

TAKING TAXIS SERIOUSLY; ISSUES AND IMPLICATIONS

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Introduction

Taxis are one of the most immediately recognisable forms of transport worldwide; operating a service broadly consistent, widely understood and implicitly trusted the world over. Given the ubiquitous nature of the mode, it is something of a surprise that it receives limited attention in research terms, in political debate, or that the potential of the mode is underplayed, innovation ignored, and holistic planning largely non-existent.

From the wealth of documented practice, detailed discussion and research, the role and significance of (other modes of) transport in our everyday lives is apparent. Research and practice act to define the role, develop or create new roles, accommodate changes in communities, even act in mitigating economic decline and environmental impact. Among the contribution of transport, public mass transit split by mode adds to personal mobility, while individual private vehicles collectively define highway needs and design.

Sitting somewhere between the traditional domains of public and private transport, the taxi, taxicab, hackney and/or jitney appear to sit outwith traditional domains of transport analysis. How, indeed why, taxis operate in the ways apparent in our cities challenges the same concepts as in other modes, while intriguing novel applications which include taxi transport may in fact contribute to solutions to individual transport 'problems'.

This paper considers the roles, perceptual, actual and potential, played by the taxi, exploring some of the key issues confronting taxi transport in Scotland today. The paper concludes that a more significant role exists than apparent given the confines of a discussion limited to the question whether to regulate or deregulate. The paper concludes with a plea for a holistic policy that includes taxis, and proposes a multi-variate testing model for taxi transport that considers impacts on all actors involved.

Defining the interaction(s) of Transport

Despite an apparent scarcity of references to taxis in the wide transport literature, and notwithstanding the limited attention given to the mode in much public transport literature, the taxi plays a significant role in the movement of people in UK communities. In the most recent review of regulation completed for the Department of the Environment for Northern Ireland, taxis ranked third

(at 4%) in all individual transport movements, only just behind bus services (5%) and significantly ahead of rail (1%) of journey numbers.

The mode, as with other forms of transport serves a role in providing access, itself enhancing the actual and perceived quality of life in the urban environment, including social inclusion (Bonaiuto 2003), economic well being of a society (Camagni et al. 2001) and the ability to promote urban society. Moreover the taxi serves a full cross section of journey types, premium, leisure and low income. Taxis contribute positively to community cohesion, and as with other forms of transport impact negatively on the environment. These are not new concepts for transport, Colin Buchanan's seminal work (Buchanan 1963) identified many of the issues of traffic and its impact on the urban form, but rarely discussed specific to taxis. Moreover, the relationship between taxis and other modes of transport, including the positive contribution possible with wider consideration of the role of the taxi have been largely ignored.

While not specific to the taxi, responses to negative interaction of transport and its environment(s) have tended to be rapid and reactionary particularly in instances that are seen as urgent, in the public eye, or politically expedient. Analysis of the role of the taxi is far smaller than its mainstream counterparts, but that which exists is not without controversy in its own right. Regular but infrequent discussions of the control of taxi services tend to highlight the single issue of regulation, in its various forms, often in isolation without reference to innovation, interaction or opportunity. This said, the issue of regulation regime alone sharpens opposing arguments, tending to short term benefit, expedience or a desire to be seen to solve single issue headlines rather than fully addressing the extent to which altering regulation represent the best method of ensuring an appropriate relationship between transport and its urban environment.

Several fundamental questions remain: to what extent is the structure of the taxi industry appropriate, to what extent do restrictions imposed by regulations reduce positive impacts arising from the use of taxis; and to what extent would we be advanced in thinking if analysis moved away from single issue to multi impact, multi solution concepts?

The Role(s) of taxis – a critique

Much of the discussion of the role of the UK taxi industry, as with taxis in other countries, has emerged as a result of friction between opposing views of whether regulation is appropriate or inappropriate in the delivery of the mode. The discussion is regular, in that it is apparent in different countries at seemingly consistent intervals, but infrequent, in that the discussions appear every decade or so.

