SECTION 1

SF Now and Proposed Ordinance

On June 6, 1978, Proposition K, an ordinance providing for the regulation of taxicabs and other motor vehicles for hire, was approved by the voters of San Francisco. This ordinance, among other things, restructured San Francisco's approach to market exchanges of taxicab medallions.

This ordinance is described as:

> An ordinance providing regulations, policies, and procedures relating to the issuance by the Police Commission of permits for taxicabs and other motor vehicles for hire in the City and County of San Francisco; regulating the times for operation under such permits, nontransferability of permits, surrender and exchange of existing permits, surrender and exchange of existing permits, provisions as corporate permittees, financial and accounting records, and certain aspects of taxicab rates; repealing various sections of Parts II and III of the San Francisco Municipal Code.[1]

Proposition K[2] did not allow permits to be auctioned and/or transferred via the market mechanism. Other than a specific preference given to existing drivers at the time of passage, 1978 Proposition K limited the issuance of new permits to individuals (natural persons) based on the order applications were received by the Police Commission. Existing permits could not be bought and sold. New permits would only be issued based on "whether or not public convenience and necessity exist for the issuance of a permit…." Proposition K also established strict regulatory provisions for operating a taxicab and maintaining a medallion.

Regulation is a reaction to the concept of a natural monopoly. A natural monopoly is a firm whose costs decline as output increases, such that one firm is more efficient than two or more could be.[3]

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[1] See http://taxi-reg.home.att.net/prop-k.htm.
[2] See Appendix 1, Section 1
[3] Alchain and Allen, Exchange & Production, Competition, Coordination, & Control, Wadsworth Press, Belmont, California, 1977.

marginal costs for gas, etc. On those costs that would not otherwise have accrued without carrying passengers. The CPUC permitted this type experimentation (marginal cost pricing) not allowed by the CAB the U.S. trucking industry under the Interstate Commerce Commission (ICC) legislation of 1935.

Many economists believe that the CPUC's more flexible application of the public convenience and necessity criteria, versus the stricter application by the CAB and ICC, led to the eventual demise of the federal agencies. Air and surface carriers are still subject to strict safety controls. It has been estimated that the restrictive policies of the ICC cost the U.S. approximately 3 per cent in cumulative GDP growth[8].

By comparison, the San Francisco taxicab industry is offering to change Proposition K (1978). It is convinced that the time has come to loosen some aspect of regulatory control in the interest of economic and social wellbeing. An economic rent is "the price necessary to keep a good in existence; hence any price in excess of resource cost. Economic rents may however be necessary to allocate goods to their highest value use.[9]"

An allowed market-transfer of the existing stock of San Francisco medallions would generate considerable information as to market value. Cab medallions would be assigned to those who value them more highly as capital goods, and by internalizing their own wealth, will produce a more socially viable product. These market prices would also act as an excellent signal to the San Francisco Taxi Commission as to when to add new taxis to the existing stock. The New York City (NYC) example of taxis selling at close to $300,000 per medallion shows in the NYC market, on the margin, what the new medallions (900) are fetching. New York City is benefiting in two direct ways: (1) Every auction is paid directly into the treasury and, (2) every transfer transaction yields 5 percent to the City.

Laws (such as Proposition K) that unexpectedly curtail future market transactions cause a wealth loss to the owner of a capital resource such as a taxicab medallion (in this case, the owner is the City). The proposed proposition is not doing this. Proposition K did. The proposed proposition will allow resources to be bid to their highest and best use, without curtailing the tariff-setting (fares and quality of service attributes) and rights of the

[8] G.W. Hilton, UCLA, Ph.D. program, Transportation Economics, 1968.
[9] Alchain & Allen, Exchange and Production, 3rd Editions, Wadsworth Press, 1983, p 463.

SFTC to control exit and entry. The proposed legislation merely frees up resources to move from one registered and approved license holder to another approved and registered license holder based on "buyer/seller" asset marginal valuation.

