



## THE LATEST REPORT CARD

Over the past 20 years genetic gains in New Zealand sheep have accelerated as more accurate genetic information has become available and new traits added to breeding objectives. **Mark Young** explains why.

**T**he potential of genomics, where DNA tests can provide increased accuracy or bring new traits into the mix, will be realised over the next 20 years. Future gains will change as some traits approach optimums – for example, fatness in lambs and body condition score in ewes as well as the number of lambs each ewe has – and new traits such as ewe stayability and body condition score (BCS) are brought into the mix.

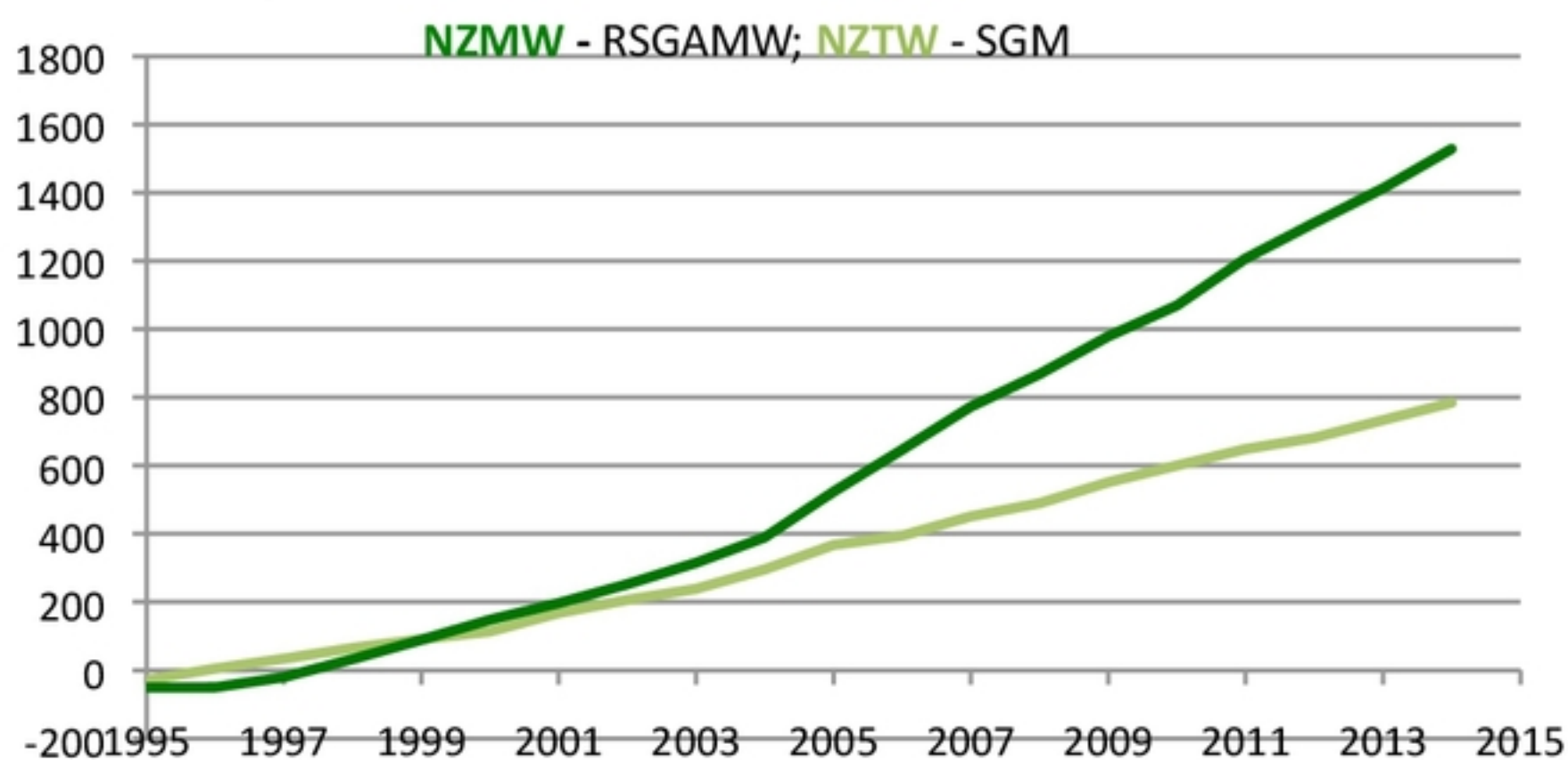
Let's consider the gains NZ ram breeding flocks have made using SIL genetic trend graphs for indices and key component traits. Each point on the graphs in this article is the average genetic merit (left-hand scale) of animals born in a year (bottom scale). Blue lines are for maternal (dual-purpose) sheep and red lines for meat (terminal) sheep. Data are from SIL-ACE, SIL's largest genetic evaluation, for those flocks measuring the trait(s) and that have good genetic connections to each other.

