

มูลค่าทางเศรษฐศาสตร์ของห้องสมุดสาธารณะ: กรณีศึกษาห้องสมุดสาธารณะซอยพระนาง กรุงเทพมหานคร ประเทศไทย

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บทคัดย่อ

บทความนี้นำเสนอการประยุกต์เทคนิคการประเมินมูลค่าของสินค้าที่ไม่มีมูลค่าการตลาดเพื่อที่จะประเมินมูลค่าของห้องสมุดสาธารณะซอยพระนางในเขตกรุงเทพของประเทศไทย. ทั้งนี้วิธีต้นทุนการเดินทางของแต่ละบุคคลซึ่งเป็นเทคนิคการประเมินมูลค่าที่ถูกนำมาใช้ในการประเมินมูลค่าครั้งนี้ได้ถูกนำมาทดสอบผ่านสามแบบจำลองเพื่อเลือกแบบจำลองที่เหมาะสมที่สุด ผลการศึกษาพบว่าต้นทุนการเดินทางไปยังห้องสมุดมีผลกระทบด้านลบอย่างมีนัยสำคัญต่อการใช้บริการห้องสมุด ขณะเดียวกันผลการทดสอบพบว่าแบบจำลองเชิงเส้นมีความเหมาะสมที่สุด และโดยอาศัยแบบจำลองนี้ในการประเมินมูลค่าพบว่ามูลค่าของห้องสมุดสาธารณะซอยพระนางมีมูลค่าประมาณ 1,586,281.158 บาทต่อปี

คำสำคัญ: สินค้าสาธารณะ; ห้องสมุดสาธารณะ; วิธีต้นทุนการเดินทาง

Economic Value of a Public Library: The Case of Soi-Pranang Public Library in Bangkok, Thailand

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Abstract

This paper applies non-market valuation techniques to measure the benefits of Soi-Pranang Public Library in Bangkok Thailand. The individual travel cost method (ITCM) was used to estimate the consumer surplus welfare measures of the public library with three choices of models. The results reveal that travel costs for the public library has a negative significant effect on the visiting rate for all models. As a result of the linear-model, which represented the best fit for the data, the value of consumer surplus is around 1,586,281.158 baht per annual.

Keywords: Public Goods; Public Library; Travel Cost Models

Introduction

The literacy rate is one of the proxy variables of human capital. A country with a high literacy rate is likely to be successful in sustaining economic growth. Nevertheless, according to the human development report of United Nations Development Program (UNDP) in 2008, even though Thailand's literacy rate is higher than many developing countries, it is still lower than many developing countries which have a lower level of economic development. Similar to literacy rates, the National Statistical Organization (NSO) reports that Thailand's reading rate of persons that are aged over 5 years declined from 69.1% in 2004 to 66.3% in 2007. This indicates that not only is Thailand's literacy rate low, but also is its reading rate, and thus this may be another proxy variable that shows a diminishing trend in Thailand's human capital development. Consequently, these statistical facts imply that the level of Thailand's human capital development needs to improve if Thailand is to sustain its economic growth.

There are many areas in the level of Thailand's human capital development that need to improve. However, another survey of Thailand's NSO that represents the percentage of responses by persons aged over 5 years by type that supported the opinion to increase reading in 2005 showed that having a community or village library is the most important factor that supports an increase in reading. These data nevertheless may not be surprising data if we compare the number of public libraries in Thailand with other countries¹. The number of public libraries in Thailand is much lower when compared with some developed countries; for example, there are about 12,000 public libraries in Germany (Locher, 2005), while Thailand's public libraries are mostly located in each province or some districts, and the total number is around 200. Therefore, to increase reading rate as well as literacy rate, and thus improve the human capital in Thailand, increasing the number of public libraries should be one of the main approaches.

