

TAXI FARES AND THE CAPITALIZATION OF TAXI LICENSES

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Introduction

The taxi industry in Canada has avoided regulatory reform despite the overwhelming success of economic deregulation in the freight and inter-city passenger markets. Where taxi deregulation has occurred, in Ireland and New Zealand, the results are encouraging. Moreover, the majority of economists that have studied taxi markets favour deregulation (Moore and Balaker, 2006). This paper examines the experience of taxi regulation in the City of Winnipeg, Manitoba.

Taxicabs in Winnipeg are regulated by the Manitoba Taxicab Board (MTB). The MTB sets the tariffs charged by metered taxicabs, and uses licences to limit the number of taxicabs allowed to operate in the city. The license values of Winnipeg taxicabs are determined within the regulated monopoly through an open exchange. This public record of transactions provides a detailed database for economic analysis.

Applications for taxi rate increases are subject to the discretion of the MTB. Pressure from the taxi license owners to increase rates is understandable, but the MTB has to consider both consumers and taxi providers. A 2009 report on the taxi service commissioned by the MTB makes the following observation on taxi fares: "Rates are balanced to protect the user not only from onerous or arbitrary fares

but, at the same time, to still yield the provider sufficient funds to continue in business and make a modest profit.” Mundy (p.3, 2009)

The difficulty for the regulators is to determine whether taxi rates provide a modest profit, or yield excessive returns. Cases for rate increases are usually based on submissions of operating and capital costs, but data based on averages or hypothetical models can be very misleading. The capitalized value of the operating licence is a more reliable indicator of whether the regulated profits are adequate, or excessive. The taxi licence value is the amount that new entrants are willing to pay for the opportunity to obtain the available returns. Consequently, taxi licence values are an estimate of how much beyond Mundy’s “modest profits” are being earned in the industry.

This analysis begins with a brief overview of deregulated taxi markets in New Zealand and Ireland. This is followed by a description of the taxi industry structure in Manitoba. Subsequently, the theory of taxicab licence capitalization is presented with some estimates of taxi licence values across Canada. The penultimate section presents a regression analysis of taxi licence values in Winnipeg and the impact of fare increases from 2000 to mid-2009. The paper concludes with some thoughts on future research and regulatory approaches in Canada.

Ireland: Taxi Deregulation

Until the recent worldwide recession, rapid growth in Ireland increased the need for better urban transportation. A more open market for taxicabs was sought to achieve the public’s transportation demand, but this happened very suddenly. “The deregulation of the taxi sector in Ireland by the High Court in 2000 brought a three-fold increase in taxi numbers and much reduced passenger waiting times for taxis. The deregulation decision by the High Court was based on the rights of persons to enter a sector for which they had the training and skills and the right of the public to purchase the services of such persons. The decision was upheld in judicial review.” (Barrett, p.34) Ireland’s deregulation created the ability for literally anyone to become a taxi driver.

Before deregulation the cost of a taxi license in Dublin had increased from £3,500 in 1980 to £90,000 by 2000. The capitalized value of

taxicab licences fell dramatically after deregulation as more operators competed in the market. By 2002, the value of a taxicab licence in Dublin was £13,224 (Barrett).

By 2002, Dublin's population of slightly more than one million people were served by over 8,609 taxis, or approximately 8.5 taxis per thousand, versus 2,722 taxis prior to deregulation in 2000. Increased customer service was noticed by the public as more taxi cab drivers attempted to gain customers. In 1997, 75% of people had to wait longer than 5 minutes for a taxi. After deregulation the percentage dropped down to 52% (Barrett).

Taxi deregulation in Ireland created a more competitive industry and a warning to those who hold taxi licences with inflated values. Three judgments under Irish law confirmed that taxi licences confer no property rights and that the government can alter the terms under which they are held without compensation.

New Zealand: Taxi Deregulation

New Zealand is the first documented market to go through taxi deregulation that produced clear benefits to its customers. Market entry was highly regulated from 1939 to 1989. The New Zealand government decided to keep fares reasonable (as they saw fit) and to open the market to competition. After deregulation, the number of taxis serving the Wellington Region of 300,000 residents increased from 454 in 1989 to 932 in 1994 (Morrison, 1997).

