PROTECTIONISM THROUGH EXCISE TAXATION
IN A UNIONISED INTERNATIONAL DUOPOLY

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Protectionism through excise taxation in a unionised international duopoly

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Abstract: This paper analyses the unilateral incentives for a Leviathan government of using specific excise duties under the destination principle in the presence of strategic product markets. In a Cournot-Nash international duopoly sector with unionised labour markets and unit-elastic product demand curves, the paper shows that a marginal increase in the excise tax rate raises domestic production, firm's profits and union's utility and lowers imports, provided that the foreign firm is sufficiently larger than the home firm. By adding a competitive export sector to the model, the paper shows that the Leviathan is likely to choose a higher tax rate, if the degree of foreign penetration is sufficiently high and the size of the Cournot-Nash import sector is sufficiently small, which is consistent with using tax policy as a strategic competition device. Finally, the paper shows that excise taxes may emerge in a political equilibrium in which domestic unions and firms in the import sector lobby the government for protection.

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"The [European] Commission cannot tolerate protectionism within the Internal Market whatever form it takes. Imposing higher taxes on wine, that comes from other Member States, compared to beer, mainly produced in Sweden, may be a more subtle way to defend domestic production than import quotas or tariffs, but the effect is the same-illegal protection. I hope the Swedish government will act quickly to follow through with its previous commitments to put an end to this unacceptable regime."
Frits Bolkestein (EU Taxation commissioner on the European Commission's decision to send a formal request to Sweden to end tax discrimination against wine in comparison to beer), 12th June 2001.

1. Introduction

Excise taxes are often imposed in imperfectly competitive product markets in which home and foreign firms compete for domestic consumers. In such a situation, a domestic government can use specific consumption taxes not only for raising a given tax revenue, but also for favouring domestic over foreign producers. This strategic motive for consumption taxation may have become more important in recent years, when discriminatory trade and industrial policies, such as specific tariffs or subsidies, are becoming harder or impossible to implement in the face of international trade agreements and anti-trust legislation.[1]

The idea that national governments may use excise taxes as a way of both raising revenue and preserving or expanding domestic producers' market shares is also well recognized in the European Community. As is well known, the Treaty of Rome of 1957 prevents member states from using internal taxation (see art. 95) as a means for indirect protection of domestic products. However, discriminatory taxation, especially as regards alcoholic beverages, has been in widespread use in the European Community. Until 1995, the European Commission has brought before the European Court of Justice about 125 cases alleging discriminatory treatment by a member state in violation of article 95 of the

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1. Specific tariffs have been an important historical source of revenue amounting at 50% of the US federal tax revenue in 1913 and 26% of the total tax revenue for one hundred developing countries in 1987, see Tanzi (1991: 210-18).

Treaty, one-quarter of the cases involving alcoholic beverage taxation.[2] Notwithstanding the directives on tax harmonization, mandating minimum excise tax rates (see the directives 92/83/EEC and 92/84/EEC), EU countries continue applying different excise tax rates on alcohol and tobacco, and the potential use of discriminatory domestic excise taxation is still high on the European Commission's agenda (see EC, 2001).[3]

This paper aims at investigating the unilateral incentives for a country of using specific excise duties under the destination tax principle as a non tariff protective device. Contrary to previous works focussing on tax harmonisation as an instrument for curbing protective tax setting in imperfectly competitive product markets (see e.g. Kay and Keen, 1987, Keen and Lahiri, 1993, Lockwood, 2001, Keen et al., 2002, Haufler and Schjelderup, 2004),[4] this paper assumes that the domestic government is a self-interested Leviathan, implying that the main reason for it imposing excise taxes is that of securing tax revenue. However, with strategic product markets, domestic taxation may indeed give the government a tool for shifting foreign rents towards domestic producers. As a consequence, domestic producers may have an incentive to lobby the incumbent government for their preferred tax policy to be implemented. This political-economy

2. In the alcoholic beverage cases (Case 168/78, Commission vs. France, 1979; Case 169/78, Commission vs. Italy, 1980; Case 170/78, Commission vs. UK, 1980; Case 171/78, Commission vs. Denmark, 1980), the Court always invalidated the use of domestic discriminatory taxation. However, in other cases (Case 46/80, Vinal vs. Orbat, 1981; Case 243/84, John Walker & Sons vs. Ministeriet for Skatter og Afgifter, Denmark, 1986), the Court actually accepted the arguments for tax discrimination, see Lubkin (1996: section VII).

3. For example, the agreed minimum excise rate duty is 0 euro per hectolitre of wine and 0.748 euro per hectolitre per degree Plato of beer. However, Belgium, Denmark, Eire, Finland, France, the Netherlands, Sweden and the UK impose a positive excise duty on wine, and all the EU countries set duties above the minimum rate for beer.

4. These papers consider two-country models in which tax harmonisation occurs starting from the non-cooperative Nash equilibrium taxes. Benevolent national governments use taxes similarly to trade policy instruments in order to favour home firms. It is shown that, ceteris paribus, tax harmonisation is likely to be Pareto improving under the destination principle (see e.g. Keen and Lahiri, 1993, and Lockwood, 2001: Prop. 7) and undesirable under the origin principle (see Keen et al., 2002, Haufler and Schjelderup, 2004).

aspect has been overlooked in formal models of domestic taxation as a protective device, although it is by now an important issue in the trade literature (see e.g. Grossman and Helpman, 2002). Therefore, this paper will also consider lobbying for protective taxation by domestic producers.

