

DRAWBACKS FOR INDIRECT EXPORTERS AND MONOPOLY POWER

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The paper presents different methods for extending export drawback schemes to 'indirect exporters', i.e. firms that sell inputs to exporters. We review the schemes to extend export drawbacks to indirect exporters that have been adopted in Chile, Korea and Colombia. To compare them, we consider a market structure where the indirect exporter is a monopolist. We assume he must charge a linear price because of potential for a resale market for the input. We find that the Korean scheme is reasonably efficient. The Colombian scheme excludes small exporters and promotes vertical integration artificially. The Chilean scheme allows the input monopolist to charge a fixed fee to the final exporters, leading to unexpected results: If the optimal pricing policy is of a certain type, national welfare rises but input prices do not fall and no previously inactive firm enters the export business. If the optimal pricing policy is of the other possible type, the input price may rise or fall, depending of the shape of the demand curve. If the input price rises enough, national welfare would fall. We suggest an alternative scheme, based on the Colombian one, that should do better than the Korean and Chilean schemes.

1. Introduction

Export drawbacks are schemes that attempt to return to exporters the duties paid on imported inputs. They can be classified according to whether indirect imported inputs are covered or not. Most export drawback schemes apply only when the importing firm is the same as the exporting one. However, some countries have tried to redesign their export drawback schemes to include 'indirect exporters', i.e. producers of inputs for exporting companies. Among these countries, Colombia, Korea and Chile have adopted quite different methods for achieving this end.

This paper attempts a comparison of these different methods. However, it

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is not enough to compare them using perfect competition models. The reason is that usually important details, which determine the effectiveness of the policy, are overlooked. We analyze a particular market structure where a domestic input monopolist (the 'indirect exporter') sells an intermediate input to factor-price-taking final exporters. These exporters can exhibit several market structures. The input monopolist uses foreign inputs, and pays a tariff on them, which theoretically can be drawn back when indirect exporters are included in the drawback scheme. This market structure is interesting in the Chilean case, because the main indirect exporter that has used the 1988 extension of the drawback scheme enjoys limited monopoly power. This market structure should be of general interest for developing countries where economies of scale relative to market size and protection imply that only one or few input producers exist.

We find that the Korean scheme is reasonably efficient. The Colombian scheme excludes small exporters and promotes vertical integration artificially. The Chilean scheme allows the input monopolist to charge a fixed fee to the final exporters, leading to unexpected results. This happens because the Chilean rules pay the drawback to the final exporter, but require documentation that only the indirect exporter can provide. As she is not forced to provide it, she may charge a fee for it.

If the optimal pricing policy of the monopolist involves charging a substantial fixed fee, national welfare rises but input prices do not fall. Moreover, no previously inactive firm enters the export business and smaller active exporters prefer not to receive the drawback to avoid paying the fixed fee. If the optimal pricing policy involves a small or zero fixed fee, it turns out that the input price may rise or fall, depending of the shape of the demand curve. We provide an example where the input price rises, contradicting conventional wisdom. If the input price rises enough, national welfare would fall. Adoption of either of these pricing policies depends on the sensitivity to fixed fees of demand for the domestic intermediate input.

We also show that forcing the indirect exporter to provide the documentation would make the Chilean scheme equivalent to the Korean one. In addition, we argue that requiring the final and indirect exporters to make drawback requests jointly would be much better, because the monopoly distortion itself would be reduced.

Other work in this area is summarized now. Most applied economists, from Smith (1776) to Krueger (1978), have considered export drawbacks to be unambiguously welfare enhancing. Nam (1987) reviews the GATT framework for export drawbacks and subsidies. General equilibrium analysis under perfect competition by Ramaswami and Srinivasan (1968) shows that export drawbacks on duties paid in imported inputs are optimal in the second-best allocation. However, Behrman and Levy (1988) argued recently that when

tariff rates are given, export drawbacks are like a customs union, and that the general theory of the second-best precludes definite welfare judgements.¹

Section 2 of this paper describes export drawback regimes in developing countries. Then, section 3.1 describes the production relations and market structure that are the basis of our model. Section 3.2 presents equilibrium pricing when indirect exporters do not have access to the drawback. Section 4 finds out the effects of an extension of drawbacks to indirect exporters, under the rules of Chile, Korea and Colombia. Other rules are suggested. Section 5 sums up.

2. Drawbacks for indirect exporters in developing countries

Export drawbacks are a well established institution in the trading countries of the world, including most less developed countries. They were well known to Adam Smith, who in *'The Wealth of Nations'* defined them as *'to allow the merchant to draw back upon exportation, either the whole or a part of whatever excise or inland duty is imposed upon domestic industry; and upon the reexportation of foreign goods imported, the largest part of the duty upon importation.'* Export drawbacks are different from export subsidies because the first are a devolution of taxes or duties effectively paid. However, in many countries this distinction is not always carried through and export subsidies are called drawbacks.²

This paper concentrates on the type of drawback mentioned last by Smith, namely the devolution of import duties paid on imported inputs incorporated in exports. This type of drawback has become more popular in developing countries lately, as many of them have sought to expand their exports, while keeping in place the high tariffs that protect the import-competing sector. Export drawbacks for imported inputs are necessary to exempt exports from the burden of the protection conferred to domestic producers of inputs. Its most obvious advantage over export subsidies, in a context where many of these countries have joined the General Agreement

¹Their model is based on the assumption that a firm that sells both for the domestic and export markets gets an export drawback that reduces the imported input's net price in proportion to the value of the output that is exported. In practice, however, GATT allows drawbacks only in proportion to the quantity of exports, through a fixed input-output coefficient. If the world price of an export that is supplied inelastically rises, actual drawback schemes continue paying the same amount to the exporter. Instead, B-L's assumption has the undesirable implication that the drawback rises proportionally to the rise in export values, and that the marginal cost of the imported input falls.

²In 1956-1961 in Israel, there was an export 'drawback' that was calculated on the basis of an input-output matrix defined at an important level of aggregation, and the actual determination of imported inputs was not done at the firm level. See Michaely (1976). The same is true of a 1985 Chilean law called 'simplified export drawback system', which in fact is an export subsidy. See Justiniano (1988).

Table 1

Chile: Drawbacks on duties paid on imported inputs (millions of U.S. dollars of each year).

Year	Drawback expenditure	Duties collected on imports ^a	% Drawn back	Number of firms
1978	1.48	193.40	0.8%	27
1979	1.52	183.60	0.8%	34
1980	6.46	156.57	4.1%	70
1981	8.56	174.80	4.9%	87
1982	12.11	112.50	10.8%	94
1983	12.14	196.07	6.2%	129
1984	13.61	311.03	4.4%	155
1985	19.48	270.89	7.2%	186
1986	20.36	228.62	8.9%	180
1987	21.08	210.04	10.0%	141

^aOnly intermediate goods imports, excluding fuels, replacement parts, and parts for assembly, whose tariffs cannot be drawn back.

Sources: First and last columns, Chilean Customs Service. Second column: Boletín Mensual Banco Central de Chile, Table 'Clasificación Económica por Destino Final', CIF values. These values were multiplied by the average uniform tariff rate of the year.

on Trade and Tariffs (GATT), is that GATT allows export drawbacks³ but not export subsidies [Nam (1987)]. The GATT accepts, as an alternative for export drawbacks, with the same excluded inputs, institutions like free-trade zones and Custom Service-controlled warehouses and manufacturing plants. In this paper, we will consider all these institutions together, under the collective name of 'export drawbacks'.

2.1. Export drawbacks to direct exporters

The workings of most export drawback regimes are such that only direct intermediate inputs are covered. An example was the Chilean export drawback regime⁴ for the period 1978–1987. At this time Chile had a uniform tariff rate on almost all imported goods, final or intermediate. The main characteristics of the drawback regime was that the importing firm that paid the duties had to be the same legal entity as the exporting firm that requested the drawback. This restriction has been the subject of criticism, as it obviously favours vertically integrated firms, which usually are also the larger firms. The Chilean drawback worked as shown in table 1.

