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The Microdynamics and Farm Family Economics of Structural Change in Agriculture

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THE MICRODYNAMICS AND FARM FAMILYECONOMICS OF STRUCTURAL CHANGE IN AGRICULTURE

ABSTRACT

The decades of economic expansion which followed World War II witnessed a dramatic decrease in the size of the farm labour force but the fundamental structures of agricultural production remained constant in Canada and the northern United States. The economic turbulence of the last two decades has raised questions as to whether this structural continuity will persist.

To date, the rate of economic concentration did increase among the fewer but larger surviving farm units, but concentration proceeded at a quite modest and gradual pace. Most farm production was still organized by independent family enterprises and even the largest farms were relatively small units compared to enterprises in other production sectors.

Rates of entry and exit of farm enterprises in the 50+ sales percentiles, size classes which generate 93 per cent of farm sales, were also relatively modest. Upward size class mobility by farm enterprises was even more modest.

The proportion of total family income provided by non-agricultural income flows on mid-sized farms is significant and appears to be increasing. These mid-sized farms continue their role as the core component of the Canadian agricultural system. The pursuit of non-farm income sources can be viewed as a "private stabilization program" created by farm families.

Statistics Canada's Agriculture-Population Census Linkage is a unique policy analysis resource which enables us to examine relations between farm enterprise and farm family viability. The large sample size of the Ag-Pop data base permits a reliable disaggregation of variations in farm enterprise and farm family economic organization by scale of production, commodity sector, and region.

Forty per cent of the Middle 1 farm families and one-quarter of the Middle 2 families rely on non-farm income flows to attain total family income equal to or greater than Statistics Canada's Low Income Cut-Off level (LICO). The importance of non-agricultural income for mid-sized farms suggests that rural development strategies can make sense as a farm program.

KEYWORDS: farm family income poverty entry exit structure concentration

INTRODUCTION

The restructuring of world commodity and financial markets, compounded by international negotiations to restructure agricultural policies, are exerting fundamental pressures on the structure of the farm sector. In the face of these pressures, farm families are reorganizing their enterprises and rethinking their strategies.

The degree of structural reorganization of the farm sector is typically underestimated by census data published in the form of net changes in farm number and economic concentration over a given time period. "Microdynamic" analysis, which focuses on the balance between gross flows of entries and exits in the farm sector, plus paths of expansion or contraction by continuing farms, is a fundamental tool for understanding the restructuring of agriculture. Relatively modest proportional changes in gross flows can produce major proportional changes in net rates of structural change.

Agricultural production and investment strategies are formulated in terms both of the farm enterprise and the total available income flows, both farm and non-farm, which are contributed by each member of the farm family. Farm production decisions are taken within the context of total income and labour time contributions from both agricultural and non-agricultural sources by all members of the farm family. Families operating mid-sized farms still form the core of the agricultural production systems of Canada and the northern states of the U.S.A. These families are now tending towards the same two paycheck family pattern which has become prevalent in urban settings. Non-farm income has become a crucial component of total family income on many mid-sized farms and is likely to become more important over time.

The objective of this paper is to profile the microdynamics and farm family economics of structural change in agriculture. The purpose of this profile, in turn, is to advance analysis of agricultural policy by sharpening our understanding of structural change in the farm sector. An important ancillary objective is to illustrate the utility of two unique Statistics Canada data bases for analyzing the microdynamics and farm family economics of structural change:

1) the 1966-86 micro-longitudinal Census of Agriculture Match; and
2) the Agriculture-Population Census Linkages for 1971, 1981, and 1986.

ECONOMIC CONCENTRATION: THE PRIMARY DIMENSION OF FARM STRUCTURE

Understanding the way a given economic sector functions and estimating the likely outcome of policy initiatives are contingent on a knowledge of the structural characteristics of its enterprises. Economic structure is a multidimensional phenomenon. The five salient dimensions of farm structure are:

1) economic concentration: the size distribution of enterprises, i.e., the proportion of enterprises in different size classes and the proportion of total sector sales generated by class;

2) specialization: the degree to which an enterprise's sales and profits are generated by different types of production; in particular, we are interested in whether specialized commercial farms have important secondary branches of production which can, to some extent, hedge against price fluctuations in the primary branch;

3) internal organization of resources: the mix of labour, capital, and technology used to organize production, plus ownership and financing arrangements;

4) entry/exit and expansion/contraction over short-term, intermediate-term, and long-term time periods;

5) farm family economics: the totality of income and labour contributions by each family member to the farm enterprise and the extent to which total family income is generated by off-farm activities.

This paper focuses on the fourth and fifth dimensions of farm structure. The primary dimension for organizing analysis of entry/exit and farm family economics is economic concentration.

Economic concentration is both the first line and the bottom line of economic structure. The first line is that enterprises in successive size classes organize their labour forces, financing, and marketing strategies in different ways. The bottom line is that changes in the size distribution condition the manner in which labour and capital will be combined in a given sector.

Change is not unilinearly in favour of bigness and more concentration. One of the salient characteristics of the North American economy during the 1980's has been the extent to which new jobs and new technologies have been generated by small and medium-sized enterprises.

Farm enterprises in Canada and the northern states of the U.S.A. constitute small business sectors par excellence. In a context where forestry and mining are dominated by large corporations, and where very large farms are a common phenomenon throughout the Sunbelt, the institutional persistence of the family farm is a study in contrasts.

Debates over the persistence or purported disappearance of the family farm are more than debates over the most efficient way to organize production. Deeply rooted values are involved with respect to both preferences for the manner in which farm production is organized and the expected impacts of different kinds of farm enterprise organization on rural communities. The Canadian evidence suggests that a gradual decline in the number of farms and increasing average farm size has not been associated with major institutional changes in enterprise organization, i.e., the family farm has maintained a predominant and stable share of commercial agricultural production. We expect that this holds true for the northern United States as well (Ehrensaft et al, 1984).

Our focus here is on a brief examination of selected aspects of economic concentration which are necessary for analysis of the micro-dynamics and farm family economics of farm production. It is our intention, however, that this relatively technical discussion be considered within the larger context of contemporary debates over the objectives of farm policy.

Economic concentration is a relative term. In order to measure concentration, the share of output or income generated, or the share of capital held, by one class of farms is compared to the share of other classes. Census-farms are ranked in terms of a criterion such as gross sales, value-added or a given commodity, and then divided into successive size classes. Our first approach to measuring concentration in the Canadian farm sector as a whole was to rank census-farms in terms of gross sales and then partition them into successive percentile size classes for 1966, 1971, 1981, and 1986 respectively.[1]

Over time, farm firm growth includes one component which compensates for inflation, one which represents changes in efficiency, and another which adds absolute resources to the farm (Bollman, 1983). For example, to be in the top one percent of farms (the 99th percentile), a farm needed to have gross sales of $89,000 in 1971; $400,000 in 1981; and $562,550 in 1986 (Table 1). The growth in the size limits of the top one percent of farms exceeded the rate of inflation of agricultural prices (Ehrensaft and Bollman, 1983; Ehrensaft, 1987).

Table 1. Size of Gross Farm Sales at Selected Percentile Limits, CANADA(1), 1966 - 1986

	Percentile class of gross farm sales					
	1 to 24	25 to 49	50 to 74	75 to 94	95 to 98	99+
1966	< $1,490	$1,490 - 4,199	$4,200 - 9,019	$9,020 - 23,829	$23,830 - 54,139	$54,140+
1971	< $1,970	$1,970 - 5,559	$5,560 - 12,059	$12,060 - 36,189	$36,190 - 89,439	$89,440+
1981	< $5,318	$5,318 - 21,804	$21,805 - 55,999	$56,000 - 159,999	$160,000 - 399,999	$400,000+
1986	< $8,000	$8,000 - 30,276	$30,277 - 81,999	$82,000 - 235,380	$235,381 - 562,549	$562,550+

Source: Canada. Statistics Canada. Censuses of Agriculture, 1966 to 1986

(1) Institutional farms, community pastures, and farms in the Yukon and Northwest Territories are excluded.

Farms were aggregated into the following groups (Tables 1 and 2; Figure 1) :

a) "Small 1": the first quartile (percentiles 1-24, gross sales under $8,000 in 1986), which generated under 2 per cent of total gross sales;

b) "Small 2": the second quartile (percentiles 25-49, gross sales from $8,000 to $30,276) which generated 6 percent of total gross sales in 1986;

c) "Middle 1": the third quartile (50th to 74th percentiles, $30,277 to $81,999 gross sales), with 19 per cent of sales;

d) "Middle 2": percentiles 75-94 ($82,000 to $235,380), with 37 per cent of gross sales;

e) "Large 1": percentiles 95-98 ($235,381 to $562,549) which generated 18 percent of total gross sales; and

f) "Large 2" or "Top Farms": the top 1 per cent of farms ($562,550 or more gross sales), with 18 per cent of gross sales in 1986.

Between 1966 and 1981, there was a modest but persistent increase in the rate of concentration over time. The rate of concentration in terms of the share of the top one per cent and top 5 per cent of producers appears to have stabilized between 1981-86. This apparent stabilization of concentration ratios may be due to a number of factors. The difficult context of agricultural markets during the 1980's probably prevented some farm expansion. Falling land prices removed the incentive for both non-farmers and farmers to enter the market as speculators.

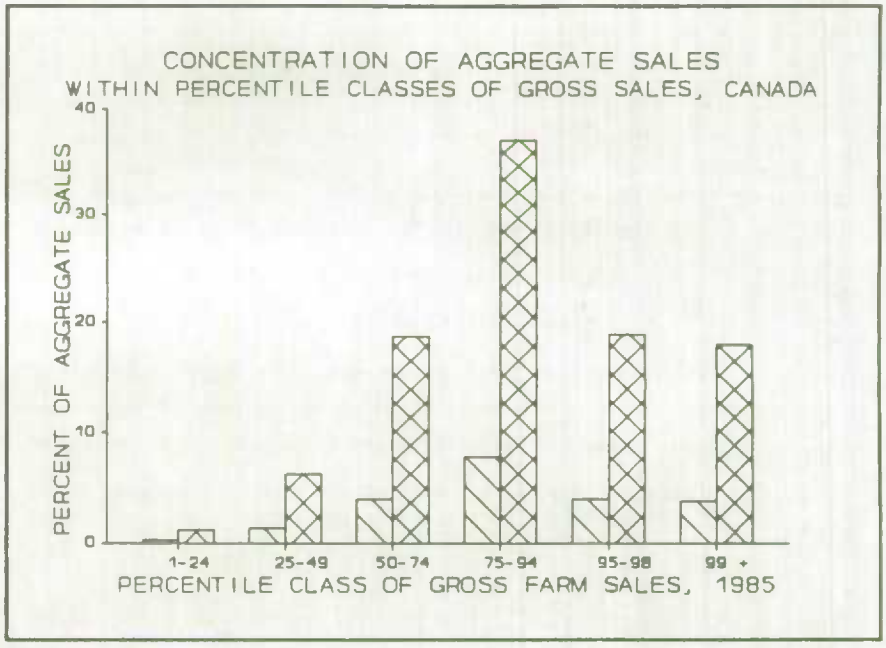

Figure 1

Table 2. Concentration of Aggregate Gross Farm Sales within Selected Percentile Classes of Gross Farm Sales, CANADA(1), 1966 - 1986

	Percentile class of gross farm sales					
	1 to 24	25 to 49	50 to 74	75 to 94	95 to 98	99+
	**** Percent of Aggregate Gross Farm Sales ****					
1966	2	9	20	36	17	16
1971	2	8	18	35	18	18
1981	1	6	18	36	19	19
1986	1	6	19	37	19	18

Source: Canada. Statistics Canada. Censuses of Agriculture, 1966 to 1986

(1) Institutional farms, community pastures, and farms in the Yukon and Northwest Territories are excluded.

Mid-sized and large farms in the 50+ sales percentiles ($30,277+) generated 93 percent of gross sales in 1986. Specialized commodity groups vary considerably in terms of the relative proportion of farms located in the middle and top size classes respectively and the proportion of total sales generated by farms in each size class. Twenty-nine per cent of the specialized poultry farms and 17 per cent of the hog farms are located in the size class defined by ranking in the top 5 per cent of all farms in terms of gross sales ($235,381+ in 1986) (Table 3B). On the other hand, only 3 per cent of the grain farms are located in this top 5 per cent class.

The case of poultry and hog farms raises the issue of whether it is more appropriate to measure and compare farm size for different types of farms in terms of gross sales as opposed to value-added, which represents the enterprise's contribution to gross national product. Relatively thin margins on high gross sales by a poultry farm may yield the same amount of value-added (sales minus intermediate inputs produced by other enterprises) as a lower level of gross sales on a grain farm which purchases a lower proportion of intermediate inputs.

Measuring size in terms of value-added emphasizes the production activity of different types of farms in total national farm production. Alternatively, measuring size in terms of gross sales emphasizes a) market shares of different size classes for a given commodity sector or for agriculture as a whole and b) shares of total inputs, including intermediate inputs and returns to farm entrepreneurs.[2] This second aspect is important in gauging the impact of large intensive farming operations such as poultry barns which mobilize relatively large quantities of labour and capital but have low ratios of value-added to gross sales. The 1986 Census of Agriculture is the first Canadian census in recent times to collect sufficiently detailed cost data to estimate value-added. This permitted us to compare the two approaches to measuring farm size and economic concentration.

