



Tax Competition, Trade Integration and Market Structure

Ian Wooton

University of Strathclyde

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Introduction to lecture 2

This lecture continues the examination of the outcome of international competition for FDI

- now consider a large number of firms in industry
- examine impact of regional economic integration
 - on the international distribution of firms
 - on national welfare
- will compare with economic geography model
- based on the paper
 - Andreas Haufler and Ian Wooton (2007),
“Competition for firms in an oligopolistic industry: The impact of economic integration”
CESifo Working Paper No. 1976



Starting point

Financial relationship between host countries and large multinational firms (MNEs) multi-dimensional

- indications that capital mobility has changed “bargaining power” in favour of firms

Taxation

- nominal and average effective rates of corporate taxation have fallen (Devereux *et al.*, 2002)
 - tax payments of MNEs have fallen even more due to profit shifting and discriminatory tax breaks (Hines, 2005; Egger *et al.*, 2007)

Investment subsidies

- have become increasingly common
- ⇒ direction of net tax/subsidy flows are ambiguous



Corporate taxation in OECD

Source: Devereux <i>et al.</i> (2002)	Statutory tax rate			Effective average tax rate		
	1985	1995	2005	1985	1995	2005
Large countries (population > 20 million)						
Australia	50	36	30	37	31	26
Canada	45	36	36	28	28	28
France	50	37	34	34	27	25
Germany	63	57	38	45	41	32
Italy	46	52	37	31	36	26
Japan	56	50	40	45	40	32
Spain	35	35	35	27	24	26
UK	40	33	30	28	26	24
USA	50	39	39	32	29	29
Large country average	48.3	41.7	35.4	34.1	31.3	27.6
Small countries (population < 20 million)						
Austria	61	34	25	37	24	22
Belgium	45	40	34	35	31	26
Finland	60	25	26	45	19	21
Greece	44	40	32	36	33	21
Ireland	10	10	13	5	8	11
Netherlands	43	35	32	34	28	25
Norway	51	28	28	36	24	24
Portugal	55	40	28	48	29	20
Sweden	60	28	28	45	21	21
Switzerland	35	35	34	26	26	25
Small country average	46.4	31.5	28.0	34.7	24.3	21.6



Approved investment subsidies in EU member states (>40 € million, 2001-7)

Company	Date of approval	Host country (city/region)	State aid (€ million)	Aid intensity (%)
Nissan	01 2001	UK (Sunderland)	60	18·6
Volkswagen	01 2007	Germany (Dresden)	75	12·3
Daimler Chrysler	12 2001	Germany (Thuringia)	57	30·9
Infineon	04 2002	Germany (Saxony)	219	19·8
ST Microelectronics	04 2002	Italy (Sicily)	542	26·3
Iveco	10 2002	Italy (Puglia)	109	44·0
BMW	12 2002	Germany (Leipzig)	363	30·1
Solar World	03 2003	Germany (Saxony)	73	35·0
Ford	07 2003	Belgium (Genk)	45	4·2
AMD	02 2004	Germany (Saxony)	≤ 545	≤ 22·7
Wacker	02 2004	Germany (Saxony)	120	28·0
Infineon	03 2004	Portugal (Porto)	42	29·0
DHL Airways	04 2004	Germany (Leipzig)	70	28·0
De Tomaso	01 2005	Italy (Calabria)	81	60·0
Südzucker	06 2005	Germany (Saxony-Anh·)	43	23·8
AMD	07 2007	Germany (Saxony)	262	11·9

Source: *Official Journal of the European Communities*



This paper

Incorporates arguments for both taxes and subsidies

1. governments have incentive to pay subsidies in order to reduce consumer prices
2. location rents for firms arise, even in symmetric equilibrium, as in case of duopoly
 - profitability gap arising from different number of firms in each market

Focus on effects of economic integration. Main results

1. *U*-shaped relationship between equilibrium tax rates and trade costs
2. economic integration can simultaneously harm large countries and benefit small countries



Between two strands of literature

Competition for monopolist/duopolist

- Black & Hoyt (*AER* 1989); Haufler & Wooton (*JPubE* 1999), Fumagalli (*EER* 2003), Bjorvatn & Eckel (*EER* 2006); Ferrett & Wooton (mimeo. 2005)
 - location rents arise from national asymmetries

New economic geography (NEG) models

- Ludema & Wooton (*JIE* 1999); Baldwin & Krugman (*EER* 2004); Ottaviano & van Ypersele (*JIE* 2005)
 - agglomeration rents taxed by “core country”
 - only when all firms agglomerated
 - subsidies paid when firms dispersed
 - tax rates *rise* in core country in early stages of economic integration



