

The Effect of Energy Prices on Operation and Investment in OECD Countries: Evidence from the Vintage Capital Model

**Jevgenijs Steinbuks, Andreia Meshreky, and Karsten Neuhoff
Faculty of Economics and EPRG
Cambridge University**

2009 Supergen FlexNet General Assembly, Manchester
May 21, 2009

Thinking Networks



1. Background of a Research Question

- The Effect of Energy Prices on Energy Efficiency
 - Input Substitution
 - Change in the Industrial Structure (?)
 - Energy Efficiency of Capital Stock
 - Technological Change
 - Operational Response
 - Investment Response

2. Contribution of this Study

- Explicit Representation of Capital Stock
- Comprehensive Representation:
 - Panel
 - Sector-level resolution
 - Inertia of Capital Stock
- Better match of data
- Stronger response of energy demand / efficiency of capital stock to energy prices
- Policy implications:
 - Confirms that (i) operation/consumption and (ii) investment affected

3. Theoretical Model

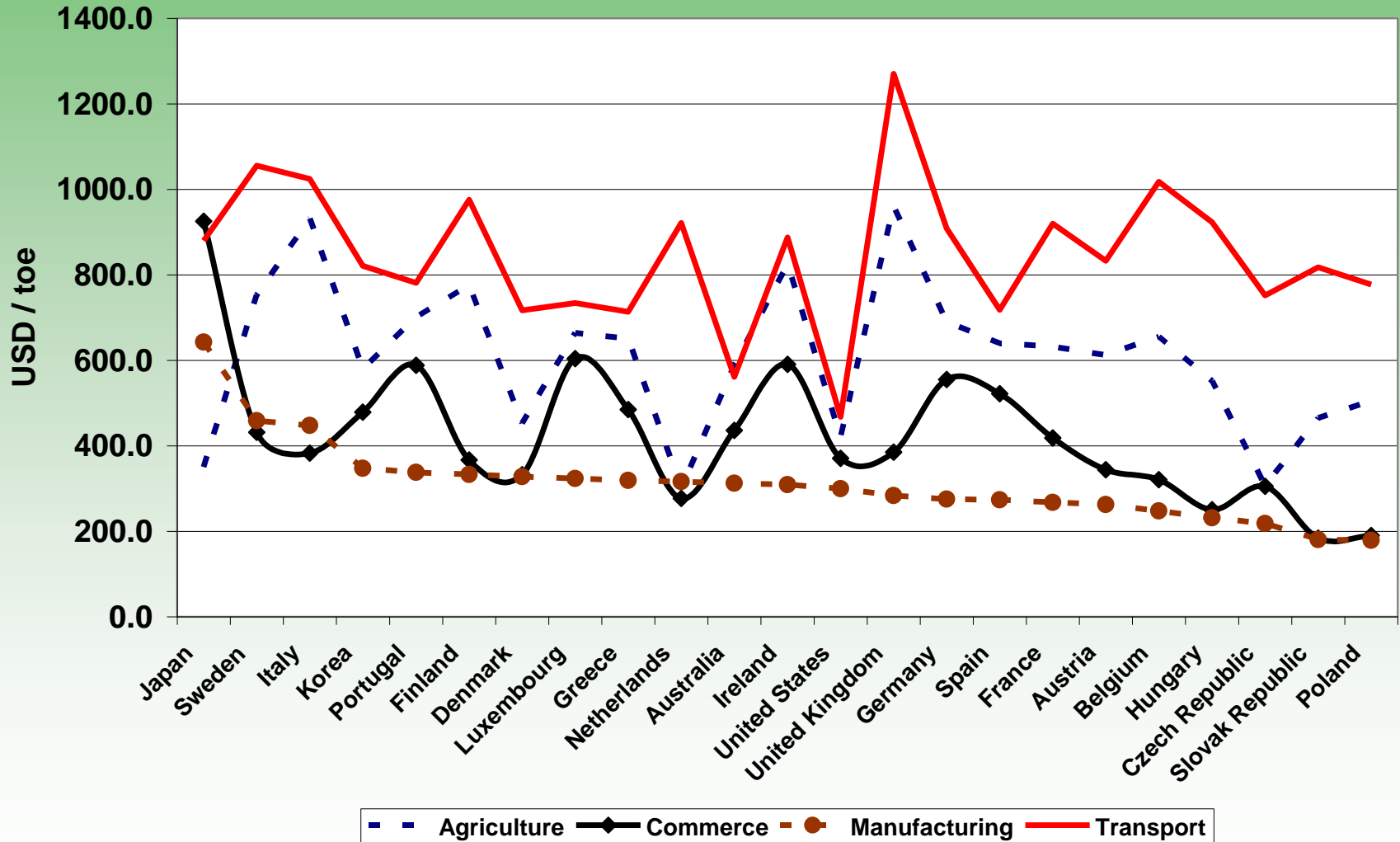
- Representative (rational cost-minimizing) firm
- Perfectly competitive factor markets (price-taker)
- Flexible labor, energy, and materials inputs
- “Putty-Clay” capital stock, vintage representation
- Firm chooses
 - optimal input prices
 - optimal efficiency of each capital vintage

