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The Effect of Taxes and Social Programs  
on Competitiveness in  
International Agriculture:  
A Case Study of the Wheat Industry



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**THE EFFECT OF TAXES AND SOCIAL PROGRAMS ON  
COMPETITIVENESS IN INTERNATIONAL AGRICULTURE:  
A CASE STUDY OF THE WHEAT INDUSTRY**

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## **THE EFFECT OF TAXES AND SOCIAL PROGRAMS ON COMPETITIVENESS IN INTERNATIONAL AGRICULTURE: A CASE STUDY OF THE WHEAT INDUSTRY**

Perceptions of competitiveness of U.S. products in world markets, or the lack thereof, continues to receive attention among both policymakers and the general public. As evidence of a decline in U.S. competitiveness, the U.S. international trade balance fell from a surplus of \$2.7 billion in 1970 to a deficit of \$119.8 billion in 1988 (Bureau of the Census). U.S. citizens are concerned about a balance of trade deficit because it may represent lost jobs and a lower standard of living.

During this same 1970-88 period, however, agriculture has gone against this negative trend by registering significant surpluses in trade. Perhaps as a result, farm groups and other agricultural interests have been among the most vocal in pressing for more open markets in Japan, Europe and elsewhere (Moore). Many within the agricultural sector feel the United States has a comparative advantage<sup>1</sup> in food production and that its market share will be maintained or continue to grow if trade barriers are reduced or eliminated (Yates). A recent study by the USDA, for example, suggests that liberalizing trade between the United States and Mexico would increase U.S. farm income by \$1.7 billion in the 15 years after the agreement takes effect (USDA).

On the other hand, there is concern that free trade benefits to agriculture and related sectors will be more than offset by losses in other production sectors. There is the prediction, for example, that in the case of the North American Free Trade Agreement (NAFTA), greater poverty will emerge in Mexico and the United States, with only the upper 30 percent of populations in both countries benefitting from lower consumer prices (Yates). In addition, differences in environmental regulations may provide farmers in third-world countries, such as Mexico, with a competitive advantage in trade with the United States and world markets (Hofferber).

As the debate over the costs and benefits of the NAFTA and other free trade agreements continues, domestic tax policies represent an important, but often overlooked variable in assessing the competitive position of trading countries. In fact, tax policies can be just as significant as some subsidies in influencing competitiveness. To allow a country's natural, or comparative, advantage to determine trade flows, all government interaction with producers (e.g., subsidies, taxes, and environmental regulations) must impose the same total net cost. To illustrate, farmers who receive substantial subsidies, but also pay high taxes, would be in

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<sup>1</sup>Comparative advantage refers to activities in which a group performs better relative to others. As used in this document, comparative advantage performance is based on soils, climate, and other resources. Competitive advantage represents the actual trade advantage a country has, including all comparative advantage items plus those artificially created by government (e.g., direct subsidies, barriers to trade).

the same competitive position as farmers in another country who receive no subsidies, but incur much smaller tax obligations. In addition, focusing on direct subsidy measures, such as the Producer Subsidy Equivalent, as a gauge of government intervention may not result in a true reduction in subsidies. Rather, some governments that find it desirable to subsidize their farmers may choose to switch to tax policy as an alternative subsidy vehicle. The effect of such a government policy on producers' competitive position can be addressed adequately only through the consideration of domestic and international taxation policies in trade negotiations.

Although tax revenues are used to provide governmental services to all sectors of the economy, including agriculture, the relative benefits of government intervention in each production sector are unevenly distributed. Many of these services or lack thereof contribute significantly to individual production sectors' competitive advantage or disadvantage in trade. Ultimately, however, the cost of production per unit of output, rate of technological change, and the rate of return acceptable to farmers will be the deciding factors determining competitive advantage in the production of wheat and other commodities. Any government program that subsidizes the farmer's standard of living allows these producers to lower their acceptable rate of return, thereby enhancing trade competitiveness. These other governmental services (i.e., national health care, pensions, etc.) also should be considered in any comparison of tax burdens between countries.<sup>2</sup>

There is, fortunately, increased recognition among economists concerning the importance of taxation policy on competitiveness. Sharples, for example, argues that reducing tax burdens on farmers is one way government can make commodities more competitive in international markets. In addition, a recent study of the U.S. - Canada Free Trade Agreement by Canadian researchers recognizes the role of tax policy in affecting trade outcomes, and suggests that more research is needed to quantify the tax burden faced by farmers in both countries (*Growing Together*). Further, using a case farm situation, Perry, Nixon and Bunnage (1992) demonstrated that differences in taxation policies can be more important than direct government subsidies in determining overall competitive advantage between U.S. and Canadian wheat farmers.

In this study, we report the results of a firm-level investigation into tax policies for wheat farmers in the world's major wheat-exporting countries, specifically, Argentina, Australia, Canada, France (representing the Economic Community) and the United States. The presentation of this research begins with development of a theoretical basis for the research approach. Next, a detailed overview of the taxation policies in each of these five countries is presented, along with a description of major social program benefits. A simulation model is then used to illustrate how taxes and social programs fit together to determine an overall level of net return in each country. Initially, farms with approximately equal returns in three different countries are compared under alternative taxation policies to determine how taxes

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<sup>2</sup>This approach is not without its flaws. Some services, such as national defense, are difficult to measure.

and social programs influence competitiveness. The analysis is then expanded to other farm sizes to explore how government policies aid or hinder the international competitiveness of each country.

### Theoretical Framework for Analytical Approach

Following the work of Chambers and Lopez, it is assumed farm households seek to maximize utility based on choices between consumption (c), leisure (l), and saving(s). The basic behavioral model is

$$(1) \quad \underset{C, L_1, L_2}{\text{Max}} \quad U(C, H - L_1 - L_2)$$

subject to

$$(i) \quad \Delta E = \theta[\tilde{\pi}] \cdot \{\tilde{\pi}(L_1, K, P, d, e) - r[K]K - \lambda[\tilde{\pi}] + [1 - \lambda(w)] \cdot WL_2 + ST\} - \alpha[c] \cdot C$$

where H is total time available to the farm household,  $L_1$  and  $L_2$  are time spent in on-farm and off-farm work, and leisure is implicitly defined as  $l \equiv H - L_1 - L_2$ . Savings is represented by change in farm equity ( $\Delta E$ ). The term  $\theta[\tilde{\pi}]$  represents one minus the proportion of federal, state, and local income taxes, all dependent on farm profit and government tax schedules. Farm profit  $\tilde{\pi}$  is a function of on-farm labor, capital employed in the operation<sup>3</sup> (K), prices of both inputs and outputs (P), debt level (d), and a random component (e). Taxable farm profits can be reduced by taxes on capital and labor. Capital (or property) taxes are based on the schedule  $r[K]$ , with different rates depending on the types of farm capital being taxed. Payroll taxes for on-farm returns to labor  $\lambda[\tilde{\pi}]$  are based on farm profits, whereas off-farm payroll taxes are tied to off-farm labor.<sup>4</sup> The term ST represents government social transfers, some of which may be tax-exempt. The term C represents family withdrawals needed to cover living expenses, which are subject to a sales tax schedule  $\alpha[C]$ .

To understand how alternative tax policies would affect farm profits, we elected to use an approach akin to the Laspeyres measure of welfare change. Initially, we assume that the farm household has made consumption, leisure, and saving decisions in such a manner as to maximize utility. By gathering current information on prices, quantities used, and management decisions made, we can describe the farm's financial position. Suppose we simplify (1,i) above to be

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<sup>3</sup> Capital as used here includes land, and physical and financial capital.

<sup>4</sup> Payroll taxes for farmers often are poorly related to farm labor hours, but are linked to farm income. They differ in the income base used to calculate tax.

$$(2) \quad \Delta E = t[\tilde{\pi}_A] \cdot [\tilde{\pi}_A(C, H-L, -L_2)]$$

such that  $t[\tilde{\pi}_A]$  represents all tax schedules and  $\tilde{\pi}_A$  represents the farmers net return in country A. The welfare effect of a change in tax policy can be obtained by

$$(3) \quad \Delta W_A = \{t[\tilde{\pi}_A] - t[\tilde{\pi}_B]\} \cdot [\tilde{\pi}_A(C, H-L_1-L_2)]$$

where  $t[\tilde{\pi}_1]$  is the alternative tax plan (e.g., tax policies in country B). Like other measures using the Laspeyres index approach, such as the consumer price index, the resulting measure is a short-run, partial equilibrium result. However, the general equilibrium solution can be approximated by comparing (3) with

$$(4) \quad \Delta W_B = \{t[\tilde{\pi}_A] - t[\tilde{\pi}_B]\} \cdot [\tilde{\pi}_B(C, H-L_1-L_2)]$$

To illustrate, if  $\Delta W_A$  and  $\Delta W_B$  are both similar in size and direction, then it follows that the general equilibrium solution would also generate these results.

### Overview of Study Areas

A number of representative farms were developed for use in this analysis, representing Argentina, Australia, Canada, and the United States. Insufficient information was available to develop a farm for France. In this section we provide a brief description of each farm developed. Because the focus of this study is tax policy, no description of the myriad of government agricultural policies in each country or cost of production differences is presented.

#### Argentina

Argentine wheat production is centered in the rich Pampas area of the Buenos Aires province. In Southern Buenos Aires wheat is produced in rotation with sunflowers and some corn. A more important wheat producing area is located in the Northern Buenos Aires province where wheat is double-cropped with soybeans. A representative farm of 450 hectares located in the Pergamino area of Buenos Aires was developed for the study. The farm consisted of 55 percent soybeans, 20 percent corn, and 25 percent wheat-soybeans double-cropped. Lack of support prices and moderately high marketing costs mean that per hectare wheat production costs must be low to remain competitive in international wheat trade. A small debt load is

another important characteristic of this farm. The high inflation policies of Argentine governments over several decades essentially destroyed credit markets, causing farmers to self-finance all land and equipment purchases.

### **Australia**

Australian wheat is grown in a narrow crescent known as the wheat belt. The crescent stretches in a curve from central Queensland, through New South Wales, Victoria, and southern South Australia. The crescent continues around the southwest of Western Australia. New South Wales has the highest wheat production, providing about 30 percent of country's production. Most wheat in New South Wales is farmed in rotation with pasture. Virtually all Australian wheat is grown under nonirrigated conditions, with weather variability causing substantial yield fluctuations. Australian farmers specialize in soft red and white wheats.

For this study, the Australian case farm was placed in Moree District, a major wheat producing area of northcentral New South Wales. The farm contained 875 hectares of land, with a 75 percent wheat and 25 percent barley crop mix. Although the rotation differs from the traditional grain-pasture rotation, production practices are much the same.

### **Canada**

Canadian wheat production is centered in the prairie provinces of Alberta, Saskatchewan, and Manitoba. Canada specializes in spring wheats, specifically hard red and durum varieties. The case study situation selected for Canada was located in Warner County, Alberta, adjacent to the U.S. (Montana) border. The production practices and productivity levels are similar to low rainfall wheat production areas of the United States. A grain-fallow rotational system is followed in the Warner area. Durum and hard red spring wheats dominate in the rotation. For this analysis, the crop mix was assumed to consist of 50 percent fallow, 20 percent hard red spring, 20 percent durum, 5 percent hard red winter, and 5 percent barley. The representative farm size was 1,700 hectares.

### **The United States**

The case farm situation was developed for Morrow County, Oregon. Morrow County is located in the Columbia Plateau region, a major wheat producing area in Oregon and Washington. The typical cropping system involves a wheat-fallow rotation, with some barley and other small grains sometimes included. The cropping system is land extensive, with an average farm size of about 1,100 hectares. Morrow County yields vary a great deal, depending on rainfall and soil depth, but are typical of the Columbia Plateau region. Yields and production practices are similar to those in the low rainfall areas of the Great Plains (e.g., Montana, North Dakota, and Colorado).



