

**Incentive for poultry integrators to  
contract bio-secure producers and  
implication for government  
indemnification program**



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# Government's policy for invasive species

1. *Ex post* indemnification programs as typically administered by APHIS
2. *A prior* insurance or indemnification programs as offered by RMA
3. Proposed tiered indemnification that ties higher coverage to explicit risk reducing production practices



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## Comparison of government's policy for invasive species



- *Ex post*: Efficient when the probability of loss faced by producers is quite small.
- *Ex ante* insurance: The most efficient government response at this stage of infestation spread.
- Tiered indemnification or insurance design: Observability.



# Background information of Avian flu



- High Mortality (50%-90%)
- Very contagious
- World wide spread
- Potential health risk for people
- Great influence to poultry product export and price
- Low Pathogenic Avian Influenza & High Pathogenic Avian Influenza



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# Unique aspects of Poultry Disease Policy



- Vertically integrated into all production stages - The integrator owns the birds
- Farmers are paid based on relative rate of gain efficiency and largely face business interruption risk
- While the integrator can cut off growers –capital investment requires commitment
- Concerned about non-indemnifiable disease that cause mortality and export restrictions (price-shocks)
- Much of bio-security is generic rather than disease specific
- The integrator tightly supervises the farm (weekly visits)



# Conceptual Framework



- Risk averse integrators
- Has a choice of using bio-secure or insecure growers
- Bio-secure farms are slightly less productive and slightly riskier
- The government offers indemnification with a deductible on AI
- The government does not indemnify the other disease which also causes death loss and it creates a price shock
- An indemnity penalty for high risk farms suffering loss (assuming observability)



# Simulation procedure



- We model the probability of AI and LT disease losses for bio-secure and insecure farms based on historical data
- Price is also random and negatively correlated with an outbreak
- Random variables are model with the Anderson, Harri, and Coble Multivariate simulation procedure (JARE, 2009)

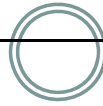


## Sensitivity analysis of deductible coefficient (d)

Value of variable d	Number of bio-secure farm for Max CE	Net Revenue
0	350	96.98
0.1	350	98.06
0.2	500	94.81
0.3	700	91.29
0.4	800	90.29
0.5	900	89.67
0.6	1000	89.87
0.7	1000	90.11
0.8	1000	88.06
0.9	1000	88.21
1	1000	89.12



## Sensitivity analysis of risk aversion coefficient



Relative Risk Aversion	Number of bio-secure farms for Max CE	Net Revenue
1	50	95.77
2	500	94.40
3	650	91.13
4	700	92.28



# Conclusion



- **Factors encouraging more Bio-security**
  - Price reductions when an outbreak occurs
  - The risk aversion level of integrator
  - Share of output lost if an outbreak
  - Probability of other diseases outbreak
  - Deductible level
  - Indemnity penalty
- **Caveat: our assumption that bio-security is negatively correlated with output**



# **A Key assumption in this analysis is that there is an output/biosecurity trade off.**

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- With the help of a large poultry integrator we surveyed contract-growers to assess if more biosecure growers were on relatively less productive.
- The survey questionnaire was administered by field managers who worked for the integrator.
- We receive 466 responses.