Documented observation suggests the first of the 'current' reforms to the taxi market, took place in the USA in the late 1970s. During the period of 5 years into the early 1980s (Jones et al. 1999; Cevero 1992) 22 US cities removed

regulations impacting on taxi operations [1]. Despite the argument and theoretical justification forwarded prior to US deregulation, the introduction of a liberalised framework to U.S. cities has courted a significant amount of controversy, with widely differing levels of 'success' since deregulation. This to the extent that most of the US cities that introduced deregulation in the 1970s have returned to forms of regulated control (Teal 1992).

A further 'tranche' of deregulation followed in the late 1980s, with New Zealand deregulating in 1989 (National Competition Council 2000) followed by Sweden in 1990 (Marell and Westin 2002). Taxi services have also been deregulated in Dublin, Republic of Ireland, and in part in the Netherlands and Belgium.

Much of the, polarised, discussion specific to taxi industry reform makes reference to Regulatory Economics (RE), a strand of Economic thinking concerned with the regulation of markets, including (Niskanen 2000) problems of natural monopoly, antitrust and competition policy, deregulation, auction theory, etc. Regulatory Economics having a broad theory base typified by the work of Stigler (1971), Posner (1974) and Peltzman (1976), and applied papers looking at the impacts of regulation on various industries, including transport (Farris 1969) and how mainstream modes of transport have altered as a result of deregulation (Peltzman 1989).

The move of mainstream public transport, in most western economies, from government ownership to a privately operated industry, highlights issues of control and a need for regulation of industries no longer operated 'in house'. Potential differences in approach for private operators raise issues of a requirement for safety regulation (otherwise referred to as Quality Regulation), while a desire for profit maximisation may and has resulted in forms of Economic Regulation, and in some instances quantity control. The move to private operation does not preclude the possibility of regulatory control, but has impacted on its nature, extent and the ways by which it is applied. The move from public to private operation has effectively altered the framework in which transport can be controlled, and the appropriateness of industry regulation previously applied under national control.

In the taxi market, regulatory arguments revolve around the issues of effective operation of the market mechanism; whether the unrestricted market would allow for appropriate price setting or demonstrate the existence of market failure (imperfect markets). The arguments further focus on the question as to which of a deregulated or regulated environment is appropriate to ensure adequate levels of supply within the industry. Taxi regulation, however, is not a simple polar choice between full regulation or no regulation, rather that the provision of transport is controlled as appropriate to the best interests of public, including the determination of what is sustainable in the medium and longer term. In economic texts this may be equated to optimisation; of price (van Vuuren 2002; Trotter 1985) and service both impacting on the customer; Income and extent of regulation impacting on the driver / operator of the taxi; and regulatory efficiency impacting on the regulator. Optimisation might be

seen as the balancing of divergent interests and expectation in the delivery of services.

Two arguments in favour of regulation are common, to protect consumer interests (Crew and Kleindorfer 2002), reducing a risk of overcharging where market forces are restricted, or where market failure occurs; and secondly to alleviate the external costs of operation (Lok Sang Ho 1993) including the mode's impact in creating congestion, (a significant factor in metropolitan cities such as New York). Opposed to regulation, are arguments of free market competition and (Baumol and Sidak 1994) - the *'heavy social costs of governmental intrusion into pricing, investment, and other such business decisions...'* In practical terms, the desire to restrict or maintain restrictions on quantity relates directly to a perception of loss of service standards in derestricted or deregulated environments on the one hand, and that free markets produce better services on the other. Arguments specific to negative impacts of deregulation are forwarded by Shreiber (1975), Teal and Burgland (1987), Douglas (1972), and Rufolo (1998). Opposing views are set out by Coffman (1977), while Rufolo detects differences between some elements of taxi operations, and supports a need for control of (at least part) of the taxi market. The distinction is more clearly identified to include 'distinct' elements of a cruising market (Williams 1980) sometimes referred to as 'Street Taxis', and an 'at rank / at stance' market. See also Pagano and McKnight 1983; Teal and Burgland 1987; and Hackner and Nyberg 1995. Furthermore, pre-booked vehicles, whether private or public hire; as well as taxibus, shared taxis and limousine services, also constitute integral elements of the taxi market, reducing the appropriateness of a one regulation fits all solution.

