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The Value of Genetic Information to Bull Buyers: A Combined Revealed, Stated Preference Approach

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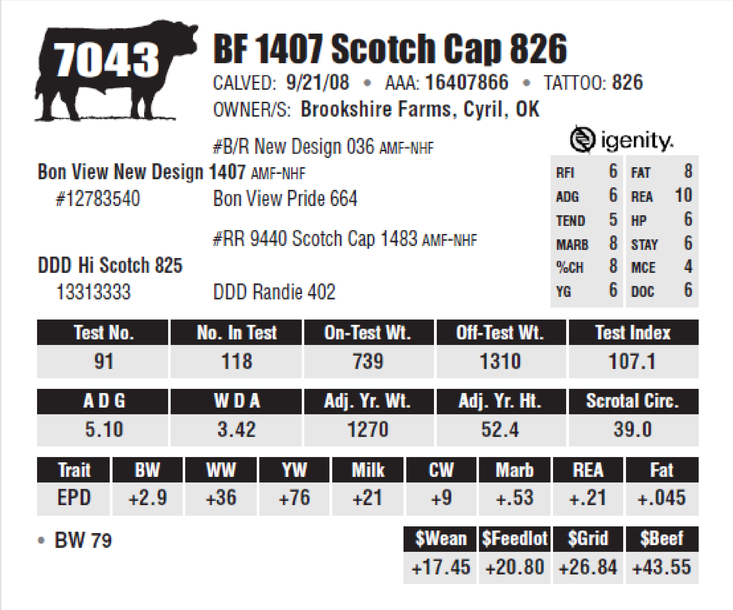
Background:

DNA profile information has begun appearing in purebred bull auction catalogs; however, the value of this information is as of yet unknown. This study uses data from actual bull sales at a test station and combines it with stated-preference survey data to determine the value of the DNA profile information.

Objective:

- Determine the extent to which cow-calf producers value DNA profile information.
- Establish bull buyers' valuation of bull information

Figure 1. Example of Catalog Entry for OBI Bull Sold in Spring 2010



7043 **BF 1407 Scotch Cap 826**
CALVED: 9/21/08 • AAA: 16407866 • TATTOO: 826
OWNER/S: Brookshire Farms, Cyril, OK

Bon View New Design 1407 AMF-NHF #12783540
#B/R New Design 036 AMF-NHF
Bon View Pride 664

DDD Hi Scotch 825 13313333
#RR 9440 Scotch Cap 1483 AMF-NHF
DDD Randie 402

igenity.

RFI	6	FAT	8
ADG	6	REA	10
TEND	5	HP	6
MARB	8	STAY	6
%CH	8	MCE	4
YG	6	DOC	6

Test No.	No. In Test	On-Test Wt.	Off-Test Wt.	Test Index
91	118	739	1310	107.1

A D G	W D A	Adj. Yr. Wt.	Adj. Yr. Ht.	Scrotal Circ.
5.10	3.42	1270	52.4	39.0

Trait	BW	WW	YW	Milk	CW	Marb	REA	Fat
EPD	+2.9	+36	+76	+21	+9	+.53	+.21	+.045

• BW 79

$Wean	$Feedlot	$Grid	$Beef
+17.45	+20.80	+26.84	+43.55

Data:

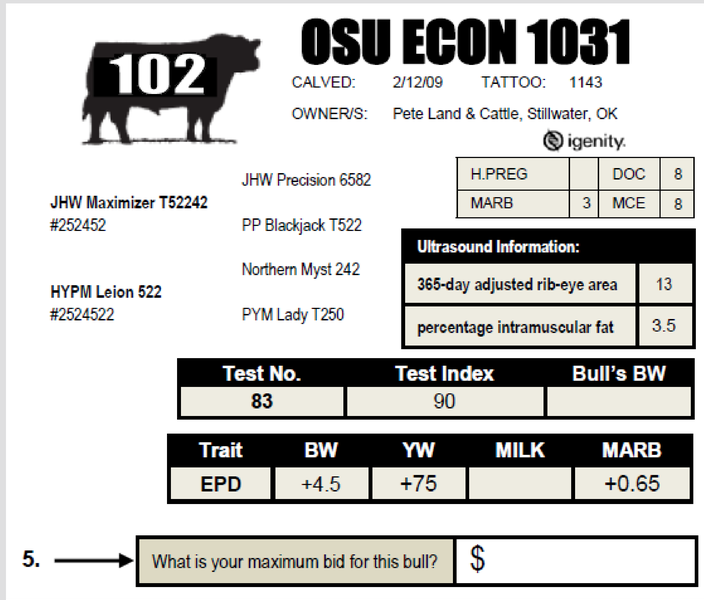
Revealed Preference Data

Sale price, test performance, EPDs, ultrasound information, and Igenity scores were collected on individual animals from three Oklahoma Beef Inc. (OBI) Performance-Tested bull sales held in the Spring of 2009, Fall of 2009, and the Spring of 2010. Over the three sales, data were collected on 238 Angus bulls. The average price paid was $2,363.00. Figure 1 is a bull which sold in the Spring 2010 sale and shows the variety of information provided in the catalog.