## Bio-security and Production Performance Assessment

**Complex:** \_\_\_\_\_ **Service Tech:** \_\_\_\_\_ **Farm** \_\_\_\_\_

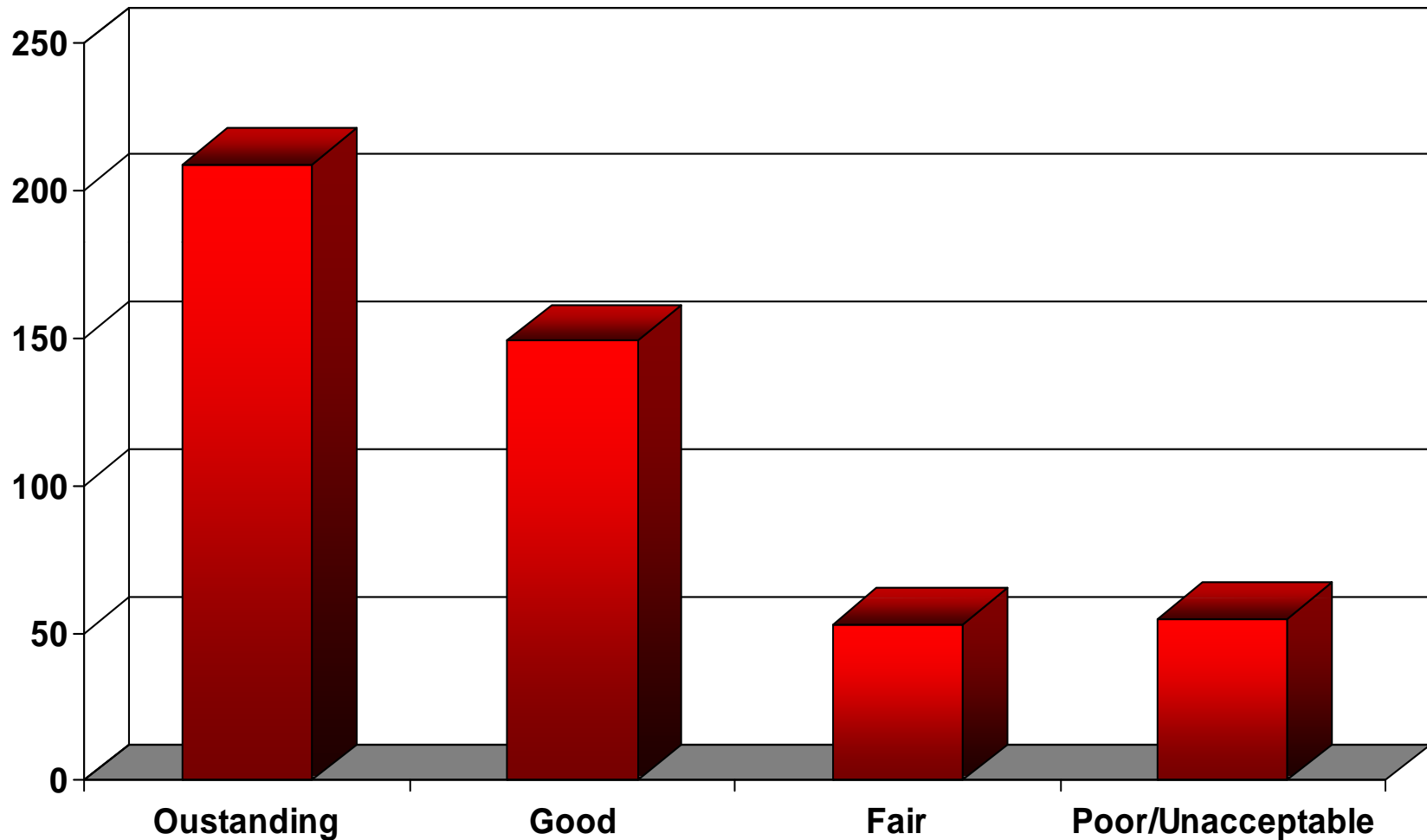
<p><b>Grade Questions</b></p>	<p>Grade the farm on a 100 point scale. (100-90 is outstanding, 89-80 is good, 79-70 is fair, 69-60 is poor, and below 60 is unacceptable)</p>
1. Farm workers avoid sharing equipment with other growers or if they do share equipment, they sanitize the equipment.	
2. Farm workers wear footwear and other clothing that are only worn on the premises to avoid 'tracking in' disease.	
3. Farm workers avoid visiting other poultry chicken houses or follow the steps to sanitize themselves if they do.	
4. Visitors are required to disinfect their footwear in footbaths or wear coveralls and boots	
5. Farm workers clean manure, mud or debris from vehicle, boots, and then disinfect the tools which are used for cleaning.	
6. Facilities have rodent control programs and are relatively rodent free.	
7. Other domesticated animals and waterfowl are kept at least 150 feet from poultry buildings.	
8. Grass and weeds are mowed and the farm is neatly maintained	
9. Poultry building control rooms are neat and clean.	
10. The farm maintains good insect control	
<p><b>Performance: The production performance of this farm ranked _____ out of _____ in 2008.</b></p>	