Table 3(a). Number of Census-farm Operators(1) by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of gross farm sales						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of gross farm sales						
	under $8,000	$8,000 to 30,726	$30277 to 81,999	$82,000 to 235,380	$235,381 to 562,549	$562,550 and over	Total
Dairy	1,755	4,140	11,140	15,490	2,085	160	34,760
Cattle	22,625	22,210	13,535	6,830	1,490	685	67,380
Hog	1,225	1,850	2,875	4,455	1,675	440	12,525
Poultry	2,325	540	365	1,120	1,195	545	6,090
Sheep	1,900	685	170	25	5	-	2,790
Goat	905	160	30	5	5	-	1,105
Horse	2,655	1,310	495	245	50	15	4,775
Fur	315	235	110	120	50	15	845
Other animal	1,515	520	245	130	20	-	2,430
Wheat	5,625	14,080	17,995	9,630	960	85	48,380
Oilseed	1,970	4,260	3,900	2,460	340	30	12,955
Grain corn	1,015	2,170	2,050	1,675	405	55	7,375
Field pea/bean	65	145	100	70	15	-	400
Other small grain	7,055	10,040	12,455	10,080	1,600	180	41,410
GRAIN SUBTOTAL	15,730	30,695	36,500	23,915	3,325	355	110,520
Hay/fodder	970	530	205	70	10	5	1,795
Forage seed	235	265	230	135	10	5	875
Tobacco	40	80	305	1,145	205	15	1,785
Potato	425	300	430	545	275	85	2,060
Other field crops	30	40	35	40	20	5	165
Fruit	3,695	2,455	1,405	650	145	45	8,395
Vegetable	1,630	1,115	880	730	255	75	4,685
Fruit/vegetable comb.	175	80	80	40	5	-	390
Mushroom	25	20	10	40	40	40	175
Greenhouse	925	885	710	590	255	155	3,520
Nursery	785	375	230	180	95	60	1,720
Maple tree	2,095	590	85	20	5	-	2,795
Cattle/hog combination	350	710	915	640	125	60	2,800
Cattle/hog/sheep comb.	170	135	60	20	-	5	390
Livestock combination	800	775	640	400	110	115	2,840
Crop combination	70	140	200	235	75	10	735
Other	9,580	2,355	1,165	665	165	35	13,960
All types	72,945	73,195	73,040	58,490	11,695	2,925	292,285

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Operators of institutional farms and community pastures are excluded.

Table 3(b). Percent of Census-farm Operators(1) by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of gross farm sales						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of gross farm sales						
	under $8,000	$8,000 to 30,726	$30277 to 81,999	$82,000 to 235,380	$235,381 to 562,549	$562,550 and over	Total
	**** Percent Distribution within each Farm Type ****						
Dairy	5	12	32	45	6	0	100
Cattle	34	33	20	10	2	1	100
Hog	10	15	23	36	13	4	100
Poultry	38	9	6	18	20	9	100
Sheep	68	25	6	1	0	0	100
Goat	82	14	3	0	0	0	100
Horse	56	27	10	5	1	0	100
Fur	37	28	13	14	6	2	100
Other animal	62	21	10	5	1	0	100
Wheat	12	29	37	20	2	0	100
Oilseed	15	33	30	19	3	0	100
Grain corn	14	29	28	23	5	1	100
Field pea/bean	16	36	25	18	4	0	100
Other small grain	17	24	30	24	4	0	100
GRAIN SUBTOTAL	14	28	33	22	3	0	100
Hay/fodder	54	30	11	4	1	0	100
Forage seed	27	30	26	15	1	1	100
Tobacco	2	4	17	64	11	1	100
Potato	21	15	21	26	13	4	100
Other field crops	18	24	21	24	12	3	100
Fruit	44	29	17	8	2	1	100
Vegetable	35	24	19	16	5	2	100
Fruit/vegetable combination	45	21	21	10	1	0	100
Mushroom	14	11	6	23	23	23	100
Greenhouse	26	25	20	17	7	4	100
Nursery	46	22	13	10	6	3	100
Maple tree	75	21	3	1	0	0	100
Cattle/hog comb.	13	25	33	23	4	2	100
Cattle/hog/ sheep combination	44	35	15	5	0	1	100
Livestock comb.	28	27	23	14	4	4	100
Crop combination	10	19	27	32	10	1	100
Other	69	17	8	5	1	0	100
All types	25	25	25	20	4	1	100

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Operators of institutional farms and community pastures are excluded.

Table 3(c). Percent of Census-farm Operators(1) by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of gross farm sales						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of gross farm sales						
	under $8,000	$8,000 to 30,726	$30,277 to 81,999	$82,000 to 235,380	$235,381 to 562,549	$562,550 and over	Total
	**** Percent Distribution within each Gross Sales Class ****						
Dairy	2	6	15	26	18	5	12
Cattle	31	30	19	12	13	23	23
Hog	2	3	4	8	14	15	4
Poultry	3	1	0	2	10	19	2
Sheep	3	1	0	0	0	0	1
Goat	1	0	0	0	0	0	0
Horse	4	2	1	0	0	1	2
Fur	0	0	0	0	0	1	0
Other animal	2	1	0	0	0	0	1
Wheat	8	19	25	16	8	3	17
Oilseed	3	6	5	4	3	1	4
Grain corn	1	3	3	3	3	2	3
Field pea/bean	0	0	0	0	0	0	0
Other small grain	10	14	17	17	14	6	14
GRAIN SUBTOTAL	22	42	50	41	28	12	38
Hay/fodder	1	1	0	0	0	0	1
Forage seed	0	0	0	0	0	0	0
Tobacco	0	0	0	2	2	1	1
Potato	1	0	1	1	2	3	1
Other field crops	0	0	0	0	0	0	0
Fruit	5	3	2	1	1	2	3
Vegetable	2	2	1	1	2	3	2
Fruit/vegetable combination	0	0	0	0	0	0	0
Mushroom	0	0	0	0	0	1	0
Greenhouse	1	1	1	1	2	5	1
Nursery	1	1	0	0	1	2	1
Maple tree	3	1	0	0	0	0	1
Cattle/hog comb.	0	1	1	1	1	2	1
Cattle/hog/ sheep comb.	0	0	0	0	0	0	0
Livestock comb.	1	1	1	1	1	4	1
Crop combination	0	0	0	0	1	0	0
Other	13	3	2	1	1	1	5
All types	100	100	100	100	100	100	100

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Operators of institutional farms and community pastures are excluded.

Farms were ranked in terms of value-added from the smallest to the largest and classed in size classes parallel to those for gross sales. Allthe farms in the first quartile have negative value-added of -$509 or less (Table 4).
This makes sense in that we know that the large majority of very small farms are losing rather than making money.

Important shifts in farm size rankings occur when different types of enterprises are ranked by value-added as opposed to gross sales. For example, when farms in the 95-98th gross sales percentiles are re-ranked in terms value-added percentiles, we see that somewhat over one-half retain the same ranking, about a quarter drop down one size class, and ten per cent move up one size class (Table 5, Figure 2). Within the 95-98th percentile value-added class, average gross sales by farm type range from a low of $237,000 for specialized wheat farms to $492,000 for poultry farms (Figure 3).

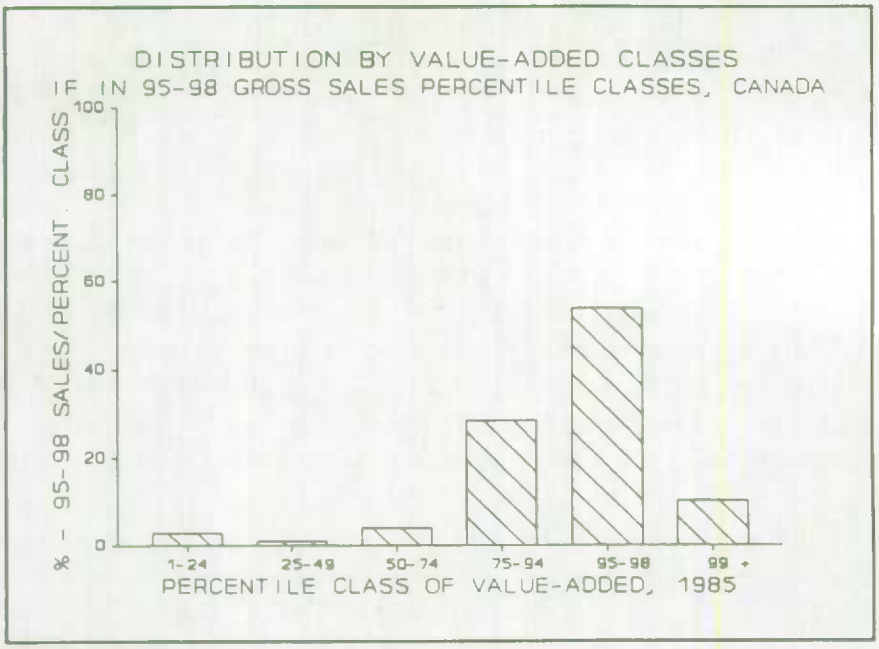

Figure 2

This more than two-to-one ratio for gross sale averages of different farm types at the same level of value-added size classes indicates the sensitivity of concentration measures to the choice of ranking criteria. From another perspective, we observe that the percentage of poultry farms in the top five percent in terms of value-added falls to 17 percent, compared to 29 percent for gross sales.

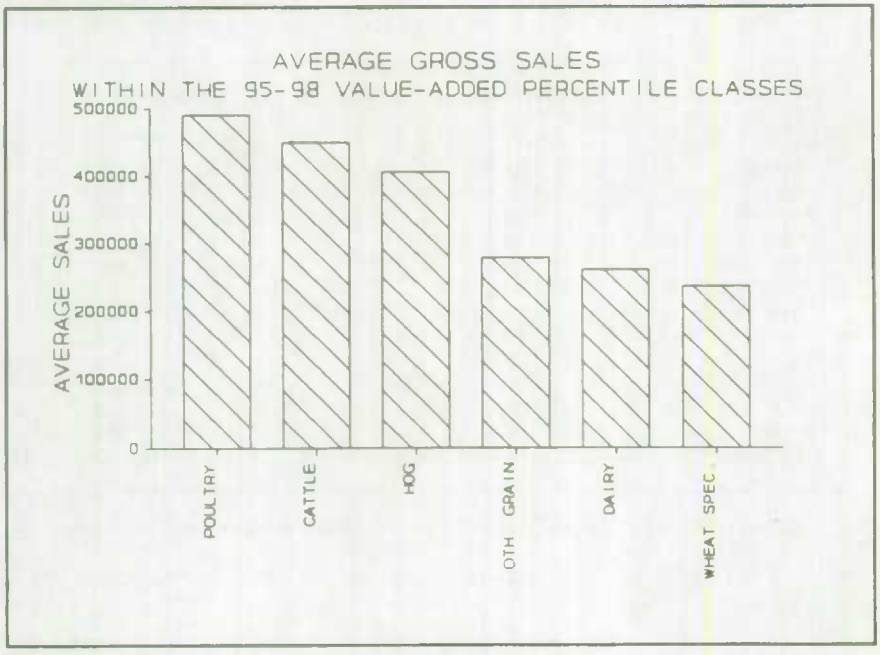

Figure 3

Hogs drop to 9 per cent in the top 5 per cent class for value-added compared to 17 per cent for gross sales. On the other hand, 5 per cent of grain farms are in the top 5 per cent class compared to 3 per cent in terms of gross sales.

Since the 1986 Census of Agriculture was the first recent census to allow a calculation of value-added, we will organize the remainder of the data in terms of gross sales size classes in order to have a time series. The use of value-added as a measure of size of production also has a problem which we will tackle in future research: a large share of calculated value-added is the residual return to unpaid family labour and family equity capital. This may be negative in some years even for farms with high gross sales. Do we really want to put a farm with over $562,050 of gross sales but a negative value-added of $-162,000 in the same size class as minor agricultural holdings with $8,000 gross sales and average negative value-added of $-5,300?

Table 4(a). Number of Census-farm Operators(1) by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of value - added						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of value - added						
	under -$159	-$159 to 9,408	$9,409 to 35,188	$35,189 to 105,522	$105,523 to 227,660	$227,661 and over	Total
	**** number of census-farm operators ****						
Dairy	2,675	3,365	10,885	14,835	2,660	335	34,760
Cattle	25,460	20,785	13,705	6,135	965	325	67,380
Hog	2,470	1,965	3,435	3,510	875	260	12,520
Poultry	1,935	1,150	640	1,315	735	310	6,090
Wheat specialty	6,540	10,715	16,780	12,465	1,685	190	48,385
Other small grain	12,880	14,550	17,970	13,680	2,615	455	62,140
GRAIN SUBTOTAL	19,420	25,265	34,750	26,145	4,300	645	110,525
Other field crops	1,440	1,550	1,150	1,590	770	170	6,680
Fruit	1,935	3,390	1,845	930	190	95	8,390
Vegetables	925	1,575	995	750	300	135	4,685
Specialty	8,370	7,045	2,425	1,385	485	440	20,150
Livestock comb.	1,885	1,320	1,595	910	180	135	6,025
Other	6,560	5,655	1,640	950	225	60	15,080
All types	73,070	73,070	73,065	58,460	11,695	2,925	292,280

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Operators of institutional farms and community pastures are excluded.

Table 4(b). Percent of Census-farm Operators(1) by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of value - added						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of value - added						
	under -$159	-$159 to 9,408	$9,409 to 35,188	$35,189 to 105,522	$105,523 to 227,660	$227,661 and over	Total
	**** percent distribution within each farm type ****						
Dairy	8	10	31	43	8	1	100
Cattle	38	31	20	9	1	0	100
Hog	20	16	27	28	7	2	100
Poultry	32	19	11	22	12	5	100
Wheat specialty	14	22	35	26	3	0	100
Other small grain	21	23	29	22	4	1	100
GRAIN SUBTOTAL	18	23	31	24	4	1	100
Other field crops	22	23	17	24	12	3	100
Fruit	23	40	22	11	2	1	100
Vegetables	20	34	21	16	6	3	100
Specialty	42	35	12	7	2	2	100
Livestock combination	31	22	26	15	3	2	100
Other	44	38	11	6	1	0	100
All types	25	25	25	20	4	1	100

Source: Canada. Statistics Canada. 1986 Census of Agriculture
(1) Operators of institutional farms and community pastures are excluded.

Table 4(c). Concentration of Aggregate Value - added by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of value - added						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of value - added						
	under -$159	-$159 to 9,408	$9,409 to 35,188	$35,189 to 105,522	$105,523 to 227,660	$227,661 and over	Total
	**** aggregate value - added ($,000,000) ****						
Dairy	-31	16	244	897	374	107	1,607
Cattle	-212	72	264	348	142	180	795
Hog	-37	8	73	212	126	114	496
Poultry	-15	2	14	86	111	193	393
Wheat specialty	-48	46	347	721	237	66	1,370
Other small grain	-101	59	367	812	377	153	1,667
GRAIN SUBTOTAL	-149	105	714	1,533	614	219	3,037
Other field crops	-11	5	23	106	112	74	310
Fruit	-8	10	36	55	28	46	169
Vegetables	-4	5	20	46	45	58	170
Specialty	-61	20	46	84	75	321	484
Livestock combination	-22	5	32	53	27	65	160
Other	-31	12	32	56	32	23	124
All types	-580	260	1,498	3,474	1,686	1,401	7,746

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Operators of institutional farms and community pastures are excluded.

