A Comparison of the Taxation of Livestock Farmers in Australia, Canada, New Zealand and the United States.

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Abstract.

Many farmers argue that the Australian income taxation system provides an impediment to the operations agricultural sector. It is common for individual components of another tax system to be cited as providing more favourable policy settings.

The paper provides an overview of major income tax policies affecting farmers in Australia, Canada, New Zealand and the United States. To quantify the effect of the different systems, the income tax system of each country is applied to three case study Australian farms.

In conclusion, it is argued that the New Zealand tax system is more neutral and provides less tax deferral than occurs in other countries studied. Income taxes payable vary substantially between and within countries, and no system provides lower tax payments in all case studies.

Keywords: *income tax, policy*

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1. Introduction.

The purpose of this study is to examine the effect of different tax bases and rate structures on income taxes paid by farmers in Australia, Canada, New Zealand and the United States. Unlike most previous studies (see for example, Nixon and Perry (1993), Perry *et al* 1994), this study includes livestock farms and uses a longer time horizon. Also included in the analysis are levies commonly collected through the income tax system using taxable income as the determinant of the amount of levy payable.

This paper is divided into three sections. In the first section, a "thumbnail sketch" is provided of the most important features of each country's tax system for broadacre farmers. As this paper is designed to be read by non-tax specialists, the description of the respective tax laws for each country is that which broadly applies to the "average farmer"; many complexities and technicalities have been ignored or glossed-over. The discussion of the law applies to *bona fide* primary producers. There are special provisions relating to "hobby" or part time farmers which are not discussed.

In the second section, results of three case study analyses of income tax paid by representative Australian farms are presented and discussed.

In the final section, it is argued that the Australian tax system provides lower net present values of income tax payments for the average farmer. However, it appears that the tax systems of Australia, Canada and the United States provide significant tax deferrals to farmers, and so lack neutrality. The tax deferrals may affect levels of investment between agricultural industries, and between agriculture and other sectors of the economy. Further, the tax deferrals may result in lock-in effects, and mask price signals.

2. Description of income tax provisions

In this section, the tax treatment of common items of income taxation are highlighted. In Australia and New Zealand, income taxes are collected at national government level only. In the United States and Canada, both national and state/provincial governments levy income taxes, with significant differences in tax rates between states/provinces. For example, some US states such as Texas and Wyoming do not levy income taxes, while other states such as Montana impose income taxes with marginal rates up to 11 per cent. Similarly in Canada, provincial income taxes can range from 45 per cent of federal taxes in the Northwest Territories to 69 per cent of federal taxes in Newfoundland. In order to reduce the bias which could result from comparing a high tax state/province to a low tax state/province, it was decided to report on both high and low tax states/provinces. The states/provinces chosen for study were Texas (no state income taxes) and Montana (high state income taxes) in the United States, and Alberta (low provincial income taxes) and Ontario (high provincial income taxes) in Canada.

The taxation law which is described in this analysis is that which applied to the default fiscal year in each country, e.g., the year ending 31 March 1994 in New Zealand, 30 June, 1994 in Australia, and 31 December, 1994 in Canada and the United States. CCH Master Tax Guides for each country provide a more detailed description of individual items.

2.1. Differences in tax bases.

The income tax bases of Australia, Canada and New Zealand have more similarities than differences. None of the 3 countries strictly adhere to the *Schanz-Haig-Simons* concept of income, for example lottery winnings are untaxed. In each system, there is a dichotomy between the tax treatment of receipts/expenses of revenue and receipts/expenses of capital. Revenue losses are carried forward to be offset against future positive taxable income in each country. The judiciary in each country refer to (and may use as precedent) tax cases of the other 3 countries.

The United States concept of income is more rigorously based on the *Schanz-Haig-Simons* concept of income, and includes "all gain" (including windfall gains such as lottery prizes) as income. The dichotomy between receipts of income and capital remains relevant as concessional tax rates apply to capital gains (a maximum of 28 per cent compared to a normal maximum rate of 39.6 per cent), and for calculating social security taxes.

The significant differences in the income tax systems which are relevant to this analysis are valuation of livestock, depreciation rates and re-capture provisions, tax rates, income averaging, and levies calculated using taxable income as a base. Other significant differences, such as the treatment of capital gains, are discussed but are not germane to the case study analysis.

In this analysis, an important consequence of the similarity in tax bases, the assumption of no inflation and the "sale" of assets at the end of ten years is that total taxable income from the farm business in the case studies is the same under each countries tax laws; the different provisions change only the timing of recognition of income, not the quantum.

2.2. Tax provisions for farmers

In each country, there are tax provisions which are unique to, or primarily used by, farmers. These are summarised in Table 1, and described below. It can be seen that with the exception of the livestock valuation provisions, Australian tax provisions for farmers are as concessional or more concessional than those applying in the other 3 countries. By contrast, the New Zealand system appears to be the most neutral. It would also appear that Australia relies more on tax policy to achieve rural policy objectives than the other 3 countries.

Table 1
Tax provisions for farmers in Australia, Canada, New Zealand, and the United States - 1994

PROVISION	AUSTRALIA	CANADA	NEW ZEALAND	UNITED STATES
Livestock valuation	Concessional valuation of natural increase of most species, average cost calculation provide significant deferral	Cash method of accounting only requires inventories of livestock when losses are incurred	National Standard Cost provides for absorption costing of livestock, Herd method treats livestock as capital.	No requirement to inventory natural increase, depreciation allowed on breeding livestock
Relief for forced sales of livestock	Elections allow income from forced sales to be spread over 5 years, Income Equalisation Deposit Schemes	Income may be deferred for one year	Income Equalisation Deposit Schemes only	Income may be deferred for one year
Soil conservation expenditure	100% deduction, plus possible capital gains advantages	No special provisions	5% depreciation	Choice of 100% deduction for expenditure in accordance with an approved plan or adding to the capital value of the land
Water conservation expenditure	3 year write-off, plus possible capital gains advantages	100% deduction for bores and wells, 20% depreciation for reticulation works, 4% depreciation for dams	5% depreciation	Choice of 100% deduction for expenditure in accordance with an approved plan or adding to the capital value of the land
Subsidised savings	Income Equalisation Deposit schemes	Nil through tax system, direct subsidies used	Income Equalisation Deposit schemes	Nil
Period equity measures	Averaging, Income Equalisation Deposit schemes	Nil	Income Equalisation Deposit schemes	Nil
Remote area allowances	Zone rebates	Nil	Nil	Nil

2.2.1. Livestock valuation.

In Australia, livestock are treated as trading stock (assets held for the purpose of resale). Upon commencing a business of primary production, taxpayers are required to elect to value inventories of livestock at either market or cost values (the default is cost value). Natural increase of specified classes of livestock (cattle, sheep, goats, deer, pigs, horses) may be valued at prescribed minimum costs which some (Douglas 1995) argue are substantially below the cost of production. The natural increase of other species of livestock must be valued on a full absorption cost basis. The average cost method of calculating inventory values is normally used, on a whole herd basis. Douglas (1995) provides a more detailed analysis of the taxation of livestock in Australia.

Canadian farmers have the option of using either cash or accrual accounting for tax purposes. Most opt to use cash accounting which does not require that a value be placed on inventory each year. However, there are mandatory and optional inventory adjustments that do require a value be placed on inventories. If a Canadian farmer reports a cash-basis loss, the mandatory inventory adjustment (MIA) requires that the taxpayer add back the lesser amount of the loss or the value of the purchased inventory. The value of the inventory is the lesser of the cash cost or market value.

