

Université Lumière Lyon 2

Faculté des Sciences Economiques

Sources of Errors and Biases in Traffic Forecasts for Toll Road Concessions

Thèse pour le Doctorat ès Sciences Economiques

Mention Economie des Transports

Antonio NUNEZ

dirigée par M. le Professeur Alain BONNAFOUS

Présentée et soutenue publiquement le
5 décembre 2007.

Membres du Jury:

M. Alain BONNAFOUS	Pr. à l'IEP de Lyon	<i>Directeur</i>
M. Yves CROZET	Pr. à l'Université Lyon 2	
M. Jean DELONS	Chargé de Mission à Cofiroute	
M. Fabien LEURENT	Pr. à l'ENPC	
M. Werner ROTHENGATTER	Pr. à l'Université de Karlsruhe	<i>Rapporteur</i>
M. Stéphane SAUSSIER	Pr. à l'Université de Paris 11	<i>Rapporteur</i>

Contents

Acknowledgements	11
Abstract	13
Résumé	19
Introduction	27
Plan of the Manuscript	29
1 Errors and Biases in Transport Demand Forecasts	33
1.1 What is Forecasting?	35
1.2 Forecasting in Transport	36
1.2.1 The Classic 4-step Model	38
1.3 Errors in Traffic Forecasts	39
1.4 Sources of Errors	41
1.4.1 Uncertainty About the Future	42
1.4.2 Methodology, Assumptions and Data	43
1.4.3 Behavioural Sources	46
1.4.4 The Particular Case of Road Concessions	49
1.5 Objectives of this Research	51
2 Transport Forecasters' Behaviour and Overconfidence	55
2.1 Introduction	56
2.2 Who Forecasts Transport Demand?	57
2.3 The Latest Forecast	61
2.4 Models	63
2.5 Forecast Errors	66
2.5.1 Sources of Errors	67

2.6	Forecast's Environment	68
2.7	Overconfidence in Transport Forecasts	72
2.8	Econometric Analysis of Biases	76
2.9	Comments Uncommented	77
2.10	Conclusions	78
3	Winner's Curse in Toll Road Concessions	83
3.1	Introduction	85
3.2	Auctions for Toll Road Concessions	90
3.2.1	First-Price, Sealed-Bid Auctions	90
3.2.2	Common Value Auctions	90
3.2.3	Auctions with Differing Levels of Common Uncertainty	92
3.2.4	Renegotiation in Toll Road Concessions	94
3.3	Bidding for Toll Road Concessions: A Simple Model	96
3.3.1	Model Framework	96
3.3.2	Model Setting	97
3.3.3	Number of Bidders and Traffic Forecast Deviation	99
3.3.4	Number of Bidders and Level of Common Uncertainty	100
3.3.5	Number of Bidders and Renegotiation	101
3.4	Data on Road Concession Contract Auctions	103
3.4.1	Dependent Variable: Traffic Forecast Deviation	103
3.4.2	Explanatory Variables	104
3.5	Econometric Results	107
3.6	Robustness Analysis	109
3.7	Conclusions	111
4	Decreasing Long-Term Traffic Growth	119
4.1	Introduction	121
4.2	Traffic Growth	122
4.3	Why does Traffic Grow Decreasingly?	124
4.4	Econometric Issues	127
4.4.1	Partial Adjustment	127
4.4.2	Integrated variables, Cointegration and Error-Correction	128
4.5	Data and Estimation	131
4.6	Evidences of Decreasing Growth	131

4.6.1	Cross-section Time Series Analysis	132
4.6.2	Testing for Parameter Stability	134
4.6.3	Moving Regressions	136
4.7	A Functional Form for Decreasing Elasticity	137
4.7.1	Impact on Long-Term Forecasts	140
4.8	Conclusions	142
5	Estimating the Value of Travel Time Savings	147
5.1	Introduction	148
5.2	The Value of Time in Transport	151
5.2.1	VTTS in Freight Transport	154
5.3	Discrete Choice Models	155
5.3.1	The Multinomial Logit	155
5.3.2	The Mixed Logit Model	160
5.4	Bayesian Procedures	162
5.4.1	Overview of Bayesian Concepts	163
5.4.2	Drawing from the Posterior	165
5.4.3	Posterior Mean as a Classical Estimator	169
5.4.4	Posteriors for the Mean and Variance	170
5.4.5	Hierarchical Bayes for Mixed Logit	174
5.5	Challenges in Estimating VTTS	178
5.5.1	Identifying Preference Heterogeneity	178
5.5.2	Selecting Random Parameters	179
5.5.3	Selecting the Distributions of the Random Parameters	180
5.5.4	Revealed Preference Data	182
5.5.5	Optimization Problems	182
5.5.6	Imposing Constraints	182
5.5.7	Priors	183
5.5.8	Advantages and Problems of Bayesian Procedures	183
5.5.9	The Role of the Alternative Specific Constant	184
5.6	The Survey	185
5.7	Econometric Results	188
5.7.1	Maximum Likelihood estimations	188
5.7.2	Bayesian Estimations	189
5.8	Discussion	192

