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**Producing Protein for a
Food Insecure & Uncertain World**

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Economist's Views on Biosecurity & Disease Mitigation

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*Behavioral approaches to reducing
the impact of livestock pests or
disease outbreaks*



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Point #1

Empirical Estimates on
Producer Biosecurity
Decision-Making are
Limited & Needed

Will an incentive-compatible indemnity policy please stand up? Livestock producer willingness to self-protect

Glynn T. Tonsor¹  | Lee L. Schulz² 

Abstract

This study evaluates the role of private market signals and conditional indemnity policies in livestock producer willingness to self-protect against disease and invest more in biosecurity. Our focus on Tier 1 swine diseases and U.S. hog producer decision-making is timely and informative for a multitude of current disease discussions. We find biosecurity effort adjusts to economic incentives in private, livestock markets and public, indemnity policies.

Biosecurity Investment Cost & Risk Benefit Sensitivity

- Choice Experiment, Example Scenario:

	<u>Biosecurity Option A</u>	<u>Biosecurity Option B</u>	<u>Option C</u>
Annualized Cost (\$ per pig sold)	\$5	\$2	I would choose
Own-Farm Outbreak Risk (%)	Less than 1% chance	Less than 3% chance	not to implement
Enhanced Market Access	Yes	Yes	Biosecurity
Enhanced Indemnity Status	No	Yes	Options A or B
<i>I would choose:</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 4 or 5 Scenarios per respondent (Market Hog Sellers; National 2017 survey)

Biosecurity Investment Cost & Risk Benefit Sensitivity

- Tonsor & Schulz, 2020 TED Results: Producer Homogeneity Approach
 1. Producers willing to pay (WTP) \$2.02/pig sold to have improved biosecurity
 2. For each 1% own-farm disease risk reduction, WTP \$0.36/pig sold
 3. WTP \$2.24/pig sold for enhanced market access
 4. WTP \$1.39/pig sold for enhanced indemnity status

- Can derive implied biosecurity participation elasticities from producer selections:
 - +0.06 own-farm risk reduction
 - For each 10% reduction in risk, biosecurity participation increases by 0.6%
 - -0.17 cost
 - For each 10% reduction in costs, biosecurity participation increases by 1.7%