The Canadian system allows farmers using cash accounting to reduce their net income to zero for tax purposes by purchasing livestock or other inventories. The purchases are tax-deductible, and there is no requirement to include the value of inventories in taxable income.

The New Zealand system allows the taxpayer the choice of treating livestock (sheep, cattle, deer, goats and pigs) as either trading stock or capital. The trading schemes allow livestock to be valued at the taxpayers choice of market value, replacement value or cost. If cost is chosen, the taxpayer has the further election of using prescribed National Standard Costs, or self-assessing cost on a partial absorption basis. The capital valuation option is known as the Herd Scheme. Under this scheme, livestock are revalued each year on the basis of National Average Market Values declared by the Inland Revenue Department. Any change in the values of livestock between years valued under the Herd scheme is neither assessable nor deductible for income tax purposes, and is thus treated as a non taxable capital gain or loss. Excluded from these schemes are high priced livestock (defined as having a purchase cost at a level of 5 times or more of the National Average Market Value with a minimum cost of $NZ 500 per head) which are capitalised and depreciated. King (1992) provides a more detailed explanation of the New Zealand schemes for livestock valuation.

Farmers in the United States are also allowed to use cash accounting. However, unlike Canadian farmers, they are not entitled to deduct the cost of purchased livestock until they have received matching revenue. This provision produces similar results to the inventory requirements of Australia. The United States tax law also allows farmers to treat breeding livestock as items of capital and depreciate them over a 5 year period. Some profits on the sale of depreciated livestock (where sale price greater than original cost) can be taxed as capital gains at lower rates.

2.2.2. Relief from adverse events.

The Australian system provides several elections which allow income from forced sales of livestock (and certain insurance recoveries) to be transferred to future years (Douglas 1995 provides more detail).

The New Zealand System has no similar provisions, but does provide an Adverse Event Income Equalisation Deposit Scheme (described in subsection 2.1.6).

In Canada, farmers who sell part of their breeding herd due to drought conditions are allowed to defer part of the sale proceeds to the following year, or the year following a series of consecutive drought years. The proceeds of sales of breeding animals eligible for the tax deferral are net of the cost of any breeding animals acquired in the year.

Farmers in the United States may elect to defer the profit on forced sales of livestock because of drought for one year.

2.2.3. Depreciation.

The Australian, Canadian and New Zealand tax systems provide similar depreciation methods. Equipment is commonly depreciated on a diminishing value method[2]. In Australia and New Zealand, first year depreciation is pro-rated for period owned, while Canadian taxpayers must reduce first year depreciation by 50 per cent irrespective of period of ownership.

The United States uses the Modified Accelerated Cost Recovery System (MACRS) provides different rates for each year of depreciation. The basic scheme is that equipment is first depreciated using a diminishing value method, then changed to a straightline method. Pigs are depreciated as property with a 3 year life, cattle sheep, cars and trucks as 5 year property, trees, vines, and agricultural and horticultural structures as 10 year property, and buildings as 20 year property.

2.2.4. Soil and water conservation expenses.

In Australia, capital expenses incurred in preventing or combating land degradation qualify for an immediate deductions, while the expenses of conveying and conserving water may be deducted in 3 equal annual instalments. It appears that poor legislative drafting may mean that these expenses can be subsequently deducted off taxable capital gains, effectively giving a 200 per cent deduction.

In Canada there are no similar provisions. The costs of sinking wells or bores, draining land or clearing land qualify for an immediate deduction, but other expenses such as conveying and conserving water qualify for depreciation at relatively low rates.

New Zealand allows deductions for most farm development expenditure at relatively low rates (5 per cent p.a.).

In the United States farmers have a choice of claiming an immediate deduction for soil and water conservation expenses in accordance with a plan certified by the Soil Conservation Service, or adding the expenditure to the cost base of their land.

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[2] In each country, a straight line depreciation method is also available, but not commonly used.

2.2.5. Income Equalisation Deposit schemes.

The Australian System provides two schemes, the Income Equalisation Deposit (IED) Scheme and the Farm Management Bond (FMB) scheme. Deposits (which must be made in the financial year) to both schemes are tax deductible, while withdrawals are included in assessable income. Withdrawals may be made from the IED scheme after one year. Withdrawals may only be made from the FMB scheme when the taxpayer is in financial hardship following a fire, flood or drought, or low commodity prices. Interest was paid on both schemes at the short-term Commonwealth Bond rate, but only on 61 per cent of the IED balance (80 per cent of the FMB balance). The limit on holdings was $A 300 000 per taxpayer for IEDs and FMBs combined of which only $A 80 000 may be held in FMBs[3]. The minimum deposit for both schemes was $A 1 000, and deposits in any year are restricted to net income from farming.

The New Zealand System also provides for two schemes, the Income Equalisation Deposit Scheme (IEDS) and the Adverse Event Income Equalisation Scheme (AEIES). The IEDS allows tax deductible deposits to be made up until 6 months after balance date. The minimum deposit is $NZ 200 with the maximum deposit being the assessable farm income for the year. Deposits must remain in the scheme for 1 year and must be fully withdrawn at the end of 5 years. Withdrawals are treated as assessable income in the year of withdrawal. An interest rate of 3 per cent p. a. is paid on deposits.

The AEIES allows income arising from the forced sale of livestock caused by an adverse event to be deposited in the scheme up until 1 month after balance date. Withdrawals can be made at any time. Deposits are tax deductible and withdrawals are assessable income in the year either occurs. The minimum deposit is $200 and the maximum is limited to the assessable income arising from the forced sale of livestock calculated under a specific formula. Adverse events are self assessed by the livestock owner. A daily interest rate is paid on balances at 4.7 per cent p. a. (increased to 6.5 per cent in 1995). Deposits remaining in the AAIES after one year from the date of deposit are automatically transferred to the main IEDS scheme and deemed to have been in that scheme for 1 year.

The Canadian Net Income Stabilisation Account (NISA) scheme is a voluntary program under which farmers can deposit money to an individual account, and a matching contribution is made by the federal and provincial governments. The contributions made by the farmer are not tax deductible when made, and not assessable on withdrawal. Government contributions and interest are taxable on withdrawal.

United States farmers do not have access to similar schemes.

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[3] In December 1994, the government announced changes to the FMB scheme which included payment of interest on 100 per cent of the balance, increasing the maximum holding to $A 150 000.

2.2.6. Treatment of capital gains.

Major capital gains tax provisions in each country are shown in Table 2.

Table 2
Major capital gains provisions in Australia, Canada, New Zealand and the United States

	Australia	Canada	New Zealand	United States
Real gains (gains in excess of cost plus inflation)	Taxable, rate averaging and rollover relief may apply, rollover relief applies to testamentary transfers	75 per cent taxable, first $C500 000 of capital gains from eligible farm property exempt, rollover relief applies to transfer of eligible farm property	Tax exempt	Taxable, concessional rates may apply
Nominal capital gains (gains in excess of cost, but less than cost plus inflation)	Tax exempt	75 per cent taxable, first $C 500 000 of capital gains from eligible farm property exempt, rollover relief applies to transfer of eligible farm property	Tax exempt	Taxable, concessional rates may apply
Capital losses	Deductible only against taxable capital gains, carried forward indefinitely, no carry back	Deductible against taxable capital gains, may be carried back 3 years, and carried forward indefinitely	Not deductible	Deductible against taxable capital gains and up to $US 3 000 of income p.a., carried forward indefinitely, no carry back

2.3. Income tax rates.

2.3.1. Individuals

Australian tax rates for resident individuals in 1993-94 are shown in Table 3.

