Valuing Attributes of Planting Material and Products

Approaches

The implicit value of the attributes of either planting material or products can be derived through

- Revealed preference approaches
  - hedonic models, with market or farmgate prices
- Stated preference approaches
  - conjoint analysis or attributed-based choice experiments, with hypothetical situations
- Each has pros and cons
- Combining them is feasible
- The value of related Information can be estimated

Theoretical foundations

- Lancaster theory of consumer choice
  - consumers derive utility from the attributes of goods rather than the goods
  - farmers consume planting material as a production input
- Models of input and output characteristics
- Market and transport economics
- Environmental economics
  - valuing non-market goods

Hedonic analysis

- Identify market chain and actors, and the attributes of planting material or products that are important to them
- Choose point(s) of analysis in the market chain
- Record prices paid at purchase, observable and unobservable attributes of the material or products, accounting for seasonal variation
- Estimate implicit payment for attributes with a multivariate regression method

Choice Experiments

- Identify the non-market good, the attributes, and levels of attributes (limited in number)
- Identify a hypothetical price or surrogate variable that can be related to a price
- Generate all possible combinations of attribute levels, eliminating those not respecting orthogonality
- Construct 6 choice sets of 3 alternatives (one of which is the status quo)
- Select survey instrument (e.g. photos, menus)
- Estimate marginal willingness to pay from conditional logit regression, testing for consistency with utility theory

Pros and cons

- Hedonic methods rely on observed prices and the quality of price information
- Experimental methods rely on hypothetical situations and have associated biases
- Both have measurement error
- Combining them might strengthen reliability of results and inferences
- How reliably can either depict response to change? Aren't both estimates static?

Recent Examples: Household hedonic model

- Dalton (2004) derives a hedonic model formulation based on the model of the agricultural household
- tests for the statistical relevance of consumption attributes
- uses experimental data for rice in West Africa
- concludes that rice breeders should consider post-harvest attributes in addition to production traits

Recent Examples: Household hedonic model

$$p_m = \sum_{z=1} \bar{p}_z^p q_z^p + \sum_{z=1} \bar{p}_z^c q_z^c$$

- market price of rice
- implicit prices and levels of production attributes
- implicit prices and levels of consumption attributes

Recent Examples: Farmgate hedonic model

- Edmeades (2005) uses the farmgate price to estimate marginal values of banana attributes at point of sale, including transactions costs
- explains variation in marginal values of attributes with attribute levels of varieties grown by farmers, household and individual characteristics
- uses household survey data for bananas in Uganda
- note that this is feasible because the variety identity is known at point of sale

Recent Examples: Biodiversity choice experiment

- Birol (2004) estimates farmers' marginal willingness to accept compensation for four components of agrobiodiversity in Hungarian home gardens
- explains the heterogeneity of preferences with farmer, household, and site characteristics
- relates farmers' valuation of agrobiodiversity components to economic development, based on settlement characteristics
- uses survey data, stated preferences and secondary data

Assuming that the following gardens were the ONLY choices you have, which one would you prefer to cultivate? (check one)

Garden Characteristics	Garden A	Garden B	Neither Garden A nor Garden B: I will NOT cultivate a home garden
Total number of crops grown in the home garden	25	20	
Home garden is combined with livestock production	Yes	Yes	
Home garden crops produced entirely with organic methods	No	No	
Home garden has an ancestral crop variety	No	Yes	
Expected proportion (in %) of annual household food consumption met through food production in home garden	45	75	

WTA compensation values by household prototype and site (in € per household per annum, 2002 prices)

Region and Attribute	Prototype1	Prototype 2	Prototype 3
Dévaványa			
Crop variety diversity	+405	+408	+429
Landrace	-19	-128	-71
Agro-diversity	-346	-391	-367
Organic production	-338	-107	-230
Őrség-Vend			
Crop variety diversity	-116	-92	-103
Landrace	-55	-137	-99
Agro-diversity	-103	-88	-95
Organic production	-133	-39	-109
Szatmár-Bereg			
Crop variety diversity	-134	-136	-286
Landrace	-127	-138	-17
Agro-diversity	-64	-201	-530
Organic production	-42	-43	-89

Recent Examples: Value of information

- Horna (2005) uses conjoint utility to estimate the structure of farmer preferences for rice seed, introducing information variables as extension activities
- elicits farmer willingness to pay for rice varieties with contingent valuation
- derives willingness to pay for seed-related information using indirect utility function
- Uses survey and experimental data

Willingness to pay for seed-related information

WTP (US$)	Nigeria			Benin		All Respondents
	Kogi	Ogun	Ebonyi	Dassa	Glazoue	
On-farm experience	0,663*	0,273*	0,081*	-0,019	0,090*	0,126*
Field day experience	-0,030	-0,001	-0,026	-0,008	-0,019	-0,039

Horna concludes that farmers are willing to pay only for the information gained through on-farm trials; the amounts are low, indicating limited incentives for private provision of extension services

Other Example: Paired comparisons

- Most of these models are based on Luce and McFadden, and the assumption of IIA, which is often violated in empirical work
- Tversky proposed a family of models for paired comparison in which this model, as well as others such as elimination by aspects and hierarchical models, are nested
- A Matlab function has been developed to enable the specification, testing, and comparison of nested models as special cases of the general model (Wickelmaier and Schmid)