



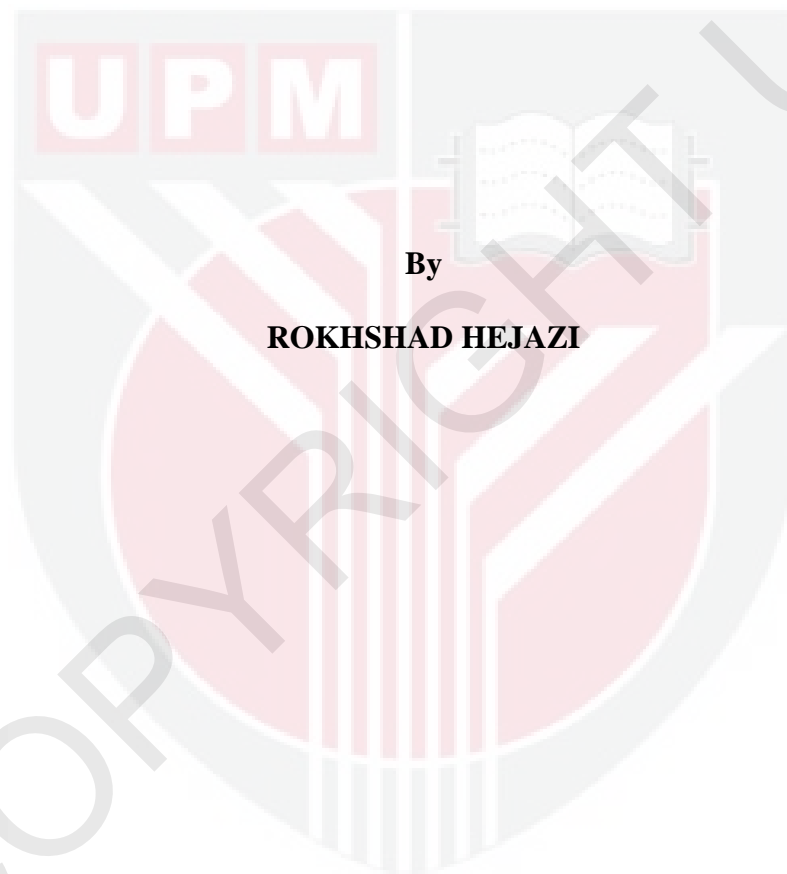
UNIVERSITI PUTRA MALAYSIA

***ECONOMIC VALUES OF NATURAL RESOURCES ALONG
TEHRAN-SHOMAL FREEWAY, IRAN***

ROKHSHAD HEJAZI

FPAS 2012 17

**ECONOMIC VALUES OF NATURAL RESOURCES ALONG
TEHRAN-SHOMAL FREEWAY, IRAN**



By

ROKSHAD HEJAZI

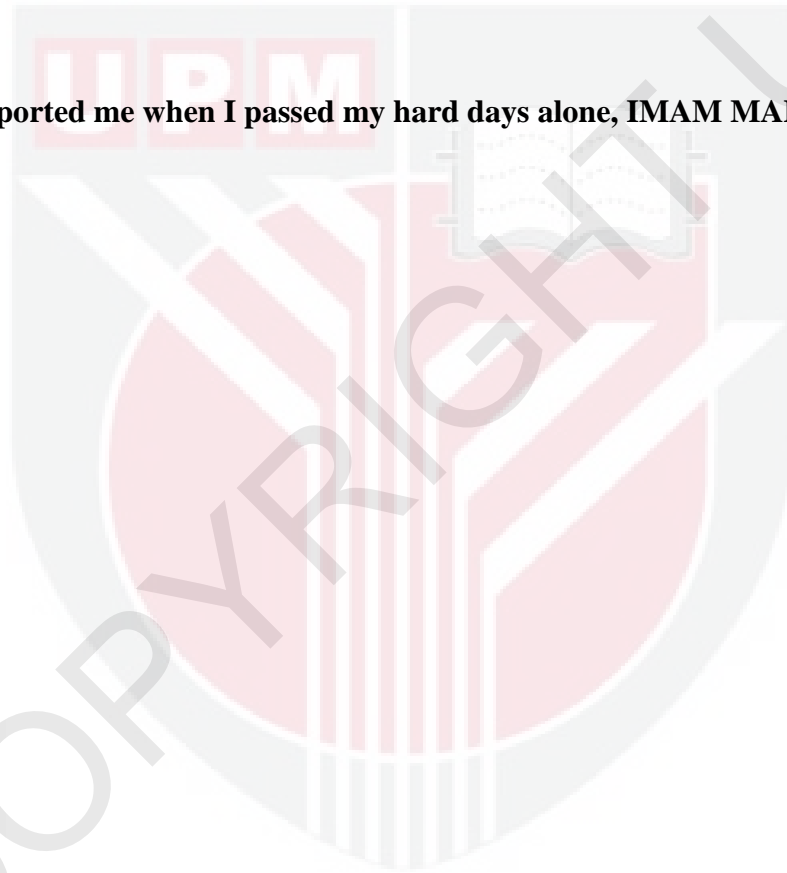
**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfillment of the Requirements for the Degree of Doctor of
Philosophy**