³GATT disallows drawbacks of tariffs paid on some inputs, specifically fuels, replacement parts and parts for assembly, apparently because content control is too difficult in those cases.

⁴Decree Law no. 409, of 1970. Until 1977, this law had little application because no detailed rules of operations were issued by the Customs Service. In addition, before the 1975–1977 uniformation of Chilean import tariffs, most exporters found the advantages of specific input tariff exemptions more attractive than the devolution provided by this export drawback regime. In September 1977, the missing rules were issued by the Customs Service.

Table 2
Chile: Size distribution of drawback claims in 1986.

Size range (U.S. \$)	Average claim	% of no. of claims	% of volume of claims	% of vol. for exp. distr. ^a
up to 1,000	576.8	10.5	0.05	0.85
10E3-10E4	3768.0	38.3	1.23	7.33
10E4-10E5	34,807	31.7	9.41	49.23
10E5-10E6	323.22	16.7	45.98	42.57
10E6 and +	1.827E6	2.8	43.33	0.02

^aThis column shows the %s for an exponential distribution of claim sizes with the same average claim, namely U.S.\$ 117,163.0, and it was placed there for reference purposes only. The range of sizes of total claims per firm was U.S.\$ 35.5 to U.S.\$ 2,464,407.7 in 1986.

Source: Built by the author from Chilean Customs Service data.

These figures must be assessed by taking into account that many imported intermediate inputs are used to manufacture non-traded goods, importables and exportables consumed domestically. It is also interesting to review the size distribution of total annual drawback claims per firm, which may show a bias in favour of larger exporters. (See table 2.)

The administrative team in charge of this drawback at the Chilean Customs Service manages around 3,000 requests per year, and for 1987 consisted of three full-time persons in the Customs Service, two in the General Accounting Office⁵ and four Custom Service chemists that devote part of their time to ex-post content control. This was possible because of the limited number of firms that used this drawback scheme.

2.2. Export development contracts

In some developing countries, notably in Colombia and Brazil, export drawbacks have been an important component of Export Development Contracts offered by the government. For instance, in the Colombian Vallejo Plan, introduced in 1959, the contract is a commitment by a firm to export at least some volume over the next years and to obtain external financing for its imports, in exchange for the right to import up to some volume of inputs and capital goods free of tariffs and quotas. Since 1974 the Vallejo Plan has limited the input imports to 50% of the exported value.

The Brazilian BEFIEX Plan started in 1972, and consists of a similar commitment in exchange for special drawback rights. More precisely, the benefits consist of: (a) a drawback for imports of capital goods of any kind, bypassing the requirement of inexistence of similar local products imposed in the regular Brazilian drawback scheme, plus (b) a similar privileged draw-

⁵Contraloría General de la República. These officials check exporters ex-post and randomly.

back for imports of inputs and parts for assembly under the twin conditions of not exceeding a third of the value of exports when excluding imports under special regimes, and not exceeding half of the value of exports when including all imports. The commitments required from the firm are the following five: (1) attaining a preset cumulative volume of exports for the next ten years, (2) attaining a preset cumulative volume of net exports, i.e. subtracting imports of capital goods and inputs, of 75% of gross exports over ten years, (3) attaining positive net exports in each individual year, (4) to invest a preset figure in fixed assets, and (5) to buy a preset volume of domestic capital goods.⁶ The requirements were changed in 1988, when they became differentiated by location of the plant, and the right to import computer equipment was added to benefits [Baumann (1989)].

These contracts differ from normal export drawbacks because they are not unconditional and because they are not offered on the same terms to all exporters. Government officials can discriminate between exporters, bargaining on an individual basis the exact terms of each contract. The process has an implicit bias against small firms. In 1987 the average size, measured by equity, of manufacturing firms that participated in the BEFIEX program was 4.9 times the average size of the 4,337 firms that appear in the 1987 Annual Balance Sheet Survey published by *Gazeta Mercantil* [see Baumann (1989)].

The significant growth shown by the BEFIEX program since 1979 is due to several factors. The first is the disappearance of alternative mechanisms to obtain tariff exemptions for imported inputs. This induced additional manufacturing sectors to move into the BEFIEX program, and as these were less intensive in imported inputs, the average performance indices improved. (See table 3).

2.3. Export drawbacks for indirect exporters

Export drawbacks have been criticized on the grounds that they generate distortions in the input markets. As the exporter has access to foreign inputs exempt from tariffs, the domestic producer of alternative inputs loses his tariff protection. Moreover, the domestic producer of inputs may be importing his own inputs, further back in the chain of production. As he is not an exporter, the duties paid on those inputs raise his costs, reducing his chances of competing with the inputs imported directly by the final exporter. The consequence is that simple export drawbacks present a clear bias against 'indirect exporters', i.e. the domestic producers of inputs for final exporters.

The bias persists even if the input is not internationally tradeable, because the tariff paid by indirect exporters raises the cost and price of the domestically produced input. The result is that simple export drawbacks may

⁶The exact duration of the program, the percentages, and the figures mentioned are negotiated on a case by case basis, so the numbers given are an estimated average. See Baumann (1989).

Table 3

Brazil: Export contracts through BEFIEX 1976-1985 (millions of U.S. dollars of each year, %, numbers).

Year	BEFIEX exports	Duties and taxes drawn back/exp.	Exempt inputs & capital/exp.	No. of outst. contracts
1976	456	22.1%	25%	23
1977	665	27.0%	29%	28
1978	865	29.6%	58%	38
1979	1,119	23.3%	33%	54
1980	1,793	23.5%	28%	89
1981	2,581	34.3%	45%	124
1982	2,343	23.9%	41%	203
1983	2,935	11.5%	15%	228
1984	3,872	9.9%	12%	273
1985	4,851	7.1%	10%	317

Source: Tables 1 and 5 in Baumann (1989).

promote excessive reliance on foreign inputs, and the development of an export sector detached from the domestic economy. Alternatively, simple export drawbacks may promote unnecessary vertical integration between final and indirect exporters. This seems to be the case in Brazil [García (1978)], Colombia [French-Davis and Piñera (1978)] and in Mexican maquiladoras [ECLAC at Mexico City (1978)].

These results are clearly avoidable, since GATT allows *subsidies* on tradeable intermediate inputs if they do not cause prices to be lower than international prices. In addition, GATT allows subsidies on non-traded intermediate inputs as long as they are neutral between export and domestic sales [Nam (1987)]. However, it must be remembered that GATT rules are different from the United States' law, which is the country that retaliates through countervailing duties most frequently [Finger and Nogués (1987)].

Some developing countries have followed explicit policies to avoid the problems of simple export drawbacks. Taiwan pays exporters the same drawback for the purchase of imported inputs and importable inputs, i.e. regardless of the source of the input. This solution is equivalent to an 'export' subsidy for indirect exporters that compete directly with imported inputs, which keeps up their effective protection. However, this policy does not compensate for tariffs paid by producers of inputs that are non-tradeable or exportable.⁷

Colombia modified its export contract program in 1967 to reduce the bias against indirect exporters. Under the modified Plan Vallejo, export drawbacks and exemptions from import quotas were extended to imports of the suppliers of intermediate goods to exporters. The export contract, however,

⁷In the Chilean case, where most capital equipment is importable, the government adopted the Taiwanese scheme for capital goods in 1987 [Justiniano (1988)].

had to be subscribed jointly by the final exporter and the indirect exporter. Since 1974 the Vallejo Plan has limited the combined input imports of the direct and indirect exporter to 40% of the exported value. Note that this policy is not equivalent to a full drawback for indirect exporters because a long-term contract must be signed with the government, and there is a limitation to the volume of imported inputs subject to the plan. It is applicable to the manufacturing sector only, excluding services and other sectors. Finally, it can be extended only one stage back in the chain of production and distribution.

