

# Traceability and Quality Verification in the Canadian Food Chain

Jill E. Hobbs

Department of Agricultural Economics  
University of Saskatchewan

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# A Changing Food Industry

- Food safety Issues
  - ❖ BSE
  - ❖ E. coli
  - ❖ Salmonella
- Food Quality Issues
  - ❖ Animal welfare
  - ❖ Environment
  - ❖ Genetically modified foods
  - ❖ Awareness of the link between food & health

# Traceability

- Growing interest in the traceability of agri-food products
- “Traceability” featured in Canadian Govt. Agricultural Policy Framework
- Private sector traceability initiatives
- Regulatory approaches to traceability (EU)
- Relationship between traceability, food safety and food quality

# Information Asymmetry and Product Attributes

- Some products have ‘credence’ attributes
  - ❖ Most “new” food quality issues
  - ❖ GMOs; on-farm production methods  
animal welfare; environment;  
other food safety problems
- Buyers incur information costs in determining whether credence attributes are present
- Solutions?
  - ❖ Label the presence of credence attributes

# Private Sector Traceability Initiatives

- Voluntary labelling and/or certification to identify a credence attribute
- Market premium for ‘safer’ or higher quality food, or protection of market share, provides the incentive
- Individual supply chain initiatives  
e.g. Tracesafe (UK); van Drie Group (Neths);  
Maple Leaf Foods - DNA traceability for  
pork

# Private Sector Industry-wide Initiatives

- Canadian Cattle Identification Agency cattle identification program
- Partial traceability:  
packing plant to farm of origin
- Facilitates **traceback** of cattle in the event of a food safety or herd health problem
- USA: exploring a national animal identification system. Liability & privacy issues

# Regulatory Initiatives

- EU Beef Labelling Regulation (EC 1760/2000)
  - ❖ Compulsory beef labelling and traceability system including cattle ID, beef product labelling (traceability number)
- EU General Food Traceability Regulation (EC/178/2002)
  - ❖ Food and feed
  - ❖ Identify immediate suppliers & customers
  - ❖ Member states must implement
- EU GMO Traceability & Labelling Regulation

# Functions of a Traceability System

## 1) Reactive function

- ❖ allows traceback of food products, animals, ingredients, in the event of a food safety problem
- ❖ cost & risk reduction (private & social costs)
- ❖ protects firms who practice due diligence from free riders
- ❖ But no additional information for consumers
- ➔ most livestock traceability systems

# Functions of a Traceability System

## **2) Enhance the effectiveness of Tort Liability law as an incentive for firms to produce safe (high quality) food**

- ❖ incentive: civil legal penalties & loss of reputation
- ❖ reduces monitoring and enforcement costs for consumers and downstream food firms

# Functions of a Traceability System

## **3) Reduce information costs for consumers**

- ❖ labelling the presence of credence attributes  
e.g. animal welfare, environmentally-friendly,  
feeding method, food safety . . .
- ❖ proactive information provision and quality  
verification
- ➔ reduce consumer information asymmetry with  
respect to credence attributes

# The Challenge

- Transform credence attributes into search attributes through identification & labelling
- This requires **ex ante** provision of information on process attributes
- More than just ‘traceability’
- Most existing regulatory or industry-wide traceability initiatives facilitate traceback, rather than providing quality verification on credence attributes

# What Do Consumers Really Want?

- Researching consumers' willingness-to-pay for traceability, food safety and on-farm production assurances in meat
- Canadian study - 2002 (similar analysis conducted in UK, USA and Japan)
- Experimental auction: combines stated preference methodology with revealed preference bidding behaviour.

# Experiment Design

- Subjects given a light lunch, including beef (ham) sandwich, and payment for participation (\$20)
- Complete a short survey (after the auction)
- Bid to **exchange** their sandwich for a sandwich with additional verifiable characteristics

## 4 'Auction' Sandwiches

- 1) An extra assurance of **humane animal treatment**
- 2) An extra assurance regarding **food safety** standards over and above the industry norm
- 3) Meat that was **traceable** to the farm of origin
- 4) Meat traceable to the farm of origin, with an extra assurance of humane animal treatment and an extra assurance of food safety

