

Effects of Eco-Label Knowledge on Chinese Consumer Preferences for Certified Wood Flooring: A Case Study in Chongqing City

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Abstract

Expanding the use of eco-labeled wood flooring in China is an important step in achieving the country's sustainable development goals. For a deep understanding of the relationship between the knowledge of the eco-label and consumer preferences for certified wood flooring in China, this study assessed consumers' purchase intention (PI) and price premium (PP) for Forest Stewardship Council (FSC)- and China Environmental Labeling (CEL)-labeled wood flooring versus nonlabeled wood flooring. A total of 367 face-to-face interviews were conducted at building material markets in Chongqing City with visitors planning to purchase wood flooring in March 2018. The results showed, first, that 21 percent of respondents knew the FSC label, and 65 percent of respondents intended to buy FSC-labeled wood flooring with a PP of 41 CNY/m². Second, 46 percent of respondents knew the CEL label, and 81 percent of respondents intended to buy CEL-labeled wood flooring with a PP of 48 CNY/m². Third, the knowledge of the FSC label positively affected consumers' PI and PP, but the knowledge of the CEL label only influenced PI for certified wood flooring. This study showed that the eco-label knowledge played a main role in consumer preferences for certified wood products and suggested that different strategies should be considered in promoting FSC- and CEL-labeled wood products in the Chongqing market.

China is the world's largest wood flooring market. In 2017, the country's production and consumption of wood flooring both exceeded 500 million square meters (State Forestry Administration of China 2018). In addition, the floor space of sold residential buildings increased from 600 to 1,400 million square meters between 2008 and 2017 (National Statistics Bureau of China 2018). This growth in the market for residential buildings implies an increasing demand for floor materials. In contrast, with intensifying environmental pressures and rising awareness of environmental conservation, Chinese consumers have increased their intentions to purchase environmentally friendly products (Wei et al. 2017). The widespread use of eco-labeled wood flooring is an important step in promoting environmental sustainability in China.

This study focuses on Forest Stewardship Council (FSC)- and China Environmental Labeling (CEL)-labeled wood flooring. The FSC label is the most well-known among forest certification labels, and CEL among environmental certification labels in China (Wang 2013, Luo et al. 2017).

The FSC label is issued by a third-party organization that considers forest conservation a priority and confirms that the wood material comes from sustainably managed forests and can be traced throughout the supply chain (FSC 2019). Globally, 199 million hectares of forest have been certified, and 33,759 chain of custody (CoC) certificates have been issued by the FSC as of April 2018. The vast majority of FSC-certified forests stand in Europe and North America, making up 84 percent of worldwide FSC-certified forests.

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China has 1 million hectares of FSC-certified forests, and 5,600 FSC CoC certificates have been issued (FSC 2018). To date, some large purchasers of wood (e.g., IKEA Group, B&Q, and Home Depot) have committed to stocking FSC-labeled wood products around the world (Teisl 2003, Anderson 2004). The CEL label is issued by the China Certification Committee for Environmental Labeling Products (Shen 2008). Environmental certification considers industrial environmental management a priority (International Organization for Standardization [ISO] 2019; ISO 14001:2015). The label guarantees that the product has had limited negative effects on the environment and human health from the manufacturing process through to end use (Ministry of Environmental Protection of China 2010). Therefore, the widespread use of FSC-labeled wood flooring supports sustainable forest management, and the use of CEL-labeled wood flooring promotes industrial energy conservation and emission reduction performance in China.

A number of previous studies have shown that consumers' socioeconomic status has an influence on consumer preferences for eco-labeled wood products in China. For instance, education and income have had positive impacts, and women have had higher intentions to buy those products than men (Peng 2015, Liu et al. 2016, Luo et al. 2017). Otherwise, Peng (2015) showed that the budget for wood flooring affected Chinese consumers' price premium (PP) for low-carbon flooring. The effect of eco-label knowledge on consumer preferences has been examined in various foreign countries, but few studies have been conducted in China. For instance, Veisten (2007) showed that eco-label knowledge affected consumers' PP for wood furniture in England and Norway. Shoji et al. (2014) suggested that knowledge of the FSC label affected consumers' PP for wood interior materials in Japan. Teisl et al. (2003) compared US consumer preferences for FSC-labeled wood products and US Environmental Protection Agency (EPA)-certified labeled wood products and showed that consumers consider the EPA label to be more important than the FSC label due to an absence of knowledge about the FSC label.