Table 3
Australian income tax rates for resident individuals 1993-94

Taxable income $A	Tax payable $A
0 - 5 400	Nil
5 401 - 20 700	Nil + 20 per cent of excess over 5 400
20 701 - 38 000	3 060 + 34 per cent of excess over 20 700
38 000 - 50 000	8 942 + 43 per cent of excess over 38 000
> 50 000	14 102 + 47 per cent of excess over 50 000

A low income rebate of $A 150 applies to taxable incomes below $A 20 700. The rebate phases out at a marginal rate of 4 per cent for incomes in excess of $A 20 700, and does not apply to incomes in excess of $A 24 449.

Canadian basic tax rates for 1994 are shown in Table 4.

Table 4
Canadian basic income tax rates 1994

Taxable income $C	Tax payable $C
0 - < 29 590	17 per cent
29 590 - 59 180	5 030 + 26 per cent of excess over 29 590
> 59 180	12 724 + 29 per cent of excess over 59 180

While there is no tax free threshold, taxpayers receive a non-refundable credit of $C 1 098 which effectively means individuals with an income below $C 6 456 do not pay tax.

There is a federal surtax of 3 per cent of basic federal tax, with a further surtax of 5 per cent (making a total of 8 per cent) payable on basic federal taxes in excess of $C 12 500.

All provinces impose income taxes as well, generally expressed as a percentage of federal tax payable. The exception is Quebec which has its own personal income tax system. The provincial tax rates ranged from 45 per cent of federal taxes in the Northwest Territories to 69 per cent of federal taxes in Newfoundland. The provinces also have surtaxes and some apply flat taxes to net or taxable income.

The provinces chosen for this the case study examination are the low-tax Alberta with provincial income taxes of 45.5 per cent of federal taxes (plus an 8 per cent surtax on provincial tax in excess of $C3 500 and a flat tax of 0.5 per cent of taxable income) and the relatively high-tax Ontario with provincial taxes of 58 per cent of federal taxes, plus surtaxes of up to 30 per cent of provincial tax payable.

New Zealand basic tax rates for 1993 94 are shown in Table 5.

Table 5
New Zealand basic tax rates for individuals 1993-94

Taxable income $NZ	Tax payable $NZ
0 - 30 875	24 per cent
> 30 875	7 410 + 33 per cent of excess over 30 875

The New Zealand tax rate schedule does not have a tax free threshold. Relief is provided to low-income taxpayers by a Low Income Rebate of 9 per cent for incomes below $NZ 9 500. The maximum rebate of $NZ 855 which is reduced by 4 cents for every dollar that taxable income exceeds $NZ 9 500. There is a further low income rebate (known as the Transitional Tax Allowance Rebate) for "earned" income. The maximum rebate is $NZ 728 where taxable income is below $NZ 6 241. The rebate is reduced at a marginal rate of 20 cents per dollar of income in excess of $NZ 6 241 and ceases to apply when income is $NZ 9 880. This rebate is only available to persons who would not otherwise qualify for tax credit relief under the family support legislation.

The New Zealand income tax system is also used to deliver financial relief to families (including single parent families) with one or more dependant children. The schemes are the Family Support Tax Credit Scheme; and the Guaranteed Minimum Family Income Scheme. These two schemes have been excluded from this study as they are forms of social welfare assistance delivered through the income tax system rather than direct payments through a different agency.

U.S. basic tax rates for 1993-94 are shown in Table 6.

Table 6
United States basic tax rates for single individuals 1994

Taxable income $US	Tax payable $US
0 - < 22 750	15 per cent
22 750 - < 55 100	3 412.50 + 28 per cent of excess over 22 750
55 100 - < 115 000	12 470.50 + 31 per cent of excess over 55 100
115 000 - < 250 000	31 039.50 + 36 per cent of excess over 115 000
>= 250 000	79 639.50 + 39.6 per cent of excess over 250 000

There are separate schedules for "married individuals filing jointly, and surviving spouses", "married individuals filing separately", and "heads of households". The effect is that spouses may be taxed on their joint income without the need for an income splitting device (e.g. partnership, trust) as required in Australia, Canada and New Zealand.

The United States rate schedule does not have a tax free threshold. However, taxpayers are entitled to a personal income deduction of $US 2 450, plus an additional deduction of $US 2 450 for each dependent. As well, taxpayers are entitled to standard deductions which range from $US 3 800 for a single taxpayer to $US 6 350 for taxpayers who are married filing jointly. There are also refundable earned income credits provided for low-income taxpayers, ranging up to $US 2 528 for a taxpayer with 2 children and a taxable income between $US 8 425 and $US 11 000. Further, most states and some cities also impose income taxes with marginal rates ranging up to 12 per cent in North Dakota.

2.3.2. Accident, Medicare, Pension and Social Security Levies.

Australian taxpayers are required to pay Medicare Levy (generally 1.4 per cent of taxable income) on incomes greater than $A 12 688. Shading in provisions exist for incomes between $A 12 688 and $A 13 643. The thresholds increase according to the number of dependents, for example, a taxpayer with a dependent spouse and 4 dependent children would not be subject to Medicare Levy until taxable income exceeded $A 29 766.

Canadian taxpayers are required to contribute to the Canadian Pension Plan. The 1994 rate was 5.2 per cent on incomes in excess of $C 3 400, with a maximum levy of $C 1 612 applying to incomes in excess of $C 34 400.

In several provinces, health care costs are partially funded by health insurance premiums on individuals and families or by payroll taxes. In Alberta, 1994 government health care insurance premiums were $C 32 per month for a sing[illegible]erson and $C 64 a month for families. In Ontario, the Employer Health Tax (EHT) was 0.98 per cent for annual payrolls less than $C 200 000 increasing to 1.95 per cent for payrolls over $C 400 000. Self employed persons with net self-employment income in excess of $C 40 000 must pay EHT. As these health care levies are not collected through the income tax system, they have been excluded from the case study analysis.

New Zealand taxpayers are liable to pay Accident Compensation Levies, with rates based on occupational safety records. The GST exclusive rate for farmers is 2.5423 per cent of taxable income (including employer premium for self employed taxpayers). The maximum Accident Levy payable by farmers is $NZ 1 948.62 on taxable incomes greater than $ NZ 76 647.

United States taxpayers are required to pay Social Security and Medicare levies of 15.3 per cent of taxable income up to $US 60 600, and 2.9 per cent on incomes in excess of $US 60 600.

2.3.3. Other individual deductions and rebates.

Common tax deductions and rebates for each country are shown in Table 7.

Table 7
Common Tax Rebates and Deductions in Australia, Canada, New Zealand and the United States 1993 - 94.

Description	Australia *Rebates* $A	Canada *Rebates* $C	New Zealand *Rebates* $NZ	United States *Deductions* $US
Spouse - no dependent children[4]	1 188	915	n.a.	2 450
Spouse - with dependent children[5]	1 425	915	n.a.	2 450
Dependent children	n.a.	n.a.	n.a.	2 450 per child
Sole parent (equivalent to spouse)	1 116	915	60[6]	Head of household tax rates apply
Remote area rebates[7]	up to 1 173 + 50% other rebates	n.a.	n.a.	n.a.
Standard deductions	n.a.	n.a.	n.a.	3 800 - 6 350 dependent on filing status
GST credit	n.a.	199	n.a.	n.a.
Medical expenses	20% excess over 1 000	17% excess of 3% of income or 1 615	n.a.	excess of 7.5% of income[8]
Child minding (housekeeper)	n.a.	expenses of childminding deductible (up to $5 000 per child)	33% to max of $310	up to 30% of cost to max 2 400 (1 child) or 4 800
School fees	n.a.	n.a.	33% to maximum 500	n.a.
Charitable gifts	Deduction allowed for gifts only	17% credit to 200, 29% in excess of 200 to maximum of 20% of income	33% to maximum 500	gifts deductible

[4] Spouse rebates abate at a marginal rate of 4 per cent if the spouse's separate net income exceeds $282.
[5] This rebate has since been replaced by Family Payments delivered through the social security system.
[6] This rebate is discretionary for cases of hardship.
[7] Remote area ("Zone") rebates apply to taxpayers who spend over half the year in defined isolated areas (mainly the pastoral zone) of Australia.
[8] This deduction is only available to taxpayers who do not claim the standard deduction.