Highlighted throughout, and consistent in all elements of the reform debate, the concern remains whether passenger interests are best served by whatever operating frameworks are seen to be in place.

The UK Taxi Market

In UK cities practical and pragmatic issues dominate thinking in the delivery of taxi services. The most acute shortage of supply is apparent in serving late night Friday and late night Saturday demand, and this alone represents one of the more cogent arguments pertaining to supply side measures. A second element, that of price competition, relates to a perception that taxi drivers operating in restricted markets might be charging more than a rate achievable in open competition, not directly an accusation of overcharging (although such discussions have occurred) rather a view that increased supply will impact to reduce the fares charged. Of the tariff arguments, the suggestion of overcharging by increased mileage rates or overly complicated routes promote arguments in favour of regulation; while the desire for open price competition support some arguments for reduced controls.

To date, typical responses to the concerns of a lack of supply, and lack of price competition have included:

- (a) the removal of barriers to entry imposed by entry control /'medallion caps' [2] (Teal and Burgland 1987), and
- (b) active encouragement of price competition (OFT 2003).

Although this can include total removal of economic regulation, this has not occurred in the UK taxi industry. As with the view of negative impacts, today's proposed 'solutions' remain remarkably similar to those argued for and attempted in some instances in the late 1970s and early 1980s.

Responses to the challenges of developing taxi operations in the UK tend to follow the same cycles applied, and in some instances rejected, elsewhere. The UK Office of Fair Trading (OFT) investigation follows a predictable pattern, recommending quantity deregulation, and mirrors similar reforms in the USA (since reversed). Although, arguably, appropriate in some instances quantity deregulation as a single measure inevitably attempts a one size fits all solution to a wide range of issues, and may, also arguably, fail to address the question of an industry role in voluntarily sustaining operating standards, or take full account of impacts on employment markets. Moreover, the regulation of transport is not a simple polar choice between full regulation or no regulation, rather a combination of control and market forces as appropriate to the best interests of public, including the determination of what is sustainable in the medium and longer term. In economic texts this may be equated to optimisation; of price (Trotter 1985; van Vuuren 2002 page 99) and service (Costelloe 2001) both impacting on the customer; Income (Cooper et al 2003) and extent of regulation (Leisey 2001) impacting on the driver operator of the taxi; and regulatory efficiency (Tyson 2001; Mollina 2004) impacting on the regulator. Not only does a single fit solution fail to address the individual circumstances of differing regions, the whole debate remains concentrated on a single economic constant: regulation, deregulation, re-regulation.

Gains and losses resulting from regulatory reform relate in part to market maturity. Short-term gains are particularly prevalent where secondary markets exist (eg, Dublin), or grey markets (eg, New York)[3] in which private hire (minicab) services exist and are able to switch status from minicab to taxi with little difficulty. Some evidence also exists of cross-boundary traffic movements, taxi services crossing from neighbouring administrations to take advantage of relaxed entry regulation in neighbouring areas.

While policy makers, regulatory authorities and professional communities continue to address the concerns of regulation, the debate will inevitably fail to consider wider impacts on the communities served; a possibility, if not a need, to address multi agency issues of city management, pedestrian and reveller behaviour, and an increased concern as to the suitability of existing transport options to solve large numbers of city centre users enjoying facilities at weekend evening and late night transport.

The need remains, becomes, to balance a wider impact assessment, using key values of sustainable regulatory frameworks at its core, to measure, and therefore match, the needs of all the cities' users, potential users, and

affected parties to ensure a sustainable future development of urban transport that includes taxis.

Identification of data required for informed policy decisions

Despite widely differing interpretation, international experience reveals that some agreement is achieved in the measures by which reform can be assessed. These include [4]:

- Change in the size of the industry
- Change in the cost of using a taxi
- Response time, and refusals / no shows
- Productivity

Indicators, identified in respect of policy measures that impact on the differing 'actors', might be appropriate in the assessment of differing scenarios – designed to identify positive changes and representing a cross section of regulatory and policy approaches, including revision to regulation, service structure, even to the extent that some combination of tradition, paratransit and novel application (which may include other forms of Demand Responsive Transport) may be included. What are, by this measure, the impacts of changes in (a) regulation; and (b) other structural concepts including novel applications, on (a) the existing taxi user, (b) the potential user, (c) the operator – in turn the approach to the industry, in turn the impact on (a) and (b), and so on to ... (i) the licensing authority and beyond.

