



USING BEST-WORST SCALING TO DETERMINE MARKET CHANNEL CHOICE BY SMALL FARMERS IN INDONESIA

Wendy Umberger, Sahara & Randy Stringer

School of Agriculture, Food and Wine

University of Adelaide, Australia

AARES 2011

Melbourne, VIC

9-11 February



Background

- Widespread coordination issues for high value fruit and vegetable (HVFV) chain participants
- Smallholder participation in emerging HVFV market channels?
 - Opportunities to reduce transaction costs
 - Payment delays for delivered products
 - Difficulty accessing quality inputs and services in timely manner
 - High search costs for buyers and sellers
 - Missing credit markets
 - Weak market access
 - Difficulties meeting quality and safety standards
 - Buyers must form “relationships” with buyers/traders?

Objectives

- What is important to Indonesian Chili producers when considering a market channel?
- What buyer/trader “attributes” can strengthen the buyer-seller relationship?
- Specifically we:
 1. Estimate the relative importance of buyer characteristics
 2. Determine if producers are heterogeneous in their preferences
 3. Understand the unique characteristics of producers with different preferences



Sampling and Data

- Survey of 602 chili farmers in West Java, Indonesia conducted in 2010
 - ▣ Largest Chili producing zone
 - ▣ Traders selling to wholesale markets, supermarkets and processors
- Systemic random sampling based on average chili production in 2004-2008
 - ▣ 489 households representative of 'traditional chili producers'
- 113 households selling into a supermarket channel
- Questionnaire assessed
 - ▣ household characteristics, assets, agricultural land, chilli production, input costs, chilli marketing, changes in chilli production and marketing arrangement, perceptions and experiences with modern channels, cash income activities
- Unique Best-Worst Scaling Experiment

Why BW Scaling?

- Respondents make trade-offs among sets of attributes

- Issues with other methods (e.g. rating and ranking):
 - ▣ Indistinguishable measures of importance among attributes
 - ▣ Biased estimates due to gender or cultural background

- Best-worst:
 - ▣ Efficient elicitation of relative importance of attributes
 - ▣ More discriminating estimates
 - ▣ Determine both MOST & LEAST important attributes

Auger et al., 2007; Cohen, 2009; Jaeger et al., 2008; Lusk and Briggeman, 2009; Mueller and Rungie, 2009; Mueller et al., 2010

11 Buyer Characteristics Considered

“We would now like to ask you 11 questions regarding the importance of several buyers/trader characteristics/attributes that might be important to you when choosing who you sell your potatoes to.”

The buyer characteristics that we would like you to consider are explained below:

- 1) Price per Kg
- 2) Pays cash immediately
- 3) Opportunity for price premiums
- 4) Willing to negotiate or match another buyer's price
- 5) Shares information about market conditions (e.g price, demand, supply)
- 6) Access to certified potato seed
- 7) Credit or access for input purchases
- 8) Provides money for loan
- 9) Technical Assistance
- 10) Always follows through on their commitments to buy my product
- 11) Established relationship

Example of 1 of 11 BW Sets

QUESTION A

For each of the following questions (A-K), check only one attribute as the **MOST important** (left hand side) and also check only one attribute as the **LEAST important** (right hand side).

- A. Considering the five characteristics presented below, please tick one box in the left column to indicate the characteristic that is **MOST important** to you and please tick one box in the right column to indicate the characteristic that is **LEAST important** to you. Please tick only one box per column.

Question A

Most Important (tick one box)	Of these buyer characteristics, which are the Most and Least important to you...	Least important (tick one box)
<input type="checkbox"/>	Price per Kg	<input type="checkbox"/>
<input type="checkbox"/>	Credit or access for input purchases	<input type="checkbox"/>
<input type="checkbox"/>	Provides money for loan	<input type="checkbox"/>
<input type="checkbox"/>	Shares information about market conditions	<input type="checkbox"/>
<input type="checkbox"/>	Access to certified potato seed	<input type="checkbox"/>

Analysis: Aggregate and Individual

- Aggregate Analysis

- Explore for heterogeneity?