## Comparison of Tax and Social Program Policies

The five countries analyzed here depend on the same basic set of sources, income, property, and sales, to levy taxes. The proportion raised from each source varies greatly, however. Most of these countries have also experienced major changes in their tax system during the last decade and will likely see further change in the 1990's. Consequently, what is presented is a "snapshot" of the tax law in each country for 1991.

### Income Taxes

A comparison of 1991 federal and state/provincial income tax laws for each country is given in Table 1. Argentina, Australia, and Canada provide one tax schedule for individuals and a second for corporations. In France, family incomes are aggregated prior to calculating income tax, with the appropriate tax schedule based on the taxpayer's family responsibilities (known as parts). Heads of households and spouses count as one part each, with each child representing one-half part. The French tax schedule listed in Table 1 is for three parts. The United States, on the other hand, provides four alternative schedules for individuals: (a) married filing jointly, (b) married, filing separately, (c) head of household, and (d) single. Married couples have the option of paying their taxes jointly or married filing separately, with joint filing providing a small benefit.

A single, progressive tax schedule on each individual (like that in Argentina, Australia, and Canada) encourages husband and wife to earn income separately because total taxes paid will be less than if only one spouse were to earn the equivalent amount of income. Sole proprietor farms typically assign all income to the husband, resulting in substantial income taxes. To deal with this issue, farmers in Canada and Australia create husband-wife partnerships, with each spouse sharing equally in farm proceeds. To qualify as a husband-wife partnership, each partner provides labor, financial capital, or assets in proportion to their share of farm income. Argentina does not permit this kind of partnership. As noted in the previous paragraph, husband-wife partnerships in the United States and France seldom are beneficial and can result in higher taxes.

Canada and the United States have only three tax rates for individuals, with a top rate of 29 percent in Canada, and 31 percent in the United States. Surtaxes are also levied on regular Canadian taxes, resulting in a top effective tax rate of almost 32 percent. Australia and France have much more progressive tax systems with higher rates. The federal governments in Argentina, Australia, and France also collect essentially all income tax dollars, whereas most states or provinces in Canada and the United States have substantial state income taxes. Finally, Argentine federal income tax levels are quite modest compared to the other countries.<sup>5</sup>

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<sup>5</sup>Historically, the compliance rate for Argentine income taxes was very low, largely because there was no legal recourse for noncompliance. With recent economic reforms, however, has come a commitment to punish those who don't pay taxes. Whether the government will carry through on its threats remains to be seen.

Table 1. Summary of 1991 Federal and State/Provincial Income Tax Law by Country in 1991

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada <sup>a</sup>	La Marne France	Oregon United States
Federal Personal Income Tax Bracket and Rates	\$0. - 1,372. 6% 1,372. - 13,725. 10% 13,725. - 28,822. 15% 28,822. - 57,643. 20% 57,643. - 115,287. 25% 115,287. and above 30%	\$0. - 4,148. 0% 4,148. - 13,944. 20% 13,944. - 16,274. 24% 16,274. - 16,353. 29% 16,353. - 27,650. 38% 27,650. - 28,440. 42% 28,440. - 39,500. 46% 39,500. and above 47%	\$0. - 24,466. 17% 24,466. - 48,933. 26% 48,933. and above 29%	\$0. - 10,013. 0% 10,013. - 10,466. 5% 10,466. - 12,403. 10% 12,403. - 19,607. 14% 19,607. - 25,204. 19% 25,204. - 31,641. 24% 31,641. - 38,292. 29% 38,292. - 44,177. 34% 44,177. - 73,604. 38% 73,604. - 101,237. 43% 101,237. - 119,751. 49% 119,751. - 136,217. 54% 136,217. and above 57%	\$0. - 34,000. 15% 34,000. - 82,150. 28% 82,125. and above 31%
Preferred Personal Filing Status	household	husband-wife partnership	husband-wife partnership	household	married filing jointly
State/Provincial Personal Income Tax Brackets and Rates	none	none	46.5% of federal tax	none	0. - 4,000. 5% 4,000. - 10,000. 7% 10,000. and above 9%
Federal Corporate Income Tax Brackets and Rates	20% of income	39% of income	38% of income, reduced to 12% if income below \$170,000	24% of income from land or farming	0. - 50,000. 15% 50,000. - 75,000. 25% 75,000. - 100,000. 34% 100,000. - 335,000. 39% 335,000. and above 34%
State/Provincial Corporate Tax	none	none	39.5% of federal tax, reduced to 6%	none	6.6% of income

<sup>a</sup>In addition to the income tax rates listed here, Canada also charges a 5% surtax on tax payable, increasing to 10% for taxes above \$10,625. Alberta levies an 8% surtax on provincial taxes above \$2,975.

Some countries have special provisions in treatment of corporate taxes. The United States, for example, is the only country in the study with more than one tax rate for corporations. Australia, on the other hand, taxes corporations, or companies as they are referred to there, at a flat 39 percent rate. The standard corporate tax rate in France is 50 percent, but it is reduced to 24 percent for income from land or farming. In Argentina, the corporate tax rate is 20 percent. A distinct disadvantage of incorporation is the double taxation of corporate profits. The double taxation occurs because corporate profits are taxed at the corporate level and then again when profits are distributed to shareholders in the form of dividends. In Australia, dividend imputation allows individual shareholders to avoid this form of double taxation. To illustrate, individuals who are in the 47 percent tax bracket would receive a 39 percent tax credit on each dollar of dividends received. The net result is an 8 percent tax payment on dividends received by individuals.

In Canada, corporations are taxed at a 38 percent rate. However, if the corporation has less than \$170,000 in taxable income it qualifies as a small business. Small business corporations in Canada receive a federal tax abatement of 10 percent and a small business deduction of 16 percent. The net result to these corporations is an effective tax rate of 12 percent.

The United States tax law also provides for two different types of corporations, referred to as "S" and "C" corporations. The S corporation is essentially treated like a partnership for tax purposes, so it will not be considered in this study. The C corporations are further subdivided into regular, personal holding companies or personal services corporation. Farming operations typically qualify as regular C corporations. The progressive tax rates for regular C corporations range from 15-34 percent.

A summary of state/provincial income taxes is also outlined in Table 1. Argentina, Australia and France have no state income taxes. Oregon has no sales tax, so it must depend on income and property taxes to fund government services. Oregon's income tax is the major state government revenue source and basically consists of a flat tax rate of 9 percent of federal taxable income.

Canadian provincial taxes are generally collected by the federal government and are based on some percentage of federal taxes payable. The marginal rates, however, are generally a larger percentage of the federal rates than in the United States. In Alberta, for example, the base provincial income tax is 46.5 percent of the federal income tax.

### Deductions and Exemptions

All countries permit deductions from taxes or taxable income based on certain expenses. Several countries also allow for tax exemptions on a part of taxable income based on family size. Argentina, for example, permits limited deductions for social security funds, medical plan premiums, life insurance premiums, private retirement insurance premiums, and donations. The head of the household receives a basic exemption of \$4,200, the spouse \$2,100, and each dependent \$1,050. Australia allows deductions for charitable contributions

to nonreligious organizations, contributions to a superannuation (retirement) fund, a spouse earning little or no income, investment in the Australian film industry, or medical expenses over \$790. No exemptions are available in Australia.

Self-employed Canadian taxpayers are allowed to deduct 17 percent of contributions to pension plans, professional dues, child care expenses, and 50 percent of taxes paid to the Canadian Pension Plan as tax credits. A portion of medical expenses can be treated as a tax credit if these expenses exceed 3 percent of net income. In addition, taxpayers are also allowed to deduct 17 percent of tuition and the first \$213 of charitable contributions directly from their federal tax payable. Charitable expenses above \$213 are deducted from taxes at 29 percent of their value up to 20 percent of net income. Tax exemptions for children in Canada vary by family size, with more generous benefits given to larger families. General sales tax (GST) rebates are provided for lower income families.

France allows deductions from taxable income for the cost of caring for relatives over 75 years of age, food costs for children not at home, and investment in the French film industry. Tax credits are also provided for a host of items, including food and lodging costs for disabled persons, contributions to charitable organizations or political campaigns, life insurance, weatherization expenses, and accounting fees. Taxpayers also may reduce taxable income by 20 percent when using an accounting firm to calculate income. No exemptions are directly given, but the appropriate tax bracket is a function of household size. Tax liabilities are substantially reduced as family size increases. For example, a single person with a taxable income of \$50,000 would pay \$18,924 in taxes whereas a couple with two children and the same income would pay only \$9,994.

In the United States, taxpayers can choose a standard deduction of \$5,700 (for married couples filing a joint return) or they can itemize personal deductible expenses. These personal expenses include state income and property taxes, interest on homes, excessive medical expenses, and charitable contributions.<sup>6</sup> Farmers can also deduct 50 percent of their self-employment taxes from gross taxable income. Personal exemptions amount to \$2,150 for each household member.

### Treatment of Business Expenses and Income

The method for calculating taxable income from a farm is similar in each country. Farm income is calculated (using cash or accrual accounting) as income less cash expenses and depreciation. All five countries also permit losses from previous years to be carried over and deducted from the current year's income. Major differences exist among the countries in the calculation of annual depreciation and provisions for placing some income in tax-exempt savings programs.

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<sup>6</sup>Farmers typically are able to deduct home interest and property taxes as part of farm business expenses.

Depreciation in Argentina is calculated using straight-line methods, with the depreciable life based on the expected life of buildings and equipment. The depreciable life ranges from 8-20 years for equipment and from 30-50 years for buildings. Currently, Argentina does not have a capital gains tax for noncorporate businesses, but does subject the sale of real estate to a 1.5 percent tax. Corporate capital gains are taxed as regular income.

Australia allows farmers to choose between straight-line and diminishing balance depreciation schedules. Assets are assigned a straight-line, or prime cost, depreciation rate based on their use classification. If a diminishing value pattern is chosen, the rate is 50 percent higher than the straight-line rate. In addition, 20 percent loading rates apply to assets purchased after May 25, 1988. Loading increases the depreciation rates for both prime cost and diminishing value depreciation. For example, a 25 percent prime cost depreciation rate would increase to 30 percent under a 20 percent loading scheme, with the diminishing value rate increasing to 45 percent. Most self-propelled farm equipment purchased in 1991 would be depreciated (with loading and a diminishing value pattern) at a 27 percent rate, with other farm equipment depreciated at 18 percent. Farm buildings are depreciated at 5.4 percent annually.

The purchase price for a capital gain item in Australia is indexed upward to the same dollar value when the item is sold. Consequently, individuals pay tax only on the real capital gain. Any real capital gains are taxed at the same rate as regular income.

The Income Equalisation Deposit program in Australia allows a farmer to deposit some income<sup>7</sup> in a government-sponsored account, thereby deferring the recognition of the income. The farmer can withdraw the money at any time with no penalty, but must report the withdrawn money as income. Total deposits in this program cannot exceed \$197,500 per person. This program was created in response to the high level of income variability faced by most Australian farmers. In addition, farmers are allowed to use income averaging for tax purposes. A better description of the Australian approach is tax rate averaging. If averaging is selected, the farmer calculates the average tax rate for farm income earned in the current and previous four years. These rates are then averaged and multiplied by the current year's taxable income to obtain taxes payable.

Canada levies tax on capital gains at three-fourths of the regular income rate. Canada also allows only one-half the annual depreciation allowance in the year of acquisition. In Canada, deduction of an allowance for the capital cost of depreciable property (capital cost allowance or CCA) is permitted in lieu of depreciation. Depreciable properties are pooled together in classes on the basis of their similarity in use. Annual capital costs allowances are deducted from the year-end balance of each class at rates that are class specific. In most cases, depreciation rates are applied on a diminishing-balance basis. Taxpayers may also claim less than the maximum CCA and even vary the depreciation rate from year to year. There is neither a stipulated minimum nor a requirement that the deduction be related to amounts

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<sup>7</sup>The minimum deposit is \$3,950 in any year.

claimed for financial reporting purposes. The basic depreciation rate is 30 percent of current depreciable basis for motorized farm equipment, 20 percent for non-motorized equipment, and 10 percent for buildings.