This analysis is made in two steps. First, the paper shows that in a unionised international Cournot-Nash duopoly with unit-elastic demand curves and homogeneous products, a marginal increase in the excise tax rate will both increase (viz. reduce) the domestic firm's market share and make the domestic firm and the rent-maximising union better (viz. worse) off, if the foreign firm is sufficiently larger (viz. smaller) than the home firm, the exact condition depending on cost asymmetries related to the union's bargaining power, the type of labour contract, and reservation prices (see below and Seade, 1985, for the case of a domestic oligopoly with Walrasian labour markets). By considering a small open economy composed of a large number of unionised international Cournot-Nash duopolies and a competitive export sector, the paper shows that a Leviathan government, aiming at maximising the real (i.e. in terms of CPI) tax revenue while being able to precommit itself to a given tax policy, will be likely to choose a higher tax rate when the degree of import penetration (i.e. the foreign firm's size in the import sector) is larger, thus providing more protection through excise taxation in this situation.

Second, the paper sketches the conditions under which protective excise taxation will emerge in a political equilibrium when import sector domestic firms and unions lobby the government. Following the interest groups approach to endogenous trade policy (see Grossman and Helpman, 2002, chapters 4 and 6), the paper considers a game in which lobbies initially offer contribution schedules to the government in order to influence its tax policy, and then the Leviathan government chooses the excise tax rate in order to

maximise the sum of tax revenue and contributions. It turns out that, under some conditions, lobbying may indeed push for higher tax rates when import penetration is high.

The main result of this paper that a country facing strategic import competition from a low-cost foreign firm may have an incentive to set higher excise tax rates under the destination principle is consistent with previous analysis in the tax harmonisation literature pointing out the role of firms' cost asymmetries. For example, Keen and Lahiri (1993: 66-71) and Keen et al. (2002: 1563-1564) consider an international Cournot duopoly producing homogeneous goods under linear product demand curves, and show that a home country which is a net importer of the good will tax domestic consumption if the home firm has less than half of the domestic market, which in turn depends on the home firm having higher marginal cost, in so far as this policy is seen as a means for shifting rents away from foreign competitors.[5] However, whereas this policy result is driven in these papers by benevolent governments' pure rent shifting motives, in the current paper it may arise from the interaction between a self interested Leviathan government and domestic interest groups most directly affected by such a policy.[6]

The analysis of this paper can provide a partial explanation for the observed differences in the level of excise taxation among different countries. Notwithstanding different government's preferences for merit goods and their associated consumption externalities,[7] revenue and strategic competition considerations may help to explain why,

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5. A similar result is derived by Haufler and Schjelderup (2004: Proposition 1) in a model where imperfect competition takes the form of tacit collusion between a home based and a foreign based firm competing on prices.

6. The standard prediction of models à la Grossman and Helpman (2002) is that trade protection is higher in sectors with lower import penetration, as private gains are larger whereas social deadweight losses are smaller in this case. However, the empirical evidence (see Gawande and Krishna, 2003, for a survey) is mixed. Moreover, casual observation seems to suggest that this may not be the case for protective domestic taxation (see the opening quote).

7.See Frey (2002) for an up-to-date discussion of the role and effects of excise taxation.

for example, in Portugal, the excise tax rate on wine, mainly produced domestically, is lower than that on beer (0 and up to 31.4 euro per hectolitre depending on specific gravity, respectively), whereas in Sweden consumption of wine, which originates in other countries, is always taxed more heavily than beer (242.42 and 16.14 euro per hectolitre, respectively), with some 90% of Swedish beer consumption being satisfied by domestic production (see EC, 2003; Cnossen, 2001, Tab. 6).

The paper is organised as follows. Section 2 presents the model and considers the implications of excise taxation in the case of government's precommitment and no political pressure. Section 3 characterises the political equilibrium with lobbying by domestic producers. Section 4 concludes.

2. The model

The basic model follows Santoni (1996), while lobbying activity is modelled as in Palokangas (2003) and Gawande et al. (2004).[8] The home country is a small open economy composed of two sectors: a perfectly competitive net export sector and a Cournot-Nash net import sector. This latter sector is composed of a fixed and large number of identical duopolies, indexed by k=1,..j,.. f. In the jth typical duopoly, there is a unionised home firm and a non unionised foreign firm. Firms produce a homogeneous good, which is sold to domestic consumers only. The sequence of events is as follows. First, the workers and firms in the import sector lobby the government on its tax policy by announcing contributions. Second, the government sets the tax rate and collects the contributions. Then, in the typical home firm of the import sector, there is sequential

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8. In Palogankas (2003) firms and unions lobby a utilitarian government for income taxation and labour market regulation in a one-sector closed economy with competitive goods markets. Gawande et al. (2004: 7-13) assume that product markets are composed of linear-demand Cournot-Nash international oligopolies and that the labour market is competitive. Both papers build on Grossman and Helpman (2002, chapter 4).

bargaining à la Manning (1987): initially (at stage three of the game) the firm and union negotiate over the wage, then (at stage four of the game) they bargain over output and employment. This latter stage occurs simultaneously and independently of the choice of output and employment by part of the foreign firm. The foreign wage is fixed. Labour is the only input and labour markets are segmented among sectors and countries. The level of economic activity is demand determined, so that there is no full employment in the economy. The model is solved by backward induction. Section 2 of the paper will abstract from lobbying, by assuming that tax policy is exogenous for the private sector. Section 3 will consider endogenous taxes.

