POTENTIAL OF A BEEF SYSTEM TO CASH IN ON SEASONAL PREMIUMS

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Abstract

Due to the vast majority of New Zealand livestock farming systems being based on pastoral feed, the flow of livestock for processing also follows a pattern dictated by this supply. This leads to the meat processing companies having very pronounced peaks and shoulders in the throughput of livestock. The result is that New Zealand's total beef kill could be processed in 28 weeks rather than the approximately 50 weeks that processors are operating. To try and smooth out the supply of livestock and to meet market requirements, meat companies offer seasonal premiums to encourage farmers to send in livestock at times which may not be optimal for biological efficiency.

This paper uses a linear programming whole farm modelling technique to investigate the feasibility of a beef system which can capture some of these premiums without sacrificing feed quality and overall farm flexibility. The system, an autumn based 'once bred heifer' system (AOBH) has heifers' surplus to replacement requirements bred to calve in the autumn and then finished for slaughter in the following spring, a time when off-season premiums are at their highest.

The results indicate when compared to a conventional model and spring based OBH system, the AOBH is more profitable and has the potential to provide more flexibility to the farming system.

Keywords: Seasonal premiums, autumn once bred heifers, flexibility

Introduction

New Zealand farmers pride themselves on the efficiency of their pastoral systems. Much of this efficiency relates to matching animal demand to feed supplies. In many cases this provides the optimal system for a farm. However, when looking at the profile of what meat processors pay for product, it can be seen that this is generally counter cyclical to the best match for on-farm biological efficiency. The reason for this mismatch is simple economics: when there is plenty of livestock available the processors are not required to pay premiums to attract stock whereas when there is a shortage they are (providing they wish to keep product flowing through the works).

This premium is clearly visible when looking at the 'local trade' market (see Figure 1). Based on nine years data from AgriFax NZ (2010), there is an obvious peak in the schedule in the mid-spring to early summer period. This premium is created by a reduction in supply generated by the need for farmers to retain stock to utilise available feed through this period of high grass growth which is occurring throughout the country. In addition, coming out of winter means there is likely to be less finished stock available. The result is that processors need to pay increased premiums to attract stock. Similar premiums are paid at this time for export beef and lamb. The lamb premiums have additional drivers (UK Christmas market); however they too coincide with this period.

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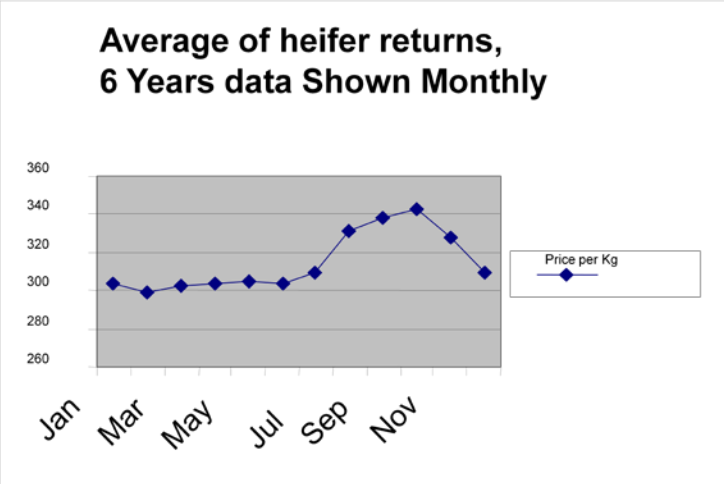

Figure 1: Average of 'local trade' heifer returns, six years data shown monthly
AgriFax 2004-2009

The attraction and the challenge for farmers is to find a system that not only takes advantage of these premiums but does so without creating feed quality problems over the spring early summer period. Reduced feed quality could come about due to under-utilising the extra seasonal feed available. Loss of control of feed at this period can impact negatively on stock performance through the later part of the season.

The method

The writer has experience with AOBH systems while farming in the Gisborne region and while having confidence that the system fitted well biologically into the farm system operated was never able to fully satisfy himself that it was fully beneficial, both economically and biologically. A partial budget 'gross margins' approach is not able to capture the full complexities of such a systems change. Hence, to investigate the issues around finding a system which could capture these premiums while still being able to utilise the feed grown on a property, a "Whole Farm Model" was created through the use of a Linear Programming (LP). LP is a mathematical modelling tool designed to provide the 'optimal' farm system from the data provided.