# Canadian Experiments

- Saskatchewan & Ontario (2002)
- 204 respondents (104 beef, 100 pork)
- Groups of 12-14
- Range of demographics
  - ❖ Saskatchewan: faculty, professional staff, students, maintenance staff
  - ❖ Ontario: subjects recruited from consumer research company database

# Bidding

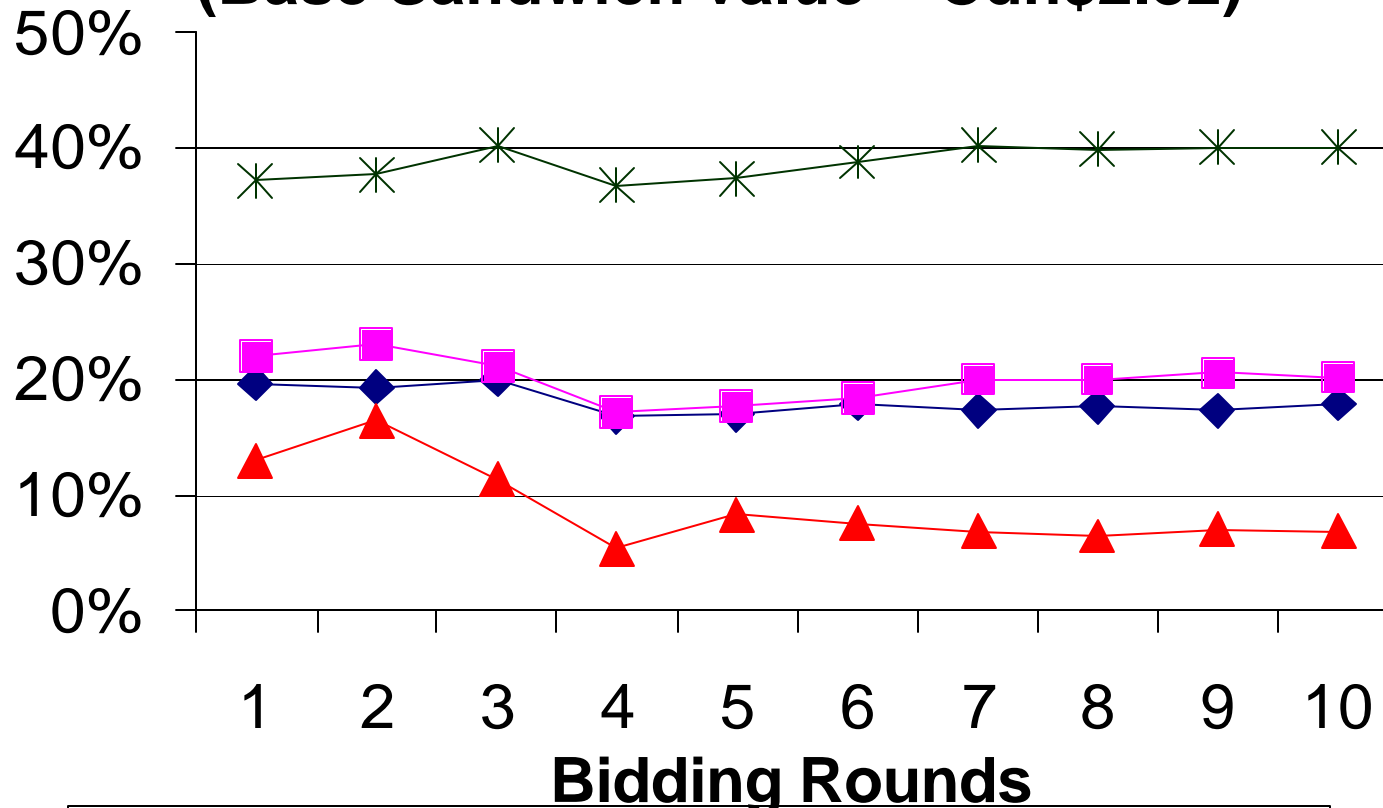
- Vickrey 2nd price auction
- 10 rounds of bidding for each sandwich
- Sealed-bid
- One sandwich and one round randomly selected at the end as the binding round/sandwich
- Only one sandwich is 'auctioned' off
- Auction 'winner' exchanges sandwich and **pays the exchange price**
- Everyone eats their sandwich!

