THE EXTENT OF THE STRUCTURAL CHANGE IN PRIMARY AGRICULTURE

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Abstract

The primary agriculture production industry in OECD countries has been going through rapid increases in the concentration of production, giving rise to concerns about the industry developing into a bimodal distribution of farms with many small lifestyle oriented farms, a growing number of large farms, where the bulk of the production takes place, and fewer middle sized farms. It is true that larger farm businesses produce most of the agricultural commodities and get most of the government payments although less than the percentage of commodities they produce. However increased profitability is not completely correlated with increased farm business size, in that some small and medium sized farms are profitable. Unfortunately, many farm businesses especially the smaller ones are reliant on government payments for their financial survival. This is particularly true for Europe. Finally, the structural change in agricultural production that has occurred in the past will continue into the future. Concentration of production will continue with fewer and larger farm businesses. Niche market farm businesses, part time farms with off-farm income and lifestyle farms will dominate the farm numbers but not farm production.

Keywords: farm financial structure, profitability, government payments

1. Introduction

This paper reviews the literature to document the extent of the structural change, that is, the distribution of enterprise size and type within a region or country, in the primary agricultural production industry in many countries of the Organization for Economic Co-operation and Development (OECD). How this structure has changed over time and what it may look like in the future are also discussed.

The primary agriculture production industry in OECD countries has been going through rapid increases in the concentration of production, giving rise to concerns about the industry developing into a bimodal distribution of farms with many small lifestyle oriented farms, a growing number of large farms, where the bulk of the production takes place, and fewer middle sized farms. Contributing to this concentration of production is the industrialization of many parts of production agriculture, especially in the livestock sectors. Technological advances have also contributed, especially in the crop sector with regards to larger and more technologically advanced machinery requiring increased amounts of land and thereby production to reduce the fixed costs per unit. Organizational changes in the form of industrialization and market coordination have also occurred. Industrialization refers to the control of natural production processes to the extent that uniform products are mass produced at a minimum per unit cost. It is obvious that only very large farm businesses can accomplish this industrialization and it has occurred extensively in the livestock industry and is occurring rapidly in crop production as well. Market coordination deals with the extent to which supply chains are coordinated through contracts and less use of open markets. This increased coordination comes at the costs of a loss of independence and increased uncertainty over the continuation of the contracts, but also reduces some of the risk associated with market variability (Harrington and Koenig 2000).

Economic opportunity results in off-farm income becoming more important to the point where net farm income is only 1/8 of the income of farm households across most sizes of farms in the U.S. (Harrington and Koenig 2000). In Saskatchewan, Canada in 2009, off-farm income represented 70.7% of total farm family income and was significantly higher in previous years (Saskatchewan Ministry of Agriculture 2012). Off-farm income affects farm structure by taking time away from the farm, reducing involvement in labour intensive enterprises and in many cases means the farm business is losing its position of primary importance.

Agricultural policies, such as price and income support, also influence structural change by giving more risk reduction benefits and larger direct payments to larger farms. This in turn allows them to take on more financial leverage and acquire the assets of smaller farms (Harrington and Koenig 2000). Macroeconomic policies with regard to inflation control and taxation also influence farm business structural change because farmland values increases have tended to equal or exceed inflation rates, especially in the recent past. The tax rate on the capital gain associated with farmland is lower than normal income in many countries and can be deferred almost indefinitely as long as the land stays in the immediate family (Canada Revenue Agency 2012). The combination of these two forces makes the ownership of farmland attractive.

The future of structural change in the farm sector, at least in the short term will include continued industrialization, consolidation, and greater coordination of production and distribution systems. The gains from this structural change; are needed to maintain or improve global competitiveness, increase productivity, lower consumer prices and respond to consumer demands for quality, variety, and accountability in food supplies. The potential losses include; the disappearance of traditional market channels, problematic price discovery due to thin or non-existent markets, and loss of producer bargaining power. Farm sizes will continue to grow and farm numbers will continue to decline in most developed countries.