Pasture supply data was obtained from the Manutuke Research Farm near Gisborne (Lincoln Farm Manual 2006). This data provided as kilograms of dry matter (kgdm) was then converted to megajoules of metabolisable energy (MJME). This was done by multiplying the monthly grass growth supplied by a MJME factor each month. This factor was obtained from the Farmax^{TM} model (www.farmax.co.nz. 2010). The supply is provided to the model on a monthly basis. To encourage the programme to utilise feed in the month it was grown, any feed carried over into the next month had a quality cost of 15% allocated to it. A starting "base" level of 1500kg dry matter (DM) per ha is assumed on July 1st which the model is unable to go below.

The farm modelled was a "typical" North Island East Coast farm of 600ha with a 60%:40% sheep to cattle ratio based upon feed consumed (not balance date figures) and a self replacing sheep flock and beef herd. It had the option of selling surplus cattle as weaners in March, as rising one year (R1yr) in June and as R2yr in the following June; this system is described as the "conventional" system. The option was also provided to allow surplus heifers to join either a spring based "Once Bred Heifer" herd (SOBH system) or an autumn based "Once Bred Heifer" herd (AOBH system).

The Once Bred Heifer systems are beef finishing systems which utilise heifers deemed unsuitable or not required to be used as long term herd replacement animals but are still able to be bred from. Usually they are mated at 15months of age, calved as two year olds (SOBH), with the calves weaned

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anywhere from 4 to 6 months of age. The dam heifer is aimed to be kept in a forward store condition and is able to be quickly 'finished' post weaning to be a suitable animal for the 'local trade' market, i.e. supplying domestic butchers and supermarkets and also potentially 'prime' export markets.

The "AOBH" system is much the same but mating is delayed from being at 15 months to be six months (approximately) later. This puts the finishing programme later, allowing the heifer to be marketed into a different market, spring as opposed to autumn, and also avoid many of the negative issues associated with calving heifers as two year olds.

Progeny of these AOBH and SOBH heifers were allowed to follow the same sales options as previously mentioned with allowances made for the different calving dates (September for SOBH and late February –March for the AOBH). The heifer dams were able to be sold prime in June for the SOBH and October for the AOBH. These months are nine months past the mean calving date for the OBH and seven and a half months for the AOBH. This reduced difference in sale time between the two systems was to account for the older age and greater body weight of the AOBH heifers as well as the higher quality of feed in the spring period. However the greater MJME required for these greater weights and intakes are taken into account in the model. There were no "free lunches" for any system adopted.

The major question to answer was to see if the four months of additional feeding for the AOBH system was able to be offset by the increase in potential income. The issue of maintaining feed quality was also of concern.

To prevent any short term aberrations in price schedules influencing the results, prices were averaged over a number of years. Costs were allocated on a per hectare basis for "fixed costs" and on a per head basis for the different classes of livestock.

What was found?

The results confirmed that the model including the AOBH system had advantages over the others available and it was selected as providing the optimal result. Net farm income (before tax and depreciation) increased by 21.7% ($19,594) for the farm system incorporating the AOBH system over the conventional sheep and beef system. The SOBH system was less profitable than both the conventional system and the system with the AOBH component with profitability reducing by approximately $100 for every SOBH heifer kept.

The sheep component which consisted of a self replacing breeding unit with surplus lambs being sold to processors from weaning in November through to the following June was maintained at 60% of total feed utilised for both models. These sheep numbers had only minor changes which were in line with the changing overall stock numbers. However, the balance date figures are quite different from the 60%:40% sheep cattle feed ratio, as can be seen in Table 1. This Table also shows the additional profit able to be achieved by the AOBH system over the next best system; the conventional system. The AOBH system despite having a greater balance date (June 30th) number of stock units, consumed nearly the same total kg DM per hectare.

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Table 1 Major differences

	With AOBH	Without AOBH	Additional margin for AOBH
Net farm income	$110,232	$90,367.00	21.7%
Balance date S/U's	6,861.00	6,412.00	7.00%
Kgdm per ha required	9,611	9,569	0.44%
Balance date Sheep/Cattle ratio	43% - 57%	45.3% - 54.7%	

Tables 2 and 3 provide livestock reconciliations for both systems. It is apparent that even though the conventional system (without AOBH) has a higher sale number to opening numbers cattle ratio (i.e. within the cattle reconciliation) than the 'with AOBH' system, the timing, class and weights of animals being sold have led to the system being less profitable. The AOBH heifers are sold at schedule peak and at a carcass weight of 260kgs, and AOBH progeny are taken through to June of the following year and sold as 16month old cattle at 400kgs live weight. It should be noted that even when progeny returns were reduced by $250 per head the model still was more profitable under the AOBH regime. Sheep only provided an additional extra 20 sale animals, indicating the greatest profit additions were obtained from the cattle system.

