LOG EXPORT RESTRICTION IN BRITISH COLUMBIA: AN ECONOMIC EXAMINATION

by

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We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

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Date October 4, 1977
The restrictions imposed on the export of unmanufactured forest products from British Columbia are examined from an economic standpoint. The subject is divided into two major areas: the level of restriction (the price protection afforded the domestic processing industry as a result of the policy) and the method of restriction (the structure of the regulatory system used to control the flow of exports). In the first area, the issue underlying the restriction/non-restriction debate is clarified; the way the policy works to assist the domestic processing industry is described; and the economic consequences of assisting the processing sector through export restrictions are identified. Most significantly, the opportunity cost imposed on the log producing sector is identified as negating some of the benefits achieved through the induced growth of the processing sector. It is concluded that these often unrecognized consequences are of substantial importance and should be considered explicitly in any examination of the restrictions. In the second area, the administrative procedures and timber tax charges that form the basis of the export control system are described. The system is found to be based on the arbitrary and unilateral view that domestic processing is the best use of the province's timber. The procedure for determining export eligibility is identified as being cumbersome, time-consuming, risk-inducing and expensive; the timber tax is identified as being inefficient, inequitable and counterproductive. It is concluded that the method of export regulation should be restructured to include incentives for economic efficiency.

The revisions to the export control system proposed by the Royal
Commission on Forest Resources are considered as an alternative to the administrative restrictions. The advantages of a system of export control that is tied directly to the export market, along with the possible constitutional and international questions that introduction of the proposed controls would raise, are discussed. Estimates of the early-round effects of the proposed controls and suggested tax rate on log exports, Crown revenue, timber utilization and timber harvests are presented. It is concluded that the proposed system of export regulation offers a viable alternative to the existing controls but that certain modifications to the Commission's proposal would be appropriate prior to the recommendation's implementation.

In addition, the evolution of the policy in British Columbia is described and areas for further research are identified.
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Much of the material presented in this thesis was developed as a research project for the Valuation Division of the British Columbia Forest Service and later extended for the Royal Commission on Forest Resources. In this regard, I would like to acknowledge the assistance of a number of individuals. Specifically, D. R. Glew, H. Waelti, and Mrs. H. Cullimore of the B.C. Forest Service for so freely giving of their time during the early stages of the project; Dr. P. H. Pearse and R. S. Campbell of the Royal Commission for their insight and inspiration; and especially, Dr. H. V. Lewis of the B.C. Forest Service for his continuing interest, support and advice. While this group should receive much of the credit for the work presented here, they must be absolved completely of the responsibility for the opinions and conclusions expressed within—that burden is mine alone.

Special thanks are due also to the members of my advisory committee. Drs. D. Haley (chairman), J. H. G. Smith and R. W. Wellwood have each made particularly important contributions to not only this thesis but to my entire graduate program. The assistance of former colleague R. N. Byron and the financial support of the Van Dusen Foundation, the National Research Council and the Faculty of Forestry are also gratefully acknowledged.

Finally, I would like to thank the lady with whom I share my life. Her encouragement, motivation, understanding and assistance have provided the support so necessary for the completion of this project.
CHAPTER 1

INTRODUCTION AND OBJECTIVES

Virtually from its inception, forest policy in British Columbia has included measures designed to encourage the manufacture of timber within the province. While these measures consisted initially of direct incentives to manufacturers, by the turn of the century the basis of the policy had shifted to legislative restrictions against the export of unmanufactured forest products. This policy remains in effect today; log and chip exports are restricted by both provincial and federal legislation and exports are confined to a very small percentage of provincial timber production.

The underlying objective of the restrictive export policy is to promote the development of British Columbia's timber processing industry and, in turn, to create employment and income opportunities in the province. Traditionally, the policy has received strong support; in fact, members of British Columbia's economic community have referred to the policy as being a major factor in the forest industry becoming the province's greatest single source of wealth (Williston, 1968).

Examination of the policy in an economic context suggests, however, that neither the way in which it works to stimulate domestic processing nor the implications of restricting the export of raw materials are well understood. Recent studies by Lewis (1976) and by Scott and Shearer (1975) have indicated that significant economic
costs are associated with the policy of export restriction. The policy was examined also by the 1976 Royal Commission on Forest Resources which described it as "misdirected and contrary to a constructive industrial strategy" (p. 312). The Pearse Commission proposed substantial revisions to both the policy of export restriction and to the method by which the restrictions are imposed (pp. 312-316).

The objectives of this thesis are fivefold. First, to document the evolution of the policy. Second, to clarify the issues surrounding the imposition of the restrictions. Third, to provide insight into the existence, the magnitude and the distributional considerations of some of the most important—but yet often unrecognized—economic consequences of export restriction. Fourth, to examine from an economic standpoint the method of restricting the flow of exports. And fifth, to analyze the effectiveness of the alternative method of control proposed by the Pearse Commission.

The underlying concern of this examination of British Columbia's log export restrictions is that of economic efficiency; specifically, to what extent does the policy encourage the minimization of the total costs of forest industry production relative to the value of its output or, viewed more broadly, to what extent does the policy encourage (or discourage) the allocation of the timber resource to the uses which will maximize its contribution to the B.C. economy. Techniques of traditional economic analysis which use market prices as indicators of relative values provide the basis for the examination (Scitovsky, 1971; Leftwich, 1973).

1 Hereinafter referred to as the 'Pearse Commission'.

...
The importance of public policy to encourage efficiency in resource allocation and production cannot be overstated. The ability of the British Columbia forest industry to compete in world markets in the long run and the ability of this province to achieve its economic potential are dependent upon it (Deutsch et al., 1959; Shearer, 1968; Scott and Shearer, 1975).

The thesis deals individually with the level and the method of export restriction. The level of restriction refers to the degree of protection afforded the domestic processing industry as a result of the policy; the method of restriction refers to the structure of the regulatory system used to control the flow of exports. While the former is dependent to some extent upon the latter, the separation of the issues in the manner described provides a convenient means for examining the restrictions and their implications. Although the method of restriction provides the most realistic area for policy revision, it has never been subjected to rigorous economic analysis. For this reason, the emphasis in this thesis is placed on the examination of the export control system.

For the sake of simplicity the thesis is concerned solely with the restrictions imposed on the export of logs (as opposed to chips and other minor unmanufactured forest products that are also subject to export restrictions). The exigencies of the different markets make the restrictions on log exports the most important and the most easily identified. Nevertheless, the conceptual arguments presented in this thesis apply equally to the other products.

The thesis is divided into eight chapters. Chapter 2 outlines the legislative basis for export restriction and describes the
evolution of the policy at both the provincial and federal levels.

Chapter 3 provides the statistical setting for the discussion by describing exports in the contexts of the B.C. forest industry and the world market for softwood logs; by considering exports from the Pacific Northwest region of the United States; and by documenting the important differences between log prices on the export and domestic markets. Chapter 4 relates to the question of log export restriction: a listing of the arguments that have been expressed both in favour of and in opposition to the export restrictions is given; the issue underlying the restrictions is placed in the proper perspective; and indications of the magnitude and distributional considerations of the economic consequences of export restriction are provided. Chapter 5 describes the method of export regulation and how it is based on the interpretation of the policy. Chapter 6 examines the control mechanism from an economic standpoint. Chapter 7 outlines the recommendations of the Pearse Commission with regard to the export restrictions and examines the effects of introducing the Commission's recommendations on the volume, species and grades of log exports; on Crown revenue; and on timber utilization and timber harvests. Chapter 8 summarizes the material presented and draws conclusions with respect to the adequacy of both the existing policy and the proposed changes.

By examining the subject of export restriction in the manner outlined above, this thesis provides information that should enable the provincial government to reach a more informed and socially responsible decision with respect to whether the restrictions on log exports should be maintained as presently structured or replaced by an alternative system that would be more cognizant of the need to encourage economic efficiency in the allocation of timber resources.
CHAPTER 2

THE LEGISLATIVE BASIS FOR EXPORT RESTRICTION

Control over the export of unmanufactured forest products from British Columbia is shared by the provincial and federal governments—a consequence of the division of legislative powers provided for by the British North America Act. Under the terms of this Act, matters of international trade were assigned entirely to the federal Parliament while the provinces received constitutional authority over the natural resources located within their boundaries. Through their respective jurisdictions the two levels of government have each introduced legislation to restrict the export of unmanufactured forest products—the objective of both being to encourage the development of secondary industry by ensuring the domestic manufacture of raw materials.

This chapter establishes the legislative setting for the following discussion. In the first section, the statutes which form the basis of the existing export policy in British Columbia—both provincially and federally—are described and the differences in their jurisdictions outlined. The second section examines the evolution of the policy. Emphasis is placed on the more important provincial legislation, with the discussion undertaken within the context of the development of the province's land tenure system.
2.1. **Present Legislation**

While the government of British Columbia does not have the authority to interfere directly with international trade, it has translated provincial authority over natural resources into restrictions on the export of unmanufactured wood products by imposing specified terms and conditions on the sale of Crown timber. The enabling provincial legislation is contained in Part X of the *Forest Act* which provides: "All timber cut on Crown lands, or on lands granted after the twelfth day of March 1906 . . . shall be used in the Province, or be manufactured in the Province . . .". These provisions relate to international and interprovincial shipments and apply to timber harvested from both provincially titled land and private land granted after the legislation was adopted. They do not apply, however, to timber harvested on private land granted prior to 1906 or to timber cut on land controlled by the federal government.

The statutory power of the federal government to control exports is embodied in the provisions of the *Export and Import Permits Act*. This Act provides that the federal government may establish an 'Export Control List' on which it may include, and thereby restrict the export of, any article. The criteria for establishing the list include the specific objective of promoting further processing of natural resources in Canada, and unmanufactured wood products such as logs have been included on it. In contrast to the provincial legislation, the federal

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2 According to the Canadian Council of Resource and Environment Ministers Task Force on Forest Policy (1976), most of the other Canadian provinces have introduced similar legislation.

3 The name of this Act was changed to the *Ministry of Forests Act* in 1977. For the sake of brevity, the previous title is used throughout this thesis.
policy relates only to trade across the borders of Canada—it does not apply to interprovincial trade. Furthermore, the federal legislation applies to all international shipments of unmanufactured forest products, whether they are covered by or exempted from the provincial controls.

These respective jurisdictions and legislative provisions result in a complementary system of control over the export of unmanufactured wood products. Timber cut from the early Crown grants and from all federal land is subject to the federal export restrictions only; timber harvested from all other land in the province is subject to both the federal and provincial controls. This last group is the most important—accounting for 91 percent of the total provincial timber harvest in 1975 (Forest Service, 1975a).

Neither the provincial nor the federal legislation prohibits the export of unmanufactured wood products. The conditions of Part X of the *Forest Act* allow export upon the authority of the Lieutenant-Governor in Council. Section 7 of the *Export and Import Permits Act* authorizes the Minister of Industry, Trade and Commerce to issue export permits for goods included on the Export Control List.

2.2. Evolution of the Policy

The objective of promoting the domestic processing of raw materials has been an integral part of forest policy in British Columbia since the late 1800's. Originally, the policy was based on direct incentives to manufacturers. Some early forms of Crown timber rights were issued only to mill operators and, for a time, monetary incentives under royalty arrangements were used to encourage domestic sawmilling.
However, in a series of steps beginning in 1891, the provisions for encouraging domestic manufacturing shifted to direct legislative restrictions on the export of unmanufactured timber. This shift was culminated in 1906 with the passing of the legislation which forms the basis of the existing provincial policy. The federal legislation as it relates to forest products was not introduced until the 1940's.

Legislation enacted in 1888 established, for the first time, the principle of alienating the harvesting rights for Crown timber for the expressed purpose of encouraging the development of the provincial sawmilling industry. Timber leases granted under amendments to the Land Act required the lessee to maintain a sawmill with a capacity not less than 1,000 board feet per day for each 400 acres held under lease (Sloan, 1945). Previous leases, issued under the authority of the 1865 Land Ordinance, had not distinguished between the milling and logging sectors. In addition to the specific mill requirements, the 1888 legislation empowered the Lieutenant-Governor in Council to allow a royalty rebate (equal to one-half of royalty) on the export of manufactured timber on which royalty had been paid.

Due, however, to difficulties encountered in the enforcement of this legislation (Pearse et al., 1974a), a number of revisions were passed to make the objective of domestic manufacture more explicit. In 1891 the first measures prohibiting raw material exports were introduced. Land Act amendments passed in that year required all timber cut from land held under lease to be used or manufactured in the province (Sloan, 1945).

The direct encouragement of the domestic processing industry was strengthened during the same period as well. In 1892 it was required
that the mill be appurtenant to the lease and a deposit equivalent to 10¢ per acre was necessary to guarantee the mill's construction within two years. In 1895 the policy of granting leases to mill operators only was revised, and non-mill owners became eligible to acquire them. Even still, the policy of encouraging the provincial sawmilling industry was maintained by granting leases to operators at lower rental rates than to non-operators. In 1897, amendments to the Land Act required that mills be kept in operation for six months each year unless excused by the Lieutenant-Governor in Council. In the same year, the allowed size of the lease for each 1,000 board feet of daily mill capacity was reduced to 100 acres (Sloan, 1945).

Further amendments to the Land Act in 1901 required that, unless specifically exempted, all timber cut from Crown land be manufactured or used in the province (Sloan, 1945). This legislation supported that of 1891 by extending the domestic manufacturing requirements to all forms of Crown tenure including the Timber Licences which had been introduced in 1884. This legislation can be considered to be the second step in shifting the basis of the policy to direct restrictions against exports.

In 1903 the provincial government introduced measures which applied the principle of encouraging domestic manufacturing to timber harvested from non-provincially controlled land. Amendments to the Land Act passed in that year imposed a tax on all timber cut from non-royalty bearing land4 which was entirely refundable (except for 1¢ per 1,000 board feet) when the timber was used or manufactured in the

4 This land included Crown grants issued prior to 1887 and a number of important railway grants.
At the turn of the century, the attraction of investment capital was considered crucial to British Columbia's future. The lease and licence systems had been designed to induce investment but had been largely unsuccessful. In 1905, the provincial government introduced a revised form of Timber Licence. The innovative features of these licences coupled with the changing economic environment in North America spurred the desired flow of capital into B.C. When the granting of these licences was suspended in 1907, some 11.4 million acres were held in the form of temporary Crown tenures—an increase from less than 2 million acres in 1904 (Pearse et al., 1974a).

Throughout this period the B.C. government maintained its belief that provincial economic development should be stimulated through investment in the sawmilling industry. To supplement the 1905 policy and to lay the final step in the imposition of the direct restrictions against the export of unmanufactured timber, the government, in 1906, introduced the Timber Manufacture Act. This Act incorporated the requirements of the 1901 legislation relative to Crown land but also included, for the first time, explicit provisions pertaining to Crown-granted land. That is, land Crown-granted after the date of the legislation was granted subject to the provision that the timber be used or manufactured in the province.

The rationale underlying the passing of the legislation was

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5 This tax was declared ultra vires of the Provincial Legislature in 1929—see section 7.2.

6 1906 is often considered to be the year that B.C.'s log export restrictions were introduced (Austin, 1969). As the preceding discussion indicates, the restrictions actually date back to 1891.
clearly to nationalize the benefits of resource exploitation. The Honourable W. R. Ross referred to these benefits in a speech to the Provincial Legislature in 1912 when he said:

... to make sure that our forest resources should not merely be the foundation, but should also build up the whole fabric of the lumbering industry and strengthen the whole commercial system of the Province ... (and to insure) ... that the profit in manufacturing raw materials should benefit our citizens ... (the Government) ... clinched the policy of 1905 by an emphatic prohibition of timber export. (Ross, 1912: p. 8)

As a result of the enactment of this legislation, the only land in British Columbia which did not fall within the purview of the province's export restrictions was that which had been Crown-granted prior to 1906 and that (such as Indian Reserves) which fell under the direct authority of the federal government.

The intent and applicability of the legislation have remained unaltered since the passing of the Timber Manufacture Act. The provisions of the Act, however, were incorporated into the Forest Act in 1912.

The restrictions on the export of unmanufactured timber imposed by the federal government are much more recent than those of the provincial government and were originally intended to serve national security purposes. In July 1940, under the provisions of the War Measures Act, the Timber Controller prohibited the export of unmanufactured Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) logs (Forest Service, 1940). The ban was extended to true fir (*Abies* species) sawlogs in December 1940 and broadened further in 1942 to include all unmanufactured wood products, unless specifically exempted (Sloan, 1945).

Prior to the imposition of these restrictions, timber not subject to
the provincial legislation was considered, from the federal point of view, to be freely exportable. In 1945 the federal provisions were written into the National Emergency Transitions Power Act and in 1947 transferred to the Export and Import Permits Act, where they remain today.
CHAPTER 3

B.C. LOG EXPORTS AND THE WORLD MARKET FOR SOFTWOOD LOGS

To place the examination of British Columbia's log export restrictions in the proper perspective, the importance of B.C. log exports must be considered within the contexts of both the provincial forest industry and the world market for softwood logs. The first two sections of this chapter contain a descriptive analysis of these matters with particular emphasis placed on the examination of historical data. The third section relates to log exports from the U.S. Pacific Northwest—a region similar to B.C. but from where the volume of log exports over the years has been substantially greater. The fourth section is devoted to the important issue of the difference in log values on the export and domestic markets. In discussing these matters, this chapter provides the statistical basis for the analyses contained in Chapters 4, 6, and 7.

3.1. B.C. Log Exports

3.1.1. Exports Relative to Total Provincial Harvest

Historically, log exports have constituted only a very small percentage of British Columbia’s total log production. Table 3-1 (page 16) shows that the relative physical importance of exports reached its maximum level in the 1930's when exports averaged 8.8 percent of total provincial harvests. Since that time, exports as a percentage of
provincial log production have declined. During the period from 1966 to 1975 exports averaged only 1.3 percent of the total harvest. The decrease in the relative importance of exports has been attributed to the efforts of the provincial exports controls (Sloan, 1945) and to the introduction of the federal export regulations in the 1940's.

Closer examination of the export and provincial harvest statistics indicates that the volume of exports has fluctuated widely from year to year, as has the percentage of provincial harvest constituted by exports. This has been particularly true during the last decade. To a certain extent at least, these fluctuations are due also to the success of the provincial export control system. Exports tend to vary inversely with the health of the North American lumber market: when lumber demand and prices are high, the domestic industry consumes all log production and very little material is directed toward the export market; when the lumber market is depressed more logs become available for export. For example, in 1973, when U.S. housing starts and lumber prices reached record levels, B.C. log exports totalled 47.5 thousand cunits—the smallest volume since 1920 and only 0.19 percent of the total provincial harvest. In 1970, when the U.S. lumber market was depressed, B.C. exports totalled 500 thousand cunits—the largest volume ever, but still only 2.6 percent of the province's log production.

