

Measuring a Port's Performance Using the Economic Value of Commodities

by

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Commodity value as a measure of performance

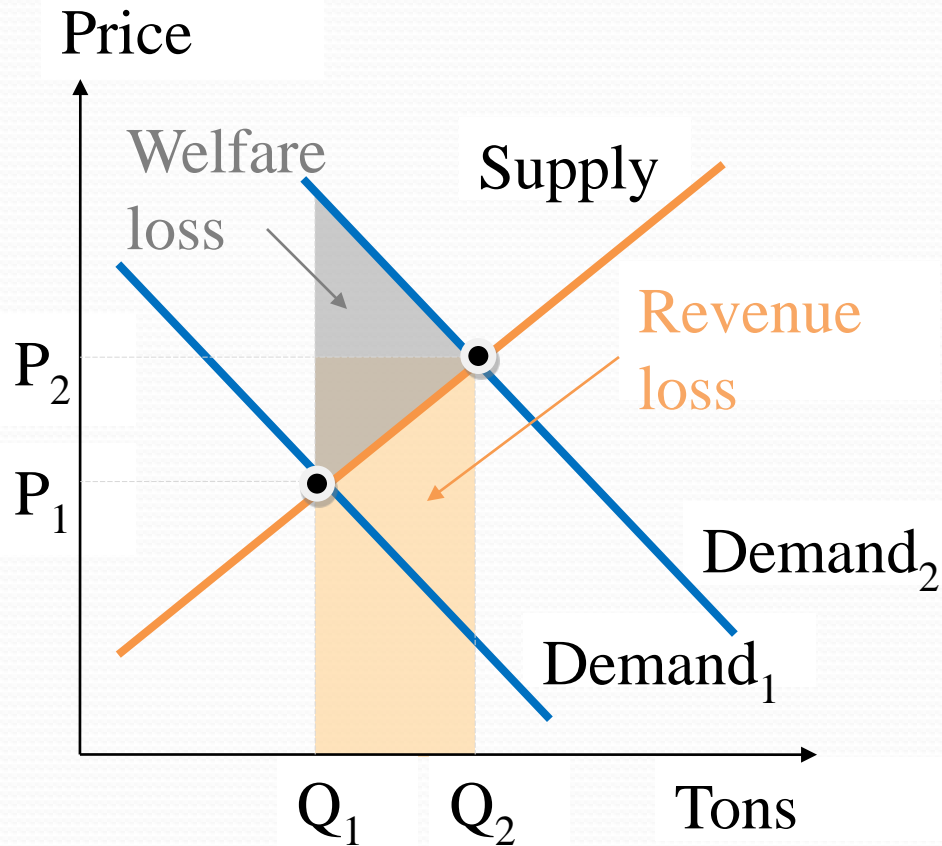
- Great Lakes – Martin and Associates (2001-2011)
- Ports Fact Sheet - U.S. Army Corps of Engineers (2008)
- Bureau of Transportation Statistics (2012)
 - Tracks the value of cargo at a national level
 - Comparative performance tables by *mode*
- Container ports
 - Port of Los-Angeles: #1 in cargo value (2007)
 - Port of Baltimore: #11 in cargo value (2011)