Table 4(d). Concentration of Aggregate Value - added by Type and Size of Farm, Canada, 1986

Type of farm	Percentile class of value - added						
	1 - 24	25 - 49	50 - 74	75 - 94	95 - 98	99 +	Total
	Size class of value - added						
	under -$159	-$159 to 9,408	$9,409 to 35,188	$35,189 to 105,522	$105,523 to 227,660	$227,661 and over	Total
	**** percent distribution within each farm type ****						
Dairy	-2	1	15	56	23	7	100
Cattle	-27	9	33	44	18	23	100
Hog	-7	2	15	43	25	23	100
Poultry	-4	1	4	22	28	49	100
Wheat specialty	-3	3	25	53	17	5	100
Other small grain	-6	4	22	49	23	9	100
GRAIN SUBTOTAL	-5	3	24	50	20	7	100
Other field crops	-4	2	8	34	36	24	100
Fruit	-4	6	21	33	17	27	100
Vegetables	-2	3	12	27	26	34	100
Specialty	-13	4	10	17	16	66	100
Livestock combination	-14	3	20	33	17	41	100
Other	-25	10	26	45	26	19	100
All types	-7	3	19	45	22	18	100

Source: Canada. Statistics Canada. 1986 Census of Agriculture
(1) Operators of institutional farms and community pastures are excluded.

Table 5. Percent of Census-farms(1) by Size Classes of Gross Farm Sales by Size Class of Value - added (using percentile classes), Canada, 1986

Percentile group of gross farm sales	Percentile group of value - added						
	1-24	25-49	50-74	75-94	95-98	99+	Total
	**** row percent ****						
1 to 24	63	37	0	0	0	0	100
25 to 49	27	51	23	0	0	0	100
50 to 74	7	11	64	18	0	0	100
75 to 94	3	2	16	71	8	0	100
95 to 98	3	1	4	28	54	10	100
99 +	5	0	2	9	23	60	100
Total	25	25	25	20	4	1	100

Source: Canada. Statistics Canada. 1986 Census of Agriculture

(1) Institutional farms, community pastures, and farms in the Yukon and Northwest Territories are excluded.

THE MICRODYNAMICS OF ENTRY/EXIT AND EXPANSION/CONTRACTION MOVEMENTS

Net changes in farm numbers are quite sensitive to relatively minor variations in gross entry and exit flows that have stayed at the same general range for the past half-century. The tendency towards a decreasing rate of negative net change in Prairie farms between 1926 and 1986 is produced by quite modest shifts in both entry and exit flows (Figure 4). It is difficult to determine whether these shifts are related to policy or macro-economic changes or are determined more by demographic cycles that may be relatively impervious to the economic context.

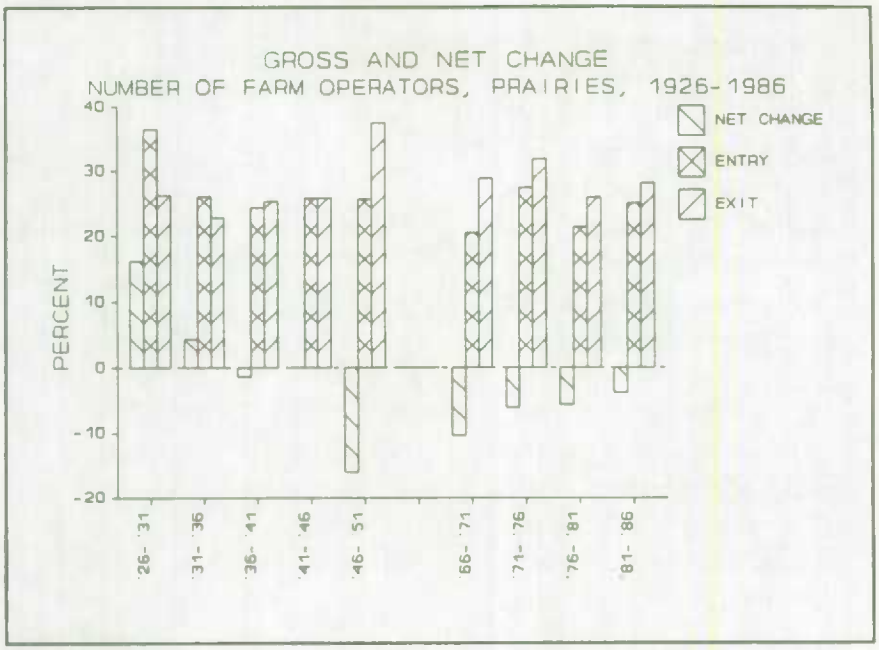

Figure 4

The high gross flow rates (32 per cent exit rate, 24 per cent entry rate for 1981-86) which exist for the farm sector as a whole do not in fact reflect the turnover rate for the mid-sized and large farms which generate the lion's share of output. This high sector-wide figure is produced by entry rates which vary from 40 to 50 percent over time for farms in the bottom gross sales quartile and the 20 to 30 per cent range for farms in the second quartile (Figure 5).

The mid-sized and larger size classes have modest 5-year entry rates in the 15-20 per cent range, which works out to a 3 to 4 per cent annual turnover.[3] This is a low rate of rotation for a sector characterized by small and medium sized enterprises. (Even the largest farms in Canada would be classified as small or medium sized enterprises within a total ranking for enterprises in all economic sectors.)

Upward and downward mobility between size classes is an important dimension of farm structure dynamics.

There are relatively low rates of upward mobility at commercial levels of production over a five year period. (Figure 6)

Only a few per cent of farms in what we have labelled the Middle 2 size class (percentiles 75-94) had moved up to this class from a lower size class.

Exits and dropping down a notch are large relative to upward mobility.

Size class mobility patterns vary within a relatively limited range over time (Table 6).

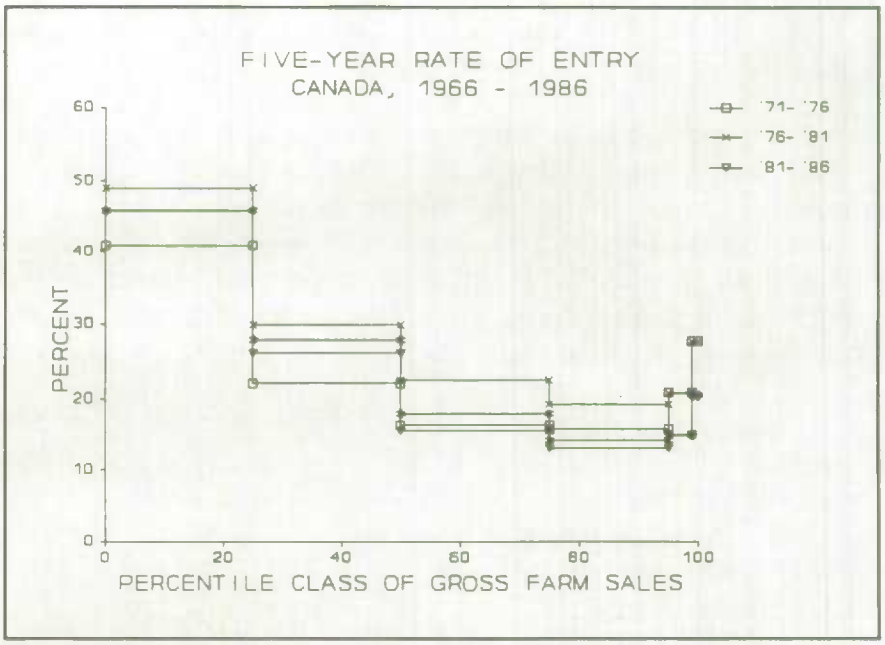

Figure 5

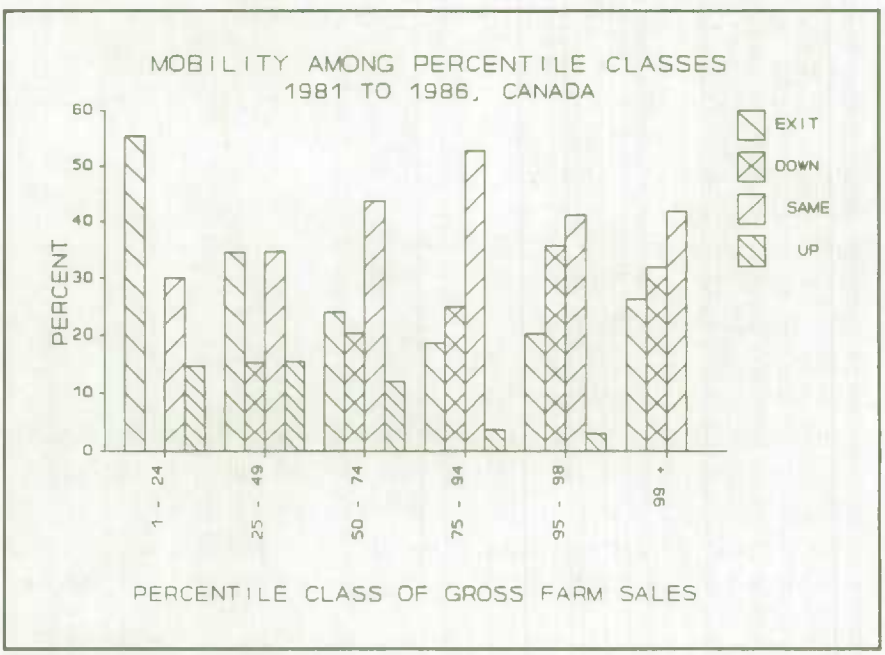

Figure 6

Table 6(a). Gross Flows of Census-farm Operators(1) among Size Classes of Gross Farm Sales (using percentile classes), Canada, 1966-1986

Percentile group of gross farm sales at beginning of period	Period	Total at beginning of period	Percentile group of gross farm sales at end of period						
			1 to 24	25 to 49	50 to 74	75 to 94	95 to 98	99 +	Exiters
1 to 24	1966-1971	107,360	29,195	10,490	3,210	1,375	265	80	62,750
	1971-1976	91,259	23,065	13,017	3,817	1,207	146	34	49,973
	1976-1981	84,430	24,828	10,629	2,081	1,235	273	51	45,333
	1981-1986	79,430	23,820	9,325	2,195	815	130	20	43,125
25 to 49	1966-1971	107,450	17,875	32,935	14,860	3,575	375	75	37,760
	1971-1976	91,316	12,248	25,188	15,136	4,597	348	41	33,758
	1976-1981	84,449	13,041	27,739	13,488	3,215	424	82	26,460
	1981-1986	79,425	12,145	27,510	9,670	2,185	250	45	27,630
50 to 74	1966-1971	107,465	5,105	22,005	36,820	14,680	720	90	28,045
	1971-1976	91,397	4,680	15,430	29,643	15,562	919	99	25,064
	1976-1981	84,450	3,793	15,850	33,113	13,880	846	126	16,842
	1981-1986	79,265	2,730	13,360	34,575	9,865	520	75	18,140
75 to 94	1966-1971	85,955	1,560	5,265	20,620	35,905	3,945	290	18,370
	1971-1976	73,090	2,380	4,877	15,654	28,420	4,873	412	16,474
	1976-1981	67,562	1,291	4,020	17,198	31,284	4,250	398	9,121
	1981-1986	63,410	695	2,285	12,850	33,420	3,080	210	10,885
95 to 98	1966-1971	17,200	205	350	870	5,690	5,225	720	4,135
	1971-1976	14,617	592	634	1,002	4,372	3,611	799	3,607
	1976-1981	13,513	142	377	948	5,149	4,243	793	1,861
	1981-1986	12,965	115	270	550	3,685	5,335	615	2,400
99 +	1966-1971	4,295	60	70	110	350	1,035	1,385	1,295
	1971-1976	3,653	94	104	126	423	804	1,056	1,046
	1976-1981	3,378	26	55	117	353	990	1,129	708
	1981-1986	3,230	40	50	105	230	635	1,350	81
Continuing Operators (subtotal)	1966-1971	429,725	54,000	71,115	76,490	61,575	11,565	2,640	152,355
	1971-1976	365,332	43,059	59,250	65,378	54,581	10,701	2,441	129,922
	1976-1981	337,782	43,121	58,670	66,945	55,116	11,026	2,579	100,325
	1981-1986	317,725	39,545	52,800	59,945	50,200	9,950	2,315	102,995
Entrants	1966-1971	87,955	37,265	20,200	14,905	11,515	3,055	1,015	
	1971-1976	102,365	41,369	25,198	19,068	12,981	2,812	937	
	1976-1981	80,301	36,318	20,768	12,322	8,302	1,939	652	
	1981-1986	77,515	33,390	20,400	13,090	8,300	1,735	600	

Source: Canada. Statistics Canada. 1966 to 1986 Census of Agriculture Match

(1) Operators of institutional farms, community pastures, and farms in the Yukon and Northwest Territories are excluded.