2. The Canadian experience

The number of farms in Saskatchewan, a western province, and in Canada as a whole have been decreasing since 1941 while the average farm size has been increasing (Saskatchewan Ministry of Agriculture 2012). In 2006 Saskatchewan had 44,329 farms down from 138,713 in 1941, with an average size of 1450 acres as compared to 432. This represents a drop of 68% in farm numbers while average farm size increased by 336%. A similar situation occurred in Canada as a whole with 732,832 farms in 1941 with an average size of 237 acres and 229,373 farms in 2006 with an average size of 728 acres. Again, this represents a drop of 69% in farm numbers while average farm size increased by 307%.

The economics of crop farming on the Canadian prairies and especially in Saskatchewan is dependent on wheat and canola. In Saskatchewan, all wheat (spring, durum and winter) and canola account for more than 60% of the seeded acres and total cash receipts from crops (Saskatchewan Ministry of Agriculture 2012). Livestock are also an important part of the agricultural economy on the Canadian prairies. On the Canadian Prairies livestock account for between 20 and 50% of farm cash receipts, with cattle making up about 70% of the livestock receipts (Alberta Agriculture and Rural Development 2012) (Saskatchewan Ministry of Agriculture 2012).

The assets, debt and equity of an average farm in Saskatchewan have changed substantially between 1971 and 2010. The value of land usually represents between 65 – 80% of the average Saskatchewan farm's assets. The rise and fall of the price of farm land, thereby has a major effect on the value of the farm's equity. The inflation adjusted or real assets, debt and equity of an average farm in Saskatchewan

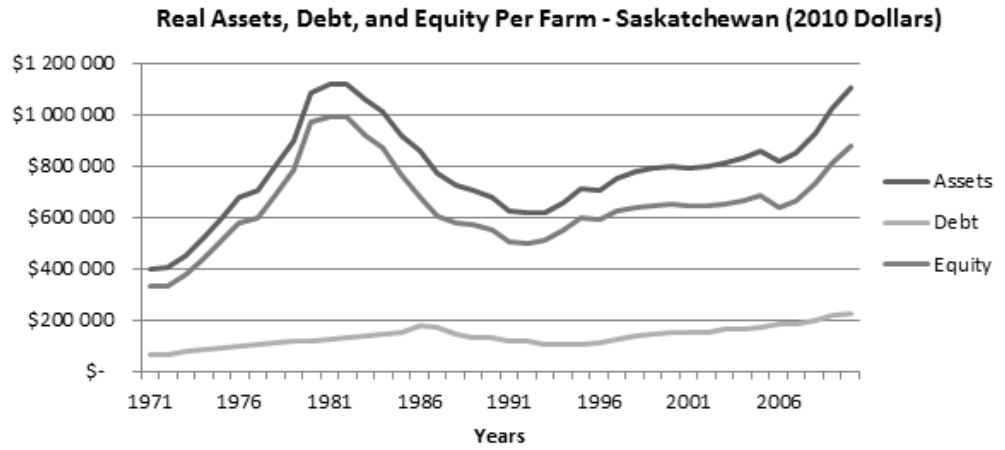

Figure 1. Real Assets, Debt, and Equity Per Farm – Saskatchewan (2010 Dollars)

have changed substantially between 1971 and 2010. Real assets and equity increased substantially in the 1970s and again since 2006 (Figure 1) (Saskatchewan Ministry of Agriculture 2012). However, the decline from the early 1980s to the mid 1990s was substantial in real terms where both assets and equity lost about 50 – 60% of their value. In fact real asset values did not regain their 1982 peak of about $1.1 million until 2010. Real equity values had still not regained their 1982 value of $1.0 million by 2010. Farm debt on the other hand has risen fairly consistently, although not a much, over the time period, with only a slight decline during the period from 1985 to 1995.

As can be seen in Figure 1 it takes quite a long time for equity value to regain from losses caused by land value decreases; in Saskatchewan, 38 years, 1982 to 2010 and still counting.

The Farm Income Issues Data Source Book last done is 2005 summarizes the changes that have occurred in the structure of Canadian agriculture (Strategic Research Policy and Planning Team 2005). In 1971 the largest 5% of farms produced about 37% of the farm production which grew to about 41% by 2001. In the same period, the largest 20% of farms increased their share of total production from 66 to 77%.