On the other hand, South Korea, and recently Chile, have adopted the policy of allowing export drawbacks to all indirect exporters. This means that indirect exporters, i.e. firms that sell inputs to exporters, can draw back the tariff paid on their imported inputs, regardless of whether their product is importable, non-tradeable or exportable. The indirect exporters have access to this benefit only in proportion to their sales to direct exporters, excluding sales to other customers, just as final exporters obtain the drawback only in proportion to their export sales. There are differences in the way in which these benefits can be obtained. In Korea, it is the indirect exporter himself who has access to the benefit, and he deals directly with the government to obtain it [Westphal (1978)]. In Chile, the indirect exporter does not obtain a direct benefit. Rather, the final exporter has the right to ask the drawback of the duties paid by his supplier when he imported his inputs. As the purpose of this paper is to explore the advantages and disadvantages of the different methods of offering drawback rights to indirect exporters, we present details about the Chilean system.

The new Chilean law⁸ on export drawbacks was approved in 1988. It bestowed upon exporters the right to draw back the tariff paid on every imported input, regardless of how far back in the chain of production is the actual importer of the input. The requirement that the importing and exporting firms are one and the same was abandoned, eliminating artificial incentives for vertical integration.

Although the final exporter is the only person with the legal right to claim the drawback, if he wants to claim it for inputs not imported by himself, he must add specific documentation whose only possible provider is the actual importer. It is assumed that the importer will either sell or give the documentation to his client (the direct exporter), because he is not forced to provide it. In 1987, before passing this law, the government requested a written opinion from the Chilean Antimonopoly Commission, about whether indirect exporters would be allowed to price-discriminate between clients that ask for the drawback documentation (presumably exporters) and those who do not (presumably those who sell to the domestic market). The Commission stated

⁸Law no. 18,708 of May 1988.

that this type of price discrimination would be allowed 'as long as the price difference is not larger than the export drawback.' The new law has been in operation for eight months at the moment of writing. All the drawbacks paid during this period belong to the seven product groups mentioned in table 4.

On an annual basis, the total volume of drawbacks paid for cases in which the importer is not the same as the exporter amounts to 7.7% of the 1987 total. Although there has been no large increase in the total volume of drawbacks, it is reasonable to expect that this number will rise over time as information on the existence of this new drawback mechanism diffuses among firms. In product groups 2 and 4 the different stages have common ownership, suggesting that the new law eliminated artificial incentives for vertical integration. The most important indirect exporter that has used the new drawback offered in Chile is the Con-Con Oil Refinery, which concentrates 85% of the drawbacks that could be quantified. It is interesting to note that in this case market structure is such that there is only one input supplier vis-à-vis several direct exporters.

The requisite documentation, as defined in the detailed rules of operations recently issued by the Chilean Customs Service, are (i) an authorized copy of the 'Declaration of Importation' of the imported input; (ii) the sales voucher issued by the indirect exporter to that individual direct exporter, and (iii) a declaration by the indirect exporter that the intermediate input described in that particular sales voucher incorporates the imported inputs covered by the Declaration of Importation. Note that the indirect exporter can easily estimate the maximum dollar amount of drawbacks that final exporters as a group can claim with such documentation. If the intermediate input can be resold, the indirect exporter cannot estimate the claims of any individual exporter, because each of them can resell or buy extra, and by attaching additional vouchers and declarations can still claim the drawback.

3. Drawbacks for indirect exporters: A model

This section will present a model that attempts to describe the effects of the introduction of a drawback for indirect exporters, taking into account that many input markets are not perfectly competitive. The purpose is to find out what is the difference between the Chilean, Colombian, and Korean approaches to offer drawbacks to indirect exporters, in the context of market power in domestic input markets. In particular, the model assumes there is a monopoly in the domestic input market, and that this input is non-tradeable. Our model sidesteps the issue of entry by not providing a detailed argument about how the input supplier can maintain his monopoly,⁹ but in some cases this issue could make a difference.

⁹Maybe because he owns an exclusive territory franchise from the foreign input manufacturer.

Table 4
Chile: Export drawbacks for indirect exporters (December 1988–August 1989).

Imported input	Product group						
	1	2	3	4	5	6	7
	Cork blocks	Steel straps, bands and seals	Fungicides and fertilizers	Tinplate	Crude oil	Nylon, lampblack	Poli-propylene bags
Intermediate good(s)	Bottle corks	Same + purchasing	Same + purchasing	Same + purchasing	Diesel and kerosene ^a	Tires	P-p bags
Final good	Bottled wine	Sawn wood slabs	Froz., canned vegetables	Canned fish	Sea and air transport	Tires + distribution	Bagged seeds
No. of indir. exporters	4	1	2	1	1	1	1
No. of direct exporters	3	6	1	1	4 shipping co. and 2 airlines	3	1
Drawbacks paid (U.S.\$)	23,079	27,100	74,043	33,343	926,509	n.a.	n.a.

^aThere are two stages of production here, because the oil refinery sells first to the big three distribution companies and they sell to the shipping companies and the airlines.

Source: Processed by the author from Customs Service data.

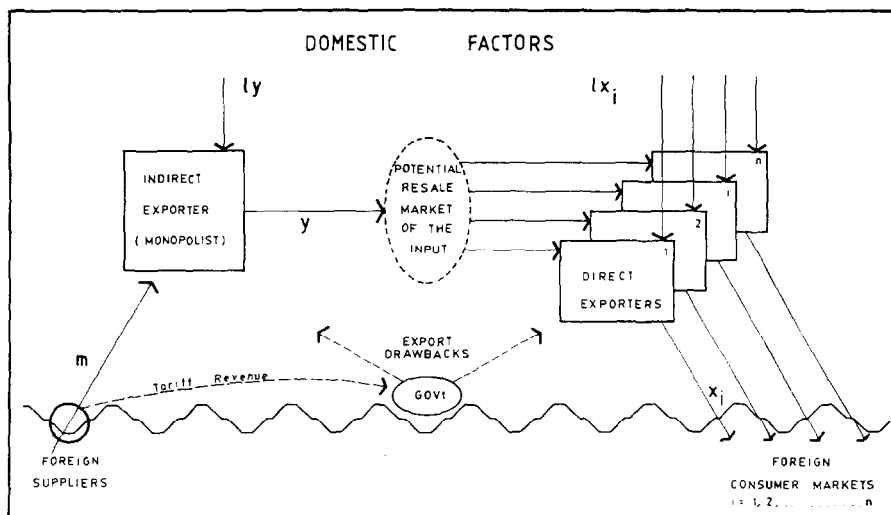


Fig. 1. The production structure.

Nevertheless, the model is entirely relevant in Chile, where the most important user of the drawback for indirect exporters is a monopoly, the Con-Con Oil Refinery, who is the only effective seller of fuels to the airlines and the merchant marine. The Refinery's monopoly power exists only within the narrow band between CIF and FOB prices, because there are no legal barriers to the entry of other importers, and because these users are able to purchase some fraction of their fuels during their trips abroad if they wish to.

Of course, these issues cannot be dealt with adequately under the assumption of perfect competition and full information. Indeed, under those assumptions the distinction between direct and indirect exporters is superfluous, since firms can always integrate vertically at no cost in order to meet the requirements of the drawback regime. Moreover, monopoly power poses no resource allocation problems under full information, because the monopolist can practice first-degree price discrimination.

3.1. Production relations and market structure

We present here our basic assumptions on production and market structure. We assume that vertical integration is not a viable alternative. Given this, our input/output assumptions will be designed to focus attention on the difference that the introduction of drawbacks for indirect exporters can make. The production structure is described in fig. 1.