Above all, the study tried to understand whether knowledge of the eco-label affects consumer preferences in China, because it might be a key factor to increase the consumption of eco-labeled wood flooring in China. The aims of the study are to (1) assess consumers' knowledge of the FSC label, purchase intention (PI), and PP for FSC-labeled wood flooring (PI-FSC and PP-FSC); (2) assess consumers' knowledge of the CEL label, PI, and PP for CEL-labeled wood flooring (PI-CEL and PP-CEL); (3) identify the impacts of eco-label knowledge on PP; and (4) predict the growth of PP through raising consumers' eco-label knowledge.

Literature Review

Many studies have assessed consumers' PI and PP for FSC-labeled wood products around the world (e.g., Ozanne and Vlosky 1997, Cai and Aguilar 2013, Shoji et al. 2014, Testa et al. 2015). These studies showed that consumers in the United States intended to pay a PP ranging from 4.4 to 18.7 percent of noncertified basic prices. Veisten (2007) compared English and Norwegian IKEA customers' PP for eco-labeled wood furniture, and showed the mean of PP was 7.5 percent in England and 6 percent in Norway. However, few studies have been conducted in the Chinese context. Wang (2013) showed that 98 percent of consumers in

Zhejiang and Jiangsu provinces intended to buy FSC-labeled wooden furniture, 24 percent of them intended to pay a 1 to 5 percent PP, and the remainder would only pay the same price as a conventional product. Luo et al. (2017) revealed that 29 percent of Chinese consumers did not mind paying a PP ranging from 10 to 30 percent for a certified wood product. Additionally, some studies suggested that Chinese consumers preferred forest-certified products, although the FSC certification was not specifically investigated. For instance, Liu et al. (2007) showed that consumers in Beijing intended to pay a 10 percent PP for a forest-certified bedside table, whereas 61 percent of consumers in Shanghai intended to pay 5 to 15 percent PP for a certified wood product (Wang et al. 2011). However, those studies did not clarify the effects of the knowledge of the FSC label on consumers' PI and PP. Moreover, few studies have assessed Chinese consumers' preferences for CEL-labeled wood products.

Methods

Study site

Chongqing is a major city in southwest China, with a total area of 51,203 km² and a population of over 31 million. Chongqing has the highest number of residential buildings sold in China over the past decade (National Statistics Bureau of China 2016). Thus, understanding Chongqing consumers' preferences is critical for the successful development of eco-labeled wood flooring in the Chinese market. In order to observe consumers of different socioeconomic status, we chose markets for two different grades of wood flooring. One was Easyhome, a high-level building material chain operating in Yubei District, and the other was Jan-Mart, a local market in Jiangbei District.

Survey design and data collection

A questionnaire was designed to assess consumer PI and PP regarding FSC- and CEL-labeled wood flooring in Chongqing City. The questionnaire contained three sections. The first section focused on collecting prepurchase information on the respondent, including wood flooring type, budget, purchase amount, and their environmental concerns about the product. The second section presented FSC and CEL labels to respondents (Fig. 1) and asked them to demonstrate their level of knowledge for each label by specifying "know well," "somewhat familiar," "seen before," and "never saw." We also asked respondents whether they had intentions to buy FSC-labeled wood flooring compared with conventional wood flooring. In the same way, respondents were asked to indicate their intentions for the CEL-labeled wood flooring. Then, those respondents with intentions to buy eco-labeled wood flooring were asked for their PP on a scale of 0 to 100 at



Figure 1.—Forest Stewardship Council (FSC) and China Environmental Labeling (CEL) labels.

intervals of 10 CNY/m². The final section gathered respondents' demographic information, including gender, age, education, and annual household income.

