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Country-specific analysis of competitiveness and resilience of organic and low input dairy farms across Europe

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Abstract

Organic (ORG) and low-input (LI) dairy farms may have environmental advantages compared to high-input (HI) farms, but may also be less competitive in economic terms. This paper focuses on resilience in relative profitability of ORG and LI farms compared to HI farms in EU countries. Both a trend and a shock scenario were developed, based on milk and feed prices during 2007-2012. Although LI farms greatly vary among the EU countries, they tend to be more resilient than HI farms when assuming trend conditions. Moreover, they seem less affected by extremely low prices. ORG farms appear even more resilient in comparison with HI and LI farms but this can be explained by the higher revenues from subsidies.

Introduction

Although low-input (LI) and organic (ORG) dairy farms contribute more to environmental services compared to high-input (HI) farms, they often tend to be less competitive in economic terms. Explanations for this competiveness gap may be decreased productivity and lack of economies of scale, however, being less dependent on external inputs might also become an economic advantage. Indeed, recently milk, feed and energy prices have become more volatile and this is likely to continue in the future. In this paper, we focus on resilience in profitability given current and possible future prices. In this article, we further explore, more country-specifically, the results of a former EU-wide analysis of ORG and LI farms of Moakes *et al.* (2012).

Material and methods

Does the European low input dairy farm exist?

Based on literature on classification of farming systems, a definition of the European LI dairy farm was difficult to develop. Moakes *et al.* (2012) proposed a pragmatic LI definition, developed with a limited choice of variables available within the FADN data set, as a tool for further exploring the economic potential of ORG and LI farms in adopting new strategies. One of the main difficulties was the variety of farming systems in Europe. To fully elaborate competitiveness issues within and between the farming systems across Europe, LI farms were defined for each country as those farms with the lowest 25% expenditures on inputs for that country and HI farms were defined as farms with the highest 25% expenditures. The inputs taken into account to identify LI farming systems, were the costs for fertilizers, crop protection, purchased feed

and energy, expressed as € per grazing livestock unit. Exploration of the FADN database (2007-2008), revealed that LI farms were smaller, had fewer animals, a slightly higher family labor percentage and lower milk yields. Besides structural differences, LI farms were found to be less profitable than other holdings, but also receive lower support payments (Moakes *et al.* 2012).

Volatility of milk and feed prices

Based on historical observations in milk and feed prices and their relationship with the medians used in the study of Moakes *et al.* (2012), two sensitivity analyses were conducted to determine the resilience of the different farm types. First, the average milk price over a longer period (2007-2012) is lower compared to that over the period 2007-2008, though the recent price evolution is again upwards. Second, volatility was high, illustrated by the high milk price in 2008 and the pronounced decline in the following year 2009. Milk prices for 2007 – 2012 are about 5.5% lower and feed prices about 3% higher compared to 2007-2008. In 2009, milk prices were very low and declined by 30% while feed prices only declined by 13 %. Based on these figures, a trend and a shock scenario was developed, (based upon FADN data results from 2007-2008) to simulate the effect of both scenarios.

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Results

Country-specific differences in performance of dairy farms

With the pragmatic country-specific definition of low input dairy farms, farms were differentiated in each country into high versus low input farms. Figure 1 represents the median economic profit per annual working unit (AWU) for dairy farms across Europe for the years 2007-2008 (with direct input costs along the x-axis). The median profit for HI farms in EU (set to 100 in Figure 1) was 6168 euro/AWU. The relative economic profit of the farms in the different countries is compared to the economic profit of the EU 27 HI farm, e.g. the profit of a dairy farm in Denmark is more than 7 times greater than that of the EU median. In the figure, each country is represented by two dots, interconnected with a line. The left dot represents the median profit of the LI farms of that country while the right dot illustrates the median profit of the HI farm.