Table 2 Stock Reconciliations without AOBH

Cattle	Opening July 1st	Births	Sales	Deaths	Transfer In	Transfer Out	Closing
M.A. Cows	421		86	4	90		421
2yr Hfrs(breeding)	93			3	93	90	93
3yr Hfrs(AOBH)			0				
2yr Hfrs(AOBH)	0						0
1yr Hfrs	93			0	93	93	93
Hfr Calves	0	228	135			93	0
Male Calves	0	228	228				0
AOBH Hfr Calves	0	0	0				0
AOBH Male Calves	0	0	0				0
Breeding Bulls	10						10
Total Cattle	617	456	449	7	276	276	617

Sheep Stock Reconciliation without AOBH

Sheep	Opening July 1st	Births	Sales	Deaths	Transfer In	Transfer Out	Closing
M.A. Ewes	1806		242	308	550		1806
2th Ewes	574			24	574	550	574
Ewe Hoggets	617			43	617	574	617
Ewe lambs		617				617	
Works lambs		3424	3424				0
Breeding Rams	36						36
	3033	4041	3666	375	1167	1167	3033

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Table 3 Stock Reconciliations with AOBH

Cattle	Opening July 1st	Births	Sales	Deaths	Transfer In	Transfer Out	Closing
M.A. Cows	278		57	4	61		278
2yr Hfrs(breeding)	61				61	61	61
3yr Hfrs(AOBH)	87		85	2	87		87
2yr Hfrs(AOBH)	88			1	88	87	88
1yr Hfrs	150		1		150	149	150
Hfr Calves		150				150	
Male Calves		150	150				
AOBH Hfr Calves	39	39	39				39
AOBH Male Calves	39	39	39				39
Breeding Bulls	7						7
Total Cattle	749	379	372	7	447	447	749

Sheep Stock Reconciliation with AOBH

Sheep	Opening July 1st	Births	Sales	Deaths	Transfer In	Transfer Out	Closing
M.A. Ewes	1816		244	309	553		1816
2th Ewes	577			24	577	553	577
Ewe Hoggets	620			43	620	577	620
Ewe Lambs		620				620	
Works lambs		3442	3442				0
Breeding Rams	36						36
	3050	4063	3686	376	1173	1173	3050

Apart from profit, the other major concern was the impact upon the grass covers and matching supply. Figures 2 and 3 show that the difference between supply and demand in the two systems is negligible. However, the AOBH system has slightly lower demands in the April, May and June months, which could be of importance.

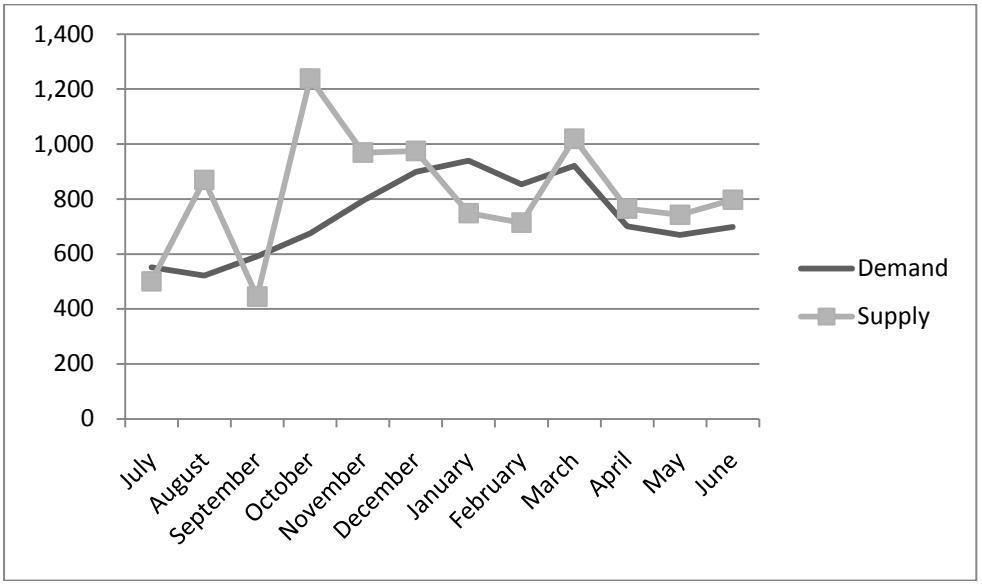

Figure2:. Pasture Supply and Demand without AOBH (KgsDM)

