INTERIM REPORT BY BRIAN BROWNE

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TAXICAB INDUSTRY REVIEW

EXECUTIVE SUMMARY

This study focuses on the need for immediate fare relief in the form of a fare surcharge to offset rising gasoline prices[1]. Since January 2003, taxicab fares have not increased. During the period 2003-2005, gasoline prices have increased at an annualized rate of 13.98 percent. For the same period, 2003-2005, The Bureau of Labor Statistics (BLS), Consumer Price Index (CPI) for Western Urban Areas increased at an annualized rate of 2.23 percent. To avoid further exacerbation of this regulatory lag and negative financial impact on the taxi industry of San Francisco, an interim $1.00 surcharge should be immediately added to the Flag Drop. This surcharge should be temporary, pending further in-depth economic analysis of the longer-term trend in gasoline and other key industry cost factors. The current rate-lag is financially detrimental to the San Francisco taxicab industry and could adversely impact its survival.[i]

INTRODUCTION

This paper is a work-in-progress that will be finalized and updated as a complementary adjunct to enhance taxicab operation in San Francisco. Data required for developing a San Francisco-specific econometric model are lacking at this time. Preliminary results, based on available data and analysis to date, demonstrate a regulatory lag in adjusting fares upward to offset increasing gasoline prices and general increases in the CPI and other taxicab-related capital and operating costs.

A 1998 econometric analysis of the New York City (NYC) taxicab industry (discussed in the text below) estimated a fare demand elasticity of .22. If the San Francisco cab industry had a like fare demand elasticity, a 1 percent fare increase would cause only a 0.22 percent decrease in cab use, being offset by an overall increase in total revenue. As long as the percent increase in fare exceeds the percent decrease in demand for taxi services, revenue generated by San Francisco taxis will increase. The New York

[1] Immediate fare relief is necessitated in that during the period from January 2003 - present gasoline and other oil based products, integral to taxicab operations, have shown significant price increases. This gasoline and related products price spikes, coupled with the approximate seven-percent increase in the basket of consumer goods used to weight the CPI, exacerbates the plight of the drivers and operators comprising SF's taxicab industry.

[i] See Endnote, pg. 29 below.

econometric approach for estimating demand elasticities is being replicated for San Francisco taxis.

There are four major milestones in any economic study: I – Preliminary analysis; II – Statistical analysis; III – Validation; and IV – Application. The conclusions presented in this interim report are a result of a Phase I analysis. The data reviewed in Phase I, as presented below, strongly suggest that regulatory lag has been detrimental to the taxicab industry of San Francisco.

Completion of all four phases will take additional time. Gasoline price increases will not wait while this econometric study is completed. It is hoped that the economic and financial data presented in this study can be submitted to the Board of Supervisors to consider in connection with its review of fares for San Francisco taxicabs.

The study is organized as follows:

SECTION 1 – STUDY GOALS

A. Demand for San Francisco taxicab services

The demand for taxicabs in San Francisco is a function of both fares and numerous other non-fare variables. In San Francisco, taxi fares and conditions of services are closely regulated (see below). Many sectors of the San Francisco economy rely heavily on an efficient taxicab industry. At the same time, the viability of the San Francisco taxicab industry is a function of revenues that are sufficient to attract investment capital (competitive return on capital), capable operators, and ensuring that all reasonable taxicab O&M costs are adequately covered (see below). The regulators have to perform a balancing act to ensure that high-quality cab services are available at a

[2] Data used in this study are stored on relational Excel worksheets that are provided with this study. Tables are numerically numbered for ease of validation, programming and review.

reasonable cost while simultaneously maintaining sufficient economic incentives to attract owners and drivers to provide excellent services.

The responsiveness of the demand for cab services to a change in fare (assuming the demand schedule is unchanged) is called elasticity of demand. More precisely, the ratio of (1) the percentage change in demand to (2) the percentage change in price is the "elasticity of demand" for any good or service. The demand is said to be "elastic" when the percentage change in quantity demanded is numerically greater than the percentage change in price. The demand schedule is said to be "inelastic" when the percentage change in quantity is less than the percentage change in price.

In other words, if price increases by 1%, but demand decreases by less than 1%, the relationship is “inelastic”. If a 1% increase in price results in a greater than 1% decrease in demand, the relationship is “inelastic”. In the case of a taxi fare increase brought about by an increase in operating costs (e.g. the cost of gasoline), if a fuel surcharge would drive away too many riders, it will not result in an overall increase in operating revenue (“elastic”). If the demand for cab services stays relatively the same, or drops less than the increase brought about by the fare boost, the result is more operating revenue to meet increased operating costs (“inelastic”).

Armen Alchain and William Allen, in University Economics, summarize the two fundamental laws of demand:

- "The first fundamental law of demand states, the demand for any good is a negative relationship between price (fare) and amount demanded (cab services).
- The second fundamental law of demand asserts the elasticity of demand is greater in the longer than the short run."[3]

B. Quantifying demand for taxicab service responses to fare increases

The San Francisco Taxi Association proposes to use econometric[4] techniques to estimate the cab services resulting from an increase in the fare to reflect gasoline and other cost increases. The Association also proposes to estimate both fare and non-fare demand elasticities in a multivariate analysis. To complete this analysis, it will be necessary to build a database with accurate fare and non-fare historical data going as far back in time as possible, hopefully 10-15-20 years.

C. Approach and milestones

The proposed study is formally outlined in Appendix No. 1, with an accompanying diagrammatic flow-chart. The study is divided into four main milestones/phases.

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[3] University Economics, Second Edition, Wadsworth Publishing Company, Belmont, California, Chapter 5, pages 48-64 (1967).
[4] Econometrics combines economic theory, mathematics and statistical techniques.

Phase I – Preliminary Analysis

- Availability of relevant data
- Economic theory guiding appropriate explanatory models
- Pre-selection of potential models based on theory and available data
- Predictability of explanatory variables
- Forecasts of explanatory variables

Phase II – Statistical Analysis

- Statistical Estimation – Multiple Regression
- Statistical Tests
- Tentative Model

Phase III – Validation

- Tests of Forecasting Performance
- Final Model

Phase IV – Application

- Traffic, Passengers and Revenues
- Partial Regression Coefficients Are Elasticities
- What if? Sensitivity Testing

SECTION 2 – SAN FRANCISCO TAXICAB REGULATION

A. Overview

The San Francisco taxi industry is closely regulated. Conditions of service, fares and other operating parameters are approved by local ordinances, rules, and regulations. There are three general and interrelated aspects of taxicab regulation:

- Rate making
  - Fixed costs (Flag Drop)
  - Variable costs (non-Flag Drop mileage/time)

- Setting rules – conditions of service, as with any other regulated enterprise – the taxicab service contract with customers
- Controlling exit and entry to balance customer needs and maintain an adequate supply of taxicabs to meet the City's public convenience and necessity standards, at equitable fares and also according cab operators a fair-market return on invested capital and time.