2.1. The aggregate consumer

There is a large and fixed number H of identical households, who share the same Cobb-Douglas preferences over consumption goods. Households are allocated ex ante and symmetrically in each sector and industry and offer one unit of labour with fixed disutility $\theta \in (0, 1)$. Households are willing to work, if the going wage rate satisfies the participation decision condition, or $w/P \geq \theta$, where w is the wage rate. Therefore, the aggregate household solves the problem: $\max [c^E/(1-\beta)]^{1-\beta}[c^I/\beta]^\beta - \theta N$, s.t. $c^E + p^I c^I \leq \Omega \equiv Y - T$, by choice of c^I, c^E and N; $\beta \in (0, 1)$ is the relative size of the import sector, c^I is consumption in that sector, c^E is consumption in the export sector, N<H is aggregate employment. International markets determine the price of exports, which is treated as given by the small domestic country and is chosen as the numeraire, $p^E \equiv 1$, such that p^I is the relative price of imports (a rise in p^I deteriorates the terms of trade). $P=(p^I)^\beta$ denotes the true cost-of-living index, Ω is the total income received. (This is the sum of domestic profits and labour income, Y, and of the net transfer by the government, T, if any. In particular, a Leviathan government ships tax revenue to a third country, such that T=0.) The household's optimal

choice yields the demand functions: $c^E=(1-\beta)\Omega$, $c^I=\beta\Omega/p^I$. Assuming that the aggregate

demand for the import good is symmetrically distributed across industries, the inverse

demand function in the jth typical duopoly is: $p^I_j=\psi/c^I_j$; *where $\psi=\{\beta\Omega/f\}$* is the average

expenditure in imports.

2.2. The import sector
In the jth typical duopoly of the import sector, there is a unionised domestic firm and a non

unionised foreign firm. For the moment being, the paper abstracts from political economy

considerations, so that the private sector treats tax policy as being predetermined. The

firms produce a homogeneous good *X,* using a linear technology: $X^h_j = L^h_j$, $X^*_j = L^*_j$, where

h and * stand for home and foreign, respectively, and L is labour input. (The j subscript

is dropped below.) In the home firm there is sequential bargaining first over the wage rate

and then over output/employment, the second stage compounding the Cournot-Nash game

with the foreign firm. The foreign wage is w* (in terms of the numéraire). The bargaining

process between the home firm and union is represented at each stage by the asymmetric

Nash bargaining solution:

$$NA = \left[\frac{\left(p^I - w^h\right)x^h}{P}\right]^{1-b}\left[\left(\frac{w^h}{P} - \theta\right)x^h\right]^b \qquad (1)$$

where w is the domestic wage, and b=z, L-with b∈(0, 1)- is the exogenous union's

bargaining power over either wages, z, or employment, L, with z≠L in general (see e.g.

Manning, 1987, for a discussion). Equation (1) states that the firm wants to maximise

profits and the union its rents, both in terms of consumption prices, and that both parties'

inside options are equal to zero. Since each negotiator is small relative to the economy,

they both treat P as given. The parties maximise equation (1), first with respect to the wage

rate, then to output/employment, subject to the appropriate constraints at each stage.[9] For L=0, the solution corresponds to wage bargaining.

The sectoral equilibrium solution is obtained by backward induction. For given government's tax policy and predetermined wage rates, in the Cournot-Nash output game the home firm and union bargain over output/employment, simultaneously and independently of the foreign firm's output choice. The parties maximise $NA|=X^h[p^I-(w^h+s)]^{1-L}$ and $\Pi^*=[X^*[p^I-(w^*+s)]$ by simultaneous and independent choice of X^h and X^*, respectively, where s is the specific excise tax, $L\in[0, 1)$ is the union's exogenous bargaining power over employment and Π^* is the foreign firm's profit function. Using the inverse product demand curve and the equilibrium condition in the typical output market, $c^I = X^h + X^*$, the first-order condition is

$$\frac{\partial NA^|}{\partial X^h} = \frac{\psi(L\ X^h\ +\ X^*)}{(X^h\ +\ X^*)^2} \ -\ w^h\ -s=\ 0, \quad if\ X^h > 0$$

$$\frac{\partial \Pi^*}{\partial X^*} = \frac{\psi\ X^h}{(X^h\ +\ X^*)^2} \ -\ w^*-s\ =\ 0, \qquad if\ X^* > 0$$

(2)

Equation (2) describes the standard output best reply functions in implicit form. As is well known (see e.g. Bhagwati et al, 1998: 388-92), with Cobb-Douglas preferences and Cournot competition in homogeneous products, they are hump-shaped in the quantity space: the larger (viz. smaller) firm views the products as strategic complements (viz. substitutes).[10] The solution to equation (2) yields the equilibrium price, $p^I=W^h +(1-L)W^*$, and outputs, $X^h=\psi W^*/[p^I]^2$ for the home firm, and $X^*=\psi[W^h - LW^*]/[p^I]^2$ for the foreign

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9. This rules out wage renegotiations. This solution is consistent with the empirical observation that wages are seldom renegotiated before the contract ends, whereas output and employment decisions are made more frequently.

10. If the union's influence over employment L is sufficiently high, the home best reply function always slopes downwards in equilibrium. From (2), there is always a unique and stable solution, see e.g. Santoni (1996).

firm, where $W^h \equiv w^h + s$, $W^* \equiv w^* + s$.[11] Turning to the wage stage, the parties choose the

wage rate strategically, by anticipating the effect on the output game, thus on the foreign

firm's decisions. By using the second stage equilibrium prices and outputs, given that the

W^*, P and ψ are exogenous variables for the negotiators, the optimal wage rate solves

$$\underset{w^h}{Max}\ NA\| = \left(\frac{w^h}{P} - \theta\right)^z \left[w^h + (1-L)w* + (2-L)s\right]^{-2} \tag{3}$$

where $z \in [0, 1]$. The solution to the first-order condition is

$$\frac{w^h}{P} = \frac{b}{(b-z)}\ \theta, \quad b = \frac{2w^h}{(w^h + s) + (1-L)(w^* + s)} \tag{4}$$

b is the gross wage elasticity of the optimal employment rule. From equation (4) yields

$$\frac{w^h}{P} = \theta + \left(\frac{z}{2-z}\right)\left(\theta + \frac{s + (1-L)(w^* + s)}{P}\right) \tag{5}$$

