UNIVERSITI PUTRA MALAYSIA

VALUATION OF FATAL AND NON-FATAL INJURIES DUE TO MOTORCYCLE ACCIDENTS IN MALAYSIA

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By

MOHD FAUDZI MOHD YUSOFF

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia in Fulfilment of the Requirement for the Degree of Doctor of Philosophy

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DEDICATION

Especially to:

My beloved mother Hajjah Che Amah bt Awang

&

In memorial ***My father Haji Mohd Yusoff bin Haji Kassim***

Special to...

Abang Athif

Fadhli

Afif

Fahmi

Nadiah

Aiman

Husna

Hanis

Last but not least to by beloved wife

Hajjah Rahani bt Mohd Zin

Jazakumullahukhairan for all the support, encouragement, patience and faith.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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Chairman: **Professor Ir. Radin Umar Radin Sohadi, PhD**

Faculty : **Engineering**

Policy makers often struggle with the question of what is the appropriate monetary value to be associated with reduced fatalities. As a result, a disproportionate number of road safety projects were abandoned in favor of other types of projects as they all compete for a limited amount of public funds. This is the motivation for carrying out this research the main objective of which is to evaluate of the value of statistical life (VOSL) of fatal and non-fatal injuries among motorcyclists in Malaysia in an attempt to overcome the lack of reliable estimates of accident.

The study utilizes extensively two surveys namely the valuation survey amongst motorcyclists covering 6 constituents within the Seremban Municipality in the state of Negeri Sembilan and the epidemiology survey of hospitalized non-fatal injuries amongst injured motorcyclists at Seremban Hospital to develop the Injury Scale Descriptor. Apart from using descriptive statistics, the inferential statistics have been utilised to test the reliability and stability on the estimated values.

Results from the valuation survey passed all the criteria of the construct validity especially the critical scope test. Multiple regression analyses showed statistically significant relationships between WTP and vital variables of income, age, accident experience and riding purpose. A unique variable of race was also found to be significantly related to WTP.

Upon control for the effect of inter-country variation in income, the mean values of statistical life (VOSL) have been found to be approximately RM1.1 million and RM77,000 per non-fatal injury. After considering GDP growth, the suggested estimate to reflect the benefits of road safety in public policy analysis for year 2004 is RM1.3 million and RM92,400 for fatal and non-fatal injury respectively

This study recommends the need for further research on other cost elements to complement the human cost in the effort to establish the comprehensive road accident costs. Other valuation methods should also be conducted in similar valuation studies to fortify the present human cost estimates. Finally, after the successful estimate of intangible benefits (human cost) of road safety, it is strongly recommended that research on other infrastructure investment benefits be undertaken. Only then, can proper Cost Benefit Analysis method become the instrument in evaluating future investments of transport infrastructures.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

MENILAI KECEDERAAN MAUT DAN TIDAK MAUT AKIBAT DARIPADA KEMALANGAN MOTOSIKAL DI MALAYSIA

Oleh

MOHD FAUDZI BIN MOHD YUSOFF

Julai 2006

Pengerusi: **Professor Ir. Radin Umar Radin Sohadi, PhD**

Fakulti : **Kejuruteraan**

Perdebatan dengan persoalan berapakah nilai wang yang berpatutan boleh dihubungkaitkan dengan pengurangan kemalangan maut tidak pernah berakhir. Akibatnya, sebahagian besar daripada projek keselamatan jalanraya dibatalkan kerana terpaksa memberi jalan kepada projek lain dalam persaingan memperolehi peruntukan dana yang terhad. Fakta inilah yang memotivasikan perlaksanaan kajian ini yang mempunyai objektif utama untuk menganggarkan nilai statistik hayat dan kecederaan di kalangan penunggang motosikal dalam usaha mengatasi ketiadaan anggaran kos kemalangan

Kajian ini telah melaksanakan dua tinjauan soalselidik iaitu soalselidik yang ditadbirkan di kalangan penunggang motorsikal sekitar enam mukim dalam Perbandaran Seremban, Negeri Sembilan dan soalselidik epidemiology mengenai kecederaan (tidak melibatkan maut) di kalangan penunggang motorsikal yang dimasukkan ke Hospital Seremban untuk menghasilkan Skala Penerangan Kecederaan. Selain daripada mengunakan statistik deskiptif, statistik inferensi juga digunakan untuk menguji kepercayaan dan kestabilan nilai yang dianggarkan.

Keputusan-keputusan yang diperolehi daripada soalselidik pertama telah melepasi semua kriteria 'construct validity' terutama sekali ujian skop yang kritikal. Analisa regressi pelbagai menunjukkan hubungan yang signifikan antara WTP dengan angkubah penting seperti pendapatan, umur, pengalaman kemalangan dan tujuan menunggang. Satu angkubah unik iaitu bangsa turut didapati mempunyai hubungan yang signifikan dengan WTP.

Setelah mengawal kesan perbezaan pendapatan antara negara, kuantiti nilai min statistik hayat seunit kemalangan maut yang diperolehi ialah sebanyak RM1.1 juta dan manakala kuantiti nilai statistik hayat bagi seunit kecederaan RM77,000. Setelah mengambil kira kenaikan GDP, anggaran yang dicadangkan bagi mencerminkan faedah keselamatan jalanraya untuk tujuan analisa polisi awam pada tahun 2004 ialah RM1.3 juta (satu kemalangan maut) dan RM92,4000 (satu kecederaan).

Kajian ini mencadangkan keperluan melaksanakan penyelidikan seterusnya atas kos-kos elemen yang lain supaya menjadi pelengkap kepada kos manusia dalam usaha penentuan kos kemalangan jalanraya yang komprehensif. Kaedah penilaian yang lain juga perlu dilaksanakan dalam kajian penilaian yang serupa untuk mengukuhkan lagi anggaran kos manusia yang digunapakai dari kajian ini. Akhir sekali, memandangkan faedah (yang tidak nampak) keselamatan jalanraya telah berjaya dianggarkan, adalah dicadangkan dengan sesungguhnya kaedah Analisa Kos dan Faedah menjadi kriteria menilai pelaburan infrasruktur pengangkutan pada masa hadapan.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BTCE	Bureau of Transport and Communication Economics (Australia)
BTE	Bureau of Transport Economics (Australia) (formerly BTCE)
CV	Contingent Valuation
CA	Conjoint Analysis
DC	Dichotomous Choice
DETR	Department of the Environment, Transport and the Regions
DOT	Department of Transport
ECU	European Currency Unit
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
HC	Human Capital
HSE	Health Safety Executive (UK)
IB	Interactive Bidding
ISD	Injury Scale Descriptor
Mi/Mu Ratio	The ratio of MRS of Injury/MRS of Death
MRS	Marginal Rate of Substitution
NRAs	Swedish National Road Administration's
NOAA	National Oceanic and Atmospheric Administration (US)
OECD	Organization of Economic Co-operation and Development
OE	Open Ended
OMD	Office of Management and Budget (US)
OSHA	Occupational Safety and Health Administration

QALY	Quality Adjusted Life Years
RULA	Relative Utility Loss Approach
RTO	Risk Trade-Off
SG	Standard Gamble
Sig. at 5% level	Significant at 5% level
TO	Trade-Off
TRL	Transport Research Laboratory
TTO	Time Trade-Off
WTP	Willingness to Pay
WTA	Willingness to Accept
UK	United Kingdom
VOSL	Value of Statistical Life