Port of Duluth-Superior: Case study

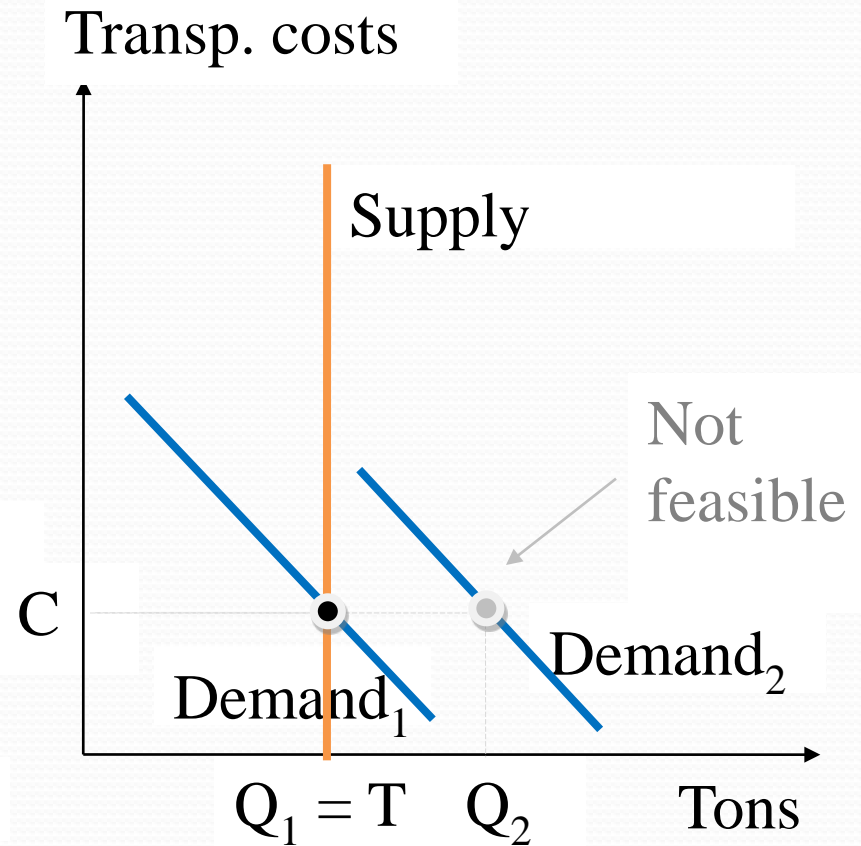


Cargo value and port performance

Panel A. Commodity Market



Panel B. Port's Services



Proposed port performance measures

1. Total real value of a port's cargo

$$TRV_t = \sum_{i=1}^N P_{it} Q_{it} \div \left(\frac{PPI_{it}}{100} \right)$$

2. Average real value per ton moved

$$ARV_t = \frac{TRV_t}{\sum_{i=1}^N Q_{it}}$$