5.9 Conclusions	195
General Conclusions and Policy Implications	197
A Forecasters' survey questions	201
B Distributions of variables in chapter 3	205
C VTTS survey form	211

List of Figures

1	Ecarts (réel/prévu)	22
2	Distribution de la valeur du temps PL.	25
1.1	Caricature of weather forecasts	36
1.2	Errors on Flyvbjerg et al (2006) sample	40
1.3	Errors variation over time on Flyvbjerg et al. (2003) sample	40
1.4	Errors on Standards and Poor's (2005) sample	41
1.5	Forecasting error in 49 road concessions (chapter 3 sample)	41
1.6	From "be" forecast to "do" forecast	45
2.1	In which country do you work?(N=178)	57
2.2	Location of the projects.(N=178)	58
2.3	Degree.(N=178)	58
2.4	Post-grad degree. (N=178)	59
2.5	Sectors forecasters work in.(N=178)	59
2.6	Gender distribution.(N=178)	60
2.7	Distributions of respondents' age. (N=178)	60
2.8	Number of forecasts.(N=178)	61
2.9	When did you prepare your latest forecast? (N=172).	61
2.10	Has the project been launched?(N=176)	62
2.11	Modes in the last forecast.(N=176)	62
2.12	Financing.(172)	63
2.13	Operation. (N=167)	63
2.14	Constant x Distributed VTTS. (N=153)	64
2.15	initial <i>versus</i> growth in demand forecasts. (N=162)	64
2.16	Aggregated or disaggregated modal share.(N=156)	65
2.17	Models forecasters apply. (N=170)	65
2.18	Stated error in the latest forecast.(N=88)	66

2.19	Perception of own's quality of results. (N=147)	67
2.20	Average distribution of under/overestimation.(N=150)	67
2.21	Forecasters under pressure. (N=168)	69
2.22	Would they produce better forecasts without pressure? (N=167)	69
2.23	Role of strategic manipulation.(N=155)	70
2.24	Sense of strategic manipulation.(N=134)	70
2.25	Influence of the technical study on the decision. (N=158)	71
2.26	Knowledge of the minimum demand level. (N=161)	72
2.27	Distributions of forecast errors.	75
2.28	Self-evaluation of competence level.(N=155)	76
2.29	Distributions of self-evaluations.	77
3.1	Length and Forecast Error.	94
3.2	TDF.	104
3.3	Number of Bidders.	105
4.1	From preferences to elasticity.	126
4.2	Traffic on the A10 motorway.	132
4.3	Traffic on the A11 motorway.	132
4.4	LTM long-run elasticities.	133
4.5	PAM long-run elasticities.	133
4.6	ECM long-run elasticities.	134
4.7	PAM short-run elasticities.	134
4.8	ECM short-run elasticities.	135
4.9	Comparing elasticities.	138
4.10	k versus traffic.	139
4.11	γ versus traffic.	139
4.12	A hypothetical example.	141
4.13	Application on the A11 motorway.	141
5.1	Comparison of VTTS distributions.	152
5.2	Survey's Location.	186
5.3	VTTS Distribution for empty and own account by ML	191
5.4	VTTS Distribution for loaded and hire by HB.	192
5.5	VTTS Distribution for empty and own account by HB.	192
5.6	VTTS Distribution for average load and hire dummies by HB.	193

A.1	Questions in the survey of forecaster's behaviour.	203
B.1	TDF.	207
B.2	Number of Bidders.	207
B.3	Length.	208
B.4	Civil Law.	208
B.5	HIC.	208
B.6	Public Information.	209
B.7	Government Learning.	209
C.1	VTTS survey form	213

