The Shape of Aggregate Production Functions: Evidence from Estimates of the World Technology Frontier

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Abstract. The article provides multifaceted evidence on the shape of the aggregate country-level production function, derived from the World Technology Frontier, estimated on the basis of annual data on inputs and output in 19 highly developed OECD countries in the period 1970–2004. A comparison of its estimates based on the Data Envelopment Analysis approach and the Bayesian Stochastic Frontier Analysis approach uncovers a number of departures from the Cobb–Douglas as well as the translog benchmark production function. Partial elasticities derived from the translog production function estimation are variable across countries and time, and are strongly correlated with stocks of inputs used for production. We also find notable departures from perfect substitutability between unskilled and skilled labor. Tests for constancy of returns to scale provide mixed evidence on this property.

Keywords and Phrases: World Technology Frontier, aggregate production function, Data Envelopment Analysis, Stochastic Frontier Analysis, returns to scale

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