B. Regulating taxicabs in San Francisco

Meter rates are established by an ordinance of the Board of Supervisors, usually based on recommendations from the Controller which, in turn, are based on data submitted by the taxi companies. Also, over the years, the City (through the Board) has imposed other price ceilings on taxi operations: maximum gate/lease fees chargeable by the taxi companies to drivers and maximum payments companies could pay to permit holders to lease/operate their permits. The Board has required paratransit program participation and paratransit discounts. Increases in gas and other operating costs, when not offset with a corresponding fare increase, reduce income for taxi-operators. This income reduction, over time, would discourage capital investment in San Francisco's taxis.

The Board also regulates the industry in other operational-related ways: safety legislation (driver shields, TV cameras in the cabs, etc.), driver training, insurance requirements, age and condition of vehicles and other qualitative terms of providing cab service to San Francisco visitors.

The other side of the regulatory coin involves the issuance of permits, after public convenience and necessity hearings, by the Taxi Commission. The Commission regulates the number of permits and oversees compliance by permit holders with the active driver requirement of Proposition K and other relevant City mandates.

Prior to 2000, the Chief of Police had additional regulatory oversight to issue regulations controlling many service attributes involving cab operations. This basically stopped in 2000, when the Taxi Commission assumed these powers.

Since almost all San Francisco taxicabs go through the airport, the Airports Commission inspects and regulates the vehicles to ensure airport passengers are being ferried in safety and comfort. The airport decal on the outside of the cabs indicates that a cab may pick up paying customers at the airport.

Regulated fares are designed to achieve two broad goals: (1) providing adequate cab service to the public at the most cost-effective fare structure, and (2) generating sufficient revenues to ensure owners and operators recover reasonable capital and operating costs. This approach is known as the revenue requirement approach to ratemaking. Once revenues have been established that the regulator believes are appropriate to meet these twin-goals, the regulator must assign fare-component charges between the fixed (flag) and variable (miles traveled and waiting time) components of the authorized fare structure.

C. Mathematics of regulatory ratemaking – revenue requirements approach

Briefly, the revenue requirement approach to ratemaking (setting cab fares) can be expressed mathematically:

$R = O + D + rB$

Where:

B = Rate Base (V-d)
    V = Rate Base Evaluation
    d = Accumulated Depreciation
R = Revenue Requirements
O = Operation and Maintenance Expenses
D =- Annual Depreciation Charges
T = Taxes
r = Permitted Rate of Return (Cost of Capital)[5]

The revenue requirement approach to fare setting (ratemaking) is consistent with how investor-owned utilities are regulated in California by the California Public Utilities Commission (CPUC). The CPUC generally has a two-step approach to ratemaking. First, rates are completely reviewed as General Rate Cases (GRC) every few (three plus) years. Second, an interim mechanism is put in place to avoid regulatory lag. The interim or bridge mechanism is to tie interim rates to key cost indicators such as those reflected in the CPI. In the case of taxicabs, a gasoline index should also be used to track the current volatility in gasoline prices, allowing for quicker regulatory responses.

During a GRC, a regulated industry is required to provide a long-term strategic plan for its future operations. This plan includes a best effort farsighted forecast of demand for services and reasonable industry costs. The econometric demand model being developed for the Taxi Association will provide valuable information to the Taxi Commission, the Board of Supervisors, the Police Department and other regulatory authorities regarding demand elasticities (price and non-price variables). With this model, the regulators will also be able to develop demand forecasts for taxicabs under various fare and non-fare scenarios.

SECTION 3 – HISTORICAL CHANGES IN SAN FRANCISCO TAXICAB FARE STRUCTURE AND OTHER KEY ECONOMIC VARIABLES.

[5] Brian Browne, EPRI – Municipal Water and Wastewater Program "Competition in the Water and Wastewater Industries," Section 3, page 5. See discussion on weighted average cost of capital.

A. Average fare component increases

Table 1, "Recent San Francisco Taxi Cab Fare History" shows the historical change (1991-2003)[6] in the fare components from June 1991 to the present.

Table 1. Recent San Francisco TaxiCab Component Fare Structure History[7]
From San Francisco Controller's Department[8]

Effective	Flag	Mileage	Waiting Time
December 2002	$2.85 first 1/5 mile	$0.45 per 1/5 mile	$0.45 per minute
June 2000	$2.50 first 1/6 mile	$0.40 per 1/5 mile	$0.40 per minute
January 1999	$2.50 first 1/6 mile	$0.30 per 1/6 mile	$0.40 per minute
June 1991	$1.70 first 1/6 mile	$0.30 per 1/6 mile	$0.30 per minute

B. Converting fare-components into an estimated average fare.

These data for the period 1991 to 2005 were converted to average fares using the assumption of an average trip of 2.64 miles with an average wait time of 5.1 minutes.[9] [10] To estimate the average taxi fare by varying (sensitivity testing) the disaggregated component parts of the existing San Francisco fare structure, an Excel algorithm was developed. This algorithm is available on the back up Review database sheet 11 diagonal A8: L46. The algorithm specifications with the above input assumptions are:

<u>Step 1</u> Input Flag Drop ($FD) amount in dollars and distance covered by flag drop (FDM) as a fraction of a mile. (Example: $2.85 per .2 mile)

<u>Step 2</u> Input estimated average trip distance in miles (ADD). (Example: 2.64 miles)

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[6] The "December 2002" change was not implemented until January 4, 2003.
[7] SF data received from Ms. Simon Chu, Controller's Office, 14 November 2005. Chart A – Controller's designation data transmitted. See study XLS-file sheet TEN.
[8] The fare model will eventually (providing data are available) be linked to the demand-forecasting model to estimate projected passenger trips and revenues. These calculations of physical demand and industry revenues are currently imputed by using "comparable estimates" of fare demand elasticity as a best effort approach.
[9] Bruce Schaller, Transportation 26:283-297 (1999) "Elasticities for taxicab fares and service availability" © Kluwer Academic Publishers, Printed in *Netherlands*. Schaller Consulting, NY, NY. Page 7 "The taxi fare (TAXIFARE) is computed for an average trip of 2.64 miles and a 5.1 minute wait time."
[10] The XLS model used to generate these fare streams is interactive and sensitivity tested. Different time and mileage assumptions can be input to generate different average fares. The model will be relationally linked to the demand-forecasting model under development (see below).