Canada created the Registered Retirement Savings Plan (RRSP) to function much like tax-exempt retirement accounts in other countries. Because there is no tax penalty on withdrawal,<sup>8</sup> Canadian farmers can use the RRSP much like the Australian income stabilization program.<sup>9</sup> Deposits are limited to 18 percent of taxable income, or \$9,350.

The French government separates capital gains into short-term (i.e., less than 2 years) and long-term categories. Short-term capital gains are taxed as ordinary income. Long-term gains are taxed at a 16 percent rate. Depreciation is calculated using the double-declining balance method, converting to straight-line once the latter produces a greater amount of depreciation. Asset lives vary from 5-10 years for equipment, with a 20-year life established for buildings. First year expensing is also allowed, with a maximum of \$1,840 per asset or \$3,680 per year.

The United States taxes capital gains at a maximum rate of 28 percent. Depreciable assets in the United States are pooled by economic life, with most farm machinery being in the 7-year and general purpose farm structures in the 20-year class life. Once a method of depreciation (accelerated versus straight-line) is selected, a change in method is allowable only with approval from the Internal Revenue Service. The United States also allows for some of the equipment price to be expensed in the year of purchase. Total expensing for all qualifying assets cannot exceed \$10,000 in a given tax year.

The United States also has a number of retirement programs that can be used by self-employed persons. Perhaps the program most commonly used by farmers is the KEOGH account. Under this program, farmers can contribute up to 15 percent of their taxable income (maximum of \$30,000) to their KEOGH account. These funds are not taxable until the farmer makes a withdrawal. KEOGH accounts can, in theory, be used like the Income Equalisation Deposit program to stabilize income. In reality, however, they seldom fill this type of role because the government assesses a 10 percent tax penalty on premature (prior to retirement age) withdrawals. When combined with normal taxes assessed on the amount withdrawn, the cost of withdrawal before retirement is generally too high for farmers to consider.

### **Social Program Taxes**

Social program taxes vary a great deal from country to country. Argentina has programs for retirement, health insurance, and family allowance payments. The retirement program requires a contribution of 18 percent from the employer and 16 percent from the employee,

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<sup>8</sup>Withdrawals are subject to a 15 percent withholding tax.

<sup>9</sup>In fact, most farmers do use the RRSP as a retirement tool and do not withdraw funds in low income years.

but does not cover self-employed individuals, such as farmers. The health insurance program requires a 7.5 percent contribution from employers and 3 percent from employees, but again does not encompass farm operators. Self-employed persons also cannot participate in the family support program. In short, although Argentina has substantial social programs in place, farm operators neither participate in paying for these programs nor receive any benefits.

The lone social program tax in Australia is for Medicare and represents 1.25 percent of income, providing the individual has an income above \$8,161. The Canadian Pension Plan is a mandatory retirement program for all Canadian citizens unless they are self-employed. To participate self-employed individuals must contribute 4.6 percent on the first \$25,925 of income.

France has an extensive set of social programs, with taxes earmarked to cover the program costs.<sup>10</sup> Taxation rates are keyed to two income levels: the minimum level and the platform level. If income falls below the minimum level (\$4,710/year) then social program taxes are calculated using this minimum level. If, however, income rises above the platform level (\$25,039/year), additional income is taxed at a lower rate. *Assurance Maladie, Maternité, Invalidité des Non-Salariés Agricoles* (AMEXA) covers health, maternity, and disability costs, with a 17.46 percent rate regardless of income. *Assurance Vieillesse Agricoles* (AVA) is for retirement and accident insurance, with an 11.71 percent rate levied below the platform and 1.44 percent thereafter. Other programs (denoted as PFA, AVI, and CSG) account for an additional 9.5 percent of income below the platform and 6.5 percent thereafter. In addition, the government levies social security (retirement) taxes on grain production of \$1.90/metric ton.

In the United States, a 12.4 percent tax on the first \$53,400 of earned (salaried or self-employed) income is levied to pay for government sponsored retirement programs. Salaried and hourly workers pay tax at 50 percent of these rates, with the other 50 percent paid by employers. Self-employed workers pay the full 12.4 percent. To cover the cost of Medicare, the United States levies a 2.9 percent tax on self-employed individuals and a 1.45 percent tax on the employer and employee, on the first \$125,000 of earned income. Self-employed individuals are allowed a deduction of 50 percent of these taxes paid.

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<sup>10</sup>The current method for calculating social program taxes for farmers in France is based on the cadastral system and is extremely complicated. Recent changes in law will phase in a social tax system similar to that for other French citizens. The values used in this study reflect the planned changes and are anticipated to result in a somewhat higher taxation level for farmers.

Table 2. Sales, Excise, and Value-Added Taxes on Consumer Goods for the Major Wheat-Exporting Countries in 1991.<sup>a</sup>

Consumption Item	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
<b>Food:</b>					
At Home	13.5 <sup>b</sup>	3. <sup>c</sup>	0.7 <sup>d</sup>	5.5	0.
Away from Home	18.	3. <sup>c</sup>	7.	5.5	0.
Utilities	22.	0.	7.	18.6	0.
Furniture	18.	10.	7.	18.6	0.
Clothing	18.	0.	7.	18.6	0.
<b>Transportation:</b>					
Gasoline and Oil	\$0.45/l	\$0.26/l	\$0.149/l plus 7%	\$0.505/l plus 18.6%	\$0.084/l
Vehicle Purchase	18.	15.	7.	25.	0.
Insurance and Other	7.2 <sup>e</sup>	6. <sup>c</sup>	4.2 <sup>e</sup>	5.58 <sup>e</sup>	0.
Health Insurance	0.	0.	0.	0.	0.
Health Items	1.8 <sup>d</sup>	0.	0.7 <sup>d</sup>	1.86 <sup>d</sup>	0.
Personal Care	18.	30.	7.	18.6	0.
Recreation	13.5	22.5 <sup>b</sup>	7.	20.5	0.
Charity	0.	0.	0.	0.	0.
Tobacco (cigarettes)	70% of retail price	75% of retail price	\$3.58/pack plus 7%	\$0.03/pack plus 52% of retail price	\$0.524/pack
Alcohol (beer)	\$0.56/l	\$0.22/l plus 20%	\$0.14/l plus 7%	\$0.039/l plus 18.6%	\$0.098/l
Other	7.2	11.25 <sup>b</sup>	5.25 <sup>b</sup>	13.95 <sup>b</sup>	0.

<sup>a</sup>Unless otherwise noted, values are reported as a percent of expenditures.

<sup>b</sup>Assumed 25% of purchases are tax-exempt.

<sup>c</sup>Assumed 70% of purchases are tax-exempt.

<sup>d</sup>Assumed 90% of purchases are tax-exempt.

<sup>e</sup>Assumed 90% of purchases are tax-exempt.



## Sales and Value-Added Taxes

An important source of government revenue in all five countries is taxation of goods and services. Sales and excise taxes in all five countries are either waived or rebated on all farm inputs. Consequently, taxes on farm inputs were ignored in the analysis. A summary of 1991 sales, excise and value-added taxes for the five countries analyzed here is given in Table 2. Argentina has an 18 percent value-add tax (VAT) that covers a broad range of consumer goods and services. Exempt items include milk, bread, medicines, insurance, reading material, education, health care, admissions to sporting and artistic events, and interest. Telephone services are taxed at a reduced rate of 11 percent and other utilities are taxed at 25 percent. Gasoline has an excise tax of \$0.45/liter and cigarettes are taxed at 70 percent of their retail sales price.

Australia has a multi-level sales tax, with rates of 10 percent, 20 percent and 30 percent. Luxury goods are taxed at the 30 percent rate, including items such as radios, televisions, cameras, cosmetics, watches, high-priced autos, and jewelry. Items taxed at the 20 percent rate include most autos, computers, soft drinks, toys, stationary, and musical instruments. The 10 percent rate applies to furniture, appliances, snack foods, ice-cream, fruit juices, and household products. Exempt items include clothing, utilities, gasoline, most food items (including those eaten at a restaurant), reading material, medicines, and most services (CCH Australia Limited). Excise taxes on gasoline total \$0.26/liter (\$0.207 federal and \$0.053 in New South Wales). New South Wales levies an excise tax equivalent to 75 percent of the wholesale price for tobacco products. Taxes on beer amount to \$0.22/liter plus 10 percent of wholesale price, plus an additional 20 percent for sales tax.

Canada has a 7 percent Goods and Services Tax (GST) that was enacted in January 1991. All provinces except Alberta also impose provincial sales taxes. The GST applies to a wide variety of goods and services including drinks, snack foods, electricity, furniture, appliances, clothing, automobiles, electronic equipment, gasoline, tobacco, and alcohol. Excise taxes on gasoline amount to \$0.149/liter (\$0.077 provincial and \$0.072 federal). A \$0.14/liter (\$0.118 federal and \$0.022 provincial) excise tax is levied on beer and an exceptionally high \$3.58/pack (\$2.23/pack provincial and \$1.35 federal) excise tax is placed on cigarettes. Vehicle registration fees are \$42.50/year.

The highest consumption taxes are in France, with an average VAT rate of 18.6 percent on most consumer goods and services. The VAT on most food products and books is 5.5 percent, with a 25 percent rate levied on cars, and a 33 percent rate on "luxury" items such as tape recorders and cameras. Tax-exempt items include insurance, education, medicine, and banking costs. The excise tax on gasoline is \$0.505/liter. Tobacco has a \$0.03/pack excise tax plus an ad valorem duty equivalent to 52 percent of the retail price. The beer excise tax is \$0.039/liter.

Neither the United States nor Oregon have a sales tax, but excise taxes exist on gasoline, alcohol, and tobacco. Unleaded gasoline has an excise tax of \$0.084/liter (\$0.058 state plus

\$0.026 federal), beer an excise tax of \$0.098/liter (\$0.022 state plus \$0.076 federal), and cigarettes a tax of \$0.524/pack (\$0.28/pack state plus \$0.244/pack federal). Oregon vehicle registration costs are \$25/year.

### **Property Taxes**

Argentina has long relied on property taxes to generate significant government revenue because agriculture has been viewed as a major holder of the country's wealth. Further, property taxes are often easier to determine than income taxes because the owners are easily identified. For these reasons property taxes in Argentina are much higher than in other countries.

The most important Argentine property tax is the *impuesto inmobiliario*, which is levied by the provinces on land. The tax rate is progressive and is based on total land value. In Buenos Aires province the rates begin at 1.38 percent of value and increase to 3.95 percent of value for acreages worth over \$549,277.

Property taxes in the other four countries are levied by local governments. In Australia property taxes are a minor source of government revenue, with corresponding low rates. Farm land in both Alberta, Canada, and Oregon, United States is valued for tax purposes based on productive use rather than market value. Productive use is less than half that of market value, resulting in a substantial break on property taxes. Oregon also levies a significant tax on the farm home and outbuildings. On the other hand, Alberta farmers generally do not pay tax on homes, farm buildings, or machinery (McKeltine). French property taxes are levied based on market value. Although the tax rate on land for French farmers is similar to that in Alberta and Oregon, the use of a fair market value base greatly increases the amount of taxes owed.

### **Social Program Benefits**

All five countries provide special aid to lower income families with children. As was already noted, Argentine farm families do not participate in this program, either as a taxpayer or recipient. Family allowance payments are made monthly to Australian families based on their income level, number of children, and ages of the children. Regular allowance payments are \$34/month/child for up to three children, and then \$45.70/month for each additional child. This program is phased out if the previous year's taxable income for the family exceeds \$50,000 and the family has one-child. Somewhat higher income levels apply for larger families. Only children under 18 qualify for this benefit. Australia also provides a supplement to the family allowance payment if income for a one child family is \$16,400 or less. The supplement provides \$90/month/child for children less than 13 years of age and \$132/month for children aged 13-15. All Australian family allowance payments are tax-free.