3.1.2. Exports by Jurisdiction of Origin

As explained in the previous chapter some log exports are subject to both federal and provincial legislation while others fall within the purview of the federal statutes only. Provincial government records recognize this jurisdictional division by classifying exports as 'exportable' and 'exported under permit'; the former pertaining to logs
originating on land not subject to the provincial legislation. Consideration of exports by jurisdiction of origin provides some insight into the success of the export controls in constraining the flow of exports.

Examination of the statistics in Table 3-1 shows a lack of consistency in recent years in the relative distribution of exports between the two jurisdictions. In seven of the ten years between 1966 and 1975 the volume of exports requiring provincial approval was greater than the volume subject only to the federal controls. This is a definite reversal from past situations. Between 1914 and 1965 the volume of exports from federally-controlled land was greater than the volume of exports requiring provincial permits in all but six years. The changes in the volume of exports by jurisdiction can be explained by changes in the relative volume of harvests from these areas, the introduction of the federal export controls in the 1940's and the tightening of the federal regulations in the late 1960's.

3.1.3. Exports by Region of Origin

Virtually all of British Columbia's log exports originate from the coastal region, exports from the interior being severely constrained by high transportation costs and a lack of markets. Between 1966 and 1975, the Vancouver and Prince Rupert (coast) Forest Districts accounted for 96.5 percent of the province's log exports. Importantly, the Vancouver

7 This classification ignores the existence of the federal controls. The two categories are more appropriately re-titled here as 'those logs subject to federal jurisdiction only' and 'those logs subject to provincial jurisdiction' respectively.

8 It is interesting to note that 1915 to 1918 accounted for four of the six years. This period of relatively large export volumes from provincial land led the government to establish the Log Export Advisory Committee to assist them in overseeing the control of exports. The Committee and its role in export regulation is discussed in detail in Chapter 5.
### TABLE 3-1

**ANNUAL VOLUMES OF B.C. LOG EXPORTS, 1914-1975**

<table>
<thead>
<tr>
<th>Year</th>
<th>Logs Subject to:</th>
<th></th>
<th>Exports as % of Total Provincial Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>federal jurisdiction only</td>
<td>provincial jurisdiction</td>
<td>Total Log Harvest</td>
</tr>
<tr>
<td>1914-19</td>
<td>30,696.4 cunits</td>
<td>61,652.5</td>
<td>92,348.9</td>
</tr>
<tr>
<td>1920-29</td>
<td>253,220.4</td>
<td>65,752.6</td>
<td>318,973.0</td>
</tr>
<tr>
<td>1930-39</td>
<td>312,201.1</td>
<td>61,573.1</td>
<td>373,774.2</td>
</tr>
<tr>
<td>1940-49</td>
<td>208,430.0</td>
<td>29,860.3</td>
<td>238,290.3</td>
</tr>
<tr>
<td>1950-59</td>
<td>117,232.1</td>
<td>22,061.7</td>
<td>139,293.8</td>
</tr>
<tr>
<td>1960-65</td>
<td>61,704.6</td>
<td>55,239.4</td>
<td>116,943.9</td>
</tr>
<tr>
<td>1966</td>
<td>73,488.2</td>
<td>163,189.2</td>
<td>236,677.4</td>
</tr>
<tr>
<td>1967</td>
<td>114,189.1</td>
<td>224,839.7</td>
<td>339,028.9</td>
</tr>
<tr>
<td>1968</td>
<td>162,651.3</td>
<td>146,446.7</td>
<td>309,098.0</td>
</tr>
<tr>
<td>1969</td>
<td>106,553.5</td>
<td>152,859.3</td>
<td>259,412.7</td>
</tr>
<tr>
<td>1970</td>
<td>134,557.3</td>
<td>365,929.3</td>
<td>500,486.6</td>
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<tr>
<td>1971</td>
<td>46,304.3</td>
<td>234,796.0</td>
<td>281,100.2</td>
</tr>
<tr>
<td>1972</td>
<td>30,058.5</td>
<td>71,819.5</td>
<td>101,878.0</td>
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<tr>
<td>1973</td>
<td>32,670.0</td>
<td>14,828.5</td>
<td>47,508.5</td>
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<td>1974</td>
<td>113,267.5</td>
<td>96,763.8</td>
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<td>1975</td>
<td>73,447.2</td>
<td>76,679.1</td>
<td>150,126.3</td>
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</table>

Source: Compiled from B.C. Forest Service Annual Reports, 1940-1975.

1 Statistics pertaining to the 6 groups covering the period from 1914 to 1965 show yearly averages.

Forest District itself accounted for 82.6 percent of the total (Forest Service, 1975a).

3.1.4. Exports by Species

Over the years, a number of different species have played important roles in terms of B.C. log exports. Western redcedar (*Thuja plicata* Donn) was originally the province's primary export species but gave way in the mid-1920's to Douglas-fir. From the early 1940's, when Douglas-fir exports were restricted by the Timber Controller, through to the end of the 1960's, western hemlock (*Tsuga heterophylla* (Raf.) Savg.) constituted
B.C.'s most important export species. During the 1970's, the export market has not been dominated by one species; in addition to hemlock, sitka spruce (*Picea sitchensis* (Bong.) Carr) and cypress (*Chamaecyparis nootkatensis* (D. Don) Spach) have emerged as valuable export species. These three species groups accounted for 72 percent of B.C.'s total log exports during the period from 1970 to 1975.

Table 3-2 summarizes the decadal averages of the proportions of log exports constituted by individual species.

**TABLE 3-2**

**PROPORTIONS OF B.C. LOG EXPORTS—BY SPECIES, 1914-1975**

<table>
<thead>
<tr>
<th>Year</th>
<th>Douglas Fir</th>
<th>Cedar</th>
<th>Spruce</th>
<th>Hemlock</th>
<th>&quot;Balsam&quot;</th>
<th>Cypress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914-19</td>
<td>14.1</td>
<td>65.2</td>
<td>6.1</td>
<td>10.5</td>
<td>0.9</td>
<td>-</td>
</tr>
<tr>
<td>1920-29</td>
<td>40.6</td>
<td>38.3</td>
<td>2.7</td>
<td>14.2</td>
<td>1.7</td>
<td>-</td>
</tr>
<tr>
<td>1930-39</td>
<td>53.9</td>
<td>17.0</td>
<td>3.2</td>
<td>20.7</td>
<td>2.0</td>
<td>-</td>
</tr>
<tr>
<td>1940-49</td>
<td>14.8</td>
<td>25.4</td>
<td>2.3</td>
<td>47.3</td>
<td>9.5</td>
<td>-</td>
</tr>
<tr>
<td>1950-59</td>
<td>11.6</td>
<td>12.8</td>
<td>0.6</td>
<td>58.5</td>
<td>15.3</td>
<td>0.7</td>
</tr>
<tr>
<td>1960-69</td>
<td>4.1</td>
<td>11.9</td>
<td>25.9</td>
<td>35.0</td>
<td>12.6</td>
<td>7.7</td>
</tr>
<tr>
<td>1970-75</td>
<td>2.9</td>
<td>10.7</td>
<td>29.6</td>
<td>24.6</td>
<td>9.5</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Source: Compiled from B.C. Forest Service Annual Reports, 1940-1975.

1"True firs" are classed as "balsam"

Comparing the export by species information with the species breakdown of domestic market sales shows a substantial difference between the two markets. For example, in 1975, cedar constituted 35 percent of total Vancouver Log Market (V.L.M.) transactions but only 11 percent of total exports. Spruce, on the other hand, accounted for only 7 percent of V.L.M. sales while comprising 42 percent of export sales (C.O.F.I., 1975;
3.1.5. Exports by Grade

The available statistics show that the grade distribution of B.C.'s log exports has remained relatively consistent over the years. Since 1940, when the federal authorities began to participate in export regulation, log exports from the province have been concentrated in low grade material. As summarized in Table 3-3, less than 25 percent of B.C.'s log exports during this period were classified as No. 1 or No. 2 grade material.

<table>
<thead>
<tr>
<th>Year</th>
<th>Grade</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930-39</td>
<td></td>
<td>4.4</td>
<td>46.9</td>
<td>24.7</td>
<td>23.9</td>
</tr>
<tr>
<td>1940-49</td>
<td></td>
<td>4.1</td>
<td>19.5</td>
<td>33.2</td>
<td>43.1</td>
</tr>
<tr>
<td>1950-59</td>
<td></td>
<td>3.8</td>
<td>12.7</td>
<td>64.0</td>
<td>19.6</td>
</tr>
<tr>
<td>1960-69</td>
<td></td>
<td>6.5</td>
<td>18.1</td>
<td>61.9</td>
<td>13.5</td>
</tr>
<tr>
<td>1970-75</td>
<td></td>
<td>6.8</td>
<td>17.7</td>
<td>64.3</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Source: Compiled from B. C. Forest Service Annual Reports, 1940-1975.

Comparison of the proportions of the export and domestic markets constituted by individual log grades shows a slight difference between the two. In 1975, 36 percent of Vancouver Log Market sales were graded as No. 1 or No. 2, while only 28 percent of log exports fell into the same grade categories.
3.1.6. Export by Destination and Value

The Pacific Northwest region of the United States and Japan constitute the two primary markets for B.C. log exports, with Japan having been the largest purchaser in terms of both volume and value in each year since 1961 (Dept. of Industrial Development, 1968; Table 3-4). A summary of B.C. log exports by destination and value from 1969 to 1975 is provided in Table 3-4.

<table>
<thead>
<tr>
<th>Year</th>
<th>Japan Volume</th>
<th>Japan Value</th>
<th>U.S. Volume</th>
<th>U.S. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>97,940</td>
<td>5,971.9</td>
<td>58,583</td>
<td>2,699.7</td>
</tr>
<tr>
<td>1970</td>
<td>247,815</td>
<td>16,436.6</td>
<td>198,020</td>
<td>9,008.7</td>
</tr>
<tr>
<td>1971</td>
<td>160,195</td>
<td>10,973.2</td>
<td>95,881</td>
<td>3,912.0</td>
</tr>
<tr>
<td>1972</td>
<td>75,972</td>
<td>4,899.0</td>
<td>9,793</td>
<td>576.8</td>
</tr>
<tr>
<td>1973</td>
<td>48,829</td>
<td>4,509.5</td>
<td>7,786</td>
<td>462.5</td>
</tr>
<tr>
<td>1974</td>
<td>126,681</td>
<td>12,853.6</td>
<td>112,945</td>
<td>8,604.1</td>
</tr>
<tr>
<td>1975</td>
<td>100,795</td>
<td>16,765.7</td>
<td>37,638</td>
<td>4,618.2</td>
</tr>
</tbody>
</table>

Source: Compiled from Dept. of Economic Development External Trade Reports, 1969-1975.

The only publication which provides information on both the destination and value of B.C. log exports is the Department of Economic Development's External Trade Report. The total volume figures presented in this publication (and in Table 3-4) differ from those collected by the B.C. Forest Service (see Table 3-1). Officials of both the federal and provincial governments were questioned about this discrepancy and suggested that the B.C. Forest Service statistics would be the more accurate of the two. For this reason the statistics presented in Table 3-4 should be looked upon as indicators of the relative distribution of export destinations and values.
3.2. The World Market for Softwood Logs

3.2.1. Growth of the Market

Since the early 1950's, the world market for softwood logs has expanded at an extremely rapid pace. From a total of 875 thousand cunits in 1950, consisting mostly of trade amongst European countries and between Canada and the U.S., the market increased to an average of 9.8 million cunits in 1973 and 1974 (F.A.O., 1974: p. 61). The primary source of this expansion has been increased purchases by Japan. As shown in Table 3-5, Japan has accounted for almost 70 percent of the world's purchases of softwood logs in recent years; European countries, Canada and many other small importers have accounted for the remainder of the market.

3.2.2. Sources of Japan's Imports

A small number of countries—in particular the U.S., the U.S.S.R. and New Zealand—have increased their softwood log exports in response to the developing Japanese market. Table 3-6 outlines Japan's imports from each of these countries since 1950 and includes the Canadian statistics for comparative purposes.

The table shows that Japan's imports of softwood logs from the U.S., the U.S.S.R. and New Zealand have increased steadily since 1955 although some levelling off has been evident in the mid-1970's. The imports from British Columbia, on the other hand, while exhibiting

10 Recorded in 'thousands of cubic metres'; converted to cunits using a ratio of 2.8316 : 1.

11 F.A.O. statistics record 'Canadian' export volumes. While there is some discrepancy between the F.A.O. statistics and those compiled by the B.C. government, it seems reasonable to assume that Canada's log exports to Japan originate in B.C.
### TABLE 3-5

THE WORLD MARKET FOR SOFTWOOD LOGS, 1950-1974

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports of Softwood Logs - thousands of cunits</th>
<th>World</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>875.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1955</td>
<td>971.2</td>
<td>36.0</td>
<td>0</td>
</tr>
<tr>
<td>1958</td>
<td>1082.4</td>
<td>201.3</td>
<td>0</td>
</tr>
<tr>
<td>1959</td>
<td>1349.0</td>
<td>342.9</td>
<td>0</td>
</tr>
<tr>
<td>1960</td>
<td>1720.2</td>
<td>435.4</td>
<td>0</td>
</tr>
<tr>
<td>1961</td>
<td>2256.6</td>
<td>943.6</td>
<td>0</td>
</tr>
<tr>
<td>1962</td>
<td>2541.6</td>
<td>1116.3</td>
<td>0</td>
</tr>
<tr>
<td>1963</td>
<td>3191.7</td>
<td>1525.6</td>
<td>0</td>
</tr>
<tr>
<td>1964</td>
<td>3557.2</td>
<td>1890.7</td>
<td>0</td>
</tr>
<tr>
<td>1965</td>
<td>4221.9</td>
<td>2100.2</td>
<td>0</td>
</tr>
<tr>
<td>1966</td>
<td>4829.6</td>
<td>2669.4</td>
<td>0</td>
</tr>
<tr>
<td>1967</td>
<td>5794.8</td>
<td>4053.4</td>
<td>0</td>
</tr>
<tr>
<td>1968</td>
<td>7492.4</td>
<td>5501.3</td>
<td>0</td>
</tr>
<tr>
<td>1969</td>
<td>7363.8</td>
<td>5489.3</td>
<td>0</td>
</tr>
<tr>
<td>1970</td>
<td>8568.8</td>
<td>6496.1</td>
<td>0</td>
</tr>
<tr>
<td>1971</td>
<td>7624.8</td>
<td>5647.2</td>
<td>0</td>
</tr>
<tr>
<td>1972</td>
<td>9357.7</td>
<td>6990.5</td>
<td>0</td>
</tr>
<tr>
<td>1973</td>
<td>10363.1</td>
<td>7375.8</td>
<td>0</td>
</tr>
<tr>
<td>1974</td>
<td>9292.0</td>
<td>6212.2</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Compiled from F.A.O. Yearbook of Forest Products, 1950-1974.
## TABLE 3-6
THE PRIMARY SOURCES OF JAPAN'S SOFTWOOD LOG IMPORTS, 1950-1974

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada</th>
<th>U.S.</th>
<th>U.S.S.R.</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1955</td>
<td>5.3</td>
<td>27.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1958</td>
<td>1.8</td>
<td>56.2</td>
<td>131.7</td>
<td>9.2</td>
</tr>
<tr>
<td>1959</td>
<td>2.5</td>
<td>86.2</td>
<td>209.8</td>
<td>39.9</td>
</tr>
<tr>
<td>1960</td>
<td>3.5</td>
<td>116.2</td>
<td>256.0</td>
<td>51.9</td>
</tr>
<tr>
<td>1961</td>
<td>45.9</td>
<td>88.3</td>
<td>308.3</td>
<td>85.1</td>
</tr>
<tr>
<td>1962</td>
<td>88.3</td>
<td>503.2</td>
<td>418.1</td>
<td>90.1</td>
</tr>
<tr>
<td>1963</td>
<td>103.1</td>
<td>841.9</td>
<td>480.6</td>
<td>82.3</td>
</tr>
<tr>
<td>1964</td>
<td>73.1</td>
<td>1051.3</td>
<td>619.1</td>
<td>112.3</td>
</tr>
<tr>
<td>1965</td>
<td>57.2</td>
<td>1146.3</td>
<td>718.7</td>
<td>145.5</td>
</tr>
<tr>
<td>1966</td>
<td>95.3</td>
<td>1448.3</td>
<td>903.4</td>
<td>69.9</td>
</tr>
<tr>
<td>1967</td>
<td>182.9</td>
<td>2186.3</td>
<td>1402.3</td>
<td>227.1</td>
</tr>
<tr>
<td>1968</td>
<td>182.9</td>
<td>3016.2</td>
<td>1762.6</td>
<td>453.1</td>
</tr>
<tr>
<td>1969</td>
<td>78.4</td>
<td>2792.3</td>
<td>1891.1</td>
<td>564.3</td>
</tr>
<tr>
<td>1970</td>
<td>188.6</td>
<td>3364.1</td>
<td>2177.9</td>
<td>595.1</td>
</tr>
<tr>
<td>1971</td>
<td>228.5</td>
<td>2503.4</td>
<td>2177.2</td>
<td>620.9</td>
</tr>
<tr>
<td>1972</td>
<td>89.0</td>
<td>3672.0</td>
<td>2401.8</td>
<td>638.5</td>
</tr>
<tr>
<td>1973</td>
<td>32.8</td>
<td>3698.2</td>
<td>2758.4</td>
<td>585.5</td>
</tr>
<tr>
<td>1974</td>
<td>55.4</td>
<td>2994.3</td>
<td>2533.5</td>
<td>409.7</td>
</tr>
</tbody>
</table>

cyclical fluctuations, have shown no discernible upward or downward trend.

At present, the U.S. and the U.S.S.R. constitute Japan's two most important sources of softwood logs—having accounted, respectively, for 50 percent and 37 percent of Japan's imports since 1970. During the same period, exports from B.C. accounted for only 1.8 percent of Japan's total imports.

As well as softwood logs, Japan imports substantial quantities of hardwood. In 1974, for example, Japan imported almost 9 million cunits of hardwood—with Indonesia, Malaysia and the Philippines being the primary sources of supply.

3.2.3. The Japanese Market

The Japanese have relied to an increasing degree on imports to meet their growing requirements for softwood logs. As shown in Table 3-7, imports had increased to over 45 percent of Japan's consumption of softwood logs by 1970 and reached nearly 50 percent in 1973.

The increase in both the volume and the relative importance of Japan's log imports reflects two basic facts: rapid economic growth—especially during the 1960's—and reduced domestic softwood harvests. In the period from 1960 to 1968, national income in Japan increased by 370 percent and the index of manufacturing production by 290 percent. More importantly, the level of residential construction rose by 270 percent (McKillop, 1973: p. 64). During the same period, Japan's annual softwood harvests declined substantially as the government introduced harvest restrictions to counteract the overcutting which occurred during and after World War II (Shand, 1968).