2.3.4. Income Averaging in Australia.

Australian farmers are uniquely entitled to calculate their tax liabilities using the average rate of tax applicable to their average income unless they have made an irrevocable election not to use the averaging system. Under the averaging scheme, an average rebate is provided if taxable income is greater than average income (complementary tax is payable if taxable income is less than average income). Average income is normally the arithmetic mean of the current and four preceding years taxable income.

The amount of the average rebate (complementary tax) is determined by the formula:

$$\text{Average rebate} = \text{tax on taxable income} - \frac{\text{tax on average income} * \text{taxable income}}{\text{average income}}$$

As the averaging system can provide substantial benefits when income trends up (taxable income greater than average income), shading-in provisions[9] have been introduced to reduce the benefits to primary production income. A result of these shading-in provisions is that many farmers have different marginal tax rates for on-farm and off-farm income.

A feature of the averaging system is that changes in the current years taxable income not only affect the current years tax liability, but also the tax liabilities of the next 4 years. If a farmer ceases to be on the averaging scheme (either because of electing not to use the scheme, or because of leaving farming), any tax deferred to following years will not be collected. Douglas and Davenport (1995) provide a more detailed analysis of the averaging system.

2.3.5. Companies.

The 1993-94 company tax rate in Australia and New Zealand was 33 per cent. Both countries use similar imputation systems (shareholders receiving dividends are entitled to tax credits equal to the company tax paid) to relieve shareholders of double taxation on company profits.

The basic Canadian federal rate of company tax is 38 per cent but it is reduced by a 10 per cent federal tax abatement for provincial taxes. There is a tax reduction of 7 per cent for income from manufacturing and processing, and a small business deduction of 16 per cent for Canadian-controlled private corporations for up to $C 200 000 of active business income. Therefore, the effective federal rate before surtaxes is 21 per cent for manufacturers and processors and 12 per cent for small businesses.

The provincial and territorial governments also impose taxes on corporate income. Effective combined federal/provincial tax rates range from 15.3 per cent for small manufacturing companies in the Yukon, to 45.8 per cent in Manitoba, New Brunswick and Saskatchewan for large non-manufacturing businesses.

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[9] Where a taxpayer has up to $5 000 of off-farm income, all income is treated as farm income, if off-farm income is between $5 000 and $10 000, the amount entitled to be included as farm income can be calculated according the formula (10 000 - off-farm income), and averaging is restricted to farm income is off-farm income exceeds $10 000.

Canada provides a dividend tax credit to reduce the impact of double taxation on corporate earnings that are distributed to shareholders. Dividends are grossed up by 25 per cent, and a non-refundable dividend federal tax credit of 13 $^1/_3$ per cent of the grossed up amount is provided.

The United States has a progressive company tax schedule, shown in Table 8. The 39 and 38 per cent rates are designed to "claw-back" the effect of lower rates on lower income bands, so that flat rates of 34 per cent apply to companies with taxable incomes between $US 335 000 and $US 10 000 000, and 35 per cent for companies with taxable incomes in excess of $US 18 333 333. The United States maintains the "classical" system of taxing companies, with dividends being fully taxable in the hands of shareholders, e.g. there is "double taxation" of company profits.

Table 8
United States Corporate Income Tax Rates - 1994

Taxable income $US	Tax rate %
0 - <50 000	15
50 000 - <75 000	25
75 000 - <100 000	34
100 000 - < 335 000	39
335 000 - <10 000 000	34
10 000 000 - <15 000 000	35
15 000 000 - < 18 333 333	38
=>18 333 333	35

3. Analysis of income tax paid on three case study farms.

3.1. Case study farms.

Three Australian case study farms (Armidale, Condobolin and Scone; all in New South Wales) are used for the purpose of this analysis. The case study farms were constructed using data provided by local consensus data groups who described farms representative of a typical farm in their region as part of the joint Centre for Agricultural and Resource Economics, NSW Agriculture and West Australian Department of Agriculture project "Drought Strategies to Enhance Farm Financial Viability".

The Armidale case-study farm represented a Northern Tablelands mixed fine-wool merino/beef cattle enterprise, the Condobolin case study farm a Central West mixed cropping-livestock enterprise and the Scone case study farm represented a specialist Upper Hunter Valley beef enterprise. A more complete description of the case study farms is available from the authors.

A common (and valid) criticism of case study analysis is that the results are only representative of the case studies themselves. On the other hand, income tax is calculated individually, the final tax liability in a year is affected by every financial transaction made in that year, and by many transactions made in past years[10]. Therefore, the starting point of any analysis of the impact of income tax provisions on agriculture must be on the effect on the firm. Once the impact on the firm has been determined, the effects may be aggregated, and economic (as opposed to financial) effects can be determined. The results of this case study analysis should be used as being illustrations of broad principles; it is magnitude and direction of effect which is important rather than the absolute value of the tax payments.

An advantage of the three farms used in this analysis is that they each have different amounts of taxable income (total taxable income at Armidale $A 1 056 378, Condobolin $A 587 850, and Scone $A 377 070) which enables the impact of the progression[11] of tax rate schedules in each country to be demonstrated.

3.2. Methodology and assumptions.

The RISKFARM models (Milham, Hardaker and Powell 1993) built for the drought project are stochastic budgeting models. Most key variables (price, yield, interest rates, climate) are specified as stochastic variables. Financial outcomes are expressed as cumulative density functions rather than point estimates. While this approach may be desirable for farm financial analysis, the multitude of outcomes makes isolating of the impact of taxation very difficult. In order to make interpretation of the results tractable, it was decided to convert the stochastic information contained within the RISKFARM models to deterministic "expected values", and to assume the same transactions took place every year. Key financial assumptions for the three case study farms are summarised in Table 9.

To capture the timing effects associated with purchase and sale of a farm, it was assumed that the assets of each case study farm were purchased at the start of year 1, and disposed of at the beginning of year 11. The livestock were sold for their purchase price, while depreciable assets were sold at 20 per cent of purchase price.

Other key assumptions include:

- constant prices;
- constant breeding and death rates;
- no asset replacement;
- no debt (ie. no interest paid);
- positive cash balances do not earn interest;
- constant tax rates (those applying in the years ended 30 June 1994 for Australia, 31 March 1994 for New Zealand, and 31 December 1994 for Canada and the United States);
- taxpayers are entitled to be taxed as resident individuals with no dependents;
- partnership income is divided equally;
- taxpayers are not entitled to concessional rebates;
- taxpayers have no other income;
- a discount rate of 7 per cent is used;

[10] Past transaction will affect the values of opening stock, depreciation, and for farmers in Australia using averaging, the rate of tax.

[11] In a progressive tax system, the average rate of income tax payable increases with income.

- provisional tax is ignored; and
- in the Canadian, New Zealand and United States analyses, Australian input and output prices are used (ie. there is no adjustment for differing levels of other taxes and charges in Canada, New Zealand and the United States).