Households and preferences

Two countries A and B

- competing to attract FDI

Two goods produced

- numeraire good z in competitive industry
- homogeneous good x produced by oligopoly
- quadratic, quasi-linear utility

$$u_i = ax_i - Bx_i^2/2 + z_i, \quad i \in \{A, B\}$$

World population is normalised to 1 (*cf.* n in lecture 1)

- country A has population $n \geq 0.5$
- country B has population $(1 - n)$

Households each supply a single unit of labour

- wage determined in numeraire industry
 - free trade equalizes wage at w



Market demand

Business tax revenue in country i is T_i

- lump-sum redistribution to households

Representative consumer's budget constraint is

$$w + T_A/n = z_A + p_A x_A$$

$$w + T_B/(1 - n) = z_B + p_B x_B$$

Utility maximization yields inverse demand curve

$$a - Bx_i = p_i, \quad i \in \{A, B\}$$

Aggregating over all consumers yields

$$X_A = n(a - p_A)/B$$

$$X_B = (1 - n)(a - p_B)/B$$

- market demand is larger in country A when $n > 0.5$



Firms

$k \geq 2$ firms in imperfectly competitive sector

- number exogenously determined
- single plant for each firm

Labour the only variable input

- effort of y workers to produce 1 unit of output
 - marginal cost of production is $\omega = yw$
 - same in both production locations

Trade costs of τ per unit

- marginal cost of $(\omega + \tau)$ for sales abroad
- no endogenously determined tariffs in region

Firms engaged in Cournot (quantity) competition

- regional markets are segmented



Incentives to locate

Firms face lump-sum taxes of t_i from host government

- tax differential is $\Delta \equiv t_A - t_B$

Firms choose where to locate

- k_A firms in country A
- k_B firms in country B

Consumer price depends on location of production

$$p_A = \frac{a + k\omega + k_B\tau}{k + 1}, \quad p_B = \frac{a + k\omega + k_A\tau}{k + 1}$$

- prices decline with number of firms in industry
- local production intensifies domestic competition



Profit maximization

Firms maximise after-tax profits, $\pi_i - t_i$, where

$$\pi_A = \frac{n[a - \omega + k_B \tau]^2}{B(k+1)^2} + \frac{(1-n)[a - \omega - (1+k_B)\tau]^2}{B(k+1)^2}$$

$$\pi_B = \frac{n[a - \omega - (1+k_A)\tau]^2}{B(k+1)^2} + \frac{(1-n)[a - \omega + k_A \tau]^2}{B(k+1)^2}$$

Locational equilibrium when $\pi_A - t_A = \pi_B - t_B$

- equilibrium number of firms located in country A is

$$k_A = \frac{k}{2} + \frac{(2n-1)[2(a-\omega) - \tau]}{2\tau} - \frac{\Delta B(k+1)}{2\tau^2}$$

- relative size and tax differential crucial

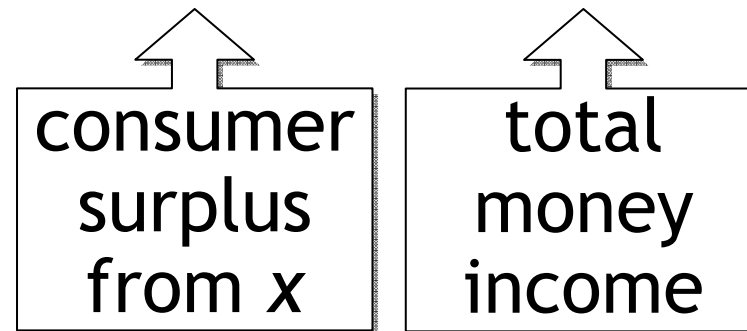


Governments and location

Governments maximise welfare of representative consumers. Aggregate welfare is derived as

$$W_A = nu_A = S_A + [T_A + nw]$$

$$W_B = (1 - n)u_B = S_B + [T_B + (1 - n)w]$$



Consumer surplus is

$$S_A = \frac{n[k(a - \omega) - k_B \tau]^2}{2B(k + 1)^2}, \quad S_B = \frac{(1 - n)[k(a - \omega) - k_A \tau]^2}{2B(k + 1)^2}$$

- decreasing in number of foreign firms
 - justifies paying incentives to attract investment



Benchmark of symmetry, $n = 0.5$

Nash equilibrium tax rate common to both countries

$$t^s = \frac{k\tau}{B(k+1)} \left[\underset{\textcircled{1}}{\tau} - \frac{2(a-w) - \tau}{4(k+1)} \right]$$

- ① **location-rent effect**: in symmetric equilibrium, if a firm moves abroad it faces more competition in its new location than in original country
 - rent that can be taxed
- ② **consumer-price effect**: attracting additional firms lowers consumer prices
 - governments willing to pay subsidies to firms
 - $\partial t^s / \partial k > 0$
 - equilibrium tax rises with number of firms

