Developing country consumers' demand for food safety and quality:

Is Mumbai ready for certified and organic fruits?

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INTRODUCTION

India is a rapidly growing and dynamic economy characterised by increasing incomes and changing consumer preferences. During the past decade there has been a 16 percent increase in the numbers of urban upper and middle class households, whose discretionary spending has risen by as much as 20 percent (Ernst and Young, 2006). With increased incomes and rapid urbanization, consumer preferences are also changing, as consumers prefer higher quality consumption goods, and they are willing to pay higher prices for these (Ernst and Young, 2006). Since food products are normal goods, it is expected that consumers' demand for food attributes, such as food safety and quality, will also increase with increasing incomes.

The aim of this paper is to investigate whether or not middle class consumers in the wealthiest city of India (Mumbai) are willing to pay a price premium for safer and higher quality food. The results of this study are expected to inform not only (aspiring) producers of higher quality and safer foodstuff who could reap substantial profits from this emerging market, but also the public sector in the revisions of the archaic food safety and quality regulations. In fact, one of the main reasons the *de jure* food safety regulations have been poorly applied is the lack of awareness among the policy makers with regards to the demand for food safety in the marketplace.

Several studies have investigated consumers' demands, commonly measured in terms of willingness to pay (WTP) a higher price premium, for higher levels of food safety and quality. The majority of these studies have been carried out in developed countries, including, but not limited to Australia, Canada, France, Finland, Germany, Greece, Italy, Norway, Sweden, UK and USA. These studies investigate a wide array of food safety and quality issues such as consumers' WTP to avoid some perceived food risks (e.g, genetically modified foods, mad-cow disease, growth hormones, general health risks from food-borne illnesses, chemical use) and their WTP for better quality (e.g., better taste and appearance, as well as more nutritious food (e.g., omega 3 in eggs)), as well as their WTP for some ethical and/or environmental causes (e.g., local production, animal welfare, fair trade).

In addition some of these studies also investigated consumers' WTP for various food certification/labelling schemes, such as those for quality, country/region of origin, organic or free range production. These studies were undertaken for a variety of food products, such as meat (poultry, beef, sausages), eggs, milk, olive oil, fruits and vegetables, grains, bread and wine to name a few. Various stated and revealed preference methods were used for their implementation, including the choice experiment (CE) method, contingent valuation method and hedonic pricing method (see for example, Burton et al., 2001; Loureiro et al., 2002; Lusk et al, 2003; Enneking, 2004; Scarpa and Del Giudica, 2004; Carlsson et al., 2005; Owen et al., 2005; Rigby and Burton, 2005; Scarpa et al., 2005; Lagerkvist et al., 2006; Loureiro et al., 2006; Loureiro and Umberger, 2006; Carlsson et al., 2007; Goldberg and Roosen, 2007; Annett et al., 2008). In general, the findings of these studies reveal that consumers in developed countries are willing to pay higher prices for safer and higher quality food, though the price premium for these

varies depending on several factors such as consumers' income, education and food safety awareness levels, to name a few.

The number of studies which investigate developing country consumers' valuation of safer and higher quality food is scarce, though there are a couple of recent noteworthy studies that have tackled this issue. One example is the contingent valuation study by Krishna and Qaim (2008) estimating urban consumers' attitudes towards a genetically modified (GM) vegetable, namely eggplant, and pesticide residues in India. Another example is that of Ehmke et al. (2008) which employ the CE method to estimate preferences of developed (France and USA) and developing country (China and Niger) consumers for country of origin labelling, GM trait and pesticide residues in onions. This paper aims to add to this scant literature on the valuation of food attributes in developing countries.

In the study presented in this paper, the foodstuff of focus is grapes, a common fruit consumed during the season in which the study was implemented. Grapes were chosen to assess consumers' preferences for food safety and quality since they represent a category of fresh products which are consumed raw, and hence might entail potentially high food safety risks in case of contamination. Moreover, since grapes are generally eaten on their own (rather than with other foodstuff and/or condiments) quality issues (such as taste) are very important.

