

Contents

Abstract	xiii
Zusammenfassung	xv
Acknowledgments	xvii
1 Introduction	1
1.1 Background and Motivation	1
1.2 Research Areas	2
1.3 Thesis Structure	3
2 Data Sets	5
2.1 Total Household Energy Consumption Data Set	5
2.1.1 Introduction	6
2.1.2 Data Collection Methodologies	6
2.1.3 Survey Protocol	8
2.1.4 Survey Design	11
2.1.5 Field Work	17
2.1.6 Descriptive Statistics	21
2.2 Household Car-Fleet Choice Data Set	23
2.2.1 Survey	24
2.2.2 Descriptive Statistics	25
2.3 Household Income and Expenditure Data Set	27
2.3.1 Introduction	27
2.3.2 Categorization of Income and Expenditure	27
2.3.3 Descriptive Statistics	28
3 A Multinomial Logit Model for Total Household Energy Consumption	45
3.1 Introduction	45
3.1.1 Research Topic	45
3.1.2 Literature	46

3.2	Methodology	48
3.2.1	Basic Model	48
3.2.2	Advanced Model	49
3.3	Results	50
3.3.1	Basic Model	50
3.3.2	Advanced Model	53
3.3.3	Utility Trade-Offs	57
3.4	Discussion	60
3.4.1	Conclusion	60
3.4.2	Outlook	61
4	A Multiple Discrete-Continuous Extreme Value Model (MD-CEV) for Total Household Energy Consumption	63
4.1	Introduction	63
4.1.1	Context	63
4.1.2	Literature	64
4.2	Methodology	65
4.2.1	Behavioural Framework	65
4.2.2	Model Specification	66
4.3	Results	67
4.4	Discussion	72
5	A Multiple Discrete-Continuous Extreme Value Model (MD-CEV) of Household Fleet Choice	75
5.1	Introduction	75
5.1.1	Context	75
5.1.2	Research Question	76
5.1.3	Literature	77
5.2	Methodology	78
5.2.1	Review of Methodology	78
5.2.2	Model Specification	80
5.3	Results	81
5.3.1	Choice Model Parameters	82
5.3.2	Role of Inertia/Taste Variable	86
5.3.3	Influence of Fuel Price on Fleet Choice	87
5.3.4	Individual Satiation of VMT	89
5.4	Discussion	90
6	An Analysis of Residuals in Multiple Discrete-Continuous Extreme Value Models (MDCEV)	93
6.1	Introduction	93
6.2	The Forecasting Procedure	94

6.3	Using Stated Adaption MDCEV Models for Comparison	95
6.4	Estimation Results of Alternative Fleet Choice Model . .	96
6.5	Results	97
6.5.1	Disaggregate Simulation Results	97
6.5.2	Aggregate Simulation Results	109
6.6	Discussion	109
7	Interdependencies and Modelling of Household Expenditure Categories	113
7.1	Introduction	113
7.1.1	Context	113
7.1.2	Literature	116
7.2	Expenditure Categories	117
7.3	Inflation	119
7.4	Correlation of Absolute Expenditure	120
7.4.1	Methodology	120
7.4.2	All Households	120
7.4.3	By Household Type	121
7.4.4	By Residential Municipality Type	127
7.4.5	By Income Class	130
7.5	Correlation of Expenditure Shares	136
7.5.1	All Households	136
7.5.2	By Income Class	138
7.6	Pseudo Panels	143
7.7	Linear Regressions	150
7.7.1	Savings and Durable Goods	152
7.7.2	Expenditures for Food	157
7.7.3	Eating Out, Alcohol and Tobacco	161
7.7.4	Housing Rent, Interest and Mortgage Payments . .	165
7.7.5	Entertainment	170
7.7.6	Consumer Goods	175
7.7.7	Communication	179
7.7.8	Public Transportation	182
7.7.9	Private Transportation	186
7.8	Discussion	191
7.8.1	Summarized Results	191
7.8.2	Methodology	193
7.8.3	Problems of Data Set	193
7.8.4	Conclusions	194

8	Discussion	197
8.1	General Insights	197
8.1.1	Energy Consumption	197
8.1.2	Household Expenditures	199
8.2	Discussion of Methodologies	201
8.2.1	Random Utility Models	201
8.2.2	Pseudo Panel	204
8.2.3	Linear Regressions	204
8.3	Used Data Sets	204
8.3.1	Total Energy Consumption Data	204
8.3.2	Car Fleet Choice Data	205
8.3.3	Household Expenditure Survey	206
	Curriculum Vitae	217