July 2012

DEDICATION

Dedicated to:

Who supported me when I passed my hard days alone, IMAM MAHDI



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

**ECONOMIC VALUES OF NATURAL RESOURCES ALONG
TEHRAN-SHOMAL FREEWAY, IRAN**

By

ROKSHAD HEJAZI

July 2012

Chairman: Professor Mad Nasir Shamsudin, PhD

Faculty: Faculty of Environmental Studies

Tehran-Shomal freeway was constructed to have a safer and shorter travel route. However it causes degradation of valuable natural resources along the constructed freeway. There is a paradox between a safer route and natural resource degradation. The traffic accidents are the second factor for Iranian death. There are 235 million thousands of fatal traffic accidents in Iran. There is a serious need for a safer and shorter travel route between Iranian people. On the other hand, Iran forest area is very poor. There are many concerns about very valuable and fragile natural resources along Tehran-Shomal freeway.

We attempt to estimate the economic values of natural resources along Tehran-Shomal freeway in this study. First specific objective is to investigate community awareness and attitudes towards supporting the natural resources. Second specific objective is to determine effect of socio-economic characteristics of the community on willingness to pay (WTP). Third specific objective is to estimate the willingness to pay (WTP) of the natural resources conservation along the Tehran-Shomal

freeway. The last specific objective is to determine the benefits and costs of the Tehran-Shomal freeway construction.

The contingent valuation method (CVM) was used to estimate the economic values of the natural resources along the Tehran-Shomal freeway. It is only approach accessible for estimation non-use values. We also applied close-ended CVM survey. The format of the close ended was a dichotomous choice (DC) question. Respondents give a "Yes" or "No" answer to wheatear or not they would pay.

Our results indicated that the community has sufficient awareness about environmental issues such as endangered species or natural resources conservation. They had adequate attitude about the natural resources along Tehran-Shomal freeway. For example, 62% of individuals manifested varying levels of worriment about the natural resources along the freeway. Gender, environmental sensitiveness, education and income variables are all significant explanatory variables in the WTP model. The cost-benefit analysis (CBA) suggested that the benefits of the Tehran-Shomal freeway construction are more than its costs. The estimated mean WTP was US\$1.84. The total WTP of supporting natural resources along Tehran-Shomal freeway was estimated at US\$77 million per year which is about 0.23% of Iranian GDP. The individuals were generally willing to pay up to 4% of their income for conservation of natural resources along the Tehran-Shomal freeway.

Tehran-Shomal freeway has been started sixteen years ago but has not completed yet, because its benefits had been never estimated. We make sure policy makers for completion the Tehran-Shomal freeway construction. According our results most of

people were concern for natural resources in part one and three of the Tehran-Shomal freeway. Policy makers can continue construction operations in the part two and three of the freeway. We recommend environmental management plan (EMP) re-examined in the part one and four which have more valuable natural resources.



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

**NILAI EKONOMI SUMBER ASLI DI LEBUH RAYA TEHRAN-SHOMAL,
IRAN**

Oleh

ROKSHAD HEJAZI

Julai 2012

Pengerusi: Profesor Mad Nasir Shamsudin, PhD

Fakulti: Pengajian Alam Sekitar

Penilaian ekonomi merupakan kaedah untuk mentafsir nilai alam sekitar dimana ia tidak mempunyai harga pasaran. Kebanyakan kajian penilaian ekonomi telah dijalankan bagi sumber asli dan kajian ini merupakan kajian penilaian ekonomi pertama yang dijalankan berdasarkan sebuah projek. Kajian ini melibatkan lebuhraya Tehran-Shomal yang masih lagi di dalam proses pembinaan. Pembinaan ini boleh mengurangkan kadar kemalangan yang tinggi, namun ia menyebabkan kerosakan kepada sumber asli yang terdapat di sepanjang lebuhraya ini.