Data were collected from Chongqing citizens planning to purchase wood flooring. To find our relevant respondents, we approached market visitors about this survey. Visitors who agreed to participate in the survey were then asked whether they had plans to buy wood flooring. Only those who had plans to buy wood flooring were offered a questionnaire. Pretest surveys ($n = 59$) were conducted in both target markets (Easyhome and Jan-Mart) between February 22 and February 24, 2018. The results showed that respondents fully understood all questions and had a wide range of budgets, incomes, and PP. The pretest questionnaire was, therefore, retained for this study. Between March 8 and March 20, 2018, a total of 419 consumers agreed to participate in the survey, of whom 49 had no plans to purchase wood flooring. A total of 370 responses were collected through face-to-face questionnaires in the markets, of which 367 (88%) were valid samples (178 samples in Easyhome and 189 samples in Jan-Mart market; three incomplete responses omitted) and used in the analysis. Detailed descriptions of variables are given in Tables 1 and 2. Of 367 valid respondents, males comprised 47 percent, and over 70 percent of respondents were aged between 31 and 50 years old. Our respondents had a relatively high educational level with over half of them having a 3-year college certification or above. This means that our respondents experienced higher education than average citizens in Chongqing, where only 7 percent of people have such certification (Chongqing Statistics 2010). Finally, with regard to annual household income, 52 percent of respondents indicated their income to be 50,000 to 200,000 CNY/yr. The average annual income per capita in Chongqing was 70,889 CNY/yr in 2017 (Chongqing Statistics 2018). Supposing household income of a single person or married couple would be between 70,000 and

140,000 CNY/yr, over half of our respondents' income range is included in the average income level in Chongqing.

Measurement of PP—contingent valuation method

The contingent valuation (CV) is a method of estimating the value that a questionnaire respondent places on a product depending on a specific hypothetical scenario (Carson 2007). This approach asks people to directly report their PP to obtain a specified product, rather than inferring the PP from observed behaviors in the market. In environmental economics, the CV method has been widely used for measuring consumers' PP for certified wood products (e.g., Ozanne and Vlosky 1997, Donovan and Nicholls 2003, Wan et al. 2018). The CV method has an advantage of making marketers and policymakers understand consumers' responses to novel goods, which are not available to predict those demands in an actual market (Sriwaranun et al. 2015).

Some studies showed a concern about the ability of the CV method to measure the real PP for environmentally friendly products (e.g., Johansson 1987, Neil 1999, Frykblom 2000). Neil et al. (1994) found that hypothetical values of PP significantly exceeded real values. However, Johannesson et al. (1997) failed to find evidence of hypothetical bias in a similar experiment. Other studies (e.g., List and Shogren 1998, Nestor and Podolsky 1998, Botelho and Pinto 2002) showed that there was no significant difference between hypothetical and real PP when questionnaire and field observation studies' responses were collected from the same respondents. In this study, following Nestor and Podolsky (1998), List and Shogren (1998), and Botelho and Pinto (2002), we measured PP for eco-labeled wood flooring using a questionnaire survey, CV method.

Table 1.—Description of the variables, mean, and standard deviation (SD).

Variables ^a	Description	Mean (SD)
Type	Type of wood flooring: -1 = solid wood flooring, 0 = engineered wood flooring, 1 = laminate flooring	-0.42 (0.71)
Purchase amount	Ranging from 30 to 120 at 10 m ² intervals	64.41 (25.36)
Budget	Ranging from 100 to 500 at 100 CNY/m ² intervals	261.58 (105.43)
Environmental concern	Priority of environmental impacts in purchasing wood flooring: 1 = very low, 2 = low, 3 = mediocre, 4 = high, 5 = very high	4.00 (1.14)
Knowledge of FSC	Consumers' awareness levels of FSC: 1 = never saw (a respondent did not know), 2 = seen before (a respondent had seen only), 3 = somewhat familiar (a respondent knew partly), 4 = know well (a respondent was familiar with)	1.67 (0.93)
Knowledge of CEL	Consumers' awareness levels of CEL: 1 = never saw (a respondent did not know), 2 = seen before (a respondent had seen only), 3 = somewhat familiar (a respondent knew partly), 4 = know well (a respondent was familiar with)	2.43 (1.11)
PI-FSC	Intend to purchase FSC certified wood flooring: 1 = yes, 0 = no	0.65 (0.48)
PI-CEL	Intend to purchase CEL certified wood flooring: 1 = yes, 0 = no	0.81 (0.40)
PP-FSC	A price premium for FSC ranging from 0 to 100 at 10 CNY/m ² intervals	43.60 (27.80)
PP-FSC (%)	PP-FSC/budget × 100%	16.98 (13.71)
PP-CEL	A price premium for CEL ranging from 0 to 100 at 10 CNY/m ² intervals	47.64 (28.47)
PP-CEL (%)	PP-FSC/budget × 100%	18.62 (12.71)

