630 US ISSN 0271-9908

Information Text Series 012

WEANED CALF DECISION ANALYSIS

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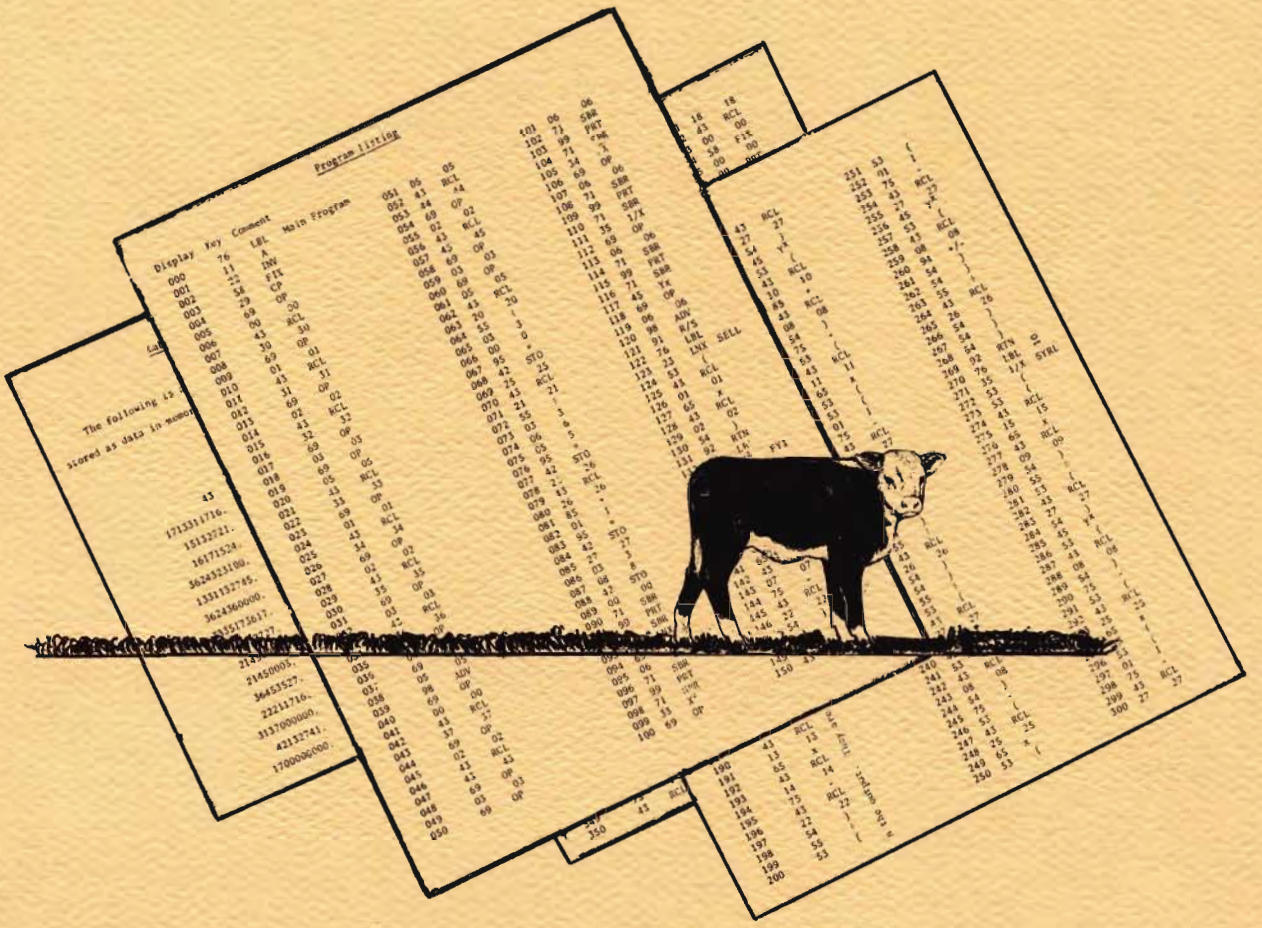
Burton J. Smith

MAY 1983



Hawaii Institute of Tropical Agriculture and Human Resources
UNIVERSITY OF HAWAII

Library of Congress Cataloging in Publication Data

Leung, PingSun,
Weaned calf decision analysis.