There are two definite stages of production, which we call the 'direct

exporters' and the 'indirect exporter'. Direct exporters export all their production if they are active, so there is no domestic market for products x_i . The intermediate input y is not tradeable internationally. The input monopolist sells this good only to direct exporters. Direct exporters may exhibit constant or decreasing returns, as explained below. We assume constant returns to scale for the indirect exporter, i.e. the input monopolist. Production technology is Leontieff, i.e. fixed coefficients, for both stages:

$$v_i = \min[lx_i/a_{iL}, y_i/a_i], \quad (1)$$

$$x_i = h_i(v_i) \quad \text{where} \quad h_i > 0, h'_i \geq 0, h''_i \leq 0, \quad (2)$$

$$y = \min[ly/b_L, m_y/b_m], \quad y = \sum y_i, \quad (3)$$

where

x_i = quantity produced by each direct exporter i ($i = 1, \dots, N$);

v_i = quantity of composite input used by each direct exporter i – the production function $h_i(v_i)$ may exhibit constant or decreasing returns, as explained below ($i = 1, \dots, N$);

lx_i = units of domestic labor employed in the production of x_i ; a_{iL} is the number of labor units used by this exporter per unit of output;

y_i = quantity of the domestic intermediate good used by direct exporter i ;

a_i = amount of input y_i required to produced one unit of x_i ;

ly = units of domestic labor used in the production of y – the unit input requirement is b_L ;

m_y = quantity of the imported input that is used by the indirect exporter;

$b_m = 1$ = amount of imported input m_y required to produce one unit of y . Units of measurement of m can be chosen, without loss of generality,¹⁰ to make $b_m = 1$.

The model allows considerable flexibility regarding the structure of the final export markets, even after restricting the model to assure a linear derived demand for the domestic input. In the alternative which we adopt below, each final exporter is a non-discriminating monopolist with constant unit costs. Other alternatives are that each final exporter is a price-taker with increasing marginal costs, or that he may be a perfectly discriminating monopolist with constant returns to scale. To obtain a linear derived

¹⁰Intuitively, this normalization implies that as the physical import content of y falls, the normalized price p_m is closer to zero, and has a smaller influence on pricing decisions.

demand for the input in the monopoly cases, final demand must be linear and $h_i(v_i) = v_i$. For the price-taking case, the production function $h_i(\cdot)$ must be quadratic. Each final product market structure implies a particular relationship, for each direct exporter, between the size of the derived demand for the input and his profit.

In the case we analyze, $h_i(v_i) = v_i$ and each direct exporter is a non-discriminating monopolist¹¹ that confronts a final demand given by

$$x_i^d = \beta_i \cdot (\alpha_i - p_i), \quad (4)$$

where p_i = export price chosen by direct exporter i , and α_i and β_i are positive parameters of the foreign demand for good i . α_i is the choke-off price in market i , while $-1/\beta_i$ is the slope of demand.

On the input side, direct exporters buy labor domestically at a price of w per unit. They also buy the domestic intermediate good produced by the input monopolist, at price py . Profit maximization by the direct exporters implies that the derived demand for that input¹² is

$$y_i^d(py) = \beta_i \cdot [\alpha_i - \{a_i \cdot py + a_{iL} \cdot w\}](a_i)(1/2). \quad (5)$$

We move on to the indirect exporter's pricing problem. He is the only producer of his variety of intermediate good, so he enjoys monopoly power. On the other hand, we assume that the input monopolist is a price-taker in all his input markets, i.e. must pay w per unit of labor and $p_m \cdot (1+t)$ per unit of the imported input, where ' t ' is the tariff rate.

If the input monopolist had full information, he could adopt a first-degree price discrimination policy, charging a different price to each direct exporter [Tirole (1988)]. In this case, the indirect exporter would sell to each direct exporter with a 'personalized two-part tariff'. This form of first-degree price discrimination involves charging a fixed fee, F_i , for the right to purchase, different for each customer, and a common marginal price per unit purchased, equal to the marginal cost of production of the intermediate good. A different F_i for each i means that it is determined through individual bargaining. The way in which F_i is divided between supplier and buyer only affects the distribution of income between these two firms, as long as the

¹¹In this case, the fact that the country has market power in international trade does not imply that export taxes are socially optimal, because direct exporters do not compete among themselves. They already exercise all their country's international market power when acting in a decentralized way. In this setting, it is natural to assume that no export taxes are levied.

¹²The intuition for eq. (5) is as follows: the derived demand for the input is the demand for the final good evaluated at the full cost, times the input requirement coefficient a_i , and multiplied by the factor of output restriction chosen by the monopolist, which for linear demand is $1/2$.

bargain is efficient. If all the bargaining power is held by the input supplier, F_i will be set at 100% of the monopoly rent earned by the direct exporter:

$$F_i = (1/4) \cdot \beta_i \cdot [\alpha_i - c_i(t)]^2, \quad c_i(t) = (a_{iL} + a_i \cdot b_L) \cdot w + a_i \cdot 1 \cdot p_m \cdot (1+t), \quad (6)$$

where $c_i(t)$ is the marginal cost of the vertical structure as a whole.

3.2. Input pricing when no drawback is allowed

We turn to more realistic assumptions regarding the quality of information available to the input monopolist. Consider an information structure in which the input monopolist does not know the conditions of final demand that his clients confront. Under this assumption, any or all of α_i , β_i and a_i could be private information of each direct exporter. We study now input pricing when direct exporters are not allowed an export drawback.

Imperfect information by itself prevents perfect discrimination, and the monopolist is forced to distort incentives to be able to extract some rent. The reason is that the monopolist must choose his pricing policy subject to the constraint of demand arbitrage, which means he cannot charge a personalized price to each client. If feasible, the optimal solution for the input monopolist is to offer clients a menu of two-part tariffs (each one is a fixed fee and a linear marginal price), where the two-part tariff which each individual client should choose is conditioned on all verifiable information at the individual client level, as long as it is legally permissible [Maskin and Riley (1984)]. Therefore, we must specify what personalized information is available to the domestic input monopolist.

We will assume that there is no personalized information available to the input monopolist. In particular, the individual volume of purchase will be assumed not verifiable, so two-part tariffs are not feasible. This is the case when resale arbitrage is feasible, i.e. a secondary or 'bootleg' market can be created for the input y . This market makes the volume of input actually purchased by any one client not verifiable, because he can sell there the amount of the input he does not use, or buy there if that price is lower than the average price charged to him by the input monopolist.¹³ Empirically, resale arbitrage is feasible for shipping company and airline fuels.

An alternative justification, important in Chile's case, is that price discrimination 'not based on cost differences' is illegal for intermediate inputs, as enforced by the Antimonopoly Commission.

This information situation forces the input monopolist to charge a linear price, with no fixed fees. The input monopolist must restrict output, introducing a distortion. As the final exporter is also a monopolist that restricts output,

¹³An obvious extension of the paper is to assume that quantity discounts are possible, and are designed to prevent arbitrage between clients, but no resale market exists.

we have a double marginalization problem from the point of view of world welfare [Spengler (1950)]. However, from a national point of view there is only one distortion, due to the input monopolist's market power.

In the general case, the α_i , β_i and the a_i would all be private information of each direct exporter. However, we will simplify the problem by assuming that only the α_i are private information. It seems reasonable to assume that the a_i are known to the indirect exporter in any given product group. Furthermore, we will assume that $a_i = a$ for all i , which means that direct exporters do not differ in their intensity of use of the intermediate input. As all direct exporters have the same unit input requirement a , there is no loss of generality in setting $a = 1$, by choosing the units¹⁴ of good y appropriately.

Regarding information about β , we will explore the case in which all exporters have a common β , known to the input monopolist. We think this is an interesting polar case which has the advantage of allowing a relatively simple solution. The general case where the input monopolist only knows the distribution of β does not allow simple results, as they depend on the shape of that distribution, even if it is independent of α . However, the same principles can be applied to that case. We will indicate the difference in results when needed.