Table 6(b). Gross Flows of Census-farm Operators(1) among Size Classes of Gross Farm Sales (using percentile classes), Canada, 1966-1986

Percentile group of gross farm sales at beginning of period	Period	Total at beginning of period	Percentile group of gross farm sales at end of period						
			1 to 24	25 to 49	50 to 74	75 to 94	95 to 98	99 +	Exiters
		Gross flows as proportion of number in class at beginning of period (transition probability matrice)							
1 to 24	1966-1971	1	.27	.10	.03	.01	.00	.00	.58
	1971-1976	1	.25	.14	.04	.01	.00	.00	.55
	1976-1981	1	.29	.13	.02	.01	.00	.00	.54
	1981-1986	1	.30	.12	.03	.01	.00	.00	.54
	average	1	.28	.12	.03	.01	.00	.00	.55
25 to 49	1966-1971	1	.17	.31	.14	.03	.00	.00	.35
	1971-1976	1	.13	.28	.17	.05	.00	.00	.37
	1976-1981	1	.15	.33	.16	.04	.01	.00	.31
	1981-1986	1	.15	.35	.12	.03	.00	.00	.35
	average	1	.15	.31	.15	.04	.00	.00	.35
50 to 74	1966-1971	1	.05	.20	.34	.14	.01	.00	.26
	1971-1976	1	.05	.17	.32	.17	.01	.00	.27
	1976-1981	1	.04	.19	.39	.16	.01	.00	.20
	1981-1986	1	.03	.17	.44	.12	.01	.00	.23
	average	1	.04	.18	.37	.15	.01	.00	.24
75 to 94	1966-1971	1	.02	.06	.24	.42	.05	.00	.21
	1971-1976	1	.03	.07	.21	.39	.07	.01	.23
	1976-1981	1	.02	.06	.25	.46	.06	.01	.14
	1981-1986	1	.01	.04	.20	.53	.05	.00	.17
	average	1	.02	.06	.23	.45	.06	.00	.19
95 to 98	1966-1971	1	.01	.02	.05	.33	.30	.04	.24
	1971-1976	1	.04	.04	.07	.30	.25	.05	.25
	1976-1981	1	.01	.03	.07	.38	.31	.06	.14
	1981-1986	1	.01	.02	.04	.28	.41	.05	.19
	average	1	.02	.03	.06	.32	.32	.05	.20
99 +	1966-1971	1	.01	.02	.03	.08	.24	.32	.30
	1971-1976	1	.03	.03	.03	.12	.22	.29	.29
	1976-1981	1	.01	.02	.03	.10	.29	.33	.21
	1981-1986	1	.01	.02	.03	.07	.20	.42	.25
	average	1	.01	.02	.03	.09	.24	.34	.26
	entrants as proportion of continuing farmers								
Entrants	1966-1971	.20	.69	.28	.19	.19	.26	.38	
	1971-1976	.28	.96	.43	.29	.24	.26	.38	
	1976-1981	.24	.84	.35	.18	.15	.18	.25	
	1981-1986	.24	.84	.39	.22	.17	.17	.26	
	average	.24	.83	.36	.22	.19	.22	.32	

Source: Canada. Statistics Canada. 1966 to 1986 Census of Agriculture Match

(1) Operators of institutional farms, community pastures, and farms in the Yukon and Northwest Territories are excluded.

FARM FAMILY ECONOMICS: THE "AG-POP" LINKAGE

Farm production and investment strategies are formulated within the context of total income and labour time contributions from all members of the farm family from all sources of revenue, both farm and non-farm. Farm production in Canada and the northern U.S. is still very much a family affair. An estimated one-third of the total income reported by families working on mid-sized and large farms is contributed by the spouses and children of farm operators.

Non-farm income has become a crucial component of total family income on mid-sized farms which form the core of the Canadian agricultural system. On the average, non-farm income flows account for one-half of total farm family income in the Middle 1 size classes and one-fifth of family income in the Middle 2 size classes.

The financial viability of farming activities can be analyzed along two dimensions: 1) the viability of the farm enterprise, which involves the capacity of agricultural production to generate income flows which pay current production costs, depreciation, retire debt, and provide the farm family with adequate income to cover living expenses; and 2) the viability of the farm family, which includes the capacity of both farm and non-farm income flows earned by each member of the farm family to provide a total family income that covers production costs, depreciation, debt payments, and an adequate level of living expenses.

The financial viability of Canadian farm enterprises and farm families respectively will be analyzed via use of the recently released 1986 Agriculture-Population Census Linkage. Statistics Canada's "Ag-Pop" data base provides farm organizations, policy makers, and agribusiness with a unique resource for analyzing the economic organization of farm production. Information on the farm enterprise derived from the Census of Agriculture is linked to information on the farm family which is contained in the Census of Population. The linkage is performed for a 20 percent sample of all census-farm households. This large sample size permits reliable disaggregation by farm size, commodity specialization, and region. The Ag-Pop linkage has been performed for the 1971, 1981, and 1986 Censuses.

Systematic data on the interface between the farm enterprise and the modern economic organization of the farm family first became available in Canada through the Farm Expenditure and Income Survey of 1958. A synthesis of the data and analysis of major aspects of the farm enterprise/farm family interface was presented by Fitzpatrick and Parker (1965). Taxfiler data were later employed both to analyze trends in the farm enterprise/farm family interface (Porteus, 1974) and the relative incomes of farm and non-farm families.

A major step forward was taken with the creation of the 1971 Ag-Pop linked data base. The 1958 survey had been based on a sample of 8,077 farms.

The 20 per cent sample of all farm households in the Ag-Pop linkage provided obvious advantages for analyzing structural trends in the highly diversified Canadian agricultural sector. Pioneering analyses of this first Ag-Pop linkage were performed by Shaw (1979a, 1979b, 1979c). Shaw found a decrease in farm/non-farm income disparities whenmeasurements were made on the basis of family rather than individual incomes; a decrease in farm/non-farm income gaps over time; the appearance of part-time farming as an enduring feature of structural adjustment in Canadian agriculture; and near parity of imputed earnings from net capital holdings by the farm and urban populations respectively.

Tendencies towards a two paycheck farm family structure are profiled in a Statistics Canada monograph by Beyrouti, Dion, and Welsh (1989). In a context of decreasing farm numbers, they measured an increase in the number of farm families where the farm operator reports an agricultural occupation and the spouse reports a non-agricultural occupation. Thirty-one per cent of families on farms in the 50+ sales percentiles reported this occupational structure in 1986. A fifth of total family income on farms in the 50+ sales percentiles was contributed by spouses.

AVERAGE TOTAL FAMILY INCOME BY SIZE CLASS

The turbulent agricultural markets of the 1980's have rekindled debates concerning the financial viability of the contemporary structure of agriculture and the possible "disappearing middle" in North American farming.
Let us begin with a broad comparison of the average family incomes of the farm and non-farm population respectively.

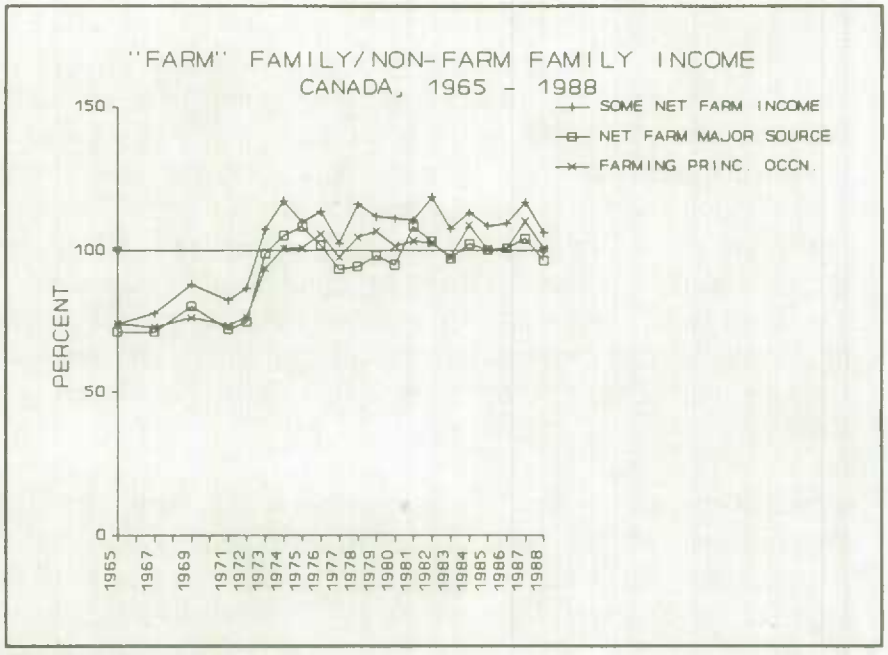

Figure 7

The ratio of "farm" family to non-farm family income for the 1965-88 period is presented according to three different definitions of a farm family: families with one individual with some net farm income; families where net farm income is the major source of income for one individual in the family; and families where at least one person declares the principal occupation to

be in agriculture. Since the early 1970's, farm and non-farm family incomes have been basically at parity (Figure 7). One possible objection to this picture of parity is that a much higher proportion of the non-farm households consist of unattached individuals compared to the farm households: "families" composed of unattached individuals have lower average incomes than other family types and this would pull down average non-farm family income, creating an artificial impression of farm/non-farm income parity. However, when both farm and non-farm families are restricted to married couples with both spouses present, the same pattern of farm/non-farm income parity is indicated.

According to the hypothesis of the declining middle, contemporary costs of production and financial markets operate in a manner that squeezes the incomes of families on mid-sized commercial farms. Average family incomes for non-farm families and families on both smaller and larger farms are higher than the average incomes of mid-sized farm families. The implication is that, in the absence of resources to move to a larger scale of production, mid-sized farm families would be better off by moving to part-time farming at a smaller scale or moving out of farming altogether.

The total farm family income flows indicated by the 1986 Ag-Pop data do not, on the average, indicate a squeezing out of the mid-sized farms or declining levels of welfare relative to the general farm population. Total incomes for farm families in the bottom half of the sales range are indicative of the incomes of non-farm families in general since families on these smaller farms average about zero net income from agriculture. Their income is basically off-farm income.

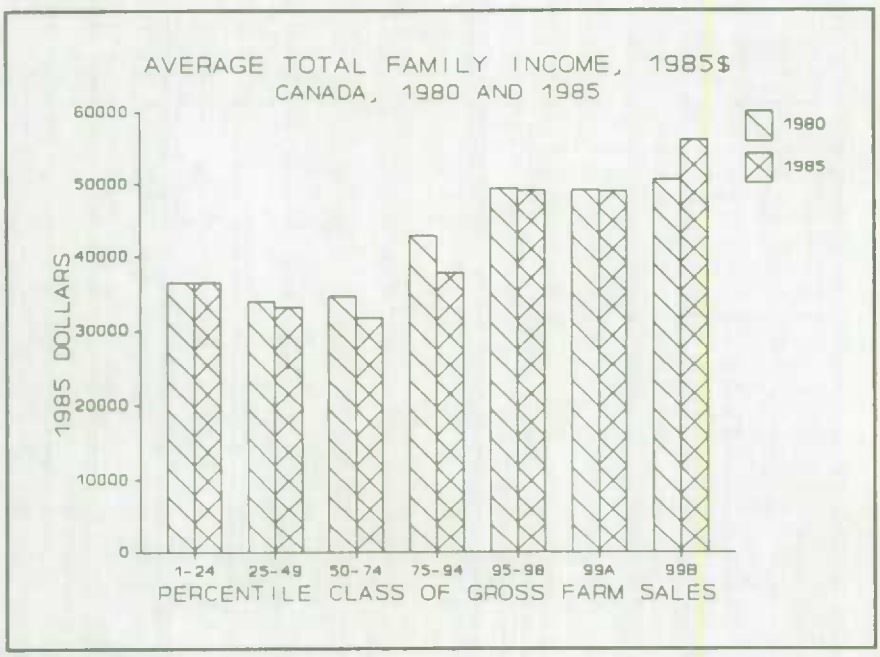

Figure 8

Average total family incomes for Middle 1 farmers (percentiles 50-74) were modestly lower than the incomes of families on small farms (Figure 8 and Table 7). Average family incomes for the Middle 1 farms was $31,700 as compared to $36,400 for the Small 1 farms and $33,100 for the Small 2 farms. Other things being equal, the Middle 1 farm families would increase their total incomes by 15 per cent by moving to the bottom of the size scale.

Table 7. Farm Families with Low and Adequate Income by Size Class of Gross Farm Sales, CANADA, 1981 and 1986

	Percentile class of gross farm sales							
	1-24	25-49	50-74	75-94	95-98	99A	99B	75+
	Size class of gross farm sales							
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 to $839,999	$840,000+	$82,000+
1986								
Average Total Family Income	36,442	33,080	31,692	37,784	49,143	48,951	56,069	40,081
% Families with Low Total Income(1)	13	19	23	20	16	11	18	19
Average Low Family Income	7,675	6,451	5,834	4,458	-956	-14,251	-40,412	2,575
% Families with Adequate Total Income(2)	87	81	77	80	84	89	82	81
Average Adequate Family Income	40,812	44,903	39,380	46,269	58,568	56,281	78,028	60,631
	Size class of gross farm sales							
	Under $5,318	$5,318 to $21,804	$21,805 to $55,999	$56,000 to $159,999	$160,000 to $399,999	$400,000 to $599,999	$600,000+	$56,000+
1981								
Average Total Family Income	25,468	23,660	24,168	29,891	34,545	34,317	35,347	30,837
Average Total Family Income, $1985 (3)	36,441	33,854	34,580	42,769	49,428	49,102	50,576	44,123
% Families with Low Total Income(1)	13	18	21	19	19	19	15	19
Average Low Family Income	4,795	4,052	3,567	263	-7,886	-8,694	-47,342	2,352
Average Low Family Income, $1985 (3)	6,861	5,798	5,104	376	-11,284	-12,440	-67,739	3,365
% Families with Adequate Income(2)	86	81	79	81	81	81	85	81
Average Adequate Family Income	28,746	28,100	29,526	36,890	44,416	44,414	49,636	47,558
Average Adequate Family Income, $1985 (3)	41,131	40,207	42,247	52,784	63,552	63,549	71,021	68,048

Source: Canada. Statistics Canada, Agriculture-Population Linkages, 1981 and 1986.

(1) Low Income = total family income less than Statistics Canada Low Income Cut-Off level (LICO), adjusted by family size. For 1985, LICO ranged from $7,567 for a one-person rural family to $21,414 for a rural family with 7 or more persons. In 1980, the range was from $5,289 to $14,966.

(2) Adequate Income = total family income >= LICO, adjusted by family size.

(3) 1980 income adjusted by Statistics Canada's consumer price index: 1988 = 1.0000; 1985 = 0.8844; 1981 = 0.6181.

But other things are often not equal at all. First, the income increment that could, in principle, be derived by downsizing is dependent upon the availability of off-farm jobs and the qualifications of members of the farm family to fill the jobs if available. Secondly, as we shall see below, the Middle 1 size class contains a high proportion of younger farm operators. The relatively lower average family income for this size class reflects, in part, the fact that 1) younger families at the beginning of their career tracks have lower average incomes than older farmers and 2) the aspiration of many of these younger mid-sized farmers is to move up the size scale. The microdynamic data suggest, as we have seen above, that only a modest fraction of the Middle 1 farmers will achieve the desired size class mobility. Younger Middle 1 farmers exhibit the same relative vulnerability which predominates among new small business enterprises in general.

Moving up one size class, to the Middle 2 level, increases average family incomes to $37,800, a level somewhat above that of the families on smaller farms. Moving to the 95th sales percentile or above would yield family incomes considerably above those of either part-time farm families on small farms or non-farm families.