Kaedah yang digunakan untuk kajian ini adalah kaedah penilaian kontinjensi (CVM). Ia dijalankan berdasarkan soalan kaji selidik yang direka untuk mengetahui nilai wang berdasarkan pendapat individu. Hasil daripada kajian mendapati para responden mempunyai kesedaran yang mencukupi mengenai konsep alam sekitar seperti spesis terancam atau perlindungan sumber semula jadi. Pendapat para responden menunjukkan sumber asli di sepanjang lebuhraya Tehran-Shomal ini mencukupi kerana hanya 15 peratus daripada mereka menyatakan perhatian terhadap sumber asli adalah tidak penting kepada mereka.

Model juga telah diregresi berdasarkan analisis daripada soalan kaji selidik. Kesanggupan untuk membayar merupakan pembolehubah bersandar dimana ia diklasifikasikan sebagai pembolehubah “dummy”. Pemboleh ubah tidak bersandar pula adalah jantina, sensitivity terhadap alam sekitar, tahap pelajaran dan pendapatan. Pengisian Eviews telah digunakan untuk menganggar nilai pekali di dalam model. Didapati nilai pekali untuk jantina adalah tertinggi manakala nilai yang terendah adalah untuk pendapatan. Ini bermaksud faktor terpenting untuk membayar lebih bagi sumber asli di sepanjang lebuh raya adalah jantina. Ini kemungkinan berikutan ketua rumah adalah kebiasaannya lelaki dan mereka mempunyai lebih keupayaan untuk membayar. Di dalam kajian ini, anggaran nilai min kesanggupan untuk membayar adalah melebihi US \$ 1.84. Nilai bagi statistik McFadden adalah 0.68 menunjukkan 68% daripada nilai kesanggupan untuk membayar diterangkan oleh pemboleh ubah bersandar. Nilai keseluruhan kesanggupan untuk membayar bagi sumber asli di sepanjang lebuh raya Tehran-Shomal adalah 77 AS\$ juta setahun. Setiap individu juga sanggup membayar empat peratus daripada pendapatan mereka untuk memelihara sumber asli ini. Nilai ini adalah 0.23% daripada GDP di Iran. Berdasarkan laporan Bank Negara Iran, perbelanjaan yang paling minimum digunakan untuk kegiatan merokok, iaitu 0.4% dan nilai perbelanjaan merokok di kalangan keluarga di Iran. Disamping itu, faedah pembinaan lebuh raya Tehran-Shomal adalah penjimatan bahan api, penjimatan masa, keselamatan, pewujudan peluang pekerjaan dan penghubungan Asia Timur ke Eropah untuk Koridor Utara-Selatan. Di antara faedah-faedah ini, penjimatan masa merupakan manfaat terbesar dengan AS\$224 juta dan keuntungan keseluruhan adalah AS\$612.25 juta setahun. Jika kita menganggar kos untuk tol adalah AS\$1, keuntungan akan berlipat ganda berbanding kos dalam masa empat tahun. Akhir sekali, kajian ini menunjukkan

majoriti responden menyokong pembinaan lebuh raya Tehran-Shomal dan dari pandangan ekonomi, faedah daripada proses pembinaan ini adalah memberangsangkan.



ACKNOWLEDGEMENTS

Above all, I would like to acknowledge Professor Dr Mad Nasir Shamsudin for allowing me the opportunity to work with him over the past four years. His kindness, patience, and knowledge not only guided me through this process, but his passion for his work, also demonstrated to me the value of finding better opportunities in my job which I love. Many grateful thanks are also expressed to my supervisor committee: Professor Dr Khalid Abd. Rahim, Associate Professor Dr Alias Radam, Associate Professor Dr Saeed Yazdani and Associate Professor Dr Zelina Zaitun Ibrahim, for providing their expertise and time. Special appreciations are extended to the citizens of Kuala Lumpur, for allowing me to study in their beautiful town, especially Amy my Malaysian friend. I have benefited also due to the scientific member and staffs of Iran Forest, Rangelands and Watershed Organization especially Mr. Zakizade, Shalbaf and who willingly shared their time and knowledge and offer data and of course Mr. Zaherpour in Iran Water and Wastewater Organization.