# Average WTP Bids - BEEF (Canada)

N=104

(Base Sandwich value = Cdn\$2.82)

Marginal bids as % of  
base sandwich value

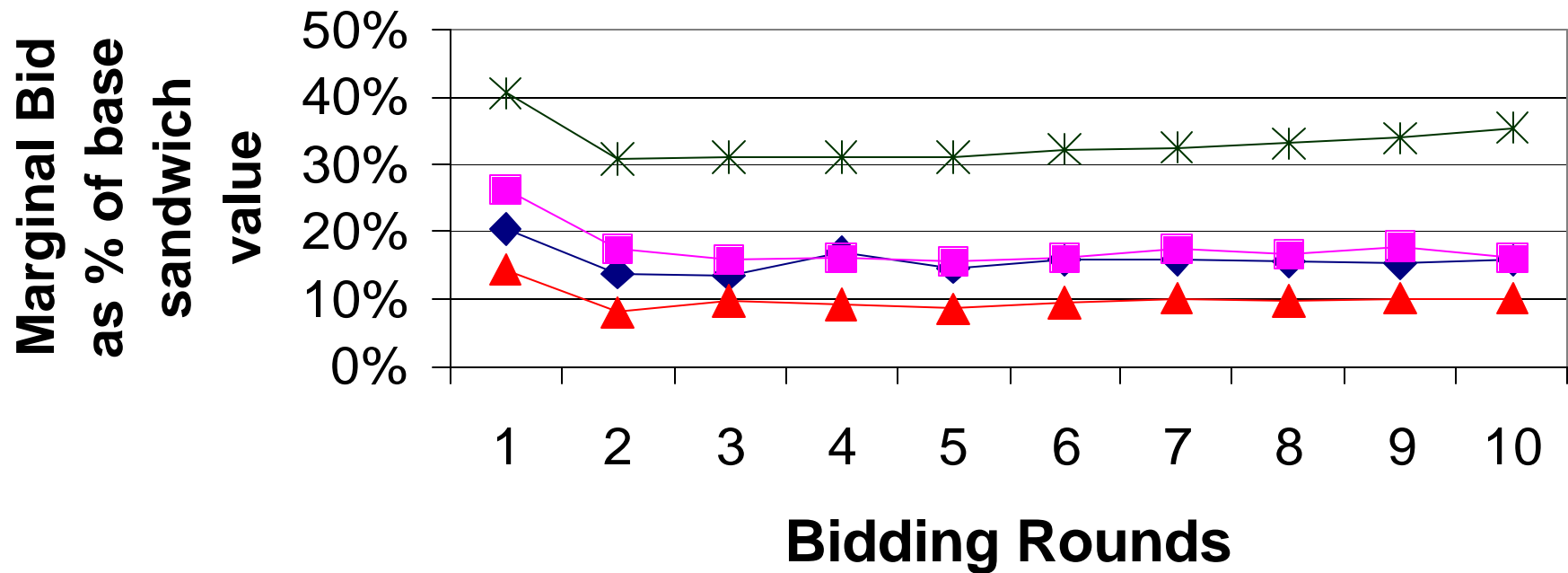


- ◆— animal treatment
- food safety
- ▲— traceability
- \*— all attributes

# Average WTP Bids - PORK (Canada)

N=100

(Base sandwich value = Cdn\$2.85)



- ◆ animal treatment
- food safety
- ▲ traceability
- \* all attributes

# Summary of Regression Results

- Statistically significant differences in bids on the four sandwiches (stronger results for beef than pork)
- Those that said they valued information on food safety, production methods and traceability tended to follow through with higher bids
- Age, education, income, gender did not affect bids
- Previous exposure to media articles about food safety tended to reduce bids for the beef sandwiches (unexpected). (Reassured consumers? or made them fatalistic?)