Bakshi and Culver analyzed and compared Canadian farm data from the 1986 and 2006 census and found that there are less farms generating less than $250,000 in annual sales and more farms generating more than $250,000 in annual sales in 2006 compared to 1986 (Bakshi 2010). These large farms are also getting a bigger share of annual sales, 27% in 1986 and 69.4% in 2006, and generally tend to be more profitable than the smaller farms (Bakshi 2010).

Another study was done to improve the understanding of the structure of farms according to income status in Canada (Mussell 2005). The results showed the following:

- There is a significant diversity in farm incomes that vary across region, farm type, and farm size.
- Off-farm income is critical in accurately reflecting the income status of farms.
- If $35,000 is held as a low income cut-off, many farms across provinces, farm types, and sizes are experiencing low incomes. Where this is occurring, income from other family members is needed to finance debt servicing, capital replacement and family living expenses.
- Farms were found below the low income cut-off irrespective of size.
- There was clearly more variability in net operating income plus operator off-farm income within a farm sales category than across categories.
- Most farms with greater than $250,000 in sales had assets valued at over $1 million (Mussell 2005).

Therefore one can conclude that in Canada and Saskatchewan at least, farms are getting larger and the largest farms are producing much of the output and making most of the profit. However, large farms are not guaranteed to make a profit.

2.1. Other areas of the world

The following analysis looks at agricultural structural change in the US, Australia and the European Union (EU). The Economic Research Service (ERS) of the United States Department of Agriculture (USDA) has developed a "Family Farm Classification System" that includes the following:

- Small family farms (sales less than $250,000)
- Retirement farms. Small farms whose operators report they are retired, although they continue to farm on a small scale.
- Residential/lifestyle farms. Small farms whose operators report a major occupation other than farming.
- Farming-occupation farms. Small farms whose operators report farming as their major occupation.
- Low-sales. Gross sales less than $100,000.
- Medium-sales. Gross sales between $100,000 and $249,999.

  Large-scale family farms (sales of $250,000 or more)
- Large family farms. Farms with gross sales between $250,000 and $499,999.
- Very large family farms. Farms with gross sales of $500,000 or more.

  Nonfamily farms
- Nonfamily farms. Any farm where the operator and persons related to the operator do not own a majority of the business" (Economic Research Service 2010).

The study found that between 45 and 75% of the farms in each small farm type had a negative operating profit margin in 2007, but other small farms were more profitable: between 17 and 32% had an operating profit margin of at least 20%. The ERS also pointed out that only 3% of U.S. farms are classified as vulnerable (negative net farm income and debt/asset ratio greater than 40%), and the majority (71%) of these farms are residential/lifestyle farms. Small farms make up most of the farm count and account for the bulk of farm assets, including farmland. Most farm production, however, occurs on large-scale and nonfamily farms. Small-farm households rely on off-farm work for most of their income. Twenty-eight percent of U.S. farms have a principal operator at least 65 years old. Most of these older operators, however, are on retirement or residential/lifestyle farms that produce only 2 percent of U.S. farm output (Economic Research Service 2010).

In 2007 small family farms made up 88% of U.S. farms and held about 64% of all farm assets, including 63% of the land. Also in 2007, large-scale family farms, plus nonfamily farms, made up only 12% of U.S. farms but accounted for 84% of the value of U.S. production. The average operating profit margin and rates of return on assets and equity for large farms and very large farms were all positive in 2007, and most of these farms had a positive operating profit margin. Average operating profit margin and rates of return on assets and equity were negative for most small-farm types. Nevertheless, some farms within each small-farm type had relatively high operating margins of at least 20%. Small-farm households typically receive substantial off-farm income and do not rely primarily on their farms for their livelihood. Median household income for retirement farms or low-sales farms were below the U.S. median in 2007 (Hoppe 2010).

Australian farms exhibit much the same concentration of production in all of its regions as do farms in Canada and the US (Australian Bureau of Agricultural and Resource Economics and Sciences 2011a,b,c,d,e). The data range from a low of approximately 5% of the farms realizing approximately 42% of the value of agricultural production in Tasmania to a high of 15% of the farms realizing approximately 53% of the value of agricultural production Western Australia.