Canada's family allowance payments are also limited to children under 18 years of age. The payments range from \$40.63/month/child for 16-17 year-old children to \$22.35/month/child

for children under 7 years. Canadians are required to repay two-thirds of their allowance if taxable income exceeds \$43,223. These payments are subject to tax.

The French government provides an extensive set of social programs for its citizens. All family allowance payments revolve around a *base de calcul* (or calculation base) of \$350.56/month. Families receive 32 percent of the base (\$112) per month for their first child and 41 percent of the base (\$144) for each additional child. Parents also receive 45.95 percent of the base (\$161) from 5 months before to three months after the birth of a child. If the spouse works, the government provides \$368/month to offset the cost of a nanny. This payment is cut in half if the family receives an education allocation.

Families with three or more children receive a number of additional benefits. If three or more children are over 3 years of age, an additional payment of 41.65 percent of the base (\$146) per child is also received. If the spouse is not currently working, but worked 2 years in the last 10, the family normally receives an education allocation of 50 percent of the base (\$171) per child, with special circumstances warranting a payment of 142.57 percent of the base (\$500) per child. At the beginning of each school year, the family receives 20 percent of the base (\$71) payment for each child to cover the cost of school supplies.

Housing rent is another major subsidy provided by the French government. A formula is used to determine the level of subsidy. The formula is based on the number of family members, monthly rent, family income, and a minimum rent set by the government. Most families qualify for some level of rent subsidy.

The United States provides an Earned Income Credit (EIC) program for low income families with children. The EIC is a refundable tax credit which either reduces the federal income tax liability or may result in a direct payment if the tax liability is small. The credit is at its maximum (\$999) when adjusted gross income is \$7,100-\$11,263. The credit is phased out for income above \$21,232 or below \$7,100. The EIC increases by up to \$43 if the family has two or more children, and up to \$357 if the family purchases health insurance for their children. The credit cannot be claimed if a couple files their income taxes separately.

### **Methodology, Data and Assumptions**

A farm-level simulation model developed at Oregon State University was used to estimate the effects of agricultural policy, costs of production, and tax policy on farm profitability. The model attempts to replicate the financial behavior of a farm over time, calculating monthly cash flow statements, income statements, and balance sheets for each year simulated. Crop yields and prices of inputs and outputs can be randomized in a Monte-Carlo framework based on distributions provided by the user. A key part of the model output is the income statement, an example of which is given in Figure 1. The income statement uses cash variable costs from the cash flow statement in combination with changes in asset values

Figure 1. Example Income Statement from Farm Management Simulation Model (FAMS).

1991	
<b>CASH FARM INCOME</b>	
Crop Receipts	\$119,392.
Direct Government Payments	0.
Crop Insurance Indemnities	24,508.
Direct Government Loans	0.
Less: Repayment of Government Loans	0.
Other Farm Income	0.
Savings Interest	136.
<b>TOTAL CASH RECEIPTS</b>	<b>144,035.</b>
<b>CASH FARM EXPENSES</b>	
Per Unit	0.
Materials	4,080.
Chemicals	44,800.
Fuel	6,013.
Labor	0.
Insurance Premiums	16,987.
Equipment Repair	10,949.
Equipment Lease	0.
Cash Rent	0.
Interest:	
Operating Loan	3,144.
Equipment and Livestock	0.
Land and Buildings	2,250.
Other	0.
Property Taxes	3,947.
Misc. Crop Expenses	1,575.
<b>TOTAL CASH EXPENSES</b>	<b>93,745.</b>
<b>NET CASH FARM INCOME</b>	<b>50,290.</b>
+ Ending crop inventories	0.
+ Change in value of crops in ground	0.
- Economic depreciation	
Equipment	18,438.
Long term assets	356.
<b>NET FARM INCOME</b>	<b>31,497.</b>
- All federal taxes	4,556.
- All government pension	1,182.
- State corporate income tax	2,094.
<b>NET INCOME AFTER TAXES (NIAT)</b>	<b>23,665.</b>
+ Land capital gains	0.
<b>NIAT AND CAPITAL GAINS</b>	<b>23,665.</b>
- Net family withdrawals	24,612.
+ Change in nonfarm net worth	0.
<b>CHANGE IN TOTAL NET WORTH</b>	<b>-947.</b>

provided on the balance sheet to calculate the change in farm net worth.<sup>11</sup> An abbreviated (and slightly modified) form of the income statement is used in presenting the simulation results.

The advantage of a simulation approach is the ability to analyze extremely complex situations and identify those factors that are important to the decisionmaker. In each of these countries, tax policy is highly complex and often contradictory. The simulation methodology enables the user to more accurately determine those individual variables that influence the financial well-being of farmers in each country. Nonetheless, it is still difficult to assess which country's policies favor farm operators as compared to other countries. The disadvantage of a simulation approach is the difficulty in providing decisionmaking ability as part of the modelling process. For example, if barley price is expected to be low over the next few years, the farmer may opt to plant fewer acres of barley. To model this behavior in a simulation framework would require a set of rules that determine when to shift away from barley acreage, how much to move into other crops, and identification of substitute crops. Because many thousands of similar decisions are made by farm operators, the use of decision making rules in this simulation model is generally avoided. Instead, the model reflects the most likely set of decisions the farmer would make in the next year, recognizing that much less decision-making flexibility exists in the first year. It is important, however, that the reader understand the major behavioral assumptions utilized for each farm in each country.

Assumptions specific to a set of analyses are discussed in the analysis section of the report. The simulation analysis was for the 1991 tax year. Farmers in Canada, France, and the United States participated in government programs, including, in Canada and the United States, the purchase of crop insurance. U.S. target prices and loan rates were consistent with values defined in the 1991 Farm Bill. Set-aside rates were 7.5 percent for barley and 15 percent for wheat. The 1991 target prices for Canada's GRIP program were based on actual values for Warner County, Alberta.

### **Consumption Expenditures**

The farmer was assumed to be married, with two children ages 16 and 8. Living expenses were treated as normal, long-run expenditures that do not respond to year-to-year fluctuations in income. A breakdown of living expenses is given in Table 3 for the farms in each country.<sup>12</sup> For consumption in Australia, Canada, and the United States, regression equations were estimated linking expenditures in each consumer category to total income. Consumption was then estimated based on the income level appropriate to the farm being analyzed. The U.S. equations were estimated based on 1990 data from the Consumer

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<sup>11</sup>To simplify the analysis and presentation of results, it was assumed that no changes occurred in land values or value of crops in the ground for the year of analysis.

<sup>12</sup>Subsequent analyses of Alberta wheat farms smaller and larger than that used in the base analysis showed consumption levels consistent with income generated by those farms.

Table 3. Annual Living Expenses (in Dollars) for Farm Scenarios Analyzed in Study (Excluding Taxes) in 1991

Consumption Item	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	Oregon United States
Farm Size (hectares)	450.	700.	1,700.	1,100.
Food:				
At Home	\$4,900.	\$5,930.	\$5,080.	\$3,420.
Away from Home	630.	2,820.	3,190.	2,120.
Utilities	410.	940.	1,760.	2,180.
Furniture	850.	2,490.	2,490.	1,180.
Clothing	1,250.	3,170.	4,540.	2,010.
Transportation:				
Gasoline and Oil <sup>a</sup>	240.	960.	1,154.	1,203.
Vehicle Purchase	2,200.	3,440.	4,380.	3,115.
Insurance and Other	650.	2,864.	3,650.	2,810.
Health Insurance	2,400.	580.	760.	3,000.
Health Items	190.	500.	550.	800.
Personal Care	200.	670.	750.	500.
Recreation	900.	4,300.	5,230.	2,190.
Charity	280.	250.	470.	1,210.
Tobacco (cigarettes) <sup>b</sup>	90.	58.	230.	164.
Alcohol (beer) <sup>c</sup>	300.	1,173.	1,085.	298.
Other	2,600.	3,030.	10,320.	3,180.
Total	18,090.	33,375.	45,639.	29,380.

<sup>a</sup>Fuel use (liters) is: Argentina, 1,029; Australia, 3,268; Canada, 4,933; U.S., 4,905.

<sup>b</sup>Tobacco use (packs) is: Argentina, 96; Australia, 45; Canada, 140; U.S., 240.

<sup>c</sup>Alcohol use (liters) is: Argentina, 134; Australia, 895; Canada, 309; U.S., 281.

Expenditure Survey (Bureau of Labor Statistics). Canadian consumption data disaggregated by income were obtained from a household survey of expenditures for 1990 (Statistics Canada). The Australian consumption data were obtained from a 1988-89 survey of expenditures for New South Wales, Australia. Consumption data for Argentina were poor relative to that available in Australia, Canada, and the United States. The consumption pattern was estimated based on a basket of goods used in calculating the Argentine consumer price index, adjusted using other data and opinions of agricultural economists. No consumption pattern was estimated for France because the study did not include a French farm. In doing an analysis for a particular country, it was assumed that the basket of goods purchased by the representative farm family did not change as consumption taxes changed. To illustrate, a family of four operating a 1,700 hectare farm in Oregon was estimated to require about \$30,000 per year for living expenses. After an investigation of current taxation policies in Oregon, it was estimated that about \$29,400 of this amount was for goods and services and \$600 was for taxes. When considering how this farm would fare under the Canadian tax system, the base quantity of goods and services purchased was left unchanged and taxes were calculated for that amount. By holding the basket of goods constant, the family utility is left unchanged. In reality, the family would substitute goods and services based on their after-tax cost. The result would be lower sales taxes and higher utility. The study, therefore, overestimates what total sales, excise, and value-added taxes would be if a change in the taxing scheme were to occur.

### **Farm Cost Data**

Equipment complements for each farm were identified based on actual farming operations in the study areas, supplemented by expert advice of extension agents and specialists. No equipment was replaced in any complement during the year analyzed. Functions provided in the *ASAE Yearbook* were used to calculate repair costs. Depreciation estimates reflected actual changes in market values during the year and were made using functions estimated by Cross.

Prices and yields were assumed the major sources of uncertainty and were treated as random variables. Both sets of random variables were assumed to exhibit multivariate normal distributions. Data for the yield distributions were based on actual farm level yield information, when available, or county data. A special effort was made to ensure the price data from each country reflected the time period 1981-90 and, when possible the same marketing year. Prices in each country were converted to their U.S. dollar equivalent using the exchange rate in effect each year.

Means and standard deviations for Canadian wheat prices were calculated using the Canadian Wheat Board (CWB) wheat prices for 1981-90 time period. Barley prices were calculated using prices registered in the Lethbridge, Alberta feed market. Because the CWB market year (August-July) does not coincide with that used in USDA calculations (June-May), monthly average prices for wheat and barley at Portland, Oregon were averaged for August through July. The Australian price was based on the Australian Wheat Board price for the 1981-90

period. The Argentine price was calculated for the August-July time period using Buenos Aires port prices. Canadian farmers were assumed to participate in the Canadian Pension Plan.<sup>13</sup> Participation in Canada's RRSP program and Australia's Income Stabilisation Program was based on a breakpoint income level. The assumption was that if taxable income was above this breakpoint income the farmer would put money in these funds, subject to the rules of each program; if below the breakpoint income, withdrawals would be made. The breakpoint income levels varied from scenario to scenario, but were set so that the expected ending fund balance was within \$100 of the beginning fund balance.

### **Results, Analysis and Implications**

The analysis centered on developing a representative wheat farm for a particular country and then estimating the effect of taxes and government social programs on this farm's income statement for each country analyzed. The cost structure, government farm programs, crop mix, and other factors were left unchanged in each scenario. As an example, the analysis of the Oregon farm was conducted as if the farm had been physically moved from Oregon to Argentina, Australia, Canada, and France, except that all U.S. government farm programs and subsidies were left in place. The results, therefore, highlight the tax and social program differences between the five countries. Taxes paid represent all forms of taxes incurred by the farm business and farm family.