Canadian, New Zealand and United States tax payable was calculated by first determining taxable income in Australian dollars using the laws of the relevant country, converting this figure to the relevant currency, calculating tax payable, and then converting the tax payable back to Australian dollars. The exchange rates used ($A 1 = $C 0.9286 = $NZ 1.2217 = $US 0.6905) are the average exchange rates for the year ended 30 June 1994 published in Butterworths Australian Tax Handbook.

Table 9.
Assumptions for case study farms.

Location	Armidale	Condobolin	Scone
Size	1 000 Ha.	2 800 Ha.	890 Ha.
Sheep flock	Merino self-replacing	First cross replacements purchased	n.a.
Closing stock (No.)	5 650	3 145	n.a.
Natural increase p.a.	1 650	1 445	n.a.
Deaths	280	155	n.a.
Market value	87 000	60 562	n.a.
Sales (No.)	1 375	1 698	n.a.
Sales ($)	19 675	43 460	n.a.
Purchases (No.)	5	1 445	n.a.
Purchases ($)	5 000	10 200	n.a.
Wool sales ($)	200 530	42 387	n.a.
Cattle herd	Self-replacing	Self-replacing	Self-replacing
Closing stock (No.)	370	146	406
Natural increase p.a.	170	56	196
Deaths	9	1	11
Market value	135 250	62 832	184 800
Sales (No)	165	56	187
Sales ($)	59 000	31 966	107 208
Purchases (No)	4	1	2
Purchases ($)	6 000	1 000	4 000
Sales of crops ($)	n.a.	138 914	n.a.
Value of plant ($)	115 339	205 800	90 000
Operating costs ($)	153 340	170 308	58 300
Total Taxable Income	1 056 378	587 850	377 075

Five base methods of calculating taxable income were modelled, Australian, Canadian cash method, New Zealand using both an equivalent of the National Standard Cost (NSC) option and the Herd Scheme option to value livestock, and United States cash method. With respect to the New Zealand NSC option, the NSC's for this study are calculated on the costs of production for each model. In effect, this is a self assessed cost option as also applies in New Zealand, but is interpreted in this paper as examples of the NSC method as if each case study was the average Australian farm (at least of that type). The actual calculation of NSC used in this study is detailed in Douglas and King (1996). With respect to the Herd Scheme option, it is simply assumed that the real value of the livestock concerned was their market value throughout. Under the Herd Scheme, any change in the per head value of livestock over time is treated as a non-taxable capital gain or loss.

3.3. Results - depreciation deductions.

Annual depreciation deductions for the Armidale case study are shown in Table 10. Similar results were obtained in the other case studies

The New Zealand depreciation rates used in the analysis were economic life depreciation rates without loading applying under the new regime introduced from the 1993/94 year (economic rates) without any additional loading. From the 1995/96 income year onwards, a permanent loading of 20 per cent will apply

Table 10
Depreciation allowed - Armidale

Year	Australia	Canada	New Zealand	United States
	$A	$A	$A	$A
1	29 429	15 128	18 662	19 105
2	21 084	26 001	15 106	31 473
3	15 308	18 714	12 318	20 656
4	11 247	13 509	10 120	13 675
5	8 350	9 785	8 372	11 865
6	6 262	7 111	6 974	8 177
7	4 741	5 188	5 846	4 671
8	3 625	3 800	4 933	2 965
9	2 797	2 795	4 187	1 100
10	2 181	2 062	3 570	1 102
Sale year	-12 753	-11 821	2 184	-22 517
Total	92 272	92 272	92 272	92 272

The Canadian and United States depreciation is reduced in the first year by a mandatory 50 per cent adjustment. In Australia and New Zealand, first year depreciation is adjusted for the length of ownership in the year. This adjustment was not necessary as it was assumed that the assets were held for the entire 12 months. It can be seen that the Australian, Canadian and United States systems provides tax deferral by allowing larger deductions than necessary to reduce the written down value of assets to 20 per cent of their cost over 10 years, and significant recapture results. By contrast, the New Zealand economic life depreciation rates provide significantly less tax deferral. These results are dependent on the assumption that depreciable assets are sold for 20 per cent of their purchase price after 10 years. The actual depreciation will, of course, vary from farm to farm and item of equipment to item of equipment.

3.4. Results - livestock valuation.

Closing total inventory values for livestock accounts for the Armidale case study are shown in Table 11 with similar results being obtained in the other case studies.

Table 11
Closing inventory values - Armidale

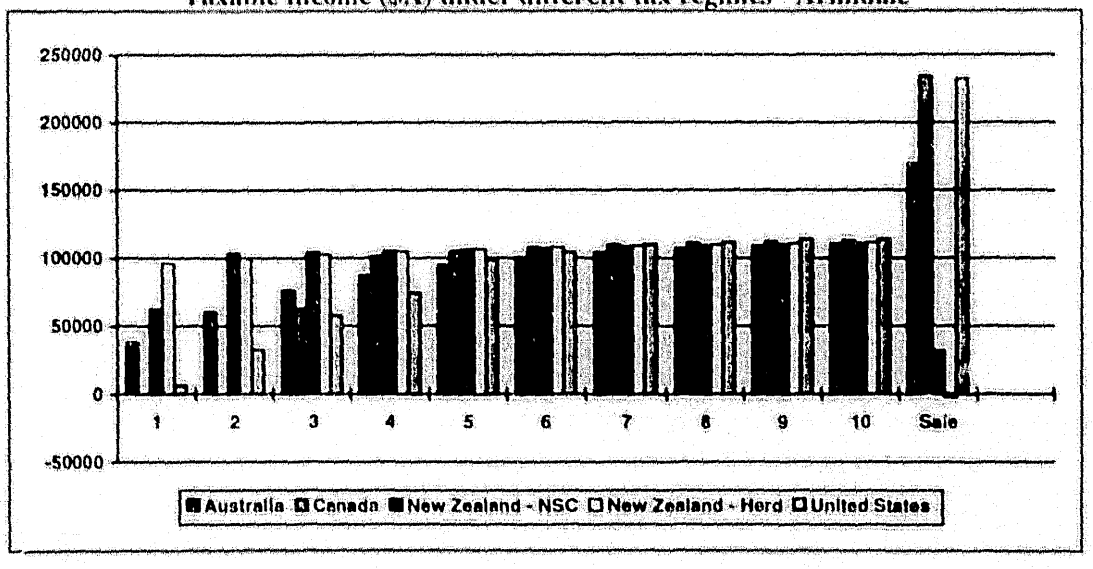
Year	Australia	Canada[12]	NZ National Standard Cost	NZ Herd	US[13]
	$A	$A	$A	$A	$A
Purchase	222 250	222 250	222 250	222 250	222 250
1	174 644	122 513	188 309	222 250	137 100
2	141 263	33 649	191 994	222 250	103 160
3	117 784	0	193 372	222 250	58 760
4	101 215	0	193 452	222 250	22 248
5	89 482	0	192 854	222 250	15 144
6	81 144	0	191 943	222 250	11 400
7	75 195	0	190 934	222 250	11 400
8	70 935	0	189 944	222 250	11 400
9	67 872	0	189 034	222 250	11 400
10	65 660	0	188 203	222 250	11 400

It can be seen that the Canadian system provides the largest tax deferrals, followed by the United States, Australia and New Zealand.

3.5. Results - taxable income.

Taxable incomes for the case study farms over the period of the case studies are shown in figure 1. The same pattern of results (on different scales) occurred in the other case studies.