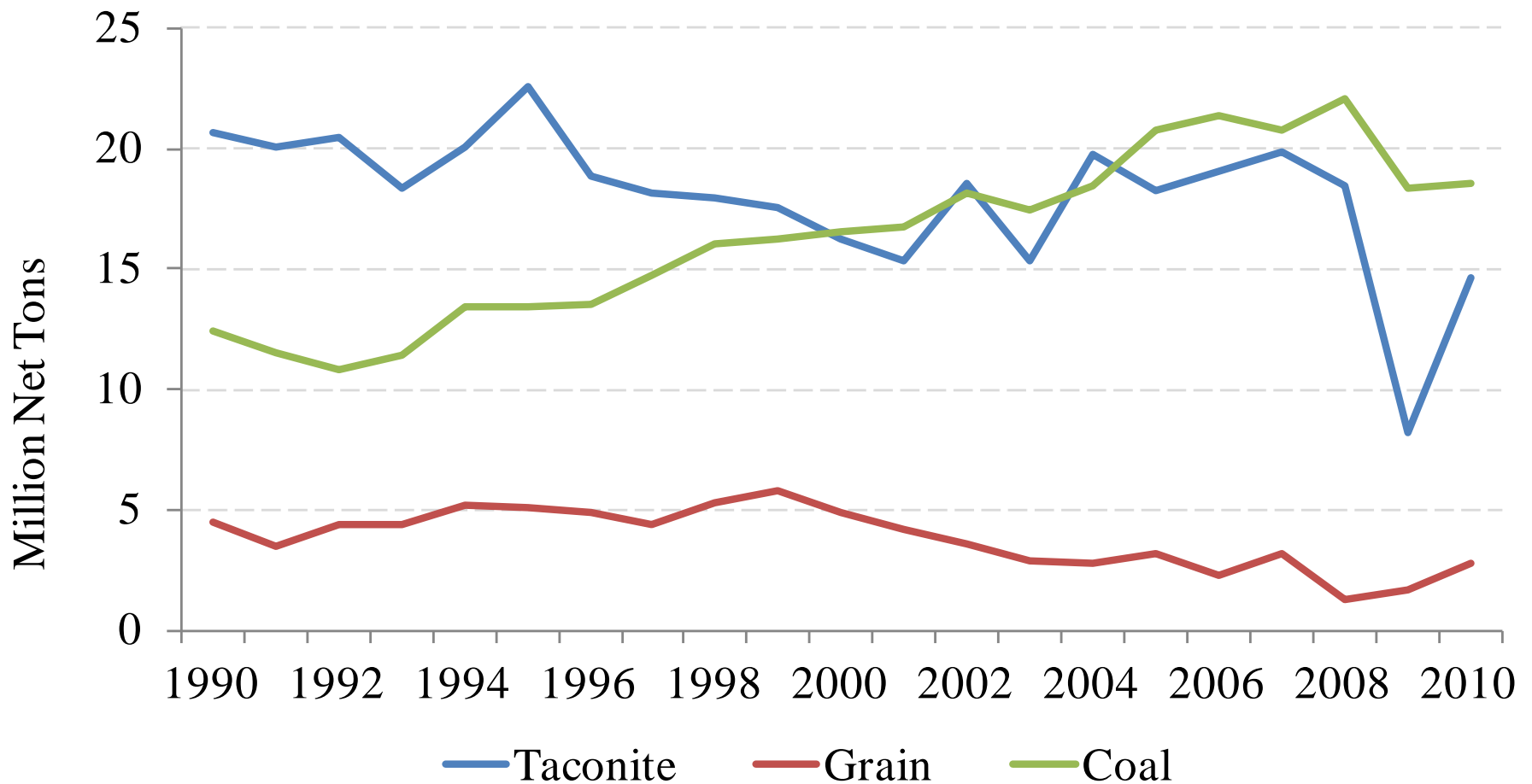
3. Real value index of a port

$$RVI_t = \frac{TRV_t}{TRV_{base}} \times 100$$

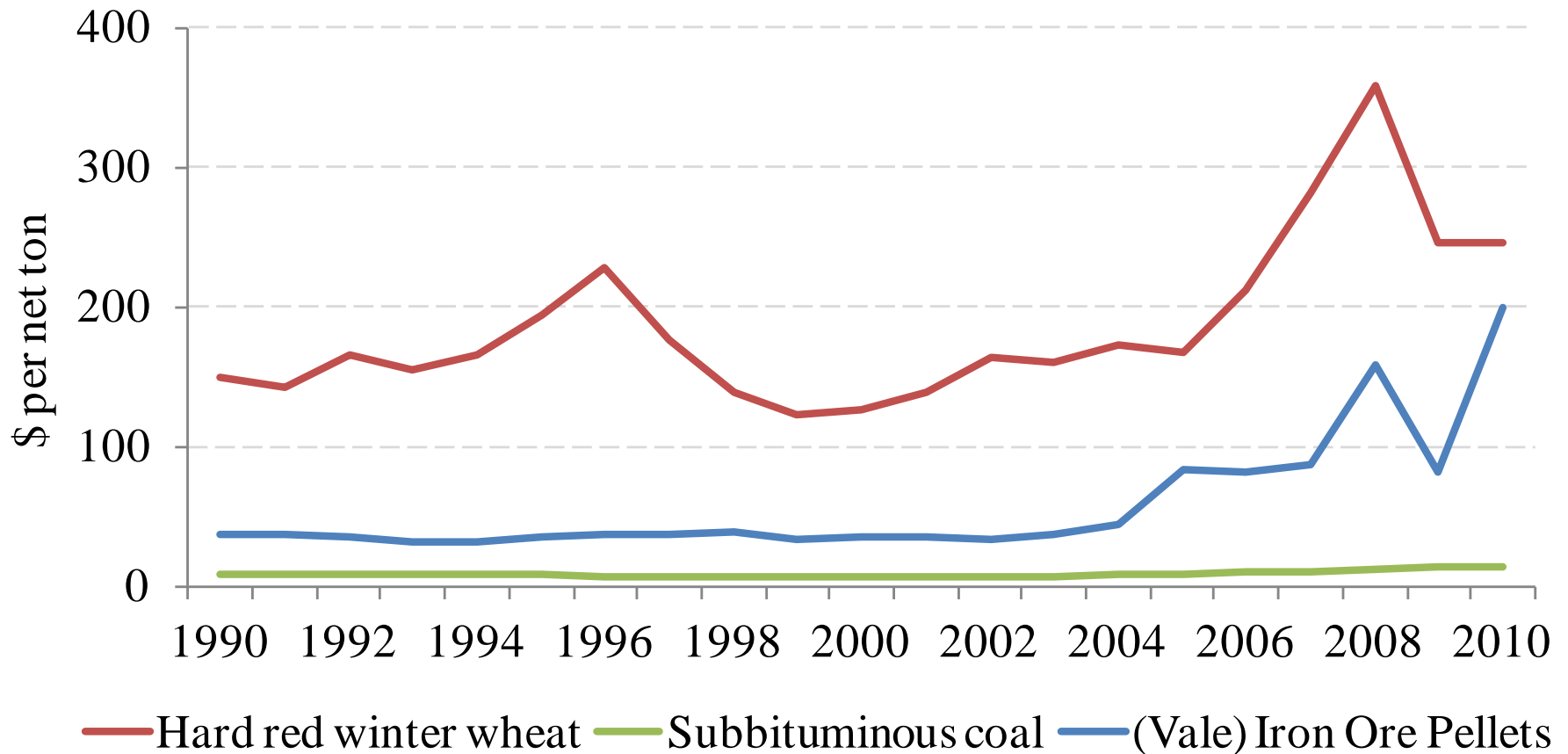
Data sources

Data	Source
Cargo tonnage	U.S. Army Corps of Engineers
Wheat prices	World Bank
Coal prices	U.S. Energy Information Administration
Taconite prices	MN DNR/World Steel Dynamics
Producer price indices	Bureau of Labor Statistics