Although the indirect exporter doesn't know the exact value of α_i for any i , he still knows the true distribution from which the actual value of the α_i were drawn. This distribution has support $[\underline{\alpha}, \bar{\alpha}]$, distribution function $F(\alpha)$, and density function $f(\alpha)$. The difference between individual clients is the choke-off price of their derived demand for the input. Obviously, setting a higher input price py implies that more of the final exporters will find that they are unable to cover their costs and will drop out from this market. Therefore, a given input price implies that there is a minimum cut-off value of α , such that clients with a smaller α will not purchase. In this context, the input monopolist will solve:

$$\max \left\{ \pi y(py, \alpha^{\text{cut}}) = (py - cy) \int_{\alpha^{\text{cut}}}^{\bar{\alpha}} y^d(\alpha, py) f(\alpha) d\alpha \right\}, \quad (7a)$$

where

$$y^d(\alpha, py) = \max(0, \beta \cdot [\alpha - \alpha^c] \cdot 1 \cdot [1/2]) \quad \text{and} \quad \alpha^{\text{cut}} = \max(\underline{\alpha}, \alpha^c);$$

subject to the individual rationality constraint:

$$\pi(\alpha) = (1/4) \cdot \beta \cdot [\alpha^c - c]^2 \geq 0 \quad \text{where} \quad c = (a_L \cdot w + 1 \cdot py), \quad (7b)$$

¹⁴Recall that this normalization implies that as the intermediate input content of x falls, the normalized price py is closer to zero, and has a smaller influence on pricing decisions.

which implies

$$\alpha^c(py) = a_L \cdot w + py.$$

This constraint acknowledges that if the input monopolist raises his price py too much, some exporters with low demand will be unable to pay market wages and will choose not to produce.

To solve his problem, the input monopolist sets $\partial\pi/\partial py = 0$ and¹⁵ finds his optimal price py^M . The determination of py^M is simpler than what it may appear. As the cut-off direct exporter has no demand above marginal cost, that exporter choose to use zero input, and the loss of his custom is irrelevant for the input monopolist. The profit-maximizing price py^M solves the following implicit equation:

$$py^M(t) = \frac{cy(t)}{2} + \frac{E(\alpha/\alpha \geq \alpha^{cut}(py^M(t))) - a_L \cdot w}{2}, \quad (8)$$

where

$$E(\alpha/\alpha \geq \alpha^{cut}) = \frac{1}{1 - F(\alpha^{cut})} \int_{\alpha^{cut}}^{\infty} \alpha \cdot f(\alpha) d\alpha.$$

It can be shown that free trade is no longer optimal for this sector of the economy, and that the optimal tariff on imported inputs is negative. The intuition for this result is that the input monopolist reduces welfare by restricting output too much, so resource allocation can be improved by subsidizing imported inputs to expand output back to the free-trade level. Of course, this result depends on the fixed-coefficients technology. A corollary is that with asymmetric information the country increases its welfare by moving towards free trade, when indirect exporters do not have access to the export drawback. All these results remain valid if the input monopolist only knows the distribution of β .

4. Pricing when indirect exporters are allowed a drawback

This section will study the consequences of changing the drawback regime to allow indirect exporters to have access in some way to a drawback. This means dropping the administrative requirement of vertical integration

¹⁵The second-order condition for the existence of a unique global maximum restricts the hazard rate of the distribution $F(\alpha)$, which must be generally decreasing with α . The condition is $f(\alpha)/[1 - F(\alpha)] < 2/[\alpha - (c + tp_m)]$, where $c = a_L w + b_L w + p_m$ is the total cost of the two stages of production, free of tariffs. The exponential distribution does not meet this condition for large values of α , so in that case we cannot assure the existence of a unique global optimum.

between importer and exporter. As explained in section 2, there are several alternative ways to do this. The most interesting are the Chilean, Colombian and Korean alternatives.

4.1. The Chilean scheme

Under the 1988 Chilean approach, regulations require that direct exporters obtain specific documentation from the indirect exporter. The decision problem of the input monopolist changes because now there is a new observable variable, namely, whether the client requests the drawback documentation or not. The input monopolist might attempt to impose two quantity discount schedules, conditioned on whether the client asked for the documentation or not. However, the existence of a secondary market in the domestic intermediate good precludes charging different marginal prices to different customers. Therefore, the only possibility to use the new information is to charge a positive fixed fee to clients that request the documentation. The other clients cannot be charged a fixed fee because, as before, the secondary market would arbitrage it away.

There is a different type of arbitrage that might be important in this setting: an exporter may act as exporting agent/trading company for another exporter, who would cease to be direct exporter, with the purpose of avoiding double payment of the fixed fee for the documentation. In this way, the new drawback regime might generate an increase in the number of vertically related activities when the domestic intermediate input is monopolized and the documentation is not free. However, the Chilean operating rules require the new indirect exporter to sell an additional certificate to the exporting agent, who would get the drawback, and a rule for division of the surplus would be required. If there were only a few clients per exporting agent, bargaining would proceed at the correct marginal prices. However, there is an incentive to bring as many new indirect exporters as possible under the umbrella of any one exporting agent. The problem is that few exporting agents means that they have monopoly power vis-à-vis new indirect exporters, and that the input monopolist may raise substantially the charge for his documentation because large exporting agents may be willing to pay much larger sums.

To simplify the analysis, we will assume that this type of arbitrage is not effective. A justification is that these arrangements usually mean that direct exporters have to sacrifice their confidential knowledge of their particular foreign market to an exporting agent, who might force them into the position of a perfectly competitive supplier. Therefore, direct exporters with monopoly power will shun these arrangements.

A drawback for indirect exporters under these rules has two effects. First, by varying the level of the fixed fee, the input monopolist can induce a change in the group of clients that ask for the drawback, so it increases his

discrimination abilities. Second, there is a reduced net cost for at least some direct exporters, which allows them to expand production and demand more of the intermediate input, which in turn yields a positive margin for the input monopolist. The price p_y set by the input monopolist may change in comparison to when he did not have access to a drawback.

It is apparent that the input monopolist can choose from two broad types of pricing policies. In the first, he charges a substantial fee for the documentation, which divides his customers into three groups. Group one, as before, is the group of potential direct exporters who confront so low an export demand, that at current input prices they are unable to meet market wages. Group two is made of direct exporters that choose not to ask for the drawback because the input monopolist charges too high a fee for the required documentation. Finally, the larger exporters earn enough from the drawbacks to be able to pay the fee and still pocket a difference in their favor.

The other type of pricing policy that the input monopolist might pursue is to divide his customers into two groups only, by setting the price of the documentation at a low enough level, maybe zero. Group one is inactive, but group two includes all active exporters, plus some that were inactive when the drawback was not available to indirect exporters, for given input prices. This might be profitable if it allows many inactive exporters to enter business. In this case there is no middle group.

If three customer groups exist, they can be defined by two¹⁶ values of α , which we will call α^c , the 'cut-off' exporter and α^* , the 'borderline' exporter. With this pricing policy, $\alpha^* \geq \alpha^c$. If there are only two groups of customers, the only cut-off value is α^* , and in this second pricing policy $\alpha^* \leq \alpha^c$. As we will see, α^c is directly related to p_y , the price set by the input monopolist, while α^* is related to both p_y and the price of the documentation, which we call G . The change of variables from (p_y, G) to (p_y, α^*) allows us to simplify the optimization, because the optimal α^* is independent of p_y , and the optimal p_y is independent of α^* in the pricing policy with large fixed fees.

$$\max \left\{ \pi y(p_y, \alpha^*) = \pi^{\text{NoDr}}(p_y) + G(p_y, \alpha^*) \cdot [1 - F(\alpha^*)] \right. \\ \left. + (p_y - cy) \cdot \int_{\alpha^*}^{\alpha^c} [y^d(\alpha, p_y^{\text{net}}) - y^d(\alpha, p_y)] f(\alpha) d\alpha \right\}, \quad (9a)$$

where

¹⁶In order to reduce notation, we only present the case where $\max(\underline{\alpha}, \alpha^c) = \alpha^c$ so $\alpha^c > \underline{\alpha}$ and both pricing policies can be pursued.

$$py^{net} = py - t \cdot p_m \cdot 1,$$

subject to individual rationality and self-selection constraints.