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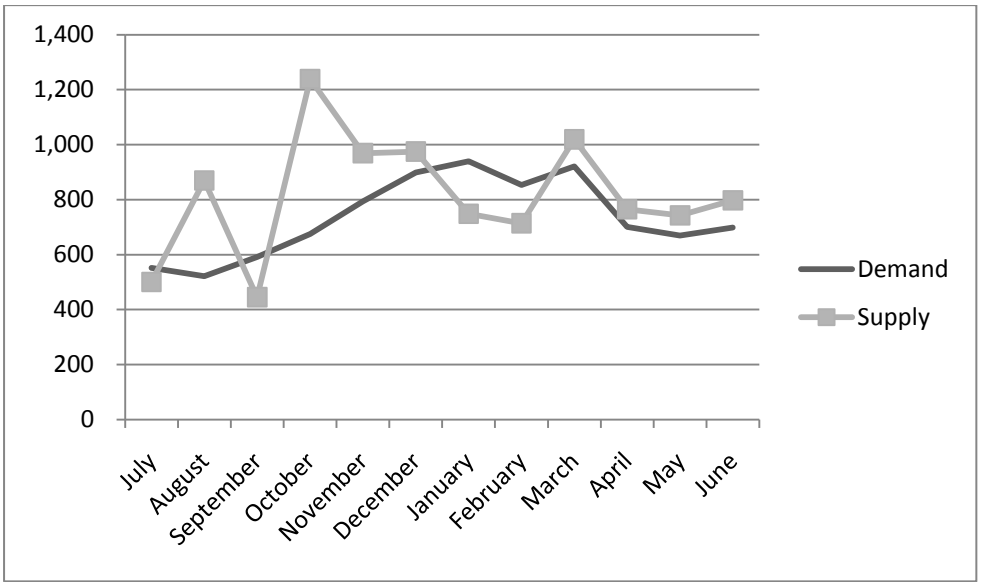

Figure 3:. Pasture Supply and Demand With AOBH (KgsDM)

The trough shown in the September period is silage taken out of the system, slightly more for the conventional system (.44%) but considered inconsequential in the total scheme of the two systems. This silage is fed out from April through to and including July.

Effects upon management

When examining any farming system and particularly when it is related to the East Coast of New Zealand, flexibility has to be a major consideration. Uncertain rainfall over the summer period can lead to a wide divergence between the extremes of high and low pasture production. Any changes that are suggested to current systems need to improve flexibility to accommodate this wide range i.e. be able to "mop up" unexpected surpluses as they occur, but also provide the ability to reduce feed demand when periods of low supply occur.
With the AOBH system, flexibility is provided from a number of areas due to the later mating date (May). If a severe summer-autumn drought is encountered then potential heifer dams can be sold off. This will reduce the following year's income but it does allow considerable destocking of animals without having an impact on the capital stock. Heifers which are already in calf can be sent to processors prior to calving and obtain a premium, subject to timing, from the additional payment for foetal bloods, (The blood of foetuses is extracted and used in the pharmaceutical industry). If feed shortages occur after calving (February- March) then the problem does become more difficult to manage without the addition of extra saved or purchased feed supplements. The cost of these will vary for different farms; in the model silage was made in both systems and deemed necessary for their viability.

The AOBH has 211 fewer animals required to maintain the 'capital' breeding herd which potentially provides a considerable buffer to any adverse climatic event.

In a 'normal' year feed shortages are more likely to occur in the mid to late winter periods leading into early spring. As earlier stated, the AOBH system has a slightly lower requirement through this period. Many farms over this period have very little "low priority" stock which are able to be put into the harder areas of the property. This is especially the case if hoggets (rising one year sheep) are mated and replacement heifers are calved at 2years. The AOBH heifers as rising 2year olds, which are up to nine months from calving, are able to become a low priority class and put into forestry blocks, steeper gullies or other areas unsuitable for breeding stock. They are then able to be brought out as feed covers improve to assist cows in controlling feed and maintain quality.

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On traditional farms the beef breeding cow has to a large extent filled this role of providing flexibility in feed demand. Despite this important role, beef cow numbers have continued to fall (Figure 4). This has been due to a lack of profitability, especially when paddock intensification has reduced the 'grooming' role of cows, and severe droughts forcing farmers to cut back on numbers to get through. The high capital cost of cows has also been a major disincentive to then rebuild herds in better times. The result has been a major shift to using animals sourced from the dairy industry to replace more traditionally bred cattle.