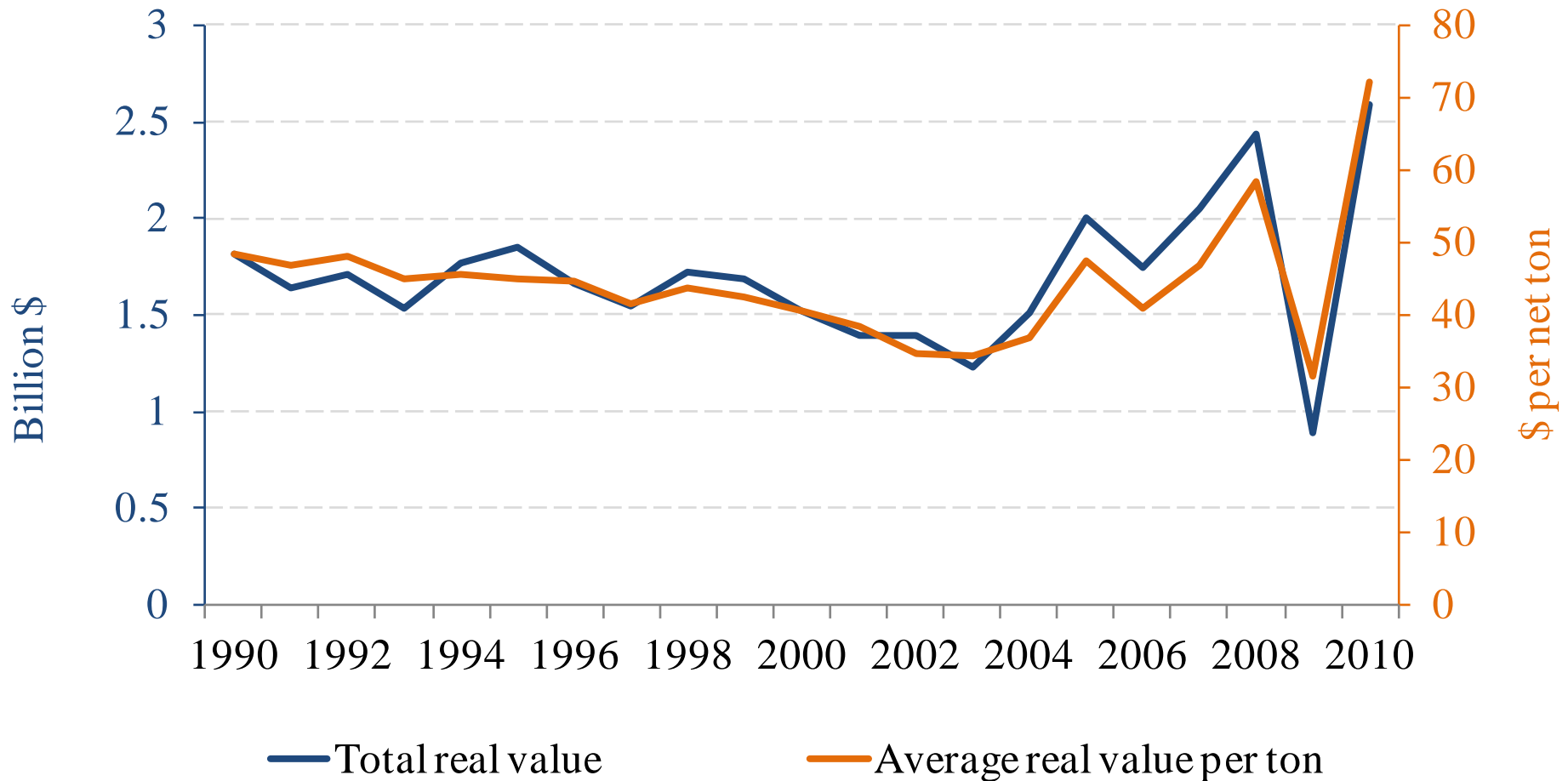
Port of Duluth-Superior commodities tonnage (1990-2010)



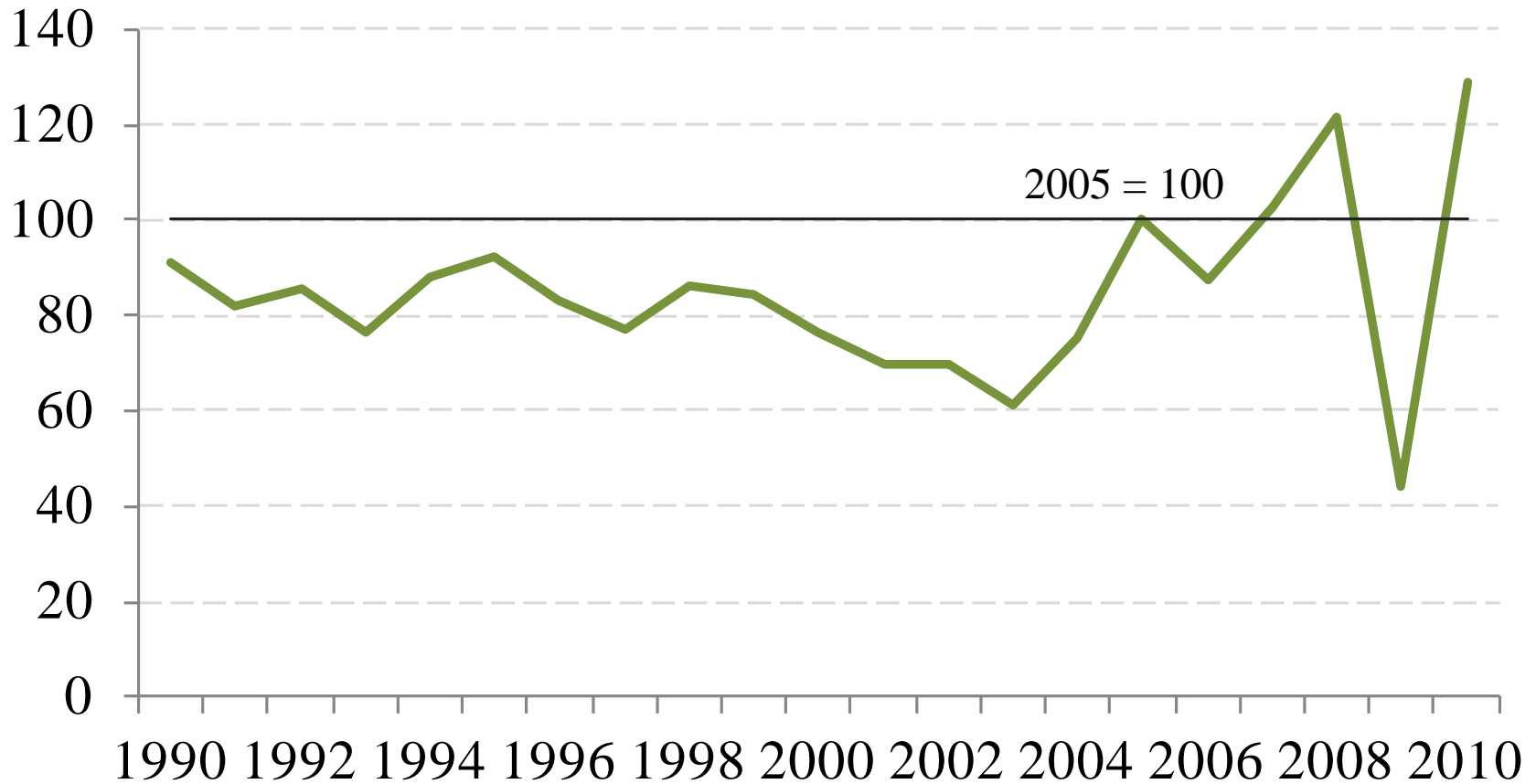
Commodities nominal market prices (1990-2010)



