



Evidence Report

GB Dairy Herd performance 2015/16

March 2017

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This report aims to support business decisions by providing a foundation level of industry costs and margin potential. The data in this survey is from British dairy farm accounts, all with year-ends falling between December 2015 and June 2016. It reflects a period of lower margins, as milk prices in this period had in many cases fallen significantly, despite some relief from lower input prices.

Key findings – stemming from year end 2015/16 data

- Full investment costs of production were 20% lower in the top quartile, compared with the bottom quartile of GB dairy farms
- The gap, between top and bottom 25%, in the full costs of production, fell by a third to 6.5ppl from 2013/14 to 2015/16
- The top quartile of GB producers achieved a positive net margin of 4ppl in 2015/16. In contrast, the bottom quartile made a loss after all costs of 7.6ppl, a range of over 11ppl, similar to 2014/15
- Wider range in revenue between the top and bottom quartiles with a difference of 5ppl compared to 2ppl in 2014/15
- Western European typical costs of milk production only were 33ppl ECM in 2015. In comparison, for GB, the top 25% costs were 8.5ppl ECM lower and the middle 50% were 6ppl ECM less

Key dairy herd indicator figures from 2015/16

26.3ppl	4.0ppl	24%	95%
Top 25%	Top 25%	Top 25%	Top 25%
Full investment costs of production	Full investment net margin	Proportion of revenue retained after cash costs	Calving percentage
2,352 litres or 179kg ms	6.5ppl	65%	37%
Top 25%	Top 25% v Bottom 25%	Top 25% v Bottom 25%	All herds
Estimated amount of milk yield produced from forage	Gap in costs of production	Proportion four key cost areas contribute to costs of production gap	Proportion making a positive full investment net margin

Notes: Ranked by net margin ppl
MS= milk solids (butterfat & protein)

Energy corrected milk (ECM)(kg) = (Milk production(L/year) x 1.033 x (0.383 x butterfat (%) + 0.242 x protein (%) + 0.7832/3.1138): allows comparison between milk types with different solid contents

Background

The data in this survey is from farm accounts all with year-ends falling between December 2015 and June 2016. The data reflects a period of lower margins, as milk prices in this period have in many cases fallen significantly. It is against this background that this report aims to provide financial evidence to inform decisions. This report aims to provide the evidence to demonstrate that good management and technically excellent producers are able to make sufficient return over the long term.

The aim of the report

In addition to the presentation of the latest set of physical and financial performance data for dairy herds in Great Britain, this report aims to examine viability and sustainability through:

1. Presenting a selection of business performance indicators derived from the financial data
2. Examining the sustainability of herds against the background of milk price changes in 2015/16
3. Showing typical British costs of milk production in context to other countries around the world
4. Investigating British productivity in comparison with a selection of European 'typical farms'

This report does not attempt to address questions relating to different types of farming systems or to champion or compare any aspect of technical excellence.

Benefits of using this report

Provides farmers and key industry influencers such as consultants and bank managers a robust data set of output, costs and margin potential to guide or support business decisions. The report creates an opportunity for discussion on farm, to help identify key areas for improvement.

The data

The data is sourced from 328 sets of farm accounts, all with year ends falling between December 2015 and June 2016, collected by Promar International and its contributing partners. The data sample used here is stratified to reflect the range of producers in the dairy sector. Farm stratification was based on the following criteria:

- Geographical location
- Level of milk production
- Calving pattern
- Housing period
- Type of contract
- Financial and physical performance

The basis of the financial review

In this report, the financial data is provided as cash cost of production and also full investment (economic) cost of production. Each dairy business will have its own management accounting conventions for evaluating its financial performance. By presenting both cash costs and full investment cost, this report provides the range of costs that most businesses will fall within.

Cash costs of production are recognisable as the day-to-day costs of running a milking operation. Whereby full investment costs would be important in consideration of an investment appraisal and return on capital employed and, hence, the change of the term to full investment costs of production and net margin.

The report presents the performance of the upper and lower quartiles but also the inclusion of the top and bottom 5%, which provides a further insight into the performance range of dairy herds in GB. The data has been reviewed on a pence per litre (ppl), £ per hectare basis, £ per cow, categorising by cow yield and housing period and, for the first time, £/kg milk solids.

In addition, a number of business performance indicators are now provided to further understand enterprise performance. These include:

- **Output to input ratio:** Which gives an overall indication of the financial efficiency of the use of inputs to generate income (revenue) from every £1 of total investment cost, eg 1.30 would mean that £1.30 of revenue was achieved from every £1 of cost
- **Feed and forage costs %:** This cost shows how efficient the largest cost category for most dairy herds is used to produce financial output
- **Labour (paid/unpaid) and machinery costs %:** Similar to feed costs, indicates how well these key resources are managed in relation to the level of revenue
- **Rent and finance %:** Provides a simple health of the business comparison indicator on how much a business has borrowed or spent on rent
- **Revenue retained % (by the dairy enterprise):** Measures how well it can contribute to the farm business' loan repayments, tax, drawings and capital expenditure
- **Net cash flow (before tax and private drawings):** Indicates whether a business had the cash to cover all of its annual operating costs including capital repayments
- **Annual investment/capital expenditure:** Simply an indicator of how much the enterprise is spending on expansion or potential capital replacement or improvements net of any sales

Further detail on how the indicators are calculated can be found in the Glossary.

Results for account year ending December 2015 to June 2016

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Dairy herd enterprise – pence per litre

The comparison between the top performers of GB dairy herd enterprises and bottom ones, ranked on net margin in ppl, shows a large variation in both physical and financial performance, as presented in Tables 1 and 2.

Table 1: Range in physical performance of GB dairy herds 2015/16 (ranked by net margin ppl)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Number of farms	16	82	82	16
Herd size	320	255	158	158
Dairy stocking density (LU/ha)	1.79	1.89	1.76	1.72
Herd replacement rate (%)	22.2	25.4	27.3	20.1
Cows calved (%) ¹	95	95	88	84
Milk yield (l/cow/year)	7,996	8,041	7,305	5,890
Milk solids (kg/cow/year)	607	612	559	463
Milk from forage (l/cow/year)	2,176	2,352	1,976	2,073
Butterfat (%)	4.05	4.07	4.11	4.24
Protein (%)	3.33	3.32	3.31	3.40
Labour (hours/cow/year)	25	33	45	49

Note: ¹ Ranked by net margin ppl ¹ The % of cows in a herd calved in a 365-day period

Table 2: Range in financial performance of GB dairy herds 2015/16 (ranked by net margin ppl)

pence per litre	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Milk sales	29.6	28.3	23.4	23.5
Revenue	31.6	30.3	25.2	25.2
Herd replacement cost	2.0	2.6	3.6	3.6
Feed and forage cost	8.5	8.5	8.8	9.2
Livestock costs	2.9	2.9	3.0	3.0
Total variable costs	11.4	11.8	12.8	12.2
Labour costs (paid)	2.3	2.3	2.5	2.4
Power and machinery cost	2.5	2.5	3.0	5.5
Property repairs, rent & finance	2.6	2.6	2.1	3.1
Other operational costs	0.8	0.8	1.1	1.6
Cash fixed costs	8.2	8.7	10.5	12.6
Cash costs of production	21.6	23.1	26.9	28.4
Cash net margin	9.9	7.2	-1.7	-3.2
Labour costs unpaid	0.9	1.2	2.7	4.8
Total depreciation	1.3	1.4	2.3	3.1
Rental value of owned land	0.4	0.5	0.9	0.9
Non-cash fixed costs	2.6	3.2	5.9	8.8
Full investment fixed costs (cash and non-cash)	10.8	11.9	16.4	21.4
Full investment costs of production	24.2	26.3	32.8	37.2
Full investment net margin	7.3	4.0	-7.6	-12.0

