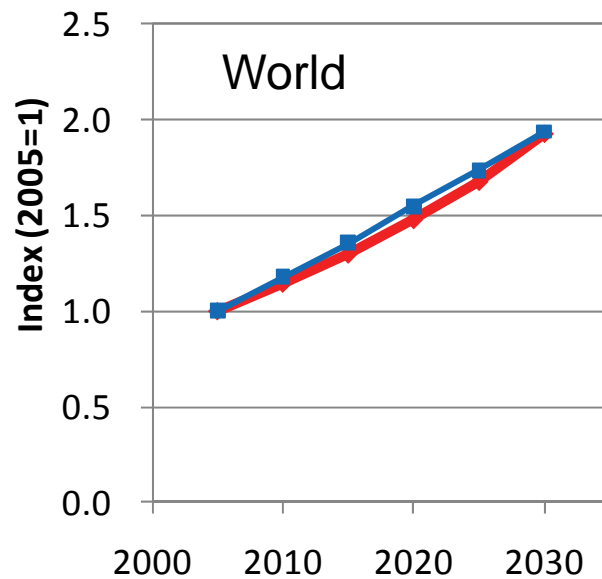


# Passenger transportation by car



- ◆ This study
- IEA (Fulton,2004)
- ▲ MLIT (MILT,2008)

# Freight transportation by truck



- ◆ This study
- IEA (Fulton,2004)
- ▲ MLIT (MILT,2008)

Don't quote

# Summary

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Annual change rate are estimated as follows

- GDP:  
World(3.2%), China(7.3%), India(7.0%), Japan(1.3%)
- Steel production:  
World(2.0%), China(2.0%), India(8.3%), Japan(-0.1%)
- Cement production:  
World(1.9%), China(0.7%), India(5.6%), Japan(-0.4%)
- Pass. transport by car:  
World(2.0%), China(6.8%), India(5.5%), Japan(0.2%)
- Freight transport by truck:  
World(2.7%), China(5.8%), India(3.4%), Japan(0.1%)