The contract wage is a markup over the reservation wage. It is increasing in z and

decreasing in L. It is equal to the reservation wage for z=0 and to the monopoly wage for

z=1 and L=0, as expected. Given that labour demand is iso-elastic, an increase in the tax

rate lowers the elasticity of the optimal employment rule $b = -d\log x^h / d\log w^h$: the union

pushes for a higher wage at the bargaining table, similarly to the response of a monopoly

union operating in a competitive product market (see e.g. Oswald, 1982: 589). Using

equation (5), the equilibrium price and outputs are:

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11. From (2), the market shares are: $X^h/(X^*+X^h) \equiv q^h = W^*/[W^h+(1-L)W^*]$; $X^*/(X^*+X^h) \equiv q^* = [W^h - LW^*]/[W^h+(1-L)W^*]$. The home (viz. foreign) market share is increasing (viz. decreasing) in L, for given marginal costs.

$$a) \quad \frac{p^I}{P} = \left(\frac{2}{2-z}\right)\left(\theta + \frac{(1-L)(w^*+s)+s}{P}\right)$$

$$b) \quad X^h = \psi\left(\frac{2-z}{2}\right)^2\left[\frac{w^*+s}{\left[\theta P + (1-L)(w^*+s)+s\right]^2}\right] \tag{6}$$

$$c) \quad X^* = \psi\left(\frac{2-z}{2}\right)\left[\frac{\theta P + (z/2-L)(w^*+s)+s}{\left[\theta P + (1-L)(w^*+s)+s\right]^2}\right]$$

Recall that the typical firm and union perceive $\psi = \beta\Omega/f$ and P as being exogenous. Note that, from equations (5) and (6), the foreign firm is larger than the home firm ($X^* > X^h$) in the neighbourhood of the no-excise tax equilibrium (s=0), when the condition $\theta P > (1-z+L)w^*$ holds: for given home reservation wage θP and foreign marginal costs w^*, higher union power over wages z (viz. employment L) makes it more (viz. less) likely that the home firm is smaller than the foreign firm, as long as the home firm's marginal costs becomes higher (viz. smaller) relative to the foreign firm's, ceteris paribus. Finally note that, for $z \geq L$, $\theta P > w^*$ is sufficient for the foreign firm to be dominant in the industry. This observation will prove to be useful below.

2.3 Tax incidence in the typical Cournot-Nash duopoly

This section studies tax incidence in the typical duopoly. The explicit results are derived in the Appendix A.1. The effects are driven by the reaction of home and foreign outputs: totally differentiating the FOCS with respect to X^h, X^*, and s and using Cramer's rule

$$\frac{dX^h}{ds} = \left[\frac{(-NA_{X^h{}_s}\,\Pi_{x^*x^*}) + (\Pi_{X^*{}_s}\,NA_{X^hX^*})}{D}\right]$$

$$\frac{dX^*}{ds} = \left[\frac{(-\Pi_{X^*{}_s}NA_{X^hX^h}) + (NA_{X^h{}_s}\Pi_{X^*X^h})}{D}\right] \tag{7}$$

The subscripts represent partial second and cross-partial derivatives. As usual in strategic

models (see e.g. Padilla et al., 1996), the effect of a change in the tax rate can be divided in two components: the direct effect, given by the first term in round brackets, and the strategic effect, given by the second term in round brackets. Diagrammatically, the direct effect corresponds to a shift in one player's best reply function, whereas the strategic effect is the movement along its given best reply. Tax changes are evaluated in the neighbourhood of an equilibrium without government's intervention. The results are summarised in[12]

Proposition 1: **Excise tax in the import sector.** A marginal increase in the excise tax rate evaluated at s=0: i) raises domestic output, if the home firm is sufficiently smaller than the foreign firm, or $\theta P>(3-L)w^*$; lowers imports, if the foreign firm is larger than the home firm; ii) lowers consumption, raises the wage rate and price; iii) raises the union's utility and home profits if $\theta P>w^*$, implying that the foreign firm is larger than the home firm when the union has no less influence over wages than over employment.

A marginal increase in the excise duty has the direct effect of reducing the outputs in both the firms, as long as the marginal costs increase with it. This effect is bigger for the domestic firm, because of the first-stage wage response (see eq. 5). The sign of the indirect effect for each firm depends on the slope of its output best reply function at the initial equilibrium. For instance, if the foreign firm is larger, $X^*>X^h$, its best reply function slopes upwards, whereas the smaller home firm's slopes downwards, at the initial equilibrium. The direct effect of the excise change corresponds to a downwards shift for the home best reply function, and a leftward shift for the foreign's. As long as the direct effect makes both the firms less aggressive, the indirect effect amplifies the output reduction for the larger foreign firm, whereas it increases output for the smaller home firm, thus making the overall market effect ambiguous, as summarised in Proposition 1i.

