HOUSEHOLD WILLINGNESS TO PAY FOR MANDATED KERBSIDE RECYCLING PROGRAMME IN HULU LANGAT, MALAYSIA

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By

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia
in fulfilment of the requirement for the degree of
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July 2011

Chair: Professor Khalid Abdul Rahim, PhD

Faculty: Economics and Management

The aim of this study is to determine contingent valuation (CV) estimates of household willingness to pay (WTP) to a mandated kerbside recycling program (KRP) through time-use approach in two separate aspects; the opportunity costs of time used for waste self-sorting and WTP for others to do the sorting. Specifically, the purpose of this research was to ascertain how much people would be willing to pay for an environmentally sound waste management without any effort or work on their behalf. Furthermore, to determine residents' attitudes and behaviour towards recycling, factors influencing recycling behaviour before and after proposed idea of KRP. Finally, to examine to what extent various attitudinal, behavioural, and demographic variables were associated with WTP served as another specific aim.

An open-ended iterative bidding WTP question was applied, the scale of the bid levels being established from a pilot sample of respondents presented with an open-

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ended WTP question. Survey data was gathered and conducted within the District of Hulu Langat, Selangor involving samples of 250 families. The study was unique in that, as the programme was already implemented in few cities in Malaysia, the respondents had relatively a higher level of information about the commodity that they were valuing; therefore, biasness of CV studies can be reduced. The survey was accessed together with some recycling questions, yielding responses to be correlated to the utility that individuals were assembling of the recycling activities.

Based on the regression analysis, the WTP was influenced by socio-demographic factors (education, age and whether an individual a recycler or not). If the programme was mandated, the value of WTP would be higher. Furthermore, the mean WTP for mandated KRP is estimated to be RM5.45 per household. This value is not just an amount that people would pay to have the sorting service; it somehow enlighten the expected worth of the service.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
Sebagai memenuhi keperluan untuk ijazah
Master Sains

KESANGGUPAN ISI RUMAH HULU LANGAT, MALAYSIA MEMBAYAR UNTUK PROGRAM KITAR SEMULA DENGAN KAEDAH PENGUTIPAN RUMAH KE RUMAH SECARA WAJIB

Oleh

NG PHUAY YING

Julai 2011

Pengerusi: Profesor Khalid Abdul Rahim, PhD

Fakulti: Ekonomi dan Pengurusan

Tujuan kajian ini adalah menganggar nilai kontingen (*contingent valuation, CV*) bagi kesanggupan isi rumah membayar (*willingness to pay, WTP*) untuk program kitar semula dengan kaedah pengutipan rumah ke rumah secara wajib (*mandated kerbside recycling programme, KRP*); melalui dua aspek yang berasingan dalam pendekatan berasaskan masa (*time-use approach*), iaitu kos lepas yang digunakan mengasingkan sisa buangan dan WTP untuk orang lain menjalankan pengasingan sisa buangan. Secara khusus, kajian ini bertujuan untuk mengenalpasti kesanggupan isi rumah membayar untuk pengurusan sisa yang lebih bersifat mesra alam tanpa usaha gigih isi rumah tersebut. Selain itu, kajian ini juga menilai sikap dan perilaku isi rumah terhadap program kitar semula, faktor-faktor yang mempengaruhi perilaku isi rumah terhadap program kitar semula sebelum dan selepas KRP dicadangkan. Kajian ini juga bermatlamat untuk mengenalpasti sejauh mana pelbagai sikap, perilaku, dan pembolehubah demografi dikaitkan dengan WTP.

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Soal selidik "*open-ended iterative bidding*" WTP diedarkan, skala peringkat tawaran WTP ditetapkan dari sampel responden siasatan tinjauan dengan soal selidik "*open-ended*". Data tinjauan dikumpul dan dijalankan dalam Daerah Hulu Langat, Selangor melibatkan sampel 250 isi rumah. Penyelidikan ini unik kerana, KRP telah dilaksanakan di beberapa bandar di Malaysia, responden mempunyai tahap pengetahuan yang lebih tinggi tentang KRP. Oleh itu, ia mengurangkan beberapa kelemahan (*biasness*) dalam kajian CV. Soal selidik ini diedarkan bersama dengan beberapa soalan mengenai kitar semula, ini memberikan tanggapan berkaitan dengan utiliti yang diperoleh daripapda usaha kitar semula.