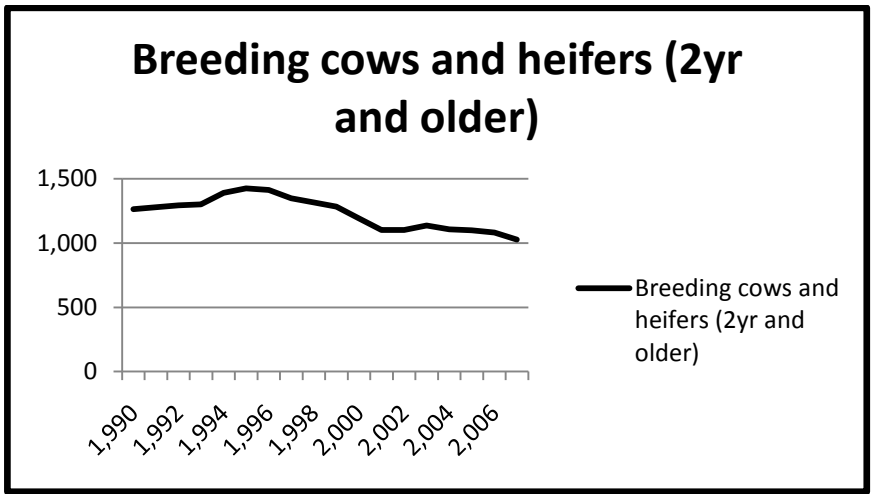

Figure 4: Beef cow numbers (Data sourced from MAF statistics 2009)

With the reduced beef cow herd, there appears to be a shortage of animals suitable to go into prime finishing systems. Specialist local trade abattoirs for the Auckland region are having to source cattle from further afield i.e. Poverty Bay to meet demand. The SOBH and AOBH systems in general can potentially provide a large number of animals to feed into prime systems. These systems have been around for some time and achieved some focus from work done by Steve Morris and others from Massey University in the early 1990s in response to the opportunities of the Korean quarter beef market. For a number of reasons the system failed to take hold. Some of these reasons appear to stem from perceived difficulties with calving heifers at a young age, extra work at a time when most sheep and beef farms are busy with lambing, docking, hogget shearing to name some jobs and for intensive finishing farms the bull beef systems appear more profitable.

The AOBH system gets around a lot of the problems encountered by the SOBH system. Due to the older age and increase in size of the heifers, calving problems are greatly reduced. There is some research which also suggests that cows/heifers which carry their pregnancy through the heat of summer calve slightly earlier which also contributes to less calving problems (Kastner, White, Rubio, Wettemann, and Lalman, 2004). The slightly older age of the AOBH heifers also allows later maturing exotic breeds to be included in the heifer pool to be mated.

Carcass weights and age

Due to the extra time spent on the farm, there is potential for the heifers to have greater carcass weights. Part of the increased profitability of AOBH is due to this. This is likely to take them away from the 'local trade' carcass weight range (180-220 kgs). The heifers in the AOBH model were assessed to have reached 277kgs carcass weight at time of slaughter. At the time of sales the schedule for SOBH was $3.18 per kg whereas for the AOBH it was $3.43 (P2 grade195-220 as supplied by AgriFax). If the AOBH were paid at the higher export market price for P2 grade 295-320 they may have achieved a further 11cents per kg, so it is possible that the AOBH may have achieved a greater per kg return.

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At the foreseen slaughter age (36 -38 months of age), erupting teeth, which could potentially result in heifers being graded as 'manufacturing cow' have not proved to be a problem, with on-farm experience showing cattle being graded as heifers through into the January February period. There are breed difference (Dodt & O'Rourke. 1988), with British breeds erupting earlier than European breeds and some monitoring of teeth may be conducted if this is seen as a concern.

Conclusions

From the models results (which reinforced the writers own on-farm experience) there is certainly potential for the AOBH system. It is not likely to be the most profitable beef finishing system available but it does provide options to farmers who wish to increase cattle profitability without going down the bull beef path. This model only compared a narrow range of potential options, and all were within the confines of a self replacing herd. More work is needed to be done to test the economics against other beef systems. However, a system where purchased heifers come into the farming system as 15 -18 month animals and are mated to calve in the autumn is likely to improve upon the current model. This is due to the reduced maintenance drag on the system of the older entering cattle.

On-farm work would also reveal how well this AOBH system can be adapted to regions with low winter and early spring pasture growth rates. It is assumed that there would be higher supplementary feeds cost to ensure the required animals performance was met meet different seasonal shortfalls.

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