Average total family income during the 1980's for successive size classes does not suggest strong pressures towards a disappearing middle in agriculture. How does this compare with income patterns in previous decades? The Farm Income and Expenditure Survey of 1958 provides us with one benchmark set of data (Fitzpatrick and Parker, 1965). When their gross sales size class categories are converted into percentile equivalents, the data indicates that the modest observed dip in total average total family income occurs for Small 2 farms rather than Middle 1 farms (Fitzpatrick and Parker, 1965:56). The 1971 income tax data analyzed by Porteus also indicates an income dip for Small 2 farms rather than Middle 1 farms, but this time the dip is pronounced rather than modest (Porteus, 1974:118). This pronounced dip is associated with the very low grain prices which prevailed in 1970.[4]

The modest dip in average total family income has shifted, then, from the Small 2 farmers during the 1950's through the early 1970's to the Middle 1 farmers during more recent years. The causes and implications of this shift deserve further research.

INTRACLASS VARIATION IN TOTAL FAMILY INCOME

Average family income patterns for successive size classes can contain a great deal of variation within each class. The proportions of farm families in 1980 and 1985 who reported total family incomes less than Statistics Canada's Low Income Cut-Off level (LICO) are compared (Figure 9). The Low Income Cut-Off level is adjusted for family size and place of residence.[5] The LICO level is defined in terms of the proportion of family income devoted to essential expenditure items (food, clothing, and housing), which is relatively high for low income families.[6]

The proportion of families on Middle 1 farms with total incomes less than LICO was over 20 per cent in both 1980 and 1985, while only 13 per cent of families on smaller farms reported incomes less than LICO (Figure 9). If the operator of a Middle 1 farm was 25-34 years of age, the proportion of families with total incomes less than LICO rises to 32 per cent. This highlights the discussion in the previous discussion concerning the age structure contribution to the modest dip in the average total family incomes on Middle 1 farms. The Middle 1 size class contains a high proportion of younger farmers, and a high proportion of Middle 1 farm families with younger operators report low total incomes.

COMPONENTS OF FARM FAMILY TOTAL INCOME

Total family income, as reported on the Agriculture-Population Linkage, can be disaggregated into 1) net farm income, 2) wages and non-farm self-employment income, 3) investment income, and 4) government transfer payments (including family allowances, child tax credits, government pensions, unemployment insurance, and welfare but not farm program payments); 5) pension income from previous employment; and 6) "other income," a residual category which includes a diversity of sources, e.g., alimony.

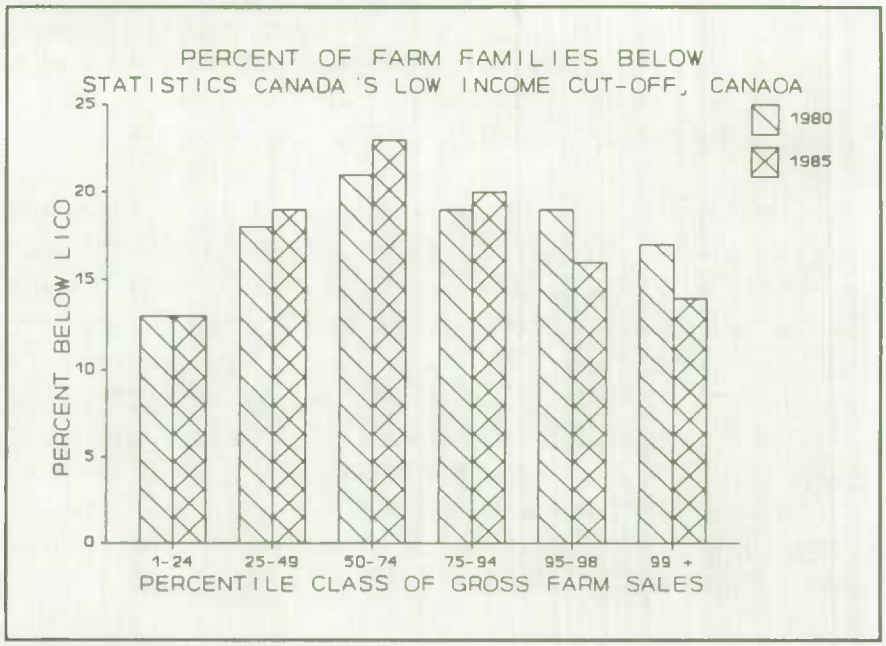

Figure 9

The contribution of agriculture to total family income tends to be <u>understated</u> by the Agriculture-Population Linkage because structural change in commercial agriculture has led to changes in the way that farm enterprise profits are received by the operator and other family members. We have attempted to correct this understatement by defining and calculating an "agricultural income." Net farm income refers to the profits earned by an unincorporated farm enterprise.

As farms with higher sales levels have adopted an incorporated legal organization in order to minimize tax obligations and facilitate the inheritance process, profits are taken in the form of dividends, wage payments to family members, and retained earnings. Thus, for families on incorporated farms, some of the reported investment income may flow from dividends paid by the farm corporation. The Ag-Pop base only takes account of earnings that are received by individuals. Thus earnings retained by a farm corporation are not measured as family income. Given the fact that one-fifth of gross farm sales are now generated by incorporated enterprises this constitutes a significant gap in the data.

Wages paid to family members by the farm corporation, as opposed to off-farm income, may constitute an important fraction of the "wages" reported as received by farm family members. An important fraction of wages paid by the farm enterprise may flow to family members on unincorporated farms as well as on incorporated farms.[7] Reported investment is likely to include earnings on accumulated past profits from the farm operation on both unincorporated and incorporated farms.

Consequently, the ratio of farm wages paid to family members to total family wage and non-farm self-employment earnings was calculated for each family. The approximated wage component flowing from the farm enterprise was added to net farm income in order to obtain present earnings from agricultural production.

Investment earnings from agriculture were estimated by multiplying the reported investment earnings by the ratio of net farm income plus wages from the farm enterprise divided by the sum of net farm income plus total family wage and non-farm self-employment earnings. We realize that there is a debate concerning the analysis of investment income flows in farm family income. Some studies treat all investment income as non-farm income, the interpretation being that farmers have chosen to place surplus income in investments off the farm rather than in the farm enterprise. Our view is that it is prudent for any enterprise to retain a certain fraction of its surplus for a rainy day. It is also prudent for the enterprise to invest these savings in instruments that yield a good return. Hence a portion of total farm family investment flows can be treated as a hedging fund related to future fluctuations in income flows from the farm enterprise.

Our rough estimate of investment flows assumes that the relative weight of the different components of past family earnings which generate current income flows are the same as the relative weight of current components of family earnings. The manner in which the income data is presented in our tables permits readers to make alternative interpretations of the role of investment flows in agricultural income.

The agricultural income flow for each family is thus comprised of 1) net farm income, plus 2) farm wages paid to the operator's family, plus 3) investment earnings attributed to the farm. The agricultural income flow may be viewed as one measure of the financial viability of the farm enterprise: this flow indicates the ability of farm production to pay current production costs and depreciation plus providing a minimal standard of living for the farm family.

Agricultural income flows are indicated for farm families which report adequate total family income, i.e., income equal to or greater than LICO (Table 8). This approach is chosen in terms of farm policy debates. One concern is with the capacity of families on mainstream, mid-sized farms to generate adequate incomes. We have seen that more than four out of five families on farms with gross sales above the median report adequate incomes. The reader will recall that farms with sales above the median generate 93 per cent of total Canadian gross farm sales. For these commercial farm families that are "making it," what are the relative weights of the different components of total family income? How many of these families achieve adequate total income on the basis of farm enterprise income alone?

Table 8(a). Agricultural(1) and Non-agricultural Family Income By Farm Size and Family Income Level, CANADA, 1985

	Size class of ADJUSTED (10) gross farm sales						
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 and over	Total
AGRICULTURAL INCOME (6) and LOW TOTAL FAMILY INCOME (7)							
1. Number of farm families (5)	5,380	12,895	15,905	11,745	1,805	325	48,055
2. Percent of families in sales class	13	18	22	20	15	13	19
3. Average (unincorporated) net farm income	-2,653	-1,726	-1,059	-2,736	-10,024	-41,732	-2,440
4. Average "agricultural" wages (2)	33	166	580	1,276	2,424	3,831	669
5. Average non-agricultural wages	4,666	4,162	3,259	2,739	2,534	5,529	3,520
6. Average total wages (#4+#5)	4,699	4,328	3,839	4,015	4,958	9,360	4,189
7. Average "agricultural" investment income (3)	352	500	494	509	1,581	1,733	533
8. Average non-agricultural investment income	228	243	171	98	163	289	179
9. Average total investment income (subtotal)	580	743	665	607	1,744	2,022	712
10. Average AGRICULTURAL income (#3+#4+#7) (1)	-2,268	-1,060	15	-951	-6,019	-36,168	-1,238
11. Average non-farm self-employment income	572	512	351	148	559	592	379
12. Average superannuation and other income	256	241	138	114	95	64	171
13. Average transfer income	3,729	2,606	2,222	2,230	2,158	1,966	2,492
14. Average NON-AGRICULTURAL income (#5+#8+#11+#12+#13) (4)	9,451	7,764	6,141	5,329	5,509	8,440	6,741
15. Average total family income (#10+#14)	7,183	6,704	6,156	4,378	-510	-27,728	5,503

Table 8(b). Agricultural(1) and Non-agricultural Family Income By Farm Size and Family Income Level, CANADA, 1985

	Size class of ADJUSTED (10) gross farm sales						
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 and over	Total
LOW AGRICULTURAL INCOME (6) and ADEQUATE TOTAL FAMILY INCOME (8)							
1. Number of farm families (5)	35,250	50,460	28,520	13,695	2,095	510	130,520
2. Percent of families in sales class	85	71	39	23	18	21	50
3. Average (unincorporated) net farm income	-1,249	362	2,584	3,812	2,786	362	813
4. Average "agricultural" wages (2)	68	325	947	1,870	2,388	2,296	594
5. Average non-agricultural wages	29,772	27,620	22,803	20,326	21,154	35,137	26,309
6. Average total wages (#4+#5)	29,840	27,945	23,750	22,196	23,542	37,433	26,903
7. Average "agricultural" investment income (3)	277	363	375	420	412	717	351
8. Average non-agricultural investment income	3,413	2,514	2,131	2,561	9,737	9,114	2,819
9. Average total investment income (subtotal)	3,690	2,877	2,506	2,981	10,149	9,831	3,170
10. Average AGRICULTURAL income (#3+#4+#7) (1)	-904	1,050	3,906	6,102	5,586	3,375	1,758
11. Average non-farm self-employment income	2,434	2,929	2,841	3,348	4,368	5,537	2,853
12. Average superannuation and other income	1,330	995	712	907	918	1,638	1,016
13. Average transfer income	4,406	4,035	3,456	3,454	3,243	2,396	3,929
14. Average NON-AGRICULTURAL income (#5+#8+#11+#12+#13) (4)	41,355	38,093	31,943	30,596	39,420	53,822	36,926
15. Average total family income (#10+#14)	40,451	39,143	35,849	36,698	45,006	57,197	38,684

Table 8(c). Agricultural(1) and Non-agricultural Family Income By Farm Size and Family Income Level, CANADA, 1985

	Size class of ADJUSTED (10) gross farm sales						
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 and over	Total
ADEQUATE AGRICULTURAL INCOME (9) and ADEQUATE TOTAL FAMILY INCOME (8)							
1. Number of farm families (5)	1,020	7,225	28,175	34,740	7,880	1,595	80,640
2. Percent of families in sales class	2	10	39	58	67	66	31
3. Average (unincorporated) net farm income	-1,646	9,275	20,110	31,638	42,532	47,375	26,559
4. Average "agricultural" wages (2)	31	498	1,770	4,378	10,160	19,586	3,930
5. Average non-agricultural wages	273	4,875	7,705	6,113	5,862	8,969	6,516
6. Average total wages (#4+#5)	304	5,373	9,475	10,491	16,022	28,555	10,446
7. Average "agricultural" investment income (3)	28,759	10,796	5,221	4,381	5,252	5,731	5,670
8. Average non-agricultural investment income	231	1,097	785	525	362	597	649
9. Average total investment income (subtotal)	28,990	11,893	6,006	4,906	5,614	6,328	6,319
10. Average AGRICULTURAL income (#3+#4+#7) (1)	27,144	20,569	27,101	40,397	57,944	72,692	36,159
11. Average non-farm self-employment income	-32	639	892	865	1,010	1,977	879
12. Average superannuation and other income	5,181	1,748	734	531	468	325	759
13. Average transfer income	6,584	4,516	2,848	2,293	2,055	2,220	2,716
14. Average NON-AGRICULTURAL income (#5+#8+#11+#12+#13) (4)	12,237	12,875	12,964	10,327	9,757	14,088	11,519
15. Average total family income (#10+#14)	39,381	33,444	40,065	50,724	67,701	86,780	47,678

Table 8(d). Agricultural(1) and Non-agricultural Family Income By Farm Size and Family Income Level, CANADA, 1985

	Size class of ADJUSTED (10) gross farm sales						
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 and over	Total
Subtotal: ADEQUATE FAMILY INCOME (8)							
1. Number of farm families (5)	36,270	57,685	56,700	48,430	9,975	2,105	211,16
2. Percent of families in sales class	87	82	78	80	85	87	8
3. Average (unincorporated) net farm income	-1,260	1,478	11,294	23,771	34,189	36,022	10,64
4. Average "agricultural" wages (2)	67	347	1,356	3,669	8,528	15,412	1,86
5. Average non-agricultural wages	28,942	24,769	15,300	10,131	9,073	15,287	18,75
6. Average total wages (#4+#5)	29,009	25,116	16,656	13,800	17,601	30,699	20,61
7. Average "agricultural" investment income (3)	1,078	1,670	2,783	3,261	4,235	4,521	2,38
8. Average non-agricultural investment income	3,324	2,337	1,463	1,101	2,331	2,653	1,99
9. Average total investment income (subtotal)	4,402	4,007	4,246	4,362	6,566	7,174	4,37
10. Average AGRICULTURAL income (#3+#4+#7) (1)	-115	3,495	15,433	30,701	46,952	55,955	14,89
11. Average non-farm self-employment income	2,365	2,642	1,873	1,567	1,715	2,836	2,0
12. Average superannuation and other income	1,439	1,089	723	637	563	642	91
13. Average transfer income	4,467	4,096	3,154	2,621	2,304	2,263	3,45
14. Average NON-AGRICULTURAL income (#5+#8+#11+#12+#13) (4)	40,537	34,933	22,513	16,057	15,986	23,681	27,22
15. Average total family income (#10+#14)	40,422	38,428	37,946	46,758	62,938	79,636	42,12