List of Tables

1.1	Transport Modelling	53
2.1	Sources of errors.	80
2.2	Comparing ex-post and revealed errors	81
2.3	Comparing drivers and forecasters skilful	81
2.4	Impact of the main characteristics on self-evaluation.	82
3.1	Toll Road Concessions by Country and by Year	114
3.2	Data Definitions and Descriptive Statistics	115
3.3	Econometric results	116
3.4	Econometric results - extended	117
4.1	ADF test - exogenous variables	129
4.2	ADF test - traffic	143
4.3	Summary of descriptive statistics	144
4.4	CUSUM of squares test	145
4.5	Subsamples Elasticities	146
5.1	Sample and traffic count data	187
5.2	Final Sample	187
5.3	Summary of descriptive statistics	188
5.4	Econometric results	194

Bibliography

- Abraham, C. and Blanchet, J. (1973). Le modèle prix-temps. *Revue de l'Aviation Civile*.
- Adams, J. (1999). The social implications of hypermobility. Technical report, OECD Project on Environmentally Sustainable Transport, UCL.
- Albert, J. H. and Chib, S. (1993). Bayesian analysis of binary and polychotomous response data. *Journal of the American Statistical Association*, 88(422):669–679.
- Algers, S., Bergström, P., Dahlberg, M., and Lindqvist Dillén, J. (1998). Mixed logit estimation of the value of travel time. Working Paper Series 1998:15, Uppsala University, Department of Economics.
- Allenby, G. (1997). An introduction to hierarchical bayesian modeling. Tutorial notes, advanced research techniques forum, American Marketing Association.
- Allenby, G. and Lenk, P. (1994). Modeling household purchase behavior with logistic normal regression. *Journal of the American Statistical Association*, 89:1218–1231.
- Allenby, G. and Rossi, P. (1999). Marketing models for consumer heterogeneity. *Journal of Econometrics*, 89:57–78.
- Alloy, L. B. and Ahrens, A. H. (1987). Depression and pessimism for the future: Biased use of statistically relevant information in predictions for self versus others. *Journal of Personality and Social Psychology*, 52:366–378.
- Alpert, M. and Raiffa, H. (2007). A progress report on the training of probability assessors. In Kahneman, D., Slovic, P., and Tversky, A., editors,

- Judgment under uncertainty: Heuristics and biases*. Cambridge University Press.
- Alvarez, O., Cantos, P., and García, L. (2007). The value of time and transport policies in a parallel road network. *Transport Policy*, 14(5):366–376.
- Amador, F., González, R., and Ortúzar, J. (2004). Preference heterogeneity and willingness to pay for travel time. Documentos de trabajo conjunto ULL-ULPGC 2004-12, Facultad de Ciencias Económicas de la ULPGC.
- Armstrong, J. (2001). *Principles of Forecasting: A Handbook for Researchers and Practitioners*. Kluwer Academic Publishers.
- Armstrong, P., Garrido, R., and Ortuzar, J. D. (2001). Confidence intervals to bound the value of time. *Transportation Research*, 37:143–161.
- Arnold, B. and Brockett, P. L. (1992). On distributions whose component ratios are cauchy. *The American Statistician*, 46(1):25–26.
- Ascher, W. (1978). Forecasting: an appraisal for policymakers and planners. *Journal of Policy Sciences*, 33(1).
- Athey, S. and Haile, P. (2007). Nonparametric approaches to auctions. In Heckman, J. and Leamer, E., editors, *Handbook of Econometrics*, volume 6. Elsevier, Amsterdam. forthcoming.
- Athias, L. and Saussier, S. (2007). Un partenariat public privé rigide ou flexible ? théorie et application aux concessions routières à péage. *Revue Economique*.
- Athias, L. and Saussier, S. (2006). Contractual design of toll adjustment provisions in infrastructure concession contracts. Ssrn and atom working paper.
- Baldwin, R. and Cave, M. (1999). Franchising and its limitations. In *Understanding Regulation- Theory, Strategy and Practice*. Oxford University Press.
- Ben-Akiva, M. and Lerman, S. (1994). *Discrete Choice Analysis*. MIT Press, Cambridge, Mass.
- Bernstein, P. (1996). *Against the Gods: The Remarkable Story of Risk*. John Wiley and Sons, Inc.

