New Zealand dairy farming profits

Causes of variation between farms

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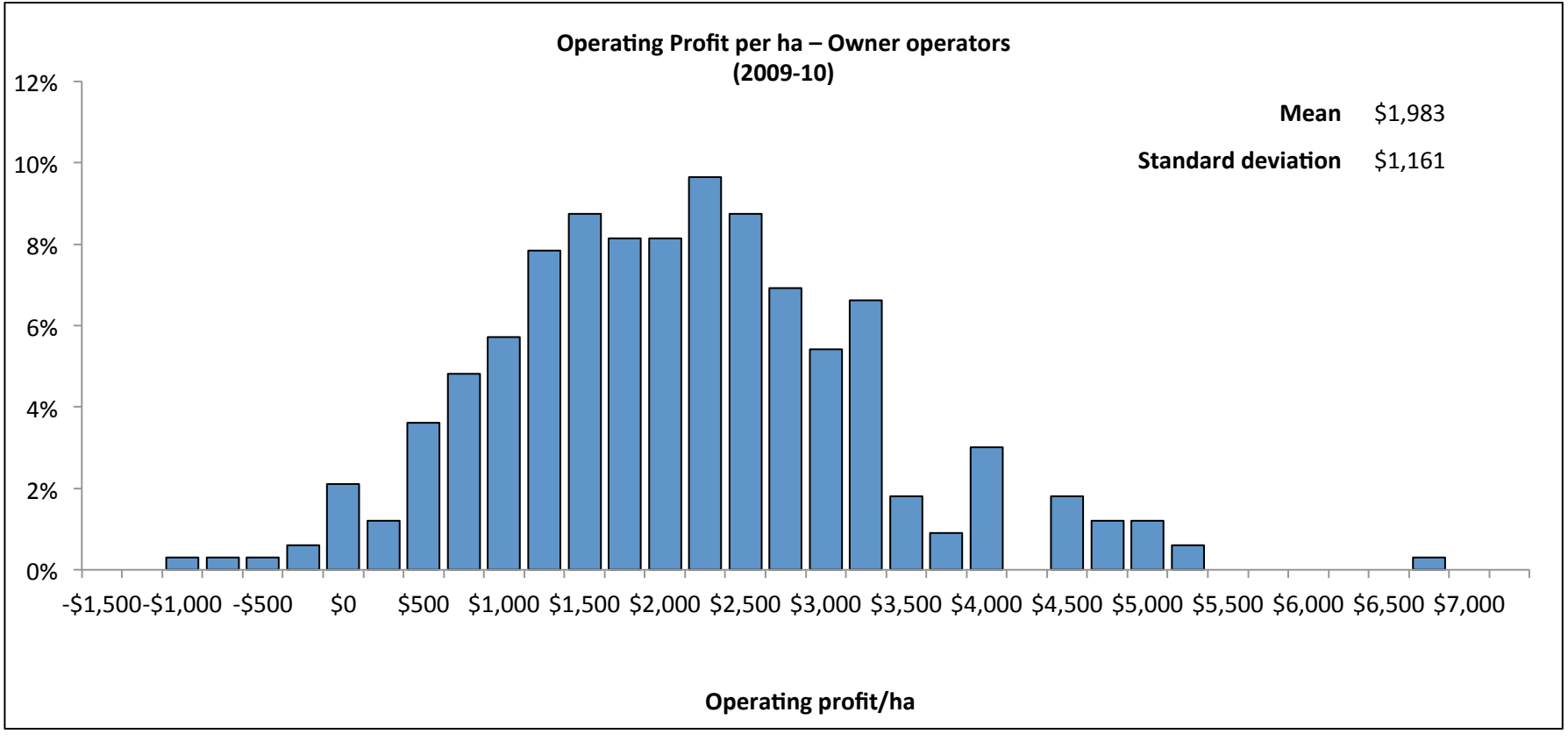
The dairy industry has good historic data on farm profitability. Operating Profit varies in part due to variation in skill levels throughout the workforce. If we can estimate how much of the variation is due to skills, we arrive at a way of estimating how much industry profitability will change if we change workforce skills (through training). We start by stripping away other causes of variation.