Figure 1
Taxable income ($A) under different tax regimes - Armidale



[12] The inventory value is the amount included because of the mandatory inventory adjustment provisions.
[13] Technically, this is not an inventory value, but the undeducted cost of livestock on hand.

3.6. Results - tax payable

Total tax payable discounted at 7 per cent for each of the case studies are shown in figures 2 and 3.

Figure 2
Tax payable discounted at 7 per cent - 2 partners

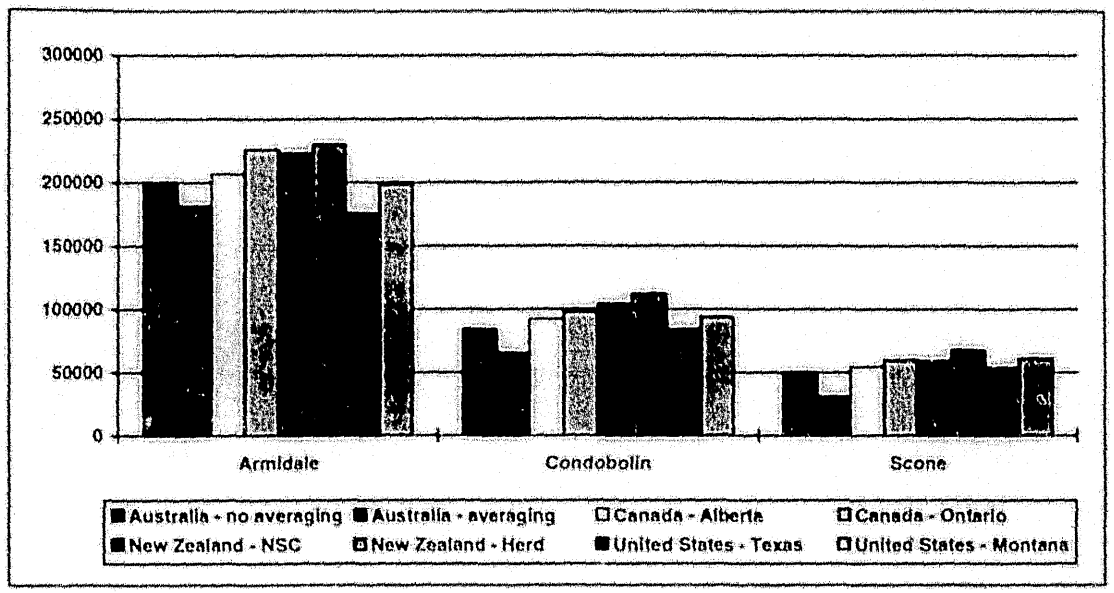
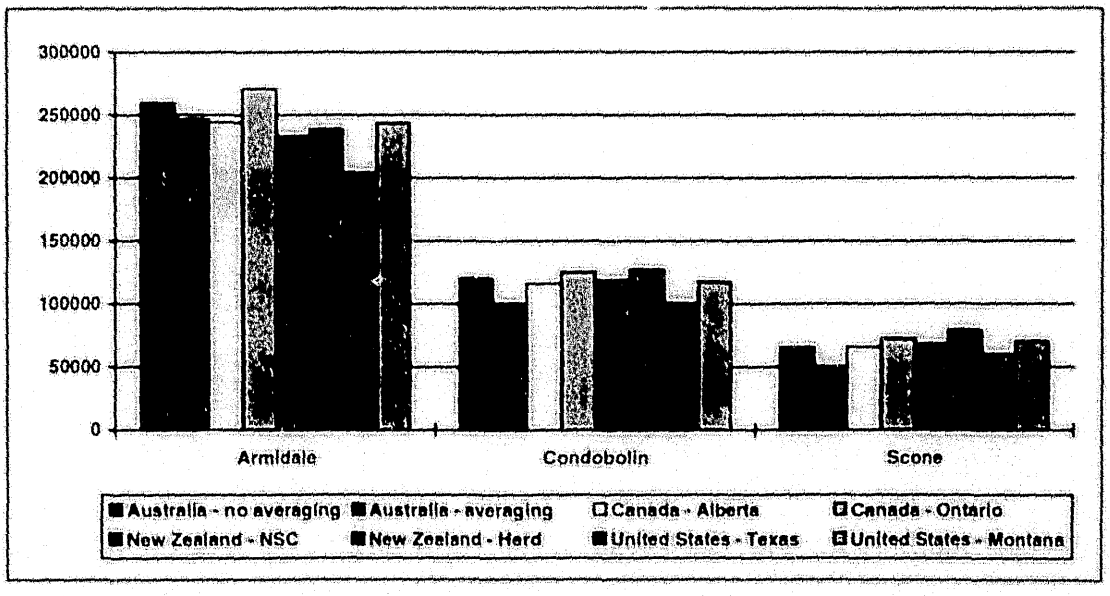


Figure 3
Tax payable discounted at 7 per cent - sole trader



Substantial differences can be seen in the amounts of taxes paid both between and within countries. Averaging always reduced tax payments by Australian farmers, while the New Zealand NSC scheme resulted in lower tax payments than the New Zealand herd scheme. Some caution must be used in interpreting the results as use of constant prices meant that there was no possibility of farmers on averaging being required to pay complementary tax. The same assumption did not allow New Zealand farmers using the herd scheme to receive increases in livestock prices tax-free.

In general, it can be said that the Australian averaging system resulted in the lowest or second lowest discounted tax payments in 5 of 6 scenarios. Canadian and New Zealand discounted tax payments were always in the higher range of results, while United States discounted tax payments were relatively high for the low income case studies, but relatively low in the high income case studies. As such, it is difficult to state that one country's tax system provides an unequivocal advantage over that of another.

3.7. Deferral of taxable income.

A critical assumption in the analysis to date has been the "sale" of all the assets in year 11. While this assumption ensured that all income (according to the *Schanz-Haig-Simons* concept) was taxed, it does not allow comparison of taxes payable for ongoing farm businesses. To examine this scenario, income and taxes paid over the 10 operating years of the case study farmers were compared. In practice, most country's systems of measuring farm income allow substantial tax deferral, as shown in Table 12.

Table 12
Taxable income in "sale" year as percentage of total taxable income

	Armidale %	Condobolin %	Scone %
Australia	16	21	46
Canada	22	25	53
New Zealand - NSC	3	9	20
New Zealand - Herd	0	0	-2
United States	22	25	53

Under the methodology used, there was no trading income in the "sale" year, any taxable income in this year resulting from either recapture of excessive depreciation allowances, or the difference between the sale and inventory values of livestock. It can be seen that the Australian, Canadian and United States systems of calculating taxable income defer taxation of significant amounts of income until the livestock and depreciable assets are sold. Calculating taxable income under the New Zealand Standard Cost option provided smaller deferrals of income, while the New Zealand Herd option provided negative deferral. The deferral of tax is effectively a long-term loan of tax by the community to the farmer, and will remain unpaid for as long as the choice of enterprises remains the same, and inventory levels are maintained.

The higher percentage of tax deferred in the Scone case study occurs because all income is derived from the sale of cattle, unlike Armidale and Condobolin where significant income is derived from the sale of other products such as wool or wheat.