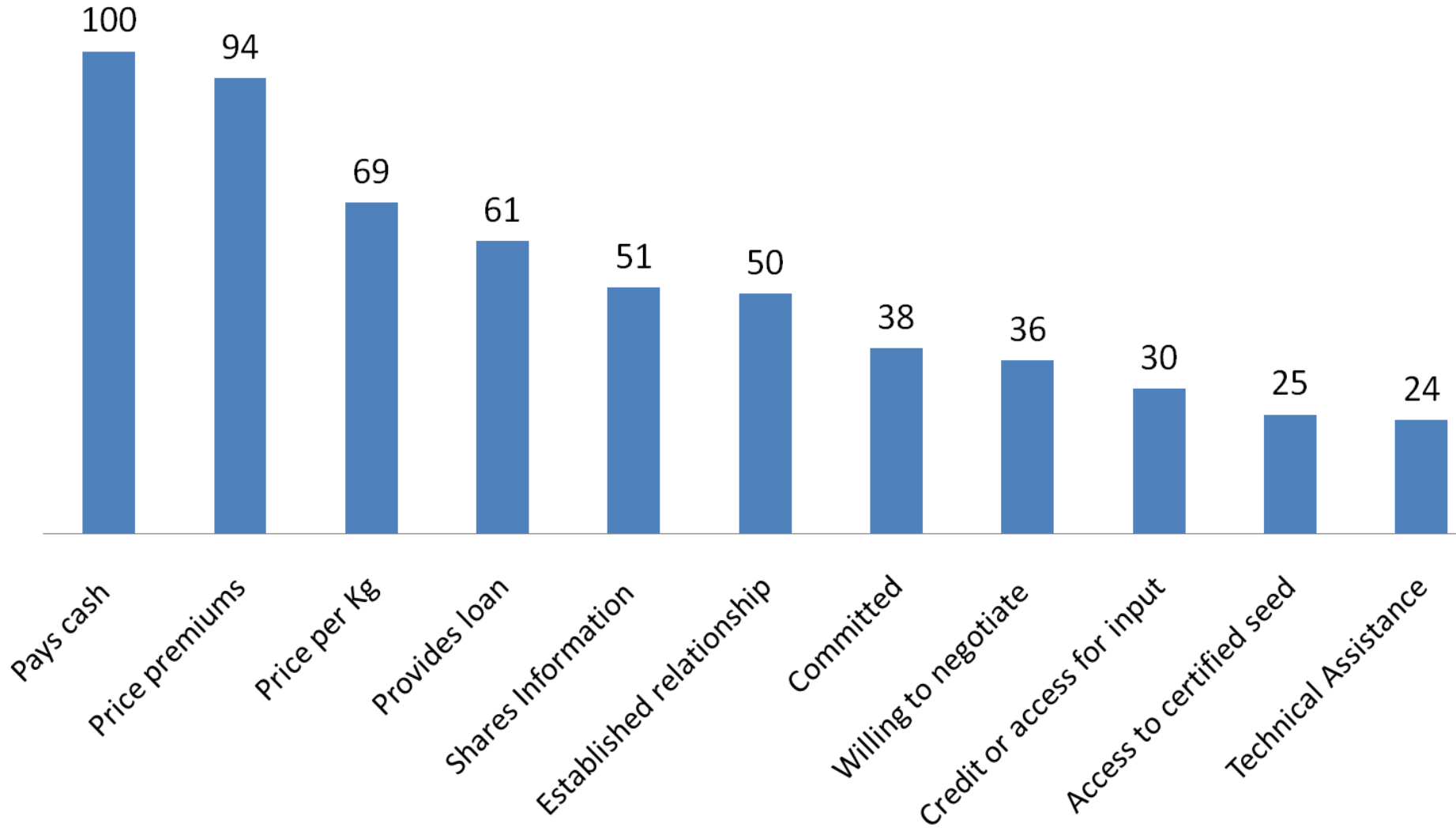
- Latent Class Cluster Analysis using Latent GOLD
 - ▣ a single nominal latent variable x ,
 - ▣ T response variables y_{it} (indicators) that can be nominal, ordinal, continuous, and/or counts,
 - ▣ R numeric or nominal covariates z_{ir}^{cov} affecting x ,
 - ▣ direct relationships between indicators and/or direct effects of covariates on indicators.

$$f(y_i | z_i^{cov}) = \sum_{x=1}^K P(x | z_i^{cov}) \prod_{t=1}^T f(y_{it} | x).$$