Table 8(e). Agricultural(1) and Non-agricultural Family Income By Farm Size and Family Income Level, CANADA, 1985

	Size class of ADJUSTED (10) gross farm sales						
	Under $8,000	$8,000 to 30,276	$30,277 to $81,199	$82,000 to $235,380	$235,381 to $562,549	$563,550 and over	Total
ALL FARM FAMILIES (5)							
1. Number of farm families (5)	41,645	70,580	72,610	60,175	11,780	2,430	259,22
2. Percent of families in sales class	100	100	100	100	100	100	10
3. Average (unincorporated) net farm income	-1,440	892	8,587	18,597	27,408	25,550	8,21
4. Average "agricultural" wages (2)	63	314	1,186	3,202	7,592	13,852	1,64
5. Average non-agricultural wages	25,807	21,005	12,662	8,688	8,070	13,973	15,92
6. Average total wages (#4+#5)	25,870	21,319	13,848	11,890	15,662	27,825	17,57
7. Average "agricultural" investment income (3)	984	1,457	2,282	2,724	3,828	4,145	2,03
8. Average non-agricultural investment income	2,925	1,953	1,179	905	1,999	2,335	1,65
9. Average total investment income (subtotal)	3,909	3,410	3,461	3,629	5,827	6,480	3,69
10. Average AGRICULTURAL income (#3+#4+#7) (1)	-393	2,663	12,055	24,523	38,828	43,547	11,90
11. Average non-farm self-employment income	2,133	2,253	1,539	1,290	1,538	2,534	1,78
12. Average superannuation and other income	1,286	934	595	535	491	564	77
13. Average transfer income	4,372	3,824	2,950	2,545	2,282	2,223	3,28
14. Average NON-AGRICULTURAL income (#5+#8+#11+#12+#13) (4)	36,523	29,969	18,925	13,963	14,380	21,629	23,42
15. Average total family income (#10+#14)	36,130	32,632	30,980	38,486	53,208	65,176	35,33

Source: Canada. Statistics Canada, Agriculture-Population Census Linkage, 1986.

(1) "Agricultural income" = family (unincorporated) net farm income + "agricultural" wages(2) + "agricultural" income.

(2) "Agricultural" wages = "cash wages paid to family members" (as reported on the Census of Agriculture questionnaire) up to a maximum of the total wages received by all family members as reported on the Census of Population questionnaire.

(3) "Agricultural" investment is the share of family investment income that is deemed to have been generated from past farm earnings. We also wish to capture the share of reported investment income that is received as dividends from a farm corporation.

"Agricultural investment" is calculated as (net farm income + "agricultural wages") divided by (net farm income + total family wages + net non-farm self-employment income) multiplied by (total family investment income).

(4) Non-agricultural income = total family income - "agricultural" income.

(5) Excluded are families of operators of institutions, community pastures, non-family corporations, Hutterite colonies, and miscellaneous types such as estates and trusts. Also excluded are unmarried operators and families with more than one operator.

(6) Agricultural income less than Statistics Canada's low income cut-off level (LICO). For rural Canada in 1985, LICO ranged from $7,567 for a one-person family to $21,414 for families with 7 or more persons. LICO for each farm family is adjusted for family size.

(7) Total family income less than LICO, adjusted by family size.

(8) Total family income equal to or greater than LICO, adjusted by family size.

(9) Agricultural income equal to or greater than LICO, adjusted by family size.

(10) Gross sales are adjusted to correct for apparent under-reporting. In cases where the family (unincorporated) net farm income (after depreciation) is larger than the net cash farm income (before depreciation) calculated on the Census of Agriculture questionnaire, gross sales are re-calculated as total expenses on the Census of Agriculture questionnaire plus family net farm income reported on the Census of Population questionnaire.

This focus on farm families on commercial enterprises is <u>not</u> meant to suggest that the proper measure of the relation of farm to non-farm family incomes is the ratio of the incomes of "successful" farm families to average Canadian non-farm incomes. In order to perform this kind of comparison, we would have to compare our successful farm families to non-farm families with incomes above LICO and also adjust the comparison by factors such as age composition and family size as well. Within the context of debates over policy options such as targeting or decoupling, it is important to have benchmark measures of the components of total family income for farm families with adequate and non-adequate incomes respectively. For other purposes, a measure of the average family incomes for a size class as a whole may be more appropriate. In this paper, the focus is on commercial farm families reporting adequate incomes.

When family income from reported net farm income is compared to our estimation of "agricultural income" for farms in the 50+ sales percentiles, the difference between the two measures is large (Figure 10). Reported net farm income is <u>gross farm revenue</u> (gross farm sales <u>and</u> farm government payments) less current costs and depreciation.

Thus the reported levels of agricultural income flows do include a component of farm government payments which varies by commodity sector, farm size, and province. Estimation of this government payments component on a per farm basis is problematic - an algorithm for assigning the benefits of selected farm government payments to census-farms has been developed (Bollman, 1989). At this point, we wish to call the reader's attention to the fact that reported agricultural income flows involve an important but unspecified government payments component.

Total family income is an indicator of the financial viability of the farm family.

Average 1985 agricultural income flows on farms with adequate total family incomes range from $15,430 for the Middle 1 farms (percentiles 50-74); $30,700 for the Middle 2 farms percentiles 75-94); $46,950 for Large farms (percentiles 95-98); $55,960 for Top farms in the 99th percentile group (Table 8D).

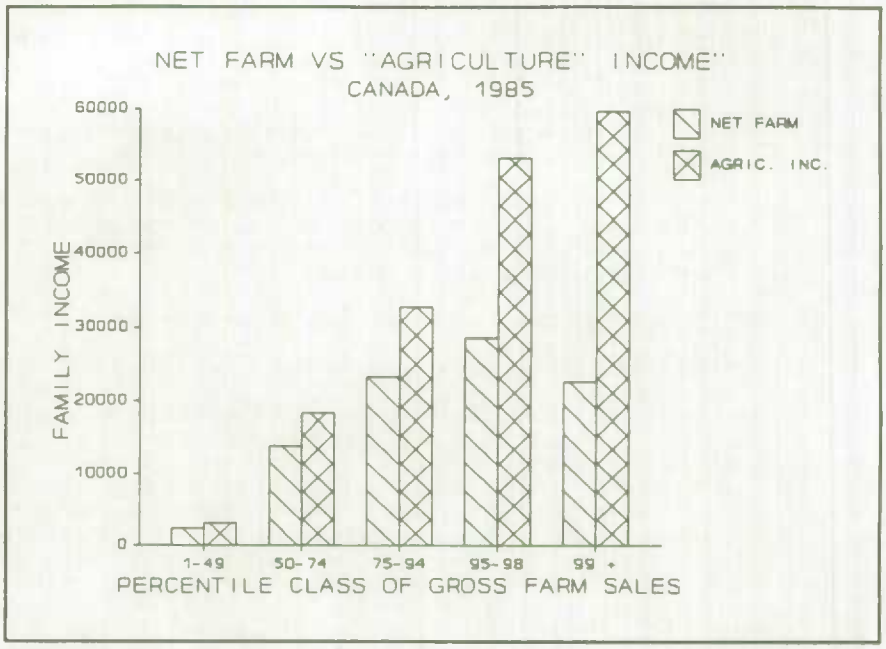

Figure 10

On Middle 1 farms, the average agricultural income flow for families with adequate total income was sufficient to provide the farm family with an income greater than LICO (the 1985 LICO point for a rural family of four persons was $15,310). We shall see, however, that a major fraction of commercial farm families with total incomes above LICO do not have agricultural incomes above LICO. For these families, the deficit is filled by off-farm work. Average off-farm wage and self-employment earnings reported by families on Middle 1 farms were $15,300, just a shade under the LICO point for a family of four persons.

The relative weight of agricultural income flows for families with income above LICO varies significantly as farm size increases. The average proportion of agricultural income flows in total family income increases from 39 percent for the Middle 1 farms to 64 percent for the Middle 2 farms to an 67 to 73 percent range for farms in the 95+ sales percentiles (Figure 11A).

The tendencies for the relative weight of farm-related income given by our estimated of agricultural income presents a significant contrast with the tendencies measured directly from the data as reported, i.e. where farm wages paid to farm family members are reported as "off-farm" wages (Figure 11B).

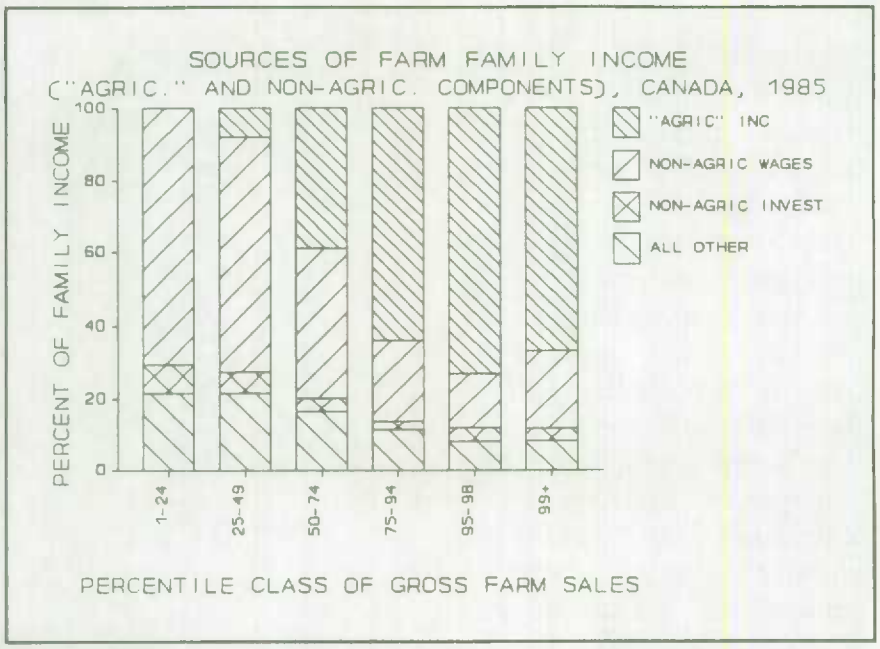

Figure 11(a)

Off-farm earnings and non-farm investment flows provided 59 percent of total 1985 family income on Middle 1 farms and 34 percent on Middle 2 farms. For larger farms, this non-farm component of farm family income is still significant, varying from 25 to 30 per cent of total family income. Government non-farm transfer payments such as child allowances and pensions provide an average 8 percent of total family income on Middle 1 farms and 6 percent on Middle 2 farms. Non-farm transfer payments play a minor role in the income of families on larger farms.

Families operating larger farms generally win or lose on the basis of agricultural income flows alone. Low or negative agricultural income flows on mid-sized farms are frequently within a range that can be counterbalanced by off-farm earnings. Whether this counterbalancing occurs is related to a series of factors such as the availability and wage levels of off-farm work in rural regions, the qualifications and desires of family members for off-farm work, and the ability to perform farm production tasks when some family labour time is shifted to off-farm work.

For some families, it is possible that these modest losses are an anticipated part of operations in the sense that the family knows that they can count on sustaining a certain level of low or negative returns because of off-farm income flows. This may relate to a phase of enterprise building, a calculation that long-term capital gains may compensate for relatively low cash flow returns, or a hope that a sunnier day is around the corner.

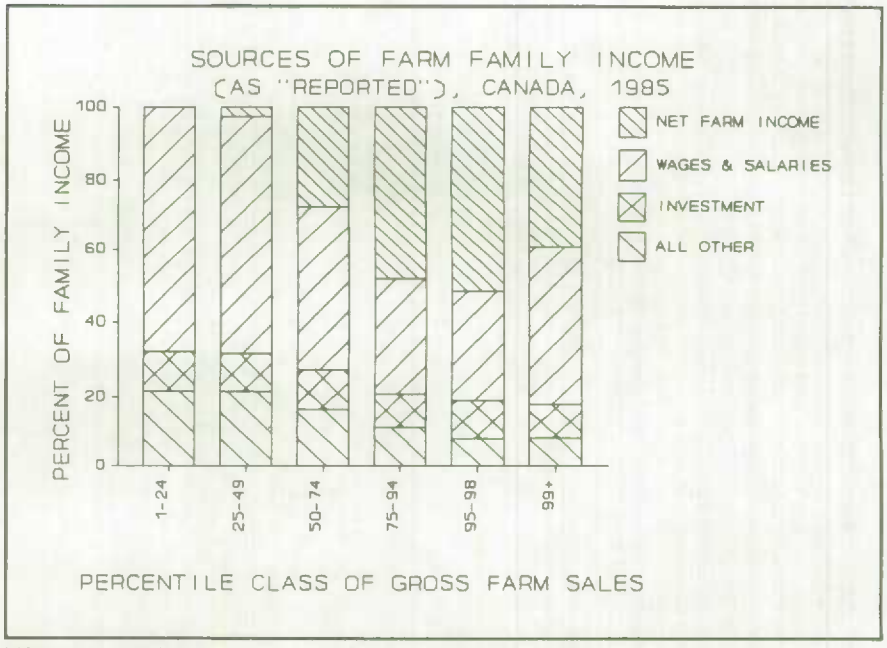

Figure 11(b)

VARIATIONS IN FAMILY INCOME BY COMMODITY SECTOR

A significant asset of the Agriculture-Population Census Linkage with respect to policy analysis is the large size of the sample and thus the ability to reliably disaggregate data by commodity sector, farm size, and region. The variation in proportions of Middle 1 farms with low incomes ranges from 36 percent for hog farrow-to-finishing operations to 16 percent for both poultry and fruit and vegetable farms. In the case of Middle 2 farms, the range is from 30 percent for farrow-to-finishing farms to 12 percent for poultry farms (Table 9).

With the exception of small feedlot operations, the various branches of the cyclical hog and beef sectors are at the top of the list in terms of the proportion of farms with total family incomes less than LICO in 1985.