Discounted tax payments for the first 10 years of the case studies are shown in figures 4 and 5

Figure 4
Tax payable discounted at 7 per cent for the 10 year operating period- 2 partners

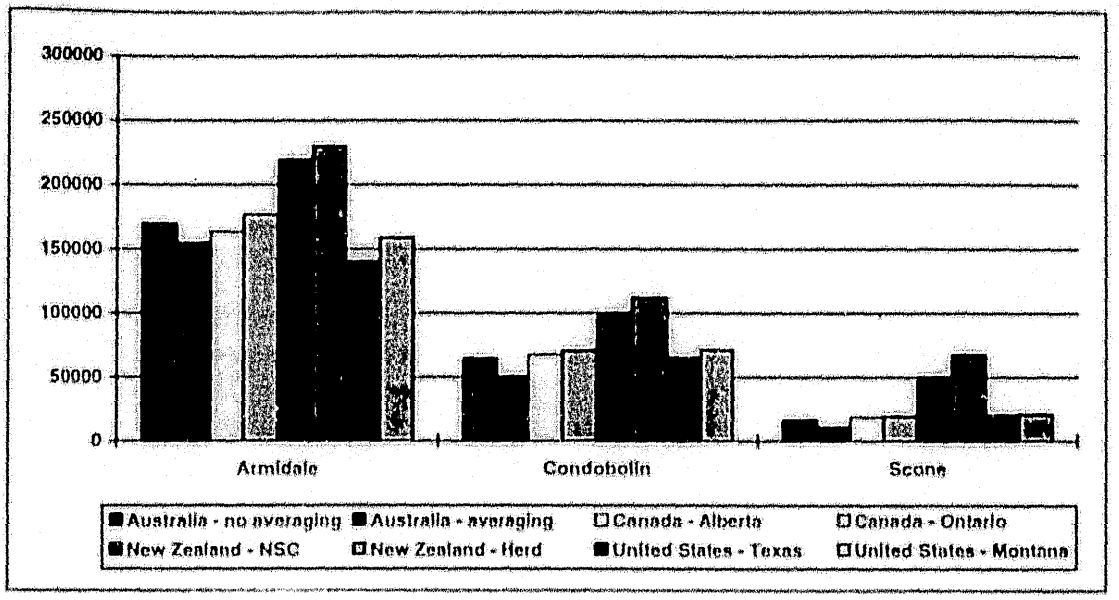
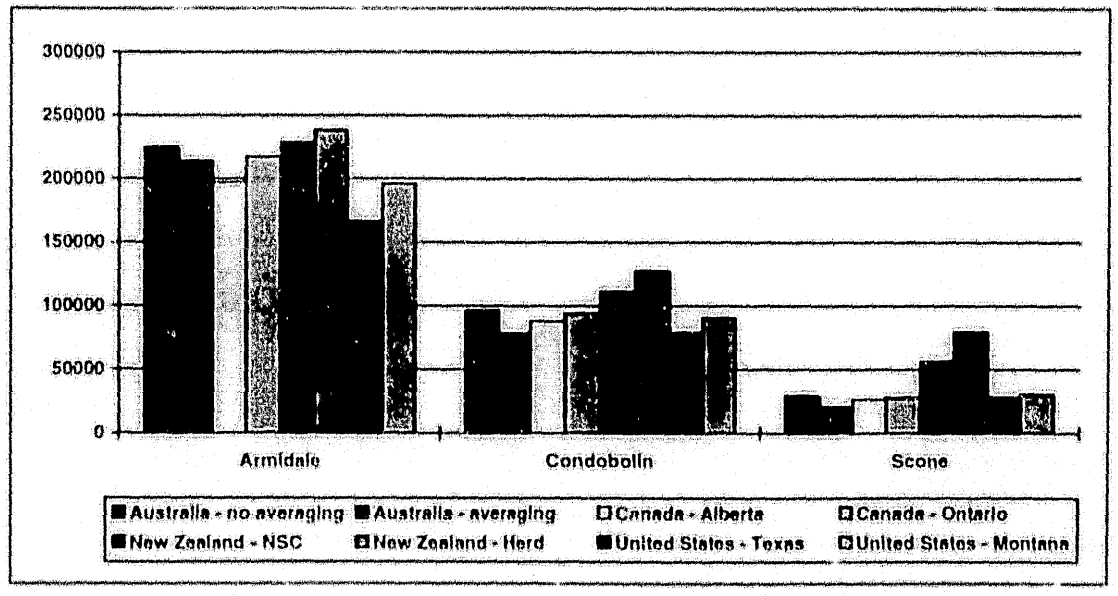


Figure 5
Tax payable discounted at 7 per cent for the 10 year operating period- sole trader



It can be seen that discounted tax payable drops significantly for all countries except New Zealand, which consistently has the largest discounted tax payable. Again, the Australian Averaging scheme provides low discounted tax payable in 4 of the 6 case scenarios, with the United States - Texas system providing the lowest discounted tax payable in the high income Armidale scenarios. The discounted value of tax deferred as a percentage of total tax payable (including the sale) over the 11 years is shown in Table 13

With the exception of New Zealand, the amounts of tax deferred are significant. At Scone, the tax systems of Australia, Canada, and the United States would have collected less than half the tax payable compared to that payable under a more neutral system of measuring taxable income. In all scenarios, the Canadian system provides the greatest tax deferrals, and the New Zealand the lowest

The obvious question is: "Will the deferred tax ever be collected?" The answer, in Australia and Canada is "Probably not, if the farm is transferred within the family", but in New Zealand and the United States, "Yes"[14]

Table 13
Discounted tax payable in "sale" year as a percentage of discounted total tax payable

	Armidale %	Condobolin %	Scone %
	Partnership/married filing jointly		
Australia - no averaging	15	23	66
Australia - averaging	15	24	65
Canada - Alberta	21	27	66
Canada - Ontario	22	28	67
New Zealand - NSC	2	6	19
New Zealand - herd	0	0	0
United States - Texas	19	22	53
United States - Montana	20	24	57
	Sole Trader		
Australia - no averaging	13	20	55
Australia - averaging	13	22	59
Canada - Alberta	19	24	60
Canada - Ontario	20	24	61
New Zealand - NSC	2	7	18
New Zealand - herd	0	0	0
United States - Texas	19	22	54
United States - Montana	19	23	57

[14] The other party to these rollover transactions not only receives the livestock or depreciated property, but also the deferred tax liability. This may not concern them if the consideration for the assets is less than market value.

In Australia, the existence of rollover relief provisions (s. 59) for any profit on disposal of machinery[15] and livestock elections (particularly s. 36AAA) available on the forced sale of livestock following an adverse event reinforce the permanency of the loan. As further rollover relief is available on transfer of trading stock and depreciable property at death, or on reorganisation of a partnership, the tax deferral may continue through generations.

Further rollover relief from capital gains tax is available on the testamentary (but not *inter vivos*) transfer of any asset. Repayment of the tax deferral will only be triggered on sale of the assets, or following a major change in the enterprise structure which does not qualify for rollover relief. Further, where income averaging is used, and the farmer exits the industry at time of final sale, part of the income tax deferred is effectively written off.

Canadian farmers are also entitled to rollover relief provision on both *inter vivos* and testamentary transfer of capital assets from spouse to spouse, or parent to child. There is also rollover relief for the testamentary transfer of inventories.

Neither New Zealand not the United States provide rollover relief on disposal of farm assets. New Zealand farmers are favoured by the absence of capital gains tax provisions.