In order to gain an economic intuition for this result, assume that the labour market

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12. The derivation of the results is reported in an Appendix available on request from the author.

is Walrasian: the excise becomes an effective protective device, namely imports fall and domestic production rises with a higher tax rate, if the home firm is three times smaller than the foreign firm (if its marginal costs are three times larger than the rival's: $\theta P > 3w^*$ here). Seade (1985: 20) derives a similar condition for an asymmetric closed oligopoly, facing a unit-elastic demand curve under constant and exogenous marginal costs: the economic intuition is that a small increase in the excise penalises the most efficient, larger firm, as long as it reduces its market share, by lowering the relative marginal cost differential with the less efficient fringe firms.[13]

How does unionisation in the home firm affect the Seade condition? It can be shown that home output increases with the excise tax if and only if $\theta P > (3-L)w^*$: again the home firm must be sufficiently smaller at the initial equilibrium for the indirect effect of the duty to dominate the direct effect, but it can be slightly larger if the union has a positive influence over the output determination.[14] This is because the direct effect of the excise tax change is smaller when L is higher (i.e. the wage response to the duty becomes smaller, see eq. 5), while the indirect effect is larger (i.e. a higher L induces the home firm to put more weight on employment vis-à-vis the price mark-up when it plays the Cournot-Nash game).

Proposition 1.ii implies that there is *overshifting* of the excise duty:[15] the consumer's gross price increases by more than the amount of the excise, or $dp^l/ds = 2(2-L)/(2-z) > 1$. Note that the degree of overshifting is decreasing in the union power over employment and

increasing in its power over wages (see Seade, 1985: 17, Table 1; 20: equation 27; 22, for the case of a Walrasian labour market, when $dp^l/ds=2$ and $dw/ds=1$).[16]

Proposition 1iii claims that there may be a profitable cost increase for both the home firm and union if the home firm's reservation wage is higher than the foreign's, namely if $\theta P>w*$ holds. To understand this condition, it is again useful to consider Seade (1985: 21, equation 24). He points out that a marginal increase in the excise tax rate affects the firms' profits via both a collusion effect, which operates at the industry level, and a firm-specific effect, which works only in an asymmetric oligopoly. The collusion effect means that the common increase in marginal costs allows firms to credibly commit themselves to a level of output closer to joint profit maximisation, which may increase profits. However, with a unit elastic demand curve, the profit change is zero: the tax induced increase in the net price and the reduction in the industry output cancel out exactly. The intuition is that, at a symmetric duopolistic equilibrium, both output best reply functions have zero slope,[17] hence a simultaneous output change in both firms has no first-order effect on their indirect profits, and firms derive no gain from colluding.

Turning to the specific effect, it depends on the firm's market share before the excise tax rate change: with only two firms, a higher excise duty raises (viz. lowers) the profits of the smaller (viz. larger) firm, the reason being that, with a Cobb-Douglas demand curve, the larger firm views the products as strategic complements, hence it reacts to the increase

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15. The elasticity of the slope of the inverse demand function is $E\equiv-P''(X^h+X*)/P'=2>1$, satisfying Seade's $E>1$ condition for price *overshifting* in oligopolies: the home and foreign producer's net price, $p^l-w^h-s=(1-L)(w*+s)$ and $p^l-w*-s=w^h(z, L, s)+[1-L]s-Lw*$, rise with the excise. Home firm's net price overshifting is independent of z: $d^2p^l/dsdz=d^2w^h/dsdz=2[(2-L)/(2-z)^2]$; increasing L lowers the consumer price more than the wage $(d^2p^l/dsdL-d^2w^h/dsdL=-1<0)$. Since prices are a mark-up over marginal costs, the latter effect does not influence the producer's net price, but the former effect makes it decreasing in L. (A higher L makes the product market more competitive.

16. In symmetric equilibrium, indirect profits are independent of the excise, and equal to $\Pi/P=\psi/4P$.

in the excise by lowering its outputs more than the smaller firm does (the output of the latter could increase, see Proposition 1ii above). Therefore, although the common, tax-induced increase in the price has a beneficial effect on both firms, its cost is mainly beared by the larger firm, which implies a surplus transfer from the larger firm to the smaller competitor: this explains the condition $\theta P > w^*$ of Proposition 1iii.[18]

Interestingly, unionisation does not change the sign of the condition, although it affects the size of the surplus transfer from the larger foreign firm to the smaller home firm. In particular, an increase in the union bargaining power over the wage, z, lowers the size of the tax induced surplus' transfer from the larger foreign firm and thus its surplus loss. The reason is that an increase in z reduces the demand for the home firm more than for the foreign firm (see eq. 6); the price mark-up does not change, but the increase in the wage mark-up over the marginal disutility of work causes a net increase in the union's welfare.[19] This analysis implies:

Corollary 1. Domestic producers' preferences for the excise tax. If the home firm is sufficiently smaller (viz. larger) than the foreign firm, the firm and its union will be made better (viz. worse) off by an increase in the excise tax rate on home consumption.

Corollary 1 points towards a potential incentive for domestic producers in industries with residual home production of lobbying the government for introducing an excise tax or for increasing the tax rate. This analysis will be the focus of section 3 below.

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17. The foreign firm's indirect profits are proportionate to its market share: $\Pi^*/P = \psi(q^*)^2/P$. Therefore, they fall with the excise, if the home reservation wage is larger than the foreign marginal costs: SIGN OF dq*/ds=SIGN OF $[(2-z)/2]^3(w^*-\theta P)$, this being evaluated at s=0.

18. For $w^* > \theta P$, it can be shown that both the foreign firm's profits fall and the home firm's profits increase are decreasing in z, while the union's utility is increasing in z. Although unionisation does not seem to change the condition for a profitable cost increase, this is strictly true in partial equilibrium. In general equilibrium, unionisation affects both the industry expenditure ψ and the price index P; because the latter is increasing in the price of imports, the higher is the degree of imperfect competition in the labour market, the more likely is that the cost increase is profitable.