#### **Base Results**

Results for the Oregon farm are presented in Table 4. Income taxes were highest in Australia, followed by Canada and the United States. Income taxes were lowest under the French tax system. Social program taxes in France, however, were over twice those of the next highest country (United States). Social program taxes in Argentina and Australia were minimal. Sales and excise taxes were also highest in France, closely followed by Argentina. The lack of a sales tax in Oregon accounted for the low sales and excise taxes in the United States. As expected, Argentina had the highest property tax burden. Nonetheless, the French had the highest overall tax burden (\$38,329). The four other countries had overall tax liabilities of about \$30,000. Figure 2 provides a graphical comparison of results for the Oregon farm, indicating the share of taxable income captured by different taxes in each country.

The Argentine and U.S. social program benefits, such as family allowance payments and reduced health insurance, were the smallest among the five countries, whereas the French social programs provided the greatest benefit. By netting the tax law and the social program benefits, the country with the most advantageous impact on farm net worth was determined.

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<sup>13</sup>Payments into the CPP are reported as a tax in the results to make comparisons consistent with other countries.



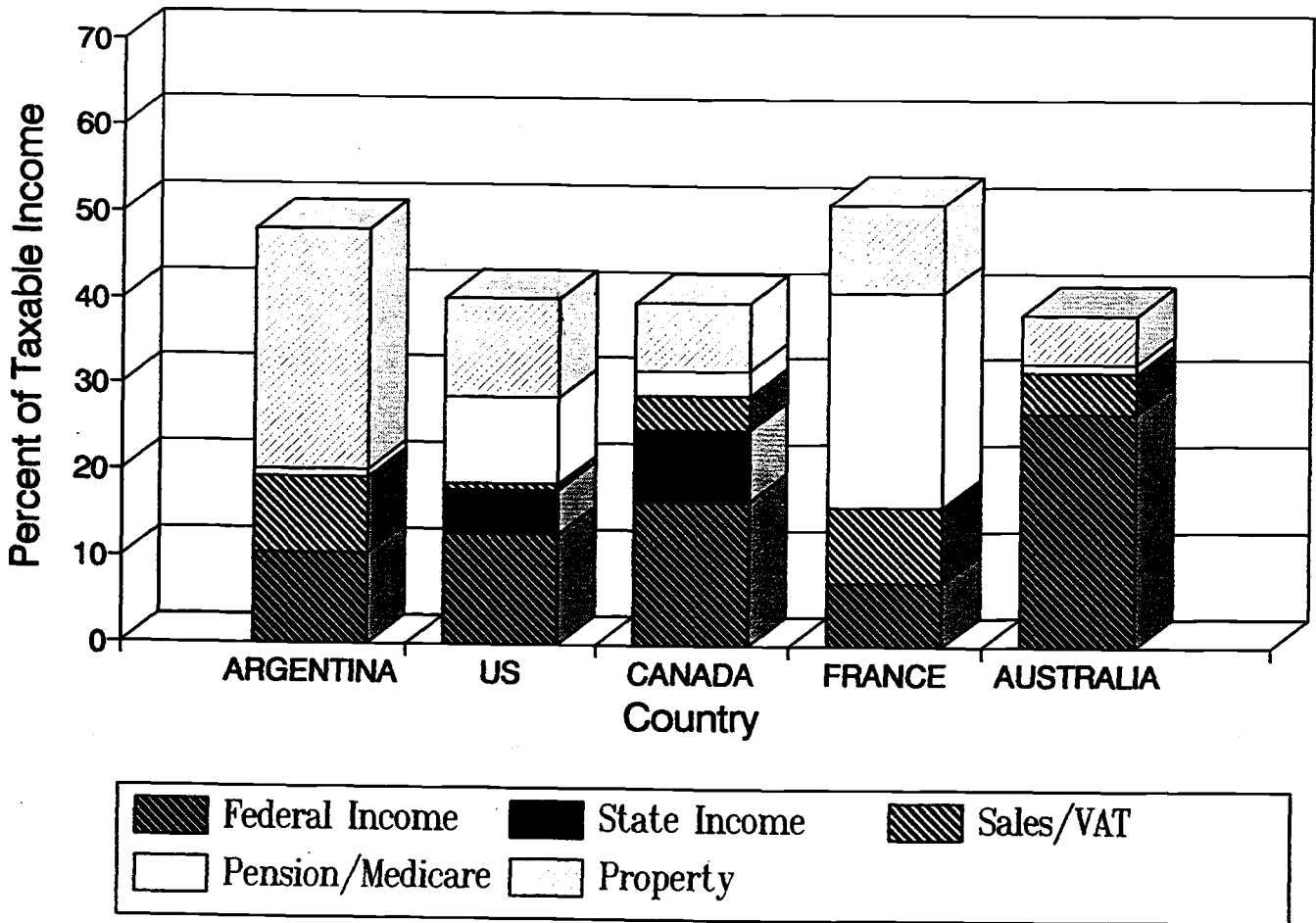
Table 4. Comparison of 1,100 Hectare Morrow County, Oregon, U.S. Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$193,121.	\$193,307.	\$193,201.	\$193,162.	\$193,237.
Cash Expenses	111,738.	110,043.	110,612.	111,631.	111,135.
Net Cash Income	81,383.	83,264.	82,589.	81,531.	82,102.
Noncash Costs	17,528.	17,528.	17,528.	17,528.	17,528.
Net Farm Income	63,855.	65,736.	65,061.	64,003.	64,574.
Less:					
Tax Payments	32,497.	30,328.	29,690.	38,329.	30,968.
Federal Income	7,175.	21,194.	12,337.	5,543.	9,738.
State Income	0.	0.	6,152.	0.	3,975.
Sales, Excise, VAT	5,926.	3,747.	3,074.	6,582.	580.
Pension/Medicare	672.	897.	2,206.	18,571.	7,804.
Property	18,724.	4,490.	5,921.	7,633.	8,871.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	26,380.	26,380.	26,380.	26,380.	26,380.
Add:					
Family Allowance	0.	0.	753.	3,071.	0.
Off-Farm Income	4,200.	4,200.	4,200.	4,200.	4,200.
Equals:					
Change in Net Worth	6,778.	12,648.	13,184.	6,565.	8,426.
Difference from U.S. Solution	-1,648.	4,222.	4,758.	-1,861.	---
Taxable Income <sup>1</sup>	66,991.	77,835.	73,999.	74,238 <sup>2</sup> .	76,694.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses, and miscellaneous deductions.

<sup>2</sup>Does not include an average exemption of \$18,500 for using an accountant to calculate returns.

Figure 2. Taxes by Country for 1, 100 Hectare Morrow County, Oregon Farm



For the Oregon farm, the combination of social programs and the tax law system in Canada provided the largest gain in net worth, \$13,184. Canada was followed in order by Australia, \$12,648, the United States, \$8,426, Argentina, \$6,778 and France, \$6,565.

Table 5 contains a summary of the tax comparisons for the New South Wales, Australia farm. Here, the somewhat different asset mix, consumption mix, and debt structure produced unequal taxable income levels. Nevertheless, the relative rankings remained roughly the same between countries. The exception was Australia and Canada, which reversed positions as the low tax country. The Australian system also realized the greatest increase in net worth position.

The results for the 1,700 hectare Alberta, Canada farm are found in Table 6. Again, taxable incomes were somewhat different because of changes in asset mix, consumer goods purchases, and debt load. Yet, the relative rankings between the countries were much the same. In this scenario, the U.S. had the lowest tax burden, followed by Canada and Australia. The change in net worth favored the Canadian system and was lowest for the Argentine system.

#### Estimation of Competitive Advantage

Using the theoretical approach described earlier in this report, we can make comparisons between these results to identify which country's taxation policy provides an overall competitive advantage. Although farms of similar size were not developed for Argentina and France, their position relative to the other countries can be estimated using comparisons between Australian, Canadian, and U.S. farms. The values in Table 7 were calculated using equation 3 (p. 5), where  $\bar{\pi}$  is net farm income for the country in which the farm is located and  $t[\bar{\pi}_0]$  is one minus the net average tax rate. The average tax rate is total tax payments plus health care costs, less family allowance payments, all of which is then divided by net farm income. The results underscore the competitive advantage enjoyed by Australian and Canadian farmers vis-à-vis their U.S. counterpart. For example, the tax advantage, as reflected in the change in equity, for the U.S. farm under Canadian tax system favors Canada by \$4,493.<sup>14</sup> The Canadian farm under the U.S. tax system favors Canada by \$2,675. We can conclude from this result that, even if either farm were allowed to adapt their production and management practices so as to best take advantage of the tax law in the other country, Canadian tax law would be preferred over U.S. tax law. A similar statement can be made regarding Australian tax law vis-à-vis the United States. Canadian tax law also enjoys a small advantage over Australia.

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<sup>14</sup>All results were calculated using equation 3. When making comparisons for general equilibrium purposes, however, one value must be calculated using equation 4, which merely means a sign change in the result. Hence for this example \$-4,493 from Table 7 was changed to a positive value.

Table 5. Comparison of 875 Hectare Moree, New South Wales, Australia Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$185,047.	\$184,702.	\$184,738.	\$185,103.	\$185,165.
Cash Expenses	96,326.	94,055.	93,665.	94,092.	93,577.
Net Cash Income	88,721.	90,647.	91,073.	91,011.	91,588.
Noncash Costs	23,756.	23,756.	23,756.	23,756.	23,756.
Net Farm Income	64,965.	66,891.	67,317.	67,255.	67,832.
Less:					
Tax Payments	38,997.	35,440.	36,602.	50,687.	36,151.
Federal Income	16,116.	27,426.	18,385.	15,768.	19,628.
State Income	0.	0.	9,477.	0.	5,362.
Sales, Excise, VAT	6,320.	4,057.	2,553.	6,558.	390.
Pension/Medicare	0.	1,007.	1,499.	23,326.	5,926.
Property	16,561.	2,950.	4,688.	5,035.	4,845.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	32,795.	32,795.	32,795.	32,795.	32,795.
Add:					
Family Allowance	0.	0.	596.	3,071.	0.
Off-Farm Income	0.	0.	0.	0.	0.
Equals:					
Change in Net Worth	-9,227.	-1,924.	-2,244.	-13,156.	-4,114.
Difference from Australian Solution	-7,303.	---	-320.	-11,232.	-2,190.
Taxable Income <sup>1</sup>	75,445.	76,709.	80,084.	86,472 <sup>2</sup> .	86,982.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses, and miscellaneous deductions.

<sup>2</sup>Does not include an average deduction of \$21,000 for using an accountant to calculate returns.

Table 6. Comparison of 1700 Hectare Warner, Alberta, Canada Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$217,924.	\$217,768.	\$217,778.	\$217,965.	\$217,980.
Cash Expenses	127,911.	125,917.	125,872.	127,696.	126,518.
Net Cash Income	90,013.	91,851.	91,906.	90,269.	91,462.
Noncash Costs	21,748.	21,748.	21,748.	21,748.	21,748.
Net Farm Income	68,265.	70,103.	70,158.	68,521.	69,714.
Less:					
Tax Payments	41,878.	36,009.	35,762.	45,037.	35,307.
Federal Income	18,267.	23,742.	13,309.	6,427.	10,331.
State Income	0.	0.	6,598.	0.	4,032.
Sales, Excise, VAT	5,631.	3,921.	2,481.	5,776.	339.
Pension/Medicare	0.	971.	2,238.	20,296.	7,805.
Property	17,980.	7,375.	11,163.	12,538.	12,800.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	29,294.	29,294.	29,294.	29,294.	29,294.
Add:					
Family Allowance	0.	0.	663.	3,071.	0.
Off-Farm Income	0.	0.	0.	0.	0.
Equals:					
Change in Net Worth	-5,307.	4,220.	5,005.	-2,739.	2,113.
Difference from Canadian Solution	-10,312.	-785.	---	-7,744.	-2,892.
Taxable Income <sup>1</sup>	68,653.	80,462.	79,124.	79,527 <sup>2</sup> .	82,042.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses and miscellaneous deductions.