Aggregate Sample Results

	Best	Worst	B-W	SQRT (B/W)	Stand. Int. Scale	Rank
Pays cash immediately	1189	269	920	2.10	100.0	1
Price per Kg	804	386	418	1.44	68.6	3
Price premiums	906	230	676	1.98	94.4	2
Willing to negotiate	422	740	-318	0.76	35.9	8
Shares Information about market	566	492	74	1.07	51.0	5
Access to certified seed	239	885	-646	0.52	24.7	10
Credit or access for input purchases	354	881	-527	0.63	30.2	9
Provides loan	939	577	362	1.28	60.7	4
Technical Assistance	265	1072	-807	0.50	23.6	11
Follows through on commitments	368	562	-194	0.81	38.5	7
Established relationship	482	440	42	1.05	49.8	6

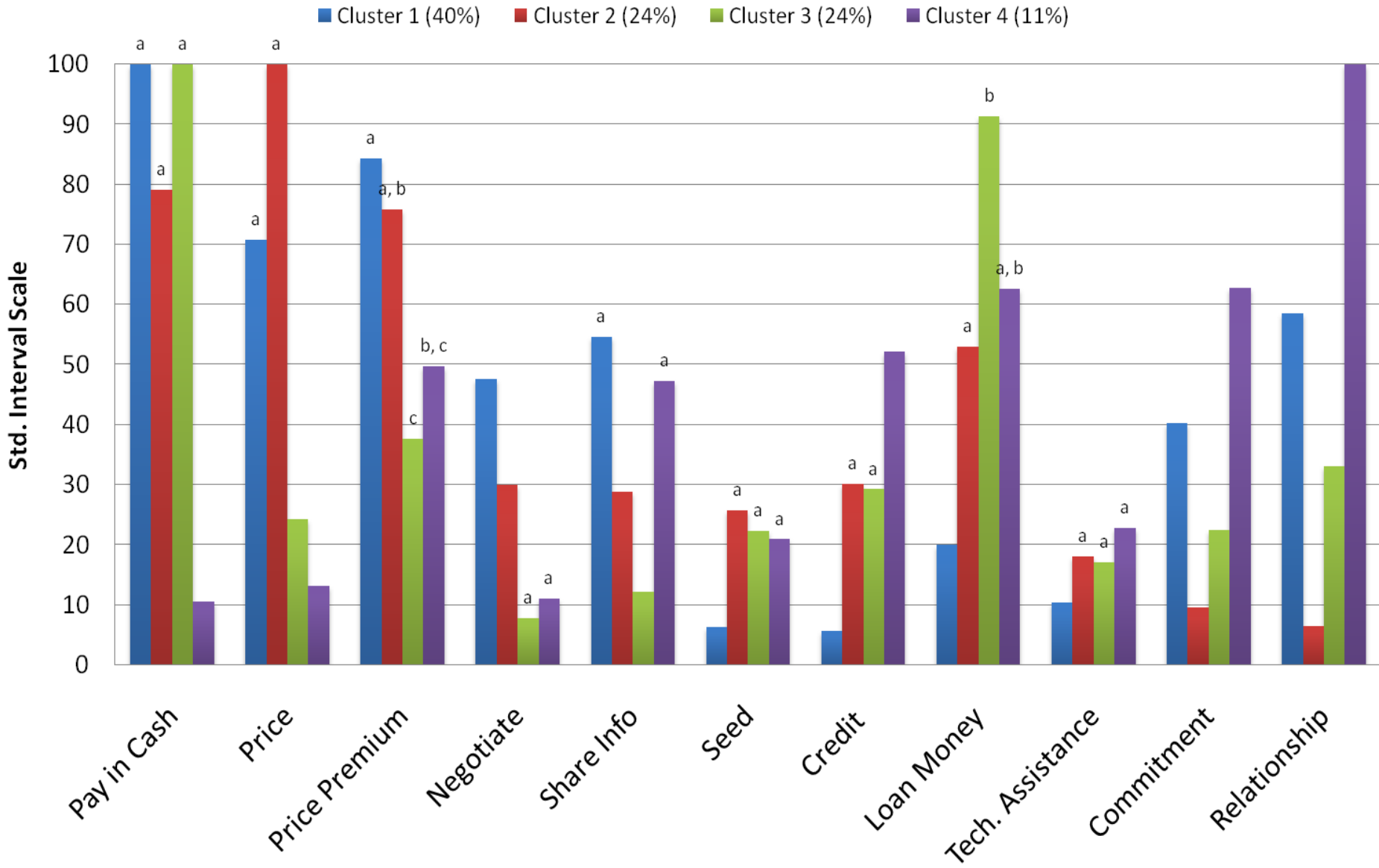
Relative Importance Based on Interval Scale