3.8. "Life-cycle" effects

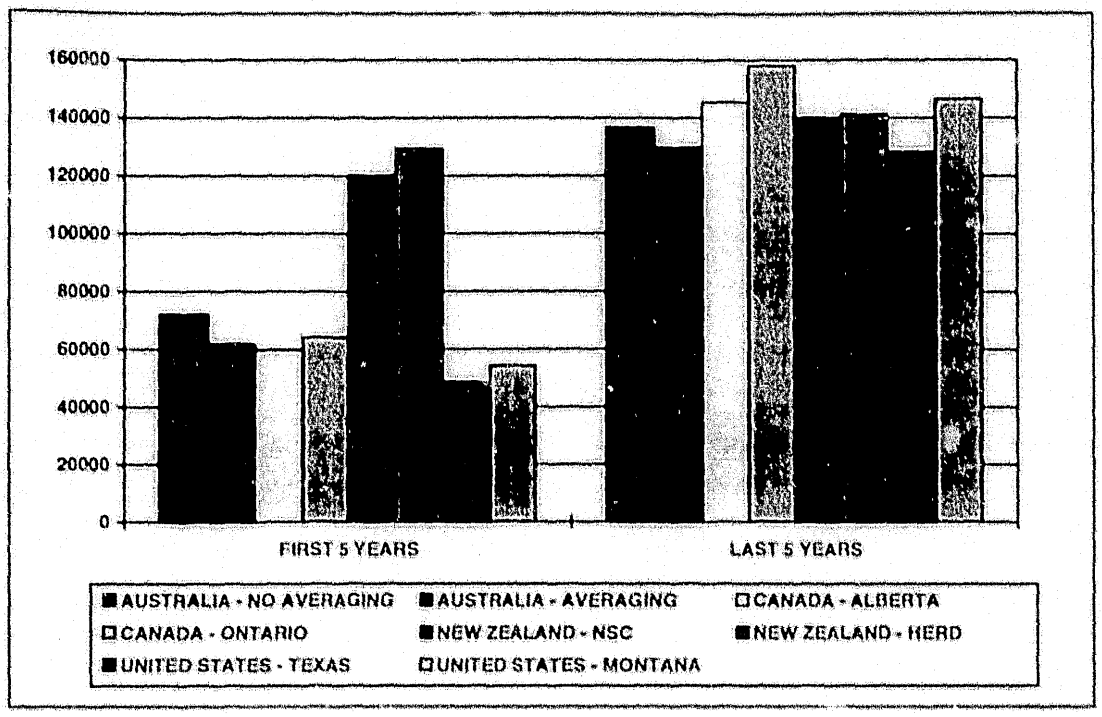
The amount of tax paid by farm businesses is heavily dependent on the length of time since major assets were acquired. This can be seen by examining the taxes paid in the first 5 operational years of the Armidale case study ("the start-up phase of the business"), compared to that paid in the last 5 operational years ("the mature phase of the business) , as shown in Figure 6.

It can be seen that the amount of tax paid over the five year periods is significantly different, with the net present values of tax payments for the Australian, Canadian and United States farm businesses approximately doubling between the start-up phase and the mature phase. It is important to note that there is a much greater disparity in tax payments between new and mature businesses in each of Australia, Canada and the United States. In New Zealand, the difference between tax paid in the formative and mature phases of the business is much less significant.

While it can be clearly seen that the New Zealand tax system defers less tax while farm businesses in their start up phase, the limitations of the case study methodology make it difficult to state that the other differences are significant. In particular, it would appear that for businesses in their mature phase, the income tax liabilities are very similar.

[15] Under s. 59, like does not have to be replaced with like, for example, a truck can replace a tractor. If there is no replacement asset, any profit on disposal can be offset against future depreciation claims by reducing the written down value of other depreciable assets.

Figure 6
Discounted taxes paid in first and last 5 year operational periods
Armidale case study - partnership/married filing jointly scenarios



4. Conclusion.

This study highlights the necessity for a holistic approach in comparing income tax systems. It is relatively easy to describe the various tax provisions of each country. However, the amounts of income tax paid in each country is a function of:

- the tax rate structure (including personal reliefs);
- the choice of enterprise structure (sole trader, partnership, etc);
- assumptions concerning the "sale" of assets at the end of the study period to ensure deferred taxes are bought to account;
- location in countries with state/provincial taxes;
- the length of time major business assets are held; and
- the scale of activity, due to differing degrees of progression in tax rates.

Therefore, the results of any comparison of taxes paid will depend on the assumptions made, meaning that care must be used in interpreting the results of this case study analysis.

Despite this caveat, general conclusions can be drawn about the size of taxes paid by Australian farmers *viz-a-viz* the other countries in the study, and the neutrality of the various tax systems.

As a rule, the discounted value of tax payments by Australian farmers on averaging compared favourably with those which would apply in Canada, New Zealand and the United States. The exception was for the high income Armidale case study under the sole trader scenario where mean taxable income was in excess of $A 100 000 p.a., a situation that applies to few Australian farmers. The case studies further showed that the Australian averaging system reduces tax payable by Australian farmers, and may allow partial write-off of deferred tax liabilities if a farmer leaves the industry.

Australian tax provisions for farmers are at least as concessional as those applying in the other 3 countries examined. The major exception is livestock valuation, where both Canada and the United States provide more concessional methods of valuing livestock. In contrast, the New Zealand system appears to be the most neutral.

Farmers in Australia, Canada and the United States received significant tax deferrals. The deferrals arose because the tax laws applying to inventories of livestock in each country are more concessional than those applying to inventories in other industry sectors. By contrast, New Zealand farmers received little deferral, with the New Zealand NSC and Herd methods of valuing livestock being consistent with accepted economic and accounting valuation principles.

The clearest symptom of the tax deferral in Australia, Canada and the United States is the manner in which taxable income increased over time. A key assumption of the case study analysis was that the same transactions were made at the same prices every year. Therefore, subject to assumptions concerning the correct method of accounting for depreciation, economic income should have been similar in every year. It is significant that inter-temporal differences in income tax payments within countries were much larger than the differences in income tax payments between countries.

The tax deferrals shown will adversely affect both the efficiency and structure of the livestock sector. By deferring up to 60 per cent of tax paid over a 10 year period until the sale of the herd, the tax system is providing both an incentive to invest in livestock, and a significant lock-in effect. The former effect will occur as, *ceretis parabis*, investment in livestock will provide a more attractive after-tax rate of return than other similar investments. However, the tax is only deferred, so that subsequent disposals of the herd/flock will attract a greater tax liability than otherwise would be the case. This additional tax liability can act as an impediment to the farmer responding to changing price signals by transferring capital to enterprises with higher pre-tax returns, resulting in a loss of economic efficiency. Furthermore, the lock-in effect may act as an impediment to farmers adjusting stocking rates in accordance with variable climatic patterns, perhaps increasing land degradation.

By initially increasing after-tax returns from livestock, tax deferrals may also affect the structure of agriculture. If after-tax returns are greater in the livestock sector than in other sectors of the economy, the price of inelastic factors of production (land, and in the short term, breeding stock) will be bid up, so reducing pre-tax returns, and equalising post tax returns across the economy. Due to differing income levels, not all farmers will be able to take advantage of the tax benefits provided. Those firms which cannot utilise the tax benefits will receive lower pre tax returns in the short run, and in the long run, may be forced from the sector (Chisholm 1976, Gardner 1994).

In Australia, Canada and the United States large tax deferrals occur in the formative years of the business. While some may argue that newly established businesses should be entitled to receive tax concessions, the convoluted method of delivery means that it is unlikely that either newly established businesses or the government are aware that tax benefits are being received. A further concern with livestock concessions, is that by providing incentives to new entrants to the sector, while simultaneously providing no incentives, and perhaps net costs, for established firms within the sector, a "vicious circle" may be created whereby the tax system which attracted new entrants makes mature firms uncompetitive, hastening their exit from the industry. Therefore, if Australian farmers are concerned with the impact of income taxes on their competitive position, their focus should be on achieving greater neutrality in the Australian income tax system.

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