The powers of the SFTC, Board, and Mayor are not diminished in any way. Instead, the market will be relied on to do what it does best and efficiently: allocate resources. Entry, exit, service attributes, and fleet levels remain in the hands of the public. Without cost to the public, the market will ensure taxicabs are operated by those who placed the highest marginal value on possessing a medallion. At the same time, the market will also generate – through auctions and transfer fees – revenues for the City and County of San Francisco, revenues not available under Proposition K.[10]

Capital markets in the U.S. are extremely well developed. Markets (banks, financial intermediaries) will bet on entrepreneurs (taxicab operators) that show promise. This applies to potential medallion holders. A qualified skilled operator will be able to obtain loans to assist in acquiring a permit. The proposed legislation while never ceding ownership from the City, as with the New York example, does provide a sufficient degree of finance collateral to make borrowing a reality.

Taxi finance specialists have developed in many U.S. cities (i.e. New York, Chicago, etc.) to assist potential owners/operators to acquire funding. These individuals specialize in the taxi industry and associated risk allocation. In addition, there are a vast number of other funding sources that will bet on an efficient operator with a strong quasi-private property right to a medallion. Ease of access to capital markets will be enhanced by the proposed legislation. Capital markets will subsume and charge for the risk differential between outright medallion ownership and the long-term, conditional lease (City still maintains ownership) envisioned by the proposed legislation.

The economics of a firm selling at different prices in different markets is illustrated by Figure 1.[11]

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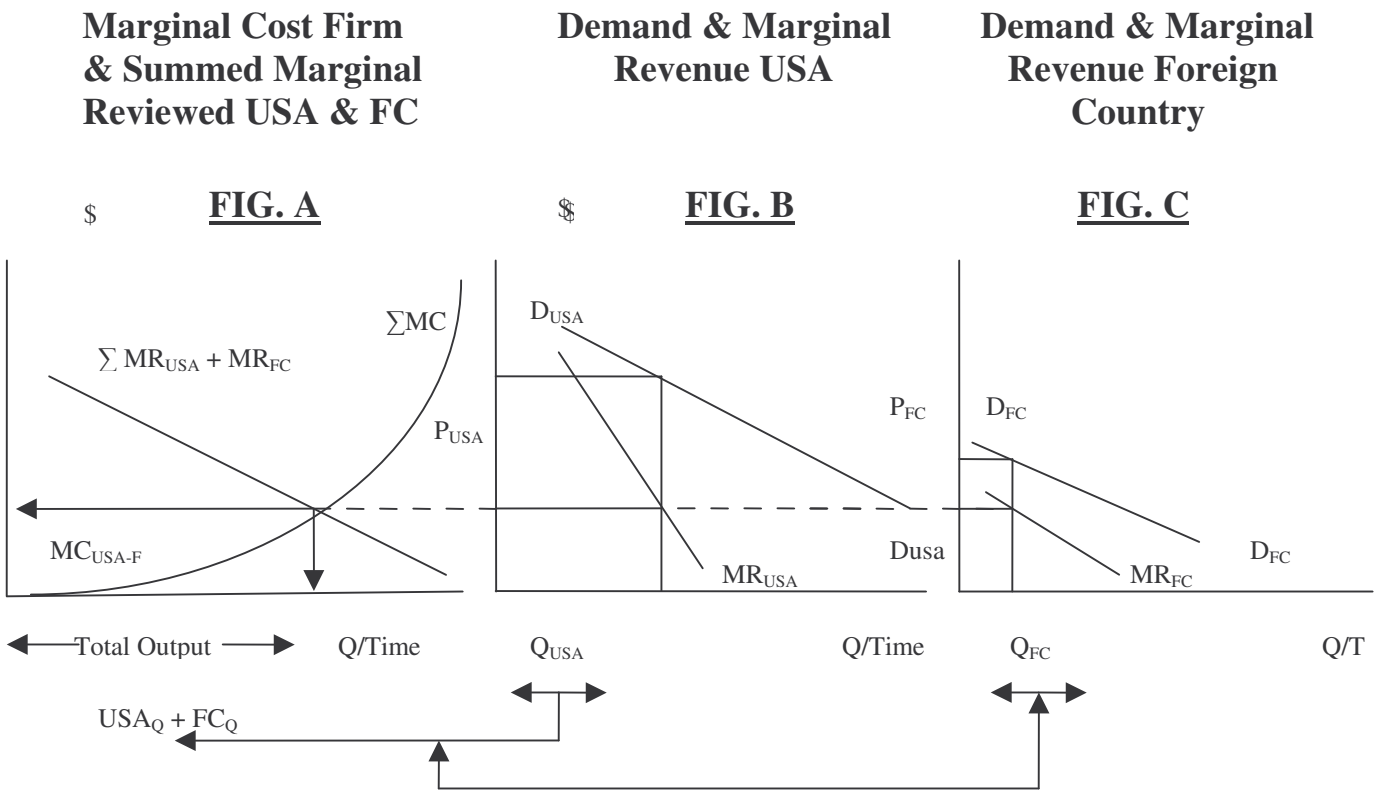
[10] For a deeper discussion on regulations – See: Government Regulation and Business, Allyn Douglas Strickland, George Washington University, Houghton Mifflin Press, Boston, 1980.

