International share ownership, profit shift and protectionism

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International Share Ownership, Profit Shift and Protectionism.

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Loughborough University and CSGR Warwick, UK.*


Abstract

This paper examines the implications of increasing globalisation of stock market ownership on the economics of protection. Current data on European, Japanese and Australian stock exchanges indicate that over 30 per cent of the stock market is foreign-owned in most cases, a large increase on a couple of decades ago. Foreign share ownership in the USA lags behind these levels, but is increasing fast. This degree of foreign share-ownership is likely to change qualitatively the nature of the response of governments to FDI and support for 'domestic' firms. In particular, two worked examples, based upon duopoly theory, suggest that the level of foreign share-ownership is sufficient to render protection unattractive.

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JEL Classifications: F10, F12.

Keywords: Trade, Oligopoly, Capital Ownership
This paper examines the implications of increasing globalisation of share ownership on the economics of protection. In particular, I examine the argument traditionally made for such protection on the basis of a profit-shifting motive. If proper account is taken account of the foreign ownership share of national champions, the profit-shift arguments in favour of protecting such firms are greatly reduced. Current data on European stock exchanges indicate that over 30 per cent of the stock market is foreign-owned in most cases, a large increase on a couple of decades ago.

The issue which I address is whether this degree of foreign share-ownership is likely to change qualitatively the nature of the response of governments to FDI and support for 'domestic' firms. In particular, two worked examples, based upon duopoly theory, suggest that the level of foreign share-ownership is sufficient to render protection unattractive.

1 Profit shift and protection

Much of the literature on strategic trade policy is reviewed in Brander (1995). Models such as the Brander (1981), Brander and Spencer (1985) or Eaton and Grossman (1986) assume that one firm is domestically-owned, while the other is foreign owned. The government therefore has an incentive to intervene, via subsidies or other policies, to favour its own company. The key motive is profit-shift: if a market is imperfectly competitive, then firms will charge a profit markup \( \mu \) over marginal cost, where \( \mu \) is typically expected to be close to \( 1/(1 - (1/\varepsilon)) \),
where $\varepsilon$ is the firm’s perceived own-price demand elasticity, based upon its conjectures of rival firms’ behaviour. Therefore, if marginal costs are constant, profits will account for proportion $\mu/(1 + \mu)$ of total turnover. A policy such as a tariff or quota or subsidy, or the use of regulations to keep a foreign entrant out, would be expected to worsen consumer welfare: however, if the share of profits in output, $\mu/(1 + \mu)$, is sufficiently large, and if the policy raises the domestic firms’ share of those profits by a sufficient amount, then the policy may benefit national welfare at the margin (at the expense of foreigners). Profit-shift is frequently cited as a motivation for the government intervention in a number of industries, such as civil aircraft manufacturing.\(^1\)

It should be noted that there are other possible reasons for protecting a domestic firm, apart from profit-shift. These include exploitation of static and dynamic scale economies or spillovers, distributional factors, the desirability of maintaining domestic head-office capability, the supposed greater accountability of local firms to local regulators etc. Nevertheless, I will concentrate upon profit shift as the main motive in this short paper.

2 Internationalisation of Share Ownership

A key feature of the papers discussed is that firms can easily be classified according to their ‘nationality’: in other words, they assume 100% of shares in the domestic firm(s) are owned by domestic nationals, and 100% of shares in

\(^1\text{See Pavcnik, 2002.}\)
foreign firms are owned by foreigners. While this may be the case when a firm is nationalised, or where it is a private company (owned by, say, a family - take the Quandt family’s ownership of BMW as a classic example), it is unlikely to be the case with a public limited company.\(^2\) Table 1, below, shows recent estimates of the ownership distribution of shares in various European countries. Effectively, shares can be split into those owned directly by the state (proportion \(s\)), those directly owned by foreigners, proportion \(\theta\), those owned by other firms and financial institutions based in the domestic country quoted on the stock market, proportion \(m\) and those directly owned by pension funds and the like, proportion \(p = 1 - s - \theta - m\). If the rate of corporate taxation is \(t\), then a lower bound estimate for the share of profits of domestically-based companies (net of tax) which actually ends up accruing to foreigners is

\[
\phi_L = \theta. \tag{1}
\]

