Economics Letters 132 (2015) 121–124

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Trade, non-homothetic preferences, and the impact of country size on wages

Xichao Wang *, Mark J. Gibson

School of Economic Sciences, Washington State University, PO Box 646210, Hulbert Hall 101, Pullman, WA, 99164-6210, USA

HIGHLIGHTS

- We examine the impact of country size on wages under non-homothetic preferences.
- We consider two cases with one representative consumer and many identical consumers.
- The results are different from the case with CES preferences.
- The advantage of larger country size is not always guaranteed.
- The two cases lead to very different results.

ARTICLE INFO

Article history:
Received 11 November 2014
Received in revised form
30 April 2015
Accepted 3 May 2015
Available online 8 May 2015

JEL classification:
F12
L11

Keywords:
Trade
Non-homotheticity
Country size
Wages

ABSTRACT

We show that the larger country does not always get the higher wage in a trade model with non-homothetic preferences. The cases of one representative consumer and many identical consumers yield different results.

1. Introduction

Since the seminal work of Krugman (1980) and Melitz (2003), most international trade studies based on monopolistic competition stick to the case of constant elasticity of substitution (CES) preferences. Recently, the literature shows that additively separable (AS) preferences,[1] which include both CES preferences and non-homothetic preferences, imply alternative views of the gains from trade (Arkolakis et al., 2012), market efficiency (Dhingra and Morrow, unpublished; Bilbiie et al., unpublished), and trade patterns (Mrázová and Neary, 2014; Bertoletti and Epifani, 2014; Zhelobodko et al., 2012). However, most of these papers focus on the symmetric countries case, so the impact of country size[2] on wages goes largely unanalyzed.[3] This paper fills this gap by analyzing the impact of country size on wages in a two-country trade model with non-homothetic AS preferences.

The standard results with CES preferences, as in Krugman (1980), are that, under free trade, wages are equal and that, with iceberg trade costs, the larger country has a higher wage. We show that, with non-homothetic preferences, these results are changed and the larger country can get the higher, lower, or same wage under different conditions. When the economy is characterized by one representative consumer, the larger country gets the lower

* Corresponding author. Tel.: +1 907 570 8068.
E-mail addresses: xichao.wang@email.wsu.edu (X. Wang), mjgibson@wsu.edu (M.J. Gibson).

[1] CES preferences are the only homothetic AS preferences. Early discussions on AS preferences are referred to Dixit and Stiglitz (1977) and Krugman (1979).

[2] In this paper, country size is defined as the total labor endowment of a country.

[3] In the literature, the impact of country size on wages is also referred as the home market effect in terms of wage, see Behrens et al. (2009) and Chen and Zeng (unpublished).

http://dx.doi.org/10.1016/j.econlet.2015.05.004
0165-1765/

wage under free trade and gets the higher wage under iceberg trade costs. When the economy is characterized by many identical consumers, wage rates are equal between countries under free trade and the larger country gets the higher, lower, or same wage under iceberg trade costs.

Kichko et al. (2014) also study a model with two asymmetric countries and AS preferences, but their paper differs from this paper in that they use a homogeneous sector to equalize the wage rate between countries. Chen and Zeng (unpublished) show that standard results under CES preferences can be extended to AS preferences. However, their results only apply to the case with many identical consumers and depend on more restrictive conditions[4] on preferences.

2. The model

We consider a model of monopolistic competition in which there are two countries in the world: Home and Foreign. Variables for Foreign have an asterisk.

2.1. Consumption

In Home, each consumer chooses consumption of each domestic good, $c(i)$, and consumption of each foreign good, $c_x(i)$, to maximize

$$U = \int_0^N u(c(i))di + \int_0^{N^*} u(c_x(i))di,$$

where i represents the variety, N and N^* are endogenous measures of firms in Home and Foreign, respectively, and the sub-utility function u is strictly increasing and concave and is at least thrice continuously differentiable. The budget constraint for each consumer in Home is

$$\int_0^N p(i)c(i)di + \int_0^{N^*} p_x^*(i)c_x(i)di = wl,$$

where w is the wage and l is the labor endowment per worker (each consumer is also a worker). There is measure k of identical consumers in Home, so the total labor endowment (country size) is $L = kl$. In Foreign, there is measure k^* of identical consumers, each endowed with l^* units of labor. Foreign's country size is $L^* = k^*l^*$. The wage in Foreign is w^*. We normalize w^* and L^* to one so that Home's relative wage is w and relative size is L. From now on, we assume that $L > 1$, so Home is the larger country.