### NEW ZEALAND STANDARD WORTH INDICES – Graph 1

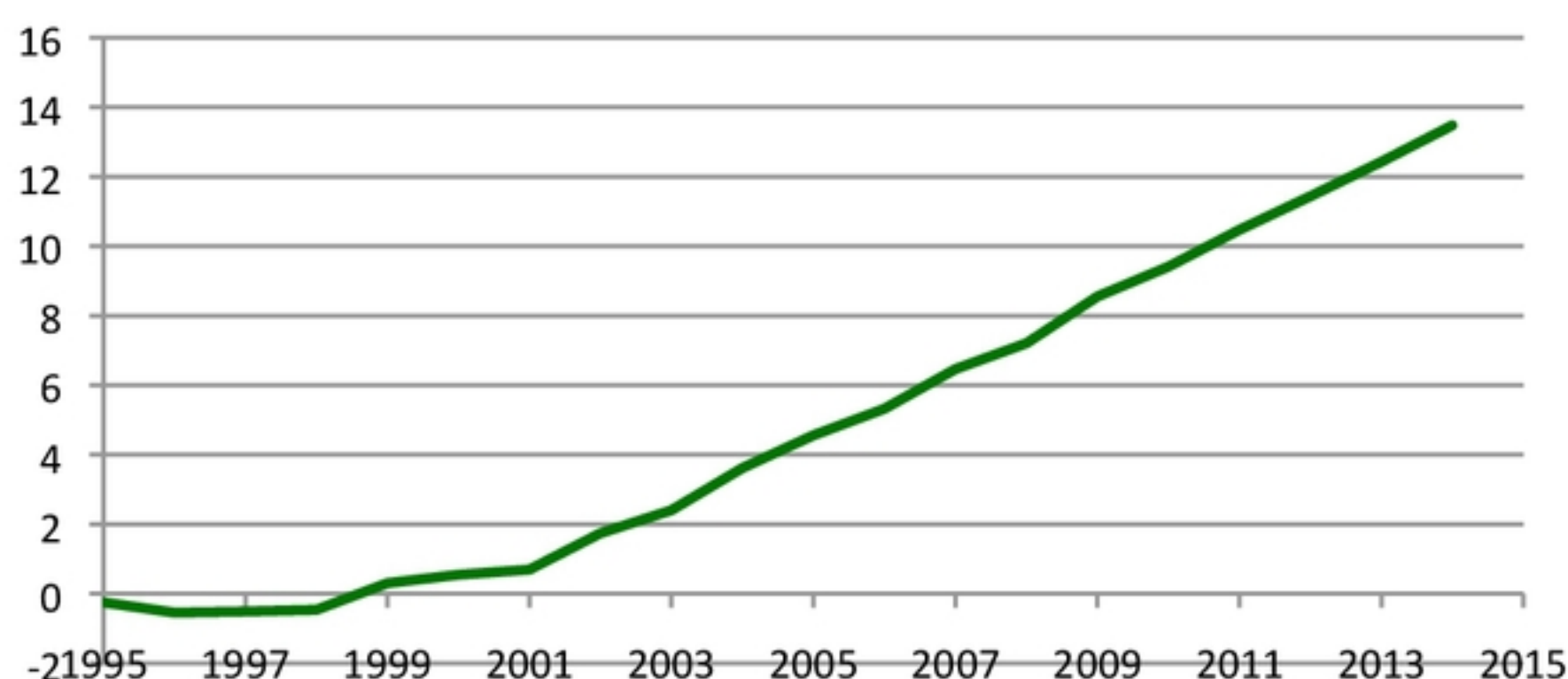
SIL is introducing a standard definition of economic merit for maternal and meat sheep types (also known as dual purpose and terminal). The new definitions (and traits in them) are:

- **NZ Standard Maternal Worth**

**Graph 1: NZ Maternal or Terminal Worth – cents**



**Graph 2: Number of lambs born, %**



(NZMW) – reproduction, lamb survival, lamb growth and adult size, carcase meat yield and wool production.