The most important food safety and quality attributes related to grapes were identified through consultations with producers, consumers and retailers in the fruit sub-sector. These attributes included the price of one kilogram of grapes; the taste (sweetness) of the fruit; whether or not the grapes have GlobalGAP certification ensuring food safety; whether or not the produce comes directly from the farmers, and the level of pesticide/fertilizer used, i.e., whether the product is organically, semi-organically or non-organically produced.

The CE method was employed to estimate consumers' preferences for these food safety and quality attributes and their implied ranking, in order to be able to inform efficient and effective provision of safer and higher quality food. Data were collected from 914 food consumers in two stores of a supermarket chain. The stores were selected to generate contrast in terms of the income and other social and economic characteristics of the consumers. Econometric analysis was conducted on the pooled and store level data using the conditional logit model and conditional logit model interacting choice attributes with social, economic, demographic and food consumption characteristics of the consumers.

Overall, the findings reveal that consumers prefer those grapes that are certified, organic, sweeter in taste and are directly sourced from the farmer. The ranking of these attributes change depending on the store. The price attribute, however, is insignificant, revealing that the price changes embedded in the choices offered to consumers were insufficiently large to influence choice. These findings have market/private sector level implications for linking farmers that already produce safer food for export markets to domestic markets, as well as public sector level policy implications for revision of food safety related policies in India.

The rest of the paper unfolds as follows. The next section the CE design, survey administration and the characteristics of the study sites and consumers surveyed. The following section presents the econometric results of the CE and the final section concludes the paper and draws policy implications for food safety in India.

CHOICE EXPERIMENT DESIGN, ADMINISTRATION AND DATA

Choice sets

The most important grape attributes and their levels were identified following a thorough inspection of the grape varieties that are currently being sold in the supermarkets and by street vendors in India; discussions with grape producers, and focus group discussions with consumers in Mumbai. The selected attributes and the levels they encompass are reported in Table 1.

Table 1. Grape attributes and attribute levels used in the CE

Grape variety attribute	Attribute definition	Attribute levels
Taste	Level of sweetness of the grape at the time of purchase.	very sweet, sweet and not so sweet
Production method	Most grapes sold in India are produced non-organically, which means synthetic fertilizers and pesticides and other chemicals were used in their production. It is however possible to produce grapes organically. Organic production totally excludes the use of synthetic fertilizers and pesticides and plant growth regulators. Organic production relies on crop rotation and integrated pest management to maintain soil productivity and control pests. There is a possibility of producing grapes semi-organically. Semi organic production means, similarly to organic production no synthetic inputs are used, however the farm is in a three year transition phase from non-organic to organic production, therefore residues of chemicals could be found in the fruits.	Organic production, Semi-organic production, and Non-organic production
GlobalGAP certification	Currently grapes sold in India are not certified to ensure their safety and quality. However it is possible to certify grapes with GlobalGAP certification. This is a Global certification which implies Good Agricultural Practices (GAP). A GlobalGAP certificate ensures that (i) the produce is easily traceable to the farms where they were produced, (ii) application of fertilizers in excess of international best practice is not permitted, (iii) use of sewage as manure is not permitted, (iv) untreated sewage water can never be used for irrigation, (v) stringent minimum pesticide residue limits are adhered to and (vi) production and packaging environment are hygienic.	Certified vs. non- certified
Source of produce	Some grapes come directly from the farmer to the supermarket. Whereas some grapes go through several hands before they reach you.	Direct from the farmer vs. Not direct from the farmer

Price	Price of one Kg of grapes in Rupees	Rs 30 to Rs 40, Rs 50, Rs 60 to Rs 70.

Sweetness of fruits in general and grapes in particular is an attribute commonly known to be valued by Indian consumers and is thought to be a significant determinant of choice in any fruit. Both the production method (organic, semi-organic or non-organic) and GlobalGAP certification attributes are related to food safety, though the latter also encompasses traits not directly related to food safety, such as requirements to pay fair wages and ethical treatment of labour. In terms of food safety, organic standard is more stringent than GlobalGAP certification for on farm practices, however the latter is a farm to fork standard where on farm restrictions on chemical residues are specified in Maximum Residue Limits (MRL) terms. GlobalGAP certification in addition includes restrictions on packaging materials, hygiene standards in storage and packing facilities and also standards in transportation of grapes.