4. Empirical Model

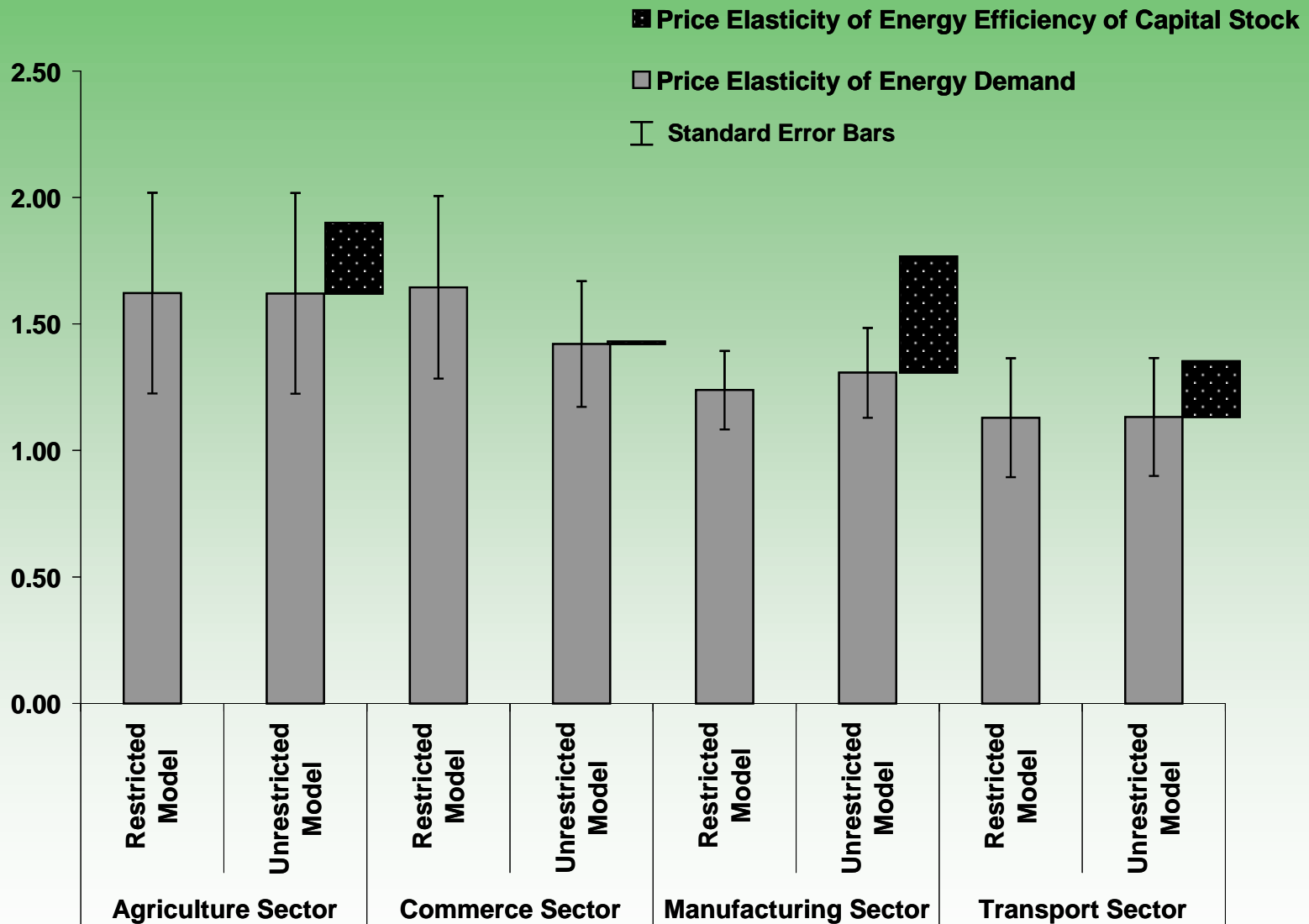
- “Translog” Approach
- Dependent Variables
 - Share of each input (KLEM) in total expenditure
- Explanatory Variables
 - Output
 - Input Prices
 - Exogenous Technological Process (time trend)
 - Index of Capital Stock Efficiency (investment, prices) [New!]
- Two-step Partially Simulated Estimation
 - “Guess” price elasticities of capital stock intensities
 - “Verify” by choosing maximum value of estimated likelihood function