- Bickel, P. and Doksum, K. (2000). *Mathematical Statistics: Basic Ideas and Selected Topics*, volume 1. Prentice Hall.
- Bikhchandani, S. and Riley, J. (1991). Equilibria in open common value auctions. *Journal of Economic Theory*, 53(1):101–130.
- Bonnel, P. (2004). *Prévoir la demande de transport*. Presses de l'ENPC.
- Brown, R. L., Durbin, J., and Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society. Series B (Methodological)*, 37(2):149–192.
- Brownstone, D. (2001). Discrete choice modeling for transportation. In Hensher, D., editor, *Travel Behavior Research: The Leading Edges*. Elsevier.
- Bulow, J., Huang, M., and Klemperer, P. (1999). Toeholds and takeovers. *The Journal of Political Economy*, 107(3):427–454.
- Bulow, J. and Klemperer, P. (1999). Prices and the winner's curse. Mimeo, Oxford University.
- Bulow, J. and Klemperer, P. (1996). Auctions versus negotiations. *The American Economic Review*, 86(1):180–194.
- Button, K. (1993). *Transport Economics*. Edward Elgar Publishing Limited, 2 edition.
- Cairncross, F. (1997). *The Death of Distance*. London: Orion.
- Calderon, C., Easterly, W., and Serven, L. (2003). *The Macroeconomics of Infrastructure in Latin America*. The World Bank.
- Calderon, C. and Serven, L. (2003). The output cost of latin america's infrastructure gap. in the macroeconomics of infrastructure in latin america. In *The Macroeconomics of Infrastructure in Latin America*. The World Bank.
- Cam, L. L. and Yang, G. (1990). *Asymptotics in Statistics*. Springer-Verlag.
- Canning, D. (1998). A database of world infrastructure stocks, 1950-95. Policy Research Working Paper 1929, The World Bank.

- Cappen, E., Clapp, R., and Campbell, W. (1971). Competitive bidding in high-risk situations. *Journal of Petroleum Technology*, 23:641–653.
- Carlsson, F. (1999). The demand for intercity public transport: The case of business passengers. Working Papers in Economics 12, Göteborg University, Department of Economics.
- Casella, G. and George, E. (1992). Explaining the gibbs sampler. *American Statistician*, 46:167–174.
- Cerf, C. and Navasky, V. (1998). *The Experts Speak : The Definitive Compendium of Authoritative Misinformation*. Villard.
- Chib, S. and Greenberg, E. (1995). Understanding the metropolis-hastings algorithm. *American Statistician*, 49:327–335.
- Chib, S. and Greenberg, E. (1996). Markov chain monte carlo simulation methods in econometrics. *Econometric Theory*, 12:409–431.
- Chong, E. (2007). Collusion in auctions and contractual length: A theoretical analysis with an application to the french water sector. Working paper, ADRES Doctoral Meeting.
- Commissariat Général du Plan, C. (2001). *Transports: choix des investissements et coût des nuisances. Sous la direction de Marcel Boiteux*. La documentation Française.
- Compte, O. (2002). The winner's curse with independent private values. Working paper, ENPC.
- Cooper, A. C., Woo, C., and Dunkelberg, W. (1988). Entrepreneurs' perceived chances of success. *Journal of Business Venturing*, 3:97–108.
- Coslett, S. (1981). Efficient estimation of discrete choice models. In Manski, C. and McFadden, D., editors, *Structural Analysis of Discrete Data: With Econometric Applications*. MIT Press, Cambridge, Mass.
- Dargay, J., Goodwin, P., and Hanly, M. (2002). Development of an aggregated transport forecasting model, stage 1- final report including extention. Technical report, ESRC Transport Studies Unit. London.