GlobalGAP certification in effect is a bundle of attributes itself that is coalesced into an attribute. By the same token organic is also a bundle of attributes though of a smaller set as it is specified only for on farm practices. Each of these sub-attributes might then have an independent value to the consumers. Some consumers for example might be aware of high levels of contamination in off farm practices and consequently associate higher food safety with GlobalGAP. Similarly, some consumers might be more wary of pesticide residues and hence put a higher premium on organic food. Hence whether the overall standard of food safety under GlobalGAP certification is higher or lower vis-à-vis organic is likely to be subject specific. Therefore specific care was taken when describing these two attributes and enumerators interacted with the respondents to ensure a uniform understanding of each attribute.

The source of produce attribute is expected to capture two aspects. First, receiving the fruit directly from the farmer is a proxy for comparatively high levels of freshness. The Indian supply chains are notorious for being long and hence time consuming. In a country with limited use of refrigeration and also a low opportunity cost of time, and hence higher shopping frequency, freshness is a highly valued attribute in food. Second, in these long supply chains it is found that the smaller the chain the fairer the price the farmer receives. Therefore this attribute could also capture urban consumers' altruistic values.

A large number of unique grape descriptions can be constructed from this number of attributes and levels. Statistical design methods (see Louviere et al., 2000) were used to structure the presentation of the levels of the five attributes in choice sets. An orthogonalisation procedure was used to recover only the main effects. Twenty-four pair-wise comparisons of grape profiles were randomly blocked into four different versions, each with six choice sets. Each consumer was presented with a version of the six choice sets, each of which contains two grape profiles and the decision to "opt out" by selecting neither of the grape profiles presented to them. This option can be considered as a status quo or baseline alternative, whose inclusion in the choice set is instrumental to achieving welfare measures that are consistent with demand theory (Louviere et al., 2000; Bennett and Blamey, 2001; Bateman et al., 2003). An example of a choice set is given in Figure 1.

Figure 1. Example of a choice set

ASSUMING THAT THE FOLLOWING TWO GRAPES WERE THE ONLY CHOICES YOU HAVE, WHICH ONE WOULD YOU PREFER TO BUY?

GRAPE CHARACTERISTICS	GRAPE A	GRAPE B	
TASTE	Very sweet	Not so sweet	I LIKE NEITHER GRAPE A NOR GRAPE B: GIVEN THESE TWO OPTIONS, I WILL **NOT** PURCHASE GRAPES IN THIS SUPERMARKET VISIT
PRODUCTION METHOD	Organic	Non-organic	
GLOBALGAP CERTIFICATION	Certified	Not certified	
SOURCE OF PRODUCE	Not direct from the farmer	Direct from the farmer	
PRICE PER KG	Rs. 40	Rs. 30	
I PREFER TO BUY	***GRAPE A……***	***GRAPE B……..***	***NEITHER……***

Study Sites

The CE survey was undertaken in March 2008 with face-to-face interviews in two stores of Apna Bazaar, a supermarket chain. Even though there are a handful of supermarket chains in India, of which Apna Bazaar appeals to the middle class, supermarkets and hypermarkets are still very uncommon, with an estimated four percent market share. The two Apna Bazaar stores selected were located in the suburbs of Andheri and Charkop neighbourhoods in Mumbai. Relatively the store located in Andheri is higher end in terms of the in store infrastructure (air conditioning, refrigeration and computerized billing). This is in line with Andheri being a comparatively wealthy neighbourhood than Charkop. The two stores are likely to differ also in terms of their clientele because of the differences in the profiles of customers in terms of their incomes and hence in terms of its covariates such as levels of education. These two stores therefore provide

variations in consumer characteristics, such as income, education and related attitudes and perceptions, which may explain consumers' preferences for higher food quality and safety.

The survey instrument consisted of three components. In the first part the CE was implemented. This part consisted of an introductory section that explained the context in which choices were to be made and carefully described each attribute to ensure uniformity in comprehension of the attributes and their levels. Respondents were reminded that there were no right or wrong answers and that we were only interested in their opinions. This was followed by a series of questions aimed at eliciting consumers' attitudes and perceptions related to food safety, labelling, organic production methods and food consumption. In the third section of the survey instrument, information on households' and food purchase decision-makers' social and economic characteristics were collected. The summary statistics are presented in the next.