The ratio of cabs per thousand people in the Wellington region increased from 1.5 in 1989 to 3.1 in 1994. New Zealand experienced a rapid increase in taxi numbers following deregulation, while fares actually declined in real terms. Morrison (1997) offers three possible explanations for this seeming paradox. First, the distortion in the pre-1989 market created such abnormally high profits that a doubling of the cabs still allowed reasonable profits for everyone. Second, the differentiation of service offerings, and prices according to quality, increased demand. The third reason is that the greater availability of taxi services in general expanded the market.

“Anecdotal evidence suggests that the use of taxis by business people, including public sector employees in the capital city has increased

largely because of the greater availability of taxis and improved ease of payment. The uncertainties and delays in obtaining a taxi that were characteristic of the prederegulated environment have been eliminated in all but the most busy times. The customer now not only faces a number of taxis on the ranks and can hail cruising taxis, but there is also choice among various firms and drivers on any given rank and in the phone book.” (Morrison, 1997; p. 920)

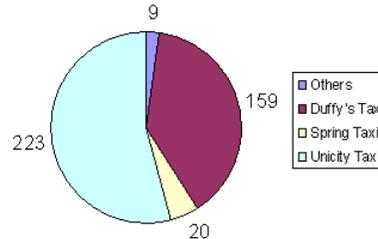
Morrison (1997) also suggests that more stringent drunk driving laws and deregulation of the labour market may have helped increase taxi usage. He notes that holders of pre-deregulation licence holders lost considerable equity, but over the last few years “those who purchased access to the largest companies appear to be benefiting from accelerated appreciation of their ‘ticket’.” The benefits of size can also be observed even in the regulated taxi market in Winnipeg, which we turn to next.

Winnipeg Taxicab Regulated Industry Structure

In Winnipeg, taxis operate as a regulated monopoly with very little internal competition on service, and none on price. The MTB taxi regulations set the maximum tariffs charged (which are used by all companies) and issues licences that limit the number of standard taxicabs that are allowed to operate in Winnipeg. Seymour (2009, p.7) observes that the MTB has maintained the number of taxi licences at “approximately 400 licences since 1947 and currently allows 410 regular licenses.”

The proportions of the standard taxicab licences held by taxi companies in Winnipeg are presented in Figure 1. Four taxi companies own a total of 9 standard taxi licenses, and account for 2 % of the market. The only medium size taxi network is

Figure 1 Standard Taxi Licences in Winnipeg, 2009



Spring Taxi, which owns 20 standard taxis licences, or 5%. Members of the Unicity Taxi co-op own over half the total standard taxicab licences (223), while Duffy's Taxi co-op members own 159 licences.

Within the “monopoly”, these two large taxi co-ops dominate the market. The drivers own the licences and the cars, while the co-ops provide office, meeting and dispatch facilities. The dispatch system offers significant benefits to co-op members. The more cars that join a network the lower the average cost of maintaining the dispatch equipment and operators. The network benefits have been enhanced in the past ten years because of the introduction of GPS (Global Positioning Systems). The dispatch systems can direct the closest car to the waiting customer thereby reducing empty miles, as well as increasing the utilization of the taxis.

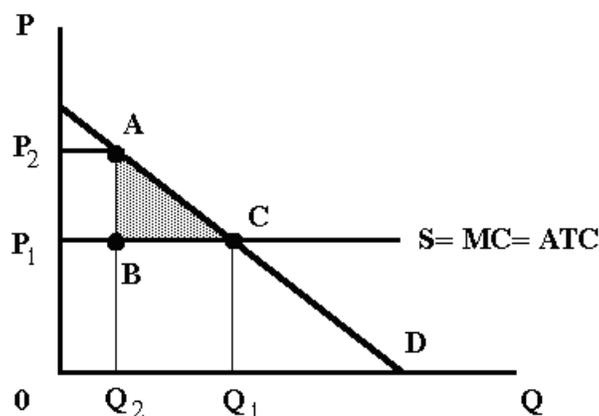
Theory Of Taxicab Licence Capitalization

Most cities in North America have regulatory boards that restrict taxi licenses and regulate taxi fares charged. Taxi owners that received these licenses free of charge benefited economically because of the restricted access. As these “regulated rights” to the market are exchanged over time, the benefits of the regulation (higher fares) become capitalized into the market value of the licenses.

The economic theory of taxicab licence capitalization is well established. The revenue of the taxi industry is based on the average fare and the number of rides provided. The regulated fares and fixed number of licences determines the share of rides and total revenue that each taxi receives. The value of a taxi licence is a function of the extra profits received beyond the normal profits earned in a competitive market. A stylized view of a regulatory regime in the taxi industry is shown in figure 2.