[11] Figures are not to scale. Representative only that an identical product into different markets will adjust price to maximize wealth whereby marginal cost equals marginal revenues. In this instance, marginal revenues are summed from both markets.

Figure No. 1 – Wealth Maximization
Charging Different Prices for the Same Product in Different Markets[12]

TAXI STUDY
PRICING IN TWO DIFFERENT MARKETS



- Figure A (subframe) is the marginal cost curve (supply curve/MC) for a U.S. drug manufacturer.
- Figure B (subframe) is the demand curve for the U.S. consumers and associated marginal revenue (MR) curve for U.S. demand.
- Figure C (subframe) is the demand curve for a foreign country (FC) and associated marginal cost (MC) curve for the foreign country.

By summing the marginal cost curves for the U.S. and the foreign country and adding to Figure A – a point where MC=MR for the U.S. company is

[12] Figure 1 has three subframes Figure A, Figure B, and Figure C – Armen Alchian circa 1968. Wealth maximization is where the sum of the marginal revenues of the USA and Foreign Company = the Marginal Cost of the US Company. These figures are not to scale.

ascertained. Wealth maximizing output and pricing is obtained where MC=MR. Figure A tells us how much the US firm will produce. By extending to Figures B and C the intersection of the point where MC=MR on figure A intersects, we can calculate a price and output in both the U.S. and a price and output in a foreign country. The sum of the outputs (B plus C) will equal the total U.S. firm output (Figure A). By reading up from where MC intersects MR for the U.S. – Figure B and the FC – Figure C it is possible to determine pricing (discriminatory) and output in the two segmented markets.

Figure 1 diagrammatically shows that the price in the U.S. is higher for the same product than in a foreign market. The explanation for the difference is that the U.S. has a higher demand for this product. This example was used to show why US drugs in foreign countries sell for less than in the US and why long-haul *vs*. short-haul price differences occur. Regulatory systems based on these differences, without regard to considering actual demand differences impinge and distort normal market transactions. U.S. drugs selling at a discount in Canada and Mexico can well be explained by demand differences and re-import restrictions.

Economists caution policy makers to look at the economic forces driving price differences before crafting restrictive policies that could be counter-productive to economic wellbeing. The proposed revisions to Proposition K attempt to commingle orthodox economic theory with the best objective goals of the existing San Francisco Taxicab regulatory system. Market forces, as discussed herein, are adapted to meet the traditional San Francisco goals of efficient and equitable service criteria.

This example can be adapted for ratemaking and fare-setting purposes and does show the limitations of regulatory powers. Some regulatory tasks are best left to market forces, as suggested by the proposed new taxi ordinance. Economists used to speak about cost-push inflation. This concept has been challenged by the neoclassical economists who believe in demand-pull, either direct or derived. They would argue that a NYC taxicab medallion is selling for close to $300,000 because of the demand.