- **NZ Standard Terminal Worth (NZTW)** – lamb survival, lamb growth and carcase meat yield.

**Graph 1** shows that the genetic gain in NZMW accelerated after 2003, about the time the Central Progeny Test (CPT) was established by Alliance Group (now the Beef + Lamb New Zealand Genetics CPT) and SIL-ACE (SIL's largest across flock evaluation) was introduced.

Gains since 1995 amount to \$15 per ewe lambing for NZMW and \$8 per lamb born for NZTW.

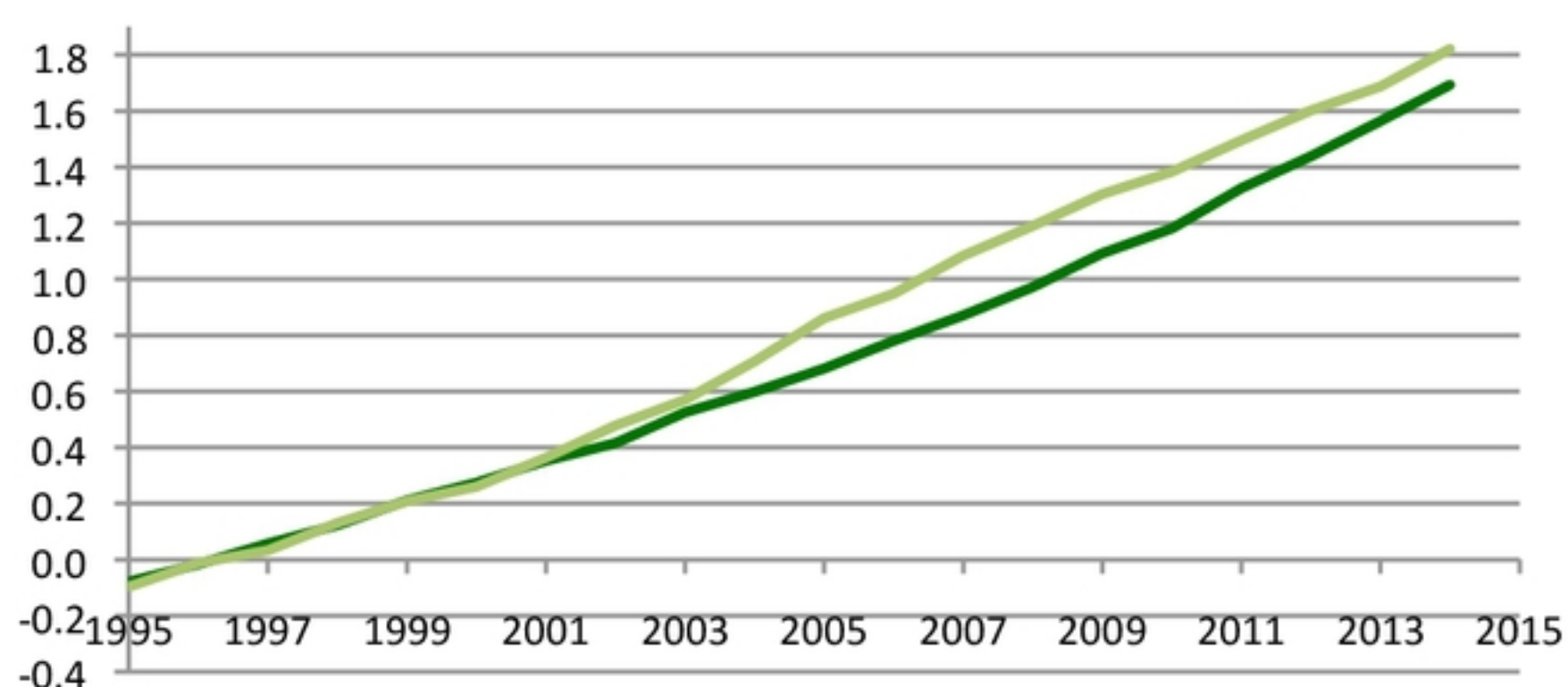
**Performance assessment** – Solid progress that accelerated as evaluation technology improved and added more traits. Expected to continue over the next 10-15 years at a faster rate as B+LNZ Genetics developments come onstream – for example, BCS and maternal stayability breeding values and genomic tools increase the accuracy of genetic information.