Biosecurity Investment Cost & Risk Benefit Sensitivity

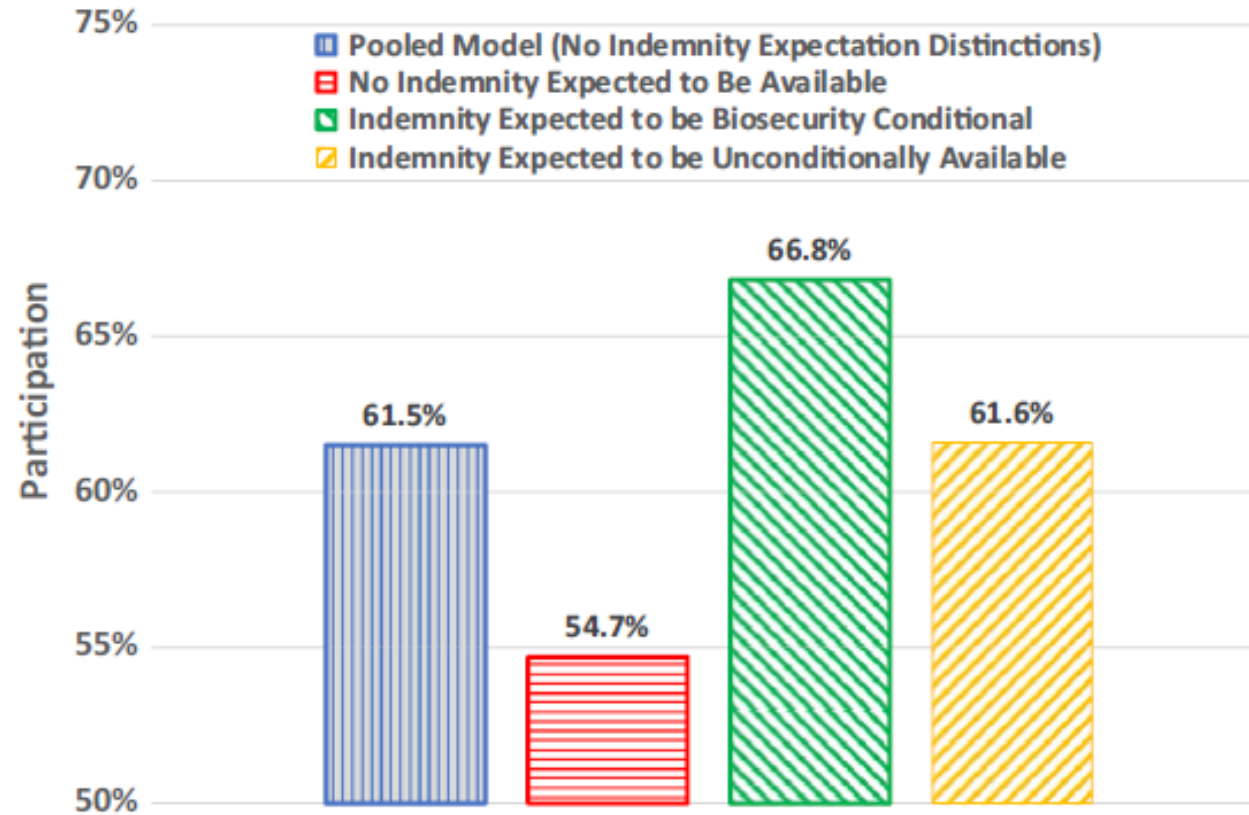


FIGURE 2 Mean participation rates of producers. Note: Estimates were derived using the mean value of attributes and model coefficients presented in Table 2

Biosecurity Investment Cost & Risk Benefit Sensitivity

- Tonsor & Schulz, 2020 TED Results: Producer Heterogeneity Approach
- No Indemnity Expected to Be Available (31%)
 - +0.02 own-farm risk reduction
 - -0.15 cost
- Indemnity Expected to Be Biosecurity Conditional (32%)
 - +0.08 own-farm risk reduction
 - -0.20 cost
 - *This group will respond most to mitigation efficacy & implementation cost gains!*
- Indemnity Expected to Be Unconditionally Available (38%)
 - +0.06 own-farm risk reduction
 - -0.13 cost

