



The Effect of Energy Prices on Operation and Investment in OECD Countries

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1. Background of a Research Question

- Four channels through which prices influence operation / investment:
 - input substitution (Berndt & Wood 1975, Griffin & Gregory 1976)
 - technological change (Popp 2002, Adeyemi & Hunt 2007, Linn 2008)
 - change in the mix of industries (Metcalf 2008, Sue Wing 2008)
 - change in the energy intensity of capital stock (Atkeson & Kehoe 1999, Diaz *at al* 2004)

2. Contribution of this Study

- Endogenous response of intensity of capital stock
- Comprehensive representation:
 - Panel
 - Sectoral resolution
 - Inertia of capital stock
- Better match of data
- Stronger response of energy demand / intensity of capital stock to prices
- Policy implications:
 - Confirms that (i) operation/consumption and (ii) investment affected

3. Theoretical Model

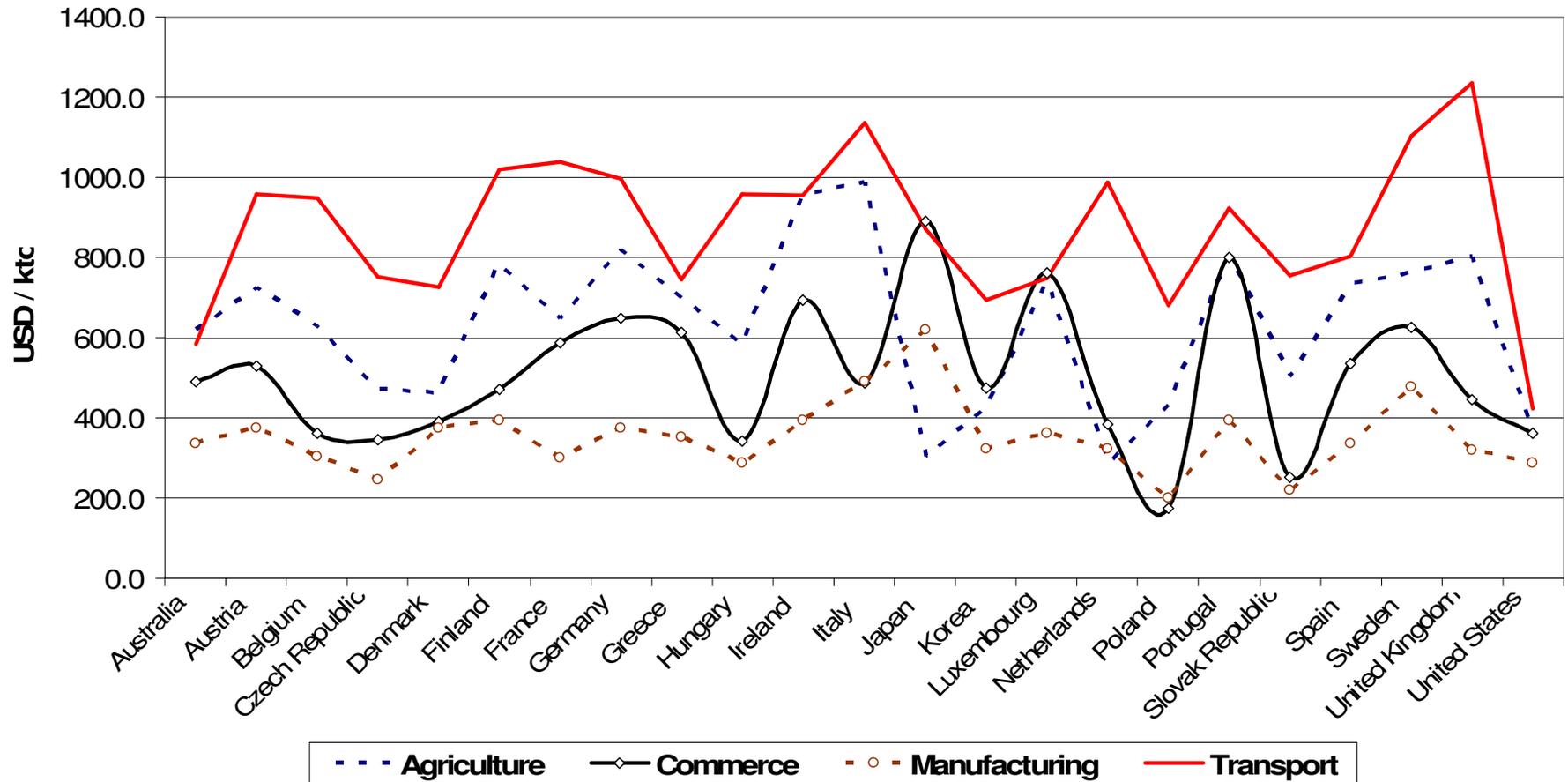
- Representative (rational cost-minimizing) firm
- Perfectly competitive factor markets (price-taker)
- Flexible labor, energy materials inputs
- “Putty-Clay” capital stock
- Firm chooses
 - optimal input prices
 - optimal factor intensity of each capital vintage