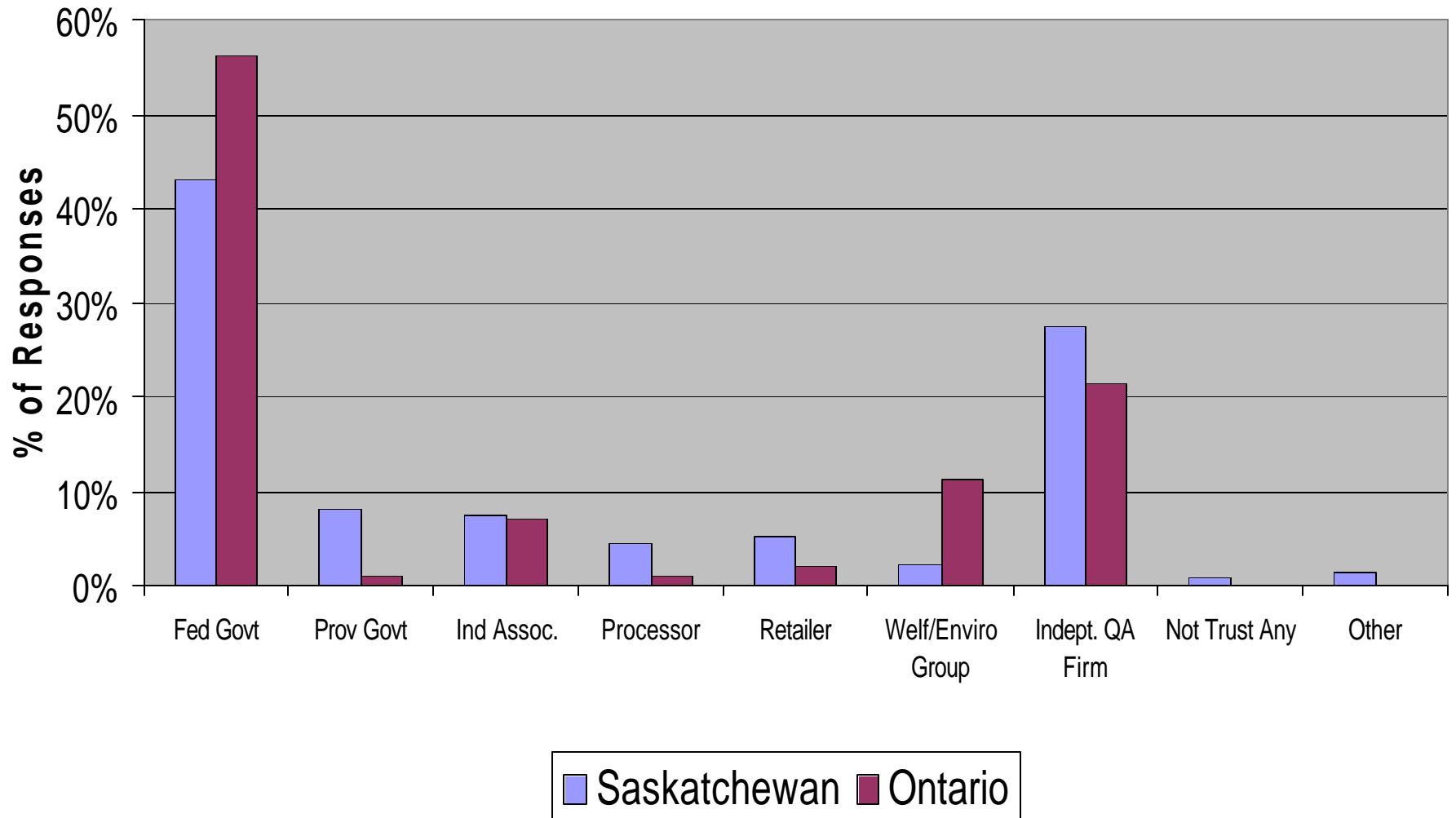
# What do we really mean by 'Traceability'

- “Traceability” by itself may not deliver much value to **most** consumers
- Most people want to know their food is safe before they eat it!
- Quality assurances with respect to specific credence attributes, bundled with traceability, have more appeal
- Traceability may be a necessary but not sufficient condition for verification of quality attributes