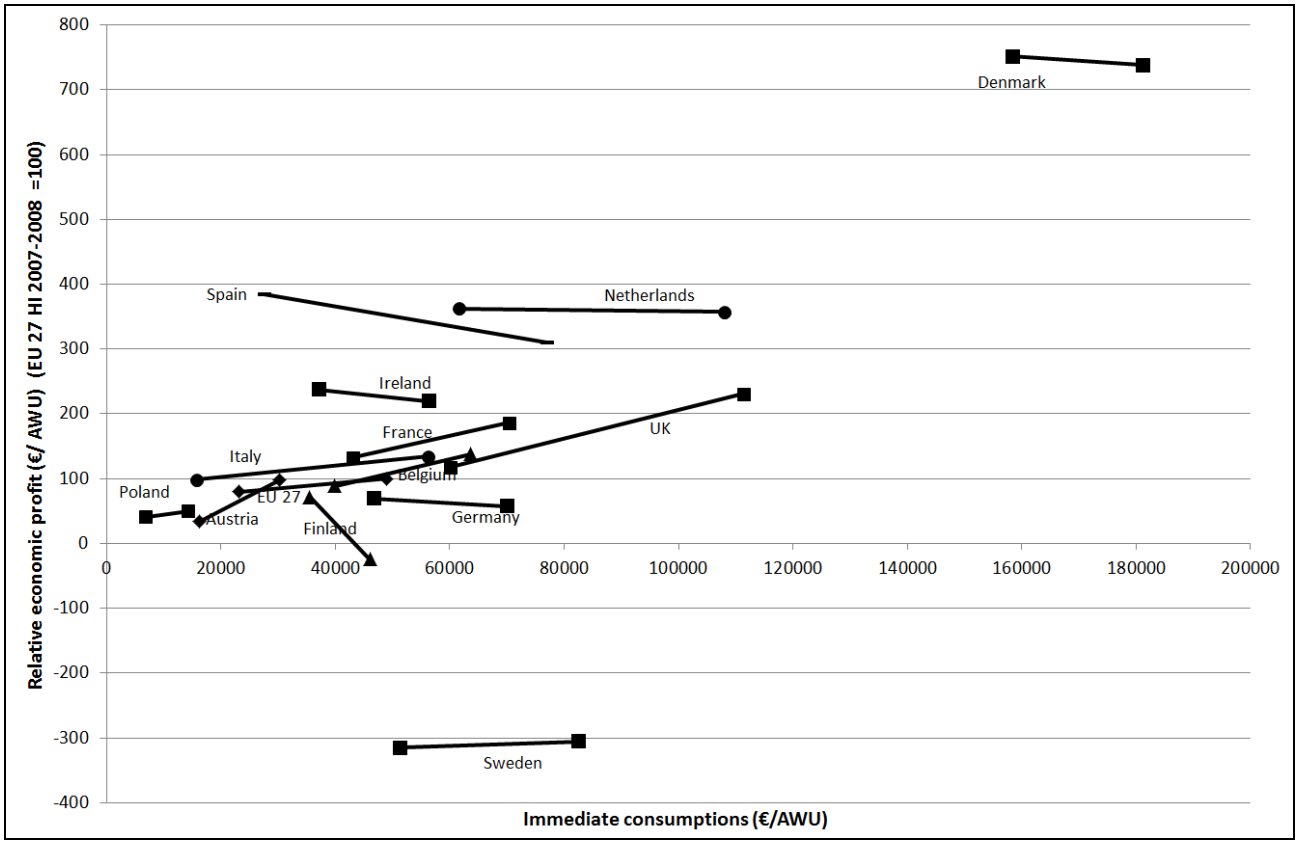

Figure 1: Relative economic profit per annual worker unit (AWU) of HI versus LI dairy farms in Europe (2007-2008)

The length of the line indicates the relative difference in input expenditure between HI and LI. The slope indicates the difference in profit: a downward slope indicating that LI holdings perform better than HI. This means that additional inputs have resulted in lower profitability. This is strongly pronounced in Finland, but also in Spain and Ireland. In several other countries, however, the line slopes upward; HI farms have higher economic profits compared to the LI farms. The position in the figure demonstrates very clearly the variety in farm size of the different farming systems within Europe. The immediate expenditures for a LI farm in Denmark, for example, are 10 times higher than those for an LI company in Italy. An LI farm in one country often corresponds with an HI country in another country. These data reveal further insights on the real behavior of LI farms: some belong indeed to another farming system, while other LI farms, such as in the Netherlands and Denmark, may be a similar production system but are more efficient than the HI companies in their country.