¹ Public library is an organization established, supported and funded by the community, either through local, regional or national government or through some other form of community organization. It provides access to knowledge, information and works of the imagination through a range of resources and services and is equally available to all members of the community regardless of race, nationality, age, gender, religion, language, disability, economic and employment status and educational attainment (Saur, 2001).

However, with no entrance fees, Thailand's public libraries possess the public good characteristics of being non-excludable and non-rival in consumption (Poor & Smith, 2004) and hence are not responsive to market forces. Consequently, with no market value, the private and even the public sector cannot directly perceive their usefulness, and for this reason, there is sometimes a lack of incentive sometimes to invest in public libraries. Thus, the value of a public library may be another way to increase awareness concerning its usefulness.

In order to estimate the value of goods which possess public good characteristics, non-market valuation techniques have primarily been used by economists. In general, there are two categories of non-market valuation methodologies used primarily by environmental economists: stated preference, and revealed preference (Poor & Smith, 2004). Nonetheless, for applying non-market valuation methodologies to value public libraries in this paper, we used the travel cost model (TCM), which is one of reveal preference valuation methods. The TCM can be divided into two models: Zonal Travel Cost Model (ZTCM), which is appropriate for evaluation of a site to which people travel only once in a long while, and the Individual Travel Cost Model (ITCM), which is appropriate sites that people visit repeatedly. Therefore, to be in line with people's public library usage behavior, the ITCM will be applied to the evaluation of public libraries, and Soi-Pranang Public Library in Bangkok was selected to be the case study in this paper since it is one of the importance public libraries where there is a large number of library users per year, and it also is located in the centre of Bangkok.

The remainder of this paper is organized as follows: Section 2 provides the theoretical background of the ITCM. Section 3 presents the paper's methodology, which explains the specific econometric models to be estimated and a discussion of the data used to estimate the econometric model. Section 4 shows the estimated model results and consumer welfare estimates. Finally, concluding remarks are provided.

Theoretical Background and Literature Review

The travel cost model is the oldest approach to environmental valuation. It was developed by Marion Clawson, who extended Harold Hotelling's work in 1959 (Israngkura, 1998). The TCM is one of the revealed preference valuation methods, which consist of the travel cost model, the hedonic model, defensive behavior model and cost of illness (Boyle, 2003).

Based on the weak complementarity assumption between trip expenditure and recreational goods, we can solve for the trip generation function from utility maximization.

$$\text{Maximize } U(X, V, Q)$$

$$\text{Subject to } I = P_x X + P_v V,$$

where X is a vector of all other goods, V is the quantity of recreation or visiting rate, Q is the quality of recreation, I is income, P_x is the price of each of the other goods, and P_v is the price of visits or travel costs, which consist of vehicle costs, opportunity costs and miscellaneous costs.

The result from the utility maximization then led to a set of demand functions or trip generation functions as follows:

$$V_i = f(P_v, I, Q). \quad (1)$$

Additionally, to complete the trip generation function, this function was extended with the addition of certain relatable variables, such as substitute sites and the socio-economic variables in the function. Thus the trip generation function can be expressed as follows:

$$V_i = f(P_v, P_s, I, Q, Z), \quad (2)$$

where P_s is the substitute price or travel cost for a substitute site and Z is the vector of demographic variables believed to influence the number of trips.

The regression result from (2) is the demand curve that will be used to calculate the consumer surplus (CS) or access value for a site by integrating under this curve. The calculation in CS of the ITCM involves a four-step procedure as follows:

First: calculate consumer surplus (CS)

$$CS_i = \int_{P_h}^{P_v} f(P_v, P_s, I, Q, Z), \quad (3)$$

where P_h is the choke price which is the price at which trips fall to zero in the

model (Parsons, 2003), and P_i is an individual's current price.