2.4 Symmetric equilibrium in the Cournot-Nash sector

In a symmetric equilibrium, each industry chooses the same wage, price, output and employment: $p_j^I = p^I$; $w_j^h = w^I$; $X^I = N^I = fX_j^h$; $c^I = fc_j^I = f(X_j^h + X_j^*)$, so that $X^I = (1-q^*)c^I$ and $X^{**} = q^*c^I$, where $q^* \equiv X^*/(X^h + X^*)$, is the typical foreign firm's market share, and $c^I = \beta\Omega/p^I$, where p^I is given by (6).

2.5 The export sector

In this sector, there are perfectly competitive labour and product markets. The representative firm produces a homogeneous good, whose price is determined in international markets, with $p^E \equiv 1$. Production technology exhibits decreasing returns to labour, $X^E = (N^E)^\alpha$, $0 < \alpha < 1$, so that the optimal output supply is: $X^E = [\alpha/w^E]^{\alpha/(1-\alpha)}$. From the participation decision condition and the assumption of underemployment, it follows that the competitive wage is $w^E = \theta P$, hence $N^E = [\alpha/\theta P]^{1/(1-\alpha)}$.

2.6 Leviathan's optimal excise tax

This section assumes that the government is a Leviathan, which maximises excise tax revenue that is then shipped abroad (see Kay, 1990: 62-3). The excise seems the most effective taxing tool for a Leviathan, as long as it is easy to administer and collect and is politically acceptable. For these reasons, it is not surprising that several countries, even in the European Community, obtain a relevant part of their total tax yield from specific consumption taxation.[20]

This section briefly outlines the general equilibrium solution. Under trade balance

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19. 'In most countries...it remains difficult to detect any coherent rationale for those goods which are singled out for especially high rates of commodity taxation...these high taxes reflect mainly a mixture of long tradition and the apparent willingness of voters to accept punitive rates of taxation on consumption about which the taxpayer herself already feels more than a little guilty', Kay (1990: 40-41), see also Frey (2002). Note that countries such as Ireland and Portugal still collected 17.1% and 21.2% of their total tax revenue from excises in 1994, although these shares have fallen to about 13.5% by 2002, see Cnossen (2001: Table 6).

$$BT \equiv (X^E - c^E) - (p^I - s)X^{**} = 0 \qquad\qquad \textbf{(8)}$$

yields equilibrium national income Ω

$$\Omega = \left(\frac{X^E}{1 - \beta(1 - n)} \right) \qquad\qquad \textbf{(9)}$$

where $n=q^*[(p^I-s)/p^I]$ is the effective marginal propensity to import, corresponding to the market share of the typical foreign firm for $s=0$, as long as $q^*=X^*/(X^h+X^*)$. Because of the assumptions of log-linear preferences, constant marginal product of labour in the import sector, constant disutility of labour and underemployment, the relative prices can be solved independently of the quantities. This implies that prices and wages are fixed at equilibrium, for given policy parameters, and that equilibrium output in the export sector can be written as an implicit function of all the exogenous variables $X^E = X^E(\alpha, \theta, \beta, L, z, w^*, s)$. The general price index is $P=(p^I)^\beta$.

The Leviathan government maximises the real value (i.e. in terms of the consumption goods index) of the tax revenue,[21] namely $R/P=s(X^I+X^{**})/P=s\beta\Omega/(p^I)^{1+\beta}$. The first-order condition is

$$\frac{dR/P}{ds} = \frac{R}{P}\left[\frac{1}{s} + \left(\frac{d\log\Omega}{ds} - (1+\beta)\frac{d\log p^I}{ds} \right) \right] = 0 \qquad\qquad \textbf{(10)}$$

The first term on the RHS gives the marginal benefit, whereas the second term on the RHS the marginal cost, of the excise duty. In general equilibrium, this latter depends on the

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20. See EC (2004: 17-19) on the member states' concern for the real value of the tax rates on alcoholic products.

effects on the national income and import price (which affect the tax base) and on the consumption price index (which affects the real value of the rate of duty). From eq.t (10)

$$s^+ = \left[(1+\beta)dlogp^{\,I}/ds - dlog\Omega/ds\right]^{-1} \qquad \textbf{(11)}$$

Equation (11) gives the optimal excise tax rate s^+ in implicit form. Provided that the RHS term has a positive sign, this is the higher, the lower is the tax-induced increase in the Cournot-Nash price, thus the consumer price index spillover (which is proportional to β), and the lower (viz. higher) is the reduction (viz. increase) in national income. The Appendix derives the general equilibrium effects of a marginal increase in the excise duty: the RHS term of (11) can then be written as: $(1+\beta)dlogp^I/ds-dlog\Omega/ds=(1+\beta)[1+\alpha\beta/(1-\alpha)]dlogp^I/ds +\{\beta/[1-\beta(1-n)]\}dn/ds$. The RHS first term is always positively signed (see equation a.8 in the Appendix); the sign of the RHS second term depends on the effects of the excise duty on the marginal propensity to import, n: if the marginal effect of the tax on the marginal propensity to import is negative, the optimal excise duty is likely to be higher than if this effect positive, ceteris paribus. It follows

Proposition 2 Optimal excise duty A sufficient condition for the marginal propensity to import to be decreasing in the excise tax is $\theta P(1-\beta)>w^*$. The optimal excise, if it exists, is likely to be increasing in the degree of foreign penetration in the domestic market. *Proof.* See Appendix for the first part. The second part follows from equation (11).