A competitive taxi industry in the absence of regulation could be characterized by a long-run equilibrium at point C where the average total cost equals average revenue and normal profits are earned. For simplicity, a horizontal supply function (S) is used because the taxi industry faces constant costs¹. Consequently, the Marginal Costs of the individual taxicabs (MC) equal the Average Total Costs (ATC).

Figure 2 Theoretical Model of Taxicab Licence Capitalization



A government can regulate the taxi industry by restricting entry and/or setting the price. In practice it is difficult to set the tariffs and the number of taxi licences to provide an optimal level of service. A vast economics literature exists on the problems of “regulatory capture” in which lobbying by the regulated parties leads to inflated regulated rates. The visible manifestation of inaccurate regulation shows up in the taxicab license values where the extra benefits of regulation become capitalized into this limiting resource i.e. access to the market.

Suppose that regulation restricts entry such that point A is the new equilibrium. Instead of normal profits with a Q_1 amount of output (taxi capacity), the smaller taxi industry supplies Q_2 amount of output. Because of the higher prices set by the regulators, the licensed firms make additional economic profits equal to P_2ABP_1 . This is a transfer of wealth from taxi consumers to taxi licence ownersⁱⁱ. If taxi license owners retire or leave the industry, they can sell their licenses to new entrants at inflated values based on the expected long-run returns accruing to restricted entry.

The value of the license depends on the size of P_2ABP_1 , the discount rates of new entrants and their expectations of change in the regulatory system. Assuming that they believe the extra benefits of

regulation will be available for as long as the new entrants continue to operate, they will be willing to offer the net present value of the extra benefits P_2ABP_1 earned over the future years.

One means of visualizing the capitalization of taxicab licences is to consider the value of a perpetual government bond (no redemption date or fixed value) that has a fixed coupon rate. Dividing the coupon by the current rate of interest provides the price or exchange value of the bond. Alternatively, multiplying the price of the bond by the current interest rate gives the expected annual payment of the bond. Similarly, if a taxi license is worth \$350,000 and current interest rates are 5 %, the imputed excess profit would equal $(\$350,000)(0.05)$, or \$17,500 for each taxi every year. This means that under these assumptions, the artificial shortage of taxicabs and inflated tariff rates would provide an extra income of \$17,500 annually above the normal income required to compensate for wages and other expenses, and the “modest profit” of operating a taxi. If this excess revenue were not there, the new taxi licence owner would not be able to pay off the investment required to buy the licenceⁱⁱⁱ.

Taxicab License Values in Canada

The goal of the regulators is not to create inflated taxi licence values. The public interest is to ensure that the taxi licence values are nominal and that the taxi industry operates competitively and efficiently within the controls that the regulators exert, or as Mundy (2009) puts it, with “a modest profit”. Of course, this is much more difficult to do in practice.

Table 1 provides a snapshot of taxi licence values across Canada in 2009, as estimated by Seymour (2009). The taxi licence values are based on the highest reported recent taxi licence transfer price in each city. The population and number of taxicabs per thousand are listed for each city. There appears to be some relationship between the number of licenced cabs and the value of the licences, but these data are imperfect at best. They do not provide any trend in licence values and the urban populations may not represent the taxi markets. For example the taxi numbers in Mississauga, Ontario are added to the Toronto total.

Table 1 Taxis and Estimated Transfer Values of Licences, 2009

City	2006 Population	Taxi Licences	Taxi per '000 pop	Licence Value
Vancouver	1,953,252	475	0.24	\$500,000
Calgary	988,079	1,411	1.42	\$ 80,000
Edmonton	862,544	1,185	1.37	\$ 55,000
Saskatoon	202,425	160	0.79	\$ 90,000
Regina	179,246	120	0.67	\$135,000
Winnipeg	641,483	410	0.63	\$280,000
Windsor	278,765	211	0.75	\$ 80,000
Toronto	4,753,120	4,073	1.17	\$114,400
Ottawa	860,928	1,066	1.24	\$185,000
Montreal	3,316,615	4,445	1.34	\$220,000

Sources: Seymour (2009) and Statistics Canada

Taxi licence ownership across Canada represents significant equity value that is only maintained by regulated fares that yield inflated returns. If the regulators who set the fares and quantity of taxicabs in their jurisdiction estimated the market properly, the taxicab license values would be nominal in value. If the tariff rate increases are too generous, or the taxi numbers remain too restrictive, the value of the licenses rise according to their extra earning power. The national survey of taxi licence values suggests the market distortion, but hard evidence is found in the pattern of fare increases and taxi licence value changes in Winnipeg, Manitoba from 2000 to 2009.