Biosecurity Investment Cost & Risk Benefit Sensitivity

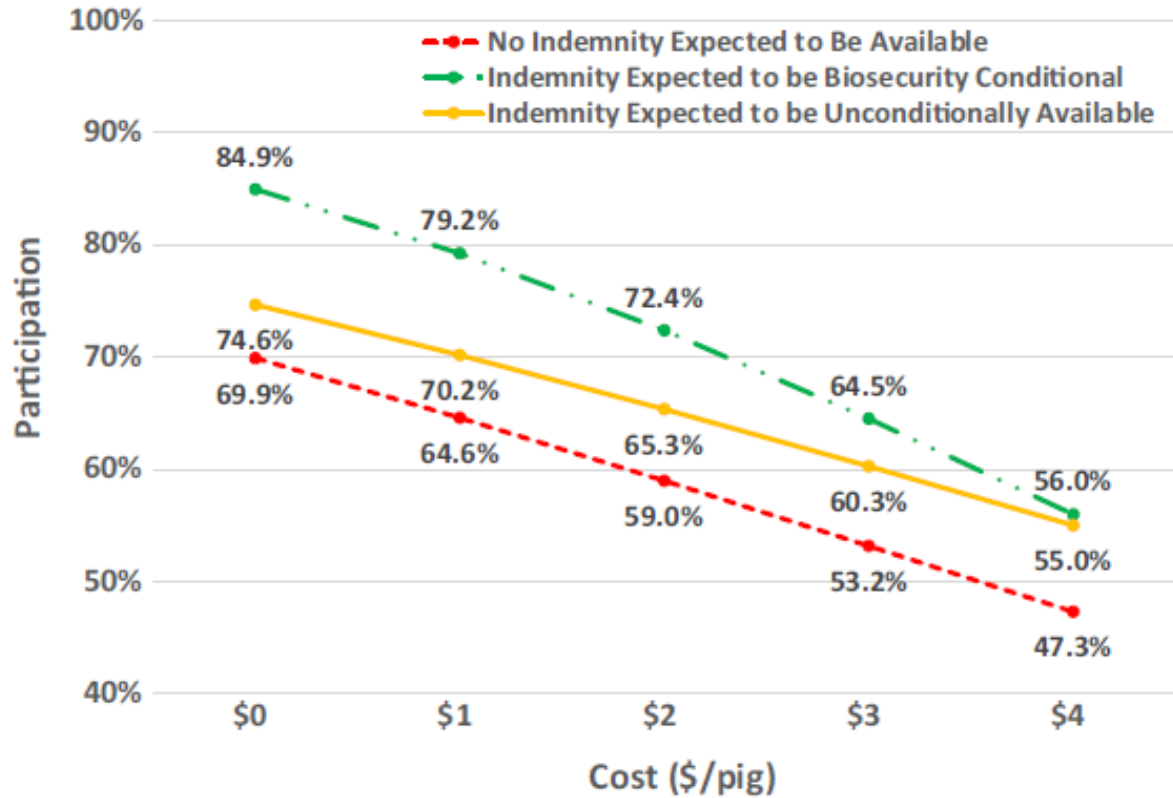


FIGURE 3 Participation rate versus annualized cost (\$/pig sold). Note: Estimates were derived using the mean value of attributes and model coefficients presented in Table 2

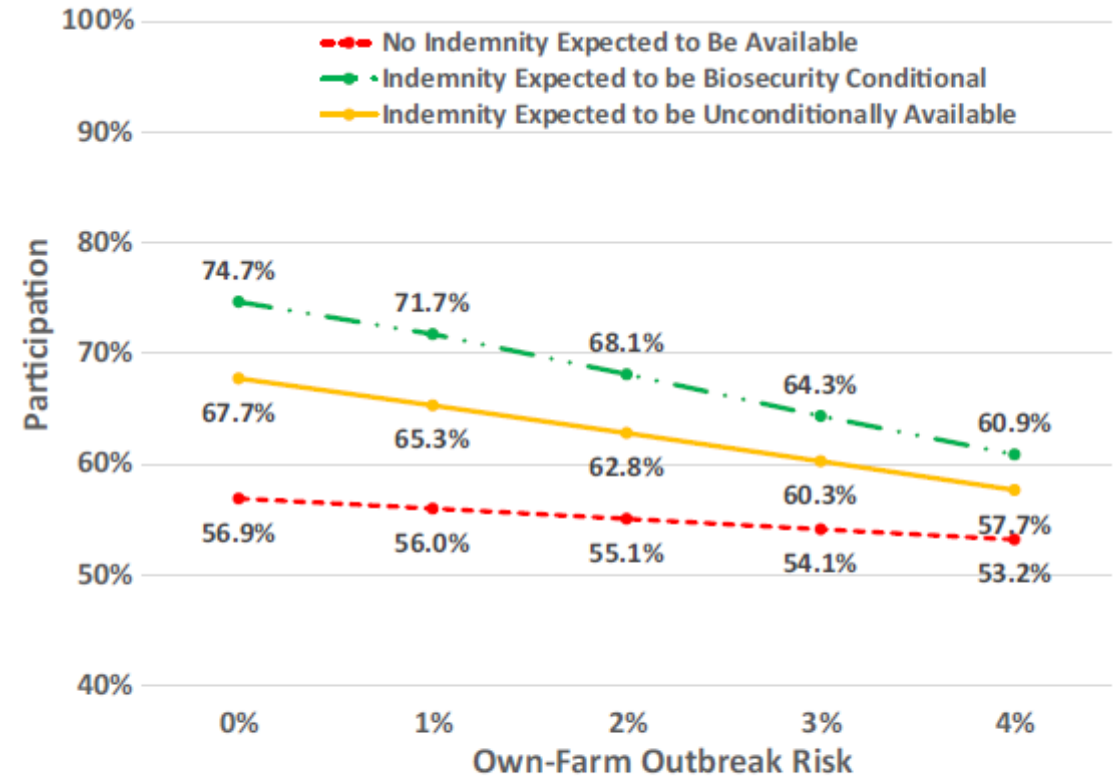


FIGURE 4 Participation rate versus own-farm outbreak risk (%). Note: Estimates were derived using the mean value of attributes and model coefficients presented in Table 2

Those expecting indemnity to be biosecurity conditional respond most to mitigation efficacy & implementation cost gains!