5. Data

Average Nominal Energy Prices across Sectors / Countries, 2000

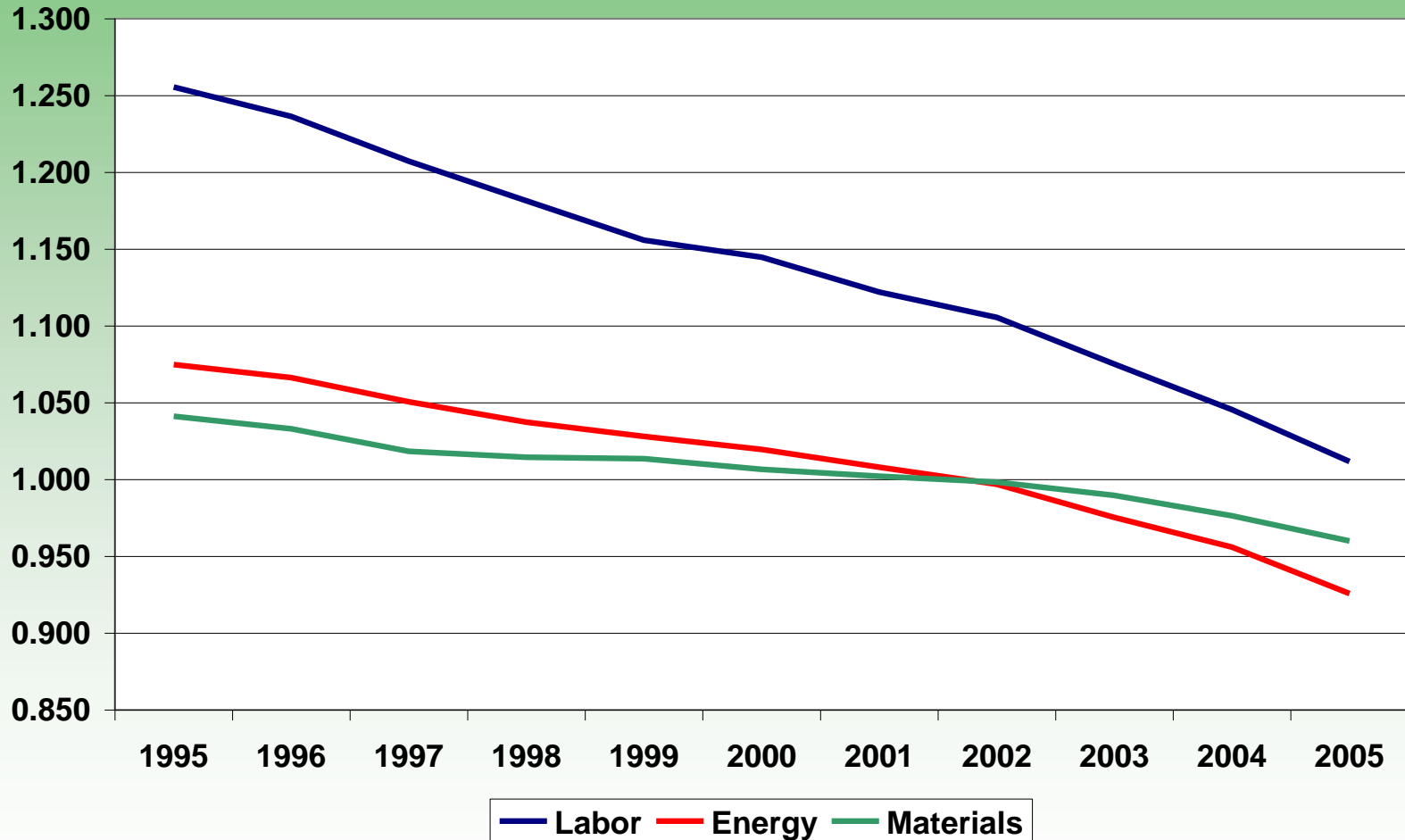


6.Results



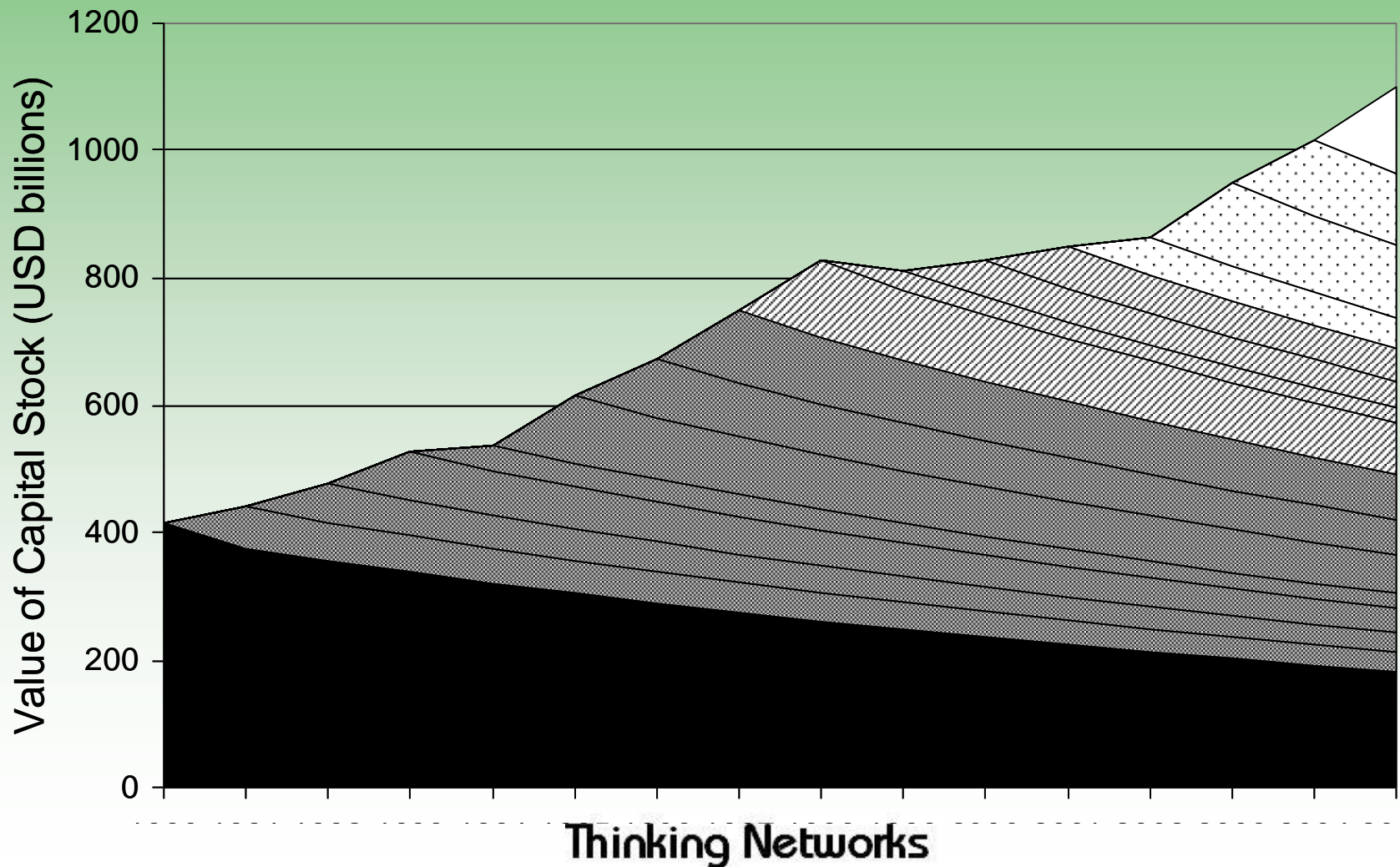
6.Results (Continued)

Indices of Capital Stock Efficiency (Manufacturing)



6.Results (Continued)

Energy Efficiency Improvements by Capital Vintages (Manufacturing)



6.Results (Continued)