# Who do Consumers trust?

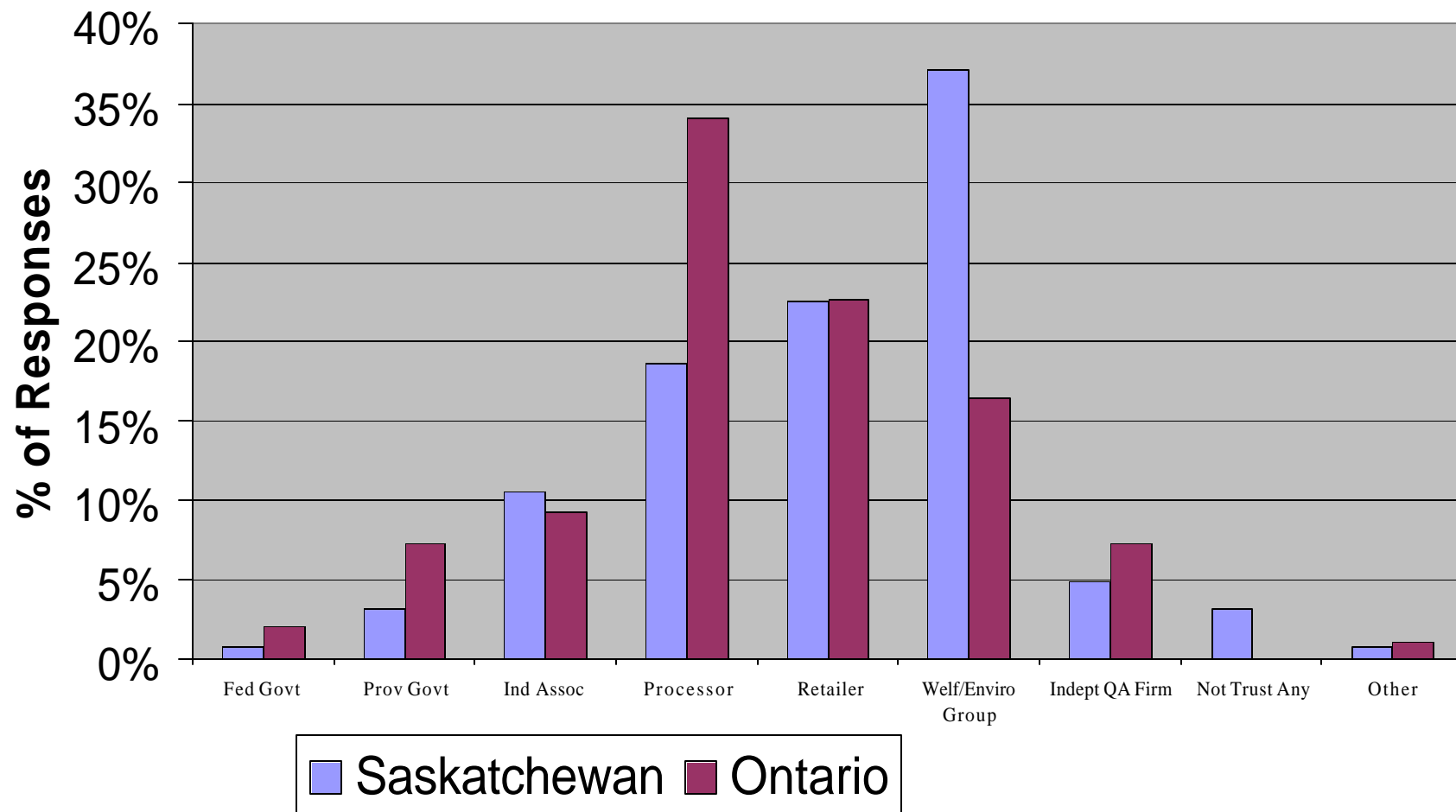
- Public sector?
- Private sector?

# Sources MOST trusted to provide information about production practices Comparison of Saskatchewan & Ontario



# Sources LEAST trusted to provide information about production practices

## Comparison of Saskatchewan & Ontario



# Other Research Questions

- Whose role is it to deliver traceability and/or quality assurances?
- Impact of future technologies on traceability and consumer demand (e.g. DNA techn.)?
- Do/would consumers use traceability information (read labels, swipe bar-codes)?
- Supply chain costs of delivery traceability and QA relative to WTP
- Implications of BSE for traceability & consumer perceptions?

# Finally . . . Traceability and BSE

- Canadian Cattle ID system offers partial traceability in the beef supply chain (packer-producer)
- Achilles Heel: only records farm of origin and place of slaughter
- Facilitates (to some extent) traceback, cost & risk reduction (1st function)
- A future vehicle for piggy-backing quality assurances? (3rd function)
- Quality assurances & branded beef programs - strategy to help industry recover - deliver value to consumers