Notes: ¹ Ranked by net margin ppl

Cash costs exclude unpaid family labour and depreciation and include actual rent and finance costs

Table 2a: Business performance indicators 2015/16 (ranked by net margin ppl)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Output to input ratio (Revenue as a ratio of full costs of production)	1.30	1.15	0.77	0.68
Feed and forage costs % (as % of revenue)	27	29	38	36
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	19	21	40	50
Rent and finance % (as a % of revenue)	5.9	5.3	8.1	9.8
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	27	32	53	72
Revenue retained (cash net margin as % of revenue)	32	24	-7	-13
Net cash flow before tax and drawings (ppl)	0.2	0.1	-4.1	-9.8
Annual investment/capital expenditure (ppl)	5.0	3.2	1.9	3.8

Notes: Ranked by net margin ppl

Further explanation of these indicators can be found on page 5 and in the glossary

Table 2 shows that the top quartile had total cash and non-cash costs (full investment costs) that were 6.5ppl (20%) lower than for the bottom quartile. The main area of difference was fixed costs. Revenue was 5.1ppl (20%) higher in the top quartile, leading to a full net margin that was 11.6ppl (153%) more than with the bottom quartile. Therefore, lower costs of production were still the biggest contributor to the better net margin with the best performing herds.

65% of the variation in costs between the top and bottom quartiles was accounted for by four key cost areas: herd replacement costs, feed and forage, labour, and power and machinery. These four cost areas are over 4ppl less for the top performers than in the bottom quartile. Figure 1 presents how these key cost drivers have changed year-on-year.

Figure 1: 2015/16 key cost drivers and compared to 2014/15 (ranked by net margin ppl)

Change on previous year (ppl)	2015/16 Top 25%	Key cost driver (ppl)	2015/16 Bottom 25%	Change on previous year (ppl)
▲ 0.3	2.6	Herd replacement	3.6	▼ -0.2
▼ -1.3	8.8	Feed and forage	9.7	▼ -1.6
■ 0.0	3.7	Labour (paid and unpaid)	4.9	▼ -0.7
▼ -0.3	3.0	Power and machinery	4.2	▼ -0.6

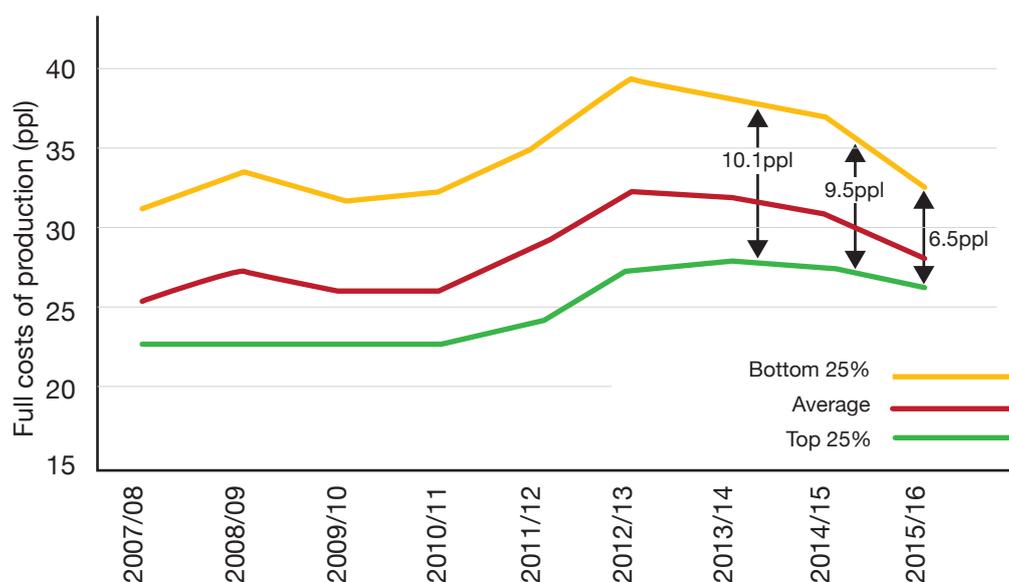
Figure 1 shows that both the top and bottom quartiles reduced costs but in fact, all quartiles have lowered costs year-on-year. Costs were diluted by 0.5-0.9ppl due to cow milk yields increasing, on average, by 2% year-on-year. The remaining cost reduction mainly occurred through lower input quantities and /or lower prices. Some specific areas of spending that noticeably reduced, included: feed, fertiliser, building repairs and capital/annual investment spending.

Table 3: The change in expenditure of select items between 2014/15 and 2015/16

	Top 25%	Bottom 25%
Concentrate feed use	6% lower	9% lower
Fertiliser expenditure	20% lower	26% lower
Building repair spending	25% lower	33% lower
Capital/annual investment spending	28% lower	66% lower

As Figure 1 and Table 3 highlight, the bottom 25% reduced spending to a greater extent than the top performers. However, they also started from a higher cost base. In the last three years, the gap in total costs between the top and bottom quartiles closed by a third (see Figure 2).

Figure 2: Trend in dairy herd costs of production 2007/8 to 2015/16



Source: AHDB Dairy

Data: 2007/08 - 21012/13 DairyCo Milkbench+; 2013/14 - 2015/16 Promar International and partners
Bottom and top 25% ranked on full investment net margin ppl

Contributing to the variation in costs of production between the top and bottom were also some key physical performance differences.

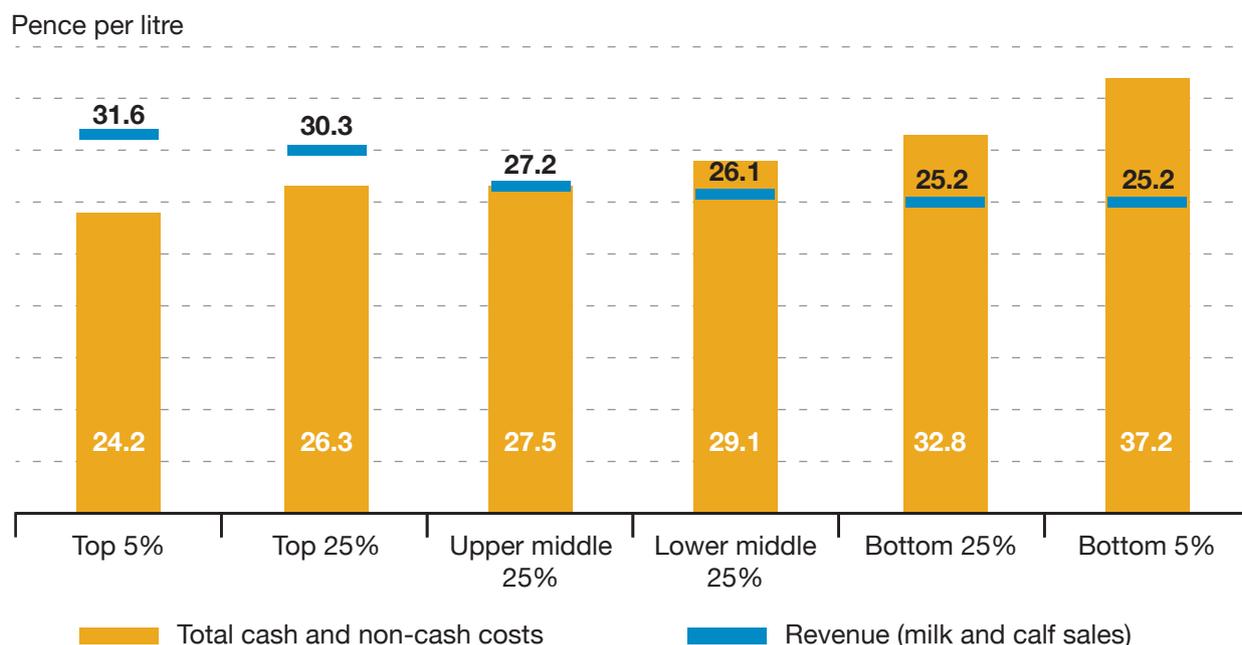
The top 25% had a higher calving percentage and stocking density, contributing to the greater volume of milk produced. The noticeable lower replacement rate meant a 1ppl lower herd replacement cost. But another point of difference influencing costs, was with the volume of milk yield from forage. The top 25% herds achieved 19% more yield from forage.