I would like to express my thanks to my parents. I will never forget their efforts for my daughter when I was far from her for not have a bad feeling. I remember my daughter shedding eyes when I want to go to Malaysia, so now, this is the time to say her thanks my Fatemeh because her staying power. Finally appreciate my dear husband Farhad, because his patience, emotional supports and encouragements. I am sure if I have not him I never start and never end my PhD out of my country. I thank also him because of the days which I was not beside him and because the hours that I had not any reason to hope for continuing my education, but he made me hope. In the end but the most thanks are due to my God, Alhamdolilah.

APPROVAL

I certify that a Thesis Examination Committee has met on 23 July 2012 to conduct the final examination of Rokhshad Hejazi on her thesis entitled “**Economic Values of Natural Resources along Tehran-Shomal Freeway, Iran**” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Name of Chairperson, PhD

Associated Professor, Dr. Mohd Bakri bin Ishak
Faculty of Environmental Studies
Universiti Putra Malaysia
(Chairman)

Name of Examiner 1, PhD

Dr. Mohd Rusli bin Yacob
Faculty of Environmental Studies
Universiti Putra Malaysia
(Internal Examiner)

Name of Examiner 2, PhD

Dr. Zaiton binti Samdin
Faculty of Forestry
Universiti Putra Malaysia
(Internal Examiner)

Name of External Examiner, PhD

Associated Professor, Dr. Akira Ishida
Faculty of Life and Environmental Science
University Shimane
Japan
(External Examiner)

SEOW HENG FONG, PhD

Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of philosophy. The members of the supervisory Committee were as follows:

Mad Nasir Shamsudin, PhD

Professor
Faculty of Environmental Studies
Universiti Putra Malaysia
(Chairman)

Khalid Abd. Rahim, PhD

Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

Alias Radam, PhD

Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

Saeed Yazdani, PhD

Professor
Faculty of Agricultural Economics
University of Tehran
(Member)

Zelina Zaitun Ibrahim, PhD

Associate Professor
Faculty of Environmental Studies
Universiti Putra Malaysia
(Member)

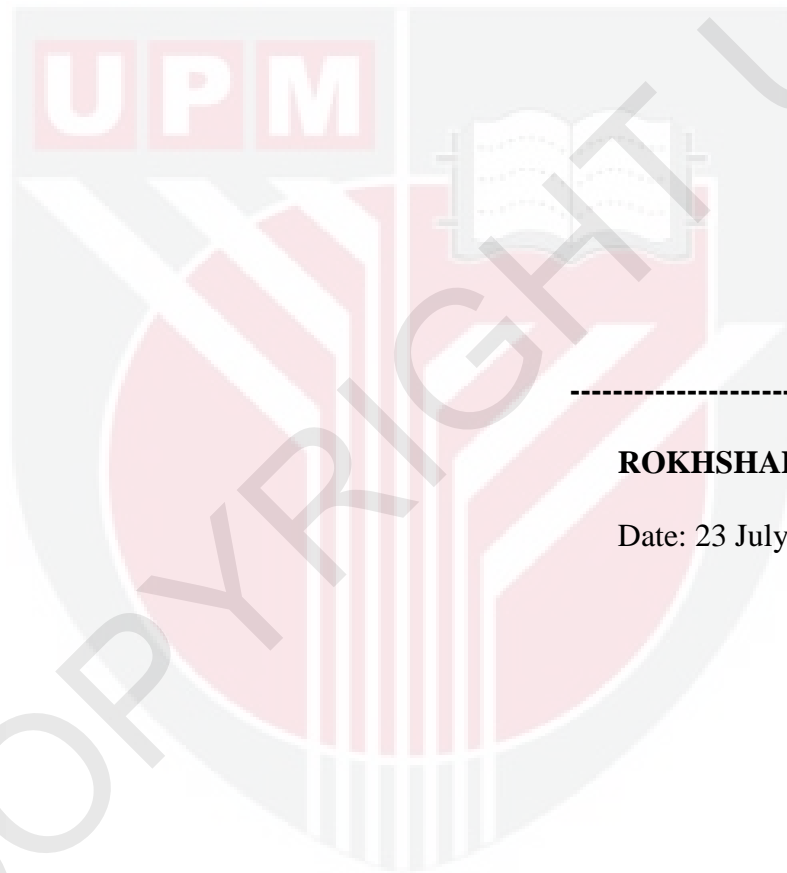
BUJANG BIN KIM HUAT, PhD

Professor and Dean
School of Graduate Studies
University Putra Malaysia

Date:

DECLARATION

I declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institutions.