^a FSC = Forest Stewardship Council; CEL = China Environmental Labeling; PI = purchase intention; PP = price premium.

Table 2.—Demographic information of the respondents (n = 367).

	Description	Frequency	Percent
Gender	Male	171	46.6
	Female	196	53.4
Age	<21 yr old	14	3.8
	21–30 yr old	70	19.1
	31–40 yr old	160	43.6
	41–50 yr old	109	29.7
	>50 yr old	14	3.8
Level of education	High school certification or below	161	43.9
	3-yr college certification	76	20.7
	Bachelor's degree	115	31.3
	Master's degree or above	15	4.1
Household income (CNY/yr)	<50,000	55	15
	50,000–100,000	129	35.1
	100,000–200,000	62	16.9
	200,000–400,000	24	6.5
	>400,000	5	1.4
	Unanswered	92	25.1

Data analyses

Data analysis was divided into three steps. First, we investigated the descriptive statistics of respondents. Second, we identified influential factors for PI using probit regression with continuous endogenous regressors (IV-Probit model) (Newey 1987). Similarly, we identified influential factors for PP using tobit regression with continuous endogenous regressors (IV-Tobit model). The following influential factors in IV-Probit and IV-Tobit models were considered: purchase amount, budget, environmental concern, gender, age, and knowledge levels of CEL and FSC labels. Dummy variables presented each knowledge level, including “know well,” “somewhat familiar,” and “seen before.” Considering that a consumer’s budget for wood flooring is related to his or her income, the budget was assumed as an endogenous variable, and the annual household income was used as an instrument in the IV-Probit and IV-Tobit models. A total of 92 samples were eliminated in the regression analyses because respondents had not disclosed their annual household income. Finally, we predicted the growth in PP for FSC-labeled wood flooring as an enhanced knowledge of the FSC label based on IV-Tobit model results. Student’s *t* test was used to examine the significant differences of PP in the knowledge levels regarding the FSC label.

Results and Discussion

FSC-labeled wood flooring

Knowledge of the FSC label, PI, and PP.—Twenty-one percent of respondents indicated that they knew about the FSC label (6% claimed to “know well” and 15% claimed to be “somewhat familiar”). Eighteen percent of respondents indicated that they had only seen the FSC label before, but did not know what the label meant. Nearly 60 percent of respondents first encountered the FSC label during this survey (Fig. 2). The result was close to the finding of Luo et al. (2017), which revealed that 19 percent of respondents knew about the FSC label. However, it was higher than the result of Wang (2013), which claimed that only 2 percent

knew about the FSC label, suggesting that awareness of the FSC label is increasing over time in China.

Sixty-five percent of respondents intended to buy FSC-labeled wood flooring instead of flooring without an eco-label (Table 1). This result was lower than those in the studies of Wang (2013) and Liu et al. (2016). We only displayed the FSC label to respondents and then asked their intentions. Because the majority of them saw the FSC label for the first time in the survey, it was difficult for them to acknowledge the label related to forest conservation from its logo design, which led to low purchase intentions for the labeled products. In contrast, prior studies directly informed respondents of the objectives of forest certification. This finding implied that Chinese consumers have acknowledged the importance of sustainable forest management. However, lack of knowledge regarding the label might stop them from purchasing forest-certified products. On the other hand, we found that the number of respondents with intentions to purchase FSC-labeled wood flooring was greater than the number who knew the FSC label. It suggests that Chinese consumers preferred an eco-labeled product to a nonlabeled product, even though they did not know what the label meant. There were two reasons we considered. One was that respondents had a positive image of the FSC logo design, especially when they saw the label along with the CEL label in the survey. Thus respondents might assume the concept of the FSC label was similar to the CEL label, which motivated them to purchase the FSC-labeled product. In an actual market, there are lots of products with multiple certification labels; thus, consumers were able to see those two labels on a product. The other one was that our respondents did not put the PP into consideration when they were asked to make a purchase preference between the wood flooring with the FSC label and the one without a label. We found that 63 out of 93 respondents without the knowledge of the FSC label indicated a PP-FSC ranging between 0 and 40 CNY/m², 12 of whom only indicated a 0 CNY/m² PP, which was less than the mean PP-FSC of 41 CNY/m² measured in the study (Table 1). It indicates that Chinese consumers had a strong preference for an eco-labeled product; however, to make them have a higher PP acceptance for the eco-labeled product, raising their knowledge of the label was important.

The mean PP-FSC was 41 CNY/m² in Chongqing, which equaled 17 percent of respondents’ reported budgets for wood flooring (Table 1). The PP was close to the finding of Luo et al. (2017) but higher than the values found by Liu et al. (2007), Wang et al. (2011), Wang (2013), and Liu et al. (2016). One explanation is that income in China is increasing over time, allowing the ability to pay a higher PP. Another explanation is that the respondents were potential buyers of the wood flooring. The purchase demand might motivate them to indicate a higher PP than people without purchase needs. We supposed that PP was lower than the previous results because Cai and Aguilar (2013) revealed that PP for a frequently purchased product with forest certification was higher than for a low-purchase-frequency item, such as wood flooring. However, the results were contrary to our expectation. Accordingly, Chinese consumers’ PP on a certified wood product might have few effects that differ between durable and nondurable goods.

Effect of FSC label knowledge on PI and PP for certified wood flooring.—The results of the IV-Probit model are shown in Table 3. A Wald test of exogeneity rejected null hypothesis ($P = 0.032$); it suggests that the budget was not

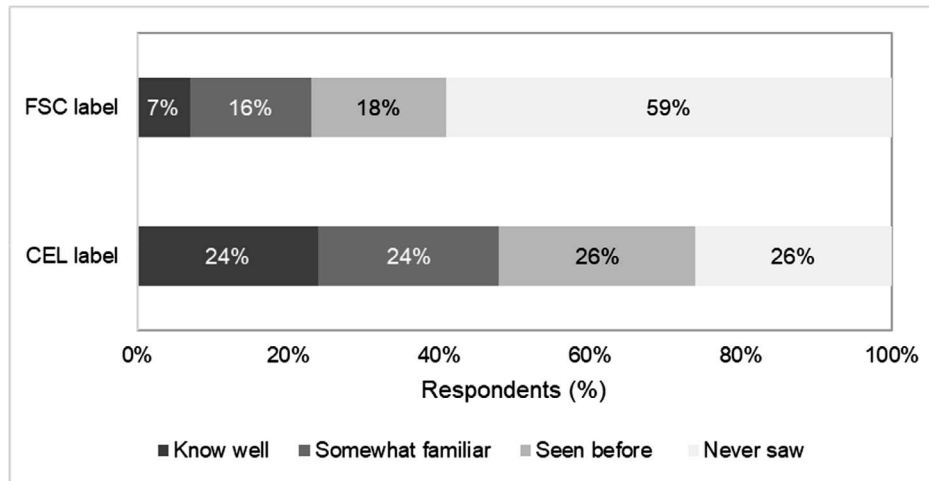


Figure 2.—Respondents' levels of knowledge about the Forest Stewardship Council (FSC) and China Environmental Labeling (CEL) labels.

an exogenous variable. According to the results, there were statistically significant relationships between PI-FSC and respondents' knowledge levels (i.e., “know well,” “somewhat familiar,” and “seen before”) of the FSC label and their budget. The positive coefficients of those knowledge levels indicate that compared with consumers who did not know the FSC label, consumers who had seen the label or knew the label had a greater intention to purchase the sustainably managed wood products. It follows the previous findings of Rahbar and Wahid (2011) and Paletto and Notaro (2018), and suggests that enhancing consumers' knowledge of the FSC label is an important way to motivate consumers' intentions to purchase the sustainably managed wood products in China.

The IV-Tobit model results are shown in Table 4. The Wald test of exogeneity rejected null hypothesis ($P = 0.006$); it suggests that the budget was not an exogenous variable. According to the results, there were statistically significant relationships between PP-FSC and respondents' knowledge

levels (i.e., “know well,” “somewhat familiar,” and “seen before”) of the FSC label, budget, and their purchase amount of wood flooring. The positive coefficients of the knowledge levels indicate that compared with consumers who did not know the FSC label, consumers who had seen the label or knew the label were willing to pay a higher PP for the sustainably managed wood products. This finding was supported by previous findings (e.g., Ladenburg and Martinsen 2004, Rahbar and Wahid 2011, Cai et al. 2017, Paletto and Notaro 2018). Moreover, we are surprised to find that the effect of purchase amount fills the gap in previous studies on consumer preference for the wood flooring in China and specifies the importance of considering the purchase amount effect in the wood flooring market.

CEL-labeled wood flooring

Knowledge of the CEL label, PI, and PP.—The results showed that 46 percent of respondents knew the CEL label,

Table 3.—Determinants of purchase intention (PI) for Forest Stewardship Council (FSC)- and China Environmental Labeling (CEL)-labeled wood flooring, respectively ($n = 275$).^a

Independent variables	PI-FSC	PI-CEL
	Coefficient (SE)	Coefficient (SE)
Know well	0.816* (0.361)	1.162*** (0.306)
Somewhat familiar	0.596* (0.247)	1.095*** (0.281)
Seen before	0.589* (0.228)	0.964*** (0.250)
Purchase amount	−0.006 (0.003)	−0.004 (0.004)
Budget	0.006** (0.002)	0.002 (0.003)
Environmental concern	0.087 (0.079)	0.127 (0.102)
Gender	0.007 (0.162)	0.150 (0.202)
Age	0.035 (0.095)	0.041 (0.113)
Education	0.030 (0.106)	0.100 (0.126)
Constant	0.812 (0.514)	−0.920 (0.667)
Log likelihood	−1787.264	−1734.978
Wald χ^2	39.81	38.47
Wald test of exogeneity		
χ^2	4.60	0.02
<i>P</i> value	0.032	0.896

^a *, **, and *** indicate *P* value levels of 0.1%, 1%, and 5%, respectively.

Table 4.—Determinants of price premium (PP) for Forest Stewardship Council (FSC)- and China Environmental Labeling (CEL)-labeled wood flooring, respectively ($n = 275$).^a

Independent variables	PP-FSC	PP-CEL
	Coefficient (SE)	Coefficient (SE)
Know well	21.771** (7.692)	7.572 (5.695)
Somewhat familiar	18.604** (5.595)	5.858 (5.628)
Seen before	18.091** (5.691)	4.475 (5.616)
Purchase amount	0.252** (0.090)	0.171* (0.081)
Budget	0.234*** (0.049)	0.230*** (0.050)
Environmental concern	−2.277 (2.123)	1.013 (1.851)
Gender	−1.130 (4.327)	−5.466 (3.790)
Age	1.532 (2.743)	1.480 (2.487)
Education	−2.412 (2.732)	−2.665 (2.644)
Constant	−37.542 (15.012)	−31.485 (14.035)
Number of observations	183	226
Wald χ^2	61.46	59.80
Wald test of exogeneity		
χ^2	7.30	4.78
<i>P</i> value	0.006	0.029

^a *, **, and *** indicate *P* value levels of 0.1%, 1%, and 5%, respectively.

and half of them claimed to “know well.” Twenty-six percent of respondents indicated that they had seen the CEL label before, but did not know what the label stands for. The remaining 28 percent first encountered the CEL label in our survey (Fig. 2). The result was close to the result of Luo et al. (2017), which showed that 57 percent of respondents knew the CEL label, but was lower than the finding of Wang (2013), which showed that 70 percent of respondents knew the CEL label in Jiangsu and Zhejiang provinces of China. It is reported that the average educational level in Jiangsu and Zhejiang provinces is higher than that in Chongqing (United Nations Development Programme 2016); thus, we considered education to have an influence on Chinese consumers’ knowledge of the CEL label, which aligns with Tikka et al. (2000).