Farm data from several European countries were analyzed and found to have quite different farm business strategies, capabilities to generate capital revenues, and segmented agricultural loan market regimes (Myyra 2011). In Denmark for example, farmers have adopted aggressive farm expansion strategies with average equity ratios in the 33-39% range with the lower end occupied by pig and poultry farms. Italian farms are the other extreme with equity ratios between 97-98%, although this may mean they do not have access to lenders. Obviously if interest rates rise substantially, Danish farms could experience major adjustments. Agricultural asset markets or the way the assets are valued also differ substantially among countries. Ireland and Denmark saw very large increases in asset values during 2004-2007, whereas France did not. This large variation in leverage positions means that farms in different countries will be affected differently by product and financial market changes.

The Farm Accountancy and Data Network (FADN) of the European Commission Directorate of Agriculture and Rural Development occasionally publishes an "EU Farm Economics Overview" describes the financial structure of farms in the EU (Farm Accountancy and Data Network 2010). The study found that the distribution of income among the farms in the EU25 from 2004-06 resulted in about 70% of income being realised by 20% of the farms (Table 1) (Farm Accountancy and Data Network 2010). The study also found that the profitability of the agricultural sector is dependent on direct payments because average total costs are higher than market revenue even on the largest farms (Table 1).

When examining the differences between farm types and size class, it can be seen that in the cases of field crops, milk, grazing livestock and mixed farms expenses exceed market revenue for even the largest farms (Table 2). However, in general the gap between costs and revenue diminishes with increasing size.

Table 1. Number of farms, share of income and share of input costs to income in the EU-25 by size class, average 2004-2006

	Farm Size in Economic Units (Economic Unit is a Gross Margin of 1,000 Euros)						
	<4.8	4.8-9.6	9.6-19.6	19.6-48	48-120	>120	Total
% of Farms	13.6%	27.8%	18.6%	20.1%	13.1%	6.8%	100%
Share of Total Income	2%	6%	7%	16%	25%	45%	100%
Income per Farm	e7,974	e12,932	e22,586	e48,771	e117,554	e404,377	e61,731
	as % of Income						
Gov't Payments	25%	21%	25%	25%	21%	13%	19%
Cash Costs as a	64.8%	52.9%	59.8%	67.4%	72.3%	78.0%	72.0%
Depreciation	21.7%	15.3%	16.7%	15.7%	14.9%	11.5%	13.8%
Imputed Own Labour Costs	69.8%	71.7%	52.6%	36.9%	22.4%	8.8%	24.4%
Imputed Own Land Costs	5.3%	7.4%	7.5%	7.0%	5.2%	4.0%	5.2%
Imputed Capital Costs	9.4%	4.5%	5.4%	4.6%	3.7%	3.0%	3.8%
Total Costs	170.9%	151.8%	142.0%	131.7%	118.5%	105.2%	119.1%

Source: DG AGRI EU-FADN

Table 2. Share of total costs to income by farm type and size class in the EU-25, average 2004-2006

	Farm Size in Economic Units (Economic Unit is a Gross Margin of 1,000 Euros)						
	<4.8	4.8-9.6	9.6-19.6	19.6-48	48-120	>120	Total
Field Crops	168.5%	162.7%	158.6%	144.7%	131.4%	118.8%	132.9%
Horticulture	106.6%	101.6%	103.7%	94.5%	95.0%	92.9%	94.2%
Wine	199.3%	166.7%	137.6%	113.3%	99.3%	87.8%	103.1%
Permanent Crops	187.5%	138.6%	124.1%	107.3%	95.5%	92.7%	112.4%
Milk		153.8%	137.7%	133.7%	121.1%	107.8%	118.3%
Grazing Livestock	287.8%	196.3%	171.0%	157.0%	136.1%	112.3%	147.2%
Granivores	98.3%	96.8%	105.2%	102.5%	96.2%	91.0%	93.7%
Mixed	181.1%	153.9%	133.5%	134.7%	122.1%	113.3%	123.3%
Total	170.9%	151.8%	142.0%	131.7%	118.5%	105.2%	119.1%