Optimal solutions result to the extent that primary and secondary objectives, set to represent preferred outcomes, impact positively on: all, 1st best; without negative impact on any, pareto optimality; or with appropriate gains to the wider community, pareto improvement. The range of indicators is important and includes all players encompassing both short and longer-term impacts.

Table 1 Indicative Policy Indicators

| | Indicator | Measurement | Source |
|---|---------------------------------|--|---------------------|
| Generic Measures | Change in size of the industry | Total number of taxi and PHV vehicles | Licensing records |
| Measures Specific to Passenger | Cost of Using a Taxi | 2 Mile journey | Tariff Table |
| | Waiting Time | At Rank Delay | SUD |
| | Vehicle Quality Qualitative | Passenger Survey Quantitative (Veh type) | Observation Survey |
| Measures Specific to Driver | Productivity | Miles driven in service | Operator records |
| | Income | | |
| Measures Specific to Licensing Authority | Cost / Effectiveness | Cost Recovery | Licensing Authority |
| | Service Delivery Response times | | Licensing Authority |

The exact extent of indicators may be further extended to identify impacts of pertinence to particular communities, and might include emissions impacts, congestion, and congestion charging priorities; and benefit from measuring a wide range of impacts on a multi-variate, and or pass/fail criteria.

Concept testing

Although still at conceptual stage, the potential of a wide indicator assessment is worth developing further. Scenario building can, and should, extend beyond the natural boundaries imposed in the regulatory debates; while concepts arising from, and limited to, the principles of regulatory reform allow for some validation of concept.

Two scenarios represent the most common approaches to current taxi operation, Regulated, and derestricted. These are summarized in Table 2.

Table 2 Scenarios for Testing

| Scenario | Economic Regulation | Quantity Regulation | Quality Regulation |
|----------------------|----------------------------|----------------------------|---------------------------|
| Regulated | Tariffs Set | Maintenance of restriction | Safety Minima |
| De-restricted | Tariffs Set | Open Access | Safety Minima |

Scenario 1 (Regulated)

Regulated services exist in many of the larger Scottish Cities and Towns. Regulation is applied to Tariffs (Economic Regulation), Numbers of Vehicles

(Quantity Regulation) and to Vehicle Standards (Quality Regulation). Testing the combination present in many cities against the indicators is intended to demonstrate current satisfaction with the provision of taxis, and provide baselines against which alternative scenarios may be assessed.

Scenario 2 (De-restricted)

An alternative to the fully regulated operations in place in larger cities, is to allow open access to taxi drivers, whereby any drivers wishing and capable of operating vehicles are able to do so. De-restricted policies exist in place in some larger cities, including Dublin and in some areas of Belfast, but are more common in smaller UK towns and districts. Indicative data exists in relation to the impacts of de-restriction in relation to Dublin, and historical data from US experiences in the 1970s and 80s.

The concept testing draws data from existing and new datasets collected on a small scale in the City of Edinburgh, and is included below as indication of potential.

Within these constraints it is not possible to obtain a full cross section of indicator values. Moreover, concepts remain very restricted within the realms of regulation, rather than addressing the potential offered by holistic concepts; equally appropriate to multiple criteria testing, of which more follows below.

Impact values specific to the user groups are included to provide an indication of the likely impacts on the various key players. A weighting specific to circumstance, and expectations e.g.: whether an authority wishes to maintain rigid Metropolitan Conditions of Fitness, would provide a further indicator for local application.