ROKSHAD HEJAZI

Date: 23 July 2012

TABLE OF CONTENTS

| | Page |
|--|-------------|
| ABSTRACT | iii |
| ABSTRAK | vi |
| ACKNOWLEDGEMENTS | ix |
| APPROVAL | x |
| DECLARATION | xii |
| LIST OF TABLES | xv |
| LIST OF FIGURES | xvii |
| LIST OF ABBREVIATIONS | xviii |
| | |
| CHAPTER | |
| | |
| 1 INTRODUCTION | 1 |
| 1.1 General Introduction | 1 |
| 1.2 Problem Statement | 5 |
| 1.3 Objective of the Study | 9 |
| 1.4 Significance of the Study | 9 |
| 1.5 Organization of the Thesis | 11 |
| | |
| 2 BACKGROUND OF THE STUDY AREA | 13 |
| 2.1 Introduction | 13 |
| 2.2 The Study Site | 13 |
| 2.2.1 Karaj River Watershed | 17 |
| 2.2.2 Karaj Dam (Amir Kabir Dam) | 19 |
| 2.2.3 Water Quantity Factors | 20 |
| 2.2.4 Water Quality Factors | 20 |
| 2.2.5 Flora in Karaj River Watershed | 21 |
| 2.2.6 Fauna in Karaj River Watershed | 22 |
| 2.3 Chalus River Watershed | 22 |
| 2.4 Land Use in the Study Area | 23 |
| | |
| 3 LITERATURE REVIEW | 32 |
| 3.1 Introduction | 32 |
| 3.2 Environmental Natural Resources Valuation | 34 |
| 3.2.1 Economic Valuation Background | 36 |
| 3.2.2 Economic Valuation and Cost Benefit Analysis | 40 |
| 3.2.3 Cost Benefit Analysis Background | 43 |
| 3.2.4 Limitation in Applying Cost Benefit Analysis | 43 |
| 3.3 Estimating Total Economic Values | 45 |
| 3.4 Comparative Study of Economic Valuation | 58 |
| 3.5 Transportation | 59 |
| 3.5.1 Environment in the Transportation Projects | 65 |
| 3.5.2 CVM in the Transportation Project | 69 |
| 3.6 Summary of Concepts | 71 |
| | |
| 4 METHODOLOGY | 73 |
| 4.1 Introduction | 73 |
| 4.2 Conceptual Framework | 80 |
| 4.3 Contingent Valuation Method | 82 |

| | |
|--|------------|
| 4.3.1 Strength and Limitation of CVM | 96 |
| 4.4 The Study Area | 98 |
| 4.5 Sampling Procedure | 98 |
| 4.5.1 Simple Random Sampling | 100 |
| 4.5.2 Pretest | 101 |
| 4.5.2 Sample Size | 103 |
| 4.6 Data Collection | 104 |
| 4.6.1 The Questionnaire Design | 105 |
| 4.6.1.1 Awareness | 110 |
| 4.6.1.2 Attitude | 111 |
| 4.6.1.3 Socio-Economic Profile | 112 |
| 4.6.1.4 Question Types in WTP Section | 113 |
| 4.7 Summary of Concepts | 117 |
| 5 RESULT AND DISCUSSION | 118 |
| 5.1 Introduction | 118 |
| 5.2 Socio-Economic Profile of Respondents | 118 |
| 5.3 Awareness on Environmental Conservation | 121 |
| 5.4 Attitude towards Environmental Conservation | 126 |
| 5.5 Analysis of the Respondent's WTP | 130 |
| 5.5.1 Graphical Representation of the Willingness to Pay | 139 |
| 5.6 Validity and Reliability of the Model | 140 |
| 5.7 Benefits of Tehran-Shomal Freeway | 144 |
| 5.7.1 Safety | 144 |
| 5.7.2 Fuel Saving | 153 |
| 5.7.3 Time Saving | 156 |
| 5.7.4 The North-South Corridor and its Sequences | 159 |
| 5.7.5 Creation of New Job Opportunities | 161 |
| 5.8 Total Benefit of the Freeway Construction | 162 |
| 5.9 Limitation of Study | 165 |
| 5.10 Future Studies | 166 |
| 5.11 Summary of Concepts | 167 |
| 6 SUMMARY AND CONCLUSION | 169 |
| 6.1 Introduction | 169 |
| 6.2 Summary of Findings | 169 |
| 6.3 Significance of Findings | 174 |
| 6.4 Policy Implications | 175 |
| 6.5 Conclusion | 176 |
| REFERENCES | 178 |
| APPENDICES | 193 |
| BIODATA OF STUDENT | 203 |