#### NUMBER OF LAMBS BORN – Graph 2

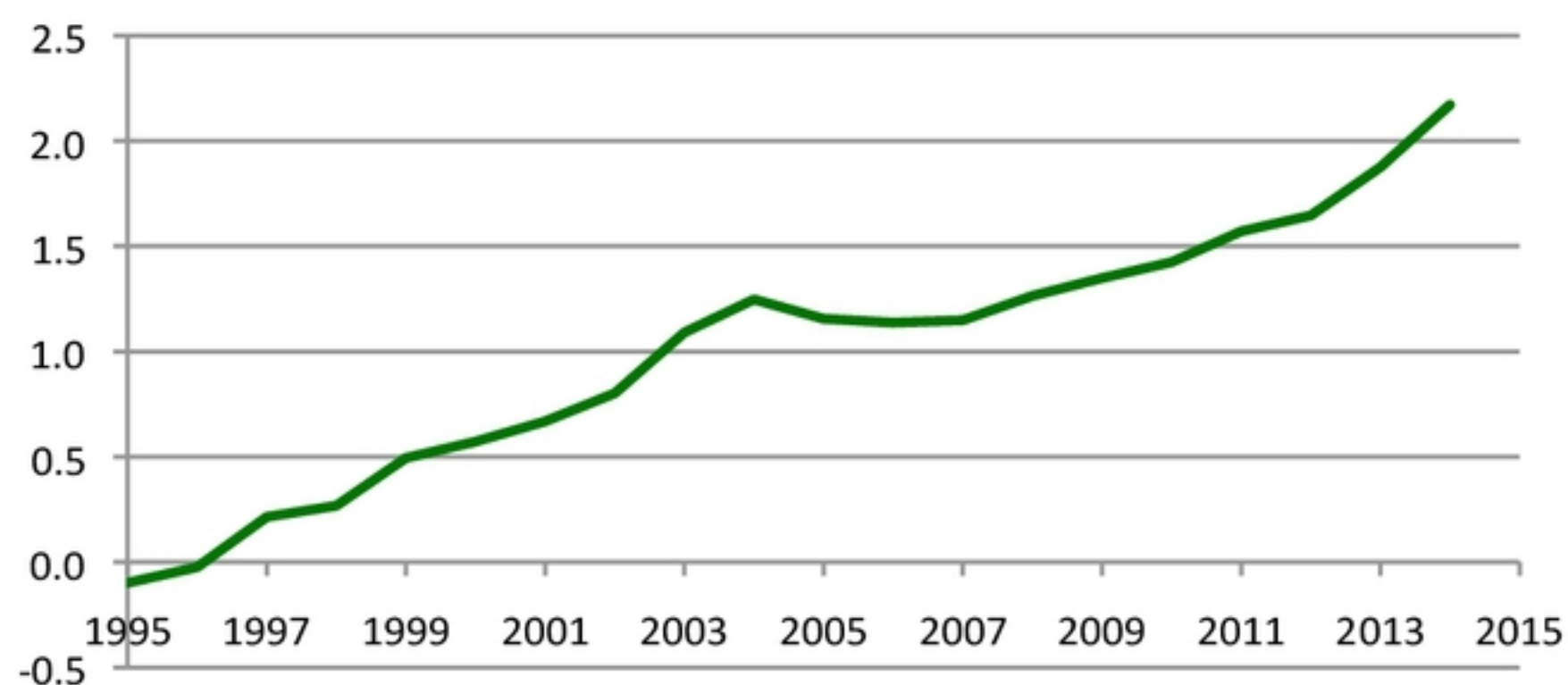
As shown in this graph the number of lambs born only began to change after SIL was established (1999-2000) and a more accurate system for estimating genetic merit for this trait was introduced.

**Performance assessment** – As a sector we are arguably nearing optimal figures for this trait in some flocks so further increase will be worth a lot less or not wanted in some situations. Together with lamb growth, this trait dominates gains made in the past 20 years.