- David, H. (1957). Estimation of means of normal populations from observed minima. *Biometrika*, 44:282–286.
- De Silva, D., Dunne, T., Kankanamge, A., and Kosmopoulou, G. (2005). The impact of public information on bidding in highway procurement auctions. Working Paper 0511011, EconWPA.
- DeJong, G. (1996). Freight and coach value of time studies. volume 35. PTRC.
- Demsetz, H. (1968). Why regulate utilities? *Journal of Law and Economics*, 11(1):55–65.
- Department for Transport (1997). Air traffic forecasts for the united kingdom 2000. Technical report, Department for Transport. London. UK.
- Domencich, T. and McFadden, D. (1975). *Urban travel Demand: A Behavioural Analysis*. North-Holland, Amsterdam.
- Drucker, P. F. (1973). *Management*. Harper and Row, New York.
- Dubra, J. (2004). Optimism and overconfidence in search. *Review of Economic Dynamics*, 37(1).
- Ehrman, C. and Shugan, S. M. (1995). The forecaster’s dilemma. *Marketing Science*, 24(2):123–147.
- Engel, E., Fischer, R., and Galetovic, A. (2002). Competition in or for the field: Which is better. Working Papers 844, Economic Growth Center, Yale University.
- Engel, E., Fischer, R., and Galetovic, A. (2003). Privatizing highways in latin america: Fixing what went wrong. *The Journal of LACEA*, 4:129–158.
- Engel, E., Fischer, R., and Galetovic, A. (2005). Privatizing highways in the united states. Documentos de Trabajo 209, Centro de Economía Aplicada, Universidad de Chile. available at <http://ideas.repec.org/p/edj/ceauch/209.html>.
- Engel, E., Fischer, R., and Galetovic, A. (2006). Renegotiation without holdup: Anticipating spending and infrastructure concessions. Cowles Foundation

- Discussion Papers 1567, Cowles Foundation, Yale University. available at <http://ideas.repec.org/p/cwl/cwldpp/1567.html>.
- Engel, E., Fischer, R., and Galetovic, A. (2007). The basic public finance of public-private partnerships. Cowles foundation discussion papers, Yale University.
- Engle, R. F. and Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2):251–276.
- Estache, A. (2006). PPI partnerships vs. PPI divorces in ldes. *Review of Industrial Organization*, 29(1):3–26.
- Flyvbjerg, B., Bruzelius, N., and Rothengatter, W. (2003). *Megaprojects and Risk Ő An Anatomy of Ambition*. Cambridge University Press.
- Flyvbjerg, B., Holm, M., and Buhl, S. (2005). How (in)accurate are demand forecasts in public works projects? the case of transportation. *Journal of the American Planning Association*, 71(2):1–24.
- Flyvbjerg, B., Holm, M. K. S., and Buhl, S. L. (2006). Inaccuracy in traffic forecasts. *Transport Reviews*, 26(1):1–24.
- Fosgerau, M. (2007). Using nonparametrics to specify a model to measure the value of travel time. *Transportation Research Part A: Policy and Practice*, 9(41):842–856.
- Fowkes, A., Firmin, P., Tweddle, G., and Whiteing, A. (2004). How highly does the freight transport industry value journey time reliability and for what reasons? *International Journal of Logistics: Research and Applications*, 7(1):33–44.
- Fowkes, A. and Wardman, M. (1988). The design of stated preference travel choice experiments, with special reference to interpersonal taste variation. *Journal of Transport Economics and Policy*, XXII:27–44.
- Frank, J. (1935). Some psychological determinants of the level of aspiration. *American Journal of Psychology*, 47:285–293.

- Gaudry, M., Jara-Diaz, S., and Ortuzar, J. (1989). Value of time sensitivity to model specification. *Transportation Research Part B*, 23:151–158.
- Gelman, A. (1992). Iterative and non-iterative simulation algorithms. *Computing Science and Statistics*, 24:433–438.
- Geweke, J. (1989). Bayesian inference in econometric models using monte carlo integration. *Econometrica*, 57:1317–1339.
- Geweke, J. (1992). Evaluating the accuracy of sampling-based approaches to the calculation of posterior moments. In Bernardo, J., Berger, J. and Dawid, A., and Smith, F., editors, *Bayesian Statistics*. Oxford University Press.
- Geweke, J. (1997). Posterior simulators in econometrics. In Kreps, D. and Wallis, K., editors, *Advance Economics and Econometric Theory and Applications*. Cambridge University Press.
- Gillen, D., Morrison, W., and Stewart, C. (2004). Air travel demand elasticities: Concepts, issues and measurement. Technical report, School of Business and Economics Wilfrid Laurier University Waterloo.
- Goeree, J. and Offerman, T. (2003). Competitive bidding in auctions with private and common values. *Economic Journal*, 113(489):598–613.
- Gomez-Ibanez, J. and Meyer, J. R. (1993). *Going Private: The International Experience with Transport Privatization*. The Brookings Institution, Washington, D.C.
- Gomez-Lobo, A. and Szymanski, S. (2001). A law of large numbers: Bidding and competitive tendering for refuse collection contracts. *Review of Industrial Organization*, 18(1):105–113.
- Goodwin, P. (1996). Empirical evidence on induced traffic: A review and synthesis. *Transportation*, 23(1):35–54.
- Graham, A. (April 2000). Demand for leisure air travel and limits to growth. *Journal of Air Transport Management*, 6:109–118(10).
- Granger, C. W. J. (1981). Some properties of time series data and their use in econometric model specification. *Journal of Econometrics*, 16(1):121–130.