\(\phi_L\) should be considered a lower bound estimate, because it is likely that many of the other firms and financial institutions who own shares within the country are themselves partly foreign-owned (and a proportion of the shareholdings in those institutions which is registered to other domestically-owned companies will also be foreign-owned \textit{etc.}). A higher estimate of the proportion of profits

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\(^{2}\)Recent papers arguing that the definition of ‘national champions’, at least in Europe, is getting increasingly blurred include Edwards and Gros (2006) and Veron (2006).
which actually ends up in companies’ hands might therefore be

\[ \phi_H = \theta + \theta m + \theta m^2 + ..., \]

\[ = \frac{\theta}{1 - m}. \quad (2) \]

Taking the examples of Germany, France, the UK and Italy in 2003 the structure of share ownership, as quoted by FEESE, was:

<table>
<thead>
<tr>
<th></th>
<th>Germany*</th>
<th>France</th>
<th>UK</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foreign investors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic investors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective investment</td>
<td>9.5</td>
<td>28.5</td>
<td>50.9</td>
<td>10.6%</td>
</tr>
<tr>
<td>Banks and savings banks</td>
<td>7.5</td>
<td>13.3</td>
<td>2.2</td>
<td>5.2%</td>
</tr>
<tr>
<td>Bond Issuing Mortgage companies</td>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others not identified</td>
<td></td>
<td></td>
<td></td>
<td>3.3%</td>
</tr>
<tr>
<td>Private Non-Financial companies</td>
<td>45.6</td>
<td>23.7</td>
<td>1.9</td>
<td>29.7%</td>
</tr>
<tr>
<td>Individual investors/households</td>
<td>14.1</td>
<td>8.5</td>
<td>14.9</td>
<td>26.6%</td>
</tr>
<tr>
<td>Public sector</td>
<td>5.8</td>
<td>4.5</td>
<td>0.0</td>
<td>10.2%</td>
</tr>
</tbody>
</table>

*Table 1: Principal European Economies, 2003, structure of share ownership.

(*Germany 2002).

In the case of Italy, our lower-bound estimate for foreign ownership would be \( \phi_L = 14.4\% \) in 2003. For the higher estimate, quite which of these categories should be considered \( m \) is not easy - an upper bound estimate would be
everything excluding the Public sector and private individuals. In this case, an upper bound estimate for foreign share ownership in Italy would be just over 28% of the total. Most other European countries are considerably more internationalised still, as the table below shows.
<table>
<thead>
<tr>
<th>Country</th>
<th>Foreign % of total</th>
<th>Foreign % of foreign+indiv+public</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slovakia</td>
<td>86.0</td>
<td>97.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>72.6</td>
<td>84.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>69.0</td>
<td>84.1</td>
</tr>
<tr>
<td>Poland</td>
<td>53.0</td>
<td>88.2</td>
</tr>
<tr>
<td>Lithuania</td>
<td>51.8</td>
<td>81.7</td>
</tr>
<tr>
<td>Belgium</td>
<td>40.3</td>
<td>78.9</td>
</tr>
<tr>
<td>Australia</td>
<td>40.0</td>
<td>64.5</td>
</tr>
<tr>
<td>Portugal</td>
<td>38.9</td>
<td>70.3</td>
</tr>
<tr>
<td>Spain</td>
<td>35.1</td>
<td>57.2</td>
</tr>
<tr>
<td>France</td>
<td>34.8</td>
<td>72.8</td>
</tr>
<tr>
<td>Sweden</td>
<td>33.2</td>
<td>55.1</td>
</tr>
<tr>
<td>UK</td>
<td>32.3</td>
<td>68.4</td>
</tr>
<tr>
<td>Greece</td>
<td>31.3</td>
<td>51.2</td>
</tr>
<tr>
<td>Norway</td>
<td>27.8</td>
<td>36.9</td>
</tr>
<tr>
<td>Denmark</td>
<td>27.3</td>
<td>51.9</td>
</tr>
<tr>
<td>Japan</td>
<td>23.7</td>
<td>53.6</td>
</tr>
<tr>
<td>Germany</td>
<td>17.5</td>
<td>46.8</td>
</tr>
<tr>
<td>Italy</td>
<td>14.4</td>
<td>28.1</td>
</tr>
<tr>
<td>Slovenia</td>
<td>8.0</td>
<td>15.5</td>
</tr>
</tbody>
</table>

Table 2: The share of foreign ownership in various stock markets, latest (2003 for most, 2004 for Japan and Australia, 2002 for Germany). *Sources for Australia ASX, for Japan World Federation of Exchanges.
Looking at Table 2, in most countries at least 1/3 of shares are now foreign-owned, and the true figure may well be over 50% in most cases.