Berdasarkan analisis regresi, WTP dipengaruhi oleh faktor-faktor sosio-demografi (pendidikan, umur dan adakah seseorang itu pengitar semula). Jika program ini diwajibkan, nilai WTP akan menjadi lebih tinggi. WTP yang dianggarkan dengan adanya KRP bernilai RM5.45 setiap isi rumah. Nilai ini bukan sekadar amaun isi rumah sanggup membayar untuk mempunyai perkhidmatan pengasingan sisa buangan, tetapi ia juga merupakan nilai anggaran perkhidmatan tersebut.

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LIST OF ABBREVIATIONS

3R's	Recycle, Reduce And Reuse
BG	Bidding Game
CS	Compensating Surplus
CV	Compensating Variation
CVM	Contingent Valuation Method
DBDC	Double-Bounded Dichotomous-Choice
DC	Dichotomous Choice
ES	Equivalent Surplus
EV	Equivalent Variation
GHGs	Green House Gases
HC	Home Composters
IB	Iterative Bidding
KRP	Kerbside Recycling Program
ML	Maximum Likelihood

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MSW	Municipal Solid Waste
NGOs	Non-Government Organizations
OE	Open-Ended
OLS	Ordinary Least Squares
PAYT	Pay As You Throw
PC	Payment Card
SC	Separation Container
SWM	Solid Waste Management
WTA	Willingness To Accept
WTP	Willingness To Pay

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CHAPTER I

INTRODUCTION

1.1 Background Information

Malaysia, with a population of more than 26 million in year 2007, it is estimated about 17,000 tonnes of domestic waste generated in Peninsular Malaysia daily in Peninsular Malaysia, which is adequate to fill up the Kuala Lumpur Twin Towers in nine days (Sunday Mail, 2005 and Omran, Mahmood, Abdul Aziz & Robinson, 2009). In 9th Malaysia Plan, National Strategic Plan on Solid Waste Management (SWM) assessed that the waste produced is tend to enlarge by 3.59 percent each year rooted in the population growth projections for the period of 2002-2020. According to the projection, the total waste produced in Peninsular Malaysia is about 19,000 tonnes per day in 2010; while the estimated population in year 2010 achieved above 28 million (The World FactBook, 2010). In 2020, the amount of waste generated is expected to be 30,000 tonnes per day with an average of 0.85 kg per capita per day.

Currently, 176 of 290 landfill spots are still in operation. Out of this, only 7 landfills are sanitary. In Malaysia, most of the wastes created were landfilled (Mohd. Abdul, 2010) even after alternatives were explored. In particular, the Sungai Sedu landfill in Banting supposed to ceased operations in June 2009. Due to the shortage of landfills in Selangor, Sungai Sedu remains open for municipal waste from Sepang and Putrajaya, a federal territory ("Solid waste separation at source pilot project initiated in Putrajaya", The Star, 19 November 2009).

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Furthermore, despite lots of power consumed, the incinerator built in Langkawi was unable to cover more than 19,000 tonnes of wastes produced daily ("Proper Garbage Disposal Method Needed", The Star, 29 December 2009). Therefore, the room to develop landfills has become scarce owing to existing landfills reaching capacity and somewhat down to the increased of residents conflict towards the establishment of new facilities (incineration plants) near housing areas. As the human population continues increasing, the volume of solid waste also increases (Seacat & Northrup, 2010), so do happen in the urban areas in developing countries like Malaysia. Therefore, it has become a great challenge for any developing countries to manage household solid waste in a proper way.

Thousand tonnes of wastes produced every day in Malaysia are absolutely uneasy for the government to collect and dispose it properly to guarantee a clean and fresh. If household wastes were disposed or recycled properly, however it would improve the current problematic waste disposal management (Mohd. Abdul, 2010). The national recycling campaign has set a target of 22 percent by year 2020 as part of 'Vision 2020' the government of Malaysia. Conversely, recycling in Malaysia is at an infant stage.

In recent years, with mounting environmental awareness, local authorities re-promoting waste recycling by drafting policies and offering support to private waste management organization. For example, the pioneer effort in Kerbside Recycling Programme (KRP) in Malaysia was held in Putrajaya by the Housing and Local

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Government Ministry ("Solid waste separation at source pilot project initiated in Putrajaya", The Star, 19 November 2009). At present, Malaysia does not operate a kerbside recycling collection service extensively. Only a few townships have KRP where households place bags of recyclable items on the kerbside, which are picked up by a special collection truck on scheduled days. In the interim, the Ministry of Housing and Local Government plans to introduce legislation to make recycling mandatory ("Waste not, want not", The Sun Daily, 12 March 2005).

The achievement of universal recycling programme is depending heavily on high-involvement rates, high recycling rates, and / or a mixture thereof. The likelihood of KRP may be weigh up via a cost-benefit analysis. Respondents' willingness to pay (WTP) was assessable through this analysis. Regardless of the lack of well-developed markets for recycling, the demand for recycling exists as a tendency among some households to recycle. Even with in the absence of market data, WTP can still be estimated directly using expressed preference methods, like contingent valuation method (CVM). Such direct evaluation techniques can and have been used to estimate a WTP for recycling programme (Lake, Bateman & Parfitt, 1996; Aadland & Capland, 2003; Irina, 2004; Blaine, Lichtkoppler, Jones & Zondag, 2005; Palatnik, Ayalon & Shechter, 2005; and Bohara, Caplan & Grijalva, 2007). This study exercised CVM to estimate WTP for two different aspects of KRP in Selangor, Malaysia.

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1.2 Problem Statement

Waste generation is strongly correlated with a few factors which include population, urbanization and affluence (Bogner, Abdelrafie Ahmed, Diaz, Faaij, Gao, Hashimoto, Mareckova, Pipatti & Zhang, 2007, p. 588). Thus, a rising industrialized country like Malaysia, SWM considered as an essential part of appropriate public health and environmental control. Currently, there are approximately 95-97 percent of waste collected was disposed of to landfills. The remaining waste was sent to small incineration plants, diverted to recycles or was illegally dumped (Mohd. Abdul, 2010). Ravindran Raman Kutty (senior corporate communications manager at Alam Flora) further disclosed that 30 percent of households generated waste could be recycled, yet there was merely about 5 percent being recycled ("Waste not, want not", The Sun Daily, 12 March 2005).

As the population in Malaysia grew, so did the per capita waste generation rate especially in urban areas, such as Penang, Kuala Lumpur and Selangor. Selangor is Malaysia's most populous state with the nation's biggest conurbation. According to the waste generation statistic produced by Ministry of Housing and Local Government, Selangor produces about 4,133 tons of waste per day; with an average of 0.7 kg per capita per day in year 2010; which is also the highest daily average waste disposed among all states. The average recycling rate for the state, in fact ranges from 3 percent to 5 percent. Compare to other urban population country like Singapore, their overall recycling rate hits 58 percent (Waste Statistics and Recycling Rate for Singapore, 2010). Their recycling rate thus clearly exceeded Malaysia's in the same period.

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With rapidly growing rates of waste generation, the government had forced to implement for new alternatives to handle solid wastes in order to reduce the amount of wastes being landfilled, to avoid landfill space crisis and the maintenance problems and costs incurred with aged landfills. Hence, numerous recycling programmes executed by local efforts to reduce the magnitude of waste end up being landfilled. One of the highest awareness gained was the introduction of residential KRP, for instance, the pioneer efforts in Putrajaya in year 2009 ("Waste not, want not", The Sun Daily, 12 March 2005).

The positive feedback of the pilot residential KRP project in Putrajaya has marked progress in recycling activities; therefore government plan when to make KRP a nationwide facility. Meanwhile, the Ministry of Housing and Local Government also strategize to mandated recycling via the introduction of legislation ("Waste not, want not", The Sun Daily, 12 March 2005). The government's decision to enforce the segregation of household waste in 2013 was further stressed ("Managing rubbish to live comfortably", Sin Chew Daily, 17 June 2010).

As part of 'Vision 2020' the government of Malaysia is seeking to improve environmental protection and integrate its solid waste management systems. The national recycling campaign has set a recycling target of 22 percent by 2020. Besides, under the 9th Malaysian Plan, SWM is a priority area, as can be seen by the intention

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of the government to set up a Solid Waste Department which will be entrusted to enforce the Solid Waste Management Bill.

Moreover, public awareness and participation is very crucial in recyclable collection and sorting. Public initiative is obliged to create the appropriate environment, such as education and infrastructure, for the residents to take part in the recycling effort (Mohd. Abdul, 2010). Besides, communicating with these vital players in the system is essential, for investing money and time in educating households about the effect their own actions in generating and handling waste can have on the environment would seem to be time and money well spent (White, Franke & Hindle, 1995). Hence, if local authorities planned to mandate the KRP across Malaysia, an understanding of public attitudes and behaviour towards recycling is one of the vital elements of an integrated waste management. In addition, Jamal (2002) also confirmed that householders' behaviour in waste management had a critical effect on the overall environmental impact and performance. Jamal (2002) further claimed that 93 percent of the respondents agreed that recycling was good for the environment, however, only 17 percent recycled regularly. The main reasons cited for not recycling were: respondents didn't know of any recycling programme; they did not have time to recycle; and there were no economic incentives.