Table 3 Summary of Scenario Tests, applied to Edinburgh

| Indicator | | Do Nothing | Do Something | P | D | LA |
|-----------------------------------|------------|------------|--------------|-----|-----|-----|
| Change in size of industry | Licenses | 1215 | 1823 | 1 | 2 | 1 |
| | Cab Shifts | 3000 | 3420 | 1 | 2 | 1 |
| Cost of using taxi 2 mile journey | | 4.04 | 4.04 | 2 | 2 | 2 |
| Waiting Time | At Rank | 6.77 | N/A | N/A | | N/A |
| | Prebooked | | 4.36 | 1 | 2 | 1 |
| Quality | Veh. Age | 4 years | 5.02 years | 3 | 3 | 3 |
| Quality | Veh. Type | All MCF | All MCF | 2 | 2 | 2 |
| Driver Productivity | | N/A | N/A | N/A | N/A | N/A |
| Driver Income | | 16,000 | 15,136 | 2 | 3 | 2 |
| Average Impact Values | | | | 1.7 | 2.3 | 1.7 |

P – Passenger, D – Driver, LA – Licensing Authority

(1) Impacts: 1 – Positive, 2 – Neutral, 3 – Negative, N/A – insufficient data

In the review of concept test, passenger, driver and licensing authority (dis)benefits are assessed for both retention of regulation, and for assessment of derestriction. Positive short-term passenger gains do result from the change, but do not appear to equate to long-term industry stability, and may not result in a continued improvement in passenger service. Moreover, the desire for Pareto Optimality is not achieved in all instances (values over 2) allowing at best Pareto Improvement. Weightings and relative long-term impacts are still required to validate actual change.

Concluding discussion: Recommended policy direction in the provision of taxi services

While testing of existing regulatory reforms must feature strongly in the analysis of the provision of taxi services, and as suggested may themselves fail in medium and long terms; it is the wider significance of the mode in transport and city life that remains largely unexplored, untested, and if potential benefit to UK communities.

Holistic approaches are required to address the clear and present needs of Scottish City Centres. Communities once decimated by an early evening ‘flight to the suburbs’ are again enjoying emergence and rediscovery of nighttime activities, for which traditional patterns of transport may not be appropriate. The emergence of vibrant and successful city centre economies for evening and night time entertainment has positive impacts in economic growth, and social inclusion; but brings with it a series of questions in accommodating, catering for and encouraging appropriate access to facilities.

Potential benefits of innovative transport thinking are not limited to the urban environment. Rural communities often suffer from transport poverty, lack appropriate public transport facilities, and decline in economic development by simple fact that out of work communities are unable to reach neighboring, and often not distant employment opportunities. Shared use Taxis, other Flexible Transport Services, and innovative or maybe holistic thinking, may be able to facilitate this. (See Ambrosino et al. (2004) for a comprehensive review of recent developments in flexible and demand responsive forms of transport)

Innovative and appropriate policies specific to the Scottish Taxi trade, originating at Executive and Licensing Authority level, are fundamental to the longer-term stability and sustainability of the industry. In our review of indicators, it is apparent that such policy instruments require an essential input of appropriate data for assessment, and informed review of impacts pertinent to the circumstances apparent in Scotland. It is a firm conclusion that the differences between stated objectives of deregulation, and the observed impacts in US cities cited highlight fundamental difficulties in adopting purely regulatory solutions to provision of adequate supply. In many instances, the concept of deregulated supply does not address market failure or ensure levels of service visible prior to deregulation. Moreover, the lack of data specific to tariff and supply-side approaches to meeting demand has resulted in these measures not being considered proportionately.

Evidence arising from other regions' and other countries experiences with reforms, highlighted above, suggest that development of a deregulated or derestricted taxi policy will not in itself produce the level of benefits across all players consistent with the long-term development of the taxi industry in Scotland. Whether optimising or improving criteria are adopted, long term impacts within the industry are likely to reduce the overall benefit to the passenger, or create an industry which will require review in the future to accommodate negative as well as positive impacts of the policy change.

Holistic policies not tested within the scope of existing studies may prove more beneficial to the longer-term interests of the travelling public, and to the other market participants. These should include considerations as to how the industry may be made more effective within the constraints of the policies already in place. Benefits demonstrated as beneficial to some - but not all - market participants, may form the basis of further analysis in fine-tuning policies to achieve optimal criteria. An example of this might include measures intended to increase supply at certain times, minimum service criteria, and the adaptation of waiting time criteria to reflect a time specific threshold, rather than a one value fits all approach.