4. Stochastic Specification

- **Dependent Variables**
 - Share of each input in total expenditure function
- **Explanatory Variables**
 - Output
 - Efficiency Input Prices (non-linear)
 - Exogenous technological process (time trend)
 - Energy Intensities of Capital Stock
- **Two-step Partially Simulated Estimation**
 - “Guess” price elasticities of capital stock intensities
 - “Verify” by choosing maximum value of estimated likelihood function

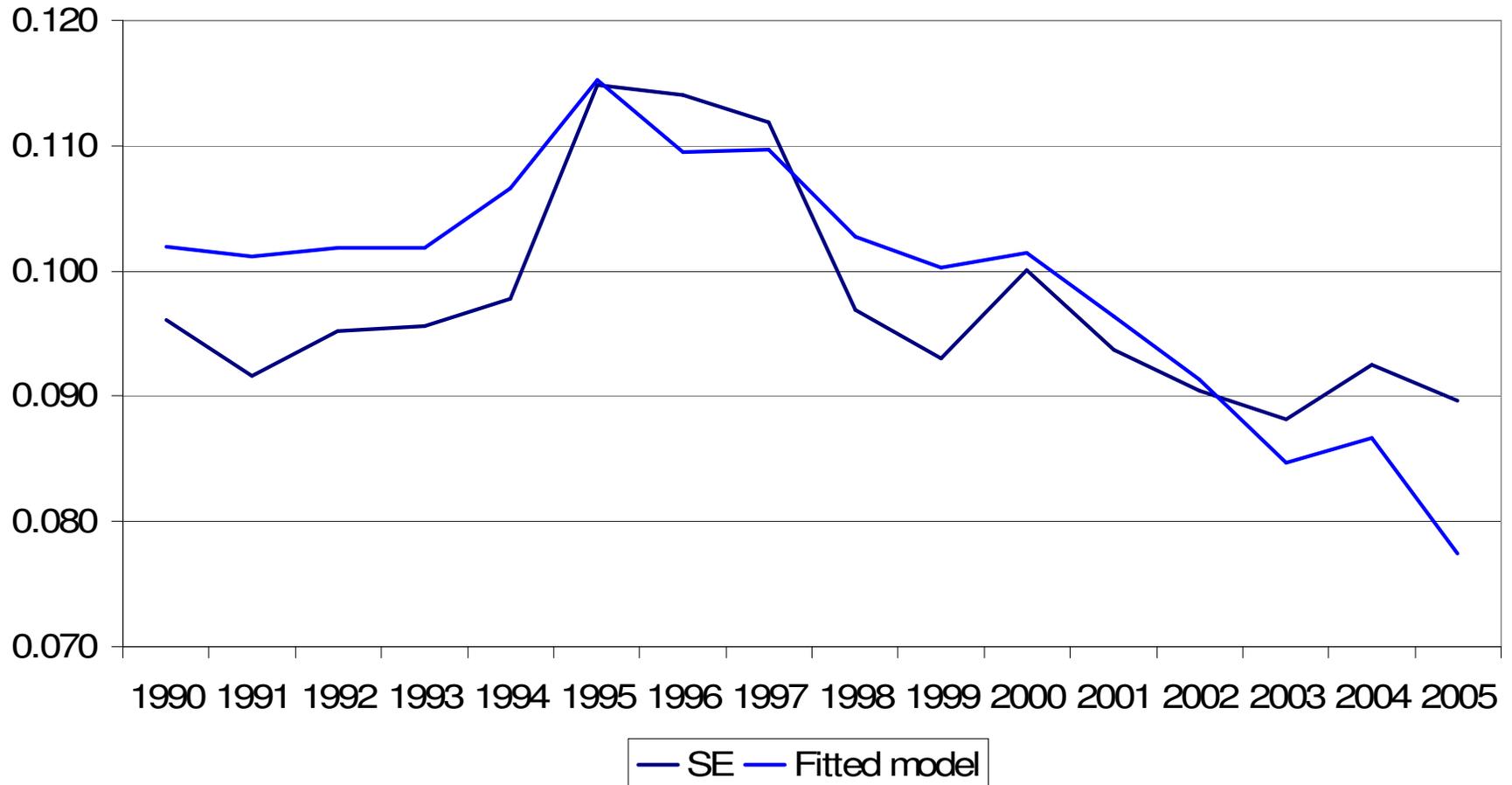
5. Data

Energy Prices across Sectors and Countries

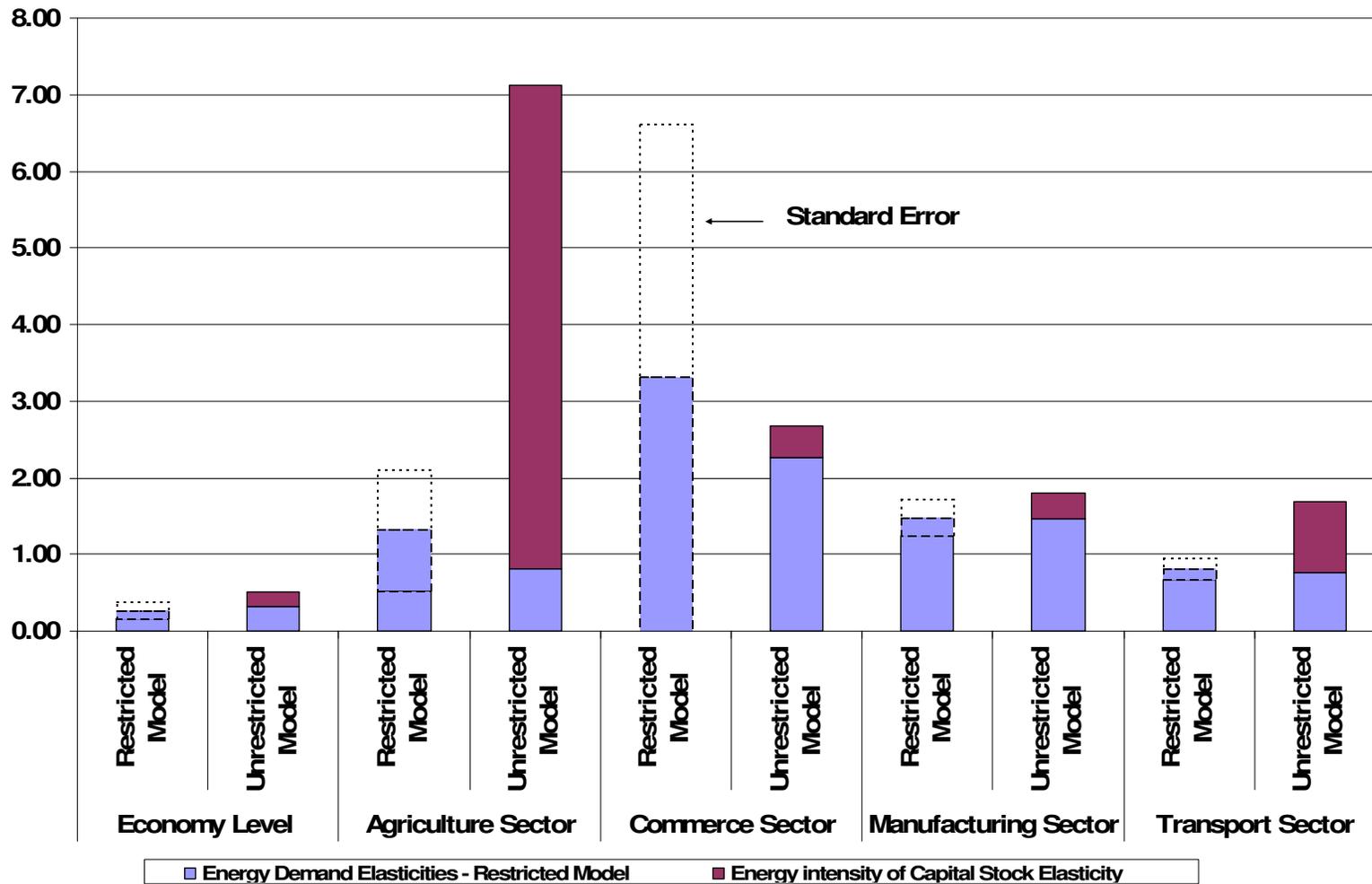


6.Results

Actual vs. Fitted Values of Energy Share (Manufacturing Sector)