## Bio-security and Production Performance Assessment

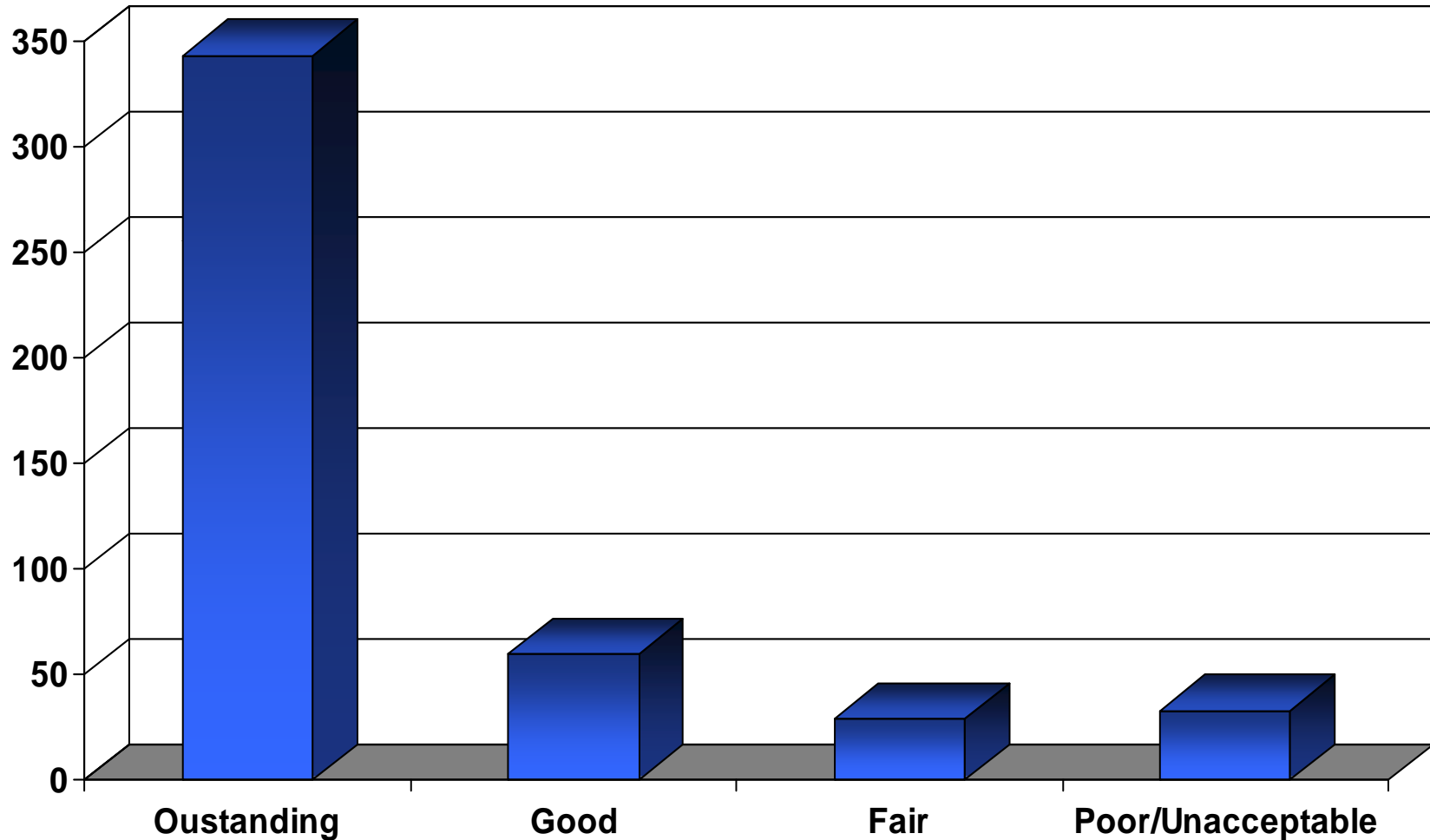
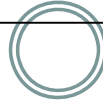
Complex: \_\_\_\_\_ Service Tech: \_\_\_\_\_ Farm \_\_\_\_\_

Other Questions	
1. How many family members have chicken farms?	Number
2. How many chicken houses are on the farm?	Number
3. How many non-company farms poultry houses are with in 0.5 miles of the farm?	Number
4. What is the distance from the farm to a road that regularly has vehicles carrying poultry?	Miles
5. Does the grower own more than one chicken farm?	Circle Yes or No
6. Does the farm have chicken houses on more than one location?	Circle Yes or No
7. Does the farm regularly use hired labor?	Circle Yes or No
8. Does the primary farm operator also work off farm?	Circle Yes or No
9. Is there a compost shed or dry litter shed on the farm?	Circle Yes or No
10. Is there an area where waterfowl congregate within 0.5 miles of the farm?	Circle Yes or No

**Farm workers clean manure, mud or debris from vehicle, boots, and then disinfect the tools which are used for cleaning.**



**Other domesticated animals and waterfowl are kept at least 150 feet from poultry buildings.**



# Relationship between Performance and Biosecurity

(correlation coefficients)

	Farm workers avoid sharing equipment with other growers or if they do share equipment, they sanitize the equipment	Farm workers wear foot wear and other clothing that are only worn on the premises to avoid 'tracking in" disease	Farm workers avoid visiting other poultry chicken houses or follow the steps to sanitize themselves if they do	Visitors are required to disinfect their footwear in footbath or wear coveralls and boots	Farm workers clean manure, mud or debris from vehicle, boots, and then disinfect the tools which are used for cleaning
2008 production performance percentile rank	0.07	0.07	0.03	-0.04	0.03

\* Denotes significance

# Relationship between Performance and Biosecurity







(correlation coefficients)

	Facilities have rodent control programs and are relatively rodent free	Other domesticated animal and waterfowls are kept at least 150 feet from poultry buildings	Grass and weeds are moved and the farm is neatly maintained	Poultry building control rooms are neat and clean	The farm maintains good insect control
2008 production performance percentile rank	<b>0.20*</b>	-0.02	0.01	<b>0.12*</b>	<b>0.14*</b>

\* Denotes significance



## Effectiveness of Tiered Indemnification

<b>Effective</b>		<b>Ineffective</b>
Negative relationship between output and biosecurity		Positive or insignificant relationship between output and biosecurity
The program disease is the primary disease for the industry		There are non-program diseases of importance to the industry
Mitigation practices are unique to the program disease		Mitigation practices are common for all diseases
Mitigation practices are observable		Mitigation practices are not observable
No adverse price shocks are associated with the disease		Adverse price shocks are associated with the disease
Given a price shock, a representative firm is small relative to the industry		Given a price shock, a representative firm is large relative to the industry