The importation of softwood logs has enabled Japan to meet its
### TABLE 3-7

**JAPAN'S CONSUMPTION OF SOFTWOOD LOGS, 1950-1974**

<table>
<thead>
<tr>
<th>Year</th>
<th>Apparent Consumption of Softwood Logs</th>
<th>Total Imports</th>
<th>Imports as % of Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>3,497.9 thousands of cunits</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1955</td>
<td>5,972.1</td>
<td>36.0</td>
<td>0.6</td>
</tr>
<tr>
<td>1960</td>
<td>8,678.9</td>
<td>435.4</td>
<td>5.0</td>
</tr>
<tr>
<td>1965</td>
<td>9,978.2</td>
<td>2,100.2</td>
<td>21.0</td>
</tr>
<tr>
<td>1970</td>
<td>14,346.6</td>
<td>6,496.1</td>
<td>45.3</td>
</tr>
<tr>
<td>1971</td>
<td>13,176.3</td>
<td>5,647.2</td>
<td>42.9</td>
</tr>
<tr>
<td>1972</td>
<td>14,685.3</td>
<td>6,990.5</td>
<td>47.6</td>
</tr>
<tr>
<td>1973</td>
<td>14,939.9</td>
<td>7,735.8</td>
<td>49.4</td>
</tr>
<tr>
<td>1974</td>
<td>13,776.3</td>
<td>6,212.2</td>
<td>45.1</td>
</tr>
</tbody>
</table>

**Source:** Compiles from F.A.O. Yearbook of Forest Products, 1950-1974.

1. Apparent consumption consists of domestic production plus imports of sawlogs and veneer logs.

Growing demand for softwood lumber primarily from domestic production. In 1974, for example, imports accounted for only 8.5 percent of Japan's softwood lumber consumption—a relatively minor increase from the levels of 3.7 percent in 1963 and 6.7 percent in 1968 (F.A.O., 1974: pp. 120-2).

As these statistics reflect, the Japanese have shown a definite preference for importing raw materials as opposed to importing finished or semi-finished products. There has been, in fact, a conscientious effort by the Japanese government to encourage the development of domestic industry. These measures have included direct financial support programs, subsidized financing, close co-operation between industry and government, and the maintenance of rigid tariff differentials between manufactured.
and unmanufactured wood product imports (Ogawa, 1963; Shand, 1968; Hamilton, 1971; Darr, 1975b; Jung, 1976). In 1974, over 24,000 sawmills were operating in Japan—virtually the same number as in 1960—although average size (based on power input) had more than doubled (Forestry Agency, 1974). Total output of Japanese sawmills was 45.0 million cubic metres in 1973 compared to 26.7 million cubic metres in 1960 (ibid: p. 4).

In addition to the contribution to economic development, other factors influence the preference of the Japanese for domestically manufactured lumber. For instance, the Japanese tend to place a greater importance on wood as a decorative material than do North Americans and the relatively slow but precise production techniques used by many Japanese mills allow for a generally higher recovery of higher-valued, specialized products than can be obtained from North American lumber producers (Q.C. Timber, 1975).

Members of the B.C. forest industry, together with the federal and provincial governments have invested substantial time and expense, especially during the last two decades, to promote the sale of manufactured B.C. forest products in Japan. These efforts have met with some success: the volume of B.C.'s lumber exports to Japan increased from 1.6 million board feet in 1960 to 155.6 million board feet in 1961 (Shand, 1968; Dept. of Industrial Development, 1968) to a cyclical high of 732.1 million board feet in 1970 (C.O.F.I., 1975). Since 1970, lumber exports to Japan have declined, registering 407.5 million board feet in 1975. The value of B.C. lumber exports to Japan increased from $38 million in 1969 to $110 million in 1974. In 1975, the value of B.C.'s lumber sales in Japan declined to $89 million (Dept. of Economic Development,

An important feature of the B.C.-Japan lumber trade to date has been the concentration of Japanese purchases in rough squares and cants. These materials require the minimum level of processing at source; they are cut into dimensions of 4 inches square ('baby squares') or 12 inches square ('Jap squares') and are remanufactured in Japan to meet Japanese specifications. The willingness of B.C. lumber producers to provide these materials, combined with the reluctance of U.S. mills to supply them, has been identified as the primary reason underlying the relative growth of the B.C.-Japan lumber trade (Shand, 1968). Considered important in this regard is the Japanese Construction Ministry's 1974 adoption of the Canadian platform frame construction system (Jung, 1976). Although there is some debate over the volume of trade to be gained (Q.C. Timber, 1975), authorities in B.C. believe that the acceptance of B.C. lumber standards will increase the demand for B.C. produced dimension lumber in Japan relative to the demand for the semi-finished product (C.O.F.I., 1975b).

Even in light of this information, probably the most important feature of the B.C.-Japan log/lumber trade is the willingness of the Japanese to pay extremely high prices for imported softwood logs. The available statistics show that the Japanese are willing to pay more for certain high quality logs than for similar quality manufactured material. For example, for the last four years at least, the resale value of No. 1 hemlock logs on the Japanese market has been consistently above the selling price of hemlock 'baby squares' (Japan Lumber Journal, 1976).\textsuperscript{12}

\textsuperscript{12}Sutton (1975) also identified this and suggested that it raised important questions with regard to the validity of the value-added concept of investment planning.
Another important fact is that these log prices are often more than double those paid by British Columbia log buyers. \textsuperscript{13}

Projections of Japanese demand for softwood logs suggest that their import requirements will continue to be strong over the next three or four decades at least. The Stanford Research Institute (1974b) has estimated that Japan would need to import approximately 10 million cunits of softwood logs by 2000 and Sutton (1975) has concluded that the Japanese will be forced to continue to import large sawlogs and peeler logs regardless of their total demand requirements because of the inability of their forests to produce enough of those trees.

3.3. Log Exports from the U.S. Pacific Northwest

3.3.1. Volumes

Over the years the volumes of softwood log exports from the U.S. West Coast have been considerably greater than those from British Columbia. An estimated 3.8 million cunits were exported from Washington and Oregon in 1975 (Ruderman, 1976: p. 18)\textsuperscript{14} compared to 150 thousand cunits from B.C. in the same year. The U.S. export market has developed over the last two decades in response to the growth of demand for softwood logs in Japan (where over 90 percent is sold). Export sales accelerated rapidly in 1961 and were further boosted by the increase in available supply following the 1962 Columbus Day storm. Some levelling off in U.S. export sales has been evident in the mid-1970's. Since 1962, exports have increased from less than 3 percent

\textsuperscript{13}See section 3.4.

\textsuperscript{14}Recorded in 'thousands of board feet'; converted to cunits using a ratio of 1.7 : 1 (see Appendix B).
of the total Washington-Oregon timber harvest to over 15 percent (Darr, 1975a: p. 2).

3.3.2. Restrictions on Exports

The development of the U.S. export market added pressure to the timber market in the Pacific Northwest and led to a widespread controversy over the question of log exports. In response to the strong lobby that was mounted in opposition to log exports a number of legislative measures were introduced to restrict the export of unmanufactured materials. The Morse Amendment, in effect from 1968 to 1973, limited softwood log exports from federal land west of the 100th meridian to 350 million board feet\(^{15}\) per year. Before its expiration in 1973, the Morse Amendment was superseded by an appropriations rider which had the effect of initiating a complete ban on log exports from the same area (Lindell, 1977). Log exports from Oregon State lands were prohibited in 1961 (Austin, 1969). As a result of these measures, only logs from private land—where over 75 percent of the volume originates (Darr, 1975b: p. 24)—and from Washington State land remain eligible for export.

3.3.3. Species and Grades

As the majority of Pacific Northwest exports originate from unrestricted land, the composition of the exports (i.e., volumes, species and grades) is, in fact, determined by free market forces; it reflects the demands of the Japanese and the willingness of U.S. log producers to sell at international market prices.

\(^{15}\)Approximately 595,000 cunits.
Table 3-8 examines the log consumption by species in the Pacific Northwest export and domestic markets. It shows a strong concentration of export sales in hemlock and Douglas-fir but also indicates the relative importance of the export market for spruce and cedar.

**TABLE 3-8**

PACIFIC NORTHWEST DOMESTIC AND EXPORT LOG SALES—BY SPECIES, 1972

<table>
<thead>
<tr>
<th>Species</th>
<th>Domestic</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Douglas-fir</td>
<td>60.0</td>
<td>27.4</td>
</tr>
<tr>
<td>Hemlock</td>
<td>13.3</td>
<td>56.3</td>
</tr>
<tr>
<td>True firs</td>
<td>5.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Spruce</td>
<td>1.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Western redcedar</td>
<td>3.1</td>
<td>4.9</td>
</tr>
<tr>
<td>Other species</td>
<td>17.5</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>


Table 3-9 examines the grade distribution of Pacific Northwest export and domestic sales and shows export sales to be concentrated in the higher grade materials.
TABLE 3-9

PACIFIC NORTHWEST DOMESTIC AND EXPORT LOG SALES--BY GRADE, 1973

<table>
<thead>
<tr>
<th>Grade</th>
<th>Domestic</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peeler</td>
<td>5.9</td>
<td>9.7</td>
</tr>
<tr>
<td>Special mill</td>
<td>6.6</td>
<td>22.4</td>
</tr>
<tr>
<td>No. 1 sawmill</td>
<td>0.8</td>
<td>4.3</td>
</tr>
<tr>
<td>No. 2 sawmill</td>
<td>37.2</td>
<td>45.9</td>
</tr>
<tr>
<td>No. 3 sawmill</td>
<td>24.8</td>
<td>17.1</td>
</tr>
<tr>
<td>Cull, utility &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 4 sawmill</td>
<td>17.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Ungraded</td>
<td>7.0</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Darr, D. R., ibid.

3.4. Export/Domestic Price Differentials

Of primary concern in examining the question of log export restriction is the difference in log prices between the export and domestic markets. As explained in the next chapter, this difference (the 'export/domestic price differential') indicates the amount that export restrictions hold domestic log prices below international price levels. The export/domestic price differential provides insight into a number of important economic consequences of export restriction and establishes the basis for examining the efficiency of the export control system.

Unfortunately, analysis of the price differential is complicated by the lack of reliable information regarding the prices received for
B.C. log exports. It is reasonable to assume, however, that export prices available to B.C. operators are similar to those available to U.S. exporters. On this basis, U.S. export prices can be used as a proxy for the value of B.C. export sales. Using published U.S. information, along with statistics purchased from the Industrial Forestry Association and data pertaining to domestic log sales, this section of Chapter 3 provides a descriptive analysis of the export/domestic price differential.

Table 3-10 examines average yearly prices on the export and domestic log markets for the important species of Douglas-fir, hemlock, spruce and cedar for the five year period from 1970 to 1975.

The information presented in this table shows a substantial difference in the selling prices obtainable on the export and domestic log markets—especially after 1972. The sudden jump in export prices in 1973 can be attributed to the upward revaluation of the Japanese yen in December 1972; to the increased competition for available logs which resulted from the high demand for lumber in both the Japanese and North American markets in 1973; and to the additional restrictions on log exports introduced in the Pacific Northwest in 1973. The decline in export prices in 1974 and 1975 can be attributed to the world-wide economic recession in general and to depressed lumber markets and the oversupply of log stocks in particular. Indications are that 1976 export price levels were approximately 8 percent above 1975 levels (Ruderman, 1976: p. 22).

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16 As explained in section 3.1.6, the information pertaining to B.C. log exports contained in B.C. government publications is not considered reliable.
TABLE 3-10

EXPORT/DOMESTIC PRICE COMPARISON\(^1\)--BY SPECIES, 1970-1975

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>$55.67 $71.79</td>
<td>$38.83 $74.19</td>
<td>$50.43 $99.80</td>
<td>$38.32 $84.07</td>
</tr>
<tr>
<td>1971</td>
<td>46.96 66.23</td>
<td>36.98 66.35</td>
<td>56.34 89.46</td>
<td>36.13 81.55</td>
</tr>
<tr>
<td>1972</td>
<td>58.27 73.06</td>
<td>46.60 75.22</td>
<td>65.08 91.89</td>
<td>46.50 82.92</td>
</tr>
<tr>
<td>1973</td>
<td>68.13 167.08</td>
<td>58.10 168.26</td>
<td>124.23 311.50</td>
<td>73.73 196.55</td>
</tr>
<tr>
<td>1974(^3)</td>
<td>69.60 136.43</td>
<td>57.87 137.19</td>
<td>112.17 194.07</td>
<td>61.83 121.06</td>
</tr>
<tr>
<td>1975(^3)</td>
<td>71.08 132.32</td>
<td>58.36 127.01</td>
<td>90.75 149.86</td>
<td>61.39 117.35</td>
</tr>
</tbody>
</table>

--- Canadian dollars per cunit ---

---

**Sources:** Compiled from C.O.F.I., Average Log Prices, 1970-75; Adams, T. C., Log Prices in Western Washington and Northwestern Oregon 1963-73, PNW-235, 1974; Industrial Forestry Association, Composite Log Sales Analysis—Puget Sound District, 1974-75.

\(^1\) The U.S. figures have been converted from Mbm Scribner to cunits using a ratio of 1.7 : 1 and from U.S. dollars to Canadian dollars using the appropriate exchange rates. See Appendix B for a discussion of both conversion factors and exchange rates.

\(^2\) Sawlog grades only.

\(^3\) The U.S. figures pertain to the 3rd quarter only and to Puget Sound District sales only.
Caution must be used in comparing these prices. Exports from the United States are composed of much higher quality logs than British Columbia exports and average U.S. export prices will tend to be somewhat higher than actual B.C. export prices for this reason. Nevertheless, examination of export and domestic prices by grade eliminates much of this problem. Table 3-11 presents a comparison of export and domestic selling prices for individual grades of Douglas-fir, hemlock, spruce and cedar for 1975.

These statistics verify the existence of the export/domestic price differential. Importantly, for each species, the export premium available for high grade material is substantially greater than that available for the low grade logs—a result consistent with the Japanese preference for high quality material.
<table>
<thead>
<tr>
<th>Species</th>
<th>Grade</th>
<th>Market</th>
<th>U.S. Export</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>V.L.M.</td>
<td></td>
</tr>
<tr>
<td>Douglas fir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 1 Peeler</td>
<td></td>
<td>$146.03</td>
<td>$322.29</td>
</tr>
<tr>
<td>No. 2 Peeler</td>
<td></td>
<td>138.88</td>
<td>252.81</td>
</tr>
<tr>
<td>No. 3/No. 4 Peeler</td>
<td></td>
<td>121.75</td>
<td>200.26</td>
</tr>
<tr>
<td>No. 1 Sawmill</td>
<td></td>
<td>97.36</td>
<td>199.83</td>
</tr>
<tr>
<td>No. 2 Sawmill</td>
<td></td>
<td>83.16</td>
<td>132.85</td>
</tr>
<tr>
<td>No. 3 Sawmill</td>
<td></td>
<td>64.04</td>
<td>79.76</td>
</tr>
<tr>
<td>Hemlock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 1</td>
<td></td>
<td>78.10</td>
<td>202.52</td>
</tr>
<tr>
<td>No. 2</td>
<td></td>
<td>73.93</td>
<td>126.90</td>
</tr>
<tr>
<td>No. 3</td>
<td></td>
<td>56.15</td>
<td>76.38</td>
</tr>
<tr>
<td>Spruce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 1</td>
<td></td>
<td>263.12</td>
<td>373.93</td>
</tr>
<tr>
<td>No. 2</td>
<td></td>
<td>100.06</td>
<td>140.74</td>
</tr>
<tr>
<td>No. 3</td>
<td></td>
<td>64.18</td>
<td>75.97</td>
</tr>
<tr>
<td>Cedar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 1</td>
<td></td>
<td>80.10</td>
<td>205.50</td>
</tr>
<tr>
<td>No. 2</td>
<td></td>
<td>66.12</td>
<td>120.61</td>
</tr>
<tr>
<td>No. 3</td>
<td></td>
<td>58.15</td>
<td>56.97</td>
</tr>
</tbody>
</table>


1The U.S. figures have been converted from Mbm Scribner to cunits using the schedule of conversion factors listed in Appendix B and from U.S. dollars to Canadian dollars using an exchange rate of 1.0173 : 1.

2Similar tables for 1973 and 1974 are presented in Appendix A.

3Grading rules differ between B.C. and the Pacific Northwest. A comparison of grades is included in Appendix B.

43rd quarter only; Puget Sound District sales only.

5Includes No. 3 Peeler and Special Mill in U.S. grades.

6Includes Peeler, Special Mill and No. 1 sawmill in U.S. grades.
CHAPTER 4

THE QUESTION OF LOG EXPORT RESTRICTION

The policy of restricting the export of unmanufactured forest products has been the subject of debate in British Columbia and elsewhere for decades. Many view raw material exports as being short-sighted in terms of achieving the maximum long-term benefit from indigenous resources while others simply consider the export of raw material to be tantamount to the export of employment. In light of these views, restrictions on the export of these materials have proven—in B.C. at least—to be popular instruments of forest policy.

The issue, however, is not as simple as that usually implied by the proponents of the restrictions. Most of the standard arguments neither view the restrictions in the proper context nor do they correctly identify the trade-offs associated with the two policy extremes.

This chapter is concerned with the question of log export restriction: it presents a brief listing of the arguments that have been expressed both in favour of and in opposition to the restrictions. Most importantly, the chapter attempts to clarify the issue underlying the debate by placing the arguments in the proper economic context. And finally, while no attempt is made to aggregate the costs and benefits associated with the policy alternatives, the chapter does add to the debate by identifying and providing insight into the existence, the magnitude and the distributional considerations of the most important—but
yet often unrecognized—economic consequences of export restriction.

4.1. Arguments in Favour/in Opposition

When the export restrictions were first introduced in British Columbia, the objective of the policy was to encourage the development of the domestic processing industry. The growth of the timber manufacturing sector, it was argued, would in turn produce a number of benefits including the creation of employment and income (Ross, 1912; Sloan, 1945; Darr, 1975a); the generation of taxation revenue (Sloan, 1945; Burch, 1976); the provision of greater and more long-lasting stimulation to economic development (Ross, 1912); and the encouragement of balanced growth and industrial stability (Deutsch et al., 1959; C.O.F.I., 1971). It is widely believed that the policy has been successful in achieving its early objectives (Williston, 1968; British Columbia Forest Products, 1975).

The objective of the policy in the 1970's is somewhat more complex; export restrictions are looked upon now as a means of protecting established industry from foreign competition for raw materials. In this regard, the restrictions shelter domestic industry from high world market prices for raw materials. This, it is argued, helps to stabilize total production costs in B.C. thereby enabling provincial manufacturers to continue to compete in world markets in the face of increasing energy, capital and labour costs.