Many of the policy reforms applied to other areas of public transport operation have resulted in identifiable benefits to the travelling public. By identifying methods of assessing changes within the taxi industry, as set out in our scenario tests, it may be possible to effect a long term growth in the importance and contribution of the taxi industry.

Notes:

[1] Regulatory reforms in the USA during the late 1920s and 1930s are not included in this assessment. A brief description of these reforms is given in the footnote of Teal and Berglund (1987: p37).

[2] Limits imposed on entry to the taxi market are described variously according to the schemes of licensing prevalent by city, district and region. US cities tend to issue licenses in the form of 'medallions', giving rise to the concept of medallion caps – a restriction on the total numbers of licenses issued by a jurisdiction. In the UK licenses take the form of 'plates', physically attached to the taxi vehicle.

[3] Secondary and gray markets exist in the provision of taxi services in certain cities, and often follow where regulation and licensed taxi numbers fail to accommodate particular areas of demand. Secondary markets can include the use of Private Hire Vehicles (PHV) in conditions akin to hackney carriage (public hire) use. PHV taxis operate in parallel with public service vehicles, and can readily transfer to a public service style operation. Gray markets exist where particular forms of operation exist on the edge of legality. Such services have been defined as 'Gypsy' (New York), or 'Pirate' (Belfast) and do not comply with all licensing regulations applied to the traditional taxi trade. However, the market definition defies outright prosecution, given an extent of tolerance, often by the communities and regulators, making a closure or ban difficult to enforce.

[4] Adapted from: Teal and Berglund 1987

Bibliography

Ambrosina, G. Nelson, J.D, and Romanazzo, M. (Eds) (2004), Demand Responsive Transport Schemes: Toward the Flexible Mobility Agency! ENEA Rome

Avants, S., Gilbert, G., and Lupro, B. (1996) Peer review of Seattle Taxicab Regulations. Report for the City of Seattle

Balcombe, R. J. (1987) Bus Deregulation in Great Britain: A Review of the First Year, TRRL Research Report 107.

Baumol, W J and Sidak, J G (1994) Toward Competition in Local Telephony

Beesley M E (1979), Competition and Supply in London Taxis, Journal of Transport Economics and Policy January 1979, Vol. 13, No. 1, Page 102.

Bonaiuto, M., Fornara, F., Bonnes, M. (2003). Indexes of perceived residential environment quality and neighbourhood attachment in urban environments: a

confirmation study on the city of Rome. *Landscape and Urban Planning* , 65, 41-52.

Boroski J W and Mildner G C S (1998) *An Economic Analysis of Taxicab Regulation in Portland, Oregon. Policy Perspective No 1007 Cascade Policy Institute.*

Braeutigam R R (1999) *Learning about Transport Costs in Essays in Transportation Economics and Policy* (Jose A Gomez-Ibanez and Clifford Winston Eds) pp57-98

BSD Consultants (1999) *Review of the Western Australian Taxi Industry. Prepared for Department of Transport, Western Australia*

Buchanan, C. (1963) *Traffic in Towns – A study of the long term problems in traffic in Urban areas, HMSO 1963*

Cairns, R. D., and Liston-Heyes, C. (1996), 'Competition and regulation in the taxi industry', *Journal of Public Economics* 59:1-15, 1996

Camagni R.1; Gibelli M.C.; Rigamonti P. (2002) *Urban mobility and urban form: the social and environmental costs of different patterns of urban expansion: Ecological Economics, February 2002, vol. 40, no. 2, pp. 199-216*

Cevero, R. (1992) *Stimulating Transportation Alternatives in Response to Congestion Pricing, FHWA Congestion Pricing Symposium, Washington, D.C., 1992.*

Coffman R. B. (1977) *The Economic Reasons for Price and Entry Regulations of Taxicabs. A Comment. Journal of Transport Economics and Policy, September 1977, Vol. 11, No. 3, Page 288.*