Step 3 Input billable part per mile (PPM) and rate of billable part per mile ($PPM). Calculate $ per mile ($PM) by dividing 1 by PPM (Example 1/0.2 = 5) and multiply by $PPM (5 x .45 = $2.25/mile)

Step 4 Calculate net dollars per trip exclusive ($NPT) of Flag Drop and Wait Time. ((ADD = FDM) x $PM) = (2.64 – .2) x $2.25 = $5.49.

Step 5 Input assumption as to Wait Time (WT) and $ per ($UWT) unit of Wait Time. (Example: 5.1 [WT] minutes at $0.45 [$UWT] per minute) Calculate total wait cost ($TWC) equals WT x $UWT.
(Example: $TWC = 5.1 x .45 = $2.30)

Step 6 Add Flag Drop + Net Travel Distance + Total Wait Costs ($TWC) to Calculate average fare ($AVGF).

Example:

$AVG = $FD + $NPT + $TWC
$10.64 = $2.85 + $5.49 + $2.30

This model can be used to perform sensitivity testing related to the impact on fares associated with changing any of the major fixed and variable components of the fare structure, including statistical estimations of taxicab demand elasticity.

The historical average fares, using the above methodology and assumptions are shown in Table 2 below. The dollar values expressed in Table 2 are nominal, not adjusted for inflation. The columns are:

- Column 1 - Year
- Column 2 - Flag Drop (fixed charge)
- Column 3 - Fraction of Mile Covered in Flag Drop (fixed charge)
- Column 4 - $ per fraction of mile after Flag Drop
- Column 5 - Fraction of mile charged after Flag Drop
- Column 6 - $/Mile (commodity charge/mile)
- Column 7 - $/Wait Charge (commodity charge)
- Column 8 - Per unit Wait time
- Column 9 - Nominal Revenues[11] per trip (Step 6 – Algorithm specifications)

[11] Nominal costs or nominal revenues are costs or revenues measured in monetary units at the time incurred or generated. Nominal amounts ignore the changes in purchasing power of money. Real income or real costs are the income and/or costs divided by the price index. In the tables presented in this period, the BLS price index has been re-based to 1991. This was done by taking the index original level at 1991 and dividing that number into the BLS index thereafter. This method allows for ease of comparative indexing – gasoline and the CPI.

Table 2 – Historical Imputed Fare Adjustments for San Francisco Taxi Fares[12] [13]

Year	Flag Drop	Flag Drop Distance	Regular Charge (see Column 5)	Distance for Regular Charge	Dollars Per Mile Regular	Charge Wait Time Per Minute	Fare Per Average Trip
1	2	3	4	5	6	7	8
1991	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1992	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1993	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1994	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1995	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1996	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1997	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1998	$1.70	0.17	$0.30	0.17	$1.80	0.30	$7.68
1999	$2.50	0.17	$0.30	0.17	$1.80	0.40	$8.99
2000	$2.50	0.17	$0.40	0.20	$2.00	0.40	$9.24
2001	$2.50	0.17	$0.40	0.20	$2.00	0.40	$9.49
2002	$2.50	0.17	$0.40	0.20	$2.00	0.40	$9.48
2003	$2.85	0.20	$0.45	0.20	$2.25	0.45	$10.64
2004	$2.85	0.20	$0.45	0.20	$2.25	0.45	$10.64
2005	$2.85	0.20	$0.45	0.20	$2.25	0.45	$10.64
Annual Chg	3.76%	1.31%	2.94%	1.31%	1.61%	2.94%	2.35%

From Table 2 it is shown that on an annualized basis[14] for the period 1991 to 2005, the following changes were observed.

- Column 2 - Flag Drop increased at an annualized rate of 3.76%
- Column 3 - Fraction per mile allowed under Flag Drop increased by 1.31%
- Column 4 - Revenues per unit of distance increased by 2.94%
- Column 5 - Fraction per mile per unit charge increased by 1.31%
- Column 6 - Dollars per mile increased by 1.61%
- Column 7 - Dollars per unit of wait time increased by 2.94%
- Column 8 - Average revenues per estimated total fare increased 2.35%

Table 3 - Assumes – 2.64-mile taxi trip and 5.1-minute wait-time (see Appendix 3).

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[12] Yellow Cab document entitled "RE: Meter Rates from 1962 to present – Revenue/Expense Report to Controller's Office, received via fax November 4, 2005. Deflator BLS Western Urban CPI. Downloaded 11/10/05.

[13] Chart pasted from worksheet "FOURTEEN" SF Taxicab Study sheets. Column 8 estimated from Fare Algorithm. Appendix 1 to this report shows how the model reacts to different inputs. Ride-specific historical data are difficult to recreate ex post. The two scenarios presented in Appendix 1 are 2.24 miles and 5.1 minutes (above) and 3.89 and 5 minutes. XLS-coordinates SF Taxicab worksheet 11, diagonal coordinates A8: L44.

[14] Mid year time adjustment for June 2000 fare changes. Other December/January fare changes unadjusted. Annualized change = ((Value 2005/value 199) ^1/(2005-1991))-1 expressed as a percent.

C. Historical comparisons of key economic factors.

Table 3 compares the estimated nominal (money price unadjusted for inflation) average fare in San Francisco with the average nominal price of gasoline ($/gallon) sold in San Francisco for the period 1991 – 2005.

Table 3 – Comparison of estimated per ride revenue and increase in San Francisco gasoline prices 1991 - 2005[15] [16]

	SF Nominal Fare Per Trip $/Trip	SF Nominal Price Gas Per Gallon $/Gallon
1	2	3
1991	$7.68	$1.21
1992	$7.68	$1.24
1993	$7.68	$1.30
1994	$7.68	$1.26
1995	$7.68	$1.32
1996	$7.68	$1.52
1997	$7.68	$1.45
1998	$7.68	$1.35
1999	$8.99	$1.52
2000	$9.24	$1.79
2001	$9.49	$2.01
2002	$9.48	$1.67
2003	$10.64	$1.88
2004	$10.64	$1.99
2005	$10.64	$2.44
Annual Change 1991-2005	2.35%	5.11%
Change 2000-2005	2.85%	6.32%
Change 2003-2005	0.00%	13.98%