Ratemaking is one area where regulators have to monitor the ebb and flow of demand and supply. If the fare is set too low, there will be a perceived shortage of cabs. If the fare is set too high, there will be a perceived surplus

of cabs. Incorrect fiat-price signals could lead to wrong policy decisions in terms of optimizing the stock of San Francisco taxi medallions.[13]

In the Taxicab Industry Review of December 2005, it was suggested that the SF Taxi Commission develop a more formalized approach to fare setting and put in place a mechanism for more immediate adjustments. The real market price is difficult to simulate in a regulatory system. Economists suggest that the gasoline shortages of the 1970s and 1980s were a function of a regulatory structure that did not allow prices to adjust to multivariate factors, including but not limited to the "inventory" demand based on fear of an immediate oil boycott.

During the "shortage period," in the Central Valley of California, where gasoline sellers had for some time been discounting from the official peg prices, they were able to use these credits (gallons under allowed for an offsetting volumetric-price over the peg) along U.S. I-5 to increase prices to clear the markets. Gasoline was available, but at a price. There were no lines and business was normal.

If the price is set above the market-clearing price, where the marginal social valuation equals the marginal cost, there will be a perceived surplus. More will be supplied at that price, than will be demanded. If the price is set below the market-clearing price, more will be demanded than will be supplied at that point on the summed marginal cost function, also known as the supply curve. The symptoms of a shortage are longer wait times and less courtesy service. *Au contraire* for a surplus.

Somewhere between Proposition K and complete deregulation, especially in an age of decreasing information and transaction costs, is a more efficient system for allocating taxicab permits in San Francisco. This system would use market prices as social coordinators where possible. The role of the regulatory agency would not be diminished. Rather, it would be enhanced. The criteria: whether or not public convenience and necessity exist for the issuance of a permit…." remains sacrosanct. The Taxi Commission would still regulate the number of competitors (medallions), entry and exit requirements, conditions of service, and ratemaking.

[13] "Perceived" in that nonmarket prices generate demand and supply responses that are not in equilibrium. A market-clearing price is where marginal societal valuation is equal to the summed marginal cost. Demand equals supply.

The current San Francisco system for allocating permits is based on grand-fathering and a medallion-queue system. The medallion fee charged is set to cover only administrative costs. One driver complained that he had been in this queue for fifteen years. Long queues indicate that the price is below the market clearing price.
The assertion that long queues indicate a nonmarket clearing price can be illustrated in Table No. 1 is reproduced from Chapter 4, Alchain & Allen (A&A), *Exchange & Production – Competition, Coordination, and Control*. This analysis is consistent with the first law of demand – the lower the price, the more will be demanded. The market demand is the sum of all individual demands at different common prices. This example sets forth the individuals A, B, C, and D with four different demand schedules for acquiring automobiles at different prices.

This analysis follows the first law of demand. "At any given price, there is some higher price at which less of a good is demanded."[14] Limiting the "population" to four does not change the explanatory power of this example to extrapolate for the entire taxicab industry of San Francisco. The supply (medallions are not produced by fiat) of cars, set initially at seven cars, is held constant for this static analysis.

This example, for simplicity, assumes a limited supply of seven automobiles and four traders with different demand schedules. By working through this example, regardless of the initial endowment of automobiles by trader, market exchanges will ensure that these automobiles are bid (re-allocated) to those that place the highest marginal value on possessing them.

There are many iterative paths to ensure final optimal market resource allocation. Information and transaction costs are internalized by the "traders" and not the taxpayers. As in New York, Chicago, and other centers around the world, persons who specialize in gathering information and lowering transaction costs (brokers) will probably emerge. Use of such specialists under the proposed legislation will be a matter of choice. The proposed legislation relies on market forces to allocate the new and existing stock of taxicab medallions. The City and County benefits by the auction proceeds and transfer fees. Buyers and sellers benefit by entering into mutually beneficial trades.

[14] Alchain and Allen, *Production and Exchange*, p. 462.

Regardless of the initial endowment of economic goods, if trade and exchange is permitted (assuming transaction and information costs do not create an inertia barrier), goods will be reassigned to their highest marginal use values. Economists describe this process of utility cum wealth maximization as the marginal process toward hypothetical Pareto-optimality; "A condition in which one individual's total utility cannot be increased without taking utility from someone else."[15] Movement toward hypothetical Paretian optimality shows (using different preference maps) trade and exchange enhancing the utility (wealth) of those involved.[16] The concept of beneficial trades and movement toward a hypothetical stable solution underscores the viability of instituting an auction system for San Francisco taxi medallions.[17]

TABLE 1

REALLOCATION OF RESOURCES
DEMAND SCHEDULES

Price	Individual A	Individual B	Individual C	Individual D	Total Demand (Market)
$1,000	2	0	1	1	4
900	2	0	1	1	4
800	2	0	1	2	5
700	2	0	1	2	5
600	3	0	1	2	6
500	3	1	1	2	7
400	3	1	2	2	8
300	3	1	2	3	9
200	3	1	2	4	10
100	4	2	2	4	12

Alchain and Allen used automobiles in their example. Automobiles could easily be exchanged for taxicab medallions and the conclusions would remain valid.

[15] *Economics and Business Dictionary*, Erwin Esser Nemmers, Littlefield, Adam , 1981,p 340,.
[16] Ibid.
[17] See pp. 431-441, Microeconomic Theory, C.E. Ferguson, Irwin Series, 1969..

The above schedule represents each individual's marginal valuation on acquiring an additional automobile. This example assumes that initially the amount supplied and available for distribution is fixed regardless of price. A&A show that by opening up this market to trades, automobiles will be exchanged in a way that will benefit society and ensure resources are bid to their highest marginal value in use. A&A describe one of many possible paths to achieve these twin goals. Their analysis begins with individual A owning seven cars. It would be difficult to improve on their explanation:

> The following is one of many possible exchanges\sequences. A would sell four cars even if he could only get $100 per car. And he could, because the other people have higher marginal use values on a car than he has for four of his seven cars. We can demonstrate this fact in several different ways. For example, if C and D extravagantly offer $900 for a car, A will delightedly sell one to each. Then B more shrewdly offered only $400 for a car; again A sells. This leaves A four cars, and B, C, and D have obtained one car each. C then offers to buy another car from A at say, $300, less than its $400 value to C – and A sells because he would rather have any amount over $100 than a fourth car. Although D, who has one car, would have paid as much as $800 to get a second car, he initially offers A only $300 for a second car; A will say he has no cars to "spare" unless he can get $700. B however if alerted to this negotiation, would offer his car to D for $600, even though he just brought it. And C who values his second car at only $400 would undercut B's price by asking for only $500. Neither A nor B would undercut their prices that far. So C would sell to D at $500.

Thus, A ends up with three cars, B with one, C with one, and D with two. Everyone given his/her preferences and initial wealth is content with the pattern of goods; there are no mutually acceptable revisions. This is the condition of market equilibrium.

Many economists believe that taxicabs should not be regulated pursuant to the natural monopoly theory. They argue that that cabs are not natural monopolies in that their marginal costs do not decrease as output increases. Notwithstanding the weakness of the natural monopoly theory (see above, Demsetz et al) Alchain and Allen (fn. Alchain and Allen*, Production,*

Exchange…. page 291) state "…nevertheless (taxicabs) are made into contrived monopolies by law and called public utilities." The proposed legislation, however, does not deregulate per se, but does allow a greater reliance on market forces for allocating San Francisco's existing and future stock of taxicab medallions. It can be argued that this change will produce greater efficiency in resource use and allocation. Market decision-making also leads to greater public wellbeing in the form of higher output. This is shown in the simple example below.