Figure 1, below, derived from the same data source, shows that data is missing for most European countries prior to 1995, and that foreign shareowning fluctuates over time. However, in a number of countries for which long time-series are available, the upward trend, decade-on-decade, is remarkable. For example, direct foreign share ownership in the UK rose from around 8% in 1985 to a third today.

Figure 1

Comparable data on foreign equity ownership in the United States is relatively hard to come by. Bertaut et al (2006) estimate foreigners owned 10 per cent of U.S. equity in June 2005 - an increase from 5 per cent in 1994 - though
their paper outlines a number of data issues. Interestingly, this number falls far short of foreign holdings of U.S. securities.

2.1 Corporate taxation

Since $\phi$ is the share of post-tax profits which accrue to foreigners, we also need to correct for corporate taxation. From Devereux and Griffith’s database\(^3\) I use estimates of the effective average tax rate in 2005, adjusted for time- and country-specific inflation. These tax rates range from just under 20% to just over 30% in the selected sample of countries. When adjustment is made for this, then (for those countries on which tax and stock market ownership data is available), the lower estimate of the share of profits accruing to foreigners ranges from 10.8% in Italy to 52.4% in the Netherlands, while the higher estimate ranges from 21% in Italy to 63.7% in the Netherlands.

<table>
<thead>
<tr>
<th>Country</th>
<th>Tax</th>
<th>Lower</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>25.7</td>
<td>29.9</td>
<td>58.6</td>
</tr>
<tr>
<td>France</td>
<td>24.6</td>
<td>26.2</td>
<td>54.9</td>
</tr>
<tr>
<td>Germany</td>
<td>30.1</td>
<td>12.2</td>
<td>32.7</td>
</tr>
<tr>
<td>Greece</td>
<td>20.5</td>
<td>24.9</td>
<td>40.7</td>
</tr>
<tr>
<td>Italy</td>
<td>25.2</td>
<td>10.8</td>
<td>21.0</td>
</tr>
<tr>
<td>Norway</td>
<td>23.1</td>
<td>21.4</td>
<td>28.3</td>
</tr>
<tr>
<td>Portugal</td>
<td>19.7</td>
<td>32.1</td>
<td>56.5</td>
</tr>
<tr>
<td>Spain</td>
<td>25.9</td>
<td>26.0</td>
<td>42.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>20.1</td>
<td>26.5</td>
<td>44.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>24.1</td>
<td>52.4</td>
<td>63.9</td>
</tr>
<tr>
<td>UK</td>
<td>23.1</td>
<td>24.9</td>
<td>52.7</td>
</tr>
<tr>
<td>Japan</td>
<td>29.2</td>
<td>16.8</td>
<td>37.9</td>
</tr>
<tr>
<td>Australia</td>
<td>25.7</td>
<td>29.7</td>
<td>47.9</td>
</tr>
</tbody>
</table>

*Table 3: Effective average corporate taxation and lower and higher estimates of the share of profits accruing abroad.*
3 Implications of foreign share ownership for protectionist policies: export subsidies with a duopoly

The first example I choose to look at is the classic case of duopolists from two countries selling into a third country market. This is an issue given some prominence by the classic paper of Brander and Spencer (1985), and, while the analysis is simplified, is widely regarded as having some relevance to real policy issues - notably the Boeing/Airbus dispute. This essentially looks at a two-stage game between the two firms and the two governments of their 'home' countries. Following a standard model formulation, I assume that the firms have identical costs and make indistinguishable products, and compete for the third country market in a subgame on the basis of Cournot conjectures about each other’s output. The two exporting country governments, however, both have a potential motive to intervene in the export market, each subsidising 'its' firm’s exports, with the intention of gaining a larger share of the market and hence a greater share of combined profits (which are supranormal because of the duopoly). In this higher-level game, each two governments are assumed to form a fixed conjecture of the other government’s likely subsidy level.