<sup>2</sup>Does not include an average deduction of \$13,600 for using an accountant to calculate returns.

Table 7. Estimate of Change in Equity with Change in Tax Law in 1991

Farm Location	Argentina	Australia	Tax Law in: Canada	France	United States
Australia	\$8,881.	---	-758.	6,346.	1,932.
Canada	8,791.	1,908.	---	13,725.	2,675.
United States	1,322.	-3,606.	-4,493.	1,605.	---

The change in net worth values can be difficult to interpret because they are so dependent on the scale of the farms analyzed. Another approach is to find the change in per metric tonne cost for the U.S. farm that would generate a change in net worth reflecting the same differences as reported in Table 7. Using this approach, the Canadian system provides a \$4.94/tonne advantage. In other words, production costs for wheat and barley on the Oregon farm would have to fall by \$4.94/tonne to offset the advantage the Canadian farm has in taxation and social programs. The other per tonne values for the Oregon farm are: Argentina, -\$6.30; Australia, \$4.14; and France, -\$6.68.

### **Comparison by Farm Size**

The results presented in Tables 4-6 represent the impact of taxation and social programs policy on one particular farm size in Australia, Canada, and the United States. An equally important question relates to tax incidence. That is, how is the burden of taxes shared between farms with different income levels.

Insufficient resources were available to develop several representative farm situations for each country in the analysis. As an alternative, two additional hypothetical farm situations from Alberta, Canada, developed for a previous study (Perry et. al) were combined with the U.S. farm and Argentine farm to represent a wide spectrum of income levels. A weakness in this analysis is the inclusion of farms from three different countries, rather than having all farms come from one country. For example, it is expected that government policies, climate, soils, and so forth will cause farm asset mixes and production practices to differ substantially between countries. In fact, practices in the United States and Canada are sufficiently similar that this issue should not cause a large bias in results. Comparisons between the Argentine farm and those in Canada and the United States should be treated with more caution, however.

Table 8 summarizes results for a small (380 hectare) farm located in Alberta, Canada. Again, the Canadian and Australian systems were preferred. France's system offered the next best alternative for the small farm. In this scenario, the value of social programs relative to farm returns and living expenses was much larger than in previous analyses. By comparison, the lack of social programs in the U.S. caused a downward shift in its net worth rankings. The Argentine system continued to offer the worst combination of tax and social programs.

Results for a larger 850 hectare farm in Alberta, Canada are contained in Table 9. In this scenario, the Australian system has the highest change in net worth, followed by Canada, France, the United States, and Argentina. Table 10 provides a summary of the results for the Argentine farm. In comparison to the other farms, the Argentine farm reflects a low input cost production approach. The Argentine farm also has virtually no debt. The result is a highly profitable operation with a large taxable income. The results were quite different under this scenario, with the systems in the United States and France registering the largest change in net worth, followed by Argentina, Australia, and Canada. The progressive income tax schedules of Canada and Australia were largely responsible for their poor performance.

Table 8. Comparison of 380 Hectare Warner, Alberta, Canada Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$47,866.	\$47,832.	\$47,897.	\$47,888.	47,895.
Cash Expenses	22,944.	23,034.	22,692.	22,751.	22,699.
Net Cash Income	24,922.	24,798.	25,205.	25,137.	25,196.
Noncash Costs	7,050.	7,050.	7,050.	7,050.	7,050.
Net Farm Income	17,872.	17,748.	18,155.	18,087.	18,146.
Less:					
Tax Payments	12,776.	7,948.	8,019.	13,405.	9,274.
Federal Income	1,503.	4,010.	1,876.	996.	1,762.
State Income	0.	0.	1,289.	0.	1,184.
Sales, Excise, VAT	2,657.	1,807.	1,162.	2,526.	162.
Pension/Medicare	1,440.	331.	745.	6,823.	3,316.
Property	7,176.	1,800.	2,947.	3,060.	2,850.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	13,586.	13,586.	13,586.	13,586.	13,586.
Add:					
Family Allowance	0.	822.	828.	3,071.	0.
Off-Farm Income	9,000.	9,000.	9,000.	9,000.	9,000.
Equals:					
Change in Net Worth	-1,890.	5,456.	5,618.	3,167.	1,016.
Taxable Income <sup>1</sup>	27,979.	29,542.	30,285.	30,878 <sup>2</sup> .	30,462.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses and miscellaneous business deductions.

<sup>2</sup>Does not include an average deduction of \$5,100 for using an accountant to calculate returns.



Table 9. Comparison of 850 Hectare Warner, Alberta, Canada Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$108,725.	\$108,641.	\$108,786.	\$108,735.	\$108,790.
Cash Expenses	42,743.	43,653.	42,388.	42,632.	42,145.
Net Cash Income	66,002.	64,988.	66,398.	66,103.	66,645.
Noncash Costs	12,120.	12,120.	12,120.	12,120.	12,120.
Net Farm Income (NFI)	53,882.	52,868.	54,278.	53,983.	54,525.
Less:					
Tax Payments	25,914.	21,742.	23,537.	28,370.	23,450.
Federal Income	5,447.	14,267.	8,645.	3,737.	7,178.
State Income	0.	0.	4,376.	0.	3,269.
Sales, Excise, VAT	4,214.	2,917.	1,964.	4,190.	247.
Pension/Medicare	384.	700.	1,988.	13,885.	6,954.
Property	15,869.	3,858.	6,564.	6,558.	5,802.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	22,299.	22,299.	22,299.	22,299.	22,299.
Add:					
Family Allowance	0.	822.	828.	3,071.	0.
Off-Farm Income	2,400.	2,400.	2,400.	2,400.	2,400.
Equals:					
Change in Net Worth	5,669.	11,469.	10,910.	8,785.	8,176.
Taxable Income <sup>1</sup>	52,671.	59,791.	59,625.	58,043 <sup>2</sup> .	60,223.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses, and miscellaneous business deductions.

<sup>2</sup>Does not include an average deduction of \$11,500 for using an accountant to calculate returns.

Table 10. Comparison of 450 Hectare Pergamino, Buenos Aires, Argentina Farm Under Alternative Tax Policies and Social Programs in 1991.

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$273,053.	\$271,060.	\$271,223.	\$273,767.	\$273,314.
Cash Expenses	62,059.	62,067.	62,065.	62,060.	62,160.
Net Cash Income	210,994.	208,993.	209,158.	211,707.	211,154.
Noncash Costs	13,482.	14,352.	14,352.	14,352.	14,352.
Net Farm Income	196,641.	194,641.	194,806.	197,355.	196,802.
Less:					
Tax Payments	79,560.	82,130.	85,847.	84,012.	76,043.
Federal Income	34,234.	72,555.	49,203.	35,811.	45,209.
State Income	0.	0.	24,784.	0.	11,596.
Sales, Excise, VAT	3,096.	1,820.	1,158.	2,718.	150.
Pension/Medicare	0.	2,455.	2,486.	36,473.	10,128.
Property	42,230.	5,300.	8,216.	9,010.	8,960.
Health Insurance	2,400.	580.	760.	0.	3,000.
Other Living Expenses	15,690.	15,690.	15,690.	15,690.	15,690.
Add:					
Family Allowance	0.	0.	0.	3,071.	0.
Off-Farm Income	0.	0.	0.	0.	0.
Equals:					
Change in Net Worth	98,991.	96,241.	92,509.	100,724.	102,069.

<sup>1</sup>Taxable income is calculated as net cash farm income plus off-farm income, less tax depreciation, deductible living expenses, and miscellaneous deductions.

Figures 3-7 summarize tax incidence for the five countries analyzed. Tax policy in Canada and Australia distributes most of the tax burden on the higher income farmers, particularly when the social program benefits are netted out. For example, taxes, net of social program benefits in Australia and Canada, constitute only 16 percent of taxable income. On the other hand, the French tax provisions provide a higher, more even, tax burden across income levels. Substantial social programs also reduce the net tax burden for French farmers earning lower income. At the lowest income level, French taxes, net of social program benefits, represent 24 percent of taxable income. Similarly, Argentine tax burdens tend to be more or less constant across all income levels, but with no social programs to ease the burden for smaller farms. Finally, taxes, net of social programs, begin at a higher level, 30 percent, in the United States than in all countries but Argentina. The overall effective tax rate rises slowly with income, suggesting that U.S. tax incidence tends to fall more on the middle income level relative to other countries.

### **Corporate Organizational Form**

The final analysis in the study focused on the corporate organizational form. Corporations are treated as a separate entity for taxation purposes, making a comparison between corporations and other business forms potentially misleading. The Oregon, U.S. farm was restructured to reflect a regular corporation business organizational form, with the farmer and spouse as sole shareholders. To assure a fair comparison between corporate and noncorporate organizations, it was assumed that the farmer and spouse received a salary from the corporation equivalent to the withdrawals they were making from the farm under a sole proprietorship. In other words, the salary was equal to net family withdrawals for living expenses plus federal, state and local income taxes withheld by the corporation as part of their salary. Results for the corporate farm are summarized in Table 11. Incorporation was very costly under the Argentine tax system, largely because the corporation was now forced to participate in the government's social programs. The Australian farm realized a small (\$2,100) increase in net worth relative to the unincorporated farm, the result of lower federal income taxes and the ability to qualify for family allowance payments. The change in net worth increased substantially (\$5,800) for the Canadian farm, mostly the result of lower federal and state income taxes. The corporate organizational form made the farmer worse off under French tax law, with higher social program taxes contributing to most of the higher tax burden. The U.S. tax provisions had an effect on the farm similar to that under the Canadian taxation structure. Significant tax savings for income and social program taxes all contributed to a more favorable U.S. tax situation than was the case under a sole proprietorship. Overall, the Canadian farm was in the best net worth position under the corporate scenario, with Australia and the United States in the middle. France and Argentina were much farther back in the rankings than was the case under the sole proprietorship analysis.