Figure 3: Key physical performance differences between the top and bottom 25% (ranked by net margin ppl)

Top 25% compared with bottom 25%	
Stocking density	7% Higher
Herd replacement rate	7% Lower
Calving percentage	8% Higher
Milk yield per cow	10% Higher
Milk from forage	19% More

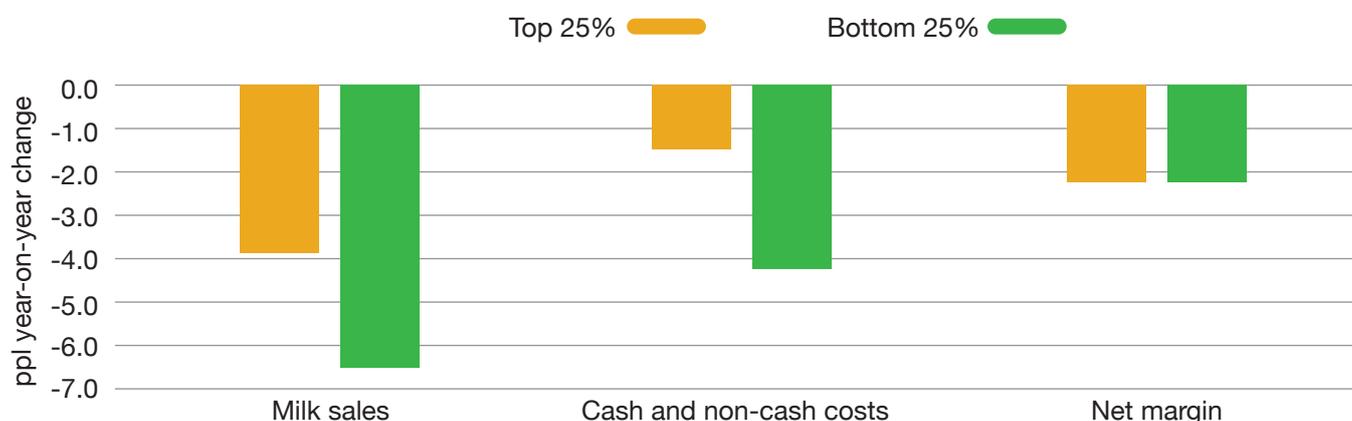
In previous AHDB Evidence Reports, revenue (income from milk and non-milk sales in the dairy herd), has varied relatively little between the top and bottom 25% of performers. However, in 2015/16, the reductions in milk prices varied significantly, depending on contract type. This led to a wider range in revenue between the top and bottom quartiles, with a difference of 5ppl compared with 2ppl in 2014/15.

Figure 4: Range in costs and revenue for 2015/16 (ranked by net margin ppl)



Between 2016/15 and 2014/15, the milk price received by most producers fell greater than the reduction in the costs of production. For example, Figure 5 shows that the bottom 25% of performers experienced on average a 6.5ppl fall in the value of milk sales, whereas total costs reduced by just over 4ppl.

Figure 5: The change in milk sales, costs and margin between 2016/15 and 2014/15 (ppl)



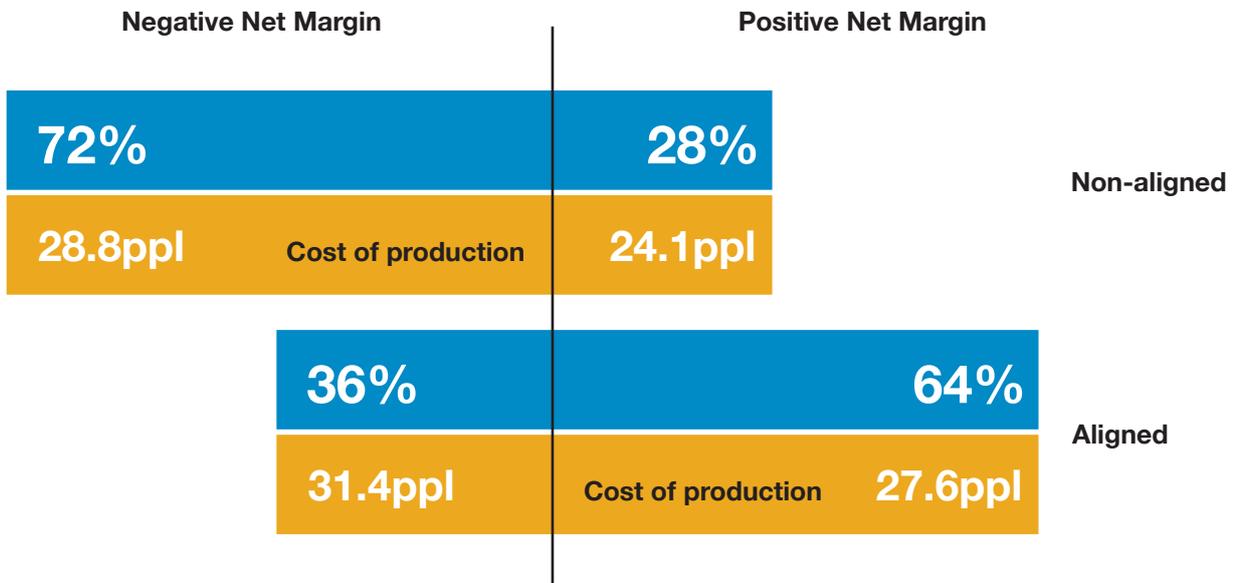
Despite the impact of milk sales and costs being greatest for the bottom quartile, the overall change in net margin was virtually the same as for the top 25%. So, although the cost of production gap narrowed between the best and the worst, the gap in net margin remained the same.

Higher milk yields and lower costs were not sufficient to off-set the fall in dairy herd revenue. Therefore, the proportion of herds that experienced negative dairy herd net margins increased. The 2015/16 results showed that around 63% of dairy herds had negative enterprise net margins. This compares with 42% in 2014/15 and 34% in 2013/14. The Defra Farm Business Survey for 2015/16 also found 63% of dairy herds in its sample reported a negative net margin.

However, as mentioned previously, reductions in milk prices varied significantly depending on contract type and this was reflected in the net margin results. The vast majority of herds on non-aligned contracts returned a negative margin. Not unsurprisingly, the majority of aligned contract producers made a positive net margin, yet a noticeable proportion still made a loss at the dairy enterprise level (see Figure 6). This meant that there was an increase in the proportion of aligned herds in the top 25%. As such, the milk price differences seen in 2015/16 between aligned and non-aligned contracts had a greater influence on net margin performance than seen in previous AHDB Evidence Reports.