To set up the market more formally: two identical firms are competing for market share in a third country. Price is given by

\[ P = \gamma \eta D_C^{n-1}, \]  

(3)
where $D_C$ is combined output,
\[ D_C = D_1 + D_2. \]  \hfill (4)

Marginal cost for each firm is
\[ MC_f = 1 - S_f, \]  \hfill (5)

where $S_f$ is a subsidy. Total revenue for firm $f$ is
\[ R_f = PD_f; \]
\[ R^C_f = \gamma \eta (D_1 + D^C_2)^{\eta-1} D_1. \]  \hfill (6)

The equilibrium conditions are given by
\[ D_C = D_1 + D_2 = [(MC_1 + MC_2)/(\gamma \eta (1 + \eta))]^{1/\eta-1}; \]  \hfill (7)
\[ P = (MC_1 + MC_2)/(1 + \eta), \]
\[ = (2 - S_1 - S_2)/(1 + \eta). \]  \hfill (8)

and
\[ \theta = (MC_1 - \eta MC_2)/(MC_2 - \eta MC_1), \]  \hfill (9)

where $\theta$ is defined as the ratio $D_2/D_1$, which implies that $D_1 = D_C/(1 + \theta)$ and $D_2 = \theta D_C/(1 + \theta)$.  

13
The two governments can manipulate the subsidy, $S_1$ or $S_2$, to induce 'their' firm to increase its output, so gaining a profit shift. I assume both governments can correctly read the outcome of the Cournot subgame between the two firm, and are engaged in their own policy game. Each government takes as given the other government’s subsidy level.

Government 1 seeks to maximise

\[ W_1 = (1 - \phi)\Pi_1 - S_1D_1, \]

\[ = (1 - \phi)PD_1 - (1 - \phi)(1 - S_1)D_1 - S_1D_1, \]

\[ = D_1((1 - \phi)(P - 1) - \phi S_1). \tag{10} \]

\[ \partial W_1 / \partial S_1 = ((1 - \phi)(P - 1) - \phi S_1)\partial D_1 / \partial S_1 + (1 - \phi)D_1\partial P / \partial S_1 - \phi D_1. \tag{11} \]

Note that

\[ P = (2 - S_1 - S_2)/(1 + \eta); \]

\[ \partial P / \partial S_1 = -1/(1 + \eta). \tag{12} \]

Also

\[ D_1 = D_C/(1 + \theta); \]

\[ = (P/\gamma \eta)^{1/\eta - 1}/(1 + \theta). \tag{13} \]
Assuming the two firms and countries are symmetrical, in Nash equilibrium

\[ S_1^* = S_2^* = S^*; \quad D_1 = D_2 = D^*. \]

Consequently

In equilibrium

\[
\begin{align*}
\theta^c &= ((1 - \eta) - S_1 + \eta S_2^c)(1 - S_2 - \eta(1 - S_1))^{-1}; \\
\frac{\partial \theta^c}{dS_1} &= -(1 - S_2^c - \eta(1 - S_1))^{-1} - \eta((1 - \eta) - S_1 + \eta S_2^c)(1 - S_2^c - \eta(1 - S_1))^{-2}, \\
&= -(1 - S_2^c - \eta(1 - S_1))^{-1} - \eta \theta(1 - S_2^c - \eta(1 - S_1))^{-1}, \\
&= -((1 + \eta \theta)/(1 - S_2^c - \eta(1 - S_1))).
\end{align*}
\]