Second: calculate CS per individual

$$\text{CS per individual} = \frac{1}{n} \sum_{i=1}^n CS_i, \quad (4)$$

where n is the number of sample groups

Third: calculate CS per visit

$$\text{CS for a visit} = \text{CS per individual} / V, \quad (5)$$

where V is the average visiting rate per year of the sample group

Fourth: calculate the CS for a site

$$\text{CS for a site} = \text{CS per visit} * N, \quad (6)$$

where N is the number of visitors per year.

According to the four step-procedures, consumer surplus for the site was calculated from equation (6). This consumer surplus is the value of the site from using the ITCM. However, the process in the consumer surplus calculation will be different in the case of the ZTCM, though both TCM can use the same trip generation function.

There are many studies that have attempted to value the public library using various techniques. Walke, Helpin, Rankin and Chamman (2011) have identified a range of potentially useful ways of measuring the economic value of public library services. These include cost of time and effort, contingent valuation, cost benefit analysis, consumer surplus, input output models, and the library use valuation calculator. Morris, Sumsion, and Hawkins (2002) used the optimization model and benefits generated model to assess the value of the UK public library. The results show that the economic value of the UK public library is around £815,000 per annum. The Vermont Department of Libraries applied formulas similar to those used in South Carolina to the 2004-05 statistics of Vermont public libraries in an attempt to estimate various types of economic impacts of public libraries on Vermont taxpayers. The significant data which were discovered in this study include: the total direct economic impact was estimated at more than \$75 million, and the indirect economic impact of public library expenditures-wages, supplies, books, and other materials, construction, etc. on the state's economy was approximately \$26 million (State of Vermont Department of Libraries, 2008).

Similar to other public libraries, Victorian public libraries have also been valued. The Dollars, Sense and Public Libraries was a major three-year project to assess the economic value of public libraries in Victorian. To measure the benefits, such as services and programs, social interaction, improved education, etc, this study used a combination of three valuation techniques: financial savings, travel costs, and contingency valuation. The average amount they were willing to pay to maintain community access to current library services was \$72 a year, while travel costs were around \$419 a year on average. Additionally, this study also identified how Victorian public libraries stimulate their local economies through direct outlay on goods and services, staff wages, and spending that has been triggered by people's use of the library. This yielded three figures: public libraries generate \$722 million in Victorian income, public libraries contribute \$120 million to the Gross State Product, and public libraries support the full-time equivalent of 4,430 jobs (State Library of Victoria, 2005).

Another Australian research project was conducted by the Library Council of New South Wales. A variety of methodologies was applied for this research. These include a survey inviting input from the library managers of all public library service; ten case studies for more in-depth evaluation of stakeholders' views, and interviews with representatives from nine external organizations. The results revealed that public libraries generate an economic benefit equivalent to \$4.24 to invested dollar and that NSW public libraries generated \$2.82 of economic activity for each dollar expended on public libraries (Library Council of New South Wales, 2008). Also, in Norway, Aabø (2005) applied the contingent valuation method, which is based on the individual's own assessment of the good to be valued and implies that respondents are asked to state their values of a change in provision of nonmarket goods, in the form of WTP for improvement or minimum compensation (WTA) to accept a change to the worse. The overall conclusion from this study showed that, on average, Norwegian households value the benefits from public libraries clearly higher than the costs of providing the library services as a result of a cost-benefit ratio of approximately 1:4 at the national level.

Methodology

1. Model

Based on the trip generation function from the previous section, we can express the trip generation function that will be used to calculate the value of the public library for this paper as follows:

$$V_i = f(TC_{vi}, TC_{si}, Y_i, Gender_i, Age_i, Edu_i), \quad (7)$$

where V_i is the visiting rate, TC_v is the travel cost for the Soi – Pranang public library, TC_s is the travel cost for the substitute site, Y is income, and $Gender$, Age and Edu are an educational experience.

2. Empirical Specifications

The trip generation function (7) will be estimated by using the Ordinary Least Square (OLS) technique. The regression results then will be used to calculate the value of the Soi-Pranang Public Library. The empirical importance of the functional form has been noted by many authors, for example, Ziemer, Musser and Hil (as cited in King, 1989, p. 169), who noted that different functional forms can generate very different magnitudes of benefits.