(Information text series, ISSN 0271-9908 ;)
Bibliography: p.
1. Cattle trade--Hawaii--Decision making--Data processing. 2. Calves--Hawaii--Marketing--Decision making--Data processing. 3. Calves--Feeding and feeds--Economic aspects--Hawaii. 4. Feedlots--Economic aspects --Hawaii. 5. Programming (Electronic computers)
I. Smith, Burton J., II. Title. III. Series.
HD9433.U5H35 1983 636.2'13 83-8435

CONTENTS

WEANED CALF DECISION ANALYSIS

Programmed for the Texas Instruments programmable calculator, Model 59, and available upon request for the Apple II Computer.

PingSun Leung and Burton J. Smith[1]

INTRODUCTION:

There are five basic marketing alternatives faced by cattlemen in Hawaii with respect to their weaned calves: sell as weaners, sell as yearlings, raise to slaughter weights and sell on the grass-fed market, raise to yearlings before consignment to a feedyard, or consign the weaners to a feedyard. In 1980, the grass-fed market accounted for 24.8 percent of total cattle marketings in Hawaii, while the grain-fed market accounted for 52.6 percent (Schermerhorn et al., 1982). The major feedyards and slaughter facilities are on Oahu, while the major production areas are on the outer islands. Consequently, if the animals are consigned to a feedyard, there is a transportation cost involved, as well as a stress factor for the animal. As a direct result of the ocean voyage and the time involved, animals commonly shrink 12 to 13 percent; this in turn requires that the animals remain in the feedyard an additional 20 days or so, just to recover this weight loss (Schermerhorn et al., 1982).

The profitability on any lot of cattle depends heavily on making the "right" marketing decision. Since many of the variables that determine the profitability of a particular group of animals fluctuate widely over a short period of time, ranchers often have to reassess their marketing decisions,

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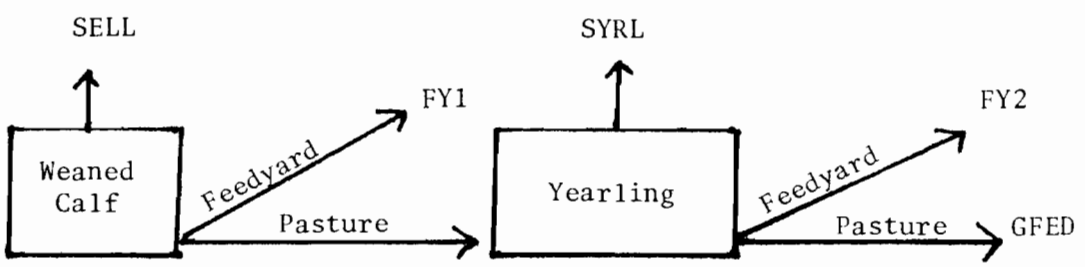
sometimes on short notice. The following program is designed to assist ranchers in making these decisions.

OBJECTIVE:

The objective of this program is to facilitate the evaluation of the various marketing alternatives that ranchers in Hawaii face with their weaned calves. The program will calculate the present values per animal, for each of the following five alternatives:

1. Sell the weaned calf (SELL)
2. Place the weaned calf in feedyard (FY1)
3. Keep the weaned calf on pasture for a few months before placement in feedyard (FY2)
4. Keep the weaned calf on pasture for a few months and sell as yearling (SYRL)
5. Keep the weaned calf on pasture until slaughter weight and sell as grass-fed (GFED)

The flow chart of the five alternatives can be represented in the following diagram:



INPUT VARIABLES AND EXAMPLE DATA:

Listed in Table 1 are the 22 input variables and their memory locations. Values for the sample input variables were calculated based on data from 1980

and 1981. Consequently they do not reflect today's situation, but are included for illustrative purposes only. Some of the inputs will change rapidly over short periods of time (selling price, interest rates, cost per day in feedyard, etc.), while others are relatively stable (carcass percentage, final liveweight, transportation cost, etc.). Still others reflect unique conditions found only on a particular ranch (rate of gain on pasture, weight to be sold, cost of keeping animal on pasture, etc.).

It is important that all input variables be the best values available, as the program is only as good as the information fed into it.

PROGRAM OUTPUT:

The output of the program is shown below:

WEANED CALF DECISION ANALYSIS

Present Value

285.00	SELL
267.39	FY 1
125.36	FY 2
148.24	SYRL
135.63	GFED

PROGRAM OPERATION:

This program is stored on one magnetic strip, while the labels are stored on another. They can be loaded into the calculator by entering

1. INV 2nd WRITE (load strip 1, side 1)
2. INV 2nd WRITE (load strip 1, side 2)--program
3. INV 2nd WRITE (load strip 2, side 1)--labels

(Note: A flashing number on the calculator display indicates that the program has not been properly entered. Press 2nd CP, followed by INV 2nd FIX, then reload the strips again.)