Social, economic and demographic characteristics of the consumers

The social, economic and demographic characteristics of the consumers and their households are reported in Table 2 by store.

Table 2. Social, economic and demographic characteristics of the consumers, by store

Household/respondent characteristic	Andheri	Charkop
	Mean (std.dev.)	
Household size	3.8 (1.4)	3.9 (1.5)
Share of food expenditure in monthly income	37.9 (18.6)	39.5 (18.3)
Household monthly income in Rs***	28377.9 (11968.8)	25302.1 (11543)
Age of the consumer	57 (13.5)	46(13)
Consumer's education (university degree or above=1, 0 otherwise)**	81.2	70.4
Sample size	571	343

T-tests and Pearson Chi square tests show significant differences among at least one pair of segments at the 5% (**), and 1% (***) significance levels.

It is observed that the household size for the clientele of both stores is less than four, which is below the Mumbai average of five members of per household (Census of India, 2001). Smaller households which constitute nuclear families are an indicator of higher education and income levels (National Council of Applied Economic Research (NCAER), 2007). Therefore, the sampled consumers are wealthier and better educated than the Mumbai average, which is expected since they constitute the minority of consumers who purchase their foodstuff from the supermarkets rather than from street vendors or *kirana* ('mom and pop') stores. The household size and composition are similar across the two stores, with an average of around three adults and one child younger than 18 years of age per household.

Share of food expenditure is not significantly different across the two shops, though households in Charkop, who have significantly lower incomes than their Andheri counterparts, spend higher shares of their incomes on food. This is in line with Engel's law which states that "The poorer is a family, the greater is the proportion of the total outgo which must be used for food" (Zimmerman, 1932). Moreover, these figures are lower than the India average of 41 percent (Ernst & Young, 2006).

Respondents' average age does not differ statistically significantly across two stores. Andheri consumers, however, are more likely to have a university degree or above, which might also explain their higher household income levels.

Consumers' attitudes and perceptions on food safety and quality

Descriptive statistics of the data on consumers' knowledge, attitudes and perceptions on food safety and quality are reported in Table 3.

Table 3. Consumers' attitudes and perceptions on food safety and quality, by store

	Andheri	Charkop
Statement	% agree or strongly agree	
Food safety certification should be mandatory for all foodstuff***	91.8	89.6
There should be a trustworthy third party certification of food***	82.8	86.6
I look for organic certification if food is sold as organic***	46.5	53.6
All foodstuff should be organic***	91.5	89.5
The first most important food characteristic is…		
..taste	18.7	18.8
…price	5.9	7.3
…nutrition*	48.3	41.5
…safety***	27.1	32.5
The second most important food characteristic is…		
..taste**	16.5	20.5
…price***	12.2	20.3
…nutrition*	29.2	27.1
…safety	42.2	32.3
Sample size	571	343

T-tests and Pearson Chi square tests show significant differences among at least one pair of segments at the 10% (*), 5% (**), and 1% (***) significance levels.

A majority of respondents strongly agreed or agreed that the food certification should be mandatory and certification should be issued by a trustworthy authority. A significantly larger proportion of Andheri consumers agreed with the former statement, whereas the reverse is true for the latter. A significantly larger proportion of Charkop clientele looked for organic certification for food sold as organic, revealing their sensitivity to this issue, even though, compared to their counterparts in Andheri, a smaller proportion of Charkop consumers were of the opinion that all foodstuff should be organic.

Finally, when asked the most important food characteristic, the clientele of the two stores had similar rankings. Consumers ranked nutrition as the number one characteristic, with the proportion of respondents that ranked nutrition as the most important characteristic being larger

in Andheri compared to Charkop. The customers ranked safety as the second most important food attribute. The third most important characteristic was taste, followed by price. The fact that price is ranked the last could be explained by the relatively smaller share of food expenditure in the overall budget of the sampled households, compared to the Indian average. Given the small share of food expenditure in the budget, households might be much less price sensitive.

RESULTS

The CE was designed with the assumption that the observable utility function would follow a strictly additive form. The model was specified so that the probability of selecting a particular grape is a function of grape attributes and the alternative specific constant (ASC), which was equalled to one when either grape A or B was chosen and to zero when the respondents chose the neither grape profile (Louviere *et al.*, 2000). The results of the conditional logit (CL) model for 5484 choices from the pooled sample of 914 respondents are reported in the second column of Table 4.