Of all the benefits to be achieved through the domestic processing industry, employment is the most identifiable and considered the most important. In this regard, the greater labour input in manufacturing relative to that in log exporting is often considered to be a priori proof of the employment benefits to be achieved from log export restriction.
The U.S. Forest Service has devoted a number of research projects to examining the employment issue (Adams and Hamilton, 1965; Darr, 1975a). In their most recent publication, the direct labour input in lumber manufacturing was found to be 2.67 times as great as that in log exporting: direct employment per thousand board feet of logs in Washington and Oregon in 1973 averaged 12.58 man-hours for the lumber industry but only 4.72 man-hours for the log export industry (Darr, 1975a: p. 9). The same study estimated the average employment in processing logs for veneer and plywood products to be over four times the direct labour input in log exporting. Figures such as these have been interpreted to imply that for each one thousand board feet of logs exported, the equivalent of one man-day in the lumber industry or two man-days in the plywood industry are foregone (Sloan, 1945).

Additional arguments supporting the policy of log export restriction have been mentioned. They include the questioning of the theoretical free trade argument and the possible conflicts between log exports and such national objectives as low-cost wood products, timber conservation and community stability (Hamilton, 1971; Stanford Research Institute, 1974a; Haynes, 1976).

On the other side of the debate, the arguments opposed to log export restrictions have focused traditionally on the incentives to timber utilization and forest management that result from the higher log revenues generated by export sales (Usmar and Yska, 1971; Fenton and Dick, 1972a & b; Darr, 1975a; Sutton, 1975). Additional arguments have included the benefits to be achieved from free trade (Alston, 1975); the discriminatory nature of international tariffs (Sutton, 1975); the contribution of log exports to the trade balance (Darr,
and the view that restrictions do not necessarily result in manufactured product exports (Shand, 1968; McKillop, 1973). Another very important argument—and one often ignored—pertains to the cost of capital. Consideration of the marginal cost and productivity of capital raises questions concerning the validity of using 'simple' value-added as the basis of investment planning (Eklund, 1972; Sutton, 1975).

4.2. Clarification of the Issue

Most of the arguments listed in section 4.1. (both in favour of and in opposition to the restrictions) tend to view the basic issue surrounding the policy as whether or not the domestic processing industry should be assisted. To this end, consideration of the trade-offs between the two policy alternatives has evolved into an examination of the relative merits of the two industries: (basically) the additional employment to be gained in manufacturing compared to the forest management incentives to be gained in exporting.

This view reflects a misunderstanding of both the issue and the effects of the restrictions. More correctly, the issue should be identified as whether or not export restrictions are an efficient means of encouraging (or protecting) the domestic timber processing industry. If public priorities dictate that the processing industry should be assisted, then export restrictions should be viewed as only one of a number of alternative policy measures that could be used. Other measures such as discriminatory financing or taxation policies and

17 A more recent article by Darr (1977) suggests that the shift to floating exchange rates has relegated the balance of payments issue to one of secondary importance in the log export debate.
infrastructural development have been described (Sanvictores, 1975; Pearse, 1976). In the same respect, the identification of the trade-offs requires a more explicit recognition of the economic relationship between the restrictions, log prices and the log producing and processing industries. Examined in this light, it becomes readily apparent that attempts to assist the domestic processing industry through a policy of log export restriction involves significant economic consequences that have not been given consideration in previous policy decisions.

This approach to examining the policy of export restriction has been developed in papers by Deutsch et al. (1959), Lewis (1976), Baumann (1975), Scott and Shearer (1975) and by the Pearse Commission. The following description of the workings and the implications of the policy draws heavily from these studies.

4.3. Economic Consequences of Export Restriction

Three important and distinguishable economic consequences are associated with log export restrictions. They are: the redistribution of income between sectors of the provincial economy; the loss of economic efficiency; and the inequitable distribution of the losses and gains that result from the restrictions.

4.3.1. Redistribution of Income

The basic effect of the export restrictions is to eliminate foreign competition for raw materials produced in B.C. This has the intended effect of providing domestic manufacturers with security of raw material supplies but, insofar as it reduces the total demand for logs, it also acts to hold domestic log prices below free market
levels. In this regard, domestic processors benefit from both a greater availability of log supplies and from low log prices. Given that B.C. processors sell in markets where they have little effect on product prices, the depressed raw material prices will be reflected in the long-run growth of the sector.

While many look upon the restrictions as protecting the domestic processing industry from 'unfair' price competition, it is important to recognize that other sectors within the provincial economy are correspondingly disadvantaged by the restriction's effect on log prices. In the first place, depressed raw material prices hold the revenue of the log producing sector below achievable levels and, in the long run, constrain the sector's growth. As such, the relevant consideration in determining employment trade-offs is not simply the relative labour input in manufacturing and log exporting but rather the extent to which the additional jobs generated in the processing sector by restricting log exports exceed those foregone in the logging sector, and at what cost of capital.

In the second place, the Crown, through its interest in resource revenues, is also affected. On the B.C. coast, only the prices of timber sold on the open market are affected directly by the restrictions. However, because stumpage charges on all Crown timber in the region are based on the average selling prices of Vancouver Log Market transactions, the effects of the restrictions are transmitted indirectly to Crown revenues. Insofar as log prices are depressed, stumpage revenue will be held below free market levels as well.

To the Crown and the log producing sector, the loss of timber values attributable to the restrictions should be viewed as an
opportunity cost; to the processing sector the price support achieved through the depressed log prices should be looked upon as a gain. In effect, the restrictions result—at least theoretically—in a redistribution of income between the Crown and the log producing sector on one hand and the log processing sector on the other.

The actual distribution of the opportunity cost between the Crown and the log producing sector is of particular importance and is dependent upon the 'profit allowance' provisions of the stumpage appraisal system: for each $1.00 per cunit that domestic log prices are held below international free market levels, the revenue of the log producing sector is reduced between 10.7¢ and 21.3¢ per cunit; Crown revenue is reduced between 78.7¢ and 89.3¢ per cunit. Taking account of the average profit ratio (20 percent) and maximum stumpage charges, it can be estimated that the Crown absorbs something in the order of 65 to 70 percent of the opportunity cost attributable to the export.

18 The system of timber valuation used in B.C. apportions the difference between log selling value and allowable operating costs (i.e., the conversion return) into stumpage for the Crown and profit allowance for the log producing sector on the basis of a profit ratio applied to the sum of operating costs plus appraised upset price. As the calculation cannot be made directly, the profit allowance is determined by applying the profit ratio to the selling price according to the formula $P \times SP$, where $P$ equals the profit ratio expressed in decimal form (Pearse et al., 1974b). Based on the coastal profit ratio range of 12% to 27%, the profit allowance will range from between 10.7% to 21.3% of the selling price.

The distribution of the opportunity cost indicated in the text above does not take account of maximum stumpage rates (60% of the conversion return) or minimum stumpage rates (the lesser of: the lowest applicable royalty; 40% of the conversion return; or 10% of the average market price in the Vancouver Forest District). If either maximum or minimum rates are in effect, an increasing percentage of the burden of the cost would be shifted to the log producing sector.
restrictions.\textsuperscript{19}

The extent by which domestic log prices are depressed is represented at the margin by the export/domestic price differential. When reversed, this measure identifies the increase in value to be achieved (on average) by releasing any log from the controlled domestic market. The difference in prices at the margin may not be indicative of the total opportunity cost, however; an accurate measurement would have to take account of the responsiveness of international log prices to a major change in log market supplies.

Empirical evidence on this matter was provided by McKillop (1973). Using quarterly data for the period from 1950 to 1970, McKillop concluded that Japanese demand for U.S. softwood logs was totally inelastic. This suggests that the level of log prices is not an important determinant in establishing the absolute level of international demand. It also implies that the total reaction to an increase in log supply would be taken up by a decrease in log prices. This view was supported by Adams (1977).

An econometric analysis to up-date McKillop's study and to identify, within reasonable limits, the price reaction to an increase in

\textsuperscript{19}This figure pertains to Douglas-fir, hemlock, spruce and cedar only and is based on calculations presented in Appendix C. The effect of minimum stumpage rates on the calculations is impossible to quantify because of the lack of precise operating cost information. Nevertheless, it can be presumed that the effect is relatively minor.
B.C. log exports is beyond the scope of this thesis. Nonetheless, a general indication of the magnitude of the opportunity cost can be gained by viewing the responsiveness of log prices within specified limits. Using Vancouver Log Market average selling prices, average export prices and timber harvest volumes, the total loss of log values which can be attributed to the restrictions for Douglas-fir, hemlock, spruce and cedar in 1975 (for the extreme case, i.e., no price decrease) can be estimated at $192 million. Even a 90 percent reduction in the difference between world and domestic prices as the result of an increase in B.C. log exports would leave the estimate of the log values foregone at $19.2 million. It seems reasonable to presume that the actual value loss in 1975 would have fallen somewhere between these two figures. Whatever the precise figure, it is clear that the dollar value of the opportunity cost is substantial; that it leads to losses in employment, income and taxation revenue that otherwise would have been generated by the log producing sector; and that it leads to the loss of Crown stumpage revenue. Based on this examination it is clear that the redistribution of income represented by the opportunity cost warrants explicit inclusion in any discussion of the trade-offs associated with the restriction/non-restriction argument.

4.3.2. Economic Efficiency

Once the way the restrictions work to assist the domestic processing industry has been clarified it becomes possible to consider some of the traditional non-restriction arguments in a more realistic context.

20 The calculations underlying these estimates, along with an indication of the distribution of the cost between the Crown and the log producing sector, are presented in Appendix C.
While the redistribution of income in favor of the domestic processing sector does not in itself constitute a cost to the provincial economy, the depressed nature of domestic log prices does affect the ability of those prices to optimize resource allocations. In this way a real cost is incurred: a reduction in economic efficiency, or stated otherwise, a loss of provincial economic welfare. This occurs in two basic areas: in terms of the growth of domestic industry in line with international comparative advantages and with respect to the harvesting and utilization of timber.

The growing comparative disadvantage of B.C. processors relative to competing producers in other countries is becoming increasingly prevalent (Farrow, 1977; Shields, 1977). In recognition of this, the Pearse Commission emphasized the need to encourage those activities in which domestic firms enjoy a comparative trade advantage and, beyond that, the importance of public policies which encourage productive efficiency (pp. 319, 375-6). In this regard, the Commission stressed the valuable role to be played by intermediate product (i.e., raw material) prices (pp. 321-2).

The 'comparative advantage/log price' argument can be summarized as follows: Export restrictions encourage the growth of the processing sector by holding raw material prices below free market levels and increasing the viability of additional domestic production. These production increases can occur through the expansion of existing firms, through the introduction of new firms or through a combination of both. The growth of the manufacturing sector in this way reduces the industry's overall level of efficiency but, more importantly, the growth occurs in production that is more costly and that is only marginally
profitable under the given circumstances. In face of competitive market prices and relatively increasing costs for the other inputs, the sustainment of this production will require increasingly large amounts of price support.

This argument is supported by the evidence. For example, the price support which accrued to domestic mills processing Douglas-fir in 1970 was $16.12 per cunit (Table 3-10). Following the international monetary revaluations of 1972, the price support accruing to the same processors increased to $98.95 per cunit. And, while the level of price support fell somewhat in 1974 and 1975, the stimulation of the world economy and revisions to currency values (Fairbairn, 1977) can be expected to increase the dollar value of price support required in the future to maintain domestic production at existing levels.

Even more important is the fact that the price support occurs at the partial expense of the log producing sector--where free market prices suggest that provincial trade advantages lie. In this regard, a change in policy which led to an increase in log prices would, in the long-run, force a marginal re-adjustment in industrial structure between the log producing and processing sectors. While the processing sector would be forced to contract, the trade-off would involve the elimination of internationally inefficient lumber production to be replaced to some extent by internationally efficient log production. The average

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21The information regarding the allocation of the income redistribution costs between the Crown and the log producing sector (section 4.3.1.) raises important questions with respect to the Pearse Commission's argument that elimination of the restrictions would not result in a reduction in total provincial employment (p. 310). Insofar as the log producing sector bears less than the full burden of the cost, elimination of the price support accruing to the processing sector (ceteris paribus) would not result in an equivalent boost to the log producing sector.
efficiency of the processing sector would increase and the ability of the industry to compete profitably, without price support, in world markets in the long-run would improve.

The second area in which the allocative abilities of log prices are affected pertains to the physical utilization of the resource—both in terms of wood as a productive input and in terms of timber as an output. In the first place, depressed raw material prices encourage domestic mills to choose manufacturing processes that involve more intensive use of the under-priced input and less exacting production techniques than would be the case if prices were higher. Speaking on the subject of timber utilization in a recent address to the Council of Forest Industries the Minister of Forests, T. M. Waterland (1977), criticized the coastal forest industry for its uneconomic timber allocations and use of out-dated production facilities. Increases in log prices relative to the prices of other productive inputs would, in the long run, induce a marginal reallocation in factor combinations, more exacting utilization and the production of higher valued products.

In the second place, the depression of log prices—insofar as it affects the value of timber at the margin—constrains the ability of the logging industry to increase the intensity of timber harvests and to harvest high cost timber stands on a profitable basis. In this regard, Pearse (p. 312) outlined the contradictory natures of the export restrictions and the provincial government's rigid standards of timber utilization.

Associated with this is the relationship between the restrictions and general forest management. The New Zealand Forest Service, in particular, has examined this subject in some detail and has found
significant benefits in terms of increased returns on afforestation investment to be achieved through log exporting (Fenton et al., 1968; Usmar and Yska, 1971; Fenton and Dick, 1972a & b).

4.3.3. Distribution of Losses and Gains from Restriction

In addition to the income redistribution and economic efficiency consequences of the restrictions, there exists a third area of concern: the inequitable distribution of the losses and gains which result from export restriction. In this regard, the allocation of the opportunity costs of the restrictions between the Crown and the log producing sector along with the consequences of reduced logging sector growth have already been identified. As with the costs, a number of questions relating to the distribution of the gains (i.e., the price support accruing to the processing industry) are evident.

A number of valid arguments can be made for using Crown revenue as an incentive for industrial investment (Haley and Smith, 1976) and, in this regard, a transfer of income from the Crown to the log processing sector might be justifiable. The indiscriminate allocation of the subsidy through export restrictions and reduced log prices and stumpage charges is questionable, however.

Under the present system the Crown has no control over the allocation of the price support. In the first place, all of the benefits accrue to the forest industry (when public priorities or investment alternatives might suggest a different allocation). And secondly, within the forest industry the benefits are distributed in accordance with the volume and quality of raw material consumption (rather than in response to specific criteria to meet specified needs or objectives). A more explicit and differentiating form of price support could be used
to eliminate these equity problems while, at the same time, being more efficient in terms of the cost to the public treasury.

4.4. Summary and Implications for Policy

In summary, the objectives of this chapter have been twofold: first, to clarify the issue surrounding the question of log export restriction; and second, to identify the existence, the magnitude (within limits) and the distributional considerations of certain economic consequences of the policy. The analysis suggests that the opportunity costs of restricting the export of unmanufactured logs are substantial and that these costs should be considered explicitly in any examination of the efficiency of log export restrictions.

In this regard, this chapter has not attempted a detailed accounting of all of the costs and benefits associated with the restrictive export policy. To do so would be a complicated undertaking involving the consideration of social as well as financial matters. Nor has this chapter attempted to examine the relative efficiency of alternative support programs. Both of these matters are areas for further research.

It is important to note at this point that a decision to eliminate the export restrictions (whether to be replaced by some other form of assistance or not), could not be effectuated in one step. The coastal forest industry has evolved within the protection and the security of the restrictions; the size and structure of the industry and the distribution of raw materials amongst the firms is dependent, to what appears to be a large extent, upon them. In this regard, the large differential between domestic and export log prices suggests that
immediate elimination of the restrictions would result in substantial disruptions to the domestic industry's raw material supply. This, in turn, would lead to short-term social dislocations and the waste of in-place capital. If the restrictions were to be replaced by an alternative form of support, a period of transition would still be required to minimize the costs of the policy revision.

Even if the decision was made—on either economic or political grounds—to maintain the restrictions, the method of controlling the flow of exports should be examined. In this matter the role of the economist extends beyond the identification and quantification of the costs and benefits associated with alternative policy choices to the examination of the relative efficiencies of alternative regulatory mechanisms.

Significantly, the method of export restriction employed in British Columbia has been subjected to even more criticism than the question of restriction itself. Many firms and associations have called for changes to the existing system of control. The Pearse Commission devoted substantial resources to examining the method of control and concluded that it was in need of revision. And, most importantly, the B.C. Forest Service has been concerned about the efficiency consequences of the administrative control system. In line with these concerns, the focus of this thesis now turns to an economic examination of the method of export regulation.

An interesting discussion of the conflict between political decision-making and economic efficiency in B.C. is presented in Black (1968).
CHAPTER 5

THE METHOD OF EXPORT REGULATION

To control the flow of exports, both the provincial and federal governments have turned to systems of administrative regulation; the advisability of exporting individual log packages is bureaucratically determined and export authorization is designated by means of permits. For those logs subject to the provincial legislation, permits are issued by the B.C. Forest Service on the authority of the Lieutenant-Governor in Council. Those logs being exported to foreign countries require permits issued by the Federal Minister of Industry, Trade and Commerce.

To provide the basis for the examination of the method of export regulation that is undertaken in Chapter 6, this chapter outlines the structure of the control system; describes the methodology it uses to determine export eligibility; and discusses the way in which the control system is based on the interpretation of the legislation.

5.1. Method of Control

5.1.1. Review Procedure

With the same objectives underlying their respective policies the two levels of government have harmonized their control systems. The federal government simply endorses export permits granted by provincial authorities and applies provincial criteria in regulating the export of
timber that is not subject to the provincial controls.

To obtain advice on the advisability of exporting logs subject to provincial legislation, the B.C. government, in 1918, established the Log Export Advisory Committee. The membership of the Committee consists of representatives from the individual sectors of the wood processing industry, logging contractors, log exporters, labour and other---including relevant government officials. It is the task of this informal committee to review individual export applications and, based on its members' specialized knowledge of industry conditions, to make recommendations to the respective governments with regard to the advisability of export. The Committee meets monthly and, on each occasion, is formally convened twice: once under the chairmanship of a representative of the B.C. Forest Service to consider provincial applications and again, under the chairmanship of an official of the Department of Industry, Trade and Commerce, to deal with those applications subject to the federal controls only.

The interpretation of the statute over the years has made it clear that raw material exports are only to be allowed if the logs in question are 'surplus' to the input requirements of domestic mills. While the Committee has received no statutory guidance with respect to the method or the criteria to be used to determine export advisability, it has introduced a methodical system for judging the 'surplus' nature of the material proposed for export. 24

23 In 1969, the federal export regulations were tightened and the terms of reference of the Committee expanded to include those exports subject only to the federal legislation.