Source: DG AGRI EU-FADN

Table 3. Share of farms where total costs are covered by market revenue by farm type and size class in the EU-25, average 2004-2006

	Farm Size in Economic Units (Economic Unit is a Gross Margin of 1,000 Euros)						
	<4.8	4.8-9.6	9.6-19.6	19.6-48	48-120	>120	Total
Field Crops	9.2%	12.4%	14.7%	16.8%	17.8%	20.5%	14.4%
Horticulture	21.5%	37.3%	40.5%	49.4%	47.2%	50.9%	44.4%
Wine	10.2%	13.6%	18.7%	32.1%	42.9%	57.2%	27.1%
Permanent Crops	10.6%	23.1%	29.1%	40.4%	50.4%	53.6%	27.4%
Milk	6.2%	13.1%	21.6%	18.1%	16.0%	29.5%	18.4%
Grazing Livestock	3.1%	6.3%	14.7%	18.7%	18.0%	24.0%	13.6%
Pig and Poultry	29.5%	21.9%	22.6%	37.4%	49.7%	57.9%	39.5%
Mixed	3.5%	7.4%	16.4%	24.7%	19.1%	24.4%	12.6%
Total	7.6%	15.5%	20.1%	24.9%	24.8%	34.1%	19.7%

Source: DG AGRI EU-FADN

Table 4. Share of profitable farms by farm type and size in the EU-25, average 2004-2006

	Farm Size in Economic Units (Economic Unit is a Gross Margin of 1,000 Euros)						
	<4.8	4.8-9.6	9.6-19.6	19.6-48	48-120	>120	Total
Field Crops	19.2%	22.0%	29.2%	38.0%	48.6%	61.3%	32.0%
Horticulture	29.0%	39.1%	43.7%	51.3%	49.6%	53.4%	47.0%
Wine	15.9%	16.0%	23.9%	37.0%	50.0%	63.3%	31.8%
Permanent Crops	15.6%	33.0%	37.4%	51.1%	59.7%	64.4%	36.4%
Milk	21.3%	29.3%	38.4%	37.6%	45.4%	62.5%	42.1%
Grazing Livestock	12.6%	21.5%	34.3%	41.9%	49.8%	65.1%	34.7%
Pig and Poultry	31.8%	25.7%	34.5%	51.1%	60.7%	68.1%	49.1%
Mixed	8.6%	15.8%	35.1%	44.2%	47.7%	63.3%	27.4%
Total	14.9%	25.0%	33.7%	42.2%	49.5%	62.4%	34.5%

Source: DG AGRI EU-FADN

The share of farms in the EU-25 which are able to cover total costs based on market revenue alone without receiving government payments is only about 20% (Table 3). It is difficult for field crops, milk, grazing livestock and mixed farms to cover total costs based on market revenue. These farm type in turn are the ones receiving the largest amount of direct payments (Farm Accountancy and Data Network 2010).

The receipt of government payments significantly increases the profitability of farms where the share of all farms covering total costs increases from 19.7 to 34.5%, a 14.8% increase (Table 4). The amount of increase is much more pronounced as farm sixe increases with an increase of 7.3% for the smallest farms and an increase of 28.3% for the largest farms (Table 4). The biggest increase in the share of farms covering total costs is for milk at 23.7%, grazing livestock at 21.1%, and field crops at 17.6% (Farm Accountancy and Data Network 2010).

3. Conclusions

First, larger farm businesses produce most of the agricultural commodities and get most of the government payments although less than the percentage of commodities they produce. Second, farm businesses are getting larger but increased profitability is not completely correlated with increased farm business size, in that some small and medium sized farms are profitable. Thirdly, many farm businesses especially the smaller ones are reliant on government payments for their financial survival. This is particularly true for Europe. Finally, the structural change in agricultural production that has occurred in the past will continue into the future. Concentration of production will continue with fewer and larger farm businesses. Niche market farm businesses, part time farms with off-farm income and lifestyle farms will dominate the farm numbers but not farm production.

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