Three functional forms were usually used to estimate the econometric model of the recreational demand model. The three functional forms estimated are linear, semi-log, and double-log, which can be expressed as follows:

(1) Linear Model:

$$V_i = b_o + b_1 TC_{vi} + b_2 TC_{si} + b_3 Y_i + b_4 Gender_i + b_5 Age_i + b_6 Edu_i + e_i$$

(2) Semi-Log Model:

$$\ln V_i = b_o + b_1 TC_{vi} + b_2 TC_{si} + b_3 Y_i + b_4 Gender_i + b_5 Age_i + b_6 Edu_i + e_i$$

(3) Double-Log Model:

$$\ln V_i = b_o + b_1 \ln TC_{vi} + b_2 \ln TC_{si} + b_3 \ln Y_i + b_4 \ln Gender_i + b_5 \ln Age_i + b_6 \ln Edu_i + e_i$$

Examination of the recreation demand literature suggests that researchers have employed at least three different ways to choose functional, for example, intuition, previous knowledge and goodness –of-fit tests (see detail

in King, 1989). However, it seems that several authors prefer the semi-log functional form to other functional forms, for example, John Loomis and Joseph Cooper (Poor & Smith, 2004; Ziemer, Musser, & Hill 1980; Smith 1975; Strong 1983; K.E. McConnell 1985 as cited in King, 1989, p. 169).

3. Data and Collection

There are two types of data used in this paper: primary data (i.e. survey data) and secondary data (the number of service users/year of the Soi-Pranang Public Library in Bangkok) in 2008. The main data came from survey data by using on-site sampling and systematic sampling as a sampling strategy, and the total number of observations was 200. The number of service users/year of the Soi-Pranang Public Library, which was around 172,854 came from the Culture, Sports, and Tourism Department, Bangkok.

In this paper, we used seven variables in the trip generation function, and a statistical summary of these variables included in the econometric model is reported in table 1. Most of the variable definitions were quite clear, but some variables needed to be interpreted. Since repeating visits usually represent service user behavior in the public library, we thus used a visiting rate/month as the unit of visiting rate (V_i) in this paper. Meanwhile, there are still different views in the interpretation of the travel cost variables. Different theories of time allocation that explain how to measure the travel time value have been discussed for a long time, for example, G.S. Becker in 1965 and A.C. DeSerpa in 1971 (Truong & Hensher, 1985).

In the field of environmental economics, travel cost, which is the most important determinant of the demand for recreational goods, generally consists of access costs, transportation costs, and time costs or opportunity costs (Earnhart, 2004). However, the composition of travel costs may be different in detail from the general travel cost model in this paper. For this paper, travel costs include: (1) vehicle costs (e.g., fare, petrol costs), (2) opportunity costs (i.e., time costs) and (3) miscellaneous costs (e.g., food, drink, and snacks).

Additionally, for simplicity, the travel cost variables were determined exogenously in this paper. Nonetheless, several authors have tried to improve

the valuation of time and transportation costs, especially for time costs or opportunity costs, for example, McConnell (1992), Bateman et al., (1999), McConnell & Strand (2001), and Earnhart (2004). Regarding the substitute site's definition, we defined the site that individuals prefer to substitute the Soi-Pranang public library (e.g., book store and other libraries), while a remainder of variables is clear in their definition.

Estimation Results and Welfare Estimate

1. Estimation Results

The Ordinary Least Squares estimation results for each of the functional forms are reported in table 2. Table 2 includes three functional forms showing the statistical relationship between visiting rate and explanatory variables. Unlike many papers in which the semi-log equation provides a better fit for the data than other functional forms, liner equation provides the best fit for the data in this paper with the highest adjusted- R^2 (0.319). In addition, a joint F-test of the explanatory variables indicated that even if all models were significant at the 1% level, the linear model shows the highest F-test value.