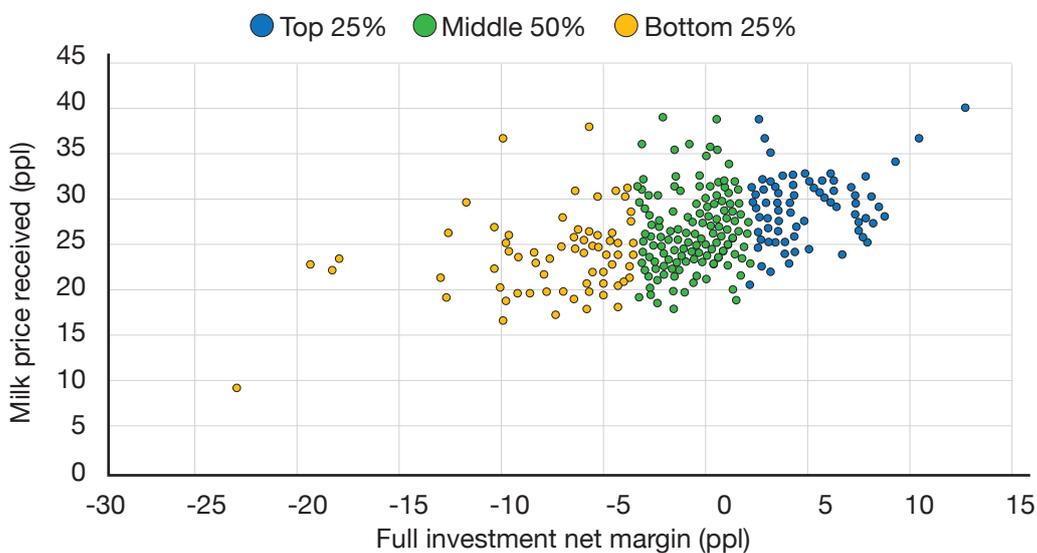
Figure 6 also shows the variation in costs of production depending on net margin performance and milk contract type. Those herds that were achieving a positive full net margin on non-aligned milk contracts had, on average, 4.7ppl lower costs, than those with negative net margins. Likewise, herds returning positive margins on aligned contracts had 3.8ppl lower costs than the herds making a loss.

Figure 6: Proportion of herds by contract type with negative or positive full investment net margin 2015/16



Although there were differences in the net margin performance of herds depending on contract type, the level of costs of production was also a factor. The 2015/16 results in Figure 7 show that receiving a relatively high milk price does not necessarily guarantee a net margin which is positive. Some herds that received some of the lowest milk prices still made a positive margin. In contrast, some herds that received relatively high milk prices, still made a significant loss due to high costs of production.

Figure 7: Full investment net margin versus milk price received for accounting year ends between December 2015 and June 2016 (ppl)



Source: AHDB Dairy/Promar International and partners

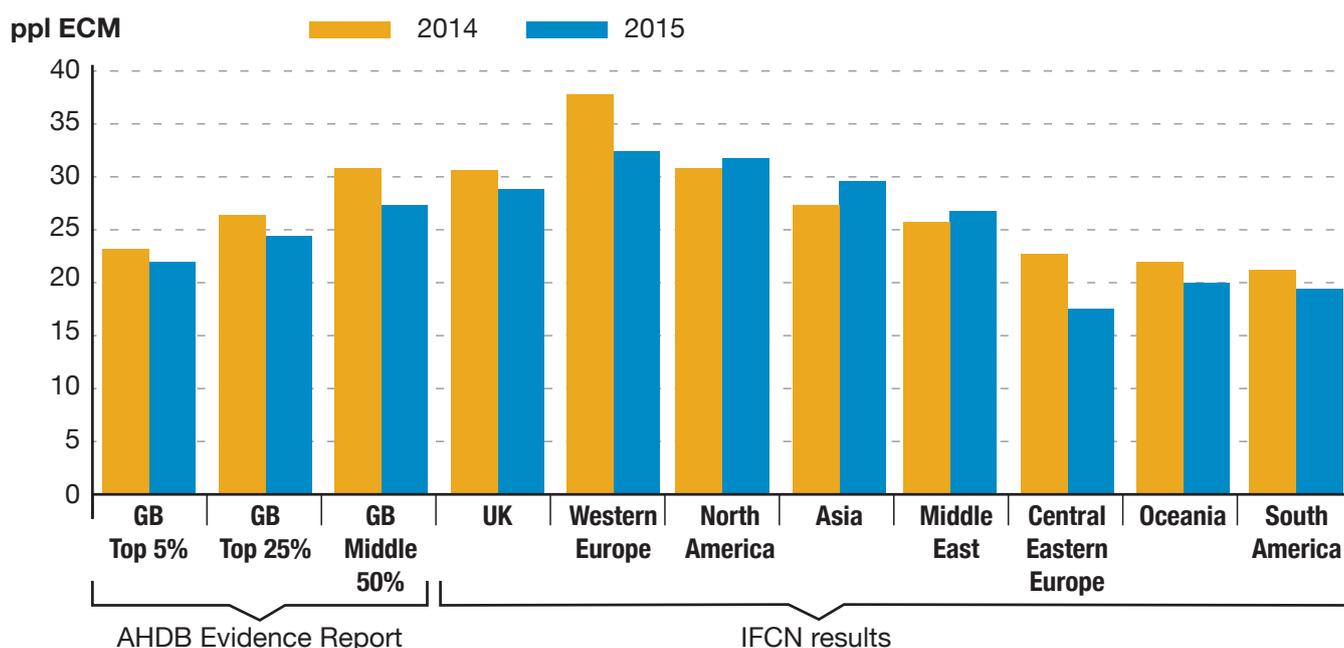
Understanding costs of milk production from all over the world allows us to know how competitive British dairy farms are relative to Europe and globally.

As a member of the International Farm Comparison Network (IFCN), AHDB Dairy has access to data updated annually from 52 major milk-producing countries around the world. The data is based on a selection of ‘typical farms’ that represent the most common types producing the highest share of milk within a region or country. It looks at milk production only – all cash and non-cash costs of the dairy enterprise and returns from milk – but excludes youngstock, calves and non-milk income.

Global costs of milk production in 2015

The global average cost of milk production was 25ppl ECM in 2015, according to the latest IFCN estimates. This was around 3% lower than in 2014. Feed prices declined by around £50/tonne during 2015 and helped contribute to the lower costs. However, IFCN also report that currency devaluation had a significant impact, especially in Europe.

Figure 8: IFCN average cost of milk production by global region compared to Great Britain results



Western European typical costs of milk production were 33ppl ECM in 2015. In comparison, for GB, the top 25% costs were 8.5ppl ECM lower and the middle 50% were 6ppl ECM less. This has meant that GB retains a reasonable competitive advantage with most of its close western European neighbours.

Comparing further afield, the GB average and top quartile seem to also be lower cost than North America. However, closer investigation reveals that typical costs of milk production in this region varies from 27ppl ECM in the USA to over 43ppl ECM in Canada. In fact, IFCN estimate that Canada is in the top 5 highest cost producers in the world.

There appears to be competitive advantage gained by Britain against the Asian region typical costs in 2015. Here also, there is a wide range in costs of production. IFCN report that Indian typical costs are in the region of 25ppl ECM and 35ppl ECM in China. Whereas Japanese costs were estimated at 50ppl ECM. Costs in this region increased compared to 2014, partly due to higher inflation rates.

Energy corrected milk (ECM) (kg) = (milk production (l/year) x 1.033 x (0.383 x butterfat (%) + 0.242 x protein (%) + 0.7832)/3.1138); allows comparison between milk types with different solid contents

From a cost of production point of view, Britain has continued its relative competitiveness in Western Europe, as well as also comparing to other significant countries around the world. But, even the top 25% in GB have typical costs that are higher than the average in regions like Oceania and Central and Eastern Europe.