24 See section 5.2.
The procedures used by the Committee for this purpose have been revised numerous times. Those currently employed require that once the logs have been scaled, the applicant notify the appropriate District Forester of his intention to apply for export permission and then advertise the logs for sale in the Vancouver and/or local newspapers according to specified procedures. After two weeks, the prospective exporter submits a formal application, including copies of any offers received, to the District Forester. All applications are forwarded to the Vancouver office of the Forest Service and subsequently to the Log Export Advisory Committee.

When the Committee recommends that a provincial export application be approved, that recommendation is passed to the government which, if it agrees with the recommendation, passes an Order-in-Council authorizing the District Forester to issue an export permit once all relevant terms and conditions (such as the payment of Crown charges) have been met by the applicant. Once notified of the Order-in-Council, the prospective exporter must formally apply for the permit. This last step is a bookkeeping formality which ensures the payment of all charges and allows the Forest Service to record the volume of timber actually exported. The exporter must also obtain a permit from the regional office of the federal Department of Industry, Trade and Commerce.

For those exports subject to the federal legislation only, a similar procedure is undertaken—although the District Forester is not involved. The logs must be advertised and the advertisement and offers (if any) submitted to the Vancouver office of the Forest Service.25

25 In this situation, the provincial Forest Service acts as an 'agent' of the federal government.
The Forest Service compiles the applications and presents them to the federal meeting of the Committee. If export approval is granted, permits are issued by both the Department of Industry, Trade and Commerce and the B.C. Forest Service—the federal permit indicating export authority; the provincial permit to record the volume of exports.

The export permits pertain to specific logs and usually remain in effect for 120 days. If the permit expires before the logs are exported, the application procedure must be undertaken a second time.

If an offer to purchase the logs has been received from the domestic market, the Committee invariably recommends that the application be rejected; the 'reasonableness' of the domestic prices is not considered. While he is not required to sell the material to the mill, the only recourse available to the applicant when he considers the domestic offer to be inadequate is direct appeal to the provincial Minister of Forests.26 It should be emphasized at this point that it is the Committee's function to provide the Lieutenant-Governor in Council (i.e., the provincial Cabinet) with advice and, while the Cabinet maintains final decision-making authority with respect to export, the Committee's recommendation has been overturned in very few cases.

The Committee is aware of the time involved in the application procedure and has attempted to develop an efficient and equitable system of review. The system in effect until late 1975 was based on the applicant obtaining written refusal to purchase the material from three appropriate mills. These letters stood as evidence that the logs had

26 This procedure applies for those logs subject to the provincial controls; there does not appear to be a set procedure for review when the logs are subject to the federal controls only. Presumably, appeal could be made to the Minister of Industry, Trade and Commerce.
been offered for sale on the market and were 'surplus' to domestic milling requirements. This procedure often required three to four months before final adjudication and was subject to a number of abuses.\textsuperscript{27} The present system—with advertising as the main feature—is more consistent and much faster. From the time of notification of the intent to apply for export permission to the issuance of the permit, the new procedure usually requires between five weeks and two months.

5.1.2. Timber Tax

In addition to the review procedures, authorized exports that fall under provincial jurisdiction are subject also to a surcharge, known informally as the 'timber tax'. The statutory basis for the 'tax' is contained in section 97 of the \textit{Forest Act} and, while some question exists with respect to the constitutional validity of the Province levying such a charge,\textsuperscript{28} its history (in its different forms) dates back to the 1888 royalty rebate on manufactured timber exports.

There is no formal schedule of tax rates or charges; the levy applied to each export package is established by the Order-in-Council authorizing the export of the material. Nevertheless, the 'tax' has been charged on a relatively consistent basis in the past. When it was introduced in its present form as a direct charge on the export of unmanufactured logs (apparently during the mid-1950's), the 'timber tax' was set at 50c per cunit. It was raised initially to 90c per cunit.\textsuperscript{29}

\textsuperscript{27} A discussion of these abuses is contained in Appendix E (p. E3) of the Pearse Commission Report.

\textsuperscript{28} See section 7.2. for a discussion of the constitutional questions associated with the 'timber tax'.

\textsuperscript{29} Forest Service records are unclear with respect to both the date that the 'timber tax' was introduced as a direct charge and the date that the levy was increased to 90c per cunit.
and, in October 1973, to $2.00 per cunit. In February 1974, several different rates were introduced to reflect the wide discrepancies between the export prices of different species: $2.00 per cunit for Interior pulpwood; $5.00 per cunit for cottonwood; and $10.00 per cunit for all other species except cypress which, bringing exceptionally high prices in Japan, was subject to a levy of $40.00 per cunit. These rates are the same today except for Coastal pulpwood which was reduced to $2.00 per cunit in mid-1976.

The objective underlying the charging of the 'timber tax' is not well documented. Informal discussions suggest that it is a charge 'in lieu of lost manufacturing benefits' but, insofar as it affects the return available from the sale of logs on the export market, the 'tax' must be considered to be an additional deterrent to the exporting of raw materials.

5.2. Interpretation of the Export Provisions

Although the legislation makes provisions for log exports, it does not indicate what exports to allow or when to allow them. Statements by government officials, however, have made it clear that permitting log exports is to be viewed strictly as a secondary objective of the policy; the primary objective is to ensure that whenever possible the timber covered by the statute is used or manufactured in the province. Under this interpretation, only those logs considered 'surplus' to the requirements of the domestic processing industry are eligible for export.

More specifically, a number of these statements have been instructions to or comments by the Log Export Advisory Committee pertaining to
the interpretation of 'surplus'. Examination of these statements makes it clear that the choice of an administrative review system as the means of export regulation, as well as the methodology and criteria used by the system, were logical consequences of the interpretation of the export provisions and, beyond that, the interpretation of 'surplus'.

The export provisions have never been interpreted as intending to allow logging for the deliberate purpose of export. The Hon. T. D. Pattullo, as Minister of Lands in 1927, said:

There is no intention of permitting even a semblance of logging for export. It would be well for the operators to take note now in order that they may not find themselves in an awkward position. (Author unknown, 1941: p. 5)

This position has been reiterated numerous times over the years (Williston, 1968) and clearly places log exports in the category of a last resort—to be allowed only in emergency situations irrespective of economic conditions or the benefits that might otherwise result from direct exports.

The 'no harvest for export' rule is probably the most important consideration in terms of the methodology used to determine export eligibility. Under this definition, the 'surplus' must actually exist at the time of application for export approval. The review procedures have been designed to demonstrate the existence of the 'surplus' insofar as the logs must be on the market (i.e., they must be scaled) before the application is made.

The second important interpretation is that 'surplus' has been defined on a physical basis. To provide domestic mills with security of log supply, the government has intended since the inception of the policy that the difference between export and domestic log prices should
not be considered in the determination of export advisability. Instructions from the Minister of Lands to the Log Export Advisory Committee in 1932 reflect this fact:

... the requirements of the local mills are of paramount consideration and the spread in price of logs between here and the other side is a matter that should not be considered by your Committee as a governing factor in dealing with log export. (Author unknown, 1941: p. 6)

The Committee, however, has extended the government's instruction into a total disregard for prices by refusing to consider the 'reasonableness' of the offers made by domestic firms on material for which export approval is being sought. As a result, only when the input requirements of all domestic mills are satisfied and a physical oversupply of material arises on the domestic market do logs become eligible for export.

Together, the interpretations of the policy which define 'surplus' in the above manner and require that the 'surplus' be demonstrable provide the basis for the system of control: demonstration requires that the logs be on the market at the time of export application while the definition of 'surplus' necessitates a search for possible domestic buyers. Insofar as neither of these criteria are true economic variables (see Chapter 6), a system of administrative regulation provides the logical choice as the means of controlling the flow of exports--only through bureaucratic examination of export applications could the meeting of the two criteria and the intended security of log supply be ensured in every case.

In summary, this chapter has described the system of export regulation, outlined the objectives of the system and provided a discussion of the transition between the two. In doing so, it has established the basis for examining the system from an economic standpoint.
CHAPTER 6

THE ECONOMIC RATIONALITY OF THE METHOD OF EXPORT REGULATION

While the primary criticism of British Columbia's log export restrictions pertains to the implications of holding domestic log prices below international price levels, the method of regulating the flow of exports through the administrative review/permit/timber tax system has, in itself, a number of important economic consequences.

The criticisms of the export control system can be related to four areas: the physical definition of 'surplus'; the requirement that the 'surplus' be demonstrable; the abuses which the system encourages; and the distribution of the gains resulting from export log sales. Each of these concerns is related to the fact that the system of export regulation is based on arbitrary, administrative controls which interfere with the workings of the log market rather than acting as a logical adjunct to it. The first two arise because the system ignores the criteria of economic efficiency. The third is an equity consideration. The fourth combines both a lack of efficiency recognition and equity problems which arise from the rigidity of the system. Taken together, these criticisms raise important questions with respect to the economic rationality of the method of export regulation.

It is important to emphasize that a complete distinction between the objectives of the legislation, the level of protection provided by the restrictions and the method of controlling the flow of exports can—
not be drawn. Indeed, as explained in Chapter 5, the criteria and methodology used by the control system to regulate the flow of exports are based directly on the extreme manner in which the legislation has been interpreted. As a result, any criticism of the method of export control must be viewed as a criticism of the interpretation of the policy as well.

6.1. Physical Interpretation of 'Surplus'

History has shown that the Log Export Advisory Committee has tended to base its recommendations of export advisability on the simple criteria of whether or not an offer to purchase the material has been received from a domestic mill. The 'reasonableness' of the prices offered, either relative to the export offer or relative to some standard on the domestic market is not considered. 30

While it has been the government's intention that the difference between export and domestic prices not be considered in the Committee's deliberations, the 'reasonableness' of the domestic offer relative to other domestic prices is another matter. Interpreting 'surplus' without due consideration to domestic price levels ignores the objective of industrial and allocative efficiency that is inherent in other Crown timber pricing procedures. Stumpage appraisal calculations, for example, provide explicit incentives for efficiency through the use of the 'operator of average efficiency' concept. The government has recognized this and has urged the Committee to consider domestic price 'reasonableness' in their deliberations. The Committee members from

30 In the past the Committee has disallowed domestic offers which were considered 'frivolous'. Apparently, however, this has not occurred for the last three or four years.
industry continue to refuse to do so, however, ostensibly out of concern that discussions of domestic log prices would constitute a contravention of federal anti-competes laws. 31

Economic theory suggests that a firm's ability to pay for a productive input will be dependent upon that firm's relative level of efficiency (Scitovsky, 1971). That is, within constraints, the more efficient a firm the higher the prices it will be able to pay for its raw materials; and conversely, the less efficient a firm the lower the prices it will be able to pay. In this respect, the Committee's decision to reject export applications on the basis of any offer can lead to firms at the lower end of the efficiency scale being able to obtain raw material supplies and being able to obtain them at less than market prices. In such a situation, the inefficient domestic processor benefits at the direct expense of the domestic log producer. This is referred to in this thesis as 'direct price support'. 32

Indications during the last year were that 'direct price support' was evident in only a relatively small number of instances. From June 1976 to February 1977 the Log Export Advisory Committee rejected seven export applications out of a total of 243; the rejected applications accounted for 1.7 percent of the total volume of logs for which export approval had been sought during the period (Forest Service, 1977).

31 Insofar as the Committee is acting as a government appointed advisory body, it is unlikely that the law would apply in this situation. The issue could be settled simply by requesting the Bureau of Competition Policy to review the matter and advise on any possible contraventions of the Combines Investigation Act.

32 The transfer of income involved in this situation occurs between two specific parties. It is different, therefore, than the redistribution of income described in Chapter 4 which is a general transfer of income between sectors.
Each of the seven applications was rejected on the grounds that an offer had been received from a domestic mill. Importantly, in each case, the domestic offer was below the Vancouver Log Market average selling price. In two of the cases, the log seller argued that the offered prices were below delivered costs. Both times the log seller offered to sell the material to the domestic mill if the mill would be willing to meet delivered costs. In each case the mill refused; the log sellers followed through with their export applications and the applications were rejected by the Committee.

Examination of the seven rejected applications suggests that the 'direct price support' occurring in individual instances can be substantial. For example, in one case involving approximately 600 cunits of spruce, the following prices (shown in comparison to the applicable V.L.M. average monthly prices) were offered by a domestic mill (Forest Service, 1977):

<table>
<thead>
<tr>
<th>Material</th>
<th>Domestic Offer</th>
<th>V.L.M. Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Spot</td>
<td>$265.63/cunit</td>
<td>$396.08/cunit</td>
</tr>
<tr>
<td>White Spot</td>
<td>234.38</td>
<td>295.86</td>
</tr>
<tr>
<td>No. 2</td>
<td>100.00</td>
<td>127.51</td>
</tr>
<tr>
<td>No. 3</td>
<td>87.50</td>
<td>89.62</td>
</tr>
</tbody>
</table>

In this case, the 'direct price support' was calculated to be in the range of $25,000. In another case, involving 1,000 cunits of Douglas-fir, the 'direct price support' totalled over $36,000. These figures notwithstanding, when the individual cases are aggregated and considered within the context of total market transactions, it becomes clear that the total amount of 'direct price support' that occurred during the period in question was relatively insignificant.

Insofar as the figures for this period reflect general market conditions in coastal B.C.—export permits were relatively easy to
obtain in late 1976 and early 1977—the number of rejected applications (and, most likely, the aggregate level of price support) could be expected to increase as the balance in the log market improves. Nevertheless, this is not the issue. The facts remain that 'direct price support' may occur at any time; that it involves an inequitable transfer of income between a log producer and a log processor; and that it is based on an interpretation of 'surplus' which ignores the criteria of efficiency and which is, therefore, inconsistent with other Crown timber pricing policies.

6.2. Demonstration of 'Surplus'

The actual demonstration of the 'surplus'—the basis of the export control system—may involve even greater economic costs than the definition of 'surplus'. The requirement that the 'surplus' be demonstrated is intended to ensure that all domestic mills receive the opportunity to bid on the material in question and to eliminate the possibility of harvest for the purpose of export. In doing so, however, the requirement adds substantial time to the review process, creates confusion in the planning of log harvests, affects the ability of exports to meet their intended objective and ignores the economic, social and forest management benefits to be gained from allowing some direct exports.

Under the present export control system it is impossible for the prospective exporter to enter into a firm contract with a foreign buyer until the necessary permits have been granted. While waiting for export approval the applicant must incur advertising, inventory and administrative costs. If the permit is granted, the knowledge that the
material is domestically 'surplus' may, in some cases, erode the exporter's bargaining power with foreign buyers thereby affecting his ability to obtain maximum value for his material on the export market. During this period the exporter cannot bring together the desired size of export package or finalize shipping arrangements. Both of these factors tend to prolong the length of storage and increase the risk of the permit expiring before the logs are shipped. In addition, extended inventory periods increase the possibility of insect and marine borer damage and the subsequent reduction in log values. Taken together these factors increase the capital requirements for prospective exporters, making it almost impossible for small operators to pursue export opportunities.

It has been stated that the objective of allowing 'surplus' logs to be exported is to relieve congestion and thereby improve the allocative efficiency of the domestic log market (Author unknown, 1941; C.O.F.I., 1971). Given this objective, the requirement that the 'surplus' be demonstrated may be self-defeating. The approval procedure comes into play only once the 'surplus' has arisen. The system does not attempt to forecast 'surpluses' nor does it take steps to ensure that 'surpluses' do not arise. Secondly, once the permit has been granted, the exporter may find himself attempting to sell logs into a market which is also over-supplied. This was the case in mid-1976 when a 'surplus' commonly believed to be in the range of one million cunits of low grade hemlock/balsam was available on the domestic

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33 If the permit expires prior to shipment the application procedure must be undertaken again. To avoid this, exporters often tow their booms to Puget Sound, incurring additional costs in the process.
market. Export permits were easily obtainable but there was virtually no demand for the logs in foreign markets. Very little material was exported and the costly over-supply situation was extended.

More important is the fact that the exporter cannot apply for export permission until after the logs have been scaled. This dictate, which follows from the 'no harvest for export' interpretation of the policy, implicitly assumes that the long-term benefits to the province from domestic manufacture will be greater than from log export in all cases except when a 'surplus' of logs exists. The blanket nature of this requirement ignores the differences in economic conditions in various regions of the province, the forest management benefits to be gained from increasing the harvest of decadent timber and the increase in present value that would result from an increase in the rate of harvest in general.

In addition, the requirement that the timber be harvested before export application can add substantial confusion to log harvest planning. The lack of knowledge of which market(s) will be available to him often leaves the log producer in a vague position with respect to the financial viability of his operation. This is particularly true in high cost/low quality timber areas such as those evident in the Prince Rupert Forest District (Prince Rupert Forest Products, 1975).\(^{34}\)

If the logs can be sold to export buyers, the high prices will ensure the profitability of the operation but, if the logs must be sold on the domestic market, the prices may not be sufficient to cover the costs of harvest. The result

\(^{34}\) In addition to high harvesting costs and low timber values, log producers in the Prince Rupert Forest District often must absorb transportation costs to mills in the Vancouver Forest District.
is that many independent logging operators are not willing to take the risk that they will be forced to sell domestically—they are closing down their operations (Manning, 1977) and forcing further reductions in employment. This is a particularly serious matter in the Prince Rupert area where unemployment rates are the highest in the province (Statistics Canada, 1977), the percentage of overmature timber the highest in the province (Forest Service, 1975b) and the ratio of actual cut to allowable annual cut the lowest in the province (Forest Service, 1975a).

6.3. Abuses of the System

The method and criteria used to determine export eligibility invite abuse by both domestic mills and exporters. Two good examples of how this abuse could arise are 'application blocking' and 'the use of market power'—both of which are due to the profit opportunities created by the rigidity of the administrative system.

Domestic mills realize that any offer is sufficient to block export approval and intentionally could enter uncompetitively low prices on proposed export material. If the mill was able to purchase the material at the bid price it would benefit in terms of lower than average raw material prices. Even if the mill did not require the logs immediately and had to hold them in inventory, a financial incentive for blocking the export application would exist whenever the inventory costs were less than the savings in raw material costs. If the log owner refused to sell the material at the bid price, the injection of the logs onto the domestic market would expand the size of the 'surplus'. This would tend to release other logs for sale, increasing the domestic mill's purchase opportunities and reducing average log prices. A variation of this could occur if a mill entered a bid to
block an application then withdrew the offer once the application had been rejected with the specific intention of using the expanding surplus to obtain other materials.

The second form of possible abuse pertains to the use of market power by large firms. To obtain export approval for a specific group of logs, firms which constitute major sources of market log supplies could intimated that future log supplies would not be made available to mills that blocked their export applications. Firms could also trade considerations by not blocking one another's applications. Important in this respect is not that the use of market power might exist—it occurs to some extent in all forms of market structure—but rather that the method of export control provides the opportunity for it to occur.