- Granger, C. W. J. and Newbold, P. (1974). Spurious regressions in econometrics. *Journal of Econometrics*, 2(2):111–120.
- Gregory, D. (2000). *Geographical Imaginations*. Cambridge, Mass.: Blackwell.
- Guasch, J., Laffont, J.-J., and Straub, S. (2003). Renegotiation of concession contracts in latin america. ESE discussion papers, Edinburgh School of Economics, University of Edinburgh.
- Guasch, J. L. (2004). Granting and renegotiating infrastructure concessions: Doing it right. Report, World Bank Institute.
- Guasch, J. L., Laffont, J.-J., and Straub, S. (2005). Concessions of infrastructure in latin america: Government-led renegotiation. ESE Discussion Papers 132, Edinburgh School of Economics, University of Edinburgh.
- Haile, P., Hong, H., and Shum, M. (2003). Nonparametric tests for common values in first-price sealed-bid auctions. Cowles Foundation Discussion Papers 1445, Cowles Foundation, Yale University.
- Harrison, R. and Smith, A. (1995). A drunk, her dog and a boyfriend: An illustration of multiple cointegration and error correction. Discussion Paper 9505, College of Business and Economics. University of Canterbury. New Zealand.
- Harvey, D. (1973). Systems of cities and information flows. *Lund Studies in Geography*, 30.
- Harvey, D. (1990). Between space and time: reflections on the geographical imagination. *Annals of the Association of American Geographers*, 80:418–434.
- Harvey, D. (2000). *The Condition of Postmodernity. An Enquiry into the Origins of Cultural Change*. Cambridge, Mass.: Blackwell.
- Hastings, W. (1970). Monte carlo sampling methods using markov chains and their applications. *Biometrika*, 57:97–109.
- Hendricks K., J. P. and Porter, R. (2003). Empirical implications of equilibrium bidding in first-price, symmetric, common value auctions. *Review of Economic Studies*, 70:115–145.

- Hensher, D. (2001a). The valuation of commuter travel time savings for car drivers: evaluating alternative model specifications. *Transportation*, 28:101–118(18).
- Hensher, D. and Button, K. (2000). *Handbook of Transport Modelling*. Pergamon.
- Hensher, D. and Goodwin, P. (2004). Using values of travel time savings for toll roads: avoiding some common errors. *Transport Policy*, 11:171–181.
- Hensher, D. and Greene, W. (2003). The mixed logit model: The state of practice. *Transportation*, 30:133–176(44).
- Hensher, D. A. (2001b). Measurement of the valuation of travel time savings. *Journal of Transport Economics and Policy*, 35:71–98(28).
- Hess, S., Bierlaire, M., and Polak, J. (2005). Estimation of value of travel-time savings using mixed logit models. *Transportation Research A*, 39(3):221–236.
- Hong, H. and Shum, M. (2002). Increasing competition and the winner’s curse: Evidence from procurement. *The Review of Economic Studies*, 69(4):871–898.
- Jara-Diaz, S. (1990). Consumer’s surplus and the value of travel time savings. *Transportation Research*, 24:73–77.
- Jiang, F. (1998). *Choix modal et système logistique en transport de marchandises*. PhD thesis, Ecole Nationale des Ponts et Chaussées.
- Jofre-Bonet, M. and Pesendorfer, M. (2003). Estimation of a dynamic auction game. *Econometrica*, 71(5):1443–1489.
- Kagel, J. H. and Levin, D. (1986). The winner’s curse and public information in common value auctions. *The American Economic Review*, 76(5):894–920.
- Klein, M. (1998). Bidding for concessions. Policy Research Working Paper Series 1957, The World Bank. available at <http://ideas.repec.org/p/wbk/wbrwps/1957.html>.
- La Porta, R., Lopez de Silanes, F., Shleifer, A., and Vishny, R. (1999). Law and finance. *Journal of Political Economy*, 105.

- Laffont, J. (1997). Game theory and empirical economics: The case of auction data. *European Economic Review*, 41:1–35.
- Laffont, J. (2005). *Regulation and Development*. Collection Frederico Caffè Lectures. Cambridge University Press.
- Lancaster, T. (2006). *An Introduction to Modern Bayesian Econometrics*. Blackwell Publishing.
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32(2):311–328.
- Lehman, D. and Nisbett, R. E. (1985). A longitudinal study of the effects of undergraduate education on reasoning. *Developmental Psychology*, 26:952–960.
- Lehmann, E. and Casella, G. (1998). *Theory of Point Estimation*. Springer, 2nd edition.
- Maccoby, E. and Jackli, . C. (1974). *Psychology of Sex Differences*. Stanford University Press.
- Mackie, P. and Preston, J. (1998). Twenty-one sources of error and bias in transport project appraisal. *Transport Policy*, 5:1–7.
- Manski, C. and McFadden, D. (1981). *Structural Analysis of Discrete Data: With Econometric Applications*. MIT Press, Cambridge, Mass.
- March, J. G. and Shapira, Z. (1987). Managerial perspectives on risk and risk taking. *Management Science*, 33:1404–1418.
- Massiani, J. (2005). *La valeur du temps en transport de marchandises*. PhD thesis, Université Paris XII.
- Matas, A. and Raymond, J. (2003). The demand elasticity on tolled motorways. *Journal of Transportation and Statistics*, 6(2/3).
- McCulloch, R. and Rossi, P. E. (1994). An exact likelihood analysis of the multinomial probit model. *Journal of Econometrics*, 64(1-2):207–240.

- McCulloch, R. and Rossi, P. E. (2000). Bayesian analysis of the multinomial probit model. In Mariano, R., Schuermann, T., and M. Weeks, editors, *Simulation-Based Inference in Econometrics*. Cambridge University Press.
- McFadden, D. (2007). The behavioral science of transportation. *Transport Policy*, 14(4):269–274.
- McFadden, D. and Train, K. (2000). Mixed mnl models for discrete response. Technical Report 5.
- McNally, M. (2007). The activity-based approach. In Hensher, D. and Button, K., editors, *Handbook of Transport Modelling*. Pergamon.
- Metropolis, N., A. Rosenbluth, M. R., A. Teller, and E. Teller (1953). Equations of state calculations by fast computing machines. *Journal of Chemical Physics*, 21:1087–1092.
- Milgrom, P. (1989). Auctions and bidding: A primer. *The Journal of Economic Perspectives*, 3(3):3–22.
- Milgrom, P. R. and Weber, R. J. (1982). A theory of auctions and competitive bidding. *Econometrica*, 50(5):1089–1122.
- Mitchell, T. and Thompson, L. (1994). A theory of temporal adjustments of the evaluation of events: Rosy prospecting and rosy retrospection. In Stubbart, J. P. and Meindl, J., editors, *Advances in managerial cognition and organizational information-processing*. Greenwich.
- Mokhtarian, P., Samaniego, F., Shumway, R., and Willits, N. (2002). Revisiting the notion of induced traffic through a matched-pairs study. *Transportation*, 29:193–220(28).
- Montier, J. (2002). *Behavioural Finance: Insights into Irrational Minds and Markets*. John Wiley and Sons.
- Morrison, S. and Winston, C. (1995). *The Evolution of the Airline Industry*. Brookings Institution Press.
- Murray, M. P. (1994). A drunk and her dog: An illustration of cointegration and error correction. *The American Statistician*, 48(1):37–39.

- Nelson, C. and Plosser, C. (1982). Trends and randomwalks in macroeconomics time series: Some evidence and implications. *Journal of Monetary Economics*, 10:139–162.
- Ortuzar, J. D. and Willumsen, L. (2001). *Modelling Transport*. John Wiley and Sons, 3 edition.
- Pinkse, J. and Tan, G. (2000). Fewer bidders can increase price in first-price auctions with affiliated private values. Mimeo, The University of British Columbia.
- Porter, R. H. and Zona, J. D. (1993). Detection of bid rigging in procurement auctions. *The Journal of Political Economy*, 101(3):518–538.
- Quinet, E. (1998). *Principes d'Economie des Transports*. Economica.
- Rao, B. (1987). *Asymptotic Theory of Statistical Inference*. John Wiley and Sons.
- Regan, A. and Garrido, R. (2002). Modelling freight demand and shipper behaviour: State of art and future directions. In Hensher, D., editor, *Travel Behaviour Research: The Leading Edge*. Pergamon, Oxford.
- Revelt, D. and Train, K. (1998). Mixed logit with repeated choices: Households' choices of appliance efficiency level. *The Review of Economics and Statistics*, 80(4):647–657.
- Revelt, D. and Train, K. (2001). Customer-specific taste parameters and mixed logit: Households' choice of electricity supplier. Working Paper Econometrics 0012001, EconWPA.
- Rossi, P., McCulloch, R., and Allenby, G. (1996). The value of household information in target marketing. *Marketing Science*, 15:321–340.
- Russo, E. and Shoemaker, P. (1992). Managing optimism. *Sloan Management Review*.
- Ruud, P. (1996). Simulation of the multinomial probit model: An analysis of covariance matrix estimation. Working paper, Department of Economics, University of California, Berkeley.