Cole, S. (1986) *Applied Transport Economics, Cogan Page pp.*

Cooper, J. (2003), *Response to the Office of Fair Trading Report - The Regulation of Licensed Taxi and PHV Services in the UK, prepared for the Scottish Taxi Federation*

Cooper, J (2004), *Taxi Regulation, review of provision in Northern Ireland, TRi Taxi Studies Group on behalf of the Combined Belfast Taxi Proprietors Association*

Costa, A. (1996), *The organisation of Urban Public Transport Systems in Western European Metropolitan Areas, in Transport Research A, Vol 30, No. 5 pp349-359*

Crandall, R W. (2003) *An End to Economic Regulation? Working Paper, The Brookings Institution. Accepted for publication in Competition and Regulation in Utility Markets (Colin Robinson ed), Edward Elgar 2003*

Crew M.A., and Kleindorfer P. (2002) Regulatory Economics: Twenty Years of Progress? *Journal of Regulatory Economics*, January 2002, vol. 21, no. 1, pp. 5-22

Dempsey, P. (1996) 'Taxi Industry Regulation, Deregulation and Reregulation: The Paradox of Market Failure,' *Transportation Law Journal*, Vol 24, pp 73–120.

Douglas, G. W. (1972). "Price Regulation and Optimal Service Standards: The Taxicab Industry", *Journal of Transport Economics and Policy*, vol. 4, no. 2 (May), pp. 116-127

Eckert, R. D. (1973) On the incentives of regulators: The case of Taxicabs. *Public Choice* Vol. XIV pp98-99

ENSR (2001) European Network of Social Research, International comparison of the taxi sector. Report for the Ministry of Transport and Communications The Netherlands.

Farris, M T (1969) Transportation Regulation and Economic Efficiency The *American Economic Review* Vol 59 No 2 pp 244 - 250

Flath, D. (2002), Taxicab regulation in Japan, Columbia University, unpublished

Gaunt, C. (1996), The impact of taxi deregulation on small urban areas: some New Zealand evidence. In *Transport Policy*, Vol 2 No. 4 pp257-262

Gilbert, G. (1992), How to make regulation work. Presentation to the International Conference on Taxi Regulation, Montreal

Hackner J. and Nyberg, S. (1995), Deregulating Taxi Services: A Word of Caution. *Journal of Transport Economics and Policy*, May 1995, Vol. 29, No. 2, Page 195.

Han, S (2003), Dynamic traffic modelling and dynamic stochastic user equilibrium assignment for general road networks. In *Transportation Research B*, Vol 37, No. 3, pp225-249

Huisman, T. and Boucherie, R (2001), Running times on railway sections with heterogenous train traffic. In *Transportation Research B*, Vol 35, No. 3, pp271-292

Ison, S., and Rye, T. (2003) Lessons from travel planning and road user charging for policy making, in *Transport Policy* 10, pp 223-233

Industry Commission (1994) *Urban Transport, Volume 1 Report, No 37*, Commonwealth of Australia

- Krol, R and Svorny, S. (1994) Regulation and Economic Performance: Lessons from the States. The Kato Journal, Vol 14, No.1
- Leisy (2001), Taxicab regulation in Seattle, Lessons Learned, Document produced for the City of Seattle
- Lok Sang Ho (1993) An optimal regulatory Framework for the Taxicab Industry, Unpublished. Centre for Environmental Studies, Chinese University of Hong Kong
- Marell, A., and Westin, K. (2001), The effects of taxicab deregulation in rural areas of Sweden. In Journal of Transport Geography, No 10, pp135-144
- Niskanen W A (2002) A Retrospective, Regulation Summer 2002 pp4-5
- NTA (1992) National Transportation Agency Review Commission, Competition in Transportation: Policy and Legislation in Review, Ottawa, Canada
- OFT (2003)(a), Office of Fair Trading, The regulation of Licensed Taxi and PHV services in the UK. Report No.676
- OFT (2003) (b) Annex to the Office of Fair Trading, The regulation of Licensed Taxi and PHV services in the UK. Report No.676
- Pagano A M and McKnight C E (1983), Economies of Scale in the Taxicab Industry. Some Empirical Evidence from the United States. Journal of Transport Economics and Policy. September 1983, Vol. 17, No. 3, Page 299.
- Pleijster F., Bruins, A., and Snijders J. (2002) Taxi abroad: An inventory of experiences with regulated and deregulated policies abroad. Report to the Netherlands Ministry of Transport, Public Works and Water Management Directoraat-Generaal Rijkswaterstaat Adviesdienst Verkeer en Vervoer
- Posner R (1974) Theories of Economic Regulation, Bell Journal of Economics and Management Science 5 pp2-50
- Price Waterhouse (1993) Analysis of Taxicab Deregulation and Reregulation, report to the Taxicab, Limousine & Paratransit Foundation
- Raux, C. and Odile (2002), How can road tolls serve urban policy, in Recherche Transports Securite, No. 75, pp115-130
- Revill, G. (2001), An Historical Geography of railways in Britain and Ireland & Railways and the Victorian imagination. In Journal of Historical Geography, April 2001, Vol 27, No. 2 pp291 – 293 FOLLOW TO TEXT
- Rufolo, A (1998) Low-Cost Solutions to Portland's Traffic Problems: Congestion Pricing and Free-Market Transit, Policy Insight 105 May 1998 pp 4 -21