6.4. **Distribution of Gains from Export**

Distribution of the gains resulting from export is the most apparent economic efficiency problem that pertains to the method of control, with concern relating to the success of the timber tax in appropriating the windfall gains that accrue to export sales.

Insofar as the restrictive export policy holds domestic log prices below international price levels, the returns from export sales (for most species and grades) tend to be much greater than from domestic sales. This does not occur because of any special expertise on the part of the log exporter. Rather, it occurs because government regulation has created two distinct markets and because only those fortunate enough to secure export permits are able to obtain the high international prices for their logs. As a result, export privileges often bestow a windfall gain on the exporter. While this claim is disputed by
The evidence as expressed by the estimated difference between export and domestic prices suggests that these windfall gains can be substantial. From an economic efficiency standpoint, the windfall gain is a form of economic rent which, by definition, should accrue to the owner of the resource. In this regard, the intention of the 'timber tax' should be to appropriate the difference for the Crown.

'Timber tax' revenues have varied widely over the years, reflecting both the fluctuations in export volumes and the changes in the tax rate. Table 6-1 summarizes the 'timber tax' revenues from log export sales during the period from 1966 to 1975.

The success of the 'timber tax' in appropriating the full value of the economic rent accruing to export sales can be judged by comparing the export/domestic price differential on individual species and grades of logs with the applicable 'timber tax' charge. This is done in Table 6-2.

The information contained in this table indicates that the 'timber tax' is unsuccessful in appropriating the rent accruing to export sales. The result is that opportunities for relatively higher profits in exporting (as opposed to selling domestically) are created—especially for high grade material—which, in turn, forms the basis of

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35 Not all of the difference between export and domestic prices is economic rent—a percentage should be returned to the exporter in lieu of marketing costs and return on additional investment. Exporters claim that any attempt by the Crown to appropriate the export differential is double taxation insofar as stumpage charges have already been paid (Pacific Coast Log Exporters Association, 1975). This argument, however, ignores the fact that stumpage charges are based on the lower Vancouver Log Market average prices.
TABLE 6-1
'TIMBER TAX' REVENUES, 1966-1975

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>thousands of dollars</td>
</tr>
<tr>
<td>1966</td>
<td>81.6</td>
</tr>
<tr>
<td>1967</td>
<td>112.4</td>
</tr>
<tr>
<td>1968</td>
<td>73.2</td>
</tr>
<tr>
<td>1969</td>
<td>76.4</td>
</tr>
<tr>
<td>1970</td>
<td>183.0</td>
</tr>
<tr>
<td>1971</td>
<td>117.4</td>
</tr>
<tr>
<td>1972</td>
<td>34.0</td>
</tr>
<tr>
<td>1973</td>
<td>13.8</td>
</tr>
<tr>
<td>1974</td>
<td>3,313.8</td>
</tr>
<tr>
<td>1975</td>
<td>929.0(^1)</td>
</tr>
</tbody>
</table>


\(^1\) The 1975 figure for 'timber tax' revenue published by the Pearse Commission differs from that contained in B.C. Forest Service records. Although it applies to the first three quarters of 1975 only, the B.C.F.S. figure is considered to be more accurate and is used in the table.
### TABLE 6-2

**THE EFFECTIVENESS OF THE 'TIMBER TAX', 1975**

<table>
<thead>
<tr>
<th>Species</th>
<th>Grade</th>
<th>Price Differential</th>
<th>Timber Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Canadian dollars per cunit</td>
<td></td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>No. 1 Sawmill</td>
<td>$102.47</td>
<td>$10</td>
</tr>
<tr>
<td></td>
<td>No. 2 Sawmill</td>
<td>46.69</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>No. 3 Sawmill</td>
<td>15.72</td>
<td>10</td>
</tr>
<tr>
<td>Hemlock</td>
<td>No. 1</td>
<td>124.42</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>52.97</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>20.23</td>
<td>10</td>
</tr>
<tr>
<td>Spruce</td>
<td>No. 1</td>
<td>110.81</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>40.68</td>
<td>10</td>
</tr>
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<td></td>
<td>No. 3</td>
<td>11.79</td>
<td>10</td>
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<tr>
<td>Cedar</td>
<td>No. 1</td>
<td>125.40</td>
<td>10</td>
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<td></td>
<td>No. 2</td>
<td>54.49</td>
<td>10</td>
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<td></td>
<td>No. 3</td>
<td>-1.18</td>
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**Sources:** Compiled from: Industrial Forestry Association, Composite Log Sales Analysis—Puget Sound District, 1975; C.O.F.I., Average Log Price, 1975.

...some of the primary equity problems relating to the export control system. For example, above normal profit opportunities create a financial incentive for exporters to attempt to circumvent the administrative review procedure (e.g., the use of market power by large firms). And secondly, even though export prices are not included in V.L.M. average selling price compilations, the inability of the control system to separate the two markets completely makes it impossible to eliminate the influence of the higher export prices from the domestic market. Speculative buying of possible export materials has the effect of increasing domestic log prices contrary to the objectives of the policy and also results in inequitable stumpage payments on timber that is subject to these price...
In addition, it is clear from Table 6-2 that the use of a single 'timber tax' rate (for most species), fixed in dollar terms, results in inequitable treatment of different species and grades of exports. For example, both No. 1 hemlock and No. 3 cedar were charged $10 per cunit when exported. The average export/domestic price differential for No. 1 hemlock during the period in question was $124.42 per cunit, while the average price differential for No. 3 cedar was less than zero. Similar results pertained to individual species and the burden of the 'tax' became even more prevalent when less than average quality No. 3 logs and No. 4 and reject material were considered.

Furthermore, Table 6-2 provides evidence that the 'tax' is working in a manner that is contrary to the objectives of the policy. The utilization of low grade logs is one of the most pervasive problems facing the coastal forest industry—indeed, the majority of the logs exported from British Columbia are low grade. In this regard, it would seem reasonable to expect the government to encourage the export of this type of material once it had been judged as 'surplus'. Just the opposite is the case. The province imposes the highest effective rate of tax on low grade/low value logs reducing the financial incentive to export these materials to often less than zero. In this regard, adherence to the rigid schedule of tax rates often relegates log exporting to a position of loss minimization.

36 In a related situation the provincial government removed the 'timber tax' on wood chip exports in 1977 in an attempt to encourage the export of surplus chips (Lewis, 1977).
6.5. Summary and Implications for Policy

In summary, this chapter has been concerned with examining the economic rationality of the method of export regulation. It is apparent that the sole objective of the control system is to ensure that no exports occur unless they have been judged as 'surplus' to the requirements of the domestic processing industry. In this regard, the system has proven to be highly effective--exports are confined to a very small percentage of provincial production. At the same time, however, it is equally apparent that the system's failure to recognize the need to encourage economic efficiency—even within the constraints of general export restriction--results in the loss of possibly substantial economic benefits.

This problem can be related directly to the interpretation of the legislation. The interpretation of the policy over the years has been very rigid: domestic processing is considered to be the best economic use of the province's timber resource in all cases and the criteria and methodology employed by the control system reflect this belief. In terms of the criteria, this chapter has shown that the rigidity of the interpretation ignores the benefits to be gained by maintaining flexibility in the view of constantly changing and varied economic conditions. In terms of the methodology, this chapter has shown that definite inefficiencies result from the use of administrative regulations to control the flow of exports--while the system was designed for bureaucratic simplicity, it imposes unwarranted costs and confusion on the logging sector in the name of export restriction.

The implications of these conclusions are clear: even within the constraints of general export restriction, the objectives of the policy
should be broadened to include economic efficiency and the method of control should be restructured to provide the incentives for it.
CHAPTER 7

THE PEARSE COMMISSION'S PROPOSAL TO REVISE THE METHOD OF EXPORT REGULATION

The Pearse Commission Report calls for fundamental changes to both the policy of restricting the export of unmanufactured forest products and to the method of regulating the flow of exports. The first recommendation is based on the view that export restrictions are an inefficient means of assisting the provincial manufacturing sector. The second recommendation is based on the need to provide a vehicle for systematically eliminating the restrictions and in recognition of the 'non-economic' nature of the existing controls.

The two recommendations can be viewed independently. If the need to provide opportunities for flexibility and efficiency in regulation is accepted, then the merits of the second recommendation can be considered regardless of whether the first recommendation is accepted or rejected. In the first case, the alternative controls proposed by Pearse would provide the basis for the transition to the 'no-controls' policy; in the second case, the proposed controls would simply replace the existing controls.

The first section of this chapter outlines the Pearse Commission's proposal to revise the export control system while the second section reviews the constitutional and international questions that introduction of the proposal would raise. The third section is the most important--
it examines the effects of the proposed change in the regulatory system on log supplies, Crown revenues and timber harvests and offers conclusions with respect to the adequacy of the proposed system.

7.1. The Price-Related System of Control

The Pearse Commission's proposal to revise the export control system calls for the administrative restrictions to be eliminated and replaced by a system of price-related controls. Specifically, the recommendation calls for the 'timber tax' to be used as the sole method of export regulation; for the tax to be changed from a fixed dollar levy to an ad valorem tax; and for the effective rate of the tax to be set at "something in the order of 40 percent" of the export selling price (p. 314). Pearse was of the view that export controls based directly on the market system could provide domestic manufacturers with whatever degree of protection from foreign competition was considered desirable and, at the same time, not give rise to the more arbitrary and inequitable features of the present restrictions.

Under the proposed control system the tax would be designed to reduce the financial incentive to export by appropriating some (or all) of the premium that would be gained by selling logs in the higher-priced export market. Although export sales would be unconstrained by administrative restrictions, normal market allocations would ensure that exports would not occur unless domestic mills could not profitably use the materials, even with the price advantage provided by the tax.

In a price-related control system the choice of the tax rate would be crucial. A very high tax rate would appropriate all of the profit from log exports and would eliminate exports. A very low tax rate--
although considered by Pearse to be desirable in the long-run—would create opportunities for substantial profits in exporting. This in turn would stimulate exports and cause, in the short and medium terms, major disruptions in the raw material supplies of B.C. mills. Obviously neither extreme is desirable.

While a 40 percent timber tax would involve an increase in the effective rate of the tax (to account for the elimination of the administrative controls), the proposed rate was not intended to appropriate the export premium completely. The tax rate—which was based on the export/domestic price differentials presented in Table 3-10—was chosen to relax the existing level of protection only slightly. In this manner, it was designed to set the basis for (and to begin) the transition to the policy of 'no restriction'.

From an efficiency standpoint, the price-related system of control would offer a number of definite improvements over the administrative control system. Most importantly, the level of protection would be tied directly to the export market. This would have the effect of replacing the isolation between the domestic and international markets with a direct (albeit constrained) association; if international markets were to change, the B.C. market would be forced to react. For example, if export prices increased, the export premium would rise to exceed the dollar value of the tax and export pressure would force domestic log prices to rise. This, in turn, would induce allocative responses on the domestic market in line with the changes in the international situation. The control system would still provide the domestic processing industry with security of raw material supplies—the new system would simply broaden the interpretation of 'security' to recognize the inter-
national dependency of the B.C. forest industry and to include incentives for efficient performance.

The second improvement is that the level of protection provided the domestic processing industry would be explicit. Insofar as the same tax rate would apply to all log exports, all domestic processors would be treated equally; the opportunities for 'direct price support' would be eliminated which, in turn, would provide further incentives for domestic efficiency. Even more importantly, the explicitness of the protection would provide full and open knowledge of the price support accruing to the domestic processing industry. Both the government and the public would be better able to examine the objectives and the successes of the policy relative to its costs. In addition, the explicitness of the tax would allow the level of protection to be adjusted in line with public priorities. For example, the tax rate could be reduced in certain areas of the province to stimulate exports and further regional employment or development objectives. Or the tax could be reduced or increased over time. In this regard, Pearse argued that a 40 percent tax rate was "undoubtedly more protection than warranted in the long run" (p. 315), and recommended that it be gradually reduced. At the same time, however, the alternative of increasing the level of protection would be available.

In the third place, the use of an \textit{ad valorem} timber tax would provide equitable treatment of different valued species and grades of logs. In addition, the \textit{ad valorem} tax would allow the dollar value of protection to respond to market cycles.

Fourthly, by making payment of the timber tax the sole condition for entry into the export market, the proposed control system would
eliminate much of the arbitrariness and confusion associated with the
administrative controls. Most importantly, improved knowledge of market
availability, prices and costs would reduce risks and allow operators to
plan harvests and make transportation arrangements more efficiently.
The time delay and the cost of obtaining export approval, along with the
incentives and the opportunities for abusing the control system, would
be eliminated.

Finally, the administration of the export controls would be much
simpler under the price-related system. The function of the Forest
Service would become that of collecting the tax—introducing a signif­
icant cost savings in this regard alone.

The introduction of a price-related control system would not
eliminate all of the 'inefficiencies' associated with export restriction.
In the first place there is presently no mechanism for collecting export
sales prices. Unless legislative measures were introduced to require
the reporting of these prices, the onus would fall on exporters to
indicate the prices received for the logs. This, in turn, would
create a financial incentive for misreporting. It was for this reason
that Pearse suggested that the Minister of Forests retain final respons­
ibility for setting the timber tax charge in each case (p. 314). And,
secondly, the proposed control system would not eliminate the redistri­
bution of income nor the problems pertaining to the allocation of both
the losses and the gains of export restriction. Improvement in this
area would require the elimination of the restrictive export policy and
the replacement of it with some other form of processing assistance
(Powrie, 1976).

Although Pearse presented his arguments clearly in favour of
introducing the system of price-related controls, there remains substantial confusion surrounding the recommendation. While most groups agree with the use of an *ad valorem* timber tax, exporters, on one hand, argue that the suggested effective rate of the tax is too high. Industry and labour, on the other hand, appear to misunderstand both the intentions of the proposal and the way in which the tax would work to protect domestic processors (Smith, 1977). These groups argue for the retention of the administrative controls.

7.2. **Constitutional and International Implications**

The prominent role proposed for the timber tax in the export control system raises important questions with respect to the constitutional validity of the Province levying such a tax. In addition, concern has been expressed over the possible implications of British Columbia imposing an explicit trade barrier in the face of on-going international trade negotiations (Smith, 1977).

In 1929, the Supreme Court of British Columbia declared the imposition of the 'timber tax' to be *ultra vires* of the Provincial Legislature. The tax which existed at the time applied only to timber harvested on non-Crown land and consisted of a royalty rebate on the timber used or manufactured in the province.\(^{37}\) The judgement was based on two grounds: first, that the imposition of a tax which, by its nature, was indirect was outside the competence of the Provincial Legislature; and second, and more important, that the tax was designed to discourage exports and was, therefore, a matter of customs and

\(^{37}\) This 'timber tax' is described in more detail in section 2.2.
excise—an area assigned to the exclusive jurisdiction of the Dominion Parliament (Dominion Law Reports, 1930).

In the mid-1950's the province introduced a revised form of 'timber tax'. This tax, which is still in effect, consists of a direct charge against exports and applies only to timber harvested on Crown land. While the constitutional validity of this tax has not been challenged, its standing is unclear. On one hand, the current tax is structured differently than the previous tax and is applied to timber over which the province retains authority (while the previous tax was applied to timber over which the province had relinquished control). On the other hand, as with the previous tax, the current tax has the effect of discouraging exports.

Possible reasons why the legality of the current tax has not been contested include the low effective rate of the tax and the fear that the provincial government would prohibit exports entirely if the previous ruling was applied. Nevertheless, it is important that the government be aware that an increase in the effective rate of the tax could lead to a challenge of the tax's validity. Importantly, it is believed in some circles that the stature of the tax could be solidified by making it an explicit condition of the timber sale contract. This would have the effect of placing the timber tax on exactly the same footing as that which allows the province to participate in log export restriction.

A related concern pertains to the position of the federal government. In recent years the allocation of natural resource revenues between the provinces and the federal government has become a much debated issue. While the controversy pertains primarily to oil and natural gas revenues (Scott, 1976), the principle could be extended in
a consistent manner to include timber. As a result, the provincial
government must be aware that the introduction of the proposed control
system—which could lead to substantial increases in timber tax reven­
ues—might result in a constitutional challenge by the federal govern­
ment.

Pearse based the proposal to revise the export control system on
the assumption that the federal government would not interfere with the
timber tax. More significantly, the proposal is based on the assump­
tion that the federal government would continue to harmonize its controls
with those of the province (pp. 315-6). If this cooperation was not
forthcoming, the superseding nature of the federal authority combined
with the more restrictive nature of the administrative controls would
render the proposed provincial control system unworkable. In this regard,
the province would be well advised to undertake discussions with the
federal authorities with respect to the introduction of a mutually
acceptable control system rather than attempting to introduce the pro­
posed controls unilaterally.

The second general consideration pertains to the international
implications of British Columbia introducing an explicit barrier to trade.
Insofar as the timber tax would constitute a highly visible attempt to
constrain exports, it could be subject to criticisms of 'protectionism'
and therefore considered contrary to agreements reached under the
'General Agreement on Tariffs and Trade' (G.A.T.T.)—a program supported
by both the federal and B.C. governments (Economic Council, 1975; Dept.
of Economic Development, 1977). In response to these criticisms,
however, the argument could be made that the tax is simply the substitu­
tion of a reverse tariff for a non-tariff barrier (the control of which
is a special concern of current G.A.T.T. negotiations; Economic Council, 1975) thereby making the protection more systematic and providing the basis for the gradual elimination (or relaxation) of the barrier.

7.3. Effects of a Forty Percent Tax

The effectiveness of the price-related system of control in regulating the flow of exports would be dependent almost entirely upon the effects of the chosen tax rate. The Pearse Commission did not attempt to quantify the effects of the proposed 40 percent tax. As a result, there has been no indication of how closely the proposed tax rate would emulate the level of protection provided by the administrative restrictions. Nor has there been any indication of whether the 40 percent tax would induce the benefits that Pearse felt it would, or whether it would provide a more equitable system of control than the administrative restrictions. The possible consequences of an inappropriate choice necessitate the consideration of these matters prior to the adoption of the system.

Unfortunately, the available information pertaining to log exports, international and domestic markets, economic prospects and other matters is not sufficiently precise to allow an accurate quantification of the long-run effects of a 40 percent tax rate. Nevertheless, the information presented in this thesis allows some important conclusions to be drawn with regard to the initial effects of the change in the control system and with respect to how these effects would be transmitted throughout the coastal forest industry.

The calculations in this section are based on estimates of what could have happened in 1975 if the price-related control system had been
in effect. Some comparisons are made to 1973 and 1974 as a means of testing the system's flexibility.