Alchian and Allen illustrated the optimization of societal wellbeing as a function of market allocation of resources in a simple, but powerful model. It is presented in Chapter 8 of *Production and Exchange* and reproduced from a landmark article, "Fishland." They assume that there is an island (model) with 1,000 similar people. These people do nothing but fish. If a person catches 4 fish (marginal productivity), the GDP of the island is 4,000 fish. An abandoned boat is discovered. The boat's marginal productivity schedule is shown in Table No. 2, Fishland (Column 3). If one person leaves the island and fishes from the boat, the marginal productivity of the first person on the boat is 6. The total number of fish caught and available to the inhabitants of the island is 4,002. The opportunity cost of fishing on the boat is a constant 4 fish per person. From the table is clear that when the marginal cost of fishing on the boat is equal to the marginal product of adding an additional fifth person to the boat, total output on the boat will be maximized at 38 fish.

TABLE 2
FISHLAND

Number of Men Onboard	Total Catch (on board)	Marginal Product (on board)	Average Product (on board)	Net Social Marginal Product	Fish Caught on Island	Fish Caught on Boat	Social Total Fish Caught
0	0	0	0.00	0	4000	0	4000
1	6	6	6.00	2	3996	6	4002
2	16	10	8.00	6	3992	16	4008
3	24	8	8.00	4	3988	24	4012
4	30	6	7.50	2	3984	30	4014
5	34	4	6.80	0	3980	34	4014
6	36	2	6.00	-2	3976	36	4012
7	36	0	5.14	-4	3972	36	4008
8	32	-4	4.00	-8	3968	32	4000
9	27	-5	3.00	-9	3964	27	3991
10	21	-6	2.10	-10	3960	21	3981

Coincidence of Private and Social Maximization

The marginal product is the total output from the addition of one unit of input (fisherman), with all other inputs used in the production process held constant. To achieve the social maximum output, with no waste of resources, the optimal amount of people fishing from the boat is four because the marginal product with a fifth crew member on board would exactly offset the lost marginal product from fishing from the island. For convenience, the highest number, in this case 5, is used. Maximizing social output then requires that inputs (crewmembers) be added to the boat, until the marginal product on board equals the marginal product on shore. It is not a far leap to impute money and see that we are talking about the wealth maximizing market-solution for a firm where marginal cost equals marginal revenues. Adding additional people to the boat would produce a smaller social total, and "profits" on board the boat would decrease.

Scenario 1: Average *vs*. Marginal Solution – Avoiding this Type Regulatory Solution

If fish were allocated/regulated on an average basis the discoverer of the boat would not allow four people on the boat, because the average would fall from 8 to 7.5. Four people on the boat would cost 16 fish and provide a net profit of 14 fish. Three people on the boat would cost 12 fish and provide a net profit on the boat of 12 fish. Increasing the number of people on the boat from three to four to five would increase profitability on the boat and also increase net social product. A new member could buy his/her way onto the boat by offering the "founders" anything slightly in excess of what s/he would earn by fishing on the island. While the average on the boat would drop from 8 fish to 7.5 fish; the fourth entrant could pay the other 3 members 3 fish (average of 1 fish per grandfathered fishermen) – The fourth fisherman would have 4.5 fish (+.5 fish as opposed to fishing on the island) and the original fisherman would have 8.5 fish. Any fisherman getting a marginal catch on board in excess of fishing from the island will trade to improve his lot. The person will be better off and society will more efficiently use its resources.

The implications for the proposed auction legislation are clear. Allowing markets to work – where markets should work – will enhance societal and private wellbeing.

Scenario 2: Private Property Rights – Employment

If a person owns the boat and is allowed to enter into employment contracts, the owner will hire a crew. The owner will pay the crew. The owner will keep all fish (money) in excess of the wages paid. The wages must exceed 4 fish per employee. The owner will hire as many additional crewmembers, as possible, that increase total output onboard in excess of the 4 fish. The owner will thus be able to pay enough to induce the crew to leave the island and fish on the boat. In this simple example, this amount is 4 fish plus. Four or five crew members will be hired by the owner. No more or no less. The crew size is selected that maximizes the owner's' wealth (profit) of fourteen fish. Coincidentally, this individual wealth-maximizing outcome also maximizes the societal output derived complementing shore fishing with boat fishing.