Table 1. Input Variable and Example Data

Input Variable Number	Variable Definitions	Variable Names	Units	Memory Location	Example Data
1	Weaning weight	W1	lb.	01	475
	For alternative SELL:				
2	selling price (liveweight)	S1	$/lb.	02	0.60
	For alternative FY1:				
3	days in feedyard	FD2	days	03	138
4	cost per day in feedyard	FC2	$/day	04	2.60
5	final liveweight	W2	lb.	05	943
6	carcass percentage	C2	decimal	06	0.55
7	selling price (carcass weight)	S2	$/lb.	07	1.25
	For alternative FY2:				
8	days on pasture	PD3	days	08	300
9	yearling weight	W4	lb.	09	675
10	days in feedyard	FD3	days	10	147
11	cost per day in feedyard	FC3	$/day	11	2.75
12	final liveweight	W3	lb.	12	1050
13	carcass percentage	C3	decimal	13	0.55
14	selling price (carcass weight)	S3	$/lb.	14	1.25
	For alternative SYRL:				
15	selling price (liveweight)	S4	$/lb.	15	0.47
	For alternative GFED:				
16	total days on pasture	PD5	days	16	720
17	final liveweight	W5	lb.	17	1150
18	carcass percentage	C5	decimal	18	0.52
19	selling price (carcass weight)	S5	$/lb.	19	0.95
	Other input information:				
20	cost for keeping an animal on pasture	PC	$/month	20	15
21	annual interest rate	i	decimal	21	0.10
22	transportation cost for alternatives FY1, FY2, and GFED	T	$/animal	22	5.0

After the program has been entered into the machine, the input data are entered into the appropriate memory locations. It is not necessary to manually store the input data, since this program has an automatic feature that stores inputs in their respective locations. The correct sequence of input entries is given in the above section on input variables and example data: input #1 must be entered first, followed by #2, etc. In order to use the automatic feature, enter the value for input #1, press E, enter the value for #2, press E, and continue until all 22 values have been entered.

Changes in individual input values may be made by entering the desired value into the calculator and then pressing STO, followed by the correct memory location.

To start the program, press A. The output will be listed as shown in the section on program output.

If an input value is not known exactly, a range of values may be used. Determine a best guess, then take a 5 or 10 percent variation on each side. For example, if selling price of the carcass is thought to be $.95, use $.90 and $1.00 on successive runs. The program will retain the information fed into memory until a new value is added to that location, or until the machine is turned off. This type of operation also allows "What if" types of questions to be evaluated. For example, how will the selling price of $1.00 instead of $1.25 affect the marketing decision. By this method the sensitivity of the various input data may be determined.

To obtain a listing of input data used in a particular run, press B.

This program may also be used for any other type of livestock operation, as long as the required input information is available.

REFERENCE:

Schermerhorn, R.W., P. Garrod, and C.T.K. Ching. 1982. A description of the market organization of the Hawaii beef industry. University of Hawaii, CTAHR Information Text Series 011.

Appendix I Method and Equations

Since the timings of the flows of money are different for the five alternatives, present values are used to standardize comparison. Present value (PV) refers to the current value of a sum of money to be received in the future.

The present values are discounted daily and the uniform daily charges are discounted using the following formula:

$$\text{Present value of charges} = \text{daily charges} \times \frac{1 - (1 + ii)^{-\#\text{ of days}}}{ii}$$

where $ii = \frac{i}{365}$ (= daily interest rate).

The variable names used are as defined in Table 1.

The present value formulas for each of the alternatives are as follows:

Alternative SELL

PV = revenue from sale of animal

$$= W1 \times S1$$

Alternative FY1

PV = discounted revenues from sale of animal, net of transportation cost - discounted feedyard costs

$$= \frac{W2 \times C2 \times S2 - T}{(1 + ii)^{FD2}} - FC2 \times \frac{1 - (1 + ii)^{-FD2}}{ii}$$

Alternative FY2

PV = discounted revenues from sale of animal, net of transportation cost - discounted feedyard costs - discounted pasture costs

$$= \frac{W3 \times C3 \times S3 - T}{(1 + ii)^{(FD3 + PD3)}} - FC3 \times \frac{1 - (1 + ii)^{-FD3}}{ii} \times \frac{1}{(1 + ii)^{PD3}}$$

$$- \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD3}}{ii}$$

Alternative SYRL

PV = discounted revenues from sale of animal - discounted pasture costs

$$= \frac{W4 \times S4}{(1 + ii)^{PD3}} - \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD3}}{ii}$$

Alternative GFED

PV = discounted revenues from sale of animal, net of transportation cost - discounted pasture costs

$$= \frac{W5 \times C5 \times S5 - T}{(1 + ii)^{PD5}} - \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD5}}{ii}$$

Appendix II Labels Used and Their Locations

The following is a listing of the labels used in the output. They are stored as data in memory locations 30 through 46.