Point #2

Heterogeneity of
Livestock Producers Must
Be Appreciated



U.S. Cattle Producer Adoption of Secure Beef Supply Plan Enhanced Biosecurity Practices and Foot-and-Mouth Disease Preparedness

Christopher C. Pudenz^{1}, James L. Mitchell², Lee L. Schulz¹ and Glynn T. Tonsor³*

<https://www.frontiersin.org/articles/10.3389/fvets.2021.660857/full>

Heterogeneity Revealed

- Pudenz et al., 2021 Results
 - Adoption of 13 enhanced biosecurity practices is generally low
 - Those who have adopted pre-outbreak practices (e.g. having a biosecurity manager, having written plan, having lines of separation) are more likely to consider other in-event practices more feasible.
 - Punchline #1: Complementarity exists in adopting multiple practices
 - Punchline #2: Industry is split in biosecurity adoption

Point #3

Public-Private Partnering
via Carefully Designed &
Targeted, Cost-Share
Programs

EDITOR'S CHOICE

The market for traceability with applications to U.S. feeder cattle FREE

James Mitchell ✉, Glynn T Tonsor, Lee Schulz

European Review of Agricultural Economics, Volume 48, Issue 3, July 2021,
Pages 447–476, <https://doi.org/10.1093/erae/jbaa027>

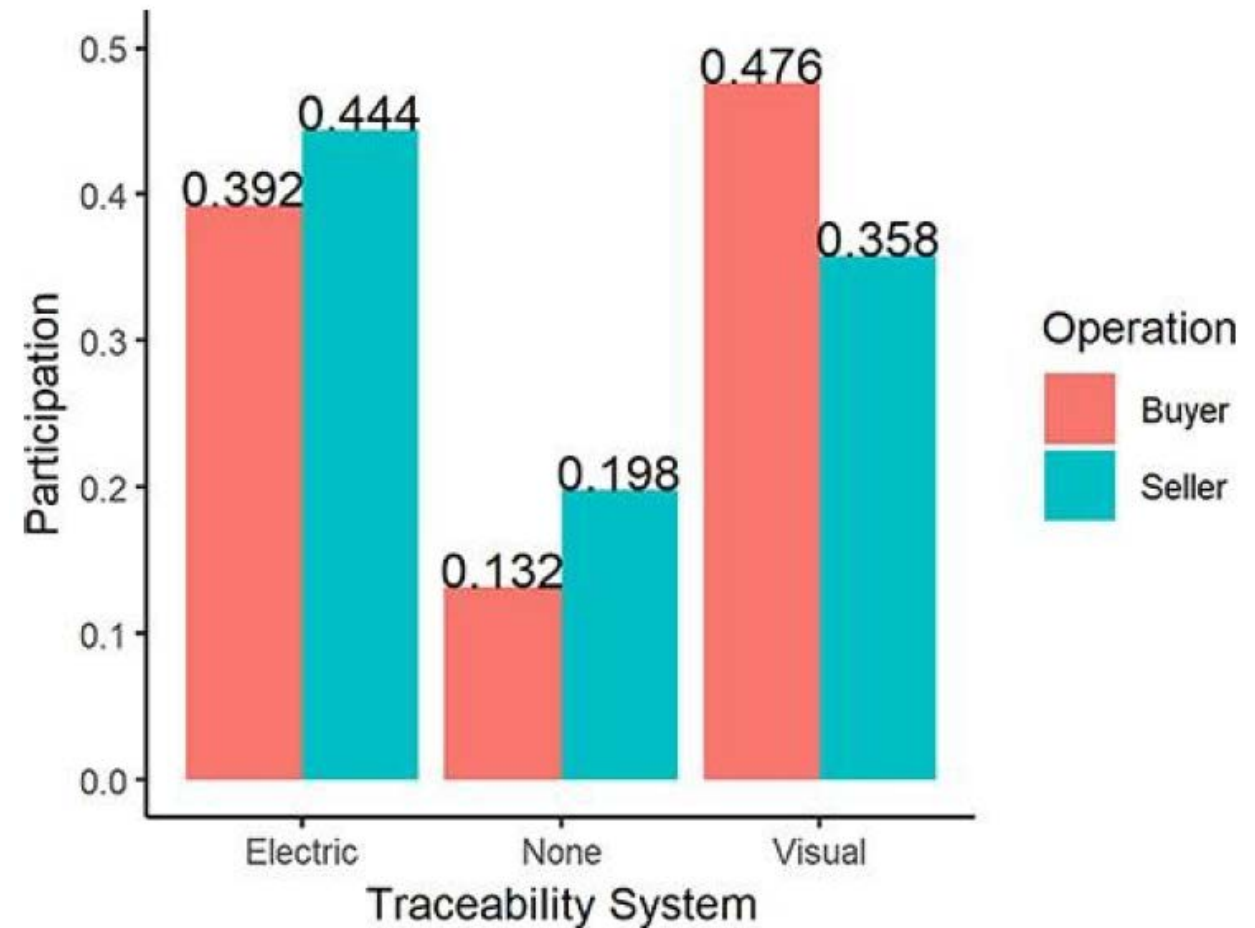
Published: 17 November 2020 **Article history** ▼

