



Openness to trade as a determinant of the macroeconomic elasticity of substitution [☆]

Marianne Saam ^{*}

Centre of European Economic Research (ZEW), P.O. Box 10 34 43, D-68034 Mannheim, Germany

Received 20 April 2007; accepted 7 June 2007

Available online 23 June 2007

Abstract

Several theoretical and empirical studies on economic growth consider the macroeconomic elasticity of substitution between capital and labor as a measure of economic flexibility that depends on technological as well as institutional aspects. One institutional aspect of economic flexibility is openness to trade. I examine in a Heckscher–Ohlin model with two large countries trading intermediate goods how openness affects the elasticity of substitution. If the technology has a constant elasticity of substitution in a closed economy, opening up to trade raises the elasticity of substitution only in the country that accumulates capital at a faster rate.

© 2007 Elsevier Inc. All rights reserved.

JEL classification: E23; F11; O40

Keywords: Macroeconomic elasticity of substitution; Economic growth; International trade; Heckscher–Ohlin model

1. Introduction

Macroeconomic production functions are essential to most models in contemporary research on economic growth. A number of recent empirical studies estimate the

[☆] Part of this paper is based on my Ph.D. thesis at the University of Frankfurt. A scholarship from the DekaBank is gratefully acknowledged. I thank in particular my discussant Andreas Irmen for insightful suggestions. I also thank Ron Jones, Rainer Klump, and Bertram Schefold for valuable comments.

^{*} Tel.: +49 621 1235 285; fax: +49 621 1235 333.

E-mail address: saam@zew.de

neoclassical production function with a constant elasticity of substitution between capital and labor. While there is a tendency for estimates of the macroeconomic elasticity of substitution to lie below one, the variance in results remains high (see Klump et al., 2007). Both on a theoretical and on an empirical level little is known about its determinants.

Some empirical studies suggest that the macroeconomic elasticity of substitution may in part depend on institutional aspects (see Klump and Preissler, 2000, for discussion). An early theoretical contribution by May (1947) also formulates this idea. As yet it is mostly based on intuitive reasoning. One formal argument was made about international trade by Ventura (1997). He shows that in a small open economy trading in intermediate goods the elasticity of substitution of the GDP function is infinite.

I consider openness to trade as an example of an economic institution and I show in which case opening up to trade raises the elasticity of substitution to a higher (but finite) level. In particular I discuss how static and dynamic effects of opening up to trade are related to the macroeconomic elasticity of substitution.¹

Considering a technology that is CES under autarky and a case of incomplete specialization, I obtain two results: First, at constant primary inputs, opening up to trade has the same qualitative effect on the set of intermediate inputs available to a country as a rise in the elasticity of substitution. Second, considering an elasticity of substitution measured from a sequence of inputs and factor prices in a growing economy, I show that trade raises the elasticity of substitution only in the country that accumulates capital at a faster rate.

The next section presents the notion of elasticity of substitution considered in the paper. Section 3 analyzes it in the Heckscher–Ohlin model and Section 4 concludes.

2. The macroeconomic elasticity of substitution

Under the assumption that factor prices equal the marginal product, the macroeconomic elasticity of substitution between capital K and labor L of a GDP function can be written as follows:

$$\sigma \equiv \frac{\partial \ln(K/L)}{\partial \ln(GDP_L/GDP_K)} = \frac{\partial \ln(K/L)}{\partial \ln(w/r)}, \quad (1)$$

where w is the real wage rate and r the real rate of return on capital. At the macroeconomic level, inputs are assumed to vary exogenously and marginal products and factor prices are assumed to adapt to them. The GDP function can be thought to depend on technological and institutional parameters and variables. In this context, institutions are understood in the sense given by North and Davies as “rules that establish the basis for production, exchange and distribution” (Davis and North, 1971, p. 6) and as arrangements that govern cooperation and competition between economic units. In a model of trade with perfect competition, opening up to trade alters the marginal returns of inputs in the GDP function.

¹ A remark on trade as a determinant of the macroeconomic elasticity of substitution can already be found in a chapter of *The Theory of Wages* that was written in 1934 and added later to the second edition. There, Hicks suggests that with international trade, the “combined elasticity of substitution” is “the arithmetical sum of the elasticity of commodity substitution and our old technical elasticity of substitution” (Hicks, 1963, p. 298). Commodity substitution depends on the finite elasticity of substitution between home and foreign goods as well as on the terms of trade. I will concentrate on the latter aspect.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات