

Modelling a Hedonic Price of Northern Thai Handicraft Products

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Abstract

Northern Thailand is famous for culture and handicraft. By nature, handicraft characterizes great variation in type of products, sizes and values e.g. small bamboo baskets and pottery to big teak crafts and ceramics, simple to delicate cultural designed woven fabrics. Due to Thai government's recent heavy promotion of rural community enterprises, the faster rise in the supply of handicraft products than in the demand brought about the decline in average prices of many products. This paper attempts to analyze the hedonic price of products so called "handicraft" using two step modelling. The first step is to construct an equation to identify factors affecting consumers' decision to buy certain pieces of handicraft and the second is to define and analyze hedonic prices using identified factors estimated in the first stage. Accordingly, Factor Analysis and Ordered-Probit model are applied to two groups of consumers i.e. local and tourist buyers. The findings suggest factors related to specific product attributes and being art appreciator are significant determinants of willingness to pay for handicrafts products.

Keywords: Handicraft products, factor analysis, ordered-probit model, hedonic prices and willingness to pay.

Introduction

In the past, handicraft products were major tools, equipment and home use materials. When manufacture products play important role in the modern life style, handmade products have become luxurious goods in many countries. For developing countries, e.g. Thailand, market generally prefers manufacturing goods due to their lower prices and durability. Further more, western fashion and modernization bear significant impact on Thai consumers' taste and preference. Thus handicraft was once deemed as old fashion and out of date especially woven fabric. It is fortunate for Thailand that Her Majesty the Queen Sirikit has been in favor of promotion folk art and products and consequently brought back preference for Thai handicraft.

After the financial crisis in 1997, the Thai government policy aimed at stimulating rural enterprises both farm and non-farm sectors such that these sectors could help absorb unemployed labor on their return home from industrial and service sectors. Evidently, the handicraft sector absorbed 5.24 million in the 2000 which accounted for 28.59 per cent of off-farm labor force (National Economic and Social Development Board, No date). Export of crafted wood products was 902 million baht and wickerwork products enjoyed 247 million baht. After the Thai government's policy on "One Tambon One Product" (OTOP) was promoted in mid 2001, both cottage food and handicrafts produced by rural communities have been accelerated. The quality products on the OTOP web-site reached 61,808 items in 2005 and 64 per cent are handicraft products (Information and Internet Centre, No date). Out the of 61,808 items of OTOP, 43,413 items or about 70 per cent are non-food products including fabric and garment, toys, and jewelry. The handicrafts which belong to the categories under this study accounts for at least 64 per cent (39,753 items) of the total OTOP products.

Due to the faster growth of supply than demand, producers of several types of products suffer from undesirably low prices and probable negative profits. (Sriboonchitta et al., 2004). However, the government has been running OTOP promotion rigorously to stimulate domestic demand. To help solving problems for rural community group enterprises to sell products at reasonable prices, the study

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aims at building a better understanding on consumers' purchasing behavior and identifying potential factors in favor of raising prices of handicraft products.

Data and Methodology

The survey conducted in Chiang Mai and Lampang provinces, the two largest cities in Northern Thailand, during November 2002 – February 2003 including 327 of local and of 396 visitor/tourist buyers. Observations were randomly selected. Only the buyers of at least one of five products were interviewed in the handicraft shopping places. This survey was designed to ensure accurate information on price, product appearance and attributes.

Five product categories are considered i.e. wickerwork products, crafted wood, pottery and ceramic, Sa paper and products and hand woven fabric and products. The products are categorized as (1) hand made for household use which can be substituted by manufactured products e.g. basket, mat, paper/cards, lamps, metal/non-wood furniture and fabric (2) handicraft-semi-artistry and (3) artistry work. Most of products both in general and in this study belong to the first two categories.

Since handicraft products are diverse in their characteristics and prices, to analysis price determinants, the study employs two steps method. The first step uses factor analysis to identify the most parsimonious factor derived from various observed variables which are likely to be collinearly related (equation 1 shows a general model).

$$\begin{aligned} x_1 &= \lambda_{11}\xi_1 + \lambda_{12}\xi_2 + \varepsilon_1 \\ x_2 &= \lambda_{21}\xi_1 + \lambda_{22}\xi_2 + \varepsilon_n \end{aligned} \quad \text{_____} \quad (1)$$

Where x'_1 and x'_2 are vectors of observed indicators/variables having n observations. The two vectors will lie in a 4-dimensional subspace defined by orthogonal vector $\xi_1, \xi_2, \varepsilon_1$ and ε_2 (Sharma, 1996: 99). The ξ s are unobserved independent variables which are called factors from now on.

Verimax (orthogonal rotation) is selected due to the ease of interpretation and being highest representation of each factor. To suggest value of significant product attributes and identify target customers, a hedonic price equation is regressed on the factors identified (in the first step). Equation (2) is developed based on consumers's utility function (Tomek with Robinson, 2003; Ladd and Martin, 1976; Unnevehr, 1986; Parker and Zilberman, 1993; Wiboonpongse et al., 2003)

$$\begin{aligned} u &= f(q_1, q_2) \\ q_1 &= g(x_1, \dots, x_k) \end{aligned}$$

Subject to consumer budget constraint $B = (p_1q_1 + p_2q_2)$

Where q_1, q_2 are goods, and x_i to x_k and p are product attributes and price respectively.

Let q_1 be handicraft product and q_2 are others

Hedonic price equation of the handicraft is

$$P_1 = a_0 + \sum_i^k b_i x_i + e \quad \text{_____} \quad (2)$$

where x_i are product attributes which will be replaced by $F_1 \dots F_k$ derived from the first step and e is a random term.

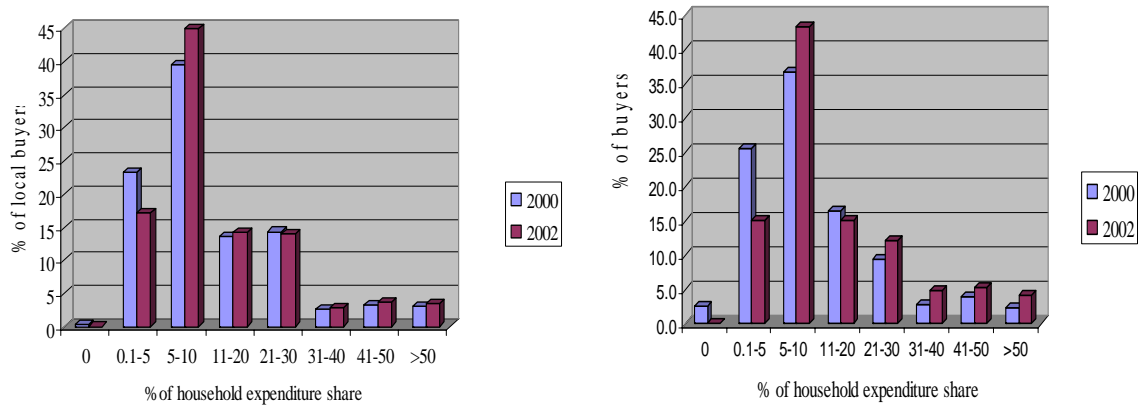
In order to identify target markets, customers' characteristics are included in equation 2. This modification of hedonic price equation is acceptable (Wallace, 1996; Parker and Zilberman, 1993)

Empirical results

Buyers' behavior and attitudes

The buyers in this study refer to final customers. The local customers were those resided in the study provinces and the non-local customers were mostly tourists to these two provinces. Both groups of customers' expenditure shares of handicraft to total household expenditure have the similar distribution patterns. Almost half of sampled observations (43-44 per cent) reported having expenditure of 5-10 per cent, 15 per cent and 13 per cent of observations spent up to 20 per cent and

30 per cent of total expenditure about the same proportion (15-17 per cent of observations) spent less than 5 per cent on handicraft. Evidently, tourists tended to increase their expenditure shares as shown in Figures 1(a) and (b) during 2000-2002.



(a) Local buyers

(b) Tourists/visitors

Source: Sriboonchitta et al. (2004)

Figure1: Handicraft product expenditure share of total household expenditure

We observed those never bought handicraft products in 2000 (.33 per cent and 2.6 per cent) disappeared in 2002 especially in the tourist group. The most popular product to local buyers was hand woven fabric (52 per cent of answers). To tourist both fabric and wood crafted products received almost equal votes (34 per cent and 31 per cent, respectively) (Figure 2).

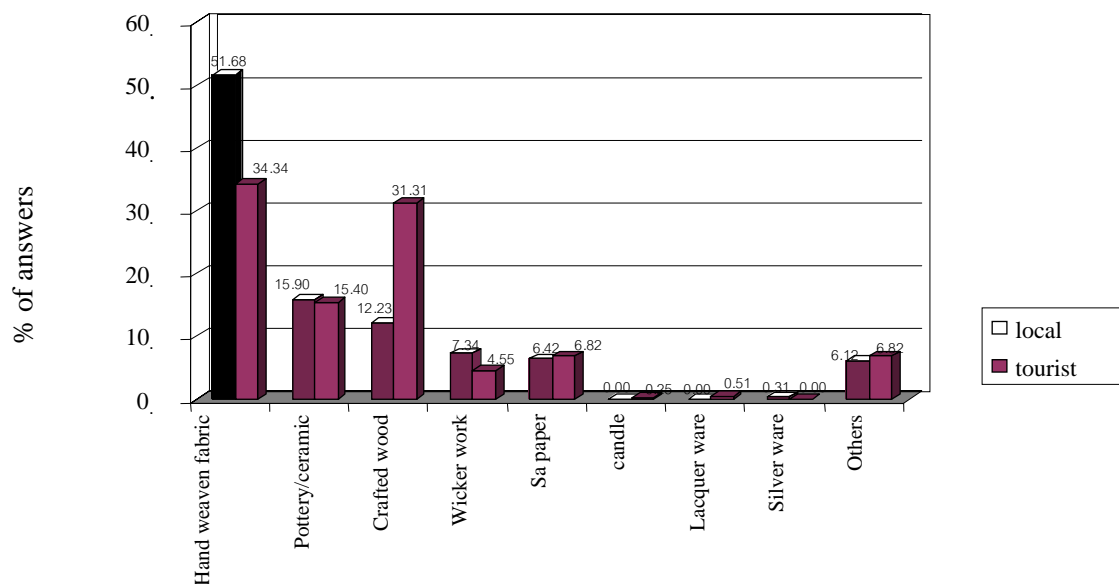


Figure2: Popularity of handicraft product

Source: Sriboonchitta, et al. (2004)

The products purchased at the survey varied substantially in terms of product types, sizes, values and functions of products. As for the five categories under consideration, the survey shows the sampled buyers bought 11 different items of wickerwork, in their last purchase 30, 14, 17 and 33 items

of wood, pottery, Sa paper and fabric products, respectively were bought. The purchase value of tourists ranged from the minimum of roughly 100 baht (US\$ 2.5) for Sa paper products to the maximum of 200,000 baht for crafted wood products. As per local buyers, their last purchase appeared much less (70-5000 baht) for the same products.

The consumers revealed they usually made careful selection of what products they bought (32-57 per cent of local-tourist buyers) 27 per cent and 41 per cent of local and tourist buyers made decision due to appealing stimuli and generally 10-15 per cent made planned purchases. However, the last type of purchase varies substantially from local and tourists when bought pottery and Sa products (5-32 per cent of both buyer groups). Tourists do not usually plan to buy but they rather decide to buy a particular piece depending on products' appeals.

As for tourists, the reasons for buying handicrafts, beside for their functional value are the values of attributes of product itself i.e. reflection of art, Thai identity and local life style. Thus differential characteristics are likely to be more important than their functional value. From five scores, most important reasons in descending orders are 1) buying to support handicraft sector (4.62) 2) product having Thai identify (5.55) 3) product being artistic (4.47) 4) reflection of rural/local life style (4.44) 5) being treat 6) being functional/complementary and functionally adaptable for other uses scored 3.96-3.39. Similar scales of reasoning were reported by local buyers.

For a particular piece of product purchased, the buyers made their decision basing on six major factors. The weight pattern given to six factors by local and tourist sectors are similar. The average scores range from 3.8 to 4.3 (from 5 marks). The maximum average score was due to style (to buyer's preference) of the piece and reasonable price (4.3 points).

However, consumers' views of appealing characteristics vary substantially by product types. Colour appears to receive highest score in general. This is particularly true for Sa paper products (97 per cent) and fabric (80 per cent). As reported by Sriboonchitta et al. (2004) while pattern design is most important for pottery/ceramic (and fabric), the functional performance is the most important factor for wickerwork and most of crafted wood products (53 per cent and 43 per cent). These examples imply different distinctive attributes of different products.

Only 666 completed observations were used for factor analysis and hedonic price estimation using ordered probit model (Verbeek, 2004). Seventeen variables are taken into account of the analyses and defined as follows:

- x_1 is functional usefulness (in score of 1-5);
- x_2 is being functionally adaptable for other uses (in score of 1-5);
- x_3 is product being artistic value (in score of 1-5);
- x_4 is buyers' attitude to support handicraft (in score of 1-5);
- x_5 is product having Thai identity (in score of 1-5);
- x_6 is product reflects local life style (in score of 1-5);
- x_7 is being creative (in score of 1-5);
- x_8 is being complementary of other use (in score of 1-5);
- x_9 is being gift (in score of 1-5);
- x_{10} is being colorful (in score of 1-5);
- x_{11} is the dummy variable for buyers' gender equal to 1 if female, 0 otherwise;
- x_{12} is the personal income (in baht per month);
- x_{13} is the age of buyers (in years);
- x_{14} is the formal education level of buyers (in years);
- x_{15} is being art appreciator (in score of 1-5);
- x_{16} is frequency of travel (number of travel times); and
- x_{17} is the dummy variable for being tourist, equal to 1 if being tourist, 0 otherwise.

From 17 variables, the Principle Component Analysis extracts five distinct factors. Factor 1 reflects being handicraft/culture indicator i.e. artistic value (x_3), buyers' attitude to support handicraft (x_4), product having Thai identity (x_5) and reflection of local life style (x_6). Factor 2 reflects attributes of the product itself i.e. being creative (x_7), being complementary (x_8), being gift

(x_9), and being colorful (x_{10}). Factor 3 is represented by personal income and age of buyers (x_{12}, x_{13}). Factor 4 refers to buyers' gender (x_{11}) and being tourists (x_{17}). Being art appreciator (x_{15}) and frequency of travel (x_{16}) represent Factor 5 (Table 1).

Due to wide range of price per piece, the interviewees were requested to identify the price they are willing to pay (WTP) basing on the scale of minimum (1) to maximum (10). Then price choice or WTP is defined as $y = 0$ represents low price (1-4), $y = 1$ represents moderate price (5-7) and $y = 2$ for high price (8-10). Out of 666 observations, 60 per cent of sampled buyers offered to pay high price and 36 per cent offered moderate. Only 4 per cent offered low price.