Proposition 2 claims that a Leviathan government is likely to set a higher optimal excise rate, if the typical foreign firm is sufficiently larger than the home firm: for example, if the import and export sectors have equal size, or $\beta=1/2$, the foreign firm must be at least twice as big as the home firm (with competitive labour markets) or $\theta P>2w^*$: the required gap between the home and foreign reservation wage is bigger, the bigger is the size of the import sector. The intuition is that a reduction in the marginal propensity to

import raises equilibrium national income, see eq. (9), thus, ceteris paribus, tax revenue: however, an increase in the excise rate allows the home firm to steal market share from the foreign firm if and only if the latter is sufficiently large (see section 2.2 above). The exact condition depends also on the import sector's size, which determines the size of the spillover effect from the price of imports to the cost-of-living index, thus the size of the feedback on prices, wages and economic activity in each sector. As a consequence, one would expect that economies where domestic production is residual relative to foreign imports, and where the import sector is not too large, will have a higher optimal excise rate when the government is a Leviathan.[22] Finally, the condition for a profitable tax increase for domestic producers is independent of the import sector's size, as they do not perceive general equilibrium effects of the policy.

3. Lobbying for excise taxation

The analysis made so far suggests that import sector firms and unions may have an incentive to lobby the government for protection through excise taxation. This sections considers this issue more closely, by presenting a simplified model of lobbying. Following Grossman and Helpman (2002, chap. 4 and 6), this section assumes that import sector domestic firms can form a lobby (i.e. an employer federation) for representing industry interests; similarly, domestic unions organise themselves into a union federation. Each lobby links it contributions only to tax policy in the import sector (the "focused lobbying effort" assumption of Grossman and Helpman, 2002: 190).[23]

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21. The optimal tax rate of a utilitarian government is also likely to be larger if the tax lowers the marginal propensity to import, in so far as the sum of rent shifting and revenue effects dominates the terms of trade effect.

22. This section assumes that the unemployed, workers employed and firms in the competitive export sector are unable to form lobbies: if there is a large number of them, they may be unable to solve free riding problems.

In order to characterise the political economy equilibrium, the sequence of events is as follows. Initially, each lobby simultaneously chooses contribution schedules, ME(s) for the employers and MU(s) for the unions, both expressed in CPI terms, linking payments to the government to the tax policy it implements. Then, the government sets the tax policy in order to maximise the sum of tax revenue and contributions.[24] Total net welfare of all firms and unions are

$$\Pi T(s; .)/P \equiv \sum_{j=1}^{f} \pi_j /P - ME = \Pi(s; .)/P - ME = (p^I - w^I - s)(1 - q^*)c^I/P - ME$$

$$AT(s) \equiv \sum_{j=1}^{f} A_j - MU = A(s) - MU = (w^I/P - \theta)(1 - q^*)c^I - MU \qquad \textbf{(13)}$$

with $q^* \equiv X^*/(X^h + X^*)$, $c^I = \beta\Omega/p^I$; w^I/P, p^I/P, X^h and X^*, Ω are given by equations (5), (6) and (9), respectively. The government objective function is specified as follows:

$$G(s,.) = ME + MU + R/P = ME + MU + s\beta\Omega/(P.p^I) \qquad \textbf{(14)}$$

Note that, because the government is purely self-interested, its marginal rate of substitution between contributions and tax revenue is assumed to be unity.

Following Grossman and Helpman (2002, Proposition 1, p. 120) and Palokangas (2003, p. 259), define a subgame perfect Nash equilibrium of the lobbying game as a set of contribution functions, ME°(s) and MU°(s), and a tax policy s° that satisfy the following conditions: i) contributions are feasible, namely they are non negative and less than the total income of the lobby; ii) the government's policy maximises its objective function, given the contributions of the two lobbies; iii) for every lobby, the tax policy maximises the sum of the government's and that lobby's welfare, given the other lobby's contribution; iv) a participation condition for the government: every lobby gives the

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23. The standard assumption (see e.g. Grossmann and Helpman, 2002: 119) is that the government cares about aggregate social welfare being it concerned about the next election or being it partly benevolent. Here, one can think of the government disregarding social welfare in so far as it believes that excise taxation is not a salient issue affecting its re-election probability. As a result, the government disregards domestic consumer surplus completely.

government at least the level of utility that it could get when the lobby offers nothing and the government's sets its policy optimally, given the other lobby's contribution. By assuming that contribution functions are differentiable around the equilibrium point s°, from conditions ii) and iii) yields that the contribution schedules are locally truthful: each lobby offers its true willingness to pay for marginal changes in the excise tax rate in equilibrium. This implies that at s° each lobby sets its contributions such that the marginal change in its contribution, due to a small change in the excise tax rate around the optimal tax rate, is equal to the change in the lobby's gross welfare provoked by this policy change

$$d[\Pi(s°)/P]/ds = dME(s°)/ds; \qquad\qquad d[A(s°; .)/P]/ds = dMU(s°)/ds.$$

When contribution schedules are differentiable around the equilibrium point, it can be shown that the government chooses the tax rate as if maximising the sum of its objective function and that of the two lobbies, implying that the optimal tax rate satisfies the FOC

$$d[\Pi(s°; .)/P]/ds + d[A(s°; .)/P]/ds + d[R(s°)/P]/ds = 0 \qquad\qquad \textbf{(15)}$$