But, if the equilibrium is symmetrical, \( \theta = 1 \) and \( S_1^* = S_2^* = S^* \). Consequently

\[
\frac{\partial \theta^c}{dS_1} = -((1 + \eta)/(1 - \eta)(1 - S^*)). \quad (A)
\]

\[
\begin{align*}
P^* &= 2(1 - S^*)/(1 + \eta); \quad (B) \\
D'^*_c &= \left(\frac{P^*}{\gamma \eta}\right)^{1/(\eta - 1)}; \\
D'^*_1 &= \left(\frac{P^*}{\gamma \eta}\right)^{1/(\eta - 1)}/2; \quad (C)
\end{align*}
\]

\[
\frac{\partial D'_c}{\partial S_1} = \left(\frac{\partial D'_c}{\partial P^*}\right)\left(\frac{\partial P^*}{\partial S_1}\right), \\
= \left(\frac{4}{(1 - \eta)(1 + \eta)}\right)(D'_1/P^*). \quad (D)
\]
\[ D_1 = \frac{D_1^*}{(1 + \theta)}; \]
\[ \frac{\partial D_1}{\partial S_1} = \left( (\frac{\partial D_1^*}{\partial S_1} / (1 + \theta)) - (1 + \theta)^{-2} \frac{\partial D_1^*}{\partial \theta} / dS_1 \right), \]
\[ = \frac{1}{2} (\frac{\partial D_1^*}{\partial S_1} - \frac{1}{4} D_1^* \frac{\partial \theta^*}{dS_1}), \]
\[ = \frac{1}{2} (\frac{\partial D_1^*}{\partial S_1} - \frac{1}{2} D_1^* \frac{\partial \theta^*}{dS_1}), \]
\[ = \frac{1}{2} [(\partial D_1^* / \partial S_1) - D_1^* (\partial \theta^* / dS_1)]. \] (E)

\[ \frac{\partial P^*}{\partial S_1} = -1/(1 + \eta). \] (F)

Consequently, in equilibrium \[ \frac{\partial W_1}{\partial S_1} = 0 \implies \]
\[ \frac{\partial W_1}{\partial S_1} = ((1 - \phi)(P^* - 1) - \phi S^*) (\partial D_1 / \partial S_1) + (1 - \phi) D_1^* \partial P / \partial S_1 - \phi D_1^* = 0. \] (G)

A-G give us 7 equations in 7 unknowns, \( S^*, \partial \theta^* / dS_1, P^*, D_1^*, \partial D_1^* / \partial S_1, \partial P^* / \partial S_1, \partial D_1 / \partial S_1. \)

The simplest initial method is numerical simulation.

### 3.1 Results of simulations

Figure 2 below shows the Nash equilibrium subsidy levels of the game between the regulators, where their firms sell into a third market as a Cournot duopoly.

It can be seen that subsidy levels are higher where demand is less elastic (since the duopoly yields higher profits in this case, giving a greater profit shift), but that subsidies decline steadily as foreign share ownership increases, and that
the lines for all elasticity cases intersect at around 1/3 foreign shareownership. Above this level, governments actually prefer to tax their firm, rather than subsidise it.

*Figure 2*

The diagram shows that, for all elasticities, the equilibrium level of subsidies, $S^* = 0$, when foreign ownership, $\phi^*$ is around 1/3. In fact, we can formally derive the proposition below:
Proposition 1 In a game of two identical producers from different nations acting as a Cournot duopoly in a third country, where marginal costs are constant and the demand elasticity is constant, the Nash equilibrium subsidy level for the two governments will equal zero when foreign ownership of shares is 1/3 of the total.

Proof of Proposition 1

We want to solve equations A-G to find the value of $\phi = \phi^*$, which gives $S^* = 0$. Consequently, we substitute for $S^* = 0$ in A-G.

$$\frac{\partial \theta^c}{dS_1} = \frac{-(1 + \eta)}{(1 - \eta)}. \quad (A')$$

$$P^* = \frac{2}{1 + \eta}. \quad (B')$$

$$D^*_1 = \frac{(P^*/\gamma \eta)^{1/(\eta - 1)}/2,}{(2^{(2-\eta)/(\eta-1)}(\gamma \eta(1 + \eta))^{1/(1 - \eta)}}, \quad (C')$$

$$\frac{\partial D^*_c}{dS_1} = \frac{(4/(1 - \eta)(1 + \eta))(D^*_1/P^*)}{(2/(1 - \eta))D^*_1} \quad (D')$$
\[
\frac{\partial D_1}{\partial S_1} = \frac{1}{2}[(\partial D^*_c/\partial S_1) - D^*_1(\partial \theta^c/dS_1)],
\]
\[
= \frac{1}{2}[(2/(1-\eta))D^*_1 + D^*_1(1+\eta)/(1-\eta)],
\]
\[
= \frac{(D^*_1/2(1-\eta))[3 + \eta]}{\phi^*}. \tag{E'}
\]
\[
\frac{\partial P^*}{\partial S_1} = -1/(1+\eta). \tag{F}
\]