Define

$$c = a_L \cdot w + 1 \cdot py = \alpha^c \quad \text{and} \quad nc = a_L \cdot w + 1 \cdot py^{net}.$$

(i) If $\alpha^* \geq \alpha^c$, then

$$(\beta/4) \cdot [\alpha - c]^2 \geq 0 \quad \text{and} \quad (9b)$$

$$(\beta/4) \cdot [\alpha - nc]^2 - G \geq (\beta/4) \cdot [\alpha - c]^2 - 0; \quad \text{equality for } \alpha = \alpha^*. \quad (9c)$$

(ii) If $\alpha^c - tpm \leq \alpha^* \leq \alpha^c$, then

$$(\beta/4) \cdot [\alpha - nc]^2 - G \geq 0; \quad \text{equality for } \alpha = \alpha^*. \quad (9d)$$

The interesting new constraints are (9c) and (9d), which determine α^* given G , where α^* is the choke-off price of the borderline client, or fix G given α^* . They assert that the input monopolist cannot charge as a fixed fee more than the increment in profit that the borderline client (i.e. the one with $\alpha = \alpha^*$) can obtain by acquiring access to the drawback. Otherwise, that client would not request the documentation, and would either operate without the drawback (9c) or close down (9d). Depending of which configuration of (i) or (ii) applies, the value of G is:

$$G = \begin{cases} (1/2) \cdot [\alpha^* - c(py)] \cdot \{\beta \cdot t \cdot p_m\} + (\beta/4) \cdot \{t \cdot p_m\}^2 & \text{if } G \geq (\beta/4) \cdot \{t \cdot p_m\}^2, \\ (\beta/4) \cdot [\alpha^* - \{c(py) - t \cdot p_m\}]^2 & \text{if } G \leq (\beta/4) \cdot \{t \cdot p_m\}^2. \end{cases} \quad (10)$$

In the first expression, the extra gross profit of the borderline exporter who receives the drawback includes two terms: One, the profit on previous exports, and two, the new profit due to the reduction of marginal costs and subsequent expansion of exports. The second expression applied when the fixed fee for the documentation is set at a level so near to zero that the borderline exporter is one who previously was unable to operate at market wages and had closed. In this case, all previous active exporters get access to the drawback, and the cut-off exporter is the same as the borderline exporter.

From the point of view of the input monopolist, expression (9a) shows that in addition to his previous profit, he obtains revenue from the fixed fee and from the sale of additional units to the exporters that acquire access to the drawback. This second source of profit is a different expression depending of the pricing policy:

$$\int_{\alpha^*}^{\bar{\alpha}} y^d(\alpha, \Delta p y) f(\alpha) d\alpha = \begin{cases} \int_{\alpha^*}^{\bar{\alpha}} (1/2) \beta t p_m f(\alpha) d\alpha & \text{if } \alpha^* \geq \alpha^c, \\ \int_{\alpha^*}^{\alpha^c} (1/2) \beta [\alpha - \alpha^c + t p_m] f(\alpha) d\alpha \\ + \int_{\alpha^c}^{\bar{\alpha}} (1/2) \beta t p_m f(\alpha) d\alpha & \text{if } \alpha^c - t p_m \leq \alpha^* \leq \alpha^c. \end{cases} \quad (11)$$

These expressions show that the increase in input demand from previously active exporters is always $(1/2)\beta t p_m$. Therefore, all final exporters who were active previously increase their sales by the same amount when they get access to the drawback, and generate the same extra profit and increase in social welfare. This is a consequence of assuming that β is the same for all exporters. If β were unknown to the indirect exporter and he only knew the distribution of β , when β is statistically independent of α , there would be only one configuration of the monopolist's maximization problem. The reason is there always exist previously inactive final exporters with large enough β but low α that may be able to generate enough extra profit to pay the fixed fee when having access to the drawback.

The global solution for our maximization problem could belong, in the general case, to configurations (i) or (ii). Depending on the shape of the distribution $F(\alpha)$, the input monopolist might prefer any of the pricing policies. In addition, the pricing policy that generates three distinct groups of customers (i.e. $\alpha^* > \alpha^c$) can be optimal only for low enough tariff rates on the imported input.¹⁷ We can prove the following proposition regarding the optimal pricing policy of the input monopolist.

Proposition 1. If the global solution is a pricing policy with three groups of customers, then the extension of drawbacks to indirect exporters, under the approach adopted by the Chilean Customs Service, does not induce the input monopolist to change the price of the intermediate input he sells.

Proof. Using (9a), (10) and (11):

¹⁷It turns out that in this pricing policy the optimal α^* depends positively of the level of the tariff on imported inputs. This means that a higher tariff always induces the input monopolist to increase the fixed fee G he requests for the drawback documentation. This is intuitive, as the drawback becomes more valuable when tariffs are higher. However, α^* may rise more slowly with the tariff than α^c , so that the middle segment of small active exporters can be squeezed out by a larger tariff. This suggests that the pricing policy discussed above may be profitable only for low enough tariff rates.

$$\begin{aligned}
\pi y(py, \alpha^*) &= \pi y^{\text{No Dr}}(py) \\
&+ [1/2 \cdot [\alpha^* - \alpha^c(py)] \cdot \{\beta \cdot t \cdot p_m\} + (\beta/4) \cdot \{t \cdot p_m\}^2] \\
&\times [1 - F(\alpha^*)] + (py - cy) \cdot \left\{ \int_{\alpha^*}^{\bar{\alpha}} (1/2) \beta t p_m f(\alpha) d\alpha \right\}. \quad (12)
\end{aligned}$$

This third item can be simplified to

$$(py - cy) \cdot (t \cdot p_m) \cdot \beta \cdot (1/2) \cdot [1 - F(\alpha^*)].$$

After simplifying, the expression for profit is

$$\begin{aligned}
\pi y(py, \alpha^*) &= \pi y^{\text{No Dr}}(py) + [1/2] \cdot [\alpha^* - c(t)] \cdot \{\beta \cdot t \cdot p_m\} \\
&+ (\beta/4) \cdot \{t \cdot p_m\}^2 \cdot [1 - F(\alpha^*)]. \quad (13)
\end{aligned}$$

The second term does not depend on py . Therefore, the optimal py is the same as if indirect exporters had no access to the drawback. $\square$

This is contrary to the conventional wisdom that allowing price discrimination reduces marginal prices. The intuition for this result is as follows. When the input monopolist raises his price py^M a little above the level that maximized his profit without drawback, he is cancelling (at the margin) the reduction in input costs available to the borderline exporter, and must reduce the fixed fee concurrently. Therefore, it must be true that the input monopolist does not gain in net by changing the input price charged to the borderline direct exporter. The other exporters, however, happen not only to pay the same fixed fee as the borderline one, but also to have generated the same extra sales due to the export drawback as the borderline exporter did, because all of them have the same β . For sales to them, the increase in the margin earned on the extra input sales allowed by the drawback, is also cancelled by the reduction in the fixed fee. Therefore, the input monopolist must be indifferent to raise py^M when considering other exporters as well.

A corollary of Proposition 1 is that α^c does not change either, as it depends on py^M . Therefore, no previously inactive exporter becomes active thanks to the new drawback policy. Another implication is that py^M is determined independently from α^* in this pricing policy.