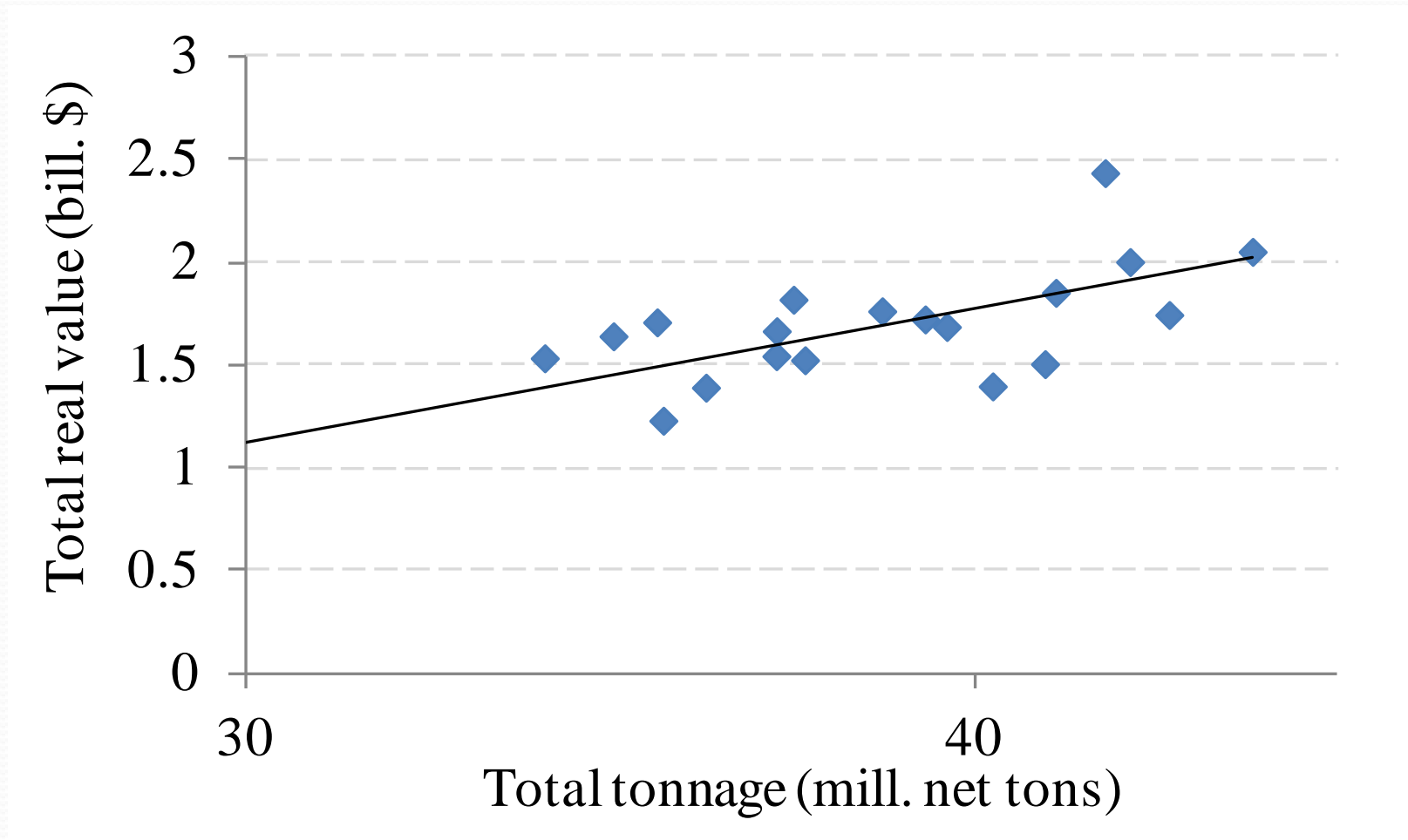
Port of Duluth-Superior total real value and average real value per net ton (1990-2010)