Firms are homogeneous, so we drop the variety indicator i when convenient. From the Home consumer's problem we obtain the inverse demand functions

$$p = u'(c)/\lambda \tag{1}$$

$$p_x^* = u'(c_x)/\lambda, \tag{2}$$

where $\lambda = (Nu'(c)c + N^*u'(c_x)c_x)/(wl)$. Similar results hold for Foreign. The inverse demand functions imply the following relationships between domestic and foreign consumption:

$$u'(c)/u'(c_x) = p/p_x^* \tag{3}$$

$$u'(c^*)/u'(c_x^*) = p^*/p_x. \tag{4}$$

The price elasticity of demand for each variety is

$$\varepsilon(x) = -u'(x)/(u''(x)x), \tag{5}$$

where $x \in \{c, c^*, c_x, c_x^*\}$.

[4] In Chen and Zeng (unpublished), demand functions need to satisfy a condition which guarantees that trade costs fall into a certain range. In this regard, their paper is a special case of our many identical consumer case.

2.2. Production

Each firm produces a unique variety using labor only. In order to produce, each firm must pay a fixed cost of f units of labor. Each firm has labor productivity φ. The gross iceberg cost of exporting to the other country is $\tau \geq 1$. Therefore, the profit function for each firm in Home is

$$\pi(i) = p(i)c(i)k + p_x(i)c_x^*(i)k^* - wf - w(c(i)k + \tau c_x^*(i)k^*)/\varphi,$$

where p is the domestic price, and p_x is the export price. Firms in Foreign have analogous profit functions.

Markets are segmented so, taking each consumer's demand functions as given, each firm maximizes variable profits in the domestic and foreign markets separately. This leads to the following pricing rules:

$$p = m(c)w/\varphi \tag{6}$$

$$p^* = m(c^*)/\varphi \tag{7}$$

$$p_x = m(c_x^*)\tau w/\varphi \tag{8}$$

$$p_x^* = m(c_x)\tau/\varphi, \tag{9}$$

where the markup factor is $m(x) = \varepsilon(x)/(\varepsilon(x) - 1)$.

As Bertoletti and Epifani (2014) show, the reciprocal of the elasticity of marginal revenue in absolute value is

$$\eta(x) = -r'(x)/(r''(x)x), \tag{10}$$

where $r(x) = u'(x)x$, $r'(x) = u'(x) + u''(x)x$, and $r''(x) = 2u''(x) + u'''(x)x$. According to (1), we have $r(c) = \lambda pc$, and similar expressions hold for c_x, c^*, and c_x^*. To get a concave profit function, we need $r'(x)/\lambda > 0$ and $r''(x)/\lambda < 0$. Thus $\eta(x)$ is positive. Now we can rewrite (3) and (4) as

$$r'(c)/r'(c_x) = w/\tau \tag{11}$$

$$r'(c^*)/r'(c_x^*) = 1/(w\tau). \tag{12}$$

2.3. Relative wage

In order to calculate the relative wage of Home in terms of the wage rate of Foreign, we first close the model by listing free-entry and labor-market-clearing conditions. Free entry requires that each firm makes zero profit. Plugging in prices, we get the following conditions:

$$(m(c) - 1)ck + (m(c_x^*) - 1)\tau c_x^* k^* = \varphi f \tag{13}$$

$$(m(c^*) - 1)c^*k^* + (m(c_x) - 1)\tau c_x k = \varphi f. \tag{14}$$

The above expressions and (11) and (12) are used to solve for the demand functions. In equilibrium, the labor demanded by firms is equal to the labor endowment:

$$N(f + ck/\varphi + \tau c_x^* k^*/\varphi) = L \tag{15}$$

$$N^*(f + c^*k^*/\varphi + \tau c_x k/\varphi) = 1. \tag{16}$$

These expressions are used to solve for the measures of firms.

Based on the above conditions, we use the balanced-trade condition ($Np_x c_x^* k^* = N^* p_x^* c_x k$) to pin down the relative wage. Plugging measures of firms and prices into the balanced-trade condition, we get the relative wage as follows:

$$w = \frac{1}{L}\frac{k}{\alpha^* k^* + k}\frac{\alpha k + k^*}{k^*}, \tag{17}$$

where $\alpha = m(c)c/(m(c_x^*)\tau(c_x^*))$, and $\alpha^* = m(c^*)c^*/(m(c_x)\tau(c_x))$. We will use this equation to analyze the impact of country size on wages.