Observed Taxicab License Values and Tariffs

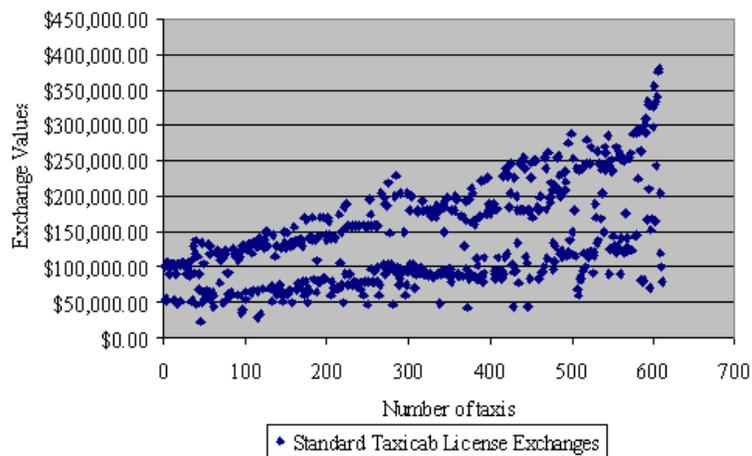
During the past 10 years, no new taxi licenses have been issued in Winnipeg, but nine fare increases have been granted. This provides a consistent span of time for analysis of license values and the impact of fare increases on the Winnipeg taxi market.

Data were obtained from the MTB for a ten year period from January 1, 2000 to June 30, 2009. After obtaining all the raw data, the transactions were inspected for anomalies and to code the data

according to taxicab licence ownership. For example, exchanges between family members that were concluded for a nominal amount of \$1.00 were excluded from the dataset. Almost 600 observations met the requirements of commercial exchanges.

The scatter plot in Figure 3 presents the cleaned data for Standard Taxicab licence exchanges organized in chronological order. The chart reveals two groups that track in parallel over the period of study. This is because the taxicab licenses can be sold as either a full licence or a half interest in a licence.

Figure 3 Winnipeg Standard Taxicab License Exchanges, 2000 - August 2009



The license values in Figure 3 have trended higher over the period of study. The percentage change in values is approximately 300 % for both full and half interest license values, an average increase of 14.87% per year, which is well above inflation that was generally less than 2% per year during this period.

The approved tariff rate changes for Standard metered taxicabs in Winnipeg from 2000 to 2009 are presented in Table 2.

Table 2 Approved Tariff Rate Charges for Standard Metered Taxicabs in Winnipeg, 2000 – 2009

Tariff Change Effective Date	Stated Rate Increase		Fixed Rate Cost (\$)	Fixed Meter Rate	Fixed Rate per meter	Vbl. Rate Cost (\$)	Vbl. Rate Meters	Vbl. Rate per meter	Wait Time Cost (\$)	Wait Time (sec.)	Wait per second (\$)
20001201	6.70%		2.70	87	0.0310	0.10	87	0.0011	0.10	14	0.0071
20020225	n/s	SC	2.95	87	0.0339	0.10	87	0.0011	0.10	14	0.0071
20030901	9.30%	DC	2.95	87	0.0339	0.10	87	0.0011	0.10	14	0.0071
20040701	3.00%		3.00	84	0.0357	0.10	84	0.0011	0.10	13.58	0.0073
20041201	3.00%		3.05	81	0.0376	0.10	81	0.0012	0.10	13.18	0.0075
20051117	n/s	FSC	3.30	79.65	0.0414	0.10	79.65	0.0012	0.10	13.18	0.0075
20060701	0.85%	GST	3.30	79.65	0.0414	0.10	79.65	0.0012	0.10	13.18	0.0075
20080101	0.95%	GST	3.30	79.65	0.0414	0.10	79.65	0.0012	0.10	13.18	0.0075
20081103	8.00%		3.30	72.5	0.0455	0.10	72.5	0.0013	0.10	13.18	0.0075

In total, nine rate increases were introduced over this 10 year period. The rates are a combination of an initial meter fixed “drop charge” for the first number of meters traveled, and a variable rate charged for units of fixed distance (in meters) beyond the initial pickup point. Also, a waiting time charge is included. During the period of study, both the waiting time in seconds and the distance in meters for both the fixed and variable rates have been shorter, which increases the unit fare charged by the taxis.