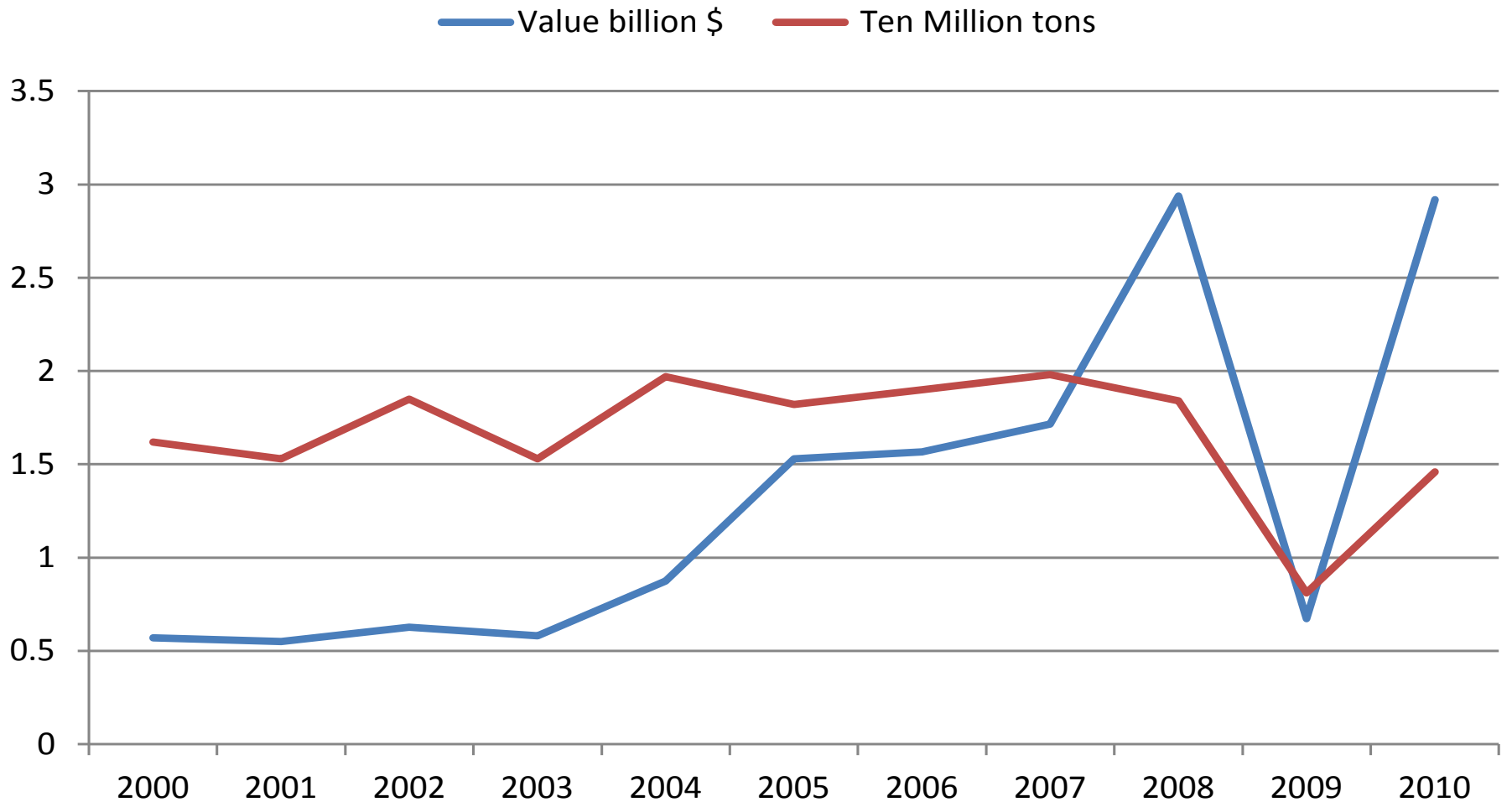
Port of Duluth-Superior real value index (1990-2010)