\[
\frac{\partial W_1}{\partial S_1} = ((1-\phi)(P^* - 1) - \phi S^*(\partial D_1/\partial S_1) + (1-\phi)D^*_1\partial P/\partial S_1 - \phi D^*_1 = 0;
\]
\[
\Rightarrow
\]
\[
((1-\phi^*)(1-\eta)/(1+\eta))(D^*_1/2(1-\eta))[3 + \eta] - (1-\phi^*)D^*_1/(1+\eta) - \phi^* D^*_1 = 0;
\]
\[
((1-\phi^*)(1+\eta))(1/2)[3 + \eta] - (1-\phi^*)/(1+\eta) - \phi^* = 0;
\]
\[
(1-\phi^*)[3 + \eta] - 2(1-\phi^*) - 2\phi^*(1 + \eta) = 0;
\]
\[
[3 + \eta] - 2 = 2\phi^*(1 + \eta) + \phi^*[3 + \eta] - 2\phi^*;
\]
\[
1 + \eta = 3(1 + \eta)\phi^*;
\]
\[ \phi^* = 1/3. \]

It is worth noting that this critical value is very close to the level of foreign share ownership reported on most European stock markets at present. This casts some doubt on the common assumption that export subsidies will, in fact, be a common feature of such markets.

4 Entry of a Foreign Competitor to a Domestic Monopolist

The second example could be seen as a case of 'economic patriotism'. This is a loosely-defined term, which appears to be mostly concerned with preventing foreign entry into 'strategic' industries and takeover of 'national champion' companies. In this case, I will concentrate on the case where a foreign firm seeks (maybe as part of a general industry deregulation) to move in to challenge a local monopolist. Orthodox theory of foreign direct investment would indicate that there is a potential cost of such a policy in terms of loss of competitive benefits and, potentially, a loss of efficiency. However, where the industry is imperfectly competitive (as any industry with a 'national champion' will be), there is, in theory, an offsetting gain from the protection: that of profit shift. Quite

\footnote{See, for example, \url{http://news.bbc.co.uk/2/hi/europe/4837150.stm}, which refers to the De Villepin government in France and its 'economic patriotism' agenda. Also Gros, 2006.}
simply, a monopoly yields a profit, and there may be circumstances under which it is preferable, from a point-of-view of national self-interest, for the industry to remain monopolistic, with that profit staying in the hands of domestic owners, rather than allowing the entry of foreign firms, who repatriate profit abroad.

Clearly, there is only a trade-off between profit-shift and competition where the domestic firm is, indeed, owned by home nationals to a significant degree more than the foreign firm. The interesting question, however, is how large a foreign shareholding in the domestic firm would constitute 'significant' in this case, in the sense that it would undermine the domestic preference for protection of the national champion.

Consider an industry (or perhaps a distinct section of an industry) where there is currently a single, domestic producer. New entry is blocked (there being sizeable sunk costs in entering the industry as a whole): however, there is one foreign firm which is capable of entering, and willing to enter. I will assume both firms have identical and constant marginal costs of $1 per unit, and that the elasticity of demand for the industry's products within the country is $\varepsilon$. I initially assume the good is not internationally tradable, though this can be easily relaxed. Also that both firms produce indistinguishable produce, and that neither firm can commit to output in advance.

The choice facing the government of the host country is therefore whether to persist with a protected monopoly (I assume there is no price regulation) or to allow the foreign firm to enter and create a duopoly. In the latter situation, prices will be lower and output higher, so benefiting consumers. Half of
the duopoly profits, however, will be sent abroad. The foreign firm is entirely foreign-owned, whereas share \((1 - \phi)\) of the domestic firm is owned by domestic residents. I will ignore profit taxes in this simple analysis, though they serve, in practice, to reduce \(\phi\).