7.3.1. Volumes, Species and Grades

The initial effects of the proposed revision to the export control system would have been evidenced in changes in the volumes, species and grades of exports. From the information presented in Chapter 3 it is apparent that there is a strong export demand for B.C. logs; that foreign buyers prefer high quality material (but are willing to purchase some lower grade logs); and that foreign buyers are willing to pay very high prices for the materials they purchase. In addition, it is reasonable to assume that domestic log sellers would sell any material on the export market for which the export premium exceeded 40 percent. This information combined with the estimates of the export/domestic price differentials presented in Table 3-11 suggests that substantial pressure to increase the export volumes of certain species and grades of logs would occur if the system of control was based on the 40 percent tax rate.

More specifically, the analysis suggests that No. 1 and No. 2 Douglas-fir peelers, No. 1 Douglas-fir sawlogs, No. 1 hemlock and No. 1 cedar would have faced heavy export demand in 1975. The pressure to increase the export of these materials would have been felt initially by those firms dependent on the open market for log supplies. In this regard, a total of 86.2 thousand units of these materials were sold on the Vancouver Log Market in 1975 (C.O.F.I., 1975a). In perspective,

38. To account for the additional costs of selling logs on the export market, it is assumed here that an export premium of 40% plus $5/unit would be required to induce export sales.

39. In addition, No. 2 hemlock and No. 2 cedar would have been subject to minor export pressures.
these materials accounted for less than 8 percent of the total volume of these four species transacted on the market in 1975 and only 1.2 percent of the Coast region harvest of these species in the same year (Forest Service, 1975a).

The increased export demand for these particular species and grades would have been met by an increase in V.L.M. prices as domestic firms attempted to bid the logs away from foreign buyers. Based on 1975 price differentials, it is reasonable to assume that the domestic prices for No. 2 Douglas-fir peelers and for No. 1 Douglas-fir sawlogs would have risen to the 40 percent protection level—a price response that would have eliminated much of the export pressure on these logs. It is unlikely, however, that B.C. log purchasers would have been able to absorb the full price increase on the other species and grades. As a result, export pressure on these materials would have been expected to remain strong. The analysis suggests that the same general results would have pertained to the use of the proposed controls and tax rate in 1974.

In 1973, however, strong export pressures would have been extended to No. 3/No. 4 Douglas-fir peelers, No. 2 Douglas-fir sawlogs, No. 2 hemlock and No. 2 cedar, increasing the volume of V.L.M. sales subject to export demand to 25 percent. More importantly, the magnitude of the individual price differentials suggests that increases in V.L.M. prices would not have been sufficient to counteract export pressures.

In addition to these volume observations, the two most significant differences between the effects of the 40 percent tax system and those of the administrative controls would have been the reversal in the quality of exports (with high grade logs substituted for low grade ones) and the
complete elimination of spruce as an export species (when it has been the most important export species throughout the 1970's).

7.3.2. Crown Revenues

Any export sales that occurred under the proposed control system would have been accompanied by the increased timber tax charge. Based on the tax rate and indicated export prices, total tax revenues in 1975 could have been expected to increase substantially. More important, however, would have been the influence of the proposed control system on stumpage prices.

Stumpage prices would have risen for the species and grades of logs that were subject to export pressure—the result of two separate processes that would have acted to increase V.L.M. average selling prices: (1) increases in the prices offered by domestic log buyers would have increased average prices, and (2) any exports that did occur would have displaced the purchases of less efficient domestic processors (i.e., those paying less than average prices for their logs). Insofar as export sales are not included in average selling price calculations, the elimination of these domestic sales from the sample would, in itself, have increased average prices.

While estimates of the total increase in stumpage revenues that would have occurred in 1975 are not feasible, some conclusions can be reached with respect to the effect of the proposed 40 percent tax on per cunit stumpage charges. First, the average selling prices of No. 1 and No. 3 Douglas-fir peeler, No. 1 Douglas-fir sawlogs, No. 1 hemlock and No. 1 cedar would have risen to the 40 percent protection level. Second, if neither minimum nor maximum stumpage rates were in effect, for each $1.00 per cunit increase in average selling prices, the marginal
stumpage charge increase would have been between 78.7¢ and 89.3¢ per cunit. And third, if minimum or maximum stumpage rates were in effect, the actual increase in stumpage charges would have been less than the indicated marginal rate.  

Using No. 2 Douglas-fir peelers as an example, it can be estimated that the average selling price would have increased by $12.81 per cunit (to $151.69/cunit). This figure suggests that the indicated stumpage assessment for all of the timber in this species/grade category on the B.C. coast would have increased by between $10.08 and $11.44 per cunit if minimum or maximum stumpage rates were not in effect. For the 1,575.7 cunits of this material sold on the V.L.M., the total assessment in 1975 would have increased by between $15,883.06 and $18,019.32. No. 1 hemlock can be used as a second example. Average selling price would have increased in the range of $43.41 per cunit (to $121.51/cunit) resulting in an increase in the indicated per cunit stumpage charge of between $34.16 and $38.77. Based on a V.L.M. volume of 13,595.94 cunits, the total indicated assessment on this material would have increased by between $464,437.31 and $527,114.59.

40 The difference between the indicated marginal stumpage rate and the actual marginal rate that results from the introduction of minimum or maximum stumpage charges cannot be determined with any precision when dealing with specific grades of logs because of the lack of information pertaining to operating costs or per grade stumpage charges.

41 The amount that domestic prices would have increased is estimated by finding the price level 40% less than the export price (i.e., $252.81 - (.4) $252.81 = $151.69) and subtracting from that price, the domestic price (i.e., $151.69 - $138.88 = $12.81). See Table 3-11 for prices.

42 It seems most likely that maximum stumpage charges would have come into effect in this situation. A general estimate, based on all-grade calculations (see Appendix C) suggests that the actual increase in stumpage assessments for No. 1 V.L.M. hemlock would have been in the range of 25% to 30% less than indicated.
Extension of the increased per cunit stumpage charges to the non-market log supplies of integrated firms would have further increased stumpage revenues. Unfortunately, estimation of the total increase in stumpage assessments is rendered unfeasible by the lack of total harvest and stumpage charge statistics for individual log grades.

It would, however, have been the application of the increased per cunit Crown charges to these non-market supplies that would have produced the major long-term benefits of the price-related control system. Increases in stumpage assessments would have forced less efficient integrated processors to make more logs available to the market where the allocative mechanism would have distributed the logs to their most valuable uses: either to more efficient domestic processors or—if the export premium was greater than the dollar value of the tax—to the export market.

7.3.3. Timber Utilization and Timber Harvests

In addition to the utilization (allocation) incentives that would have resulted from the increases in log prices and stumpage charges in 1975, the price-related control system would have been expected to produce incentives for the intensification of timber harvests.

Examination of the effects of the 40 percent tax shows that the proposed system and tax rate would have led to an increase in the revenue of the log producing sector. Based on a $1.00 per cunit increase in average selling price, the marginal revenue increase would have been in the range of 10.7¢ to 21.3¢ per cunit.43 Importantly,

43 As with the marginal stumpage increases, the marginal revenue increase that would have accrued to the log producing sector would have been affected by minimum and maximum stumpage rates. The difference, in both cases, is that the logging sector would capture the amount of the adjustment.
however, the transfer of this increase in revenue into the intensification of timber harvests would have depended upon the effect of the system on log prices at the margin—for only if the value of submarginal timber was increased would the economic intensity of the harvest have been increased. In this regard, the benefits that would have been achieved in 1975 from the 40 percent timber tax system appear to be minimal.

The initial effect of the proposed tax rate in 1975 would have been to lead to an increase in the value of specific high grade logs. Low quality materials would have been unaffected by export demand and no price increase on these logs would have been expected. As a result, the 40 percent tax rate would not, in itself, have led to the intensification of timber harvests. There are, however, two other possibilities that might have led to increased harvests. First, increased competition amongst domestic firms for low grade wood (to compensate for the export of high quality logs) might have led to an increase in the value of what had been submarginal timber previously. And second, the increased value of high grade logs could have been averaged over the stand as a whole to improve the harvestability of otherwise submarginal trees and/or submarginal stands. While this would have been an irrational action in a true economic sense, there have been some indications that private landowners in the Pacific Northwest have undertaken these practices (Lewis, 1977).

7.3.4. Conclusions and Possible Revisions

The analysis of this chapter leads to a number of conclusions with regard to the effects of the 40 percent tax rate and its success in meeting certain export control objectives. In the first place, the
aggregate level of protection that would have resulted from the use of
the tax in 1974 and 1975 would not have been significantly different
than that provided by the administrative controls. This leads to the
conclusion that the introduction and use of the proposed tax rate would
not lead to a large increase in log export volumes if economic condi-
tions were similar to those of 1974 and 1975.

In 1973, however, the 40 percent level of protection would not
have been sufficient to stop large volumes of log exports. This obser-
vation raises important questions with respect to both the flexibility
and the adequacy of the general level of protection that would be pro-
vided by the proposed control system and tax rate.

In the second place, in terms of simply adjusting the dollar
value of the tax to meet minor changes in the international market, the
price-related controls would constitute a definite improvement over the
existing controls. However, the limited range of both domestic log
price reactions and the tax adjustment itself would render the proposed
controls incapable of responding adequately to large changes in inter-
national market prices. Related to this is the conclusion that the
return of the export/domestic price differential to 1973 levels would
render the proposed tax rate ineffective. Importantly, there are
strong indications (e.g., recent revaluations in Japanese (upward) and
Canadian (downward) currencies relative to the U.S. dollar; and in-
creases in Japanese housing construction) which suggest that major
increases in the export premium in the near future are a very real
possibility.

Thirdly, it is apparent that the use of the 40 percent tax would
have led to a complete reversal in the quality of log exports—the result
of the relatively greater export premium on high quality logs. Importantly, this would have restricted any incentives for improved timber utilization or forest management to high grade materials, suggesting that some of the benefits of revising the export control system would not be achieved if the tax controls were introduced as proposed.

A number of alternatives exist for revising the tax to eliminate these problems. On one hand, the tax rate could be increased. This would eliminate the concerns pertaining to the adequacy of the protection but it would also relegate the benefits of the price-related controls to even higher quality logs. On the other hand, the tax rate could be reduced to create export pressures on low grade material. While this would extend the benefits of the proposed system to all grades of timber, it would also intensify the export demand for high and medium grade logs.

The only means for handling these conflicting problems simultaneously would be to introduce a tax schedule based on progressively increasing rates. General observation suggests that a single tax rate would be incapable of providing the same relative level of protection to all logs—and, from a true efficiency standpoint, it would not be intended to. However, the introduction of a tax schedule that would impose a low tax rate on low-valued timber and a high rate on high-valued timber would spread the benefits (i.e., utilization and management) to all grades of logs. A progressive tax system would continue to provide a direct association with the international market but yet allow the proposed control system to be introduced in a way that would be more consistent with the protection achieved under the existing controls. The higher level of price protection offered to higher quality logs would be based on explicit knowledge of the costs involved and, if
desired, could be reduced over time and brought into line with the protection afforded lower quality logs.

Determination of the structure of the system and estimation of the individual tax rates are beyond the scope of this thesis. Nevertheless, the analysis presented herein suggests that a price-related export control system—in particular, a progressive tax system—would provide a number of benefits over the administrative system of controls and still allow the volume of exports to be controlled effectively.
CHAPTER 8

SUMMARY, CONCLUSIONS AND FURTHER RESEARCH

This thesis has been concerned with five separate aspects of British Columbia’s log export restrictions. This chapter briefly summarizes the findings and conclusions of the previous chapters and identifies areas where further research is needed to substantiate or extend the analysis.

Chapter 2 documented the evolution of the restrictive export policy by examining current and historical legislation at both the provincial and federal levels. Interestingly, the policy of direct export restriction was found to date back to 1891 rather than to 1906 as is commonly thought to be the case.

In Chapter 4 the issue underlying the restrictions was discussed and clarified. The issue is not whether the growth (or protection) of the domestic processing industry should be encouraged but rather--given that alternatives are available--whether or not export restrictions are an efficient means of assisting the processing sector. Viewed in this light it is possible to examine the effects of the restrictions in a more logical, less emotional manner. The broader issue of assisting the domestic processing industry is still of interest. It is, however, a matter of social concern which lies beyond the scope of simple financial analysis.
The economic consequences of restricting the export of unmanufactured materials was also discussed in Chapter 4. In this regard, four important findings were made which raise serious questions with respect to the 'efficiency' of export restrictions. (1) The restrictions were identified as holding the prices paid for raw materials by the domestic processing industry below free market levels. (2) The depressing effect of the restrictions on domestic log prices was identified as imposing significant opportunity costs (estimated to be in the range of $19.2 to $192 million in 1975) on other sectors of the provincial economy. Insofar as part of the cost is borne by the provincial log producing sector, some of the benefits achieved through the growth of the processing sector are negated. (3) The effect of the restrictions on domestic log prices was identified also as leading to losses in economic efficiency in both industrial structure and resource use. (4) The price support accruing to the domestic processing industry was identified as being indiscriminately allocated. The chapter concluded that these consequences should be given appropriate consideration in any discussion pertaining to the restrictions.

In Chapter 6 the method of export regulation was considered. Critical examination of the export controls found them to be based on non-economic criteria which arbitrarily and unilaterally view domestic processing to be the best use of the province's timber resources. The administrative review procedure for determining export eligibility was identified as being cumbersome, time-consuming, risk-inducing and costly. In addition, the rigidity of the 'timber tax' was found to lead to the inequitable treatment of logs of different values and to the existence of windfall gains on some log exports. Importantly, the
'timber tax' was also found to be working in a manner inconsistent with the objectives of the policy. The chapter concluded that the existing export control system was void of economic consideration and suggested that an alternative should be sought—even if the general export restrictions were to be maintained—to rationalize the controls and provide explicit incentives for economic efficiency.

In Chapter 7 an examination was made of the Pearse Commission's proposal for revising the export control system. The objectives and methodology of a price-related export control system were identified and the theoretical advantages of providing incentives for efficiency (both domestically and internationally), flexibility, consistency and equity were discussed. Possible questions pertaining to the constitutional validity of the province using a tax scheme to regulate exports and regarding the implications of the province introducing an explicit barrier to trade were identified. In the last section of the chapter, the effects of introducing the proposed control system and tax rate were examined.

In addition to the effects on Crown revenue and economic efficiency, three general observations were made. First, under economic conditions similar to those of 1974 and 1975, the introduction and use of the price-related exports, controls and the 40 percent tax rate would be unlikely to lead to a large increase in the volume of log exports. Second, if economic conditions were to change to the point where the difference between export and domestic prices returned to the 1973 level, the proposed tax rate would be ineffective in controlling the flow of exports. And third, regardless of economic conditions, the use of the single tax rate would result in a reversal in the quality
of log exports. These observations led to the conclusion that the use of the 40 percent tax rate would be inappropriate, particularly during the introductory stages of the program. A progressive tax system was suggested as a possible alternative. The above concerns notwithstanding, the chapter concluded that the price-related export control system offers a viable alternative to the administrative regulations.

When the analyses and observations of the individual chapters are aggregated, they provide a serious indictment of both the existing policy and the existing method of export restriction. This thesis has not attempted to provide answers to many of the issues surrounding the restrictions. Rather, by identifying the economic consequences of both the level and the method of control, it has endeavored to eliminate some of the confusion involved in the restriction/non-restriction debate. To the extent that it has been successful, this thesis has set the stage for an improved level of discussion of export restriction in general and of the Pearse Commission's export recommendations in particular. Hopefully, the provincial government will be able to use the information and the analysis presented herein to assist in determining whether a change in policy and/or methodology is in the best interests of the province.

Throughout the thesis, areas where more detailed information or additional research would be useful were identified. The following list summarizes some of these areas. (1) More detailed information regarding export and domestic log prices is needed to increase the sophistication of the analysis and to reduce the reliance on averages. (2) The conversion factors and log grades used to compare U.S. and Canadian statistics should be closely scrutinized. While the assumptions appear reasonable, the conversion factors lie at the basis of the price analysis
and accuracy is of utmost importance.. (3) Records of the prices obtained for B.C. log exports would be useful to reduce the dependence upon or to confirm the applicability of the U.S. prices. (4) More current and improved estimates of the responsiveness of world market prices to increases in log supplies is needed to determine the existence of the market for B.C. log exports. This information is also needed to improve the estimate of the total opportunity cost of export restriction. (5) More specific stumpage and log harvest statistics would provide the basis for more detailed estimates of the effects of the proposed export control system and tax rate. (6) Consideration should be given to the responsiveness of non-market log supplies to changes in stumpage charges and to the ability of the domestic processing sector to re-arrange input combinations to achieve cost reductions and improved efficiency. (7) The effect of increased log prices on the economic viability of timber harvesting should be examined. In areas such as the Prince Rupert Forest District, the proposed change in policy provides an opportunity for increasing both the level of forest management and the level of forest-based employment and income. (8) Forecasts of changes in the international economic situation are important for determining the adequacy of the proposed tax rate. (9) The structure and individual rates of a progressive tax system should be considered. (10) The efficiency and effectiveness of alternative processing assistance programs should be considered for comparison with log export restrictions. (11) The broader social question of whether the domestic processing industry should be assisted should be investigated.


Food and Agriculture Organization of the United Nations, 1950 to 1974. Yearbook of Forest Products. Annual summaries prepared by the Statistics and Economic Analysis Unit of the Forestry Department, Rome, Italy.


, 1977. Personal communication.


TABLE A-1
EXPORT/DOMESTIC PRICE COMPARISON\(^1\)--BY GRADE, 1973

<table>
<thead>
<tr>
<th>Species</th>
<th>Grade</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V.L.M.</td>
<td>U.S. Export</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>--------------</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 1 Peeler</td>
<td>$136.74</td>
<td>$465.40</td>
</tr>
<tr>
<td>No. 2 Peeler</td>
<td>132.85</td>
<td>367.75</td>
</tr>
<tr>
<td>No. 3/No. 4 Peeler(^3)</td>
<td>110.46</td>
<td>261.33</td>
</tr>
<tr>
<td>No. 1 Sawmill</td>
<td>85.22</td>
<td>233.45</td>
</tr>
<tr>
<td>No. 2 Sawmill</td>
<td>73.80</td>
<td>167.30</td>
</tr>
<tr>
<td>No. 3 Sawmill</td>
<td>57.10</td>
<td>87.37</td>
</tr>
<tr>
<td>Hemlock</td>
<td>No. 1(^4)</td>
<td>81.15</td>
</tr>
<tr>
<td>No. 2</td>
<td>77.35</td>
<td>159.69</td>
</tr>
<tr>
<td>No. 3</td>
<td>55.20</td>
<td>101.37</td>
</tr>
<tr>
<td>Spruce</td>
<td>No. 1(^4)</td>
<td>431.12</td>
</tr>
<tr>
<td>No. 2</td>
<td>188.68</td>
<td>224.24</td>
</tr>
<tr>
<td>No. 3</td>
<td>67.71</td>
<td>104.73</td>
</tr>
<tr>
<td>Cedar</td>
<td>No. 1</td>
<td>103.65</td>
</tr>
<tr>
<td>No. 2</td>
<td>78.94</td>
<td>221.91</td>
</tr>
<tr>
<td>No. 3</td>
<td>62.75</td>
<td>102.97</td>
</tr>
</tbody>
</table>


\(^1\)See Appendix B for conversion factors and exchange rates.