Real value of cargo and demand for port's services

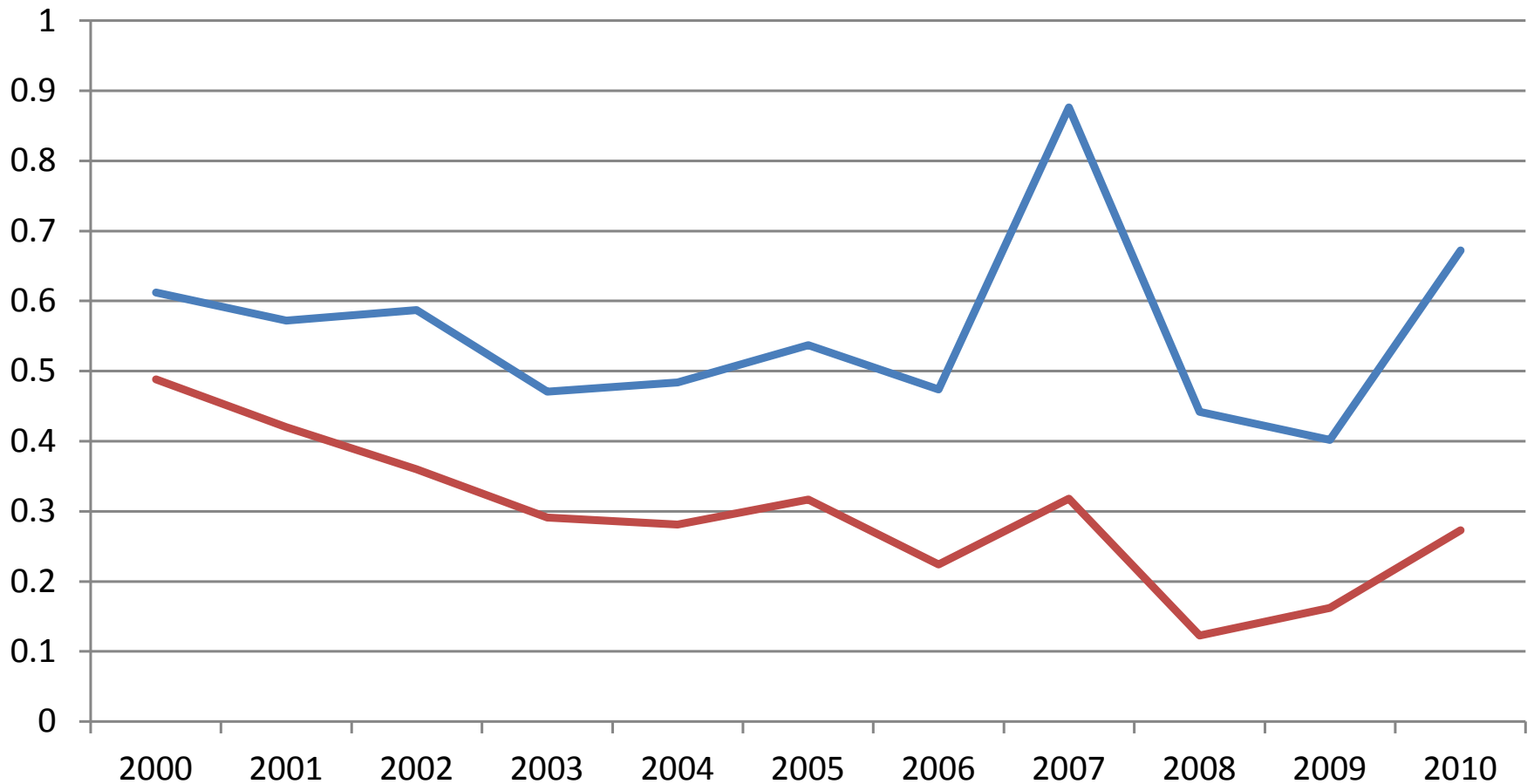


Taconite: Tons shipped and nominal market value (2000-2010)



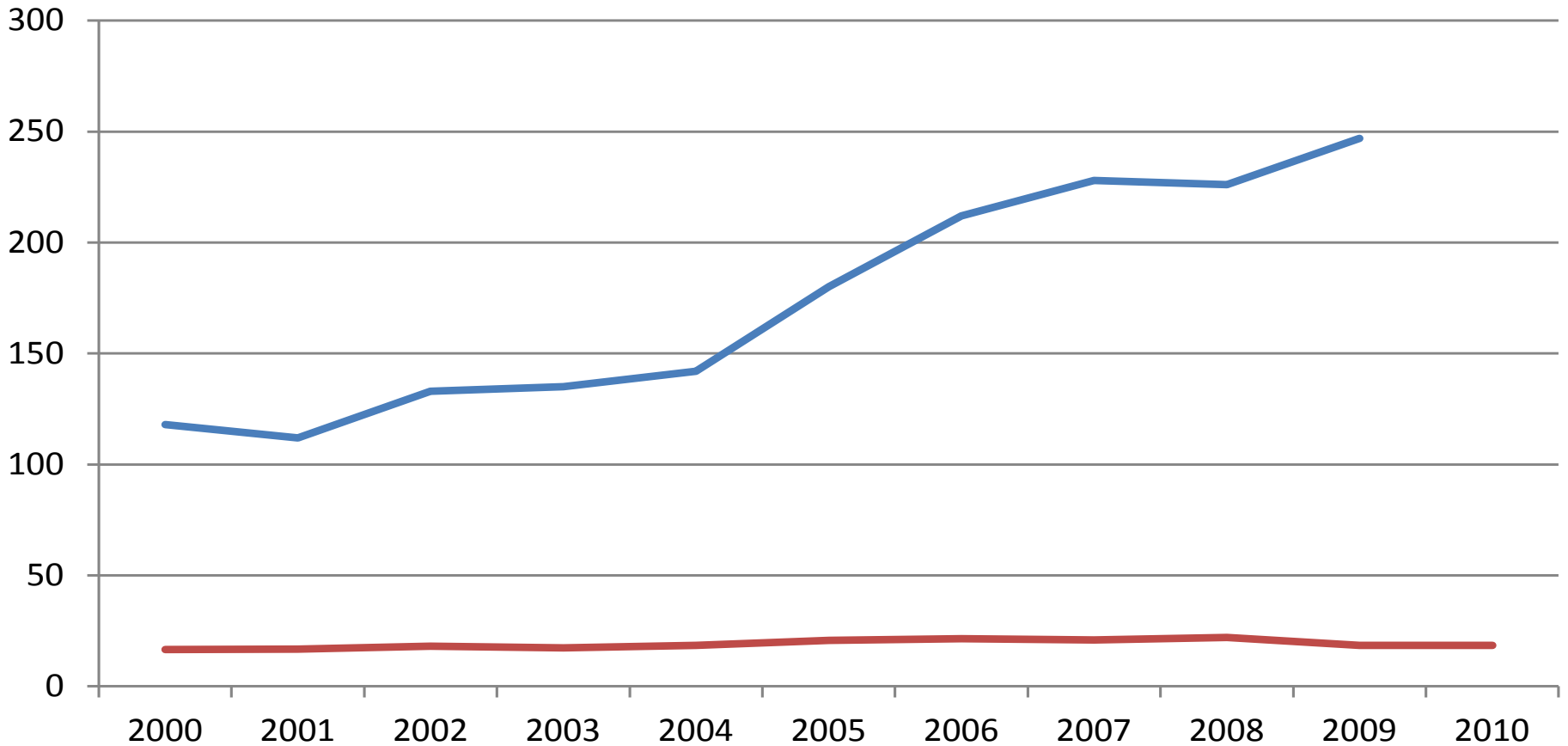
Grain: Tons shipped and nominal market value (2000-2010)