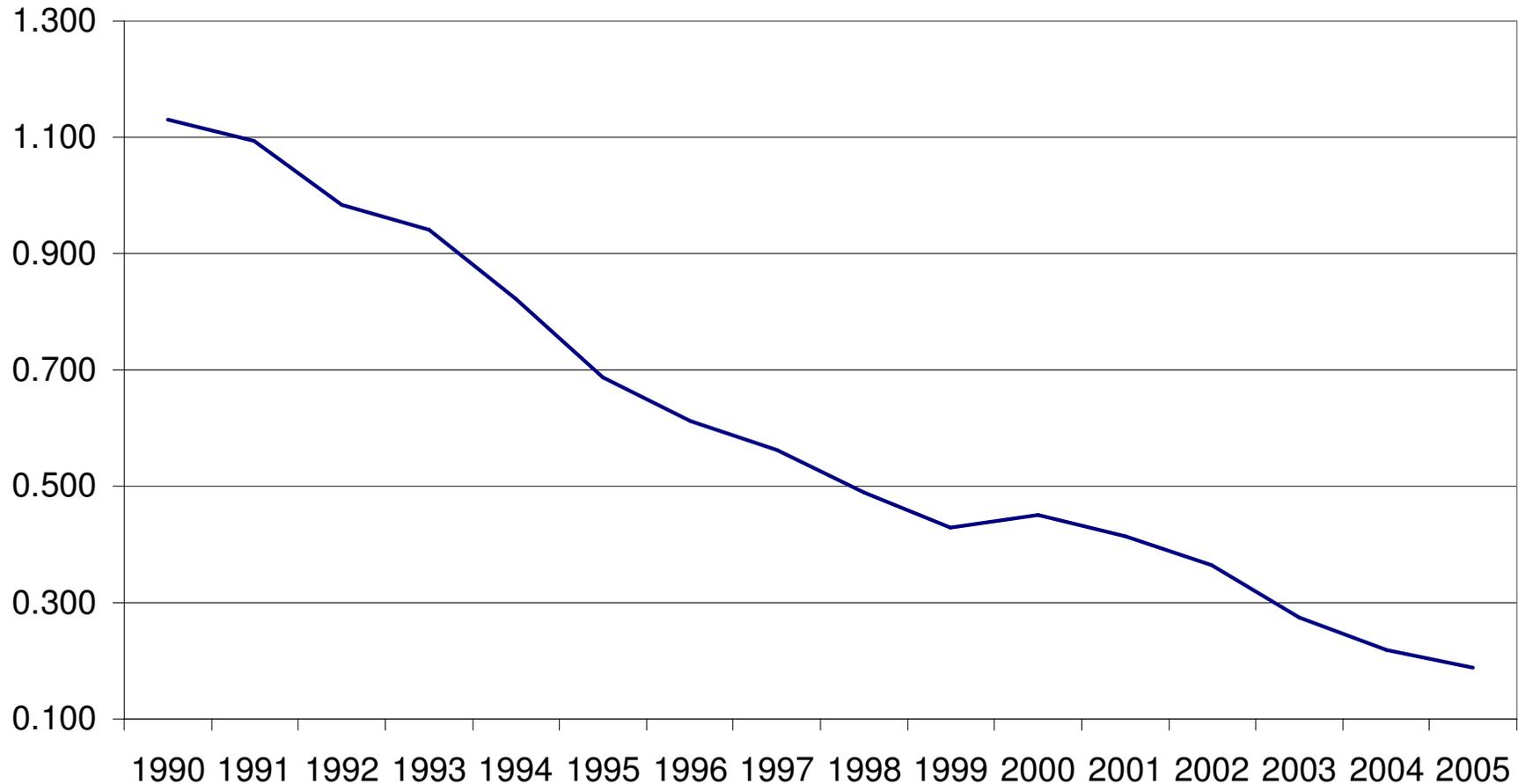


6.Results (Continued)



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Energy Intensity of Capital Stock - Manufacturing Sector



7.Results (Continued)

Energy Intensity of Capital Stock Vintages (Manufacturing Sector)