Figure 3. 1991 Argentine Taxes as a Percent of Taxable Income

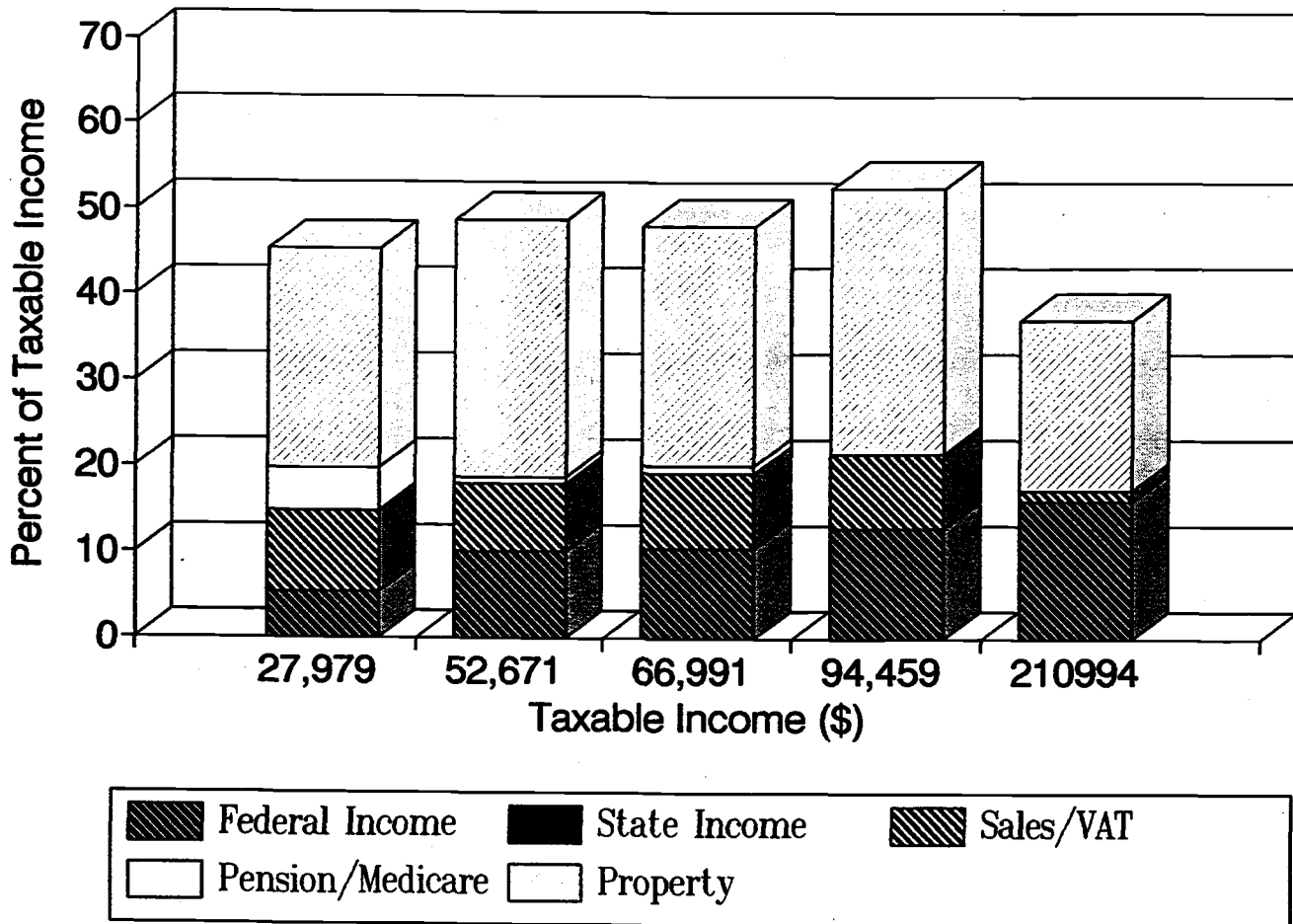


Figure 4. Australian Taxes as a Percent of Taxable Income

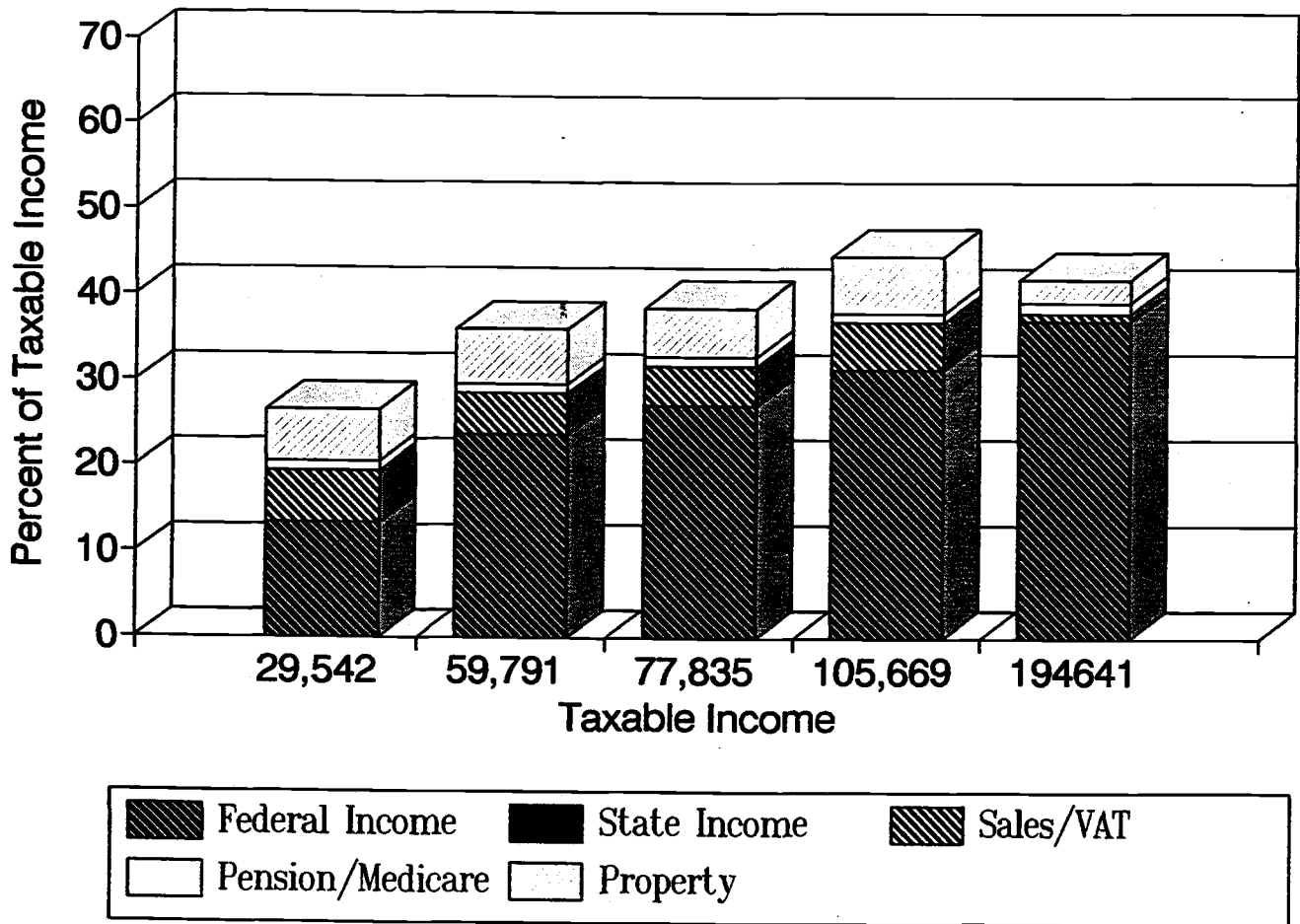


Figure 5. 1991 Canadian Taxes as a Percent of Taxable Income

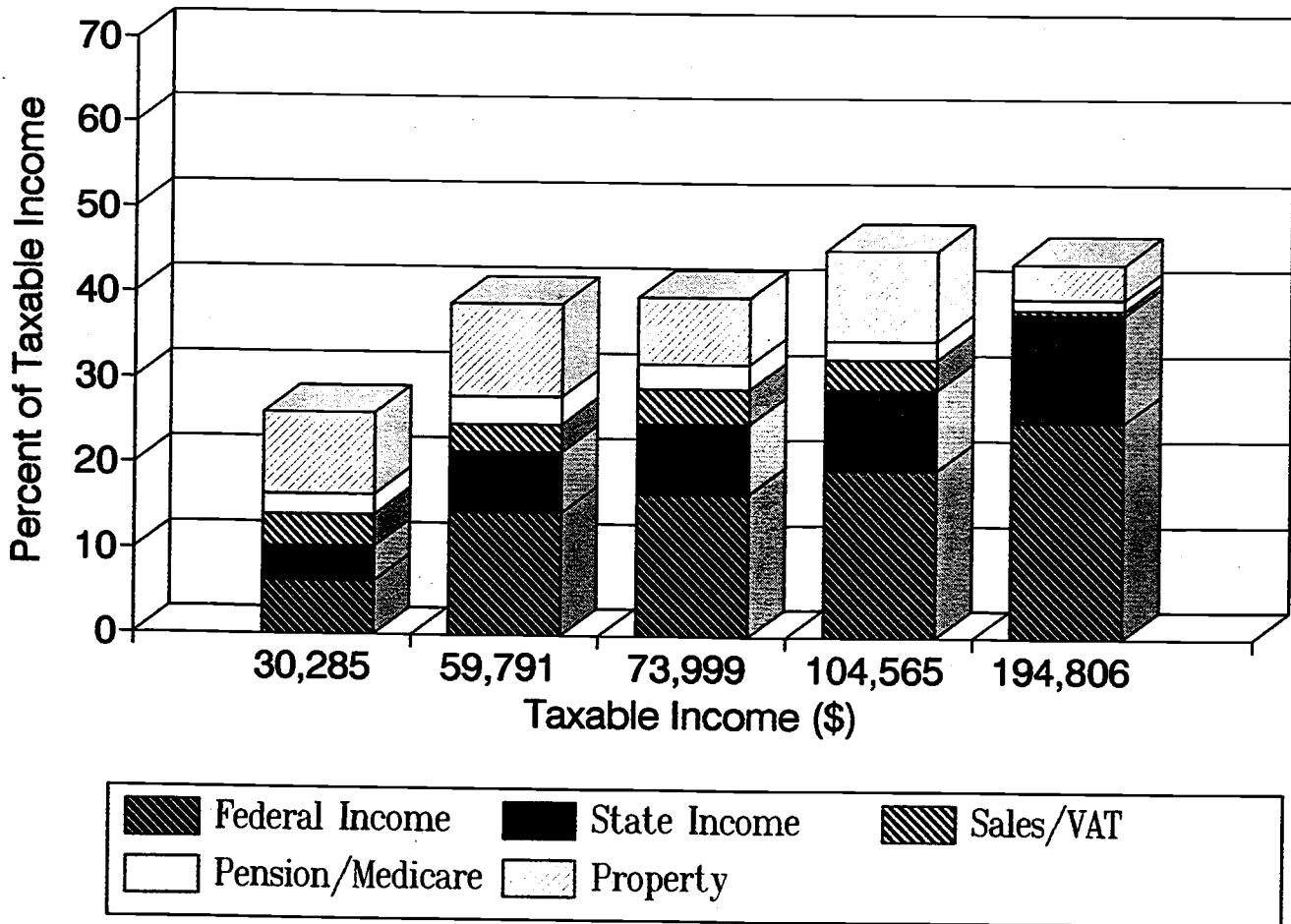


Figure 6. 1991 French Taxes as a Percent of Taxable Income

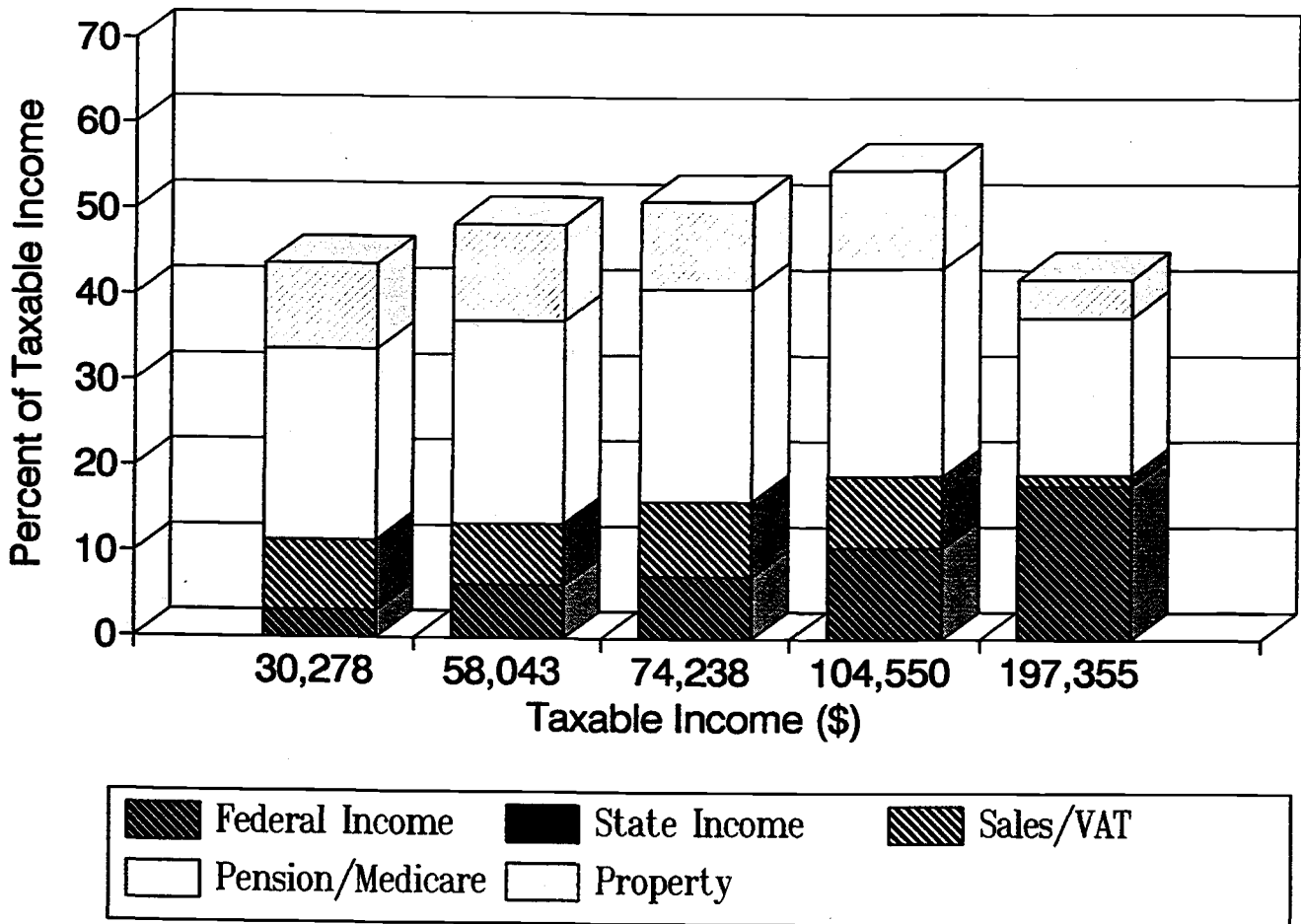


Figure 7. 1991 U.S. Taxes as a Percent of Taxable Income

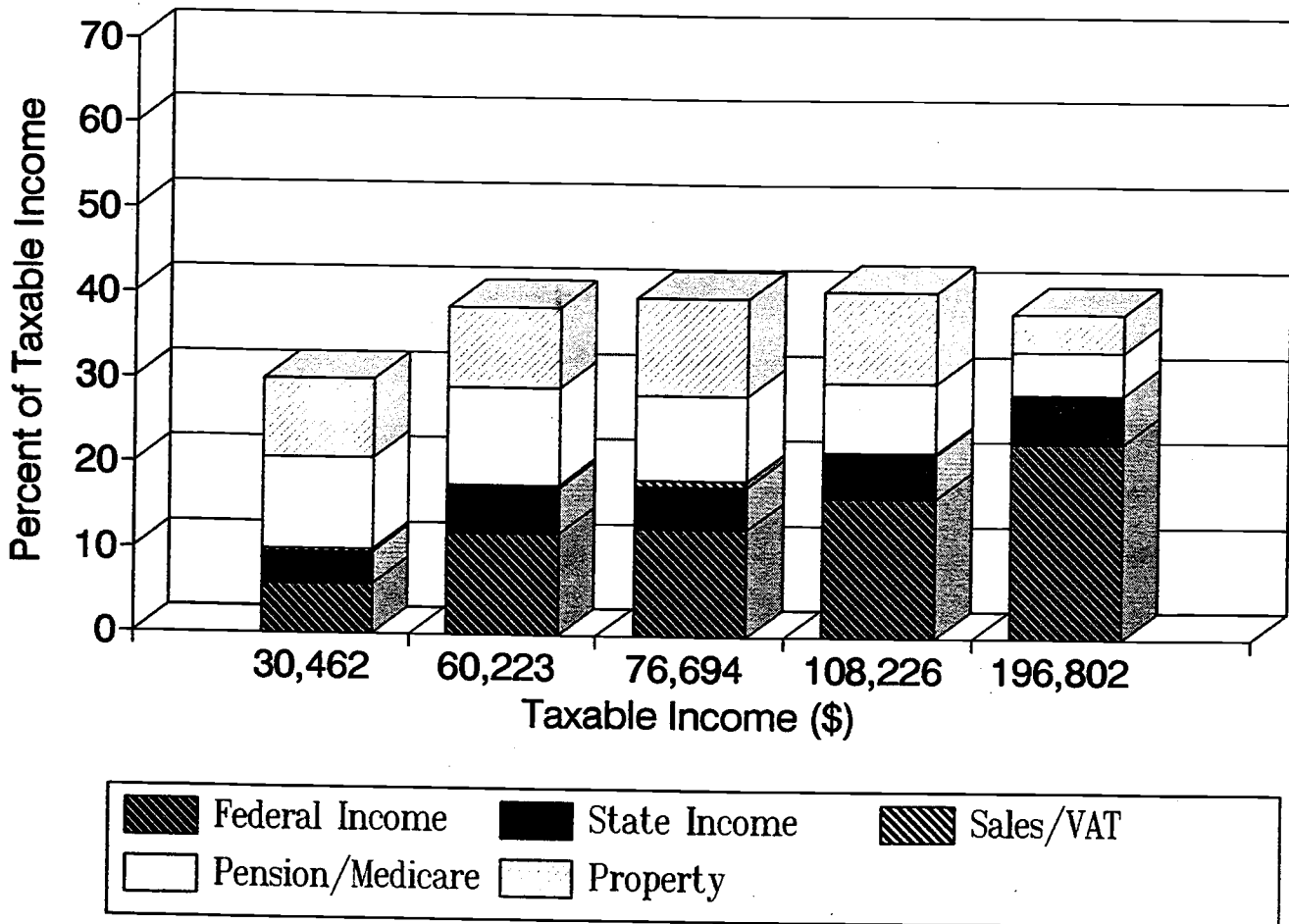




Table 11. Comparison of 1,100 Hectare Morrow County, Oregon, United States Farm Under Alternative Tax Policies and Social Programs-Corporate Business Organization 1991

	Buenos Aires Argentina	New South Wales Australia	Alberta Canada	La Marne France	Oregon United States
Cash Receipts	\$193,094.	\$193,308.	\$193,248.	\$192,667.	\$193,222.
Cash Expenses	111,803.	127,566.	110,531.	112,540.	111,161.
Net Cash Income	81,291.	83,267.	82,717.	80,124.	82,061.
Noncash Costs	17,906.	17,525.	17,525.	17,525.	17,525.
Net Farm Income	63,385.	65,742.	65,192.	62,599.	64,536.
Less:					
Tax Payments	56,858.	29,088.	24,153.	41,674.	25,739.
Federal Income	5,749.	11,180.	5,504.	5,194.	3,683.
Federal Corporate	2,025.	9,062.	3,460.	602.	3,742.
State Income	0.	0.	2,770.	0.	2,236.
State Corporate	0.	0.	1,617.	0.	1,245.
Sales, Excise, VAT	5,926.	3,747.	3,074.	6,582.	339.
Pension/Medicare	17,629.	609.	1,807.	21,663.	5,623.
Property	25,529.	4,490.	5,921.	7,633.	8,871.
Health Insurance	0.	580.	760.	0.	3,000.
Other Living Expenses	26,380.	26,380.	26,380.	26,380.	26,380.
Add:					
Family Allowance	4,053.	822.	828.	3,071.	0.
Off-Farm Income	4,200.	4,200.	4,200.	4,200.	4,200.
Equals:					
Change in Net Worth	-11,600.	14,716.	18,927.	1,816.	13,617.

## Summary and Conclusions

The objective in this study was to investigate how tax and social programs influence the competitive position of wheat farmers in world export trade. Particular focus was on the five countries that dominate the world wheat trade, Argentina, Australia, Canada, the European Community (France) and the United States. Representative farms were developed for Argentina, Australia, Canada, and the United States. A Monte Carlo simulation model was then used to analyze the impact of tax and social programs in these countries plus France. The results suggest that, in most cases, tax and social programs provide an overall competitive advantage to Canadian wheat farmers. The tax situation for small and medium sized Australian wheat farms enables them to be generally competitive with the Canadian tax situation. The Argentine and U.S. tax laws seem to favor larger farm operations. Medium-sized Canadian and U.S. farms substantially benefit from incorporation, with Argentine and French farms left worse off from a tax standpoint.

Tax incidence also varies substantially from country to country. Argentine taxes tend to fall heavier on lower income farmers when compared to other countries. The Australian tax law clearly shifts most of the tax burden to higher income families, with social programs aimed at further reducing the tax impact on lower income families. Canadian tax incidence mirrors that in Australia, although incorporation clearly can reduce taxes for high income farmers. The tax burden overall appears to fall most heavily on the medium income farmers. The U.S. tax system tends to shift more tax responsibility onto the lower income farmer, particularly when the benefit of incorporation is included.

A number of simplifying assumptions in the study are critical in analyzing the results. Cost of living estimates were tied to the farm, rather than the country being analyzed for tax purposes. Family living expenses were not influenced by farm income within a particular year. Farms under both Australian and Canadian tax laws were assumed to manage their tax-exempt retirement funds to maintain a relatively level expected fund balance. This assumption was particularly important for the Australian tax scenarios because the beginning fund balance was so low relative to the limits placed by the government on the fund balance. Australian farmers, for example, can substantially increase their after-tax financial position by allowing their tax-exempt fund to grow over time and then withdraw it at retirement. Also, tax benefits would increase if the beginning fund balance were larger, even if the fund were managed to maintain the same expected balance over time.