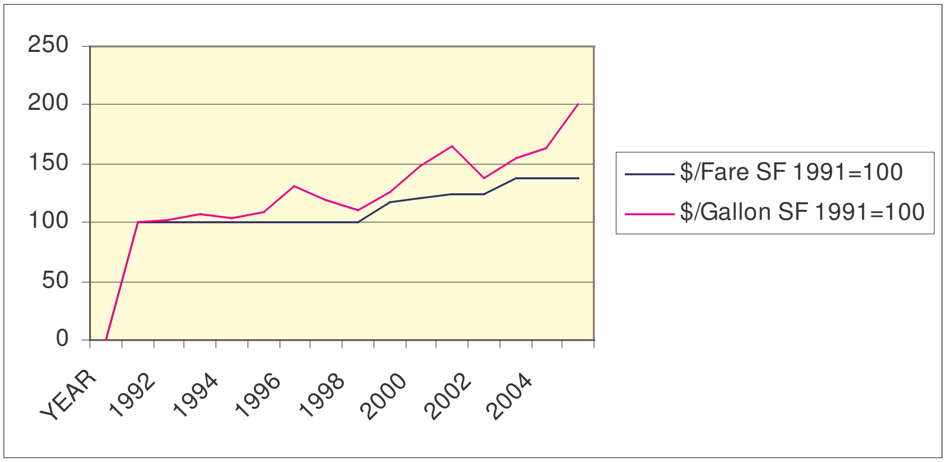
- Over the period 1991 to 2005, San Francisco gasoline increased at an annualized rate of 5.11%, while the average estimated fare per ride increased at 2.35%.
- Over the shorter period 2000 to 2005, San Francisco gasoline prices increased at annualized rate of 6.32%, while the average estimated fare per ride increased at 2.85%.
- In the last two years (2003 to 2005), San Francisco gasoline prices increased at 13.98%, while the average estimated fare per ride did not increase. The last authorized tariff fare increase for San Francisco taxis change went into effect on January 4, 2001.

Figure I Indexes both SF average gasoline prices and the average estimated fare to 1991 = 100. This figure illustrates graphically how gas prices in San Francisco ($/gallon) outpaced authorized fares ($/fare).

[15] 1, 2 and 9 refer to XLS overview spreadsheet.

[16] In January 2004, Yellow Cab Co., pursuant to "Rates Effective January 4, 2003," estimated its average fare at $9.50. This is 12% less than that estimated by using the NYC formula of 2.61 miles and 5.1 minutes wait. Reference Appendix 1, SF Taxicab data file worksheet 11, diagonal coordinates A8: L44. Changing the input assumptions does not detract from the central argument of regulatory lag and its current impact on SF taxicabs.

Figure 1
Comparison of San Francisco Gasoline Prices and Average Estimated Cab Fare for the Historical Period 1991-2005
(1991 = 100)



D. Individual components of total fare disaggregated

The San Francisco taxi fare has fixed and variable components. The fixed component is the Flag Drop. The variable components are the dollars per mile and wait time. The historical disaggregated fixed and variable fare components for the period 1991 to 2005 are shown below in Table 5.

Table 5 Fare Components Disaggregated

Year	Flag Drop	Fraction/ Mile Flag Drop Distance	Regular Charge	Fraction/ Mile Distance for Regular Charge	Dollars Per Mile Regular	Dollars Per Minute Wait $/Time
1	2	3	4	5	6	7
1991	$1.70	0.17	$0.30	0.17	1.80	$0.30
1992	$1.70	0.17	$0.30	0.17	1.80	$0.30
1993	$1.70	0.17	$0.30	0.17	1.80	$0.30
1994	$1.70	0.17	$0.30	0.17	1.80	$0.30
1995	$1.70	0.17	$0.30	0.17	1.80	$0.30
1996	$1.70	0.17	$0.30	0.17	1.80	$0.30
1997	$1.70	0.17	$0.30	0.17	1.80	$0.30
1998	$1.70	0.17	$0.30	0.17	1.80	$0.30
199	$2.50	0.17	$0.30	0.17	1.80	$0.40
2000	$2.50	0.17	$0.40	0.20	2.00	$0.40
2001	$2.50	0.17	$0.40	0.20	2.00	$0.40
2002	$2.50	0.17	$0.40	0.20	2.00	$0.40
2003	$2.85	0.20	$0.45	0.20	2.25	$0.45
2004	$2.85	0.20	$0.45	0.20	2.25	$0.45
2005	$2.85	0.20	$0.45	0.20	2.25	$0.45
Annual Chg.	3.76%	1.31%	2.94%	1.31%	1.61%	2.94%

E. Historical comparison of gasoline prices ($/gallon) and the CPI

Table 6 compares three key indicators: (1) The CPI, (2) Nominal Price (price in then-dollars at time of payment) of gasoline in San Francisco, and (3) an index of gasoline prices using the average price of gasoline in San Francisco in 1991 as the denominator to set the index equal to 100 in 1991. The BLS-CPI index in 1991, based on its 1982/4 index of 100[17], was used as the denominator for setting the "Western Urban Areas CPI" equal to 100 in 1991. The year 1991 was used because of data constraints.

Table 6
General Indices of Inflation for Comparative Purposes

[17] Taking a prior inflationary series (1980 = 100) and dividing by a particular year by itself (1990: 134/134) creates a base of 1. Thereafter general inflationary changes (say 1990: 138/134) are relative to the initial 1.00. For example 1.03, 1.07, etc. Dividing nominal dollars in this manner converts nominal dollar values into constant dollars based on the initial period indexed at 1.00. 100 is used often instead of 1.00. For example 103, 107, etc. to show the percentage change in a more explanatory manner.

Year	Western Urban Areas CPI BLS 1982/84=100	Western Urban Areas CPI BLS 1991=100	Nominal $/Gallon San Francisco $/Gallon	San Francisco Gasoline Price per Gallon 1991=100
1991	137.3	100.00	$1.21	100.00
1992	142.0	103.42	$1.24	102.14
1993	146.2	106.48	$1.30	106.92
1994	149.6	108.96	$1.26	103.63
1995	153.5	111.80	$1.32	109.15
1996	157.6	114.79	$1.59	131.24
1997	161.4	117.55	$1.45	199.13
1998	164.4	119.74	$1.35	111.05
1999	168.9	123.02	$1.52	125.56
2000	174.8	127.31	$1.79	147.82
2001	181.2	131.97	$2.01	165.38
2002	184.7	134.52	$1.67	137.43
2003	188.6	137.36	$1.88	154.58
2004	193.0	140.57	$1.99	164..06
2005	197.1	143.55	$2.44	200.82
Annual Change	2.62%	2.62%	5.11%	5.11%
Change 2003-05	2.23%	2.23%	13.98%	13.98%

From Tables 5 and 6, the following annualized changes for the period 1991 to 2005 are observed:

- Flag Drop increased by 3.76%
- Distance within flag price increased 1.31%
- Distance per unit charge increased by 1.31%, which was slightly offset by an increase in allowable charge per unit of distance of 2.94%.
- $/mile increased by 1.61%[18]
- $/minute wait time increased by 2.94%
- Unit of wait time remained constant
- The CPIU (Consumer Price Index Urban – Western Urban Areas) increased by 2.62%

[18] $/unit of distance is irrelevant unless computed to a common denominator such as $/mile.