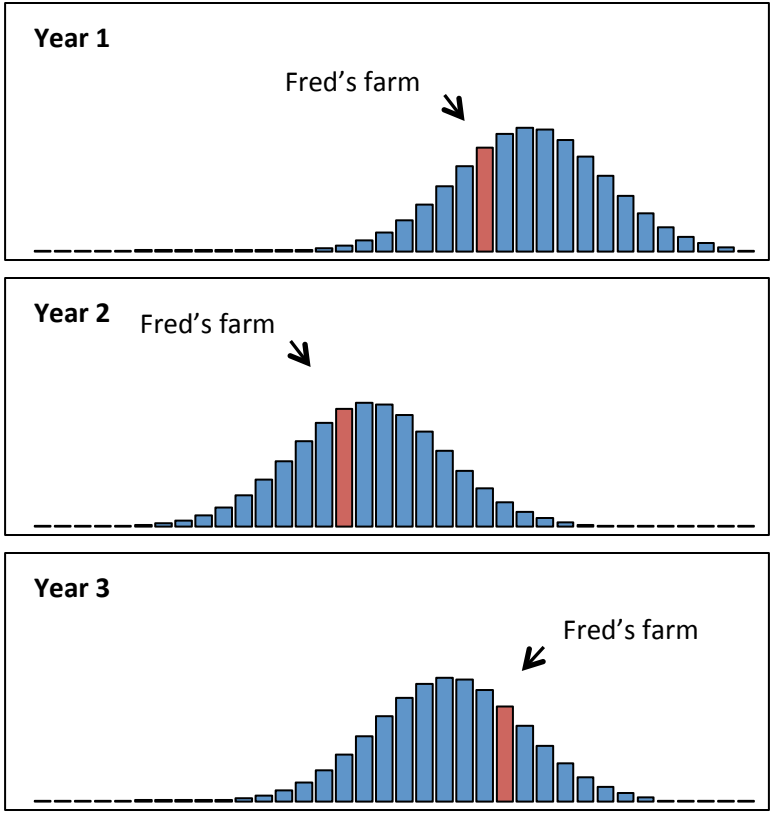
Variation in operating profit in 2009-10



Source: DairyBase

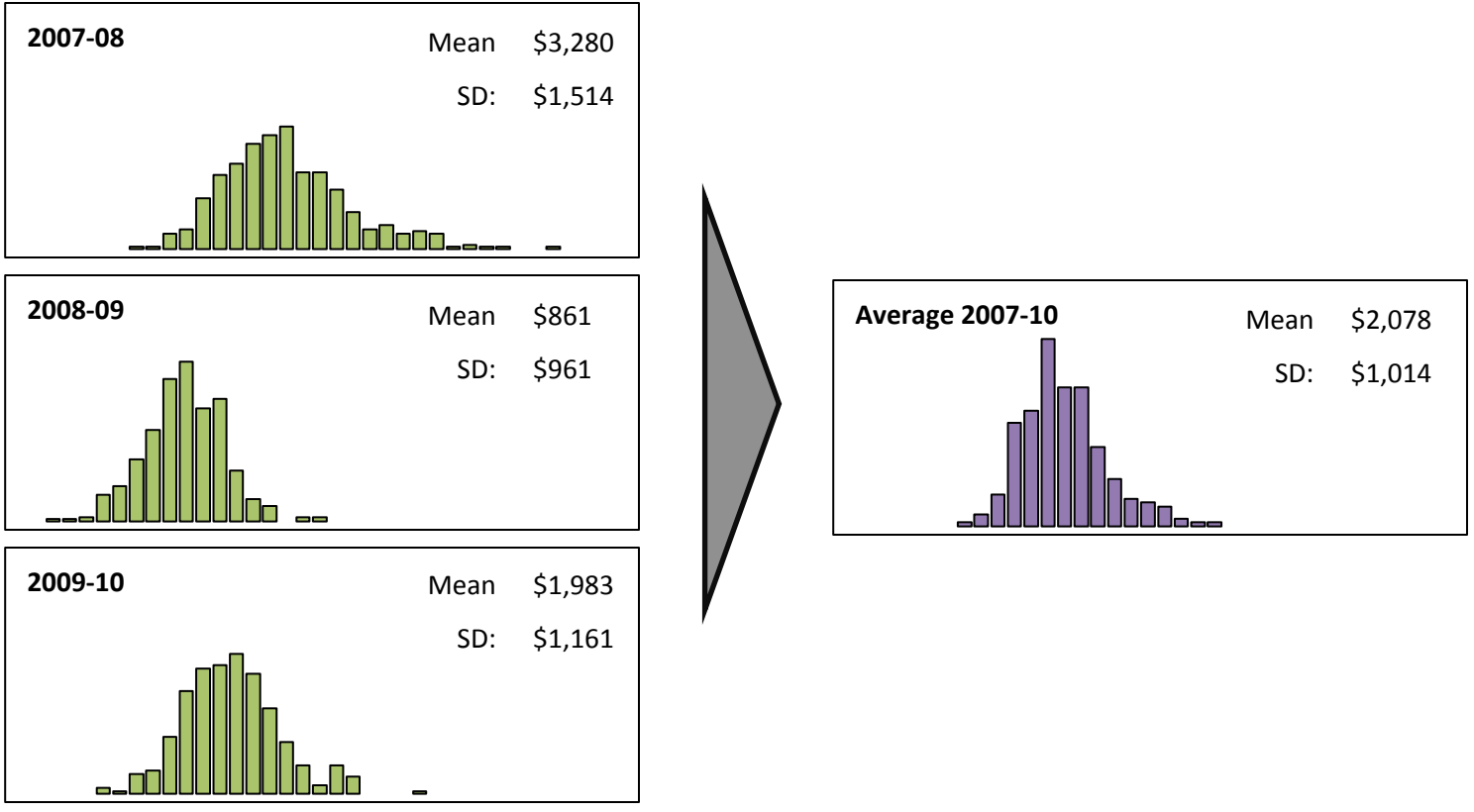
Farm profitability fluctuates from year to year. One cause is industry factors, such as changes in payout, which shift the overall distribution of profitability. Other causes are local/seasonal factors (for example, regional weather conditions) and farm level factors (for example, changes in inventories not reflected in accounts, lumpy R&M spend) which shift individual farms' position within the overall distribution. The combined effect of these year to year fluctuations increases the overall spread of profitability.