Romilly P. (1999) Substitution of bus for car travel in urban Britain: an economic evaluation of bus and car exhaust emission and other costs: Transportation Research Part D: Transport and Environment, March 1999, vol. 4, no. 2, pp. 109-125

Rye T. and Wilson, N. (2002) The urban bus situation in the UK: recent developments and a case study of Edinburgh", Seminar on bus regulation, TRAIL, Technical University of Delft, Netherlands.

Schaller, B. and Gilbert G. (1995) Factors of production in a regulated industry: New York taxi drivers and the price for better service. Transportation Quarterly, Vol 49 no 4.

Schaller, B. and Gilbert, G. (1996) Villain or Bogeyman? New York's Taxi Medallion System. Transportation Quarterly, Vol 50, No 1. pp

Shreiber, C. (1975) The Economic Reasons for Price and Entry Regulations of Taxicabs, Journal of Transport Economics and Policy, 21, pp 37-56

Shreiber, C (1977) A Rejoinder. Journal of Transport Economics and Policy, September 1977, Vol. 11, No. 3, pp298-304.

Spencer, A. H. and Andong, W. (1996), Light Rail or Busway? A comparative evaluation for a corridor in Beijing. In Journal of Transport Geography, Vol 4. No. 4, Dec 1996, pp239-251

Stigler, G J (1971) The Theory for Economic Regulation. The Bell Journal of Economics and Management Science Vol 2 pp 3-21

Teal R (1992) An overview of the American Experience with Deregulation International conference on Taxi regulation Montreal, Canada

Teal, R. and Berglund, M. (1987), 'The Impacts of Taxicab Deregulation in the USA', Journal of Transport Economics and Policy, pp37-56

Toner J. (1995) English experience of deregulation of the taxi industry, Transport Reviews, Vol 16 No.1 pp79-94

Toner, J., and Mackie, P., The Economics of Taxicab Regulation: A Welfare Assessment. Paper presented at 6th World Conference on Transport Research, Lyon, 1992

Tretheway M W and Waters II W G (1991) US Railroad productivity after Staggers. Proceedings of the 33rd Annual Meeting of the Transportation Research Forum 6, pp 119-130

Trotter, S. D. (1985) The Price Discriminating Public Enterprise with Special Reference to British Rail, *Journal of Transport Economics and Policy* Vol. 9 No 1, pp 41-64.

Van Vuuren (2002) Optimal pricing in railway passenger transport: theory and practice in The Netherlands, *Transport Policy*, Vol 9, No 2, pp 95-106

Williams D J (1980), The Economic Reasons for Price and Entry Regulation of Taxicabs. A Comment. *Journal of Transport Economics and Policy* January 1980, Vol. 14, No. 1, Page 105.

D.J. Williams (1981), Labour Costs and Taxi Supply in Melbourne. *Journal of Transport Economics and Policy*. May 1981, Vol. 15, No. 2, Page 179.