- Gasoline prices increased by 5.11%

- As noted above, the authorized San Francisco taxi fare (and components) has not increased since January 4, 2003. During this same period (2003-05), San Francisco gasoline prices have risen at an annualized rate of 13.98%, and the Bureau of Labor Statistics (BLS) for Western Urban Areas Consumer Price Index (CPI) increased at an annualized rate of 2.3%.

F. Summary

The revenue requirement (RR) approach to ratemaking assumes that a regulated industry will be allowed to recover through fare adjustments sufficient revenues to cover allowed operating, maintenance, and capital costs. Under the average fare assumptions, in the context of data provided by the San Francisco Controller and the U.S. Department of Energy, San Francisco taxi fares have not kept pace with either gasoline prices or increases in the CPI. While fares remained static during the period 2003 to 2005, gasoline prices increased an average of 13.94 percent and the CPI by 2.3 percent.

The RR approach to ratemaking does not guarantee the taxicab operator a profit. It is a statement that under normal operating conditions, an efficient taxicab operator will have the opportunity to earn a fair market return on human and non-human resources. The RR approach can only work if the supply of new taxis and alternative transport modes are regulated in a manner that accurately meters the demand assumptions underscoring taxi regulation in San Francisco. An influx of unregulated to semi-regulated, alternative transport modes (shifting the supply curve to the right) will weaken regulatory controls in San Francisco.

SECTION 4 – IMPACT ON AVERAGE ESTIMATED FARE FOR DIFFERENT FLAG DROP SURCHARGES TO OFFSET RISING GASOLINE COSTS.

A. Adding varying surcharges on the Flag Drop[19].

Table 7 was generated from the average fare algorithm, discusses above. The Flag Drop is increased by 10%, 17.5% and 35%, and the resultant impact on the estimated average fare is quantified.

Table 7
Impact of Adding Different Surcharges on the Flag Drop for the Assumed Average Trip Effective 1/1/06

[19] Assumes 2.64 miles per trip and 5.1 minutes wait as used in Table 3. Different scenarios are possible using the fare algorithm.

Flag Drop (1)	Flag Drop $ Increase (2)	Average Fare (3)	Fare % CHG. 2005/6 (4)	Fare % CHG 2003/6 (5)	Gas % CHG 2005/6 (6)	Gas % CHG 2003/6 (7)
10%	$0.29	$10.92	2.68%	.89%	10%	12.64%
17.5%	$0.50	$11.13	4.69%	1.54%	10%	12.64%
35%	$1.00	$11.63	9.38%	3.03%	10%	12.64%

In this scenario, the whole of the temporary fuel surcharge was placed on the Flag Drop (columns 1 and 2). The assumption of a representative trip was unchanged. Gasoline costs were assumed to increase by 10% for 2006 (Column 6). The three Flag Drop surcharge scenarios do not make the annualized increase in the average fare for the period 2003-2006 equal to the annual increase in gasoline (assuming a 10% increase between 2005/06). These surcharge scenarios would partially offset cab company costs for that part of O&M impacted by gasoline hikes. This model is interactive and can be tested for additional scenarios under changed input assumptions.

B. Financial Projections

Reliable data have been the major constraint. This study will be continued to ensure that the identified regulatory lag does not persist into the future. From the above tables and graphs, it is clear that the authorized fare increases have not kept pace with gasoline or general price levels (CPI).

Yellow-Cab Cooperative, Inc. tried to bridge the financial data deficit in the taxicab industry by sampling methods. This approach is worth retelling:[20]

> "1. Total miles, paid miles and total trips were all determined based on a survey conducted on the waybill of 20 drivers known to keep accurate records for which data was collected over a period of 7 days and 14 shifts. They were selected to ensure accuracy and representative nature of the data collected."

The data collected covered many aspects of then current operating parameters. This study produced two vital statistics of relevance to this study:

- Total Revenues
- Total Trips

[20] Fax received from Jim Gillespie November 4, 2005.

Table 8[21]
Statistic Assumptions of Yellow-Cab Trips and Revenues Current and Constant Dollars

Year	Yellow-Cab Imputed Average Trip	Yellow-Cab Number of Rev. Cabs	Yellow-Cabs Trips Per Day	Yellow-Cab Trips Per Year Totals	Yellow-Cabs Revenues Per Year Current$	Yellow-Cab Revenues Adj CPI Constant$ 1991=1.00	Gasoline Nominal $/Gallon SF Bay Area	Revenues Per Yellow Cab $Nominal	Revenue Per Yellow Cab $ Constant
1991	6.86	274	40	3,945,600	$27,062,589	$27,062,589	$1.21	$98,768.57	$98,768.57
1992	6.86	274	40	3,945,600	$27,062,589	$26,166,855	$1.24	$98,768.57	$95,499.47
1993	6.86	274	40	3,945,600	$27,062,589	$25,415,140	$1.30	$98,768.57	$92,755.98
1994	6.86	274	40	3,945,600	$27,062,589	$24,837,523	$1.26	$98,768.57	$90,647.89
1995	6.86	274	40	3,945,600	$27,062,589	$24,206,472	$1.32	$98,768.57	$88,344.79
1996	6.86	274	40	3,945,600	$27,062,589	$23,576,735	$1.59	$98,768.57	$86,046.48
1997	6.86	300	40	4,320,000	$29,630,571	$25,206,180	$1.45	$98,768.57	$84,020.60
1998	6.86	350	40	5,040,000	$34,569,000	$28,870,582	$1.35	$98,768.57	$82,487.38
1999	8.03	400	40	5,760,000	$46,244,571	$37,592,538	$1.52	$115,611.43	$93,981.34
2000	8.25	430	40	6,192,000	$51,080,314	$40,122,009	$1.79	$118,791.43	$93,307.00
2001	8.47	460	40	6,624,000	$56,106,857	$42,513,640	$2.01	$121,971.43	$92,420.96
2002	8.46	460	40	6,624,000	$56,067,429	$41,678,711	$1.67	$121,885.71	$90,605.89
2003	9.50	460	40	6,624,000	$62,898,429	$45,789,789	$1.88	$136,735.71	$99,543.02
2004	9.50	460	40	6,624,000	$62,898,429	$44,745,877	$1.99	$136,735.71	$97,273.65
2005	9.50	460	40	6,624,000	$62,898,429	$43,815,090	$2.44	$136,735.71	$95,250.20
	2.35%				6.21%	3.50%	5.11%	2.35%	-0.26%
Chg. 2000-2005	2.85%				4.25%	1.78%	6.32%	2.85%	0.41%

C. Summary of Economic Impacts

These data, albeit based on assumptions, indicate:

- 1991-2005 - Yellow Cab fares increased in nominal terms by 2.35 percent
- 2000 – 2005 Yellow cab fares in nominal terms increased by 2.85 percent
- 2000 – 2005 Yellow cab fares in nominal terms did not increase (decreased in real/constant dollar terms)
- 1991-2005 Yellow Cab fleet grew from 274 to 460
- The number of trips per day was assumed to be constant at 20 per shift with 2 shifts per day (total of 40 trips per day)
- Total trips increased from 3,945,600 per year in 1991 to 6,624,000. In this analysis this increase was due to fleet expansion.