Stripping away annual fluctuations A



The effect of local/seasonal factors (for example, climate) and farm level factors on the overall spread of profitability can be reduced by averaging farm results over multiple years. Doing this for three years from 2007-08 to 2009-10 results in only a small reduction in the spread of profitability. This suggests that profitable farms are consistently profitable and visa versa.

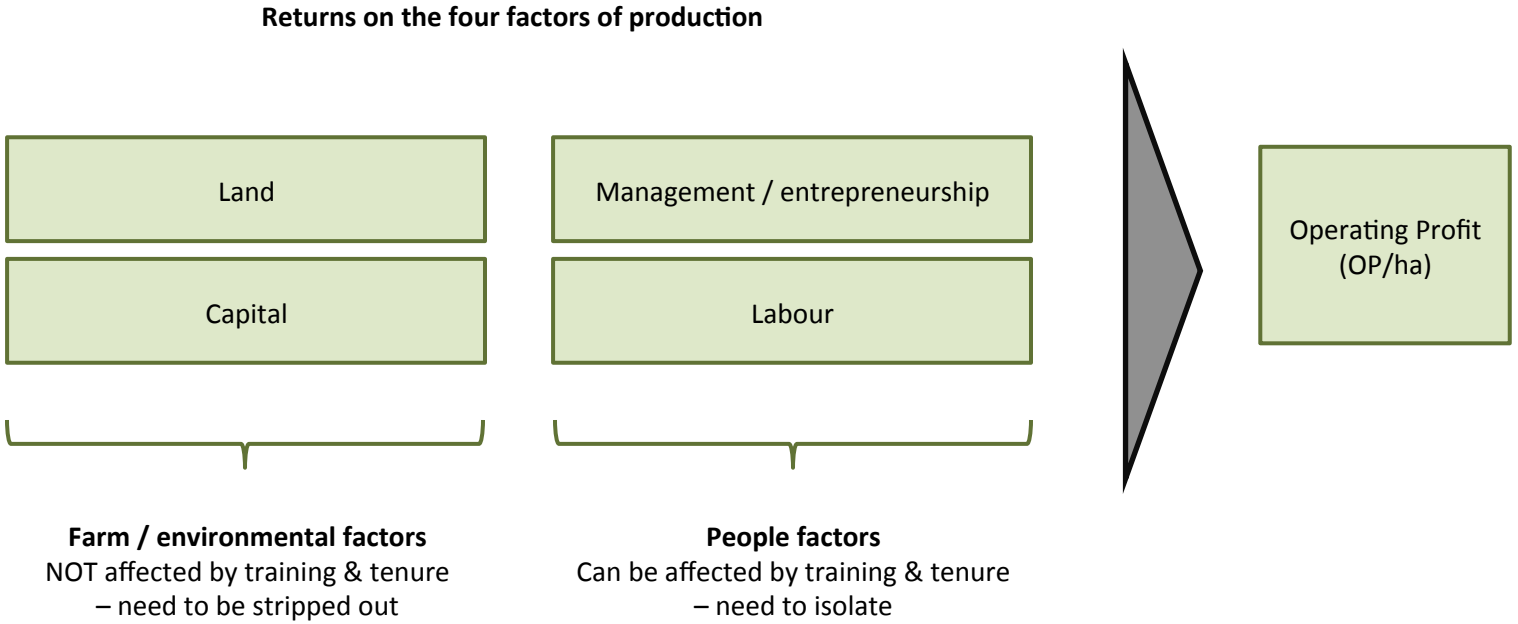
Stripping away annual fluctuations B



Source: DairyBase

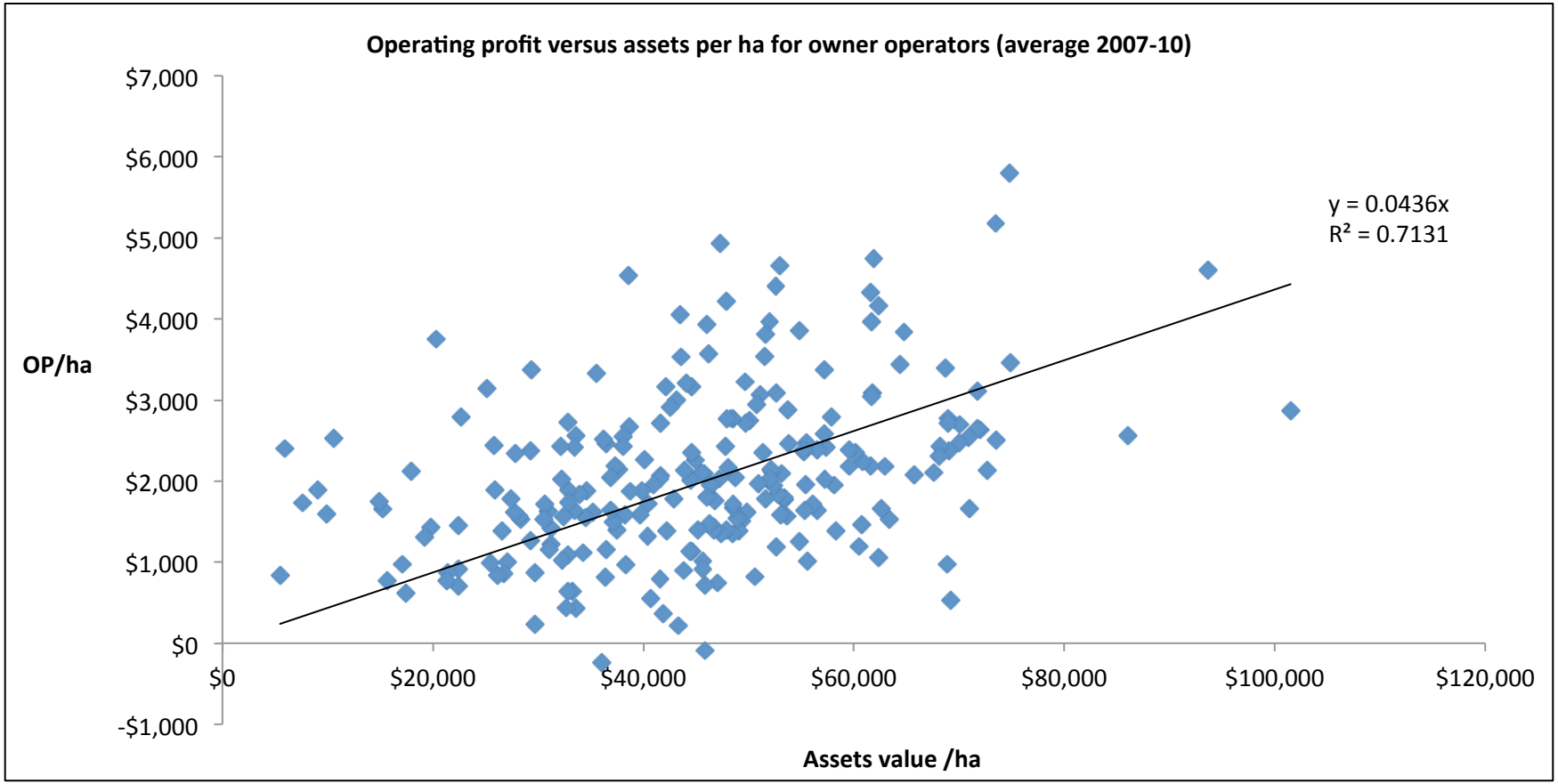
Profit is a measure of the returns on the four factors of production (land, labour, capital, management/entrepreneurship). Training and skills will only have a direct impact on two of these; management and labour productivity. We therefore need to strip out the effect of the other two "environmental" factors.

Drivers of dairy farming profitability



Influences of land and capital on Operating Profit are captured by differences in land values (for example, farms with better climate will have higher land values) and investment in infrastructure (for example, farms with rotary milking sheds will have lower labour costs). The correlation is seen in the plot below, in which the slope of the best fit line illustrates an average return on assets of 4.36%. Of interest to us is the scatter around the best fit line which we assume to be driven by "people" factors.

Impact of investment in land and infrastructure



By plotting averaged Operating Profit and adjusting for asset value (using the equation calculated on the previous slide), the remaining variation in profit can be attributed to "people" factors. Interestingly the standard deviation of this quantity (which we will call *Farm People Impact - FPI*) is only slightly less than unadjusted average Operating Profit (standard deviation of $980 per ha vs. $1,014 per ha). This provides empirical support for the hypothesis that Farm People Impact is the dominant cause of variation in farm profits.

Farm People Impact