We would expect that the sectors where prices and production are regulated by marketing boards, dairy and poultry, would exhibit a lower proportion of families with low income.[8] Poultry is at the bottom range of the distribution. While the dairy sector has a smaller proportion of families with low incomes than the average proportion of the farm sector as a whole, it is much closer than poultry to the middle of the rank-ordering of commodity sectors by the proportion of farms with family income less than LICO. This bears further investigation, as does the low proportion of farm families involved in specialized fruit and vegetable production which report low incomes.

Table 9. Percent of Mid-sized(1) Farms with Low(2) Family Income, by Commodity Sector, CANADA, 1985

Percentile class of gross farm sales					
50 - 74			75 - 94		
Size class of gross farm sales					
$30,277 to $81,999			$82,000 to $235,380		
Commodity Sector	Percent with low income	Rank	Commodity Sector	Percent with low income	Rank
Farrow-to-Finish	36	1	Farrow-to-Finish	30	1
Farrowing	35	2	Finishing	26	2
Finishing	30	3	Feedlot	25	3
Cow-Calf	28	4	Cow-Calf	24	4
Cow-Calf-Finishing	28	5	Cow-Calf-Finishing	24	5
Dairy	21	6	Farrowing	22	6
Small Grain	21	7	Small Grain	21	7
Feedlot	19	8	Dairy	17	8
Wheat	18	9	Fruit & Vegetable	17	9
Poultry	16	10	Wheat	16	10
Fruit & Vegetable	16	11	Poultry	12	11
TOTAL	23		TOTAL	20	

Source: Canada. Statistics Canada, Agriculture-Population Linkage, 1986.

(1) Mid-sized farms refer to farms in the 50 to 90th percentiles ($30,277 to $235,380)

(2) Low income refers to families with total family income less than Statistics Canada's Low Income Statistics Canada's Low Income Cut-off level adjusted for family size. For rural Canada in 1985, LICO ranged from $7,567 for a one-person family to $21,414 for a family with 7 or more persons.

(3) Farms with 50 per cent or more of imputed gross sales from a given commodity.

ENTERPRISE VIABILITY AND FARM FAMILY INCOME VIABILITY

As outlined above, the viability of farms and farm families can be analyzed in terms of:

1) the viability of the farm enterprise, which involves the capacity of farm production to generate income flows which pay current production costs, depreciation, retire debt, and provide the farm family with adequate income to cover living expenses; and

2) the viability of the farm family, which includes the capacity of both farm and non-farm income flows earned by each member of the farm family to provide a total family income that covers production costs, depreciation, debt payments, and an adequate level of living expenses.

Farm families can find themselves in one of three situations:

1) agricultural income alone is equal to or greater than Statistics Canada's Low Income Cut-Off (LICO);
2) agricultural income is less than LICO but non-agricultural income is sufficient to raise total family income above LICO; or
3) neither agricultural income alone nor total family income, including non-agricultural income flows, are equal to or above LICO.

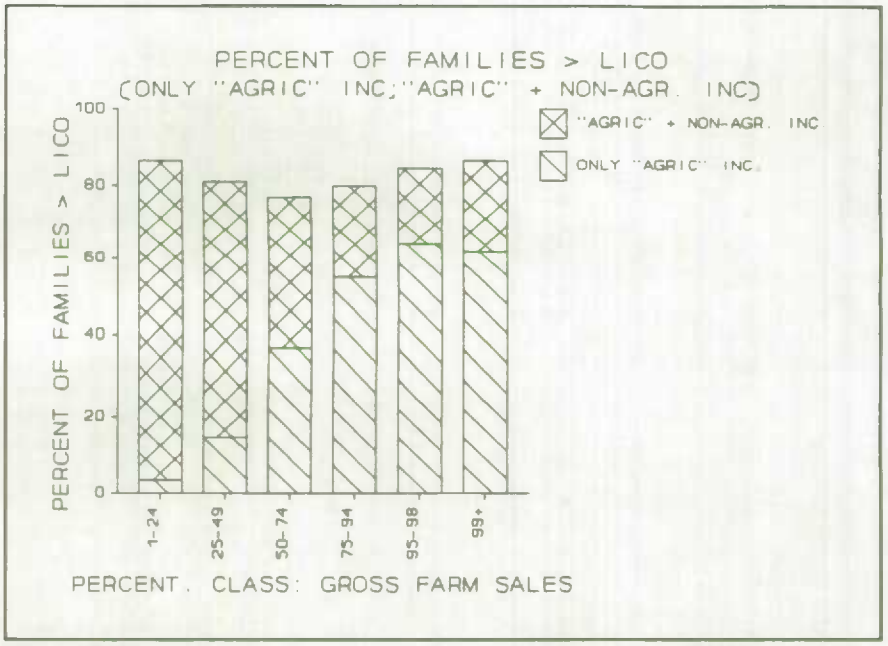

Figure 12

The proportion of farm families which have agricultural incomes that are equal to or greater than LICO is roughly one-third in the case of the "Middle 1" farms (percentiles 50-74), one-half for the "Middle 2" farms (percentiles 75-94), and two-thirds for the larger farms. (Figure 12 and Table 8A)

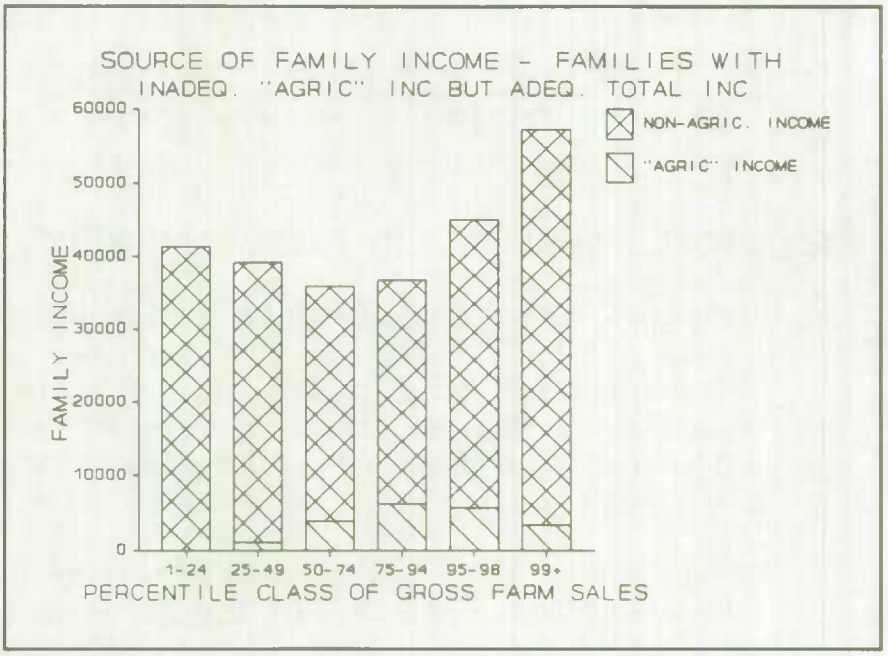

Figure 13

For families with adequate agricultural income, the level of total family income decreases modestly as one proceeds from the smallest farms to the Middle 1 farms, from $40,420 to 37,950.

Then average total income rises to $46,760 for the Middle 2 farms; $62,940 for families on farms in the 95-98th percentiles; and $79,640 for families on the largest farms in the 99th percentile. Major flows of non-agricultural incomes are indicated for families on the mid-sized farms where families have total incomes above LICO but agricultural income below LICO. Half of the families on Middle 1 farms depend on non-agricultural income flows to raise their total incomes above low income levels. The same is true for one-quarter of the Middle 2 farms and one-fifth of the families on larger farms in the 95+ sales percentiles. These families show very small but positive agricultural income and high levels of non-agricultural income (Figure 13).

Over one-fifth of the families on mid-sized farms have total incomes which are less than LICO. On the average, these families have both negative agricultural incomes and relatively low non-agricultural incomes. At the top end of the scale, families on farms in the 99th percentile with total incomes less than LICO reported average negative agricultural incomes of -$41,730. Few outside employment opportunities would provide after-tax income flows sufficient to cover these losses. The dependence of these families on the performance of the farm enterprise alone is also indicated by the 76 percent of these largest farms with agricultural incomes above LICO: average reported agricultural income is $72,690 compared with $14,090 non-agricultural income.

One can also ask whether the absolute scale of resources needed to operate today's mid-sized family farm has become so large as to preclude the possibility of off-farm revenues compensating for poor profits.
The 1986 Ag-Pop data suggests that off-farm employment can compensate for the average losses, or positive but low agricultural incomes, reported by families operating farms in the 50th through 98th sales percentiles ($30,277 to $562,549).

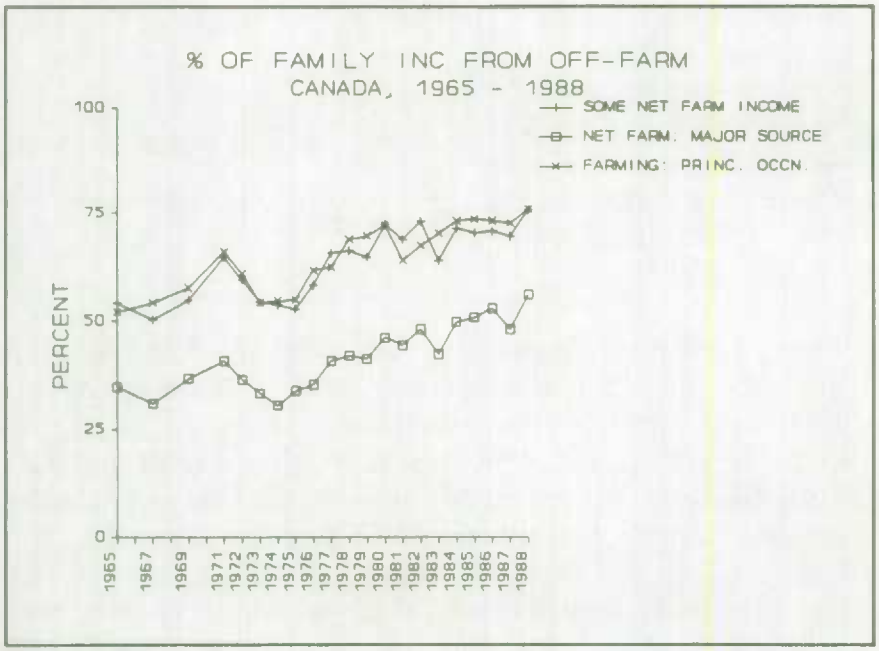

Figure 14

At the Canada level, there has been a slow and persistent increase in the proportion of total family income from off-farm sources over the past 2 decades (Figure 14). Full-time off-farm work by one adult member of the family on a Middle 1 farm would constitute, on the average, a good hedging strategy to compensate for up to a 50 per cent fluctuation in gross farm sales (Bollman and Smith, 1987).

ANNUAL INCOME FLOWS: A RANDOM WALK?

Questions have been raised as to whether income figures for a given year mean much in the face of highly fluctuating commodity prices and weather, plus opportunities for creative cash accounting. Culver, Tomiak, and Bollman (forthcoming) have examined differences in 4-year average costs by farm size for Prairie grain farmers who were in the annual National Farm Survey sample for four consecutive years during the 1983-86 period (Figure 15).

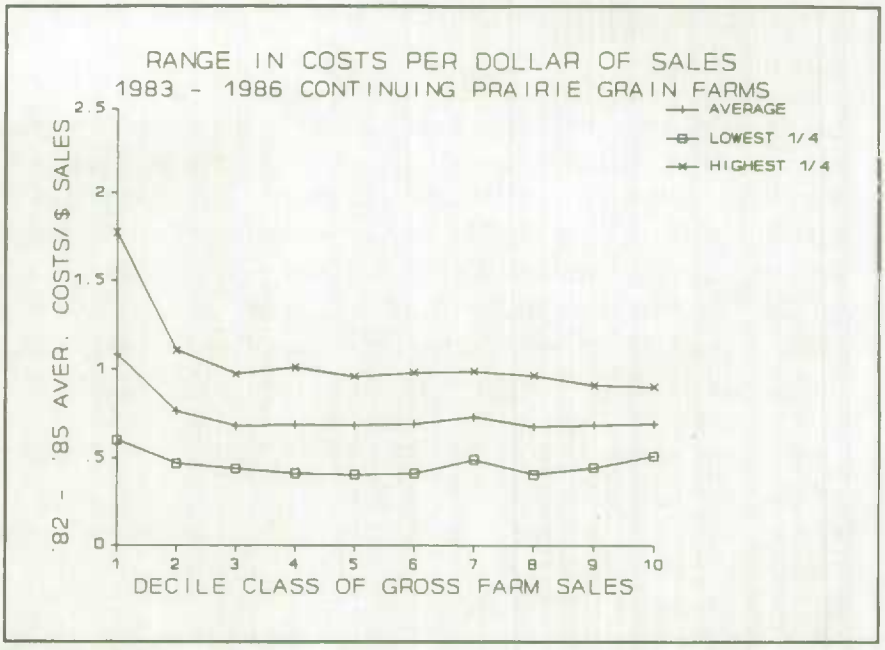

Figure 15

Three curves are presented: the class average, the highest quarter, and the lowest quarter. The differences between these extreme quartiles in costs per dollar of sales are significant. Aside from the first decile of smaller farms, costs are basically constant per dollar of sales across the size scale. The curves suggest that the relative efficiency of farm managers, as measured by costs per unit of production, is probably not an annually random variable but a pattern that persists over time.

The net cash farm income of grain farms, despite the persisting differences in the efficiency of farm operations, is variable and low. For the Prairie grain farms which continued operations over the 1982 - 1986 period, only about one-quarter of mid-sized farms obtained net cash farm income greater than the low income cut-off for four consecutive years. About one-half of the mid-sized farms had net cash farm income greater than LICO for three of the four years (Figure 16).