[21] SFTCA – database ELEVEN Diagonal X17: AE40. Source – Dept of Energy, Yellow Cab Co. and using Schaller assumptions of 5.1 minute wait per ride and mileage of 2.64/trip.

- 1991 – 2005 Yellow Cab nominal revenues increased annually by 6.21 percent.
- 2000-2005 Yellow Cab nominal fare-revenues increased by 4.25 percent.
- 2003-2005 Yellow Cab nominal fare-revenues did not increase. In real/dollars constant, Yellow Cab fare-revenues decreased.
- 1991-2005 Yellow Cab constant-dollar (real) fare-revenues increased by 3.50 percent
- 2000-2005 Yellow Cab fare-revenues increased by 1.78 percent and from 2003 to 2005 fell in constant dollar terms.
- 1991-2005 SF Bay gasoline prices $/gallon increased annually at 5.11 percent.
- 2000-2005 SF Bay gasoline prices $/gallon increased annually at 6.32 percent
- 1991-2005 Yellow Cab per-cab fare-revenues in nominal terms increased at 2.35 percent. .
- 2000-2005 Yellow Cab per-cab fare-revenues in nominal terms increased at 2.85 percent
- 1991-2005 Yellow Cab per-cab fare-revenues in constant terms increased at -0.26 percent. .
- 2000-2005 Yellow Cab per-cab fare-revenues in constant terms increased at 0.14 percent. .

If we assume that the price (fare) demand elasticity for San Francisco cabs is comparable to the estimated New York price demand elasticity of .22, a dollar increase in nominal fare (approximately 10.5%), it would cause a decrease in estimated taxi-ridership of 2.2%, from 6,624,000 in 2005 to 6,478,272 in 2006 with a corresponding increase in Yellow Cab revenue from $62,898,429 in 2005 to $68,021,856 in 2006.

Thus, a surcharge of $1.00 on the Flag Drop (which revenue goes to the driver-operator) would result in a net increase in taxi revenue and only a slight decrease (if any at all) in ridership.

APPENDIX 1

Original Proposal – In Progress
Demand Forecasting & Estimating Fare Elasticity
Major Milestones in Study
Presentation October 17, 2005

Brian Browne – Economist
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RPM, Number of Trips,
Total Revenues

Econometric Forecasting

Econometric analysis involves a combination of economic theory, mathematics, and statistical methods. The initial phase of the study is a pre-selection of the potential dependent and explanatory variables. The second stage in the development of the model consists in specifying the mathematical equation that relates the various independent or explanatory factors to the dependent variable. The third step of the analysis applies statistical tests to determine the significance of and reliability of the individual variables and the goodness-of-fit of the model. Once the behavioral equation has been established and tested, the final step is to apply forecasts for the explanatory variable to the equation, thereby forecasting the dependent variable. The forecast in this study will be to quantify the fare elasticity of demand.

For the purpose of this study, the research effort will be limited to the class of log-linear models. That is, a model in which the logarithm of the dependent (endogenous) variable is expressed as a linear function of the logarithms of the independent (exogenous) variables.

The generalized logarithmic equation may be expressed:

$$\mathrm{Log}_{10}(Y)_t = B_0 + \sum_{I=1}^{N} B1\ \mathrm{Log}_{10}\ X_{I,t}$$ [22]

Where:

Log_{10}	=	Base 10 logarithm
t	=	Time in years (months/seasonal)
Y_t	=	Taxi traffic measurement
	•	Revenue passenger miles (RPMs)
	•	Pickups (PU)
	•	Other
B_0	=	A constant

[22] From Douglas Aircraft Econ Section 1970s approach to demand forecasting. Same basic approach used by Schaller in New York study that was quoted above.

N = Number of independent variables

B_1 = Coefficient of the Ith variable

- Fares
- Income
- Conventions
- Hotel rooms
- Seasons
- Competitive modes (limousines)
- Other

$X_{I,t}$ = Ith variable

A clear advantage of this log-linear specification is that the coefficients of the model (B_1) can be directly interpreted as the elasticities of traffic with respect to the independent (exogenous) variable.

If the coefficient of the income variable was 1.96, this could be interpreted as saying a 1 percent increase in income, ceteris paribus, would result in a 1.96 percent increase in RPM. If the coefficient of the fare variable (elasticity in a log-linear construct) is -.75, a 1 percent increase in fares will lead to a .75 percent decrease in physical RPMs demanded at the new price. The net effect total revenues will increase, while total RPMs demanded will decrease. Elasticities are important inputs for decision and policy makers.

Converting data into logs (base $_{10}$) is an easy task with modern electronic spreadsheets and databases. This leads to highlighting another advantage of the log-linear approach, in that once the logarithmic transformation is performed on the original variable, linear regression techniques (also readily available in such spreadsheets as Excel) can be applied. For this study, at this point, it is assumed the equations for demand (quantifying elasticities) will be derived using ordinary least squares regression (multiple) techniques.

The values of the estimated coefficients (elasticities/AKA partial regression coefficients) are not known with certainty, since the model involves a random element. It is necessary to apply certain statistical tests to ensure that the probability of derived regression (elasticities) partial-coefficients are statistically acceptable at some subjective criteria. After accepting an equation as "statistically reliable," it will be necessary to see how this (these) equation (equations) can back-cast. This is done by driving the computed model using actual historical data and visually observing the "goodness of fit" of the derived path from the actual historical path.

Some Required Tests of Overall Goodness of Fit to Accept within Subjective Criteria As Model as Representing the San Francisco Taxi Industry.

Student's T statistic

A measure for the significance of a particular variable and its contribution to the explanation of the total variation in the dependent variable. It is the value of the coefficient divided by the standard deviation of the coefficient. A rule of thumb – if the absolute value of the T statistic exceeds 2.00, then the corresponding coefficient is significantly different from zero and the corresponding variable is significant at a 95 percent confidence level.

R^2 -- This statistic measures the overall goodness-of-fit of the estimated equation. More specifically, R^2 is the amount of variation of the dependent variable that is explained by the regression equation.

$$R^2 = \frac{\text{Amount of Variance explained by regression}}{\text{Total variance of the dependent variable}}$$

An R^2 of .9981 means that the estimated equation explains 99.81 percent of the variance of the dependent variable.

S.E. – Standard Error of Estimate

This statistic measures the errors associated with the estimated equation. It is defined as the square root of the sum of the squares of the deviation between the actual and estimated values correlated for the appropriate degrees of freedom.