British productivity compared to selected western European countries

In the 2015 Evidence Report, Britain was compared with selected European countries using net margins, after cash and full economic costs were considered, to investigate short-term and long-term viability. In this section, we continue to look at how Britain compares with these selected countries, looking specifically at some key productivity measures.

Figures 9, 10 and 11 show labour, land and capital productivity performance of milk production in typical herds that represent close to the statistical average herd size in each of those countries.

Figure 9: Labour productivity
kg milk (ECM)/hour

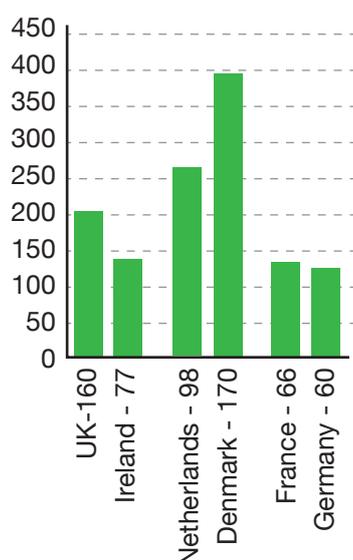


Figure 10: Land productivity
1,000kg milk (ECM)/ha

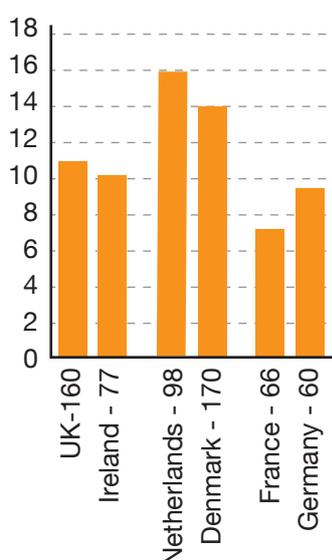
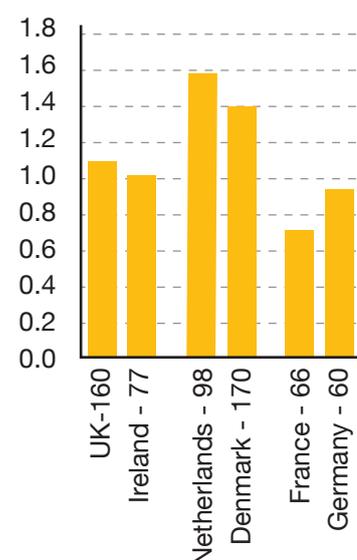


Figure 11: Capital productivity
kg milk (ECM)/£ capital



Note: Country name indicates the typical farm herd size
Source: IFCN

Labour productivity indicates the output achieved for each unit of labour use, which in Figure 9 is per hour. The graph shows that the British typical farm produces nearly 200kg milk per hour of labour input, which is higher than the Irish, French and German typical farms, but half that of the Danish farm. The Danish typical farm, despite being similar in size and stocking density to the British unit, achieves cow milk yields of over 10,000kg. The Danish farm also has a higher herd replacement rate of 41% versus around 30% for Britain, but more importantly has one fewer full-time labour equivalents at 2.3.

In contrast, the Irish typical farm, although it has similar amount of full-time labour equivalents to the Danish farm, the smaller herd size and less intensive system, ie spring calving herd, means that the labour productivity is significantly lower than the Danish and also less than the British farm.

The amount of milk produced per hectare of land allocated to the dairy herd is shown in Figure 10. This time the Dutch typical farm has the highest land productivity. Compared with the British farm, the Dutch unit is a smaller, more intensive system, with a higher stocking density (1.7 v 2.2 LU/ha) and around 500kg higher cow milk yields.

Despite the differences in scale and milk yields, the UK and Irish typical farms have a similar productivity from their land allocated to the dairy. The Irish farm has a marginally higher stocking density, which will partly make up for these differences. But the predominance and importance of the grass based systems focuses management and so productivity from the land base, performing very well compared to the more mixed system found on the typical British farm.

In terms of capital productivity, the UK typical farm produces a higher amount of milk per £ of capital input than the other selected countries, apart from Ireland. IFCN define capital as the value of assets such as buildings, machinery and livestock at the end of year. Therefore, capital productivity can be influenced by the level of investment in these assets.

For several years, dairy units on the continent have been investing more in these assets than generally in the UK. Dairy farms in countries such as the Netherlands and Denmark invested in expanding their businesses but as a result, are now carrying heavy debt loads. This has been seen with the higher levels of depreciation costs reported by these European counterparts, but can also be appreciated by looking at their lower capital productivity.

On the measures of labour, land and capital productivity, it can be surmised that the UK performs well, if not at the levels of the best in Europe, it certainly is by no means the worst. But there is scope for the UK to improve its general productivity, especially output per labour unit, albeit with the challenge of not increasing costs and avoiding heavy debt levels.

*Energy corrected milk (ECM) (kg) = (milk production (l/year) x 1.033 x (0.383 x butterfat (%) + 0.242 x protein (%)) + 0.7832)/3.1138):
allows comparison between milk types with different solid contents*

British dairy farms have experienced the greatest range in milk prices for many years. This has led to milk price having a bigger impact on net margins in 2015/16 than has been seen previously. As such, and unsurprisingly, the number of dairy enterprises that returned a negative full investment net margin increased from one third in 2013/14 to nearly two thirds in 2015/16.

Nonetheless, there was an encouraging narrowing of the gap in costs of production between the top and bottom performing 25% herds. Reductions in input prices such as feed and fertiliser certainly helped with reducing those costs at all performance levels. However, the bottom quartile demonstrated a larger decline in costs compared with the top 25% herds. This will be down to the bottom performers, in part, having a higher level of inputs on which price falls would impact, but also a greater scope to physically reduce the quantities used. But other expenses have also been reduced, such as building repairs and capital expenditure. Despite this though, costs of production were still lower in the top performing herds

However, in spite of the reducing gap in costs of production, the wider difference in revenue between the top and bottom quartiles meant the gap in net margin didn't change. The challenge for the bottom quartile herds is how to at least maintain or, better still, continue the journey of lowering costs while improving technical performance, even when milk prices increase. Maximising efficiency, therefore, must continue to focus the dairy producer's mind.

If Britain is to increase further its competitive advantage in Western Europe, then this journey is an important one. Especially in a post-Brexit world, whereby GB could be even more exposed to global market forces. Certainly, Britain is in a reasonable position in terms of some productivity measures, economies of scales and even its climate when compared to some of its closest neighbours.

The resilience of British dairy businesses in future volatile times will depend on the experiences gained during the 2014-16 market trough, whether it's how costs were able to be reduced or optimising milk contracts and resources on the farm. As 2015/16 figures show, it is evident that Britain has the potential to move to a better long-term position.

