The Price of Disclosure in the Thoroughbred Yearling Market

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MOTIVATION

• When sellers know more about the quality of a good than buyers, asymmetric information exists and can be a barrier to trade (Akerlof (1970), *Quarterly Journal of Economics*)

• Disclosures, both voluntary and mandatory, represent one possible tool to mitigate the adverse effects of asymmetric information

• Jovanovic (1982, *Bell Journal of Economics*) suggests that appropriate incentives exist for sellers to voluntarily disclose all information, yet mandatory disclosure laws are prevalent in many markets

• In the market for Thoroughbred yearlings, certain conditions are required to be disclosure prior to sale; however, the seller has the ability to disclose any information deemed pertinent

OBJECTIVES

• To test whether disclosures contain relevant information about the quality of a Thoroughbred yearling; in other words, do market prices adjust to disclosed information ?

• To estimate the marginal value of disclosures: how much do sellers gain or lose by disclosing information related to quality?

DATA DESCRIPTION

• 4,795 yearlings that were sold or that did not meet their reserve price (RNA, for reserve not attained) at the 2008 Keeneland September Yearling Sale

• Data were obtained from the following sources:

  • Keeneland Association, Inc., online database of auction results
  • 2008 Keeneland Sale Catalogs
  • *The Thoroughbred Times Buyer's Guide*
  • Keeneland Association, Inc., computer database

DISCLOSURE VARIABLES

• We can identify the presence or absence of three specific types of disclosures in the veterinary repository:

  • **Vet statement** - information regarding surgeries, illnesses, medications, or other veterinary-related information deemed pertinent by the seller
  • **Scope** - results of an endoscopic evaluation of the yearling's airways
  • **Eye** - details regarding any abnormalities in the yearling's eye(s)

• The absence of a disclosure statement means that the yearling is free of all conditions that are required to be disclosed

• The content of the disclosures is unknown (which includes whether information provided is mandatory or voluntary)

VARIABLES

Variables used in this analysis are:

Variable	Description	Expected Sign
PRICE	Final hammer price	n/a (Dep. variable)
VET	=1 if a vet statement disclosure is present in the repository	-
SCOPE	=1 if a scope disclosure is present in the repository	-
EYE	=1 if an eye disclosure is present in the repository	-
BOOK 1 - 8	A set of dummy variables indicating in which of Books 1 – 8 the yearling was sold	
REPVISTS	The number of views of a yearling's repository records before sale	+
AGE	Age of the yearling in days	
COLT	=1 if yearling is a colt	+
KY	=1 if yearling is Kentucky-bred	+
DERBY	=1 if the yearling meets the criteria for racing at a "classic" distance based on their Dosage Index and Center of Distribution statistics	+
FIRSTCROP	=1 if yearling is from sire's first crop of foals	+
SECONDCROP	=1 if yearling is from sire's second crop of foals	+
2008FEE	Stud fee of the yearling's sire at time of auction	+
PROGREP	Number of same-sired progeny at the auction	+
DAMBLACKTYPE	=1 if yearling's dam is stakes-placed	+
DAMBTPROGENY	Number of black-type progeny produced by yearling's dam	+

DETAILS ON DISCLOSURES

• Vet statement disclosures are more prevalent than the other two types, especially in the early books:

% Disclosures by Book
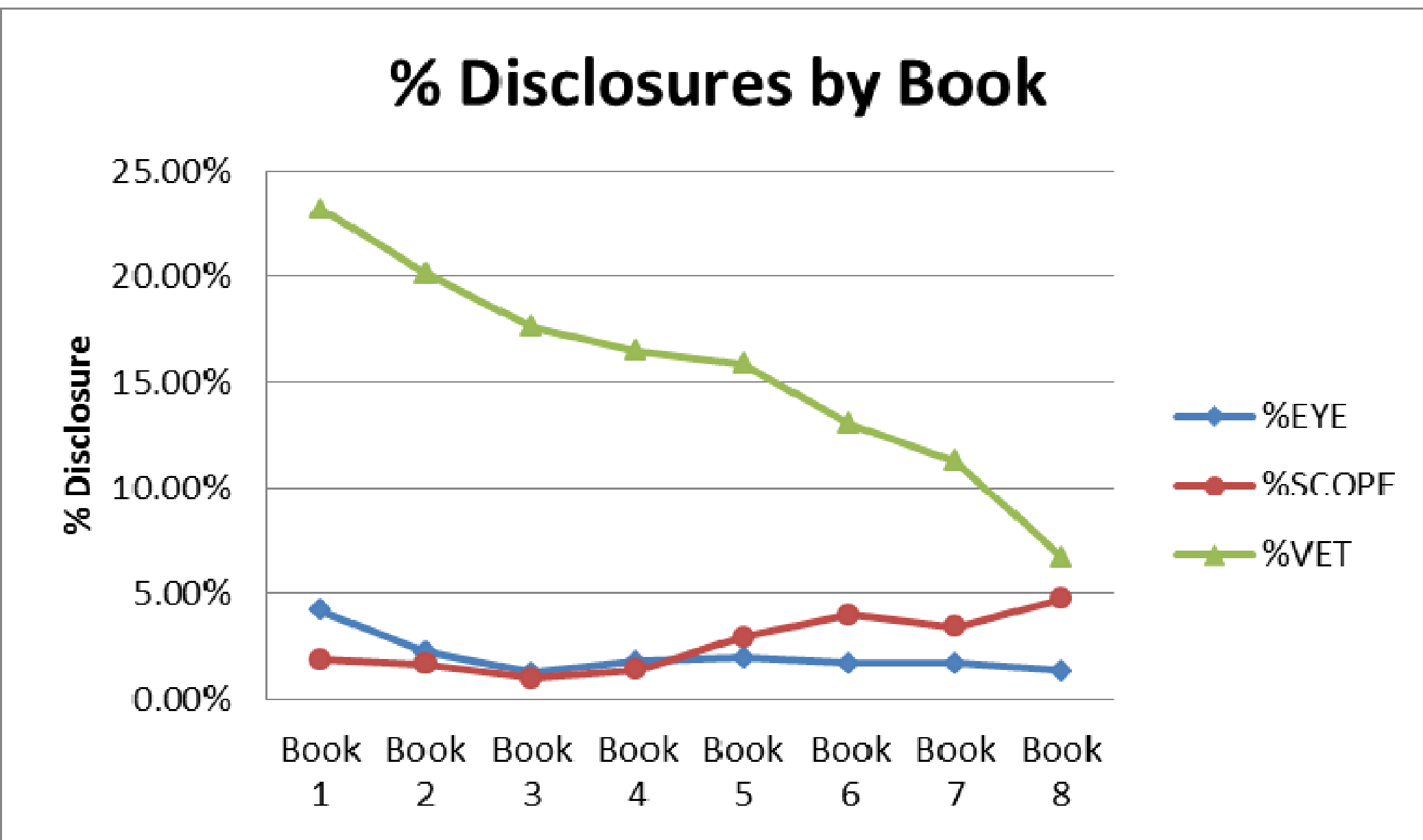
• There are no significant differences in the incidence of disclosure statements by book between sold and RNA yearlings at the 10% level or better:

TABLE: *p*-values for test of the means for a particular type of disclosure between sold and RNA yearlings, by book

	Book 1	Book 2	Book 3	Book 4	Book 5	Book 6	Book 7	Book 8
VET	0.52	0.53	0.72	0.76	0.54	0.25	0.37	0.37
SCOPE	0.74	0.44	0.64	0.69	0.24	0.53	0.70	0.11
EYE	0.19	0.89	0.95	0.90	0.17	0.49	0.54	0.22

MODEL SPECIFICATION

• We utilize a hedonic pricing model to estimate the determinants of Thoroughbred yearling hammer prices:

$$\ln(PRICE_i) = a + x_i\beta + \varepsilon_i$$

• The regressors are identified in the "Variables" table
• ε_i is a normally distributed, zero-mean noise term

• We analyze separate hedonic pricing models according to the following four subsets of data because differences among these groups imply that the variances of the errors in each group are likely unequal
  • Select yearlings (Books 1 and 2) that were sold
  • Select RNA yearlings
  • Non-Select (Books 3 - 8) yearlings that were sold
  • Non-Select RNA yearlings

• Issues with the data and models
  • Multicollinearity is often an issue with this type of analysis; however, among the selected explanatory variables, all variance inflation factors (VIF) are less than 3.3
  • Seemingly unrelated regressions (SUR) would be an appropriate estimation approach given the setup of this model, but SUR and OLS yield identical results since the RHS variables are the same for the four subsets of data

RESULTS

Results from the four hedonic pricing models are below, with results pertaining to the disclosure variables emphasized:

	Select/Sold	Select/RNA	Non-Select/Sold	Select/RNA
VET	-0.022	0.080	-0.171***	-0.252
SCOPE	-0.116	-0.038	0.003	-0.741***
EYE	-0.130	0.228	0.092	0.237
REPVISITS	0.200***	0.121***	0.134***	0.085***
AGE	-0.001	-0.002***	-0.003***	-0.005***
COLT	0.099*	-0.081	0.074**	-0.072
KY	0.333**	0.016	0.041	0.135
DERBY	0.188**	0.090	-0.111**	-0.253
FIRSTCROP	-0.006	0.200	-0.022	-0.130
SECONDCROP	0.075	-0.173	0.003	0.347**
LN(2008FEE)	0.299***	0.245***	0.093***	0.350***
PROGREP	0.003	0.000	0.002*	0.003
DAMBLACKTYPE	0.053	0.086	0.058*	0.366***
DAMBTPROGENY	0.055**	0.062	0.128***	0.178**
n	797	310	2602	816
Adj. R²	0.4701	0.4822	0.5798	0.2654

*** (**, *) indicates significance at the 1% (5%, 10%) level
Coefficient estimates on Book variables are suppressed

DISCUSSION

• None of the disclosure variables are statistically significant in the select portion of the sale
  • Quality certification that accompanies being placed in Book 1 or Book 2 provides all relevant quality information

• In the non-select books, only vet statement disclosures influence price for sold yearlings; the presence of a vet statement disclosure results in an average 17.1% decline in price
  • The marginal value of a vet statement disclosure is -$7,571.68 when evaluated at the mean

• In the non-select books, only scope disclosures influence price for RNA yearlings; the presence of a scope disclosure results in an average 74.1% decline in price
  • The marginal value of a scope disclosure is -$21,617.97 when evaluated at the mean

• Most of the attributes from previous studies are significant with the expected signs

BUSINESS IMPLICATIONS

• Our study provides evidence that pre-sale quality certification mitigates the need for disclosure

• Results on marginal values inform both sides of the market; the benefits are twofold:
  • Buyers can bid more effectively by understanding the average market value of different types of conditions
  • Sellers can more accurately set reserve prices and hence sell a higher percentage of their yearlings

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