### 4.1 Monopoly

Consider first the situation under a monopoly. Consumers have a utility function

\[
U = \gamma D^\eta, \tag{16}
\]

where \(D\) is total domestic demand and \(0 < \eta < 1\). If consumers choose \(D\) to equate marginal utility to price, \(P\), then

\[
P = \gamma\eta D^{\eta-1}. \tag{17}
\]

This implies that the price elasticity of demand, \(\varepsilon\), is \(1/(\eta - 1)\). Total revenue for the firm

\[
R = \gamma\eta D^\eta. \tag{18}
\]

Consumer surplus is utility less expenditure (which equals \(R\)).

If a single firm supplies the market, its marginal revenue will equal \(\gamma\eta^2 D^{\eta-1}\). The firm’s total cost is assumed to equal marginal cost (which I have set, without
loss of generality, to equal 1) times output

\[ C = D. \quad (19) \]

Setting marginal cost equal to marginal revenue, we obtain the monopolist’s level of output

\[ D_M = (\gamma \eta^2)^{1/1-\eta}. \quad (20) \]

The consequent price under monopoly is

\[
    P_M = \gamma \eta D_M^{\eta^{-1}},
    = 1/\eta. \quad (21)
\]

Profits are given by

\[ \Pi_M = P_M D_M - D_M. \quad (22) \]

If proportion \( \phi \) of national income is sent abroad, national welfare is

\[ W_M = V_M + (1 - \phi)\Pi_M. \quad (23) \]

### 4.2 Duopoly

Now we compare this with the situation where a foreign firm enters, and there is a Cournot duopoly.

\[ D_C = D_{1C} + D_{2C}. \quad (24) \]
The two firms are assumed to symmetrical, and neither firm can commit to output in advance. Consequently, if we look at the domestic firm (denoted with subscript 1),

$$\Pi_{1C} = R_{1C} - D_{1C}. \quad (25)$$

Profit maximisation implies setting marginal revenue equal to marginal cost ($= 1$), and since firm 1 is forming Cournot conjectures about $D_2$, which I denote $D_2^c$, then

$$\partial R_1^c / \partial D_1 = \gamma \eta (D_1 + D_2^c)^{\eta - 1} + \gamma \eta (\eta - 1)D_1(D_1 + D_2^c)^{\eta - 2} = 1. \quad (26)$$

In equilibrium, $D_2 = D_2^c = D_1$, so

$$\gamma \eta (2D_{1C})^{\eta - 1} + \gamma \eta (\eta - 1)D_{1C}(2D_{1C})^{\eta - 2} = 1;$$
$$\gamma \eta D_{1C}(2D_{1C})^{\eta - 2}(1 + \eta) = 1;$$
$$2D_{1C} = (2/\gamma \eta (1 + \eta))^{1/(\eta - 1)};$$
$$= (\gamma \eta (1 + \eta)/2)^{1/(1-\eta)}. \quad (27)$$

Note that

$$P_C = \gamma \eta (2D_{1C})^{\eta - 1},$$
$$= \gamma \eta (\gamma \eta (1 + \eta)/2)^{-1},$$
$$= 2/(1 + \eta). \quad (28)$$
Since both firms have identical market shares

\[ U_{1C} = \gamma (2D_{1C})^\eta; \]
\[ V_{1C} = U_{1C} - 2P_C D_{1C}. \] (29)

Also

\[ \Pi_{1C} = P_C D_{1C} - D_{1C}. \] (30)

Consequently,

\[ W_C = V_{1C} + (1 - \phi)\Pi_{1C}. \] (31)

### 4.3 Solution and comparison

Rather than solving these two models algebraically, it is more sensible in this case to carry out a numerical simulation for each model, based upon alternative values of \( \varepsilon \) and \( \phi \). The scale parameter, \( \gamma \), can be shown to have no effect on whether the country will prefer a protected monopoly or a duopoly.