For up to date estimated typical milk production costs for Great Britain go to <https://dairy.ahdb.org.uk/market-information/farming-data/>

Further results for account year ending December 2015 to June 2016 Dairy herd enterprise – £ per hectare

**Table 4: Range in physical performance of GB dairy herds 2015/16
(ranked by net margin £ per hectare)**

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Number of farms	16	82	82	16
Herd size	364	261	182	239
Dairy stocking density (LU/ha)	2.06	1.99	2.09	2.36
Herd replacement rate (%)	24	26	28	28
Cows calved (%) ¹	93	96	87	90
Milk yield (l/cow/year)	8,713	8,150	7,652	8,008
Milk yield per hectare (litres/ha/year)	17,392	15,808	16,825	18,703
Milk from forage (l/cow/year)	2,203	2,365	1,931	1,932
Butterfat (%)	4.02	4.07	4.09	4.04
Protein (%)	3.30	3.32	3.31	3.33
Labour (hours/cow/year)	27	32	43	46

Notes: Ranked by net margin £ per hectare

¹: The % of cows in a herd calved in a 365-day period

**Table 5: Range in financial performance of GB dairy herds 2015/16
(ranked by net margin £ per hectare)**

£ per hectare	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Milk sales	5,025	4,412	3,890	4,409
Revenue	5,335	4,720	4,179	4,681
Herd replacement cost	341	411	548	699
Feed and forage cost	1,572	1,390	1,642	1,938
Livestock costs	500	470	520	531
Total variable costs	2,072	1,860	2,161	2,469
Labour costs (paid)	411	391	426	667
Power and machinery cost	468	471	689	922
Property repairs, rent and finance	414	326	416	438
Other operational costs	130	162	219	250
Cash fixed costs	1,424	1,350	1,751	2,276
Cash costs of production	3,837	3,621	4,460	5,444
Cash net margin	1,498	1,099	-282	-763
Labour costs (unpaid)	158	183	347	283
Total depreciation	182	221	357	500
Rental value of owned land	73	78	118	98
Non-cash fixed costs	413	482	822	882
Full investment fixed costs (cash and non-cash)	1,837	1,832	2,573	3,158
Full investment costs of production	4,250	4,103	5,282	6,325
Full investment net margin	1,085	617	-1,104	-1,644

Notes: Ranked by net margin £ per hectare

Cash costs exclude unpaid family labour and depreciation and includes actual rent and finance costs

Table 5a: Business performance indicators 2015/16 (ranked by net margin £ per hectare)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Output to input ratio (revenue as a ratio of full costs of production)	1.26	1.15	0.79	0.74
Feed and forage costs % (as % of revenue)	29	29	39	41
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	20	24	38	44
Rent and finance % (as a % of revenue)	5.4	5.2	7.9	7.3
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	28	32	51	58
Revenue retained (cash net margin as % of revenue)	28	23	-7	-16
Net cash flow before tax and drawings (£/ha)	32	18	-784	-1,055
Annual investment/capital expenditure (£/ha)	748	482	326	390

Notes: Ranked by net margin £ per hectare

Further explanation of these indicators can be found on Page 5 and in the Glossary

Dairy herd enterprise – £ per cow

**Table 6: Range in physical performance of GB dairy herds 2015/16
(ranked by net margin £/cow)**

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Number of farms	16	82	82	16
Herd size	298	257	156	180
Dairy stocking density (LU/ha)	1.81	1.90	1.75	1.81
Herd replacement rate (%)	24	25	27	27
Cows calved (%) ¹	93	95	87	87
Milk yield (l/cow/year)	8,539	8,058	7,405	7,495
Milk yield per hectare (litres/ha/year)	14,862	14,957	12,664	13,342
Milk from forage (l/cow/year)	2,324	2,394	1,984	2,110
Butterfat (%)	4.04	4.07	4.11	4.10
Protein (%)	3.29	3.32	3.31	3.32
Labour (hours/cow/year)	28	33	45	51

Notes: Ranked by net margin £ per cow

¹: The % of cows in a herd calved in a 365-day period

**Table 7: Range in financial performance of GB dairy herds 2015/16
(ranked by net margin £ per cow)**

£ per cow	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Milk sales	2,479	2,303	1,854	1,788
Revenue	2,633	2,462	1,995	1,915
Herd replacement cost	155	211	277	279
Feed and forage cost	716	715	774	715
Livestock costs	240	243	247	236
Total variable costs	955	958	1,021	951
Labour costs (paid)	199	202	201	311
Power and machinery cost	218	247	335	404
Property repairs, rent and finance	211	173	202	213
Other operational costs	70	87	115	121
Cash fixed costs	698	709	853	1,048
Cash costs of production	1,809	1,877	2,150	2,279
Cash net margin	824	585	-156	-364
Labour costs (unpaid)	83	100	189	181
Total depreciation	96	115	181	249
Rental value of owned land	34	41	72	78
Non-cash fixed costs	214	256	442	508
Full investment fixed costs (cash and non-cash)	912	965	1,295	1,557
Full investment costs of production	2,022	2,134	2,593	2,787
Full investment net margin	610	329	-598	-872

Notes: Ranked by net margin £ per cow

Cash costs exclude unpaid family labour and depreciation and includes actual rent and finance costs

Table 7a: Business performance indicators 2015/16 (ranked by net margin £/cow)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Output to input ratio (Revenue as a ratio of full costs of production)	1.30	1.15	0.77	0.69
Feed and forage costs % (as % of revenue)	27	29	39	37
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	20	24	40	52
Rent and finance % (as a % of revenue)	5.4	5.2	7.9	7.3
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	28	32	53	69
Revenue retained (cash net margin as % of revenue)	31	24	-8	-19
Net cash flow before tax and drawings (£/cow)	-74	-33	-378	-869
Annual investment/capital expenditure (£/cow)	748	482	326	390

Notes: Ranked by net margin £ per cow

Further explanation of these indicators can be found on Page 5 and in the Glossary

Dairy herd enterprise – £/kg milk solids

New to this year's Evidence Report is the inclusion of the range in dairy herd economic performance, based on £/kg milk solids (MS). Providing figures based on per kg of milk solids basis would be useful to those producers who are, for example, on constituent contracts. Presenting the performance of dairy herds by milk solids is a format that is used around the world such as in New Zealand and Australia. See Page 27 for details on calculating £/kg milk solids.

Table 8: Range in physical performance of GB dairy herds 2015/16 (ranked by net margin £/kg MS)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Number of farms	16	82	82	16
Herd size	283	249	160	108
Dairy stocking density (LU/ha)	1.76	1.88	1.90	1.72
Herd replacement rate (%)	25	26	26	20
Cows calved (%) ¹	95	95	87	85
Milk yield (kg solids/cow/year)	586	601	565	446
Milk yield per hectare (kg solids/ha/year)	985	1,099	1,068	758
Milk from forage (kg solids/cow/year)	166	178	150	174
Butterfat (%)	4.06	4.05	4.10	4.11
Protein (%)	3.33	3.32	3.32	3.32
Labour (hours/cow/year)	26	32	45	48

Notes: Ranked by net margin £/kg milk solids

¹: The % of cows in a herd calved in a 365-day period

Table 9: Range in financial performance of GB dairy herds 2015/16 (ranked by net margin £/kg MS)

£/kg milk solids	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Milk sales	4.03	3.76	3.05	2.76
Revenue	4.29	4.02	3.29	3.08
Herd replacement cost	0.44	0.41	0.35	0.40
Feed and forage cost	1.11	1.18	1.28	1.27
Livestock costs	0.37	0.40	0.43	0.42
Total variable costs	1.48	1.58	1.71	1.69
Labour costs (paid)	0.31	0.32	0.35	0.22
Power and machinery cost	0.32	0.38	0.55	0.65
Property repairs, rent and finance	0.27	0.25	0.35	0.51
Other operational costs	0.12	0.14	0.19	0.21
Cash fixed costs	1.02	1.09	1.43	1.58
Cash costs of production	2.94	3.09	3.48	3.67
Cash net margin	1.35	0.93	-0.19	-0.59
Labour costs (unpaid)	0.11	0.16	0.32	0.62
Total depreciation	0.17	0.19	0.31	0.32
Rental value of owned land	0.08	0.07	0.12	0.20
Non-cash fixed costs	0.36	0.42	0.75	1.14
Full investment fixed costs (cash and non-cash)	1.38	1.51	2.18	2.73
Full investment costs of production	3.30	3.50	4.23	4.81
Full investment net margin	0.99	0.51	-0.94	-1.74