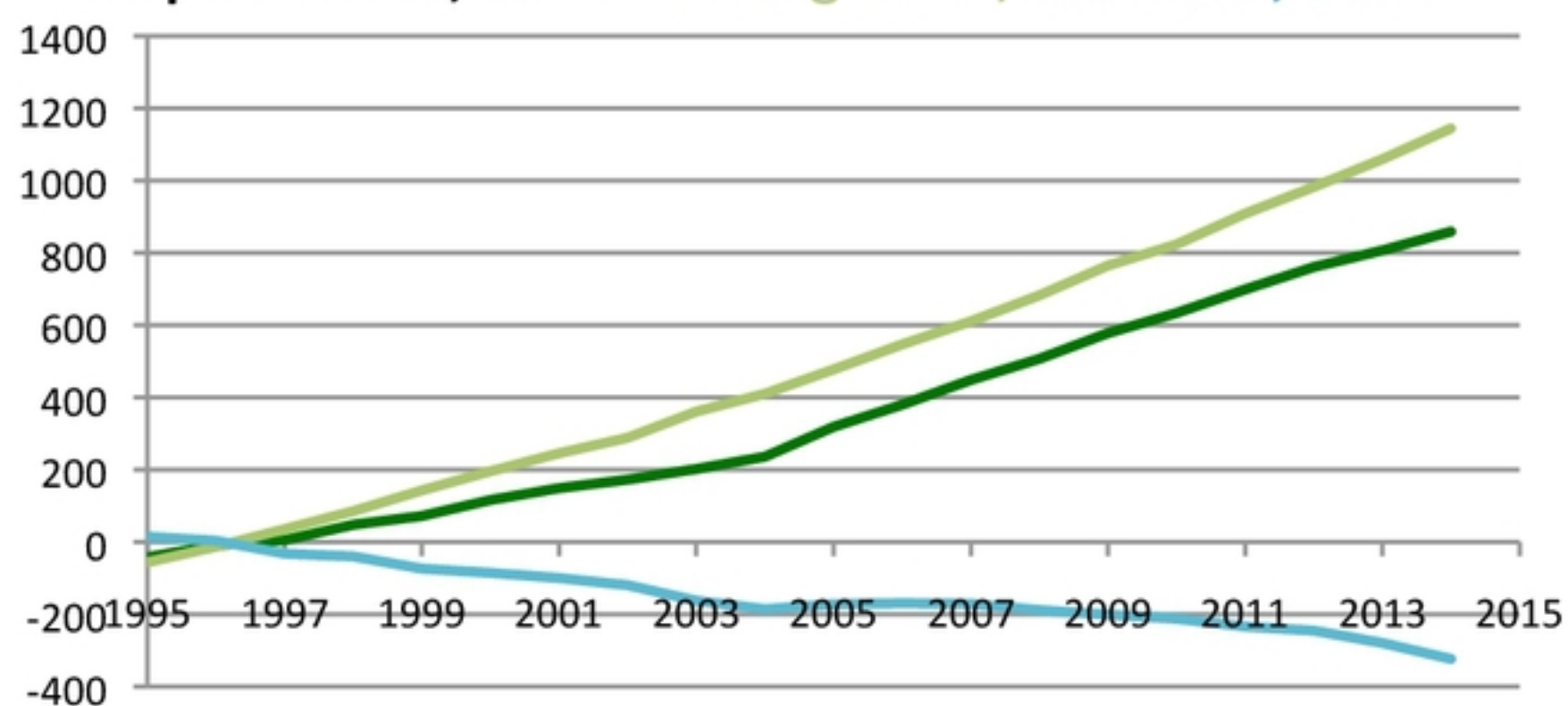
**Graph 3: Lamb carcaseweight, kg**



**Graph 4: Adult ewe bodyweight, kg**

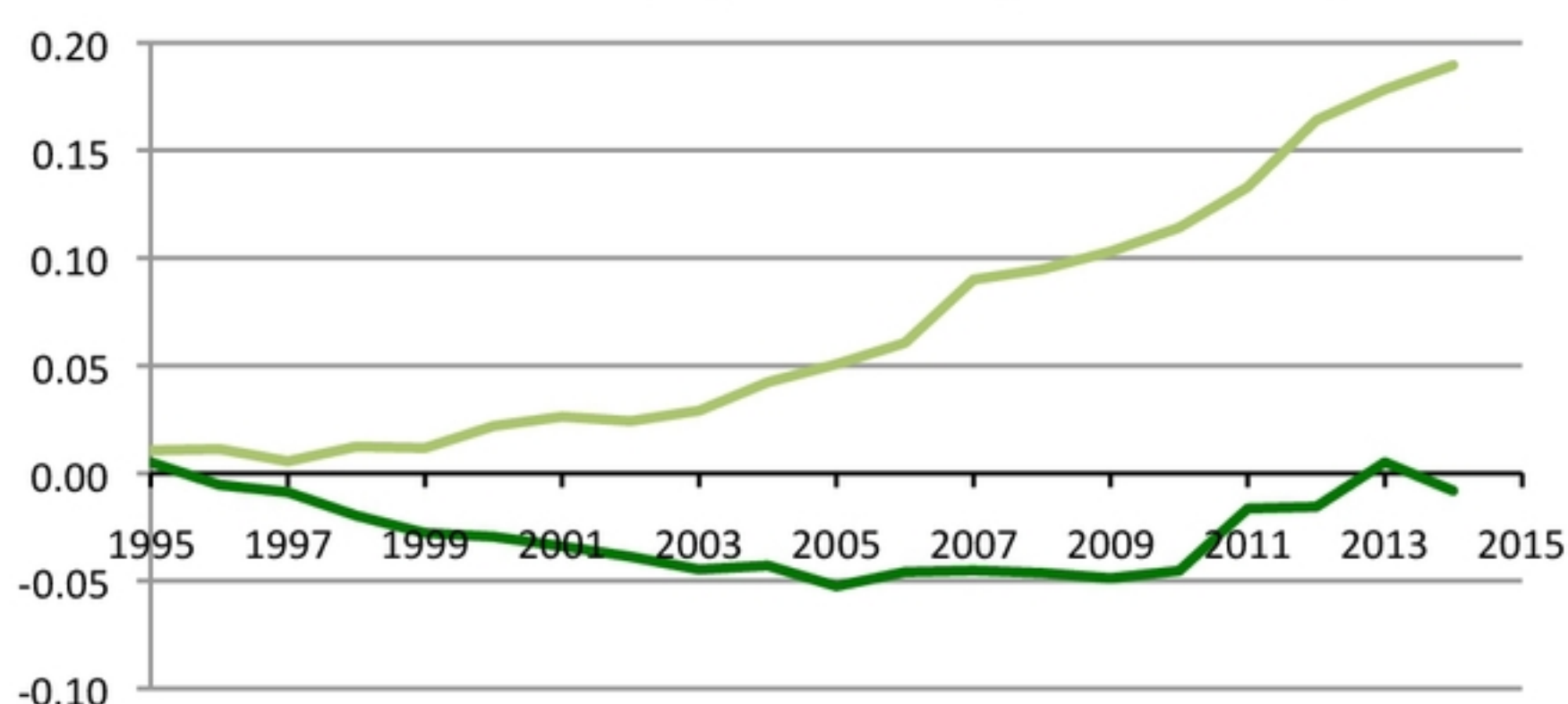


**Graph 5: Index, cents - lamb growth; adult size; both**

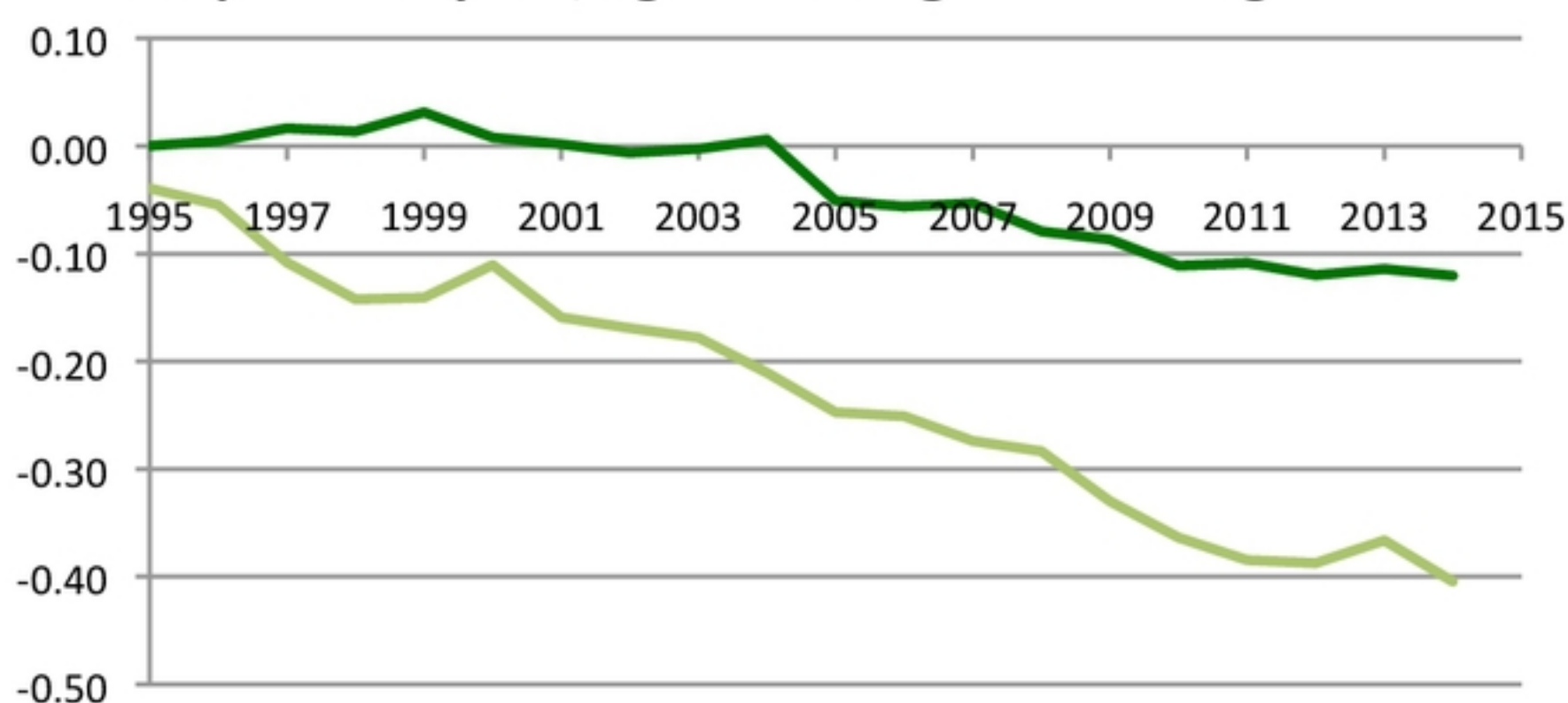




**Graph 6: Lean yield, kg fat at 18kg carcaseweight**



**Graph 7: Fat yield, kg fat at 18kg carcaseweight**



### LAMB SURVIVAL

Lamb survival gains are small but appear to be accelerating for this notoriously difficult trait. Gains are slightly better in maternal sheep than in terminals (1.0% versus 0.8%) since they have larger flock sizes and so will have more accurate estimates of genetic merit for survival partly because of larger sire progeny group sizes. B+LNZ Genetics will soon introduce developments to improve the accuracy with which we estimate genetic merit for lamb survival.