From (15), a marginal excise tax change affects the lobbies' welfare through three channels. First, it affects the price, $d[(p^I - w^I - s)/P]/ds$, and wage, $d(w^I/P - \theta)/ds$, mark-ups: for a given consumer price index P, both lobbies gain from a higher tax as the domestic price raises above the domestic wage, whereas the marginal disutility of work is fixed (see eq. 5 and 6 above); however, because there is a tax induced general price inflation, the real price and wage mark-ups fall in proportion to the size of the import sector, namely $d\log P/ds = \beta d\log p^I/ds$, which lowers the lobbies' gain. Second, there is a foreign market share effect, $d(1-q^*)/ds$: given P, the lobbies gain (viz. lose) from a higher excise tax rate if the typical foreign firm is larger (viz. smaller) than the typical home firm; however, more price inflation, by pushing up the domestic wage relative to the foreign wage raises the foreign market share, thus reducing such a gain. Finally, there is a demand effect

dc^I/ds, which is negative when a Leviathan selects a positive optimal tax duty (see eq.11 above and a.4 in Appendix). By substitution, the equilibrium excise tax rate solves:

$$\frac{d\Pi/P}{ds} + \frac{dA}{ds} + \frac{dR/P}{ds} =$$

$$c^I \left[\frac{d(p^I-s)/P}{ds}(1-q^*) - \left(\frac{p^I-s}{P} - \theta \right) \frac{dq^*}{ds} \right]$$

$$+ \left[\frac{p^I-s}{P} - \theta \right](1-q^*)c^I \left(\frac{d\log\Omega}{ds} - \frac{d\log p^I}{ds} \right) \qquad (16)$$

$$+ \frac{R}{P} \left[1 + s \left(\frac{d\log\Omega}{ds} - (1+\beta)\frac{d\log p^I}{ds} \right) \right] = 0$$

where the first and second terms on the RHS of equation (16) represent the effects of the excise tax on the gross welfare of the two lobbies and the RHS third term gives the impact of the excise on the real tax revenue, which, from Proposition 2 above, gives the optimal tax rate chosen by the Leviathan. Note that the first RHS term is positive if the tax lowers the typical foreign firm's market share (namely, if $\partial q^*/\partial s < 0$ and $d(p^I/P)/ds = (1-\beta)dp^I/ds > 0$), whereas the second RHS can be of either sign (see eq. 11 above).

Equation (16) is difficult to analyse in general, as long as it may imply that the government's chooses a tax rate that is either higher or lower than the rate it would choose in the absence of lobbying. However, there is a special case in which the lobbies would push for the selection of a higher tax rate by the government: if the lobbies do not perceive general equilibrium effects of the tax policy on P and c^I (implying that the RHS second term is zero) and the typical foreign firm is larger (such that $dq^*/ds < 0$), the chosen tax rate, if it exists, will be larger than that selected by the Leviathan. In this case, the government may choose to push the tax rate above its revenue maximising level, by trading off at the margin the loss in revenue with the increase in the lobbies' contributions. When are

lobbies more likely to misperceive general equilibrium effects? This may occur if they are either myopic or organised at the level of the single firm rather than the industry, or if general equilibrium spillovers are indeed negligible. However, the message of this section is that, in the current model, organised interests are likely to lobby for more protection through excise taxation, if import penetration in their own sector is large, ceteris paribus.

4. Conclusion

This paper has considered the effects of an excise duty in a small open economy with two sectors. The policy effects depend on such factors as the bargaining agenda, the relative firms' size, and general equilibrium spillovers. The results have been derived under specific assumptions about consumer preferences (i.e. Cobb-Douglas) and competition (Cournot-Nash in homogeneous goods), and by adopting Manning (1987) sequential bargaining approach. The partial equilibrium analysis suggests that home firms and unions gain from a higher domestic excise tax rate if the degree of foreign penetration in the import sector is sufficiently high. A Leviathan government wishing at maximising total tax revenue is also likely to set a higher excise tax rate in the import sector, if the foreign penetration is large and the import sector is small. Moreover, domestic producers in the import sector may have higher incentives to lobby for protection when import penetration is large. The analysis of this paper can therefore give a partial explanation for the empirical observation that excise tax rates appear to be higher in several industries with dominant foreign production, and smaller in industries with dominant home production.

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Appendix

Differentiating the system of equations (6)- (10), the price index P, the consumption levels in the two sectors and the output level in the export sector with respect to the excise tax, and evaluating in the neighbourhood of the no government equilibrium (s=0), yields:

$$\frac{dlogn}{ds} = \left(p^I \left[w* \frac{dlogp^I}{ds} - 2 \right] + w^* \right) \frac{}{p^I(p^I - w*)} \quad ? \qquad (a.1)$$

$$\frac{dlogX^E}{ds} = - \frac{\alpha\beta}{1-\alpha} \frac{dlog\ p^I}{ds} < 0 \qquad (a.2)$$

$$\frac{dlog\Omega}{ds} = \left(\frac{dlogX^E}{ds} - \left(\frac{\beta n}{1-\beta(1-n)} \right) \frac{dlog\ n}{ds} \right) \quad ? \qquad (a.3)$$

$$\frac{dlogc^I}{ds} = \left(\frac{dlog\Omega}{ds} - \frac{dlogp^I}{ds} \right) \quad ? \qquad (a.4)$$

$$\frac{dlogc^E}{ds} = \left(\frac{dlog\Omega}{ds} \right) \quad ? \qquad (a.5)$$

$$\frac{dlogX^I}{ds} = \left(\frac{dlogc^I}{ds} + \frac{dlog(1-n)}{ds} \right) \quad ? \qquad (a.6)$$

$$\frac{dlogX^*}{ds} = \left(\frac{dlogc^I}{ds} + \frac{dlogn}{ds} \right) \quad ? \qquad (a.7)$$

$$\frac{dlogp^I}{ds} = \frac{2-L}{\theta P(1-\beta)+(1-L)w*} > 0 \qquad (a.8)$$

It turns out that a sufficient condition for dn/ds<0 is [w*(dlogp^I/ds)-1]<0, namely θP(1-β)≥w*; moreover, dn/ds>0 if and only if w*>θP {2(1-β)/[1-(1-β) (z/2-L)]} .