α^* must be determined by maximizing (13). The optimal α^* must balance three facts: first, a higher α^* reduces the number of large exporters that pay G , effect that is proportional to $f(\alpha)$; second, a higher α^* reduces the number of large exporters that increase their input demand, effect that is proportional

to $f(\alpha)$; third, a higher α^* raises the size of the borderline exporter, and as larger exporters gain more from the drawback, allows an increase in the fee G , effect that is proportional to $1 - F(\alpha^*)$. Therefore, the first-order condition for α^* involves the hazard rate¹⁸ of the distribution $F(\alpha)$. There is a unique optimum in this configuration if the hazard rate is monotonic in α . The optimal α^* solves¹⁹ the following:

$$f(\alpha)/[1 - F(\alpha)] = 1/[\alpha - (c_0 + (1/2)tp_m)]; \quad c_0 = a_L w + b_L w + p_m, \\ \text{subject to } \alpha^c \leq \alpha \leq \bar{\alpha} \quad \text{where} \quad \alpha^c = \alpha_L w + py. \quad (14)$$

Proposition 2. Offering drawbacks to indirect exporters, under the detailed approach adopted by the Chilean Customs Service, has the following welfare implications if a domestic intermediate input monopoly exists and it chooses a pricing policy with three groups of exporters:

- (i) *National welfare increases. All of it is captured by the indirect exporter.*
- (ii) *Final exporters gain by an amount that is correlated with the size of their previous exports only. Small exporters are not benefited.*

Proof. Part (i). With this pricing policy national welfare is simply:

$$W = (W)^{\text{No Dr}} + [1 - F(\alpha^*)](\beta/4) \cdot (t \cdot p_m)^2. \quad (15)$$

As the new term is positive, welfare must have increased. For the second part, compare the second term of this expression with (13), and check that this term is part of the input monopolist's new profit after drawbacks to indirect exporters are allowed.

Part (ii). When the government changes the drawback regime, it reduces net input prices to the direct exporters who can take advantage of the new rules. Final net input prices are in fact reduced because the input monopolist does not change py .

Direct exporters who choose not to pay the fixed fee G for the documentation do not get benefits. The borderline exporter does not get anything in net, as the fixed fee leaves him as well off as before the change in drawback regime. The fixed fee includes the drawback revenue earned on previous exports by the borderline exporter.

Large direct exporters benefit from the change in drawback regime in two ways. First, they reduce costs on existing sales. This effect amounts only to a transfer of funds from the treasury to the large exporters. Second, they increase sales as their marginal cost fall. However, as all exporters have the same β , the extra profit obtained from this second source is the same as what

¹⁸The hazard rate is $(f/1 - F)$, i.e. the probability of an event given that it has not occurred already.

¹⁹The α that solves this condition also meets the second-order condition of the case where indirect exporters do not have access to the drawback.

is obtained by the borderline exporter. Therefore, this second benefit is completely captured by the input monopolist, through the fixed fee. The net gain for the large direct exporters is given by the drawback on existing exports, minus the drawback on existing exports received by the borderline exporter, and this amount is correlated with the size of their existing exports only. $\square$

Now we turn to study the case where the pricing policy that yields the global maximum is the one in which the fixed fee is relatively low, where $\alpha^c - tp_m \leq \alpha^* \leq \alpha^c$. Contrary to conventional wisdom, we find that the optimal input price py may be either lower or higher than when indirect exporters did not have access to the drawback. For example, if $\bar{\alpha}$ is distributed uniformly over $[c_0, \bar{\alpha}]$, and $\bar{\alpha}$ is not too large and belongs to $[c(t), c(t) + 3tp_m]$, then the optimal pricing policy involves no fixed fee and a higher input price than when no drawback was allowed.²⁰ If the input price rises by more than the drawback the larger exporters will reduce their sales abroad, so this shows that there can be no presumption that national welfare improves when the optimal pricing policy involves a low G and two types of customers.

In this pricing policy the optimal α^* is also independent of py . There is a unique optimum in this configuration if the hazard rate is monotonic in α . The optimal α^* solves²¹ the following condition:

$$f(\alpha)/[1 - F(\alpha)] = 1/[\alpha - c_0]; \quad c_0 = a_L w + b_L w + p_m, \\ \text{subject to } \alpha^c - tp_m \leq \alpha \leq \alpha^c \quad \text{where} \quad \alpha^c = a_L w + py. \quad (16)$$

It turns out that in this configuration the optimal α^* is independent of the level of the tariff on imported inputs. This was expected, because in this price configuration all active exporters get the drawback and are in free trade, regardless of the level of the tariff.

Consider the case where the pricing policy that meets the first-order conditions on α^* is the one in which the fixed fee is exactly at $G = (\beta/4) \cdot (t \cdot p_m)^2$. Using the first-order conditions for the two previous pricing policies, it can be proven that this case corresponds to a local minimum.

Finally, we suggest what are the factors that may push the input monopolist to either pricing policy. An analysis of the first-order conditions on α^* shows that if the hazard rate is high at $\alpha^c(py^M)$, it is probable that the optimal pricing policy will involve a low or zero fixed fee. This makes sense,

²⁰This is the case, for example, if $\bar{\alpha} = c(t) + 2tp_m$.

²¹The α that solves this condition also meets the second-order condition of the case where indirect exporters do not have access to the drawback. In addition, for any given α that meets this condition, the hazard rate is larger than the one required to meet condition (14).

because a high hazard rate implies a relatively large sensitivity of aggregate input demand with respect to G , which induces the monopolist to charge a low fixed fee – given py – to obtain an increase in input demand from previously inactive exporters. On the other hand, it turns out that if the hazard rate is relatively low at $\alpha^c(py^M)$, the optimal pricing policy will probably involve increasing the fixed fee – given py . The reason is that a low hazard rate implies that the sensitivity of input demand with respect to G is relatively small, so it makes sense increasing G even though some active exporters will not get access to the drawback. If the hazard rate is constant at an intermediate level, as could happen with the exponential distribution, then it is sure that two local maxima will exist, one at each of the interesting pricing policies.

4.2. The Colombian scheme

The Colombian authorities introduced in 1967 an extension to Plan Vallejo, its program for export contracts, that attempted an incorporation of indirect exporters [Ffrench-Davis and Piñera (1976)]. Under this extension, the export contract with the government can be signed jointly by both the direct and indirect exporter, on the condition that each of them commits to specified export targets (direct and indirect) over an extended period of time.

The application of these rules to our model are interesting. The joint contract means that the indirect exporter gets access to a wealth of information about the direct exporter. This information is needed to assess the long-term consequences of the joint export targets on the signing parties, and implies significant exchange of information about markets, costs, capacity utilization, investment plans, etc.

The implication of such extensive information exchange in the context of a market structure in which market power is present in the indirect exporter stage is that the input monopolist will price-discriminate in input sales to his partner. This means both a reduction of marginal input prices all the way down to free-trade marginal-input costs, and a substantial personalized fixed fee that transfers most of the direct exporter's profit to the input monopolist. The direct exporters lose from this arrangement. Losses may be even larger if we take into account the rents earned by sunk assets in the final exporting stage.

Foreseeing this situation, a direct exporter will not enter into a joint export contract with the input monopolist unless he is appropriately compensated at the outset, or assured in a credible way about the maximum charges that the input monopolist may request after the contract is signed. If the volume of the drawbacks is large enough, the normal outcome of such bargaining is merger, because it reduces the inefficiencies of a relationship in which both parties are continuously bargaining or building ability to make credible threats [Valdés-Prieto (1987)].

These transaction costs can be substantial, so it is obviously not worthwhile to incorporate exporters that do not demand large quantities of the domestic input. This means that there is a built-in bias against smaller direct exporters who are excluded from joint contracts with the input monopolist and the associated benefits.