**Performance assessment** – This trait is hard to improve and difficult to see progress within any single flock. However, these across-flock average lines show progress is being made, albeit at a slow rate.

### GROWTH – Graphs 3, 4 and 5

Meat sheep are ahead for lamb growth (see weaning weight and carcaseweight) as expected given the narrower focus for merit compared to maternal sheep. Interestingly, the trend line for adult ewe weight (maternals) has a distinct kink in it and does not parallel the line for lamb growth.

However, the trend is upwards because theory would predict given selection for lamb growth. The kink in the line in **Graph 4** coincides with the time breeders began to collect adult ewe bodyweight data and put it on to SIL, allowing them to better discriminate those sheep that grow fast but are not so big as adults.

Adult size is a hotly debated topic for maternal sheep at present so it is useful to look at the value of changes in growth traits to the NZ Maternal index.

The index for growth (**Graph 5**) clearly shows the value of lamb growth gains (black line) exceeds that lost to increases in ewe adult size (green line) by three to four times as evidenced by the gains in these traits accumulated to 2014.

Ewe size increases are predicted to continue to rise because of the value there is in fast lamb growth.

**Performance assessment** – Gains in lamb growth dominate the economic response gained in the past 20 years and

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**Table 1: Trait and index averages**

Averages in Apr-2015 1995 average = zero	Maternal sheep	Meat sheep
Number of lambs	+13.5 %	n/a
Lamb Survival	+1.1 %	+0.9%
Weaning bodyweight	+2.82 kg	+3.13kg
Carcaseweight	+1.69 kg	+1.82kg
Adult ewe weight	+2.17 kg	n/a
Carcase lean yield, per 18kg carcase	-8 g	+190g
Carcase fat yield, per 18kg carcase	-120 g	-405g
Fleece weight	+0.276 kg	n/a
NZ Standard Maternal Worth	1529 ¢	n/a
NZ Standard Terminal Worth	n/a	785 ¢

will continue to play a big part in future under current indices. In maternal sheep these will carry with them increased ewe size unless more pressure is put against that.