Eighty-one percent of the respondents intended to buy CEL-labeled wood flooring with a mean PP-CEL of 44 CNY/m², which equaled 19 percent of their budget for wood flooring (Table 1). Compared with the FSC-labeled wood flooring, consumers’ PI and PP for the CEL-labeled wood flooring were high versus nonlabeled wood flooring. We considered that this was because Chinese consumers highly recognized the CEL label, although the functions of those two certifications were different.

Effect of CEL label knowledge on PI and PP for certified wood flooring.—The IV-Probit model result showed that the knowledge levels of the CEL label (i.e., “know well,” “somewhat familiar,” and “seen before”) affected PI (Table 3). In interviews, 22 respondents mentioned worries about excessive chemical residues (e.g., formaldehyde) in the engineered and laminate wood flooring, which incentivized them to purchase the CEL-labeled product for its guarantee of health safety. However, the budget did not show a significant effect. In this case, consumers placed higher priority on health impacts than on the price of wood products regarding purchasing an environmentally-certified product.

The results of IV-Tobit model are shown in Table 4. The Wald test of exogeneity rejected null hypothesis ($P = 0.029$); it suggests that the budget was not an exogenous variable. According to the results, the knowledge of the CEL label did not have a significant influence on the PP. Instead, purchase amount and budget of wood flooring positively affected it. This finding indicated that consumers’ economic status played a main role in the purchase behaviors for an environmentally-certified product, which is in line with Peng (2015). The strategy of raising consumers’ eco-label knowledge, which was adapted to increase the PP-FSC, was not suitable for promoting the CEL-labeled wood flooring in China. In the interviews, 14 respondents stated that they knew of the CEL label through media coverage of its falsification by certain manufacturers. Concerns about fake CEL labeling may have a negative impact on consumers’ PP. Consumers’ credibility for an eco-label influences their PP for an environmentally-friendly product, which was supported by the studies of Vlosky et al. (1999), Ozanne and Vlosky (2003), and O’Brien and Teisl (2004). Otherwise, the CEL label is managed by the Chinese government. Lin and Kim (2017) showed that consumers trusted a third-party certification more than a governmental certification. Although we did not assess consumers’ trust of the eco-labels in the survey, it still could be considered a reason why knowledge of the

FSC label affected the PP, whereas knowledge of the CEL label did not.

Predicted PP at each level of knowledge on FSC label

For a deep understanding of the relationship between PP and knowledge of the FSC label, we predicted the mean of PP-FSC at each knowledge level of the FSC label using the following equations:

$$PP_{\text{Know}} = (21.77 + 0.25 \times \text{Purchase Amount} + 0.23 \times \text{Budget} - 0.28 \times \text{Environmental Concern} - 1.13 \times \text{Gender} + 1.53 \times \text{Age} - 2.41 \times \text{Education} - 37.54) \div 275 \quad (1)$$

$$PP_{\text{Familiar}} = (18.60 + 0.25 \times \text{Purchase Amount} + 0.23 \times \text{Budget} - 0.28 \times \text{Environmental Concern} - 1.13 \times \text{Gender} + 1.53 \times \text{Age} - 2.41 \times \text{Education} - 37.54) \div 275 \quad (2)$$

$$PP_{\text{Seen}} = (18.10 + 0.25 \times \text{Purchase Amount} + 0.23 \times \text{Budget} - 0.28 \times \text{Environmental Concern} - 1.13 \times \text{Gender} + 1.53 \times \text{Age} - 2.41 \times \text{Education} - 37.54) \div 275 \quad (3)$$

$$PP_{\text{Unknown}} = (0.25 \times \text{Purchase Amount} + 0.23 \times \text{Budget} - 0.28 \times \text{Environmental Concern} - 1.13 \times \text{Gender} + 1.53 \times \text{Age} - 2.41 \times \text{Education} - 37.54) \div 275 \quad (4)$$

PP_{Know} indicates the mean PP-FSC when all the respondents claimed to “know well.” In the same way, PP_{Familiar} , PP_{Seen} , and PP_{Unknown} indicate the mean PP-FSC when respondents chose “somewhat familiar,” “seen before,” and “never saw,” respectively. The remaining variables in the equations indicate the sum of the total respondents’ values for each variable. The numbers 21.77, 18.60, and 18.10 in Equations 1 to 3 are the parameters of knowledge levels in the IV-Tobit model (Table 4).