In general, the more elastic demand is (the higher \( \varepsilon \) or the lower \( \eta \) is), the more likely, other things equal, a country will prefer 'economic patriotism'. This is because the costs of monopoly, in terms of loss of consumer surplus, are less when demand is elastic. There is therefore a critical threshold elasticity, \( \varepsilon^* \), above which the country will prefer a domestic monopoly to a half-foreign duopoly. Simulations show that, when there is no foreign share-ownership in the domestic firm (i.e. \( \phi = 0 \)), the critical value \( \varepsilon^* \) lies at around 2.7. It is worth noting this critical elasticity probably lies well above the demand elasticity for
some monopolistic services (such as water or electricity\(^5\)), but it is possibly lower than that for some goods subsectors, or particularly for goods suppliers where there is a single domestic supplier competing with a foreign competitive fringe.\(^6\) It is therefore quite conceivable that national champions in many industries may be protected for profit-shift reasons.

Now consider the impact of allowing \(\phi\) to alter, representing a rise in foreign share ownership. Simulations indicate the following relationship:

<table>
<thead>
<tr>
<th>Foreign share (\phi)</th>
<th>Critical elasticity (\varepsilon^*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>2.7</td>
</tr>
<tr>
<td>5%</td>
<td>3.0</td>
</tr>
<tr>
<td>10%</td>
<td>3.6</td>
</tr>
<tr>
<td>15%</td>
<td>4.4</td>
</tr>
<tr>
<td>20%</td>
<td>5.9</td>
</tr>
<tr>
<td>25%</td>
<td>9.1</td>
</tr>
<tr>
<td>30%</td>
<td>20.0</td>
</tr>
</tbody>
</table>

*Table 3: Relationship between foreign share and critical elasticity for protecting a domestic monopoly.*

The pattern shown in Table 3 indicates that, at low share ownership levels, the marginal effect of raising foreign share ownership on the critical elasticity is not great; however, it becomes increasingly important, and once foreign share ownership rises above 20% the curve (as shown in Figure 3 below) becomes

\(^5\) Although the actions of a price regulator may make these industries behave as if they had a higher demand elasticity.

\(^6\) For example, a recent survey article by Anderson and Van Wincoop (2003) indicates that most traded goods have elasticities of substitution between different national producers of between 5 and 10.
steep. In other words, at the kind of foreign share-ownership level seen in most European countries today, the profit-shifting case for protection of a domestic monopolist breaks down quite rapidly.

Figure 3.

5 Summary and Conclusions

The literature on protectionism and export subsidies in the case of oligopoly has been dominated by the idea that governments will compete to help 'their' firm achieve a profit shift, making use of a perceived first-mover advantage. This has been modelled with a class of two-stage games, in which firms play a Cournot duopoly subgame, while two governments seeking to influence this are effectively
engaged in a higher-level game between themselves. The general outcome is a
Nash equilibrium in which the governments both intervene in trade.

This line of analysis became popular at a time when the great bulk of shares
in any major country’s firms were usually held by domestic nationals. This is no
longer the case. Analysis of European data suggests that typical share-ownership
by foreigners is now over a third in many countries, and this could well be a
significant underestimate. Even when account is taken of corporate taxation,
the share of profits accruing to foreigners is 20-30 per cent in most countries
on the lower estimate, while, on a higher estimate, taking account of indirect
share ownership, it may well be over half in many cases. This undermines the
profit-shifting motive for the governments.

Data on Japan and Australia show a picture broadly consistent with Europe.
Information on the United States is harder to come by, but suggests that foreign
ownership of the U.S. stock market is around 10 per cent, though increasing fast.

Consequently, I reopen two sample duopoly games, to gain an idea of the
likely point, in practice, at which the subsidising or protectionist motive will
break down, as foreign share ownership rises. In the first game, of export sub-
sidy into a third market, equilibrium subsidies cease to be positive when foreign
ownership of stock markets reaches 1/3. The second game - of blocking the
entrant of a foreign rival to a domestic monopolist - again reaches the conclu-
sion that protection ceases to be desirable at levels of 20 – 33% foreign share
ownership.

It is too early to say whether this result carries across to a wider class of
models: probably each model specification would need examination. However, a preliminary conclusion would be that standard analysis of profit shift motives for protection is probably no longer robust for many countries, given the internationalisation of capital markets.

A slight caveat is that governments’ or electorates’ perceptions may not yet have caught up with the developments in firm ownership. Consequently, it is quite possible that protectionist policies and ‘economic patriotism’ may survive for some time yet, even when they make no economic sense for the countries concerned.

References