	Label	Memory Location
43	W	30
1713311716.	EANED	31
15132721.	CALF	32
16171524.	DECI	33
3624323100.	SION	34
1331132745.	ANALY	35
3624360000.	SIS	36
3335173617.	PRESE	37
36172727.	SELL	38
21450002.	FY1	39
21450003.	FY2	40
36453527.	SYRL	41
22211716.	GFED	42
3137000000.	NT	43
42132741.	VALU	44
1700000000.	E	45
2431334137.	INPUT	46

Appendix III — Program Listing

Display	Key	Comment	
000	76	LBL	Main Program
001	11	A	
002	22	INV	
003	58	FIX	
004	29	CP	
005	69	OP	
006	00	00	
007	43	RCL	
008	30	30	
009	69	OP	
010	01	01	
011	43	RCL	
012	31	31	
013	69	OP	
014	02	02	
015	43	RCL	
016	32	32	
017	69	OP	
018	03	03	
019	69	OP	
020	05	05	
021	43	RCL	
022	33	33	
023	69	OP	
024	01	01	
025	43	RCL	
026	34	34	
027	69	OP	
028	02	02	
029	43	RCL	
030	35	35	
031	69	OP	
032	03	03	
033	43	RCL	
034	36	36	
035	69	OP	
036	04	04	
037	69	OP	
038	05	05	
039	98	ADV	
040	69	OP	
041	00	00	
042	43	RCL	
043	37	37	
044	69	OP	
045	02	02	
046	43	RCL	
047	43	43	
048	69	OP	
049	03	03	
050	69	OP	
051	05	05	
052	43	RCL	
053	44	44	
054	69	OP	
055	02	02	
056	43	RCL	
057	45	45	
058	69	OP	
059	03	03	
060	69	OP	
061	05	05	
062	43	RCL	
063	20	20	
064	55	÷	
065	03	3	
066	00	0	
067	95	=	
068	42	STO	
069	25	25	
070	43	RCL	
071	21	21	
072	55	÷	
073	03	3	
074	06	6	
075	05	5	
076	95	=	
077	42	STO	
078	26	26	
079	43	RCL	
080	26	26	
081	85	+	
082	01	1	
083	95	=	
084	42	STO	
085	27	27	
086	03	3	
087	08	8	
088	42	STO	
089	00	00	
090	71	SBR	
091	99	PRT	
092	71	SBR	
093	23	LNX	
094	69	OP	
095	06	06	
096	71	SBR	
097	99	PRT	
098	71	SBR	
099	33	X^2	
100	69	OP	
101	06	06	
102	71	SBR	
103	99	PRT	
104	71	SBR	
105	34	$\sqrt{X}$	
106	69	OP	
107	06	06	
108	71	SBR	
109	99	PRT	
110	71	SBR	
111	35	1/X	
112	69	OP	
113	06	06	
114	71	SBR	
115	99	PRT	
116	71	SBR	
117	45	Yx	
118	69	OP	
119	06	06	
120	98	ADV	
121	91	R/S	
122	76	LBL	
123	23	LNX	SELL
124	53	(	
125	43	RCL	
126	01	01	
127	65	x	
128	43	RCL	
129	02	02	
130	54	)	
131	92	RTN	
132	76	LBL	
133	33	X^2	FY1
134	53	(	
135	53	(	
136	43	RCL	
137	05	05	
138	65	x	
139	43	RCL	
140	06	06	
141	65	x	
142	43	RCL	
143	07	07	
144	75	-	
145	43	RCL	
146	22	22	
147	54	)	
148	55	÷	
149	53	(	
150	43	RCL	