Notes: Ranked by net margin £/kg milk solids

Cash costs exclude unpaid family labour and depreciation and include actual rent and finance costs

Table 9a: Business performance indicators 2015/16 (ranked by net margin £/kg MS)

	Top 5%	Top 25%	Bottom 25%	Bottom 5%
Output to input ratio (revenue as a ratio of full costs of production)	1.30	1.15	0.78	0.64
Feed and forage costs % (as % of revenue)	26	29	39	41
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	19	21	41	47
Rent and finance % (as a % of revenue)	5.1	4.7	8.4	13.7
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	25	31	54	68
Revenue retained (cash net margin as % of revenue)	31	23	-6	-19
Net cash flow before tax and drawings (£/kg milk solids)	0.03	0.02	-0.51	-2.11
Annual investment/capital expenditure (£/kg milk solids)	0.57	0.41	0.38	0.40

Notes: Ranked by net margin £/kg milk solids

Further explanation of these indicators can be found on Page 5 and in the Glossary

Dairy herd enterprise – categorised by cow milk yield

The whole 2015/16 sample has been split according to the level of milk yield achieved per cow on average in the herds. The top and bottom quartile range is given for each milk yield category, except for the highest and lowest bands, where just an average is given due to smaller sample sizes.

Table 10: Range in physical performance of GB dairy herds by cow yield (litres) in 2015/16 (ranked by net margin ppl)

	Over 9,500l	8,000 to 9,499l		6,500 to 7,999l		5,000 to 6,499l		Under 5,000l
	Average	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Average
Number of farms	34	33	33	26	26	12	12	10
Herd size	299	220	180	269	169	192	103	148
Dairy stocking density (LU/ha)	2.22	1.76	1.92	1.90	1.80	1.77	1.64	1.77
Herd replacement rate (%)	29	26	29	27	27	21	24	21
Cows calved (%) ¹	94	97	90	94	82	94	87	93
Milk yield (l/cow/year)	10,114	8,635	8,620	7,304	7,275	5,943	5,718	3,999
Milk yield (kg solids/cow/year)	752	653	649	560	552	474	443	332
Milk from forage (l/cow/year)	1,932	2,259	2,132	2,109	1,965	2,903	2,192	2,067
Butterfat (%)	3.97	4.03	4.04	4.11	4.05	4.29	4.22	4.48
Protein (%)	3.24	3.30	3.27	3.33	3.32	3.45	3.30	3.58
Labour (hours/cow/year)	36	36	44	30	45	35	45	35

Notes: Ranked by net margin ppl

¹: The % of cows in a herd calved in a 365-day period

Table 11: Range in financial performance of GB dairy herds by cow yield (litres) in 2015/16 (ranked by net margin ppl)

	Over 9,500l	8,000 to 9,499l		6,500 to 7,999l		5,000 to 6,499l		Under 5,000l
	Average	Top ` 25%	Bottom 25%	Top ` 25%	Bottom 25%	Top ` 25%	Bottom 25%	Average
Milk sales	25.2	28.1	24.0	28.9	22.5	28.3	21.6	27.4
Revenue	26.7	30.0	25.7	31.0	24.4	30.7	23.9	31.0
Herd replacement cost	2.6	2.3	3.3	2.9	3.5	3.0	4.6	5.5
Feed and forage cost	10.4	8.9	10.0	8.4	9.1	6.6	8.7	6.7
Livestock costs	3.2	2.8	3.3	3.0	2.8	2.7	2.9	3.9
Total variable costs	13.6	11.7	13.3	11.4	11.9	9.4	11.6	10.6
Labour costs (paid)	2.3	2.2	2.3	2.7	3.4	2.9	1.3	1.7
Power and machinery cost	3.1	3.0	4.1	3.0	4.3	4.4	4.4	3.6
Property repairs, rent and finance	2.0	1.9	2.3	2.2	3.0	3.2	2.6	2.5
Other operational costs	0.8	1.1	1.4	1.2	1.6	1.4	1.8	1.8
Cash fixed costs	8.2	8.2	10.1	9.0	12.2	11.9	10.2	9.6
Cash costs of production	24.3	22.2	26.7	23.3	27.6	24.2	26.4	25.8
Cash net margin	2.4	7.8	-1.0	7.6	-3.3	6.5	-2.5	5.1
Labour costs (unpaid)	1.0	1.6	1.8	0.9	2.4	1.9	4.6	3.0
Total depreciation	1.6	1.4	2.0	1.6	2.4	1.3	2.6	1.8
Rental value of owned land	0.4	0.6	0.8	0.6	0.9	0.4	0.9	0.8
Non-cash fixed costs	3.0	3.6	4.6	3.1	5.8	3.6	8.1	5.6
Full investment fixed costs (cash and non-cash)	11.1	11.8	14.8	12.2	18.0	15.5	18.3	15.3
Full investment costs of production	27.3	25.8	31.3	26.4	33.4	27.8	34.5	31.4
Full investment net margin	-0.6	4.2	-5.6	4.5	-9.0	2.9	-10.6	-0.5

Notes: Ranked by net margin ppl

Cash costs exclude unpaid family labour and depreciation and include actual rent and finance costs

Table 11a: Business performance indicators 2015/16 (ranked by net margin ppl)

	Over 9,500l	8,000 to 9,499l		6,500 to 7,999l		5,000 to 6,499l		Under 5,000l
	Average	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Average
Output to input ratio (Revenue as a ratio of full costs of production)	0.98	1.16	0.82	1.17	0.73	1.11	0.69	0.98
Feed and forage costs % (as % of revenue)	39	30	39	27	37	22	36	22
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	23	22	30	20	39	28	40	24
Rent and finance % (as a % of revenue)	5.9	4.6	6.6	5.8	9.3	6.9	9.8	7.1
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	36	34	48	34	62	44	67	43
Revenue retained (cash net margin as % of revenue)	9	26	-4	25	-13	21	-10	17

Notes: Ranked by net margin ppl

Further explanation of these indicators can be found on Page 5 and in the Glossary

Dairy herd enterprise – categorised by housing period

The 2015/16 sample has been split according to the time that the herd is housed during the year. This can provide a proxy for different systems.

Table 12: Range in physical performance of GB dairy herds by housing period in 2015/16 (ranked by net margin ppl)

	More than 10 months		7 to 10 months		5 to 7 months		Less than 5 months	
	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%
Number of Farms	12	12	22	22	37	37	12	12
Herd size	310	294	258	129	227	154	230	174
Dairy stocking density (LU/ha)	2.10	2.35	1.88	1.63	1.81	1.89	1.65	1.83
Herd replacement rate (%)	26	32	27	29	24	25	25	27
Cows calved (%) ¹	92	90	95	91	92	82	101	88
Milk yield (l/cow/year)	9,147	8,710	8,377	7,018	7,800	6,989	6,898	6,305
Milk yield (kg solids/cow/year)	6 83	643	631	533	595	539	543	505
Milk from forage (l/cow/year)	1,554	989	2,132	1,891	2,623	2,415	2,867	2,630
Butterfat (%)	3.95	3.93	4.03	4.07	4.09	4.15	4.22	4.34
Protein (%)	3.29	3.24	3.28	3.30	3.31	3.34	3.42	3.43
Labour (hours/cow/year)	32	31	31	49	34	43	34	36