With respect to the coefficient estimates, the coefficient estimate associated with the travel cost for the site variable was negative significantly at the 1% level for all three model specifications. This is consistent with demand theory in which the visiting rate was inversely related to price or travel cost. On the other hand, even though the sign of travel cost for the substitute site variables was consistent with demand theory for all three models, except for the double-log model, the coefficient of the travel cost for the substitute site variable was insignificant for all three models. Educational experience was also significant at the 1% level for all three models except for the double-log model. There was nonetheless a negative relationship between visiting rate of Soi-Pranang Public Library and educational experience. This implies that the higher the education, the less the visiting rate.

2. Welfare Estimate

To estimate welfare, we need to select the model that provided the best fit for the data. As can be seen in table 2, with the highest adjusted- R^2 , the linear-

model was the best. Therefore, we used the linear-model in calculating consumer surplus for Soi-Pranang Public Library by following the four-step procedure in section II.

First: calculate consumer surplus (CS)

With the choke price, which is calculated from the linear model, equalling 278.54 baht, the CS estimate is 211,882 baht.

Second: calculate CS per individual

$$\begin{aligned}\text{CS per individual} &= \frac{211,882}{200} \\ &= 1,059.41 \text{ baht/person}\end{aligned}$$

Third: calculate CS per visit

$$\begin{aligned}\text{CS per visit} &= \frac{1,059.4}{115.4} \\ &= 9.177 \text{ baht/visit}\end{aligned}$$

Fourth: calculate CS for a site

$$\begin{aligned}\text{CS for a site} &= 9.177 \times 172,854 \\ &= 1,586,281.158 \text{ baht/year,}\end{aligned}$$

where 172,854 is the number of service user/year of the Soi-Pranang Public Library.

Therefore, according to the ITCM for Soi-Pranang Public Library, the value of consumer surplus is about 1,586,281.158 baht/year. However, we should be aware that this value may be undervalued or overvalued due to many factors: for example, if the choke price is too high, CS values may be overvalued. In contrast, if the chock price is too low, CS values may be undervalued (Thailand Development Research Institute, 1999).

Concluding Remarks

Soi-Pranang Public Library typically possesses public goods characteristics, and thus non-market valuation techniques need to be employed to measure their benefit. The ITCM, which is one of the non-market valuation techniques, was applied in this paper. In addition, since there are usually three functional forms used to estimate the econometric model of the recreational demand model, all of the models needed to be tested to determine which model provided the best fit for the data.

The empirical results showed that the linear model provided the best fit for the data with the highest both adjusted- R^2 and F-test value. The coefficient estimate associated with the travel cost for the Soi-Pranang Public Library variables was negative significant for all three models, while all of the remaining variables were insignificant, except for the education variables in the linear-model and semi-log models. By using the linear model in calculating consumer surplus, the CS estimate for the linear model was about 1,586,281.158 baht/year. It nevertheless should be noted that this value is quite low when compared with the visiting rate per month or year. One of the possible explanations may be the low travel costs, especially fares and petrol costs, which were equal to zero in several observations. These may be normal results due to the fact that most service users were people that lived near Soi-Pranang Public Library.

Nevertheless, even though the value of Soi-Pranang Public Library was quite low, at least its value can be shown in terms of monetary value. Bangkok metropolitan's policy makers should be aware of this value, which explicitly presents the benefit of Soi-Pranang Public Library and then try to improve or even increase the number of public libraries in Bangkok. In addition, in order to have large enough budgets for improving public libraries in the future, a public library fee may also need to be implemented. Charging a fixed fee may bring about a profit-maximizing pricing strategy under certain conditions such as excess capacity or the high cost of collecting fees (Locher, 2005). However, public libraries not having to maximize profit and charge fees should depend on several factors in the future, such as the situation of the economy, budget constraints, and the community's view.

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