In some cases special charges were added to the fares. For example in 2002 a Safety Charge (SC) was included. The “Drop Charge” (DC) was increased in 2003. A Fuel Surcharge (FSC) was allowed in 2005. In 2007 and 2008 when the General Sales Tax (GST) was reduced, the fares were not changed and the taxicabs were allowed to keep the difference. Effectively, each of these changes increased the fares for taxi rides.

Regression Model Taxicab License Values and Regulated Fares

Theory holds that taxi licence values are a function of the excess economic rents. Given the fixed number of licences, licence values should vary only with fare changes. The regression model uses the transaction values of taxicab licenses from 2000 to June 2009 as the dependent variable. The values of half interest sales in taxi licenses are doubled to provide a value consistent with the prices of whole licenses. The independent variables are dummy variables that represent the taxi ownership and the fare levels at the time of rate changes.

The regression model results and statistical tests of validity are presented in Table 3. All the variables have the right signs and are highly significant (t-values at the 99 percent confidence level). For the model to be identified the small taxis and the initial rate increase are not included as variables^{iv}. The intercept term represents the licence value for the small taxis and the impact of the tariff after the first increase.

The base values of Unicity and Duffy’s taxis licences refer to average increment for taxi licence values for members of these co-ops. The incremental impact on taxi license values resulting from the fare tariff increases are expressed explicitly by the date coefficients.

The calculation for licence values for Unicity and Duffy's taxicabs is the sum of their coefficient, the intercept value and the year of tariff change. For example in 2000, the value of the small taxi licenses would be \$64,816, but the Unicity licenses would be worth \$94,538 and the Duffy's licence would be \$116,827. The premium for the taxi licenses that belong to the larger networks suggests the benefits of the co-op dispatch systems.

Table 3 Regression Model Results of Winnipeg Taxi License Values, 2000-2009

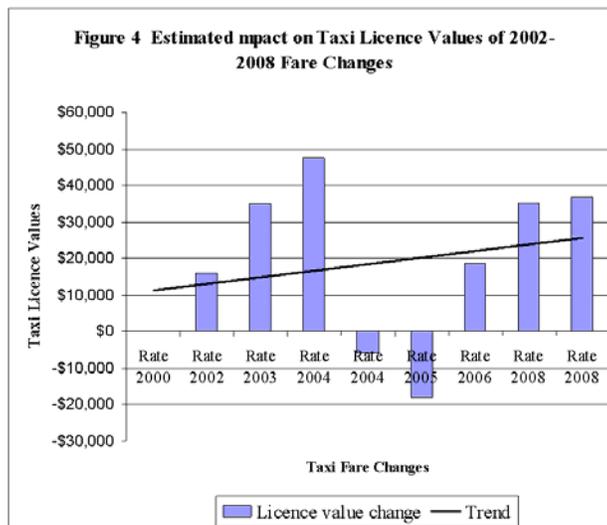
<u>Variable</u>	<u>Parameter Estimate</u>	<u>Standard Error</u>	<u>t-Value</u>
Intercept	64816*	6929	9.35
Unicity	29722*	5141	5.78
Duffy's	52011*	5172	10.05
Rate 2002	15990**	6660	2.40
Rate 2003	51064*	5998	8.51
Rate 2004	98454*	12949	7.60
Rate 2004	92713*	8531	10.87
Rate 2005	74707*	7607	9.82
Rate 2006	93524*	6028	15.51
Rate 2008	128850*	7223	17.84
Rate 2008	165603*	7462	22.19

*99% and **95% level of confidence

Root MSE 40905 R-Square 0.57 F-value 157.72

The estimated impact on Winnipeg taxi licences of the fare increases since 2000 are illustrated in Figure 4. The incremental increases in the revenue tariffs since 2000 appear to have been greater than the costs of taxi operations for most of this period. The evidence for this is the positive trend in taxicab licence values. With the exception of only two years, fare increases have led to significant increments in the value of taxi licences.