\(^2\)See Appendix B for grading rules.

\(^3\)Includes No. 3 Peeler and Special Mill in U.S. grades.

\(^4\)Includes Peeler, Special Mill and No. 1 sawmill in U.S. grades.
<table>
<thead>
<tr>
<th>Species</th>
<th>Grade</th>
<th>Market</th>
<th>V.L.M.</th>
<th>U.S. Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Douglas-fir</td>
<td>No. 1 Peeler</td>
<td>$153.43</td>
<td>$396.09</td>
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</tr>
<tr>
<td></td>
<td>No. 2 Peeler</td>
<td>144.77</td>
<td>283.26</td>
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</tr>
<tr>
<td></td>
<td>No. 3/No. 4 Peeler</td>
<td>129.05</td>
<td>206.99</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. 1 Sawmill</td>
<td>99.05</td>
<td>212.13</td>
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<td></td>
<td>No. 2 Sawmill</td>
<td>86.29</td>
<td>132.28</td>
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</tr>
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<td></td>
<td>No. 3 Sawmill</td>
<td>64.90</td>
<td>80.65</td>
<td></td>
</tr>
<tr>
<td>Hemlock</td>
<td>No. 1</td>
<td>82.33</td>
<td>202.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>79.35</td>
<td>120.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>56.97</td>
<td>78.16</td>
<td></td>
</tr>
<tr>
<td>Spruce</td>
<td>No. 1</td>
<td>401.53</td>
<td>418.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>139.32</td>
<td>161.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>69.19</td>
<td>99.97</td>
<td></td>
</tr>
<tr>
<td>Cedar</td>
<td>No. 1</td>
<td>89.47</td>
<td>192.58</td>
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<td></td>
<td>No. 2</td>
<td>66.93</td>
<td>125.01</td>
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<td>No. 3</td>
<td>57.30</td>
<td>73.29</td>
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</tbody>
</table>


1 See Appendix B for conversion factors and exchange rates.

2 See Appendix B for grading rules.

3 3rd quarter only; Puget Sound District sales only.

4 Includes No. 3 Peeler and Special Mill in U.S. grades.

5 Includes Peeler, Special Mill and No. 1 sawmill in U.S. grades.
APPENDIX B: CONVERSION FACTORS, EXCHANGE RATES AND LOG GRADES

B.1. Conversion Factors

The units of wood measurement used in the Pacific Northwest and those used in B.C. are completely different. The Scribner Decimal C Board Foot Rule is the most commonly used log scale in the P.N.W.; in B.C. the official scale is the B.C. Firmwood Cubic Rule. Comparisons of log prices in the two regions require that the prices be expressed on the basis of a common unit.

The theoretical conversion from Scribner Decimal C to B.C. Firmwood (i.e., from Mbm. Scribner to cunits) ranges from 3.5 : 1 for logs with 4" DIB (small end) to 1.3 : 1 for large logs with 40" DIB (C.O.F.I., 1973). An average conversion of between 1.9 : 1 and 2 : 1 is normally used (ibid). This averaging can be very misleading when dealing with specific log grades, however.

To facilitate the per grade examination of export and domestic log prices, individual grade conversion factors were estimated. The estimation procedure was as follows: first, the range of log diameters was divided into grades (No. 3 equalled logs between 4" and 13"; No. 2--logs between 14" and 23", No. 1--logs 24" plus). Second, the individual diameter classes (and applicable theoretical conversion factors) within each grade were weighted with the appropriate volume of logs that fell within that class in a sample of export logs (Adams and Hamilton, 1965). The conversion factors estimated were:

No. 1 - 1.4 : 1
No. 2 - 1.8 : 1
No. 3 - 2.5 : 1

These conversion factors apply only to export sales. The individual grade conversion factors reflect the size distribution within that grade, and for No. 3 logs especially, export sales are concentrated in the larger diameters.

When aggregated (again using weights) these per grade conversion factors result in an average all-grade conversion factor of 1.7 : 1. This factor reflects the relatively higher quality grade distribution of U.S. export sales and, as such, is considered to be more appropriate for the purpose of this study than the general conversion factor of 1.9 : 1.

B.2. Exchange Rates

Conversion of U.S. log prices into Canadian units requires also that the two currencies be examined on a comparable basis. All price figures in the thesis are recorded in Canadian dollars; the U.S. prices have been converted using the following schedule of exchange rates (Bank of Canada, 1977):
B.3. Log Grades

The comparison of log prices in B.C. and the Pacific Northwest is further complicated by the differences in log grading rules in the two regions.

Examination of the diameter limits, log lengths and lumber content requirements of the two grading systems suggests that the No. 1 and No. 2 grade classifications are somewhat more stringent in B.C. than in the U.S. The No. 3 grade classification in B.C. includes a much wider range of log qualities than does the U.S. No. 3. Based on this information, the comparison of similarly listed grades in the two regions would suggest a quality bias in favour of the B.C. logs. In this regard, the differences in log prices indicated by the export-domestic price comparison would tend to be conservative.
APPENDIX C: ESTIMATES OF INCOME REDISTRIBUTED, 1975

In Chapter 4, the redistribution of income within the provincial economy which occurs as the result of export restriction was described. To review briefly: the restrictions hold domestic log prices below international levels thereby providing the domestic processing sector with an implicit benefit (in terms of reduced raw material costs) while, at the same time, imposing an opportunity cost (in terms of foregone revenue) on both the log producing sector and the Crown. This appendix estimates the income redistributed in 1975 within the limits of two general assumptions regarding the price responsiveness of international demand for softwood logs. In addition, an estimate of the allocation of the cost between the Crown and the log producing sector is provided.

For the upper limit of the estimate it is assumed that international prices would not respond to an increase in log supply (i.e., that international demand is completely price elastic), which, in turn, implies that any (or all) of the coastal B.C. log production could be sold on the international market at stated export prices. For the lower limit, it is assumed that a supply increase would result in a decrease in the international price level, and that, for the volume considered here, the decrease would be in the range of 90% of the stated difference between export and domestic prices (i.e., that international demand is almost completely inelastic). As explained in Chapter 4, up-to-date information that would provide an indication of the true price responsiveness of international demand is not available.

The procedure for each of the two elasticity assumptions involves twelve steps and includes an adjustment for maximum stumpage rates. Although important, adjustment for minimum stumpage rates is not feasible without accurate information regarding operating cost allowances. Nevertheless, it can be presumed that the burden of the cost assumed by the log producing sector would have been greater than indicated below if minimum rates had been in effect (which apparently was the case in many instances in 1975).

Available information restricts the calculations to Douglas-fir, hemlock, spruce and cedar.

C.1. Price Elastic

For the assumption that export prices remain firm in the face of an increase in log supply, the twelve steps are as follows:

step 1: using statistics published by the B.C. Forest Service (1975a) find the average per cunit stumpage price for each specie.

step 2: using the profit allowance extremes of (i) 10.7% and (ii) 21.3% of average selling price along with V.L.M. average selling

The determination of the range of the profit allowance is described in footnote 18, page 41.
price, estimate the dollar value range of the profit allowance.

step 3: subtracting the average stumpage price (step 1) and the two profit allowance figures (step 2) from the V.L.M. average price, estimate the average per cunit operating costs for the two profit allowance assumptions.

step 4: substituting the average export price (Table 3-11) for the V.L.M. price, apply the 10.7% and 21.3% profit allowance assumptions and estimate the indicated per cunit profit allowance for the two extremes.

step 5: subtracting the indicated profit allowance figures (step 4) and the average operating cost figures (step 3) from the average export price, estimate the indicated per cunit stumpage charges for the two profit allowance assumptions.

step 6: adding the appropriate indicated profit allowance and stumpage charge figures, estimate the conversion returns for the two profit allowances.

step 7: multiplying the conversion return estimates by 0.6 find the maximum per cunit stumpage charges for the two assumptions.

step 8: finding the lower of the indicated stumpage charge and the maximum stumpage charge, determine the revised per cunit stumpage charge at the two extremes.

step 9: subtracting the revised stumpage charge from the conversion return, find the revised per cunit profit allowance for the two profit allowance assumptions.

step 10: subtracting the initial stumpage rate (step 1) from the revised stumpage rates, find the estimate of the per cunit stumpage revenues foregone at the two extremes. Subtracting the revised profit allowance figure from the initial allowance (step 2) find the estimate of the per cunit profit allowance foregone at the two extremes.

step 11: multiplying the per cunit stumpage and profit allowance figures (step 10) by the volume of the applicable material harvested in 1975, estimate the total cost to the Crown and to the log producing sector. Adding the two figures, estimate the total income foregone for each species.

step 12: adding the totals for the individual species find the total income foregone for the four species combined. Viewed oppositely, this figure measures the total level of price support received by the processing sector.

The results of the calculations are presented below. The calculations for Douglas-fir are presented in detail for illustrative purposes; only the final step is presented for the other species.
### C.1.1. Douglas-fir

**S.1:** average stumpage = $9.65

**S.2:** V.L.M. = $71.08 (i) at 10.7% = $7.61 (ii) at 21.3% = $15.14

**S.3:**

<table>
<thead>
<tr>
<th></th>
<th>(i)</th>
<th>(ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$71.08</td>
<td>$71.08</td>
</tr>
<tr>
<td></td>
<td>- 7.61</td>
<td>-15.14</td>
</tr>
<tr>
<td></td>
<td>- 9.65</td>
<td>- 9.65</td>
</tr>
<tr>
<td></td>
<td>$53.82</td>
<td>$46.29</td>
</tr>
</tbody>
</table>

**S.4:** export price = $132.32

(i) $132.32 - $71.08 = $61.24

(ii) $132.32 - $53.82 = $78.50

**S.5:**

<table>
<thead>
<tr>
<th></th>
<th>(i)</th>
<th>(ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$132.32</td>
<td>$132.32</td>
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<tr>
<td></td>
<td>- 53.82</td>
<td>- 46.29</td>
</tr>
<tr>
<td></td>
<td>- 14.16</td>
<td>- 28.18</td>
</tr>
<tr>
<td></td>
<td>$64.34</td>
<td>$57.85</td>
</tr>
</tbody>
</table>

**S.6:**

(i) $14.16 + $64.34 = $78.50

(ii) $28.18 + $57.85 = $86.03

**S.7:**

(i) $78.50 \times 0.6 = $47.10

(ii) $86.03 \times 0.6 = $51.62

**S.8:**

(i) $47.10

(ii) $51.62

**S.9:**

(i) $78.50 - $47.10 = $31.40

(ii) $86.03 - $51.62 = $34.41

**S.10:**

(a) foregone stumpage

(i) $47.10 - $9.65 = $37.45

(ii) $51.62 - $9.65 = $41.97

(b) foregone profit allowance

(i) $31.40 - $7.61 = $23.79

(ii) $34.41 - $15.14 = $19.27

**S.11:**

(a) total stumpage foregone

(i) $37.45 \times 347,818 \text{ cunits} = $13,025,784.10

(ii) $41.97 \times 347,818 \text{ cunits} = $14,597,921.46

(b) total profit allowance foregone

(i) $23.79 \times 347,818 \text{ cunits} = $8,274,590.22

(ii) $19.27 \times 347,818 \text{ cunits} = $6,702,452.86

(c) total income foregone = $21,300,374.32
C.1.2. **Hemlock**

S.11: (a) total stumpage foregone  
   (i) $43.21 \times 1,740,507 \text{ cunits} = $75,207,350.68  
   (ii) $46.92 \times 1,740,508 \text{ cunits} = $81,664,635.36  

   (b) total profit allowance foregone  
   (i) $25.44 \times 1,740,508 \text{ cunits} = $44,278,523.52  
   (ii) $21.73 \times 1,740,508 \text{ cunits} = $37,821,238.94  

   (c) total income foregone = $119,485,874.20  

C.1.3. **Spruce**

S.11: (a) total stumpage foregone  
   (i) $36.72 \times 232,320 \text{ cunits} = $8,530,790.40  
   (ii) $42.49 \times 232,320 \text{ cunits} = $9,871,276.80  

   (b) total profit allowance foregone  
   (i) $22.39 \times 232,320 \text{ cunits} = $5,201,644.80  
   (ii) $16.62 \times 232,320 \text{ cunits} = $3,861,158.40  

   (c) total income foregone = $13,732,435.20  

C.1.4. **Cedar**

S.11: (a) total stumpage foregone  
   (i) $35.57 \times 670,510 \text{ cunits} = $23,850,040.70  
   (ii) $38.47 \times 670,510 \text{ cunits} = $26,465,029.70  

   (b) total profit allowance foregone  
   (i) $20.39 \times 670,510 \text{ cunits} = $13,671,698.90  
   (ii) $16.49 \times 670,510 \text{ cunits} = $11,056,709.90  

   (c) total income foregone = $37,521,739.60  

Adding the individual species total (step 12) provides an estimate of the total dollar value of the income foregone by the Crown and the log producing sector (for the four species) in 1975 under the assumption of complete price elasticity.

<table>
<thead>
<tr>
<th>Species</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Douglas-fir</td>
<td>$21,300,374.32</td>
</tr>
<tr>
<td>Hemlock</td>
<td>119,485,874.20</td>
</tr>
<tr>
<td>Spruce</td>
<td>13,732,435.20</td>
</tr>
<tr>
<td>Cedar</td>
<td>37,521,739.60</td>
</tr>
</tbody>
</table>

$192,040,423.32  

Totalling the individual species stumpage figures as well as the individual species profit allowance figures gives the upper and lower estimates of the allocation of the burden between the Crown and the log producing sector.
(i) if the profit allowance was 10.7%, the cost to the Crown would have been $120,613,965.88; the cost to the log producing sector $71,426,457.44

(ii) if the profit allowance was 21.3%, the cost to the Crown would have been $132,598,863.32; the cost to the log producing sector $59,441,560.00.

C.2. Price Inelastic

For the assumption of price inelasticity, some changes have to be made in the estimating procedure to account for the responsiveness of international prices. Specifically, steps 4 and 5 become:

step 4: subtracting 90% of the difference between export and domestic prices from the average export price, estimate the extent of the price decrease that would occur from a major change in log supply. Then, substituting the revised export price for the V.L.M. price, apply the 10.7% and 21.3% profit allowance assumptions and estimate the indicated per cunit profit allowance for the two extremes.

step 5: subtracting the indicated profit allowance figures (step 4) and the average operating cost figures (step 3) from the revised export price (step 4), estimate the indicated per cunit stumpage charges for the two profit allowance assumptions.

Each of the other steps remains the same.

The calculations for this assumption are presented below. Again, only the calculations for Douglas-fir are presented in detail (from step 4).

C.2.1. Douglas-fir

S.4: revised export price = $132.32 - .9 ($132.32 - $71.08) = $77.20
   (i) at 10.7% = $8.26
   (ii) at 21.3% = $16.44

S.5:  
   (i) $77.20  
   -53.82  
   - 8.26  
   $15.12
   (ii)  
   $77.20  
   -46.29  
   -16.44  
   $14.47

S.6:  
   (i) $8.26 + $15.12 = $23.38
   (ii) $16.44 + $14.47 = $30.91
S.7:  
(i) $23.38 \times 0.6 = $14.03  
(ii) $30.91 \times 0.6 = $18.55  

S.8:  
(i) $14.03  
(ii) $14.47  

S.9:  
(i) $23.38 - $14.03 = $9.35  
(ii) $30.91 - $14.47 = $16.44  

S.10:  
(a) foregone stumpage  
(i) $14.03 - $9.65 = $4.38  
(ii) $14.47 - $9.65 = $4.82  
(b) foregone profit allowance  
(i) $9.35 - $7.61 = $1.74  
(ii) $16.44 - $15.14 = $1.30  

S.11:  
(a) total stumpage foregone  
(i) $4.38 \times 347,818 \text{ cunits} = $1,523,442.84  
(ii) $4.82 \times 347,818 \text{ cunits} = $1,676,482.76  
(b) total profit allowance foregone  
(i) $1.74 \times 347,818 \text{ cunits} = $605,203.32  
(ii) $1.30 \times 347,818 \text{ cunits} = $452,163.40  
(c) total income foregone = $2,128,646.16  

C.2.2. Hemlock  

S.11:  
(a) total stumpage foregone  
(i) $6.13 \times 1,740,507 \text{ cunits} = $10,669,307.91  
(ii) $5.41 \times 1,740,507 \text{ cunits} = $9,416,142.87  
(b) total profit allowance foregone  
(i) $0.74 \times 1,740,507 \text{ cunits} = $1,287,975.18  
(ii) $1.46 \times 1,740,507 \text{ cunits} = $2,541,140.22  
(c) total income foregone = $11,957,283.09  

C.2.3. Spruce  

S.11:  
(a) total stumpage foregone  
(i) $4.80 \times 232,320 \text{ cunits} = $1,115,136.00  
(ii) $4.65 \times 232,320 \text{ cunits} = $1,080,288.00  
(b) total profit allowance foregone  
(i) $1.11 \times 232,320 \text{ cunits} = $257,875.20  
(ii) $1.26 \times 232,320 \text{ cunits} = $292,723.20  
(c) total income foregone = $1,373,011.20
C.2.4. Cedar

S.11: (a) total stumpage foregone
   (i) $5.00  670,510 cunits = $3,352,550.00
   (ii) $4.41  670,510 cunits = $2,956,949.10

(b) total profit allowance foregone
   (i) $0.60  670,510 cunits = $402,306.00
   (ii) $1.19  670,510 cunits = $797,906.90

(c) total income foregone = $3,754,856.00

Adding the individual totals provides an estimate of the total income foregone in 1975 under the assumption that a major increase in world market log supplies would result in a substantial decrease in international log prices.

S.12: Douglas-fir $ 2,128,646.16
       Hemlock 11,957,283.09
       Spruce 1,373,011.20
       Cedar 3,754,856.00
       $19,213,796.45

The allocation of the burden between the Crown and the log producing sector would be as follows:

(i) if the profit allowance was 10.7%, the cost to the Crown would have been $16,660,436.75; the cost to the log producing sector $2,553,359.70

(ii) if the profit allowance was 21.3%, the cost to the Crown would have been $15,129,862.73; the cost to the log producing sector $4,083,933.72

C.3. Conclusions

The figures presented here provide an indication of the magnitude of the income redistributed between the Crown and the log producing sector on one hand and the processing sector on the other, given certain assumptions regarding the profit allowance and international log demand. Although it is not feasible (within the scope of this thesis) to determine where within this range the actual income transfer falls, it is clear that, even at the lower extreme, the total level of income redistributed is substantial.