Scenario 3: Boat Renting

The boat owner could decide to retire and rent the boat. As shown above, the maximum rental will be fourteen fish. Four or five people will be the crew. Four people will catch 30 fish on the boat which is 14 fish (30 minus 16) more than they could have caught on the island. Five people will catch 34 fish, which again is 14 more fish than they could have caught on the island. The rental price will be 14 fish. Three people could not afford to rent the boat. It would cost them 14 fish to rent and the catch would be 24. The average per catch on the boat would be 3.3, less than the average of 4 fish they would catch on the island. Six people would catch 36 fish on the boat and have to pay 14 fish in rental fees. Their average net 6 catch on the boat would be 3.7 fish, less than the four they could have.

Scenarios 2 and 3 are nearly identical. Alchian and Allen in presenting "Fishland" as an explanatory example of wealth maximization by firms and nexus with societal wellbeing ask the rhetorical question:

> Is there, then, no difference between Macys hiring clerks as employees and the clerks paying the owners of Macys rent for its building and facilities (inventory use-costs) out of total daily sales—leaving the clerks with the same income in either case? There indeed is no difference, if the anticipated output performance of the inputs can be predicted with certainty. But if

mistaken estimates of the anticipated products are made, someone must bear the consequences.

Scenario 4: The boat as Communal Property

For all input solutions other than 4 or 5 fishermen, social and boat wealth optimization are not obtained. Adding 6, 7 and 8 fishermen will ensure boat participants have an average catch equal to or in excess of the four they caught on the beach. Societal wellbeing will decrease and marginal costs (highest alternatives forgone) will exceed marginal revenues (fish). With communal ownership, difficulties will arise in metering performance and allocating resources and equally dividing the catch. Hardworking shore people possibly will not be happy to see their wealth decrease and will question the efficacy of investing in this boat for capital improvement programs etc to subsidize this income disparity.

Scenario 5: Government Intervention

As a result of Scenario 4, the government is asked to step in and maximize efficiency on the boat. Will the government official immediately call for a study? Hire consultants from a pool of preauthorized consultants? Establish a price control system? In the case of the boat, the way to achieve social and private wealth maximization is to allow the markets to work. In Scenario 5, the role of the government should be to ensure strong private transferable property rights.

This type approach is what is being recommended by the new ordinance. The development of a strong system of transferable private property rights, based on market exchanges, will ensure medallions are allocated to their highest use value, generate auction and transfer fees for San Francisco, and ensure that the best attributes of the current San Francisco regulatory system remain in place.

SECTION 2

Comparable City Models

Case Study – New York City[18]

New York City (NYC) has 12,779 taxicabs. NYC is expanding its fleet of yellow cabs by 900. Since 2003 the fleet has increased by 592 taxicabs. The goal of auctioning 300 medallions per year for three years is on track. There will be 308 more medallions auctioned by the New York City Taxi and Limousine Commission (NYC-TLC). The 900 medallions is the largest offering of licenses in New York for the last 70 years. The sale of 900 new taxicab medallions was subject to an environmental impact study.

The NYC-medallion system has its roots in the Great Depression era. High unemployment and public revenues in free fall catalyzed the passage of the 1937 Haas Act. At the beginning of the Great Depression, NYC had 21,000 cabs. By 1937 this number had fallen to 11,787. In recent times, including the new medallions, the number has edged up to 12,779 and will stabilize by the end of 2006 at 13,087.[19]

There are over 40,000 taxicab drivers in NYC. In 2003 NYC taxicabs carried 240 million passengers: an annual per taxicab carriage of 19,693 passengers and an annualized per driver carriage of 6,000 passengers. In 2004 the average medallion price for an individual cab was $250,000. As of 2005 this price had increased to $320,000. Similarly, corporate medallion prices went from $280,000 to $350,000. These prices varied by month, but the trend has been upward.