<https://academic.oup.com/erae/article/48/3/447/5986602?login=true>

- Mitchell, Tonsor, & Schulz, 2021 ERAE Results

- Implicit market for traceability between feeder cattle sellers & buyers
- Supply & demand for traceability changes with prices & policies

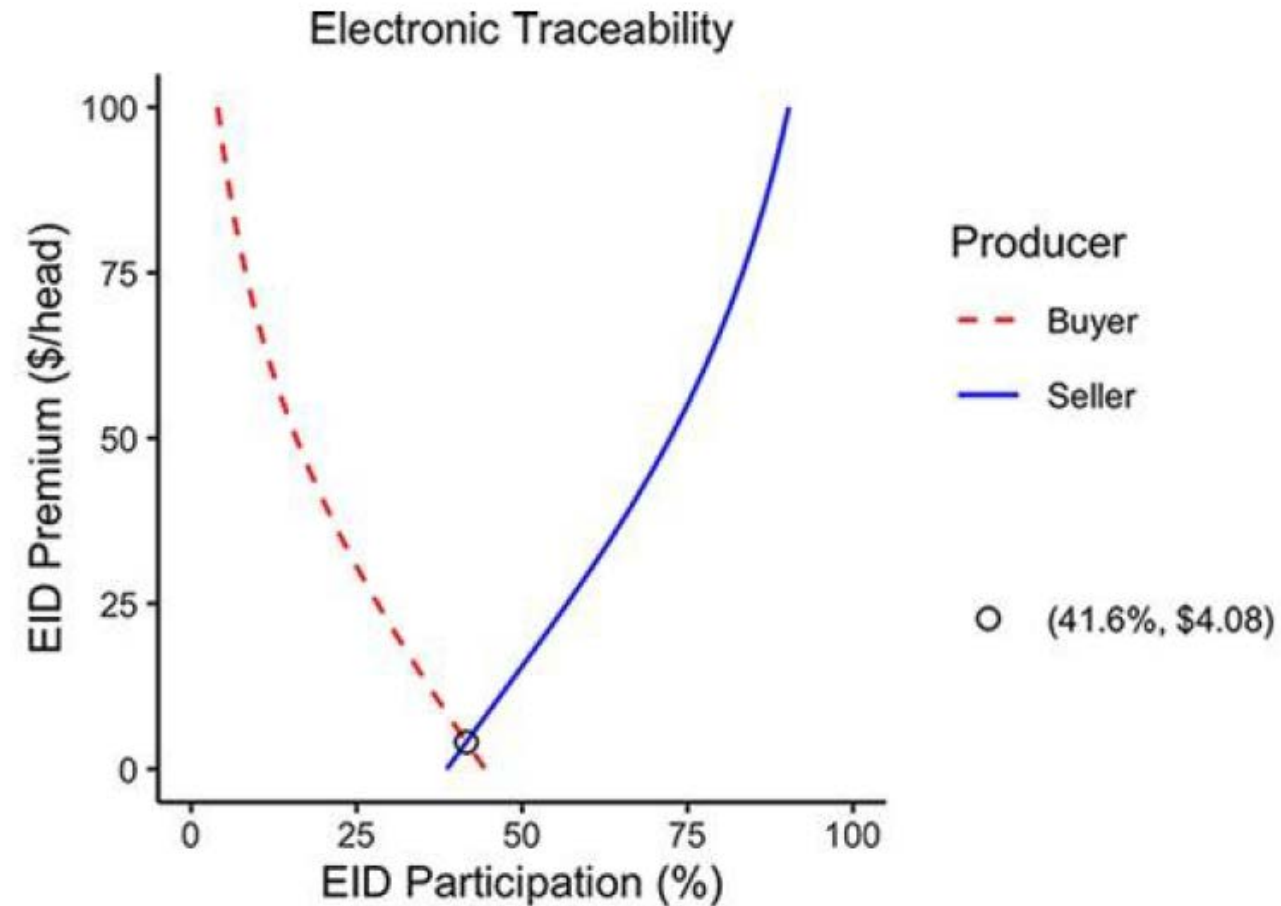
Fig. 2.