The results showed that the mean PP-FSC was on the rise with a higher knowledge level of the FSC label; these values were 36, 50, 51, and 53 CNY/m² for “never saw,” “seen before,” “somewhat familiar,” and “know well,” respectively (Fig. 3). *T* test results showed a significant difference in PP existed between “never saw” and “seen before” ($t = -3.4294$, sig. < 0.000), “somewhat familiar” ($t = -3.4294$, sig. < 0.000), and “know well” ($t = -2.783$, sig. = 0.003), respectively.

This finding suggests that enhancing consumers’ knowledge of FSC label to the “seen before” level was an important step in increasing the PP for forest-certified products in China. Because of the great increase of PP-FSC from “never saw” to “seen before” knowledge level, we considered an effect of label design on the PP. As mentioned in “FSC-labeled wood flooring,” due to the lack of information on the FSC label, it can be difficult for consumers who first encounter the label to link it with

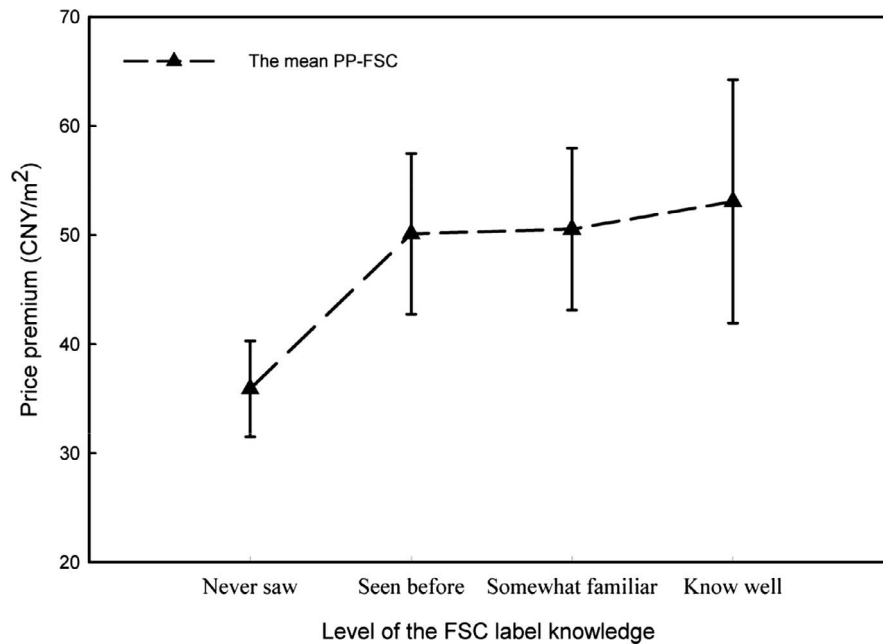


Figure 3.—The average predicted price premium (PP) at each knowledge level of the Forest Stewardship Council (FSC) label.

forest conservation. Teisl (2003) exhibited that the detailed environmental information displayed on the label positively affects consumers' purchasing behaviors. Hence, providing specific environmental information on the forest-certified products is necessary in the Chinese market.

Conclusions

This study showed that knowledge about the FSC label influenced consumers' intentions of purchasing forest-certified products and paying its PP in China. While knowledge of the CEL label had an impact on consumers' intentions of purchasing environmentally-certified products, it did not affect its PP. Therefore, the strategy of raising eco-label knowledge for increasing consumers' PP of an environmentally-friendly wood product is not suitable for all kinds of eco-labels. The main advantage of this study is that it considers the PP under the different knowledge levels of the FSC label and suggests that raising consumers' knowledge to the "seen before" level helps achieve a significant increase in the PP.

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