#### **CARCASE MERIT – Graphs 6 and 7**

Carcase merit shows the biggest differences between maternal and meat sheep. Meat sheep have increased lean yield at an accelerating rate but maternal sheep have only increased lean yield since 2010 when SIL changed its meat breeding values from tissue weights to tissue yields. Prior to 2010, maternal sheep showed gains in lean weight but these were relatively slower than the gains in carcaseweight, leading to small reductions in lean yield.

Fat yield changes almost mirror those for lean yield. This is expected since

increased lean in an 18kg carcase must replace something else.

That fat yields have changed far less in maternal sheep than meat sheep reflects the greater economic effect of other traits in the maternal index and may also reflect reluctance by maternal ram breeders to favour leaner lines in order to avoid a low body condition score (BCS) in ewes. B+LNZ Genetics will introduce a breeding value for BCS later in 2015.

Our aim is to put a value on BCS and to better describe how adult size impacts on feed costs.

We have made progress in the past 30 years to reduce the problem of light carcasses (about 13kg) that easily ran to overfat. Some say progress has been such that we now have lines of lambs that are too lean at slaughter and that some

ewes don't carry enough condition to get through tougher times. B+LNZ Genetics considers it is time we adjusted our sights and developed a new breeding objective for carcase merit for the future and relate that to ewe condition score in maternal sheep and so we are funding projects in these areas.

**Performance assessment** – Gains in carcase lean yield will slow if we place value on a minimum level of fat in the carcase. For maternal sheep, valuing condition score in the ewe will decrease the pressure on lean yield further. We must now take account of the value of fat in the carcase and in the maternal ewe, not just penalise fat in lambs.

#### **WOOL PRODUCTION**

Finally, maternal sheep continue to make gains in fleece weight with a steady



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upward trend, adding 0.3kg to fleece weight over the past 20 years.

**Performance assessment** – Steady progress, probably more to do with the strong gains in bodyweight through growth given the relatively lower returns from wool.

#### CURRENT BENCHMARKS

The 2014 points from each graph is tabulated in **Table 1**. These are the averages of 2014-born animals in the main connected flock groups of SIL-ACE.

Note: traits differ in the number of connected flocks.

Equivalent figures can be found in the SIL-ACE Percentile Bands table on the SIL-ACE downloads page – go to **www.sil.co.nz** for the link – to provide a general guide for benchmarking merit of animals against the genetic variation across the industry.

Bear in mind if using the percentile bands table, in some situations the extreme merit – for example, the top few percentages – of animals may be too extreme for traits where there is an optimum for your situation. If you are concerned about holding some traits at a certain level – such as number of lambs born or fatness – make this clear to your ram breeder so they can help achieve the genetics you want.

Few flocks, if any, assess performance for all traits as shown in **Table 2**. Where the percentage of flocks measuring a trait is greater when weighted by flock size, this indicates more of the larger flocks are assessing that trait.

You can find out what traits a flock is recording on SIL using the FlockFinder smart app produced by B+LNZ Genetics. A link to this app is at **www.sil.co.nz**.

- Dr Mark Young is a senior geneticist with B+LNZ Genetics and SIL. If you have any questions relating to this article or give feedback please email: [silhelp@sil.co.nz](mailto:silhelp@sil.co.nz) or call 0800-SILHELP (0800 745 435).



**Table 2: Proportion of SIL flocks measuring traits by number or by number weighted for flock size – 386 flocks are classed as maternal (dual-purpose) and 257 as meat (terminal)**

Trait	Maternal sheep		Meat sheep	
	By flock number	By flock number weighted for flock size	By flock number	By flock number weighted for flock size
DNA parentage	6%	15%	5%	15%
Reproduction (number of lambs)	99%	99%		
Lamb survival	92%	94%	95%	95%
Lamb growth	100%	100%	100%	100%
Adult size	64%	72%		
Meat yield	60%	62%	84%	92%
Wool production	68%	84%		
Facial eczema tolerance	13%	18%	1%	<1%
Internal parasite resistance	10%	13%	1%	1%
Internal parasite resilience	3%	3%	0%	0%
Dag score	7%	10%	2%	5%
Bareness	1%	2%	<1%	2%

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