Table 1: Factor Analysis of Consumer Purchase

variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Usefulness (x_1) ¹	-	-	-	-	-
Functionally adaptable (x_2)	-	-	-	-	-
Artistic value (x_3)	0.787	-	-	-	-
Support handicraft (x_4)	0.802	-	-	-	-
Having Thai identity (x_5)	0.866	-	-	-	-
Reflection of local life style (x_6)	0.827	-	-	-	-
Being creative piece (x_7)	-	0.728	-	-	-
Being complementary in use (x_8)	-	0.799	-	-	-
Being gift (x_9)	-	0.804	-	-	-
Being colorful (x_{10})	-	0.774	-	-	-
Buyers' gender (x_{11}),	-	-	-	0.630	-
Personal income (x_{12})	-	-	0.814	-	-
Age of buyers (x_{13})	-	-	0.693	-	-
Schooling years of buyers (x_{14})	-	-	-	-	-
Being art appreciator (x_{15})	-	-	-	-	0.732
Frequency of travel (x_{16})	-	-	-	-	0.516
Being tourist (x_{17})	-	-	-	-0.750	-

Note: Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

¹ Those correlation < 0.5 are not shown.

Source: Computed by Limdep.

The order probit model is estimated by Maximum Likelihood estimation. The estimated hedonic equation reveals willingness to pay low price ($y = 0$), moderate price ($y = 1$) and high price ($y = 2$). The coefficients and marginal effects of the predicted values of Factors 1-5 are shown in Table 2. The order probit model indicates that only two factors are major significant determinants of prices of handicraft products in general i.e. 1) product attributes and 2) art appreciation (and frequency of traveling). Influences of these two factors are consistent when the levels of WTP are considered as seen from the significant levels of marginal effects.

Table 2: Estimates of Coefficients and Marginal Effects of Five Factors for Order Probit Hedonic Equation

Variable	Hedonic Equation		Marginal Effects	
	Coefficient	P[Z >z]	Coefficient	P[Z >z]
			The effects on Prob.[Y=0] at means	
Constant	1.853	.0000	0.0000	0.0000
Factor 1	0.055	.2390	-0.0040	0.2457
Factor 2	0.311	.0000	-0.0223	0.0000
Factor 3	0.021	.6627	-0.0015	0.6630
Factor 4	-0.0046	.9232	0.0003	0.9232
Factor 5	-0.097	.0413	0.0069	0.0501
			The effects on Prob.[Y=1] at means	
Constant	-	-	0.0000	0.0000
Factor 1	-	-	-0.0174	0.2392
Factor 2	-	-	-0.0977	0.0000
Factor 3	-	-	-0.0065	0.6627
Factor 4	-	-	0.0014	0.9232
Factor 5	-	-	0.0305	0.0416
			The effects on Prob.[Y=2] at means	
Constant	-	-	0.0000	0.0000
Factor 1	-	-	0.0214	0.2390
Factor 2	-	-	0.1199	0.0000
Factor 3	-	-	0.0080	0.6627
Factor 4	-	-	-0.0018	0.9232
Factor 5	-	-	-0.0374	0.0413
Log likelihood function	= -510.5539	Prob[ChiSqd > value]	= .0000000	
Restricted log likelihood	= -534.7118			

Source: Computed by Limdep.

In total, prediction accuracy is relatively low = 61.71 per cent due to the model is unable to predict those offered low price, and only able to predict 24 per cent of those offered moderate price. The model performs well in predicting of sampled observations offering high price (354 out of 397 buyers or at 89 per cent accuracy).

Conclusion

Two factors are highly significant determinants of prices offered by buyers of handicraft products i.e. Factors 2 and 5. The results suggest that once the customers decide to buy handicraft products, being handicraft is not a factor determining their willingness to pay high price. Factor 2 affects offering high price (8-10 price score) in the positive direction while the opposite effect is shown for offering low price (2-4 price score). This implies that attributes (neatness, style, right color and new design) of the specific piece of crafted work are important. Being art admirers and frequent travelers are among people who offer lower price. These factors carry meaningful implications.

The findings encourage craftsmen to improve product design, learning market trend of color which change each year as well as to improve their work skill for high product quality. Art admirers tend to suppress price in stead of those who probably appreciate less about art since most of the handicraft products under study are handcrafted and semi-artistry, recommendation to move products forward to higher price requires particularly high craftsmanship.

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