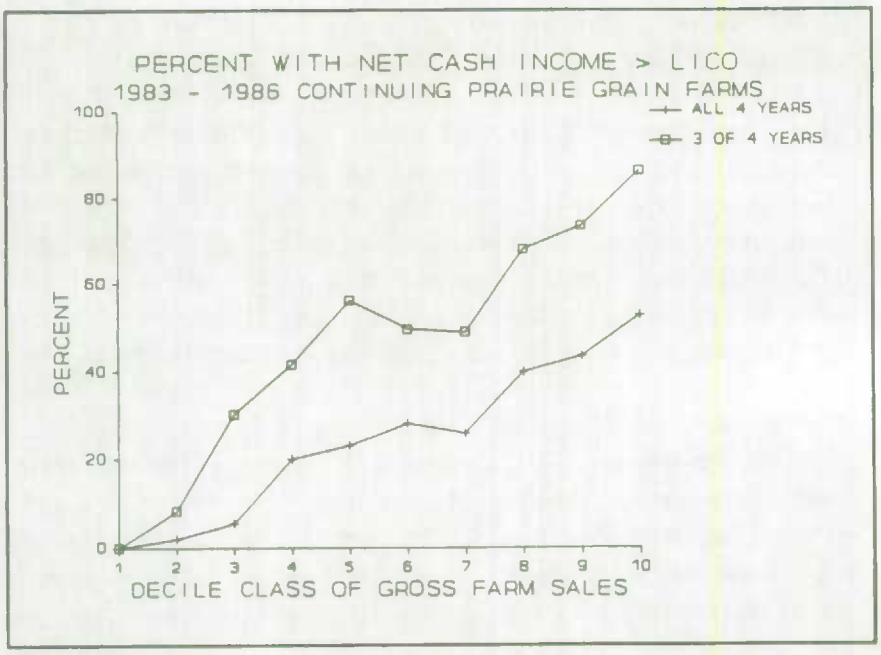

Figure 16

This suggests that families on mid-sized grain farms must either move out of agriculture, expand their operations, or obtain off-farm income. An important candidate for further research is to measure the association between differences in relative efficiency and the number of years that net cash farm income is greater or less than LICO. Relations between relative efficiency and family off-farm work patterns are, unfortunately, more difficult to measure because of the limitations of existing data bases.[9] Research by Wayne Jones at Agriculture Canada shows that, within a given size class of farms specialized in a specific commodity, average costs (not including interest payments) are higher on farms experiencing financial stress compared to farms not in stress (Jones, 1989). The Statistics Canada agricultural data bases present us with an important resource to investigate the relations between relative efficiency and key dimensions of structural change in modern agriculture.

PERMUTATIONS: FARM AND OFF-FARM WORK BY FAMILY MEMBERS

Families on mid-sized and large farms appear to be moving towards the "two paycheck family" which is becoming prevalent in Canadian society as a whole. On some farms, this represents primarily a division of the agricultural income stream. This division may represent changing definitions of social rights within the farm family, a vehicle to lower tax obligations, or both. On a significant proportion of other farms, this involves off-farm employment income by some family members as a means of increasing and stabilizing total farm family income.

The permutations of different combinations of on-farm and off-farm work by farm operators, their spouses and children are presented in Table 10. These permutations are measured for successive size classes of farms with married operators on "family farms" (eg. proprietorships, partnerships, or family corporations).

Observations with multiple farms per household are not included. The resulting group includes 87 percent of the 1986 census farms.

Thirty-one percent of the Middle 1 and Middle 2 farms report no off-farm earnings by either the operator, the spouse, or the children in the farm family (Table 10). If these farms specialize in commodities with highly fluctuating markets, such as grain or red meat, they may be quite vulnerable to declining prices. Mid-sized farms in the regulated dairy or poultry sectors are probably less vulnerable. We expect that many of the low income families are located among the 31 percent of mid-sized farms reporting no off-farm earnings and are also specialized in commodities such as grain, beef, and hogs.

The proportion of operators reporting off-farm employment income decreases from 71 percent for the smallest farms to 27 percent for the Middle 2 farms. The subsequent increase in the proportion of operators reporting off-farm earnings, to 38 percent for the 95-98th percentile farms and 55 percent for the 99th percentile, is partly an artifact of the way the data is reported. Larger farms are likely to incorporate and profits often show up as wages paid by the farm corporation to the farm operator. However, there is also an increase in the proportion of operators with non-agricultural occupations on larger farms.

The proportion of spouses reporting off-farm employment income stays at 45 to 47 percent levels for the small and mid-sized farms and then increases to 57 percent for the largest farms. This is partly due to the tendency for spouses on larger farms to receive wages from the farm. However, spouses of operators on larger farms are more likely to be engaged in non-agricultural occupations (Table 11).

Only one percent of married farm women on commercial level farms are classified by the Census of Agriculture as farm operators. The proportion of women reporting no occupation, i.e. not participating in the labour force, decreases with farm size. The proportion reporting an agricultural occupation increases from 11 percent for the smallest farms to 44 percent for the Middle 2 farms, and then decreases again to 26 percent for the largest farms.

The proportion of married farm women reporting a non-agricultural occupation is highest for the larger farms. Forty-nine percent of women on the smallest farms report a non-agricultural occupation. This proportion falls to 37 percent for the Middle 2 farms and then increases to 54 percent for farms in the 99th percentile. This suggests that the families on top farms may be moving towards the rural equivalent of the urban upper middle-class couple of two working professionals.

Table 10. Patterns of Off-farm Employment Income(1) of Operators, Spouses, and Children, by Size of Gross Farm Sales, 1986, Canada

Pattern of off-farm employment income(1)	Percentile class of gross farm sales						
	1-24	25-49	50-74	75-94	95-98	99 +	Total(2)
	Size of gross farm sales						
	under $8,000	$8,000 to 30,276	$30,277 to 81,999	$82,000 to 235,380	$235,381 to 562,549	$562,550 and over	Total(2)
	*** percent ***						
Neither operator nor spouse nor child(ren) with OFEI(1)	18	25	31	31	25	19	26
Child(ren) only with OFEI(1)	4	6	9	12	11	8	8
Spouse only with OFEI(1)	5	10	19	21	17	13	14
Child(ren) and spouse with OFEI(1)	2	3	6	9	9	5	5
Operator only with OFEI(1)	23	18	12	8	9	9	15
Operator and child(ren) with OFEI(1)	8	6	3	3	3	6	5
Operator and spouse with OFEI(1)	29	24	15	11	17	24	20
Operator and spouse and child(ren) with OFEI(1)	11	9	5	5	9	15	7
Total(2)	100	100	100	100	100	100	100
subtotal: operators with OFEI(1)	71	57	35	27	38	55	48
subtotal: spouses with OFEI(1)	47	46	45	47	52	57	46
subtotal: child(ren) with OFEI(1)	24	23	23	28	32	35	25

Source: Canada. Statistics Canada. Unpublished tabulations from 1986 Agriculture-Population Linkage

(1) OFEI (off-farm employment income) is wages and salaries and net non-farm self-employment income. Note that the wages may be received from work on the farm.

(2) This group represents 87% of all census-farms. Excluded are institutions, community pastures, non-family corporations, Hutterites, and miscellaneous types such as estates and trusts. Also excluded are unmarried operators and multi-farm households.

Table 11. Number of Married Farm Women(1) by Typology of Married Farm Women, by Size Class of Gross Farm Sales, Canada, 1986

Typology of married farm women	Percentile group of gross farm sales						
	1 to 24	25 to 49	50 to 74	75 to 94	95 to 98	99 +	Total
	Size class of gross farm sales						
	under $8,000	$8,000 to 30,276	$30,277 to 81,999	$82,000 to 235,380	$235,381 to 562,549	$562,550 and over	Total
1. Married female operator ..... number:	3,070	1,570	900	530	140	30	6,240
percent:	5	3	1	1	1	1	3
2. Spouse with no occupation ..... number:	20,540	17,125	14,025	9,490	1,820	390	63,390
percent:	35	29	23	19	18	18	26
3. Spouse with agricultural occupation(2) ..... number:	6,385	12,375	20,720	22,330	3,900	570	66,280
percent:	11	21	34	44	38	26	28
3.1 and operator with agricultural occupation(2) ..... number:	3,225	8,900	18,600	21,025	3,660	520	55,930
percent:	6	15	31	41	36	24	23
3.2 and operator with non-agricultural occupation ..... number:	3,160	3,475	2,120	1,305	240	50	10,350
percent:	5	6	4	3	2	2	4
4. Spouse with non-agricultural occupaton ..... number:	28,365	27,150	24,790	18,805	4,280	1,175	104,565
percent:	49	47	41	37	42	54	43
4.1 and operator with agricultural occupation(2) ..... number:	5,550	11,735	18,735	16,375	3,770	900	57,065
percent:	10	20	31	32	37	42	24
4.2 and operator with non-agricultural occupation ..... number:	22,815	15,415	6,055	2,430	510	275	47,500
percent:	39	26	10	5	5	13	20
5. All married farm women ..... number:	58,360	58,220	60,435	51,155	10,140	2,165	240,475
percent:	100	100	100	100	100	100	100

Source: Canada. Statistics Canada. 1986 Agriculture-Population Linkages, unpublished tabulations.

(1) Married women on farms classified as "individual or family farm", partnerships, and family corporations are included. Women on farms classified as non-family corporations and "other" (eg. Hutterite farms, co-operative farms, estates and trusts, etc.) are excluded. Note also that the Agriculture - Population Linkage identifies only one operator and thus only one family per farm.

(2) "Farming" occupation includes farmers, farm managers, farm foremen, farm workers, nursery workers, farm machinery or custom operators, and other farming occupations.

CONCLUSION

The decades of economic expansion which followed World War II witnessed a dramatic decrease in the size of the farm labour force but the fundamental structures of agricultural production remained constant in Canada and the northern United States. The economic turbulence of the last two decades has raised question as to whether this structural continuity will persist.

To date, the rate of economic concentration did increase among the fewer but larger surviving farm units, but concentration proceeded at a quite modest and gradual pace. Most farm production was still organized by independent family enterprises and even the largest farms were relatively small units compared to enterprises in other production sectors.

Rates of entry and exit of farm enterprises in the 50+ sales percentiles, size classes which generate 93 per cent of farm sales, were also relatively modest. Upward size class mobility by farm enterprises was even more modest.

As the absolute size of farm enterprises increased, however, the proportion of total family income provided by non-agricultural income flows on mid-sized farms appears to have increased. These mid-sized farms continue their role as the core component of the Canadian agricultural system, especially in grain exporting regions of the Prairies that contain three-fourths of the country's farmland. The pursuit of non-farm income sources can be viewed as a "private income support program" created by farm families. For a significant fraction of families on mid-sized farms, off-farm work by one family member does make the difference between adequate or non-adequate total family incomes.

Statistics Canada's Agriculture-Population Census Linkage is a unique policy analysis resource which enables us to examine relations between farm enterprise and farm family viability. The large sample size of the Ag-Pop data base permits a reliable disaggregation of variations in farm enterprise and farm family economic organization by scale of production, commodity sector, and region.

For Canada as a whole, the 1986 Ag-Pop data indicates that four out of five families on mid-sized and large farms report adequate total family incomes. Non-agricultural income flows provided 54 percent of total family income for families with adequate income on Middle 1 farms (sales percentiles 50-74) and 29 percent of total income for families on Middle 2 farms (sales percentiles 75-94). For families on farms in the 95+ sales percentiles, agricultural income provides nearly all family income apart from government non-farm transfer payments.

Forty per cent of the Middle 1 farm families and one-quarter of the Middle 2 families rely on non-farm income flows to attain total family income equal to or greater than Statistics Canada's Low Income Cut-Off level (LICO).

The importance of non-agricultural income for mid-sized farms suggests that rural development strategies can make sense as a farm program.

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FOOTNOTES

1. Value-added per farm (gross sales less purchased intermediate inputs such as feedgrains or fertilizer) indicates farm production activity. The 1971 through 1981 censuses do not have the detailed cost items necessary for the estimation of value-added. Consequently, we defined size classes in terms of gross sales, which yields a consistent time series for tracking family income patterns.

2. Gross sales serves in this case as a proxy for total expenses, provided that returns to entrepreneurs and capital are calculated as a residual after all other expenses. An alternative is to impute opportunity costs to entrepreneurship and capital as the measured return to these two factors, with any surplus or deficit being measured as pure profit or loss.

3. We call the reader's attention to an anomaly in the form of a modest upturn in the entry rate for the top size class. One hypothesis was that this upturn is an artifact produced by proprietorship farms "exiting"when they reorganize their operations as "entering" farm corporations. The modest upturn persists, however, when entry/exit rates by farm size are measured for proprietorships, partnerships, and farm corporations respectively. The pattern is also observed for different commodity sectors. A possible explanation is that operators of the largest farms tend to be older: the modest upturn in entry rates would be due to top operators retiring and either passing the farms on to children or selling the farm.

4. Shaw (1979A and 1979B) applies a "wheat price index" to 1970 farm family income in order have a more normal comparison of the ratios of farm to non-farm family incomes.

5. For rural Canada in 1985, LICO ranged from $7,567 for a one-person family to $21,414 for a family of seven or more persons. We use 1985 levels because the farm sales, costs, and family income components measured in the 1986 Agriculture-Population linkage are for the 1985 calendar year. In 1980, the LICO ranged from $5,289 to $14,966.

6. Statistics Canada's definition of low income levels sets the thresholds lower than alternative indicators of poverty, such as those advanced by the National Council of Welfare or the Toronto Social Planning Council (Conseil national du bien-être social, 1987:9). Given the frequently cited argument that farm households have various tax advantages compared to non-farm households, we opted for the side of caution by adopting Statistics Canada's lower monetary definitions of what constitutes low income. This would tend to balance out factors such as de facto tax deduction of the portion of mortgages covering the farm house, personal use of farm business vehicles, consumption of food produced on the farm, etc. (We should also add that there is a possibility that the generally higher costs of consumer goods in rural regions may offset some of the purported tax advantages accruing to farm families.)

7. There is also some ambiguity as to whether reported "wages paid to family" for a given farm refer to payments to the spouse and children of the farm operator, or wages to all family members including the operator. On some farms, the reported farm wages paid to the family are greater than the farm family's reported wage and self-employment earnings. This suggests that farm operators are reporting wages paid to family members residing in other households.

8. Another anticipated scenario would be that supply management has been around in the dairy sector since the 1960's and that the purchase price of dairy production quotas has been bid up to the point where financing of quota purchases could bring agricultural income below LICO. The data suggest that this is not a majority scenario for dairy farmers.

9. The 1986 Census, as noted above, provides the only recent Census data with detailed variables on costs of production. Earlier 1971 and 1981 Ag-Pop data cannot be used to estimate persisting differences in relative efficiency of farms. The National Farm Survey has no information on off-farm work. The Farm Credit Corporation Surveys of 1984 and 1988 contain information on off-farm earnings of operators and spouses, but sample size is small and there is little overlap between the 1984 and 1988 samples.

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