Dubin-Watson Statistic (or von Neumann Ratio)

A measure for the existence or absence of autocorrelation of the residuals. Autocorrelation of residuals of residual denotes that the residual, difference between the estimated and actual value, for a period is correlated with the residual(s) of the previous period(s). The statistic is defined in such a manner that the value of 2.00 would imply no autocorrelation of residuals.

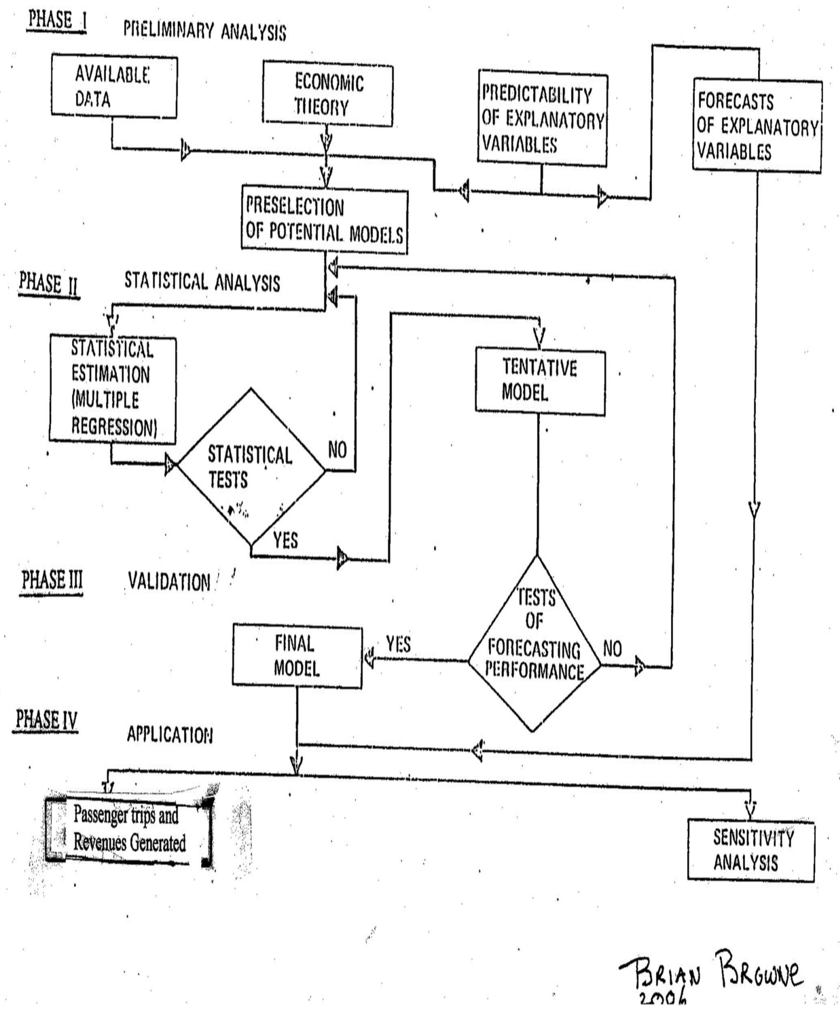
F-Statistic – Fisher-Snedecor Statistic

A measure of goodness-of-fit for the overall model. It is the ratio of the variance of the dependent variable divided by the variance of the residuals. Therefore, the smaller the residuals, the larger the F value. For 99 percent confidence intervals, values exceeding five are significant.

Figure
Diagrammatic Schema Estimating Fare Elasticities for San Francisco Taxi Cabs

Demand Forecasting
San Francisco Taxicabs

Major Milestones



APPENDIX 2

Appendix 2 – Interim Progress Report to Taxicab Association 10/26/05

Brian Browne
October 26, 2005

Jim,

Demand Elasticity of Fare Estimation Study

I have conducted a quick literature review. One article, somewhat dated (1999), entitled "Elasticities for taxicab fares and service availability" about NYC mentioned a number of related issues to our study. It is structured very similar to the proposal I presented.

This NYC study sets the dependent variables as revenue per mile ($/mile). In airline studies, as noted in the proposal (Appendix 1), total revenue passenger miles (RPMs) is the dependent variable. The NYC Taxi study divided total taxicab revenues by total miles driven to compute $/revenue mile.

The NYC taxicab study was developed to:
"Two central issues for taxi regulation are: (1) What should be the rate fare? (2) How many taxi licenses should be issued?"

The study concluded (among other things)
"The elasticity of trip demand with respect to fares is estimated to be -0.22." The conclusion "… fare increases do substantially increases [sic] industry revenues but at a lesser percentage increase in the fare."

The theoretical econometric model specification was nearly identical to the proposal.

The NYC-T dependent variable was revenue per mile. The initial specification for revenue and demand was:

Revenue per mile = *f*(economic activity; taxi fare; bus/subway fare, supply)

After testing, the analyst dropped supply from the explanatory equation. On this subject, we spoke briefly about the identification issue of demand response being caused by either/both shifts in demand or supply. We can test our models using revenue per miles (NYC) or revenue passenger miles traveled (as suggested in the proposal). The big problem is obtaining data to identify what taxicabs generate?

Do we have sufficient data to generate a reliable historical series (time series) of either revenue passenger miles traveled or revenue per mile?

The NYC-T study defined revenue per mile:

> "Revenue is measured as metered fares, excluding the 50-cent per trip evening surcharge that is not captured in the taximeter data. Revenue is divided by miles driven to control for changes in work effort. Revenue per mile (RPM) is adjusted downwards by 20 percent after the 1996 fare increase to produce the variable used in the equation (ADJ.REVM). This measures met demand – essentially the number of trips provided – as well as revenue."

The author did not give a clear explanation as to why RPM was adjusted downwards by 20 percent? Do we have these detailed data? Are data available for revenue passenger mile trips generated? Yield per mile? – Annual taxi revenues divided by total revenue passenger miles? If these data don't exist, to develop an estimate of demand (dependent variable) it might be necessary to use an approach similar to the NYC approach? In the NYC study under "DATA" they described their data collection as follows:

> "The data used in this analysis comprise the only known dataset on taxicab revenues and supply. Fare revenues and service availability are estimated from taximeter and odometer readings gathered during taxicab inspections conducted at the NYC Taxi and Limousine Commission (TLC) centralized inspection facility. Each cab is inspected three times a year. One group of taxis is inspected in January, May and September of each year; a second group in February, June and October; and a third group in March, July and November; and a fourth group in April, August and December."
>
> The TLC provided taximeter and odometer readings for all initial inspections from January 1990 to December 1996. Data were checked for completeness and consistency. Results for revenue, mileage, or revenue per mile that are incomplete, inconsistent or Drop [sic] outside of a normal range of values were excluded from the dataset. There were 89,039 inspection records with usable data, on an average of 1,113 valid records per month over 80 months of inspection.
>
> Data are weighted by industry segment to prevent bias that would occur in an unweighted dataset because some industry segments (e.g. owner driven cabs) are replaced less often –

and have more valid readings – than segments (e.g. fleet cabs)."