Table 1 summarizes the results of the relative economic profit in different countries for HI, LI and ORG farms. In most countries the ORG farms had a higher relative economic profit than the HI input and LI farms, with the exception of France, Italy, Poland and the Netherlands. In the Netherlands the relative economic profit of ORG farms is also lower than those of LI farms.

Table 1: Relative economic profit (€/AWU) per production system with EU 27 HI dairy farm = 100 and the immediate consumptions (inputs) per production system (€/AWU)

	Number of observations				Relative economic profit			Immediate consumptions		
	Total	HI	LI	ORG	HI	LI	ORG	HI	LI	ORG
EU 27	32,539	7,681	7,645	1,815	100	80	127	48,980	23,097	27,874
Austria	1,922	356	357	494	98	34	120	30,182	16,219	18,684
Belgium	752	181	181	26	138	89	372	63,590	39,873	44,907
Denmark	884	177	177	173	738	751	865	181,184	15,8422	175,033
Finland	760	173	173	65	-25	71	149	46,023	35,524	43,556
France	3,049	748	746	58	186	133	148	70,305	43,067	39,257
Germany	4,743	1,130	1,128	222	57	69	113	70,075	46,772	41,420
Ireland	740	182	181	10*	220	237	/	56,381	37,110	/
Italy	2,981	734	731	41	134	99	127	56,184	15,660	31,284
The Netherlands	699	162	161	49	357	362	259	108,045	61,588	70,968
Poland	6,117	1,501	1,494	115	50	41	5	14,291	68,21	3,683
Spain	2,249	565	561	5*	310	385	/	76,963	27,597	/
Sweden	790	154	153	174	-305	-315	-114	82,584	51,392	72,533
United Kingdom	1,108	259	257	74	231	118	334	111,357	60,147	89,282

* Calculations are not performed when there are less than 15 observations

Are LI and ORG farms more resistant to milk and feed price volatility compared to HI farms?

The absolute median economic performances of HI, LI and ORG dairy farms in EU27 in 2007-2008 are compared to the developed, trend and shock scenario (Table 2).

Table 2: Economic performance of HI versus LI and ORG dairy farms

Economic key figures (€/AWU)	2007-2008			Trend scenario			Shock scenario		
	HI	LI	ORG	HI	LI	ORG	HI	LI	ORG
Total output	71,141	43,541	49,401	67,250	41,160	46,699	50,610	30,975	35,144
Intermediate consumptions	48,980	23,097	27,874	50,401	23,767	28,683	42,726	20,148	24,315
Gross farm income	32,874	28,456	36,689	27,562	25,404	33,178	18,597	18,839	25,991
Farm net income	14,692	15,968	17,984	9,380	12,916	14,473	415	6,351	7,286
Economic profit	6,168	4,941	7,815	856	1,889	4,304	-8,109	-4,676	-2,883

The results show that ORG farms are more resilient towards price fluctuations than LI and HI farms. The ORG farms had the highest economic profit in 2007-2008 and this was also the case in both the trend and

shock scenario. This can be explained by the higher support level of the ORG farms compared to the other farm types (Moakes *et al.* 2012). LI farms are more resilient towards price fluctuations than HI farms. Where HI farms had a higher economic profit in 2007-2008, they have a lower income when assuming trend conditions and were more affected by extremely low prices as those observed in 2009. These results are confirmed by some country-specific data (Figure 3). In Figure 3 the original, trend and shock scenario are presented; HI and LI are interconnected, as in Figure 1 and the median profit of ORG farms is represented by a separate dot. When prices decline, either in the trend or shock scenario, the economic advantage of HI farms decreases in these countries where HI farms perform better; and in countries where LI farms perform better; this comparative advantage increases when prices decline. ORG farms perform better in the different scenarios than the other farm types and this is more pronounced in Sweden. For Poland the benefit of ORG farming is smaller or negative in comparison with HI and LI farms.