Table 4. Conditional logit model for grape attributes for the pool and by store

Grape attributes	Pool	Andheri	Charkop
	Coeff. (s.e)		
ASC	1.614 (0.115)***	1.607 (0.145)***	1.631 (0.190)***
Sweet taste	0.395 (0.025)***	0.428 (0.032)***	0.342 (0.041)***
Very sweet taste	0.326 (0.029)***	0.350 (0.036)***	0.286 (0.047)***
Semi-organic production	0.122 (0.029)***	0.163 (0.037)***	0.054 (0.046)
Organic production	0.292 (0.029)***	0.332 (0.037)***	0.227 (0.048)***
Direct from farmer	0.106 (0.031)***	0.097 (0.039)***	0.124 (0.051)**
GlobalGAP certification	0.413 (0.028)***	0.414 (0.035)***	0.414 (0.045)***
Price	-0.001 (0.002)	-0.001 (0.003)	-0.0003 (0.004)
ρ^2	0.152	0.149	0.161
Log-likelihood	-5110.32	-3204.986	-1897.56
Sample size	5484	3426	2058

*** 1% significance and **5% significance level with two-tailed tests.

The overall fit of the model, as measured by McFadden's ρ^2, is satisfactory by conventional standards used to describe probabilistic discrete choice models[1]. The ASC is positive and significant implying that consumers are more likely to choose one of the grape alternatives presented to them, rather than the status quo. This is expected since this study was undertaken during the grape season. For the pooled data from two stores, all grape attributes except price are significant determinants of grape choice at less than one percent significance level. The most important determinant of choice of a grape profile is GlobalGAP certification, which is followed by taste (sweet and very sweet, respectively); production method used (organic and semi-organic, respectively), and finally whether or not the grapes come directly from the farmers. Respondents therefore prefer grapes that are certified, sweet in taste, organically produced and that come directly from the farmer, avoiding long supply chains and intermediaries. The sign of the coefficient on the price attribute is negative, as expected, however insignificant, reflecting the attitude and perception indicators as reported in Table 3 above.

Since the clientele of the two stores have different income and education levels, as well as different attitudes and perceptions (as reported in Tables 2 and 3 above) it is hypothesised that they have different preferences for grape attributes. Separate CL models are estimated for the customers of the two stores and the results are reported in the third and fourth columns of Table 4.

[1] The ρ^2 value in conditional logit models is similar to the R^2 in conventional analysis except that significance occurs at lower levels. Hensher et al. (2005, p. 338) comment that values of ρ^2 between 0.2 and 0.4 are considered to be extremely good fits.

The null hypothesis that the separate effects of stores are equal to zero was rejected with a Swait Louviere log-likelihood ratio test at the 0.5 percent significance level, based on regressions with the pooled and separate store sub-samples. Hence improvements in the explanation of the data can be achieved through the store specific regressions.

The overall fit of both of the models, as measured by McFadden's ρ^2, is satisfactory. Similarly to the CL model results for the pooled data, the ASC is positive and significant implying that consumers are more likely to choose one of the grape alternatives presented to them, rather than the status quo. Moreover, for the clientele of both stores price is an insignificant determinant of grape choice, though the sign is negative as expected.

The ranking of the attributes across the two stores are different. In the store level regressions, in Andheri the most important determinant of grape choice is taste (sweet), followed by whether or not the grape has GlobalGAP certification. In Charkop, on the other hand the ranking of these two attributes are reversed. Surprisingly, customers of Charkop Apna Bazaar, who have lower education levels and incomes than their Andheri counterparts, reveal stronger preferences for certified grapes. One possible explanation for this result is that given their lower income levels, households in Charkop might be more exposed to food safety risks and are therefore wary of consequences from a lapse in food safety standards. Certification offers them an opportunity to access safer food, which owing to their experiences they might value more.

Charkop consumers also disclose strong preferences for organically produced grapes, as organic production ranks right after taste attributes and semi-organic production attribute is insignificant. Andheri consumers also rank organic production highly; this is followed by semi-organic grapes.

