

Non-linear technological progress and capital-energy substitution in China

David Broadstock^{a,b}

^a*Research Institute of Economics and Management*

Southwestern University of Finance and Economics, China.

^b*Surrey Energy Economics Centre*

Department of Economics, University of Surrey, UK.

December 30, 2011

Abstract

Su et al. (*forthcoming*) analyze substitution possibilities between capital, labor and energy for China (1953-2006) using a nested CES production function. The nested CES production function requires treating factor inputs as sequential combination pairs and does not admit non-sequential substitution elasticities in multi-factor (i.e. 3 or more) production functions. In the present paper a more flexible Translog production function is estimated for the same data. To account for significant and ongoing structural change in China the parameters of the production function are allowed to vary overtime by casting the production function within a state-space estimation framework. The results are not inconsistent with those given by the nested CES, but imply rather different dynamics. In particular, elasticities are demonstrated to revolve around 1979, but where Su et al. (*forthcoming*) find a larger elasticity after 1979 than before, the time varying parameter Translog function suggests they might be smaller post 1979. The 1979 cut-off period is deemed to reflect (i) pre-1979: planned economy period and (ii) post-1979: market economy period.

Keywords: China, Production, Non-linear technological change.

Corresponding author: David Broadstock, Research Institute of Economics and Management, Southwestern University of Finance and Economics, 55 Guanghuacun Street, Chengdu, China, 610074. Email: davidbroadstock@swufe.edu.cn; Tel. +86-28-87359293; Fax: +86-28-87099300.