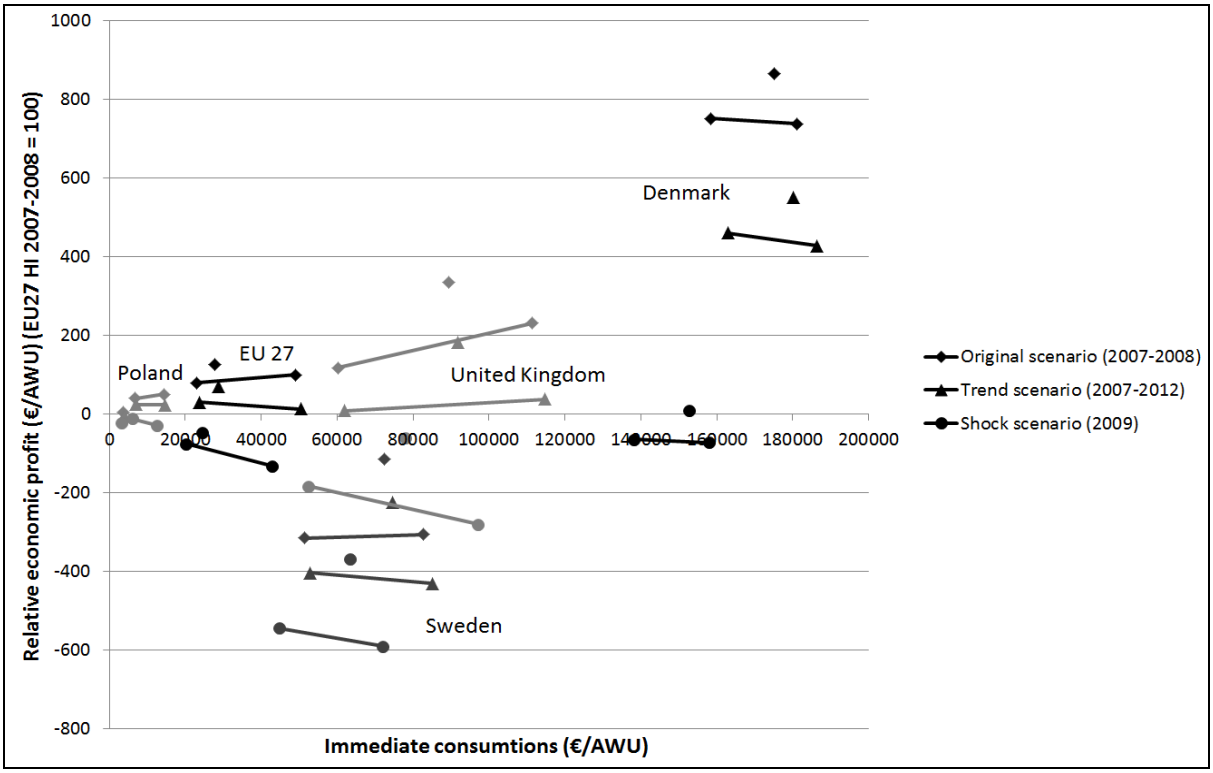

Figure 2: Median economic profit per annual worker unit (AWU) of HI, LI and ORG dairy farms in Europe during 2007-2008, and simulations of a trend and shock scenario

Discussion

Earlier analysis of LI farms across Europe revealed lower profitability of the LI farms compared to the high input ones. However, although this observation can be extended to several European countries, the opposite is true for some countries where LI farms perform better than HI farms. Although their lower use of inputs produces less output, lower inputs may result in increased efficiency in the use of fertilizer, crop protection, feed, and energy on these farms. Moreover, in all European countries, LI farms seem to be more resistant to price fluctuations, which may become more important in the post quota era, and may be of particular relevance to family farms where reduced income fluctuation can be as important as absolute profit.

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