In order to investigate the impact of customer and household level characteristics on choice of grape attributes, CL models with interactions were estimated for each store. GlobalGAP and organic production attributes were interacted with various characteristics including the age of the respondent, household per capita income, whether or not the household have children younger than 18 years of age, and whether or not the respondent agrees with the statement that all foodstuff should be organic. The correlations among these characteristics are found to be insignificant. The model resulted in significant interactions for the organic production attribute, though none of the interaction between certification and respondent and household characteristics are significant (Table 5).

Table 5. Conditional logit model with interactions for grape attributes by store

Grape attributes	Andheri	Charkop
	Coeff. (s.e)	
ASC	1.592 (0.153)***	1.604 (0.196)***
Sweet taste	0.452 (0.034)***	0.341 (0.042)***
Very sweet taste	0.38 (0.039)***	0.275 (0.048)***
Semi-organic production	0.138 (0.039)***	0.037 (0.48)
Organic production	-0.541 (0.164)***	-0.829 (0.267)***
Direct from farmer	0.099 (0.041)**	0.124 (0.052)**
GlobalGAP certification	0.438 (0.037)***	0.404 (0.046)***
Price	-0.002 (0.003)	-0.00002 (0.004)
Organic * Household income per capita	$0.6x10^{-5}$ ($0.4x10^{-5}$)*	$0.2x10^{-4}$ ($0.7x10^{-5}$)**
Organic * Age	-	0.004 (0.003)*
Organic * Have children	0.083 (0.05)*	-
Organic * All food organic	0.173 (0.042)***	0.173 (0.05)***
ρ^2	0.142	0.160
Log-likelihood	-2922.861	-1799.561
Sample size	3426	2058

*** 1% significance, **5% significance and *10% significance level with two-tailed tests.

For both stores the Swait-Louviere log likelihood ratio test rejects the null hypothesis that the regression parameters for the CL and the CL with interactions models are equal at 0.5 percent significance level, implying that improvement in the model fit is achieved with the

inclusion of social, economic and attitudinal characteristics of respondents and their household in the CL model. In both stores households with higher per capita household incomes are more likely to choose organically grown grapes. Similarly, in both stores respondents that think all foodstuff should be organic are more likely to choose those grape profiles that are organically produced. In Andheri having at least one child in the household increases the probability that organically produced fruits are preferred.

Finally in Charkop older respondents are more likely to prefer organically produced grapes, showing these consumers' health and safety concerns. This is an important finding as experience in food safety tends to be higher for this age group. There was a spate of food safety issues in the 1970s and 1980s regarding pesticide residues, which the new generation would not have experienced.

CONCLUSIONS AND POLICY IMPLICATIONS

This paper employed the choice experiment (CE) method to investigate developing country consumers' preferences for various food safety and quality attributes to help inform not only the development of stricter food safety policies, but also the producers of high quality and safe food about possible lucrative markets in urban areas. Data were collected in personal interviews with a sample of 914 customers in two stores of a supermarket chain in Mumbai, India. These two stores were chosen to represents contrasts in income, education and social status. The foodstuff of focus was grapes, since this fruit was in season during the implementation of the survey; grapes are consumed raw and generally on their own, and hence quality and safety concerns regarding grapes are paramount.

Conditional logit models (CL) and CL with interactions models were estimated for pooled and store level data to assess customers' preferences of the food quality and safety attributes. Findings disclose that the clientele of both stores reveal significant demand for grapes that are GlobalGAP certified, ensuring safety and quality. Moreover, customers in both stores also prefer grapes that are organically produced, disclosing further evidence of demand for healthier, safer and higher quality food products. Interestingly, price of grapes is not a significant determinant of grape choice in the CE. This finding echoes the results of the attitude and perception question on the most important food characteristics, where price was ranked the last following nutrition, safety and taste. It can therefore be concluded that the price of food, expenditure on which is small and shrinking for the ever growing middle-upper class of urban India, is not a binding constraint for food consumption choices made.