Stated Preference Data

In the Summer of 2010, a mail survey was sent to all previous OBI bull buyers. Each survey presented the respondent with nine hypothetical bulls and asked the buyer to indicate the most they would be willing to bid for each bull if at auction. The survey was formatted to look almost identical to the catalog buyers receive at the OBI sale. Figure 2 shows one of the questions on the survey in which buyers were asked to indicate their maximum willingness-to-pay.

Figure 2. Example of Bull Presented in Stated Preference Survey



102 **OSU ECON 1031**
CALVED: 2/12/09 TATTOO: 1143
OWNER/S: Pete Land & Cattle, Stillwater, OK

igenity.

H.PREG		DOC	8
MARB	3	MCE	8

JHW Maximizer T52242 #252452
JHW Precision 6582
PP Blackjack T522

HYPM Leion 522 #2524522
Northern Myst 242
PYM Lady T250

Ultrasound Information:	
365-day adjusted rib-eye area	13
percentage intramuscular fat	3.5

Test No.	Test Index	Bull's BW
83	90	

Trait	BW	YW	MILK	MARB
EPD	+4.5	+75		+0.65

5. → What is your maximum bid for this bull? $

Methods:

Using a hedonic regression approach, the implicit values of bull characteristics can be inferred.

The values of each survey bull (SP) were estimated using equation (8).

$$(8) \quad wtp_i = \beta_0^{sp} + \sum_{j=1}^{24} \beta_j^{sp} x_{ij} + v_i + \varepsilon_i.$$

The price of bulls sold at auction (RP) were estimated using equation (9).

$$(9) \quad price_i = \beta_0^{rp} + \sum_{j=1}^{26} \beta_j^{rp} x_{ij} + \sum_{s=1}^{2} \beta_s^{rp} sale_{is} + \varepsilon_i.$$

Table 1. Willingness to Pay for Beef Bulls ($) Estimates from Mixed Models for Stated Preference (SP) and Revealed Preference (RP) Data[b]

Bull Attribute	Survey Data (SP)	Sale Data (RP)
Intercept	212.53	-2613.04*
	(572.70)[a]	(908.06)
Attributes in SP and RP Data		
Docility Igenity	6.60	64.41*
	(12.22)	(24.09)
Intramuscular fat ultrasound	18.98	-112.06*
	(20.37)	(42.70)
Test index	15.99*	37.03*
	(3.06)	(4.86)
Bull birth weight	-11.52*	-10.34*
	(2.34)	(3.91)
Birth weight EPD	-104.98*	-73.65*
	(15.18)	(34.36)
Yearling weight EPD	8.06*	9.04*
	(2.44)	(4.04)
Attributes in SP Data Only		
Birth weight EPD missing	-293.37*	-
	(53.03)	
Yearling weight EPD missing	-343.59*	-
	(52.70)	
Milk EPD missing	-61.11	-
	(52.81)	
Marbling EPD missing	-104.27*	-
	(52.70)	
Attributes in RP data only		
Scrotal circumference	-	-3.27
		(11.73)
Carcass weight EPD	-	-8.19
		(6.69)
Fat thickness EPD	-	-524.51
		(894.21)
Ribeye area EPD	-	34.67*
		(13.52)

Note: Asterisk (*) represents statistical significance at the 5% level or lower.
[a] Numbers in parentheses are standard errors.
[b] Only partial results are presented in this table.

Results and Conclusions:

As a producer purchasing a bull, both performance and EPD genetic information on the breeding potential of the animal is shown to be relevant and significantly impacts the price received. A bull producer should note the importance of simply providing information regardless if the 'score' is thought to be favorable of the bull, therefore even if the EPDs or test performance scores are not highly sought after, a premium will be awarded to the bull for the information itself.

Results show that producers currently place small value on the information presented in a DNA profile score, yet it is unknown if this will change over time. As more bulls continue to be sold with Igenity DNA profile information, the analysis can be replicated and thus strengthened. Similar to the introduction of EPDs, producers required time to become familiar, educated, and confident in the information captured by an EPD value, likewise the value producers receive from Igenity scores will likely increase with time.