Notes: Ranked by net margin ppl

¹: The % of cows in a herd calved in a 365-day period

Table 13: Range in financial performance of GB dairy herds by housing period in 2015/16 (ranked by net margin ppl)

pence per litre	More than 10 months		7 to 10 months		5 to 7 months		Less than 5 months	
	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%
Milk sales	27.3	24.0	29.0	22.4	28.5	23.1	27.2	23.9
Revenue	29.2	25.4	30.8	24.7	30.5	24.8	29.5	26.0
Herd replacement cost	1.6	3.4	2.6	3.9	2.9	2.7	3.3	6.0
Feed and forage cost	10.5	11.8	9.3	9.7	7.9	8.7	7.5	7.5
Livestock costs	3.1	3.2	2.8	3.1	2.9	3.0	3.1	3.4
Total variable costs	13.6	15.0	12.1	12.8	10.9	11.7	10.6	10.9
Labour costs (paid)	2.4	2.4	2.1	1.1	2.6	3.6	2.3	2.5
Power and machinery cost	3.1	4.0	2.9	4.3	3.3	4.5	2.6	3.6
Property repairs, rent and finance	2.0	2.5	1.8	3.0	2.0	2.8	2.1	3.0
Other operational costs	0.7	1.1	1.1	1.6	1.2	1.5	1.0	1.7
Cash fixed costs	8.2	10.0	7.9	10.0	9.2	12.5	8.0	10.8
Cash costs of production	23.3	28.4	22.6	26.6	22.9	26.9	21.9	27.7
Cash net margin	5.8	-3.0	8.2	-1.9	7.6	-2.1	7.5	-1.6
Labour costs (unpaid)	1.0	1.1	1.3	3.8	1.4	2.0	1.4	2.1
Total depreciation	1.1	1.8	1.6	2.6	1.4	2.3	1.6	2.1
Rental value of owned land	0.6	0.6	0.7	0.9	0.6	0.7	0.7	0.9
Non-cash fixed costs	2.6	3.6	3.5	7.3	3.4	5.1	3.8	5.1
Full investment fixed costs (cash and non-cash)	10.8	13.5	11.5	17.3	12.6	17.6	11.7	15.8
Full investment costs of production	26.0	32.0	26.2	33.9	26.3	32.0	25.7	32.7
Full investment net margin	3.2	-6.6	4.6	-9.2	4.1	-7.2	3.8	-6.7

Notes: Ranked by net margin ppl

Cash costs exclude unpaid family labour and depreciation and include actual rent and finance costs

Table 13a: Business performance indicators 2015/16 (ranked by net margin ppl)

	More than 10 months		7 to 10 months		5 to 7 months		Less than 5 months	
	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%	Top 25%	Bottom 25%
Output to input ratio (Revenue as a ratio of full costs of production)	1.12	0.79	1.18	0.73	1.16	0.78	1.15	0.80
Feed and forage costs % (as % of revenue)	36	47	30	39	26	35	26	29
Labour (paid/unpaid) and machinery costs % (as a % of revenue)	21	28	19	35	23	38	21	29
Rent and finance % (as a % of revenue)	4.4	8.5	4.2	10.1	5.1	8.5	5.4	9.9
Overheads % (fixed costs excluding rent, rental value and finance as a % of revenue)	31	42	31	56	34	60	32	48
Revenue retained (cash net margin as % of revenue)	20	-12	27	-8	25	-8	26	-6

Notes: Ranked by net margin ppl
Further explanation of these indicators can be found on Page 5 and in the Glossary

Calculation of £/kg milk solids

More and more people are measuring and comparing in kilogrammes of milk solids (MS). To calculate your output and cost of production figures, you need the following information for the period of time you are looking at, eg 12 months:

- Total litres produced (either total, per cow or per ha)
- Fat and protein % of the milk produced

Litres are first converted to kg by multiplying by 1.03, because one litre of milk weighs 1.03kg. This figure is then multiplied by the % fat and protein to get kg milk solids.

Example of calculating annual figures

Total litres produced in year	=	1,000,000 litres
Total kg produced in year	=	1,030,000kg (1,000,000 multiplied by 1.03)
Average milk solid % for year	=	7.35% (3.95% butterfat + 3.4% protein)
Total milk solids for the year	=	75,705kg (1,030,000 multiplied by 7.35% or 0.0735)

If, for example, the total cost of production was £270,000 then divide this figure by the total milk solids calculated above.

Total cost of production per kg	=	£3.57 (£270,000 divided by 75,705kg)
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To calculate £/kg milk solids on a per cow or per hectare basis, replace the annual figures in the example above with per cow or per hectare figures.

Annual investment/capital expenditure – indicates how much the enterprise is spending on expansion or potential capital replacement or improvements, net of any sales.

Cash cost of production – consists of all variable, cash fixed costs and herd replacement cost. Excludes depreciation, imputed cost of family labour and includes actual rent and finance.

Cash fixed costs – cash only fixed costs, which include power and machinery, property repairs and actual labour, rent and finance plus other operational costs.

Cash net margin – equals revenue minus herd replacement, variable and cash fixed costs.

Cows calved % – percentage of cows calved in the year, calculated as the number of cows calved divided by the average herd size multiplied by 100.

ECM – Energy Corrected Milk. A method for comparing dairy financial performance across countries.

Feed and forage cost – equates to actual cost of all purchased feed and forage, plus market value of all home-grown non-forage feed and variable cost of home-grown forage.

Feed and forage costs % – calculated by dividing total feed and forage costs by revenue multiplied by 100.

Forage – grass silage, hay, non-grass forage and straw (both purchased and home-grown).

Full investment cost of production – previously full economic costs, which consists of all variable, fixed and herd replacement cost, including depreciation, an imputed cost of owned land and unpaid family labour.

Full investment net margin – previously full economic net margin, which equals revenue minus herd replacement, variable and fixed costs (including depreciation, imputed family labour, rent and finance).

Herd replacement cost – equates to the number of cows that have left the herd throughout the year, multiplied by the average value of incoming cows and heifers, plus value of dairy bull purchases, minus the total value of all outgoing cows, heifers and dairy bulls.

Herd replacement rate – is based on the number of cows that have left the herd throughout the year, presented as a percentage share of the herd size.

Herd size – the average number of dairy cows in the milking herd during the year.

IFCN – International Farm Comparison Network, based in Germany.

Imputed rent – imputed (notional) rent on the hectares of owned land used for the dairy herd (grassland and forage areas).

Labour cost – actual cost of paid labour plus imputed cost for unpaid family labour.

Labour (paid/unpaid) and machinery costs % – calculated by dividing the sum of labour (paid/unpaid), machinery repairs, tax and insurance, hire and contracting, fuel and depreciation costs by revenue multiplied by 100.

Milk solids – butterfat and protein content of milk.

Milk yield – calculated from the total amount of milk produced in the year, divided by either the herd size to obtain the average yield per cow per year or by total area allocated to the dairy herd to obtain the average yield per hectare per year.

Net cash flow – cash flow before tax and drawings. Calculated from profit before depreciation minus loan capital repayments and HP repayments.

Non-cash fixed costs – includes unpaid family labour, depreciation and value of land owned.

Non-forage feeds – consist of purchased compound feed, cereals, protein feeds and by-products, plus home-grown cereals, protein feeds and by-products.

Other operational costs – consists of water and telephone charges, general insurances, professional fees and other office-related costs.

Output to input ratio – calculated by dividing revenue by full investment cost.

Power and machinery cost – consists of repairs and spares, machinery hire, contracting, fuel and electricity.

Rent and finance % – calculated from the sum of actual rent and finance divided by revenue multiplied by 100.

Revenue – consists of the value of milk produced, value of calves at 20 days, net value of quota leases (in or out) and other dairy income (slurry to arable land, etc.).

Revenue retained % (by the dairy enterprise) – calculated by taking the cash costs net margin divided by revenue multiplied by 100.

Total depreciation – imputed depreciation on dairy-specific and forage machinery, equipment and buildings.

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