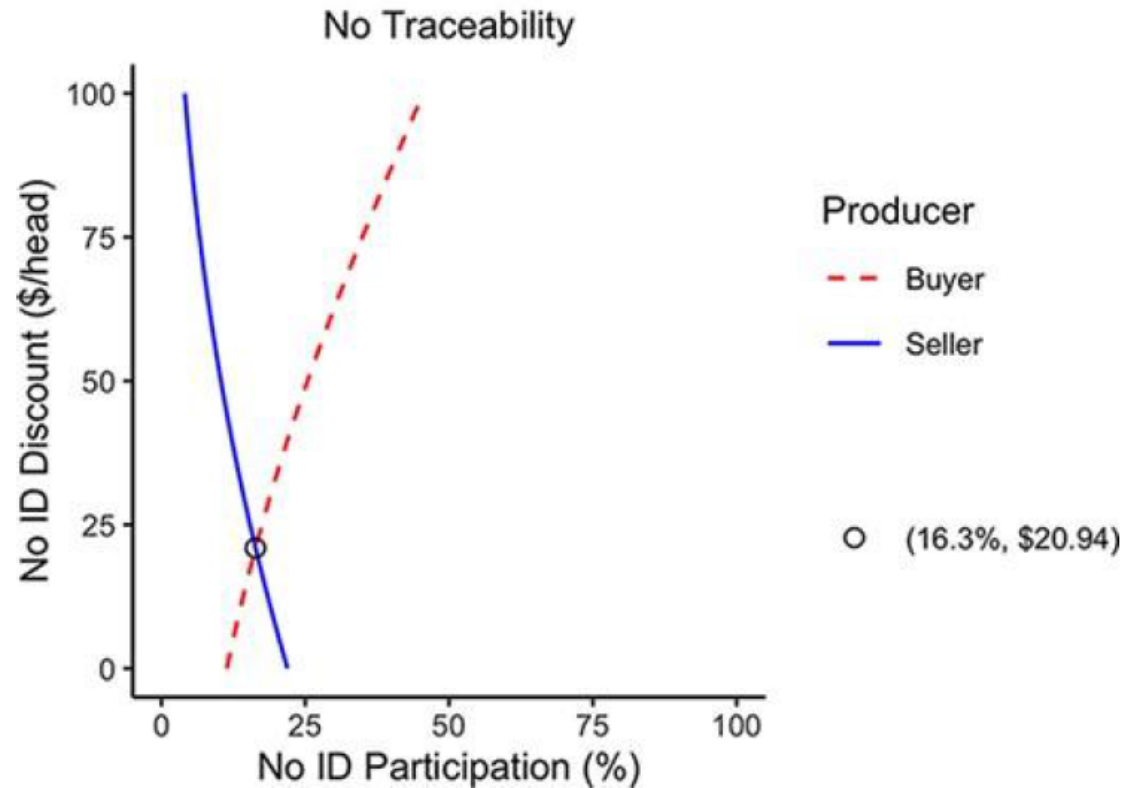
Predicted mean participation rates for feeder cattle sellers and buyers.

- Mitchell, Tonsor, & Schulz, 2021 ERAE Results
 - At a premium of \$4.08/hd, 41.6% of buyers & sellers would select electronic T

Fig. 3.



- Mitchell, Tonsor, & Schulz, 2021 ERAE Results
 - At a discount of \$20.94/hd, 16.3% of buyers & sellers would select NO traceability



Effects of USD/head premiums and discounts on electronic and no traceability participation rates for feeder cattle sellers and buyers. The top graph is participation in electronic traceability and bottom graph is choosing not to participate in traceability.

Targeted Cost-Share Merits & Limitations

- Mitchell, Tonsor, & Schulz, 2021 ERAE Results

Table 5. Government cost estimates for traceability cost-share policies (millions of dollars)

Policy	Producer group	
	Targeted	All
Government program:		
50% cost-share	4.51	30.87
100% cost-share	18.77	71.48
Government-private program:		
50% cost-share	5.05	38.36
100% cost-share	20.22	86.82

Note: Estimates are calculated using a tagging cost of USD 5.00/head and a 2019 calf-crop of 36.1 million head. Seller participation rates in a government program when the feeder cattle premium is USD 0.00/head are 29.2%, 34.2% and 39.6% for 0%, 50% and 100% cost-shares, respectively. Seller participation rates in a government-private program when the feeder cattle premium is USD 0.00/head are 36.9%, 42.5% and 48.1% for 0%, 50% and 100% cost-shares, respectively.

More information available at:



This presentation will be available in PDF format at:

<http://www.agmanager.info/about/contributors/individual/tonsor.asp>

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