A number of issues have to be considered with the intention of achieving an effective integrated waste management in the country; i.e. more research works hence must be done locally to provide the public a better understanding of the issues mentioned,

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particularly waste minimization and recycling. Besides, the attitudes and behaviour of the public also play a part in affecting the amounts. The level of recycling behaviour determines the quantities of waste that eventually disposed to the landfill sites. Moreover, these issues can only be analyzed through public opinion survey or behavioural studies. Thus, the planning and designing of future systems may be made easier if a clear understanding of the public expectations and perceptions of political and institutional practises are achieved as well as the pattern of waste generation and its components being analyzed.

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1.3 Objectives

1.3.1 General Objective

The general objective of this study is to determine contingent valuation estimates of households' willingness to pay (WTP) to a mandated KRP through time-use approach.

1.3.2 Specific Objectives

The specific objectives are

1. To determine residents' attitudes and behaviour towards recycling, factors influencing recycling behaviour before and after proposed idea of KRP.

2. To examine to what extent various attitudinal, behavioural, and socio-demographic variables were associated with WTP served as another specific aim. The attitudinal and behavioural aspects here were referring to the respondents' attitudes towards KRP which include the time they spent in waste sorting.

Households' use of time and energy are frequently overlooked in cost and benefits analysis. To achieve the general objectives, two different aspects are addressed; first, to value the people opportunity costs of time spending in recyclable and second, to determine how much people would be willing to pay for a waste sorting service.

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1.4 Significance of Study

An integrated SWM technique and the significance of public awareness in 3R's (Recycle, Reduce and Reuse) are frequent associated. Its efficacy has been observed in number of countries, but, its performance in Malaysia is hitherto to be notice (Mohd. Badruddin, 2004). Malaysians only recycle 5 percent of their waste ("Waste not, want not", The Sun Daily, 12 March 2005).

Global alarm over environmental forces knows no boundaries. The foremost hindrances to execute such a programme in Malaysia were poor community supports and scarce in proper guidelines. Malaysians have yet to tag on the tendency in revolutionizing their insights concerning the significance of waste reduction and /or recycling, as well as the understanding of institutional procedures (Mohd. Badruddin, 2004).

Malaysians share the 'need to know' attitudes and always craze for new information. Solid waste generation is one of the major environmental problems faced in the world (Omran et al., 2009). In Malaysia, the local government authorities have been accountable for the SWM service. However, over the years, scarce infrastructure, incompetent institutional setup, and flaw in financial and technical resources, has led to an inadequate and unproductive level of provision at different stages. The study of Jamal (2002) also found that households were unhappy with the existing waste management service. Thus, it is certainly needed a better planning and organizational framework on top of the close community collaboration at the grass root stages.

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In order to provide public a better understanding of the issues mentioned, more research works need to be done. The main research objective is provides contingent valuation estimates of household values for a mandated kerbside recycling program (KRP) through time-use approach in two different aspects; first, to value the people opportunity costs of time spending in recyclable and second, to determine how much people would be willing to pay for a waste sorting service. Consequently, this research may help to determine the costs incurred to the community from execution of KRP. Furthermore, the estimated results not just to compare with the similar researches done, the analysis of study however, adds significantly to current alertness on SWM issues.

Besides, this study can further reinforce the previous findings of similar research has done locally or internationally in SWM, especially in Malaysia, as the works on such areas still in a premature state.

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1.5 Dissertation Organization

The dissertation consists of five chapters. An introduction to the dissertation, problem statement, objectives and significance of study are presented in Chapter I. In Chapter II, literature review on previous studies on brief reviews of solid waste management (SWM), recycling, contingent valuation, and WTP for Kerbside Recycling Programme (KRP). While, Chapter III contains a discussion on methodology used in conducting the survey which includes survey design, econometric model and model specification. Besides, the theoretical framework is also accessible in this chapter. The summary statistics of the survey data, estimation of results, discussion and policy implementation are done in Chapter IV. In Chapter V, a summary of the research, discussion on the advances to existing knowledge, and recommendations for further research are presented.

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