Relative Importance of Attributes by 4 Clusters/ Segments

	Cash & Price Relationship (40%)	Price, Cash, Loan (24%)	Cash & Loan (24%)	Relationship Commitment & Loan (11%)
Pay in Cash	100.0	79.2	100.0	10.5
Price	70.8	100.0	24.2	13.1
Price Premium	84.3	75.8	37.7	49.7
Negotiate	47.5	29.9	7.7	11.0
Share Info	54.7	28.8	12.2	47.3
Seed	6.3	25.7	22.3	20.9
Credit	5.6	30.2	29.2	52.2
Loan Money	19.9	53.0	91.3	62.6
Tech. Assistance	10.4	18.0	17.1	22.8
Commitment	40.2	9.5	22.5	62.8
Relationship	58.5	6.5	33.0	100.0

Std. Interval Scales for 11 Attributes by 4 Clusters



Note: For each attribute, clusters with the same letter have statistically equal BW values ($\alpha = 0.05$) as determined by Tukey's HSD

Cluster 1 (40%): Cash and Price Negotiators

Most: Cash payment, premium price and price

Least: Access to Credit, Access to seed, Tech. Assistance, Loan for finance or inputs

- Negotiation & Sharing Information more important than others & Relationships more than Clusters 2 & 3
- Characteristics:
 - ▣ Highest Household Income, average age and education, experience
 - ▣ Higher Costs per Hectare
 - ▣ Higher Share of land irrigated
 - ▣ Promiscuous in terms of buyers - 26% had one buyer in last 5 years
 - ▣ Highest share getting information from other farmers
 - ▣ Highest Share sorting
 - ▣ Only 17% sell chillis that end up in modern channel
 - ▣ Higher % know they sold to modern

Cluster 2 (24%): Uncommitted, Price-driven, Diversified

Most: Price, Cash and Price Premium, Loan

Least: Relationship and Commitment lowest of any group

□ Characteristics

- Most experienced
- Higher household incomes
- Highest motorbike ownership
- Most livestock
- Lower Costs per hectare
- Lowest share using herbicides or fertilizer
- Promiscuous in terms of buyers - 26% had one buyer in last 5 years
- Only 10% sell chillis that end up in modern channel

Cluster 3 (24%): Income Constrained, Traditionalists

Most: Cash and Loan to purchase inputs

Least: Share Information, Negotiate on price

- Relationships of relatively high importance compared to other attributes
- Characteristics:
 - Older, more experienced
 - Least educated
 - Lowest household income
 - Lowest costs per hectare
 - Highest share getting information through extension (52%)
 - Highest (41%) using more fertilizer and fungicide
 - Higher Investment in Spraying
 - Highest Share removing debris
 - 70% had one buyer
 - Larger share (24%) sell chillis that end up in modern channel

Cluster 4 (11%): Inexperienced, Innovators & Relationship Seekers

Most: Relationship, Commitment and Credit higher than other segments,
Least: Cash, Price and Negotiation

□ Characteristics:

- Youngest, least experience, most educated
- Highest number of children living in household
- Lowest income per person living in the home
- Fewest head livestock, lowest share owning a motorbike
- Highest costs per hectare
- Highest share land irrigated
- Highest share (19%) invested in storage and spraying equipment (56%)
- Highest share (33%) participating in Farmers Groups and receiving production and price information
- Highest share (30%) get production information from trader
- 90% only 1 buyer in last year, 73% only 1 buyer in 5 years
- Largest share (28%) sell chillis that end up in modern channel

Summary & Conclusions

- A buyer who can provide cash when chillis are delivered and/or a small premium may immediately form a stronger relationship with producers
- Heterogeneity among producers
 - ▣ Socio-demographics help explain some of the differences in utility for buyer characteristics
- Producers more likely to be committed to one buyer place higher importance on
 - ▣ Buyer providing loans and credit/access to inputs
 - ▣ Long-term relationship

A decorative horizontal bar at the top of the slide, consisting of a red rectangular section on the left and a blue rectangular section on the right.

Thank You!

Questions?

Please contact:

wendy.umberger@adelaide.edu.au