Value billion \$ Ten Million tons

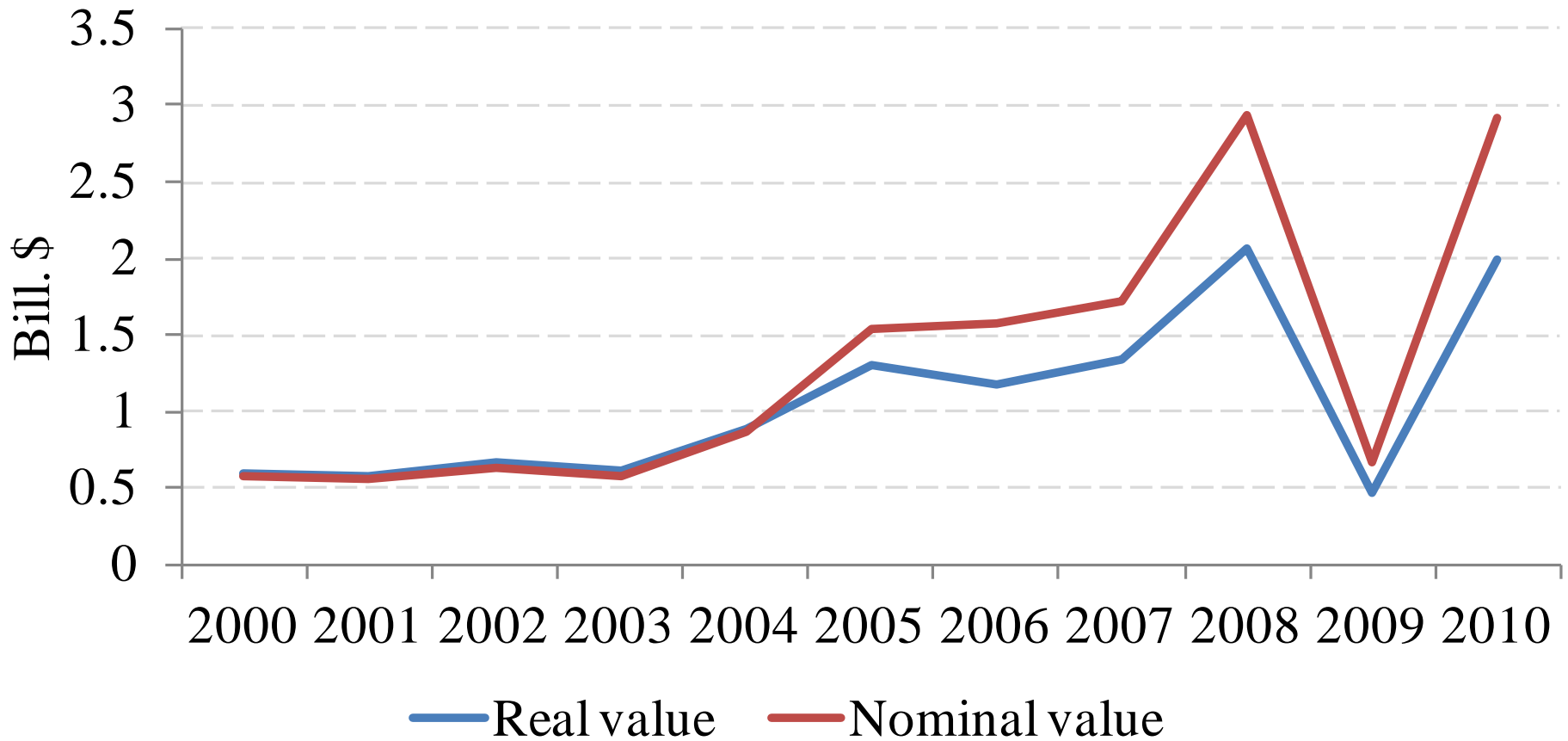


Coal: Tons shipped and nominal market value (2000-2010)

— Value hundred million \$ — Ten Million tons



Taconite: Real vs nominal value (2000-2010)



Conclusions

- Ports do not uniformly track the value of bulk cargo
- Public resource allocation should depend on internal and external to port performance measures
 - In addition to tonnage, all ports should track the *real* value of their cargo
- Port's cargo should be classified
 - E.g., 2-digit SITC commodity classification code

Further research

Other potential port performance metrics linked to cargo value:

- Value of service pricing for freight rates and port charges
- Price elasticity for freight rates
- Modal competition
- Product value and international demand
- Profit potential
- Tax revenue for HMT and state tax revenues
- Port economic multipliers