The farm situations considered in this study were typical of the state or province in which they were located. For some countries, such as Canada, these farms may also be a reasonable approximation of average wheat farms nationally. In other countries, such as the United States, farm size and production practices vary substantially from region to region. In addition, state and local taxes also vary from location to location. Consequently, these results must be interpreted with some caution. On the other hand, the approach outlined here could be extended across the major wheat producing areas in each country to determine how competitive each area is relative to the international market.

No attempt has been made to separate tax subsidies from the natural competitive position afforded by tax policy. For example, virtually all U.S. states allow for farm land to be assessed at less than market value, resulting in lower property taxes than would be paid on the same land in a non-agricultural use. This property tax break is as much a subsidy as any farm program payment and thus should be included in GATT negotiations. Other tax and social program benefits clearly do not belong in trade negotiations, although they will have an impact on trade. For example, the structure of Australian medicare taxes provides Australians with a competitive advantage relative to France and the United States. Yet, this is a benefit enjoyed by all Australians. Other tax advantages fall into a grey area where their inclusion in subsidy measures is questionable. For example, the ability of Canadians to create husband-wife partnerships as a tax avoidance scheme is not limited to agriculture, but is restricted to family business situations where some sharing of work and (or) assets is feasible. Consequently, only a small percent of the Canadian population overall can qualify for this tax benefit.

The analyses reported here are for a single year. Tax depreciation and treatment of capital gains are best analyzed in a multiple-year framework. Such an approach is beyond the scope of this study, however.

Government debt positions also significantly influence how tax policies are likely to change over time. For example, the Argentine, Canadian, and U.S. governments hold a substantial quantity of public debt. Argentina recently began restructuring its government expenditures and revenue collections to reduce this debt, whereas the United States and Canada continue to expand their public debt obligations. Australia and France are at the other extreme, with relatively low public debt obligations. Given that tax increases in the United States and Canada will likely be used to address the public debt situation, this analysis suggests that the French and Australian governments are well-positioned from a tax perspective to compete in international markets with Argentina, Canada, and the United States.

The role of government intervention in international trade is generally viewed from a subsidy standpoint. This study focused on types of government intervention (tax and social programs) typically not addressed in trade talks. This study demonstrates that the impact of tax and domestic social programs on the ability of farmers to compete in international markets should be considered. The amount and form of subsidies to farmers are important in determining their overall economic well-being in an increasingly competitive international environment. The significant differences in tax provisions and social programs among the study countries and their relative impact on wheat producers suggests that ignoring these factors could lead to incomplete trade agreements.

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