Briefly (and without comment as to possible multicollinearity[23]) the independent variables they selected as demand drivers were

- Economic activity – insured employment at Manhattan eating and drinking places (E&D)
- Taxi supply (MILES) – Total taxi odometer miles. This variable was dropped due to statistical insignificance
- Taxi fare – computed on an average trip of 2.64 miles and a 5.1-minute wait time
- Dummy[24] (1/0 – AKA discrete variable) variable for July (SUMMER) to capture reduced summer demand not reflected in E&D.
- Layoffs (LAYOFFS) in NYC. It apparently created a demand for cab services.
- Bus/Subway fares (BUSAN FRANCISCOARE) – price of the main alternatives to cab transportation.

The model results are summarized:

	Coefficient	Standard Error	t-statistic
Constant	(3.03)	0.13	(22.62)
E&D	0.65	0.02	27.01
Layoff	0.02	.000	6.94
TAXIFARE	-.22	.003	(7.75)
SUMMER	-.0.03	.000	(7.96)
BUSAN FRANCISCOARE	0.04	.003	1.45

R^2 0.94 F-Statistic 256.58 Durbin Watson 1.80 – Fitting the model to historical data produced a good visual fit.

At your convenience, I would like to meet and discuss the availability of operational data and obtain your thoughts as to the driving variable for taxicab demand in San Francisco. The literature notes that these drivers vary from market to market.

[23] The situation in which two or more independent variables are related to each other as well as each related to the dependent variable. Dictionary of Economics and Business, Erwin Esser Nemmers, Littlefield, 1978.

[24] Ibid. A colloquial term for a binary variable, that is a variable each of whose items is assigned either of two values (usually 0 and 1). The purpose is testing in one way or another, such as determining the probability, that the items assigned a value of 0 come from the same universe as items assigned a value of 0.

Thanks –

Brian

APPENDIX 3

Two Alternative Fare Scenarios Using Model to Test Major Input assumptions

NY Model Assumptions

Model Results using input assumptions:		
New York		
Miles per trip Based on Permit Data Report	2.64	miles
Wait	5.1	minutes
Flag Drop Inc.	0.35	
Flag Drop Inc.	$1.00	
Per Cent Gas Inc.	0.1	

	Year	Flag Drop	Fraction/Mile Flag Drop Distance	Regular Charge	Fraction/Mile Distance for Regular Charg	Dollars Per Mile Regular	Dollars Per Minute Wait $/Time	Unit of Wait Time	Nominal Fare Per Average Trip
	1	2	3	4	5	6	7	8	9
June	1991	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1992	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1993	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1994	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1995	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1996	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1997	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
	1998	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$7.68
January	1999	$2.50	0.17	$0.30	0.17	1.80	$0.40	1.00	$8.99
June	2000	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$9.24
	2001	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$9.49
	2002	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$9.48
New Rate Increase 03	2003	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$10.64
	2004	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$10.64
	2005	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$10.64
	Annual Chg.	3.76%	1.31%	2.94%	1.31%	1.61%	2.94%	0.00%	2.35%

Miles per trip Based on Permit Data Report	3.89	miles
Wait	5	minutes
Flag Drop Inc.	0.35	
Flag Drop Inc.	$1.00	
Per Cent Gas Inc.	0.1	

	Year	Flag Drop	Fraction/Mile Flag Drop Distance	Regular Charge	Fraction/Mile Distance for Regular Charg	Dollars Per Mile Regular	Dollars Per Minute Wait $/Time	Unit of Wait Time	Nominal Fare Per Average Trip
	1	2	3	4	5	6	7	8	9
June	1991	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1992	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1993	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1994	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1995	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1996	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1997	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
	1998	$1.70	0.17	$0.30	0.17	1.80	$0.30	1.00	$9.90
January	1999	$2.50	0.17	$0.30	0.17	1.80	$0.40	1.00	$11.20
June	2000	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$11.57
	2001	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$11.95
	2002	$2.50	0.17	$0.40	0.20	2.00	$0.40	1.00	$11.94
New Rate Increase 03	2003	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$13.40
	2004	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$13.40
	2005	$2.85	0.20	$0.45	0.20	2.25	$0.45	1.00	$13.40
	Annual Chg.	3.76%	1.31%	2.94%	1.31%	1.61%	2.94%	0.00%	2.19%

Docket states that these rates were effective January 4, 2003 – used in this analysis. Signed Naomi Little, Taxicab Commission Director

[i] For ease of comparison between historical (inter-temporal) time periods, nominal prices, wages and incomes are usually denoted in constant dollars ($XXXX) to avoid imputing the impact of inflation on money prices, wages and incomes. This inflationary-adjustment is calculated by setting a price index equal to one at a given point in time and increasing this number by the inflationary factor and dividing this number into the nominal values for each prior and or succeeding year.

If 2000 is considered the base then it is set to 1.00 and/or commonly expressed as 100. If inflation between 2000 and 2001 is three percent, then the index in 2001 would be 1.03 or 103.00. To equate prices, wages, and incomes between 2000 and 2001, 2001 nominal values would be divided by 1.03 to “factor-out” the erosion of value due to inflation. To compare 1999 nominal values with 2000 nominal values the reverse process is required. All inflationary measures such as the CPI and PPI, etc. are based on subjective weighting (baskets of goods and services) and may or may not accurate measure by industry/individual the impact on their specific spending profile as denoted by using any one specific deflationary index.

One obvious negative externality (an event not related to the specific transaction, but resulting from) of prolonged-regulatory lag in adjusting fares, concurrent particularly with strong with price increases (CPI and escalating fuel specific increases), when taxi-fares are inelastic, would lead to a greater demand (rides) on the taxi-sector, while actual taxi-sector revenue would decrease in real/constant terms. The negative impact on quality (stressing the system because of the observed price decrease in real terms) and revenues should be monitored carefully and both rate-lag and rate-lead scrupulously avoided by City regulators diligent use of a revenue requirement approach to tariff (both terms and service attributes) making. .

Calculation example - annualized “average” increases:
Nominal Gas price SF Bay in 1991 = 121.30. Nominal gas price SF Bay 2005 =243.30 (expressed in cents).

Annualized increase (243.60 divided by121.30)^(1/(2005-1991)) = 5.11%. See Taxicab XLS file, worksheet No. 11 coordinates-L17:138