- Schafer, A. (2000). Regularities in travel demand: An international perspective. *Journal of Transportation and Statistics*, 3(3):1–32.
- Schnaars, S. (1989). *Megamistakes: Forecasting and the myth of technological change*. The Free Press, New York.
- Schultz, R. (2001). The role of ego in product failure. Working paper, University of Iowa.
- Sillano, M. and Ortuzar, J. D. (2005). Willingness-to-pay estimation with mixed logit models: some new evidence. *Environment and Planning A*, 37:525–550.
- Small, K. A. and Rosen, H. S. (1981). Applied welfare economics with discrete choice models. *Econometrica*, 49(1):105–130.
- Software, S. (2000). Cbc hierarchical bayes analysis. Technical report, Sawtooth Software Inc.
- Spulber, D. (1990). Auctions and contract enforcement. *Journal of Law, Economics and Organization*, 6:325–344.
- Standard and Poor's (2002). Traffic forecasting risk in start-up toll facilities. Technical report, Standard and Poor's. London.
- Standard and Poor's (2003). Traffic forecasting risk: Study update 2003. Technical report, Standard and Poor's. London.
- Standard and Poor's (2004). Traffic forecasting risk: Study update 2004. Technical report, Standard and Poor's. London.
- Standard and Poor's (2005). Traffic forecasting risk study update 2005-through ramp-up and beyond. Technical report, Standard and Poor's. London.
- Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica*, 47:143–148.
- Taylor, S. E. and Brown, J. D. (1988). Illusion and well-being - a social psychological perspective on mental-health. *Psychological Bulletin*, 103(2):193–210.
- Thomson, J. (1974). *Modern Transport Economics*. Harmondsworth, Penguin.

- Thrift, N. (1990). For a new regional geography 1, progress in human geography. *Progress in Human Geography*, 14(2):272–279.
- Thrift, N. (1996). *Spatial Formations*. Sage.
- Tiger, L. (1979). *Optimism: The Biology of Hope*. Simon and Schuster.
- Train, K. (1998). Recreation demand models with taste differences over people. *Land Economics*, 74(2):230–239.
- Train, K. (2001). A comparison of hierarchical bayes and maximum simulated likelihood for mixed logit. Working paper, Department of Economics, University of California, Berkeley.
- Train, K. (2003). *Discrete Choice Methods with Simulation*. Cambridge University Press.
- Train, K. and Weeks, M. (2004). Discrete choice models in preference space and willingness-to pay space. Cambridge Working Papers in Economics 0443, Faculty of Economics (formerly DAE), University of Cambridge.
- Trujillo, L., Quinet, E., and Estache, A. (2000). Forecasting the demand for privatized transport - what economic regulators should know, and why. Policy research working paper series, The World Bank.
- Trujillo, L., Quinet, E., and Estache, A. (2002). Dealing with demand forecast games in transport privatization. *Transport Policy*, 9:325–334.
- Urry, J. (2000). *Sociology Beyond Societies: Mobilities for the twenty-first century*. Routledge, London.
- Wachs, M. (1982). Ethical dilemmas in forecasting for public policy. *Public Administration Review*, 6(42):562–567.
- Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of personality and social psychology*, 39:806–820.
- Williams, H. C. W. L. (1977). On the formation of travel demand models and economic evaluation measures of user benefit. *Environment and Planning A*, 9(3):285–344.

-
- Wynter, L. (1994). La valeur du temps de transport de fret en france : estimation à partir d'une enquête sur les préférences déclarées. *Recherche Transports Sécurité*, 44.
- Yin, P. (2005). Information dispersion and auction prices. Mimeo, Stanford University.