We see then that the Colombian scheme is successful in making drawbacks accessible to large direct/indirect exporter pairs, who are incited to integrate vertically, but is not effective for smaller direct exporters. This is unfortunate, since for large exporters the tradeoff between fiscal revenue loss and export promotion is steeper. In addition, the artificial incentive²² towards vertical integration may have negative consequences on the industrial market structure of the country, favoring concentration and erecting barriers to entry.

4.3. The Korean scheme

In the Korean scheme indirect exporters obtain direct access to the drawback. The drawback is not paid to direct exporters. Of course, this raises some questions about the administrative ability of the Customs Office to check if the imported inputs were effectively incorporated into exports or instead were incorporated in goods sold in the domestic market. We will assume that the direct exporter is forced to provide proof that those inputs were incorporated in exports. If direct exporters were not forced to do this, the indirect exporters would have to induce them to do so, and a complicated pricing scheme would emerge.

It is interesting to present the implications of the Korean scheme with forced cooperation by direct exporters for the market structure we analyze. The main consequence of giving indirect exporters direct access to the export drawback is that the input monopolist does not pay tariffs on the imported inputs. We can prove that he will find it optimal to reduce input prices. Differentiating (13) with respect to t , and taking into account that $\alpha^c = \alpha^c(py(t))$, we find that

$$\frac{\partial py^M(t)}{\partial t} = p_m \left/ \left[2 - [py - cy] \cdot \frac{f(\alpha^c)}{1 - F(\alpha^c)} \right] \right. \geq 0. \quad (17)$$

As most monopolists, this one reduces prices when costs fall. The reduction could be smaller or larger than the full reduction in costs, but it is always²³ a reduction. Social welfare rises unambiguously with this drawback scheme for indirect exporters. As explained in section 3.2, the optimal tariff in

²²Ironically, French-Davis and Piñera (1978) argued that the modified Vallejo Plan would eliminate incentives for vertical integration. We gather that their conclusion was based on perfect information models under perfect competition.

²³This can be shown using the second-order condition for a unique global maximum.

this case is negative, because in this way the output restriction brought about by the monopolization in the indirectly exporting stage can be compensated.

Comparing this scheme with the Chilean one when the optimal pricing policy is such that the input monopolist creates three groups of final exporters, we find that the Korean scheme is unambiguously better. Recall that in the Chilean scheme the intermediate input price does not change, while in the Korean one it falls. Therefore, in the Chilean scheme the only active final exporters are the previously active, while the Korean scheme always allows some new exporters to become active. The Chilean scheme allows the monopolist to charge a fixed fee G that excludes from the drawback the smaller active exporters, while this is not so in the Korean scheme. The Korean scheme always allows the final exporters to get an increase in profits.

However, the comparison is harder when we consider the Chilean scheme under the low-fee pricing policy, where all active exporters get the drawback. Without being precise about the distribution $F(\alpha)$, we cannot tell whether input prices will fall in the Chilean scheme, and given that, if they will fall more under the Korean or the Chilean scheme.

4.4. Alternative schemes

We will present two alternatives. In the first one, the drawback rules would require the cooperation of the indirect exporters and would pay the drawback to the final exporter, as in Chile. However, the new scheme would *force* the indirect exporter to give the required documentation directly to the Customs Service, avoiding any relation between indirect and direct exporters. This would have two effects. One, the input monopolist would not be able to charge a fee for the documentation, forcing him to charge a linear price. Two, the revelation of sensitive information that could affect entry to the indirect exporter stage is avoided. The important property of this solution is presented in the following proposition.

Proposition 3. When extending export drawbacks to an indirect exporter that has monopoly power, it is the same to do it by paying the drawback to the direct exporters (as in the proposed alternative, forcing the indirect exporters to provide the required documentation) or by paying the drawback to the indirect exporter (as in Korea, forcing the direct exporter to provide documentation).

Proof. We first find the effect on the domestic input price of giving the export drawback to final exporters. Define the 'equivalent unit labor cost' of the final exporter as $a_L w^* = a_L w - d \cdot p_m$; where d is the drawback rate received by the final exporter. When we trace the implications of raising d on α^c , $a_L w$, and py^M , we find that

$$\frac{\partial py^M(d)}{\partial d} = p_m \left(\left[1 - [py - cy] \cdot \frac{f(\alpha^c)}{1 - F(\alpha^c)} \right] / \left[2 - [py - cy] \cdot \frac{f(\alpha^c)}{1 - F(\alpha^c)} \right] \right) \geq \leq 0. \quad (18)$$

Now we will check the total effect on unit costs $c(t, d)$ of direct exporters of an increase in the drawback paid directly to them plus a reduction in the drawback received by the indirect exporter, i.e. a rise in the imported input tariff. The government keeps the same revenue. Using expressions (17) and (18) we find that

$$\frac{\partial c(t, d)}{\partial d} + \frac{\partial c(t, d)}{\partial t} = -pm + \frac{\partial py^M}{\partial d} + \frac{\partial py^M}{\partial t} = 0. \quad \square \quad (19)$$

However, it is our opinion that the administrative task involved in forcing indirect exporters to provide the required documentation is large, maybe as large as if direct exporters must be forced to cooperate as we assumed it is the case in Korea.

A second alternative rule is to require the direct and indirect exporter to present the drawback request jointly. This approach eliminates the need to force either direct or indirect exporters to cooperate. The difference with the Colombian scheme is that there is no long-term export contract involved, so the exchange of information is limited to a specific exportation. Taking as a basis the Chilean system, this alternative means to establish that the request of a drawback to the Customs Service must be signed by both direct and indirect exporter, and in the general case, by all the intermediaries involved.

The advantage is that the actual volume of exports of each particular direct exporter would be revealed to the input monopolist. In terms of our model, α_i would be revealed to the input monopolist. This would allow the input monopolist to price discriminate among clients to a greater extent. In practice, this alternative means spoiling the secondary market for the intermediate input used by exporters.

This alternative helps to reduce the monopoly distortion for the export markets. This is in addition to providing a drawback that reduces the tariff distortion. National welfare could then increase on both accounts. Under this scheme the equilibrium is like the one described in section 3.1, when explaining the full information case.

5. Summary

The paper presents the rationale for extending export drawback schemes to

'indirect exporters', i.e. firms that sell inputs to exporters. These firms may use imported inputs that ordinarily pay tariffs, so extending the export drawback scheme to them allows the recovery of the tariffs paid and a reduction in the costs of exported production. We review the extensions of export drawbacks to indirect exporters that have been adopted in Chile, Korea and Colombia.

To compare the different approaches, we considered a market structure where the indirect exporter is a monopolist with no access to the private information of clients. We assume he must charge a linear price because of potential for a resale market for the input. We find that the Korean scheme is equivalent to the Chilean scheme modified by forcing the indirect exporter to provide the required documentation. The actual Chilean scheme is similar to a modified Korean scheme in which direct exporters are not forced to cooperate providing documentation. The Colombian scheme excludes small exporters and promotes vertical integration artificially.

The Chilean scheme allows the input monopolist to charge a fixed fee to the final exporters, leading to unexpected results. If the optimal pricing policy is of a certain type, national welfare rises but input prices do not fall and no previously inactive firm enters the export business. If the optimal pricing policy is of the other type, the input price may rise or fall, depending on the shape of the demand curve. If the input price rises enough, national welfare would fall. The distributional impact is that small exporters are either squeezed out or choose not to request the drawback, in order to save the documentation fee. Larger exporters do have access to the drawback, but all the increase in national welfare they create when taking this reduced input cost into account, is captured by the indirect exporter, through the fee. The gain large direct exporters get from the new export drawback regime is correlated only with the size of previous exports.

In conclusion, although we acknowledge that the new Chilean export drawback regime is welfare increasing in case the pricing policy involves a large fixed fee, we find that the detailed operating rules set by the Customs Service are not satisfactory. We provide some suggestions for improvement of these operating rules, in the sense of generating a more desirable combination of efficiency increases and a 'reasonable' distributional impact.

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