Display	Key	Comment
151	27	27
152	54	)
153	45	Y^X
154	53	(
155	43	RCL
156	03	03
157	54	)
158	75	-
159	53	(
160	43	RCL
161	04	04
162	65	x
163	53	(
164	53	(
165	01	1
166	75	-
167	43	RCL
168	27	27
169	45	Y^X
170	53	(
171	43	RCL
172	03	03
173	94	+/-
174	54	)
175	54	)
176	55	÷
177	43	RCL
178	26	26
179	54	)
180	54	)
181	54	)
182	92	RTN
183	76	LBL
184	34	$\sqrt{X}$ FY2
185	53	(
186	53	(
187	43	RCL
188	12	12
189	65	x
190	43	RCL
191	13	13
192	65	x
193	43	RCL
194	14	14
195	75	-
196	43	RCL
197	22	22
198	54	)
199	55	÷
200	53	(
201	43	RCL
202	27	27
203	54	)
204	45	Y^X
205	53	(
206	43	RCL
207	10	10
208	85	+
209	43	RCL
210	08	08
211	54	)
212	75	-
213	53	(
214	43	RCL
215	11	11
216	65	x
217	53	(
218	53	(
219	01	1
220	75	-
221	43	RCL
222	27	27
223	45	Y^X
224	53	(
225	43	RCL
226	10	10
227	94	+/-
228	54	)
229	54	)
230	55	÷
231	43	RCL
232	26	26
233	54	)
234	54	)
235	55	÷
236	53	(
237	43	RCL
238	27	27
239	54	)
240	45	Y^X
241	53	(
242	43	RCL
243	08	08
244	54	)
245	75	-
246	53	(
247	43	RCL
248	25	25
249	65	x
250	53	(
251	53	(
252	01	1
253	75	-
254	43	RCL
255	27	27
256	45	Y^X
257	53	(
258	43	RCL
259	08	08
260	94	+/-
261	54	)
262	54	)
263	55	÷
264	43	RCL
265	26	26
266	54	)
267	54	)
268	54	)
269	92	RTN
270	76	LBL
271	35	1/X SYRL
272	53	(
273	53	(
274	43	RCL
275	15	15
276	65	x
277	43	RCL
278	09	09
279	54	)
280	55	÷
281	53	(
282	43	RCL
283	27	27
284	54	)
285	45	Y^X
286	53	(
287	43	RCL
288	08	08
289	54	)
290	75	-
291	53	(
292	43	RCL
293	25	25
294	65	x
295	53	(
296	53	(
297	01	1
298	75	-
299	43	RCL
300	27	27

Display	Key	Comment
301	45	Y^x
302	53	(
303	43	RCL
304	08	08
305	94	+/-
306	54	)
307	54	)
308	55	÷
309	43	RCL
310	26	26
311	54	)
312	54	)
313	54	)
314	92	RTN
315	76	LBL
316	45	Y^x GFED
317	53	(
318	53	(
319	43	RCL
320	17	17
321	65	x
322	43	RCL
323	18	18
324	65	x
325	43	RCL
326	19	19
327	75	-
328	43	RCL
329	22	22
330	54	)
331	55	÷
332	53	(
333	43	RCL
334	27	27
335	54	)
336	45	Y^x
337	53	(
338	43	RCL
339	16	16
340	54	)
341	75	-
342	53	(
343	43	RCL
344	25	25
345	65	x
346	53	(
347	53	(
348	01	1
349	75	-
350	43	RCL
351	27	27
352	45	Y^x
353	53	(
354	43	RCL
355	16	16
356	94	+/-
357	54	)
358	54	)
359	55	÷
360	43	RCL
361	26	26
362	54	)
363	54	)
364	54	)
365	92	RTN
366	76	LBL
367	99	PRT
368	22	INV
369	58	FIX
370	73	RC*
371	00	00
372	69	OP
373	04	04
374	69	OP
375	20	20
376	58	FIX
377	02	02
378	92	RTN
379	76	LBL Print
380	12	B input
381	69	OP
382	00	00
383	43	RCL
384	46	46
385	69	OP
386	02	02
387	69	OP
388	05	05
389	98	ADV
390	02	2
391	03	3
392	32	X:T
393	01	1
394	42	STO
395	00	00
396	43	RCL
397	00	00
398	95	=
399	67	EQ
400	04	04
401	18	18
402	43	RCL
403	00	00
404	58	FIX
405	00	00
406	99	PRT
407	73	RC*
408	00	00
409	58	FIX
410	02	02
411	99	PRT
412	69	OP
413	20	20
414	61	GTO
415	03	03
416	96	96
417	98	ADV
418	91	R/S
419	76	LBL Auto
420	14	D Loader
421	00	0
422	42	STO
423	28	28
424	01	1
425	42	STO
426	29	29
427	02	2
428	02	2
429	32	X:T
430	91	R/S
431	76	LBL
432	15	E
433	72	ST*
434	29	29
435	01	1
436	44	SUM
437	29	29
438	44	SUM
439	28	28
440	43	RCL
441	28	28
442	67	EQ
443	11	A
444	91	R/S

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HITAHR INFORMATION TEXT SERIES 012—05.83 (1M)