This is not surprising since the average monthly per capita income of sample is 101 Euros for the Charkop customers and 116.4 Euros for the Andheri customers, whereas the grape prices used in the CE ranged from 0.4 to 1 Euro. Both of these figures are significantly higher than the monthly income per capita in India, which was estimated to be 49.2 Euros in 2006 (World Fact Book, 2007). This group of affluent consumers therefore wants higher quality and safer food and the marginal increase in the price of safer and better quality food is not a major concern of theirs.

These findings are expected to provide evidence of domestic market demand to the producers of higher quality and safer food who are currently exporting to developed country markets. Furthermore, the evident and significant demand for food safety calls for reform and improvement of the current food safety policies which date back decades ago.

A pertinent question with regard to guarantee of food safety is the credibility of the agency ensuring it. There are several possible agencies that can guarantee food safety through a system of

labels and certification viz. farmer groups, retailer groups and government. The credibility can be achieved if there is adequate compensation in case of failure. Else, there is repeated interaction where reneging on the contract (that guarantees food safety) would engender punishment. Contracts in this case would be self enforcing.

The design in this project is unique in the sense that the agency chosen for guaranteeing food safety was an international body, one of the most credible agencies currently existing. The importance of the trustworthiness of the certification agency was highlighted by the consumers' answers to the attitudes and perceptions questions. Thus, given that there is demand for food safety, creating a credible agency to guarantee it can generate a win-win solution for consumers as well as producers. The extra value captured can then be shared by all participants in the value chain.

Additionally, it is possible that the primary reason for a suppressed demand for food safety might not always be the ability to pay. It is possible that lack of information regarding the merits of this attribute or even the information about availability of safe food might be the major constraint. The government needs to develop information systems that enlighten the consumers about the merits of food safety. This in turn will endogenously create a demand for food safety. The rapidly rising middle class with greater disposable income should lead the government to realize that the market for safer food exists and is likely to grow.

Moreover, the results allude to the way forward in the retail sector in India. As discussed above the organized retail sector is still in its infancy in India. The few organized retail outlets that have come up are focusing on volumes (quantity) rather than quality and safety. This in turn translates to the choice of suppliers (farmers) who provide low food safety standard and nearly homogenous products. The next phase of retail in India will most likely include greater product

differentiation in food, where food safety and quality are expected to be the principal differentiators. New supply links that will be developed are likely to move away from spot transactions. The government can pre-emptively develop institutions that can enable all farmers to participate in such a system and not be screened off. The steps for example could include creation of infrastructure and relaxation of marketing laws.

Finally, a few points on some of the issues and challenges faced when implementing the CE in India: First, even though consumers in Mumbai may be used to market surveys, none of them had previous exposure to CEs, which deal with hypothetical choice occasions. Explanation of the hypothetical choice occasions required extra attention and time. Special care was taken especially when describing the choice attributes, to ensure uniformity in understanding of each attribute, particularly those attributes regarding which the respondents might have had prior perceptions and knowledge (whether correct or incorrect), such as organic production attribute. In developed country settings, information sources tend to be more uniform and readily available, and hence understanding/knowledge of attributes (such as organic production) are likely to be a comparatively smaller problem in developed country settings.

Second, similarly to other developing countries the regional and sub-regional disparities tend to be high in India. In such a study for the results to be representative the experiments need to be conducted in several sub-populations. Relative to a more homogenous population (in terms of beliefs about some of the attributes such as food safety) the distribution tends to be much more heterogenous. We found such a difference between Andheri and Charkop outlets of Apna Bazaar in Mumbai, which are located in close proximity to each other. Also regional and sub-regional identities tend to be strong in India, similarly to many other developing countries, which implies caution in valuation of geographical indicators. In the CE presented here for example we did not

deliberately include an attribute which captures the locality of the grapes. It was thought that such an attribute could have become the dominating characteristics and biased the valuation of all other attributes.

Finally, in a setting such as the supermarket setting in which this experiment was conducted; convincing respondents of the research results' impact on policy was rather tricky. In this case study presented here, association with an international agency (GlobalGAP) lent some credibility and realism to the hypothetical exercise, however the issue of how to convince the respondents of their responses' policy implication was a difficult one to solve. At the same time, having just done their grocery shopping, the respondents are thought to be more likely to consider their budget constraints and substitute goods, when making a choice in the experiment. Therefore the extent of hypothetical bias depending on the location of the CE is a research topic that should be considered in future research.

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