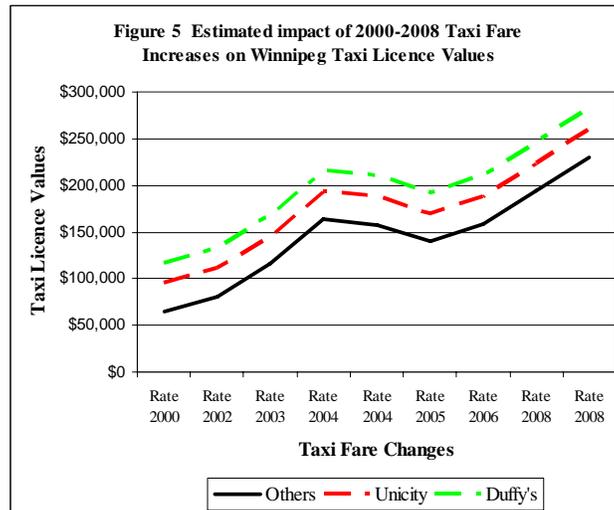
Mundy (2009) observes that the taxi co-op members are very concerned about any expansion of the industry because of the high value of their licences. “Co-op owners who are still driving and deriving their living from their cabs are typically not interested in adding additional taxis, feeling that they will only take trips from them, forcing them to work longer in order to make the same income. ... This situation is even more pronounced when there is a significant medallion value attached to each co-op member’s taxi permit.” (Mundy, p. 9, 2009)



By taking the base value and adding the coefficient for the different rates, the value in each of the pertinent years can be found. For example, adding the final rate increase in 2008 to the base value gives and estimated taxicab license value for each taxi: small taxi’s licenses would be \$230,419, but the Unicity licenses would be \$260,141 and the Duffy’s licence would be \$282,430. These data are displayed in Figure 5. The increasing difference between revenues and costs is capitalized into the values of the fixed number of licenses.

The implications of excessive taxi licence value increases in Winnipeg, echo the conclusions of Moore and Balaker (2006) who

undertook an extensive review of the literature on taxi market deregulation. Of the 28 economic studies included in their analysis, they found that “Two out of three articles on taxi-market policy by economists find taxi deregulation beneficial, and their judgments expressed in their writing show that a strong majority support deregulation. That some articles judge deregulation negatively arises in part from deregulation not having gone far enough.” And, “Our own judgment is that taxi deregulation can work well when done right. We hope this body of research will begin to weigh against the rent seeking and bureaucratic self-interest that currently dominates the making of taxi-market policy”. (Moore and Balaker, 2006; p. 126)



Conclusion

Deregulation of taxi market access is long overdue in Canada. The excessive capitalization of taxi licences and the inept management of rate increases, as illustrated by the MTB, means that Winnipeg is underserved, and likely over priced.

In addition to the deadweight loss for society associated with the under-provision and over-pricing of this service, the negative externalities of taxi regulation are important. The distorted taxi

market encourages greater private car ownership that increases congestion and air pollution. Moreover, lack of taxi availability may cause more people to drive drunk than would otherwise be the case. The impact of taxi regulation on economic efficiency and negative externalities deserves further study.

The arguments for deregulation of taxi markets are very strong. What is absent in Canada is any debate or justification for maintaining the status quo. Old-fashioned economic regulation of inter-city transport markets in Canada was reformed in the 1980s. It is time that urban transport regulation is reformed, too.

References

- Barrett, Sean D. "Regulator Capture, Property Rights and Taxi Deregulation." Oxford: Blackwell Publishing, *Institute of Economic Affairs*, 2003.
- Moore, Adrian T. and Ted Balaker. "Do Economists Reach a Conclusion on Taxi Deregulation?" *Econ Journal Watch*. Volume 3, Number 1, January 2006: pp. 109-132.
- Morrison, Philip S. "Restructuring Effects of Deregulation: The Case of the New Zealand Taxi Industry." *Environment and Planning A*, Volume 29, 1997: 013-928.
- Mundy, Ray A. *Winnipeg Taxi Study*. Tennessee Transportation and Logistics Foundation, February 4, 2009.
- Seymour, David. "Who Owns Taxi Licences? Exclusive Taxi Licences and Transparency." *F CPP Policy Series* No. 67. September, 2009.

ⁱ Another car can be added to the taxi fleet at the same cost as the one before it. Although average overhead costs for dispatch could decline slightly, average total costs change only marginally with the addition or subtraction of cars.

ⁱⁱ The shaded area ABC is the efficiency loss created by the regulated monopoly. Offering less service at higher prices causes this loss in consumer surplus.

ⁱⁱⁱ Note that the buying and selling of taxi licences creates capital gains as well as the rents collected for their use. Both these sources of income are above and beyond the revenues needed to keep the taxis and drivers in the market.

^{iv} A regression estimation requires that N-1 dummy variables are used so that the model is identified.