In 1999, San Francisco had 911 medallions and by 2006 this had increased to 1381. This represents an approximate 52 percent increase. The 900 additional medallions in NYC will represent a 7 percent increase over approximately the same period. The number of riders per cab in NYC is approximately 40 percent more than for the average San Francisco cab on an annual basis. Two factors might explain this difference: 1) longer trips per SF cab, and 2) a higher quality of service in San Francisco in terms of taxicab availability.

[18] Extracted from , www.nyc.gov/taxi
[19] See jhttp://www.schallerconsult.com/taxi2.html

NYC-TLC believes that the advantages of buying a taxicab medallion directly from auction are lower prices and avoidance of the 5 percent transfer fee, noting "An ability to purchase a restricted medallion at a lower price."

NYC-TLC has a sealed bid system for its auctions. The bid must indicate the bidder's personal information and state if the bid is for a minifleet medallion or individual medallion and whether a clean-air fuel or wheelchair-accessible medallion is being sought. The bid package must include bid amount, certified check or money order for deposit, certified or approved TLC medallion license application, and letter of commitment or bond for 80 percent of the bid price. The NYC-TLC makes use of attorneys or brokers optional. The TLC licenses brokers but does not license attorneys.

In NYC, postauction transfers are taxed at 5 percent of the average transfer value. A postauction transfer for $390,000 (at 5%) would generate $19,500 for the City treasury under the proposed legislation, in addition to the entire initial auction price.

December 2005 S.F. Taxicab Study[20]

NYC Taxicab Medallion

In NYC, the owner of a medallion is a license to operate a taxicab. It is also considered an asset that may be sold or pledged as collateral for a loan. Taxicab medallions in NYC give exclusivity to accept street hails. NYC taxicabs may only charge fares authorized by the NYC Taxi & Limousine Commission (TLC). The TLC regulates the fares that medallion holders may charge.

Ownership of a NYC Medallion

In NYC the owner of a corporate medallion owner must be 18 years of age, while individual medallion holders must be U.S. at least 19 years old. Medallion owners (ownership is a term used by the TLC) must be citizens or permanent residents of the U.S. (subject to a background check). Medallion owners must comply with all TLC rules and pay all required fees.

[20] 2005 NYC-TLC Study – Data series manually transposed from graph – reproduction in S.F. Medallion auction study – shown to replicate the direction and rate of change of asset valuation.

All individual medallion owners must posses a valid driver's license and have taken TLC specified courses for up to 80 hours. Medallion owners pay for these courses. Medallion owners must operate their taxicab at least 210 9-hour shifts (an average of 36 hours per week).

Corporate ownership attaches additional requirements: Vehicles must be operated 24-hours a day, 7 days a week. Owners may lease cabs only for specified amounts; i.e. $112 for Thursday, Friday, and Saturday nights and $103 for all other shifts.

Ownership and Management of a NYC Medallion

There are two main forms of medallion ownership and management.
Own and operate one medallion.
- Sole proprietor
- Partnership

Own and operate 2 or more medallions as a corporation.
- Self-manage
- Manage via an agent
- Manage through a fleet

NYC-TCL has defined the advantages of owning restricted medallions. These are shown below

Wheelchair-Accessible Taxicabs
- Reduced opening bid prices
- Additional income from external advertising
- Eligible for up to 6 ½ years on the road

Alternative Fuel Taxicabs
- Reduced opening bid prices
- Greater fuel economy
- Eligible for up to 7 years on the road
- NYC subsidies may be available

The NYC-TLC, as shown in Table 3, presented the following cost/revenues for a representative taxicab in 2003. Table 4 titled an "Owner/Driver Cost and Revenue Analysis" is a representative break out of costs and revenues by the NYC-TLC.

TABLE 3
OWNER/DRIVER COST AND REVENUE ANALYSIS

Start-up Costs	
Medallion	Average Down Payment: $50,000 (assuming a 20% down payment)
License & Fees	$1,400 (2-year license)
Taxi Conversion	$4,000
TLC Hack-up Fee	$50
Medallion Tin	$10

TABLE 4
OWNER/DRIVER COST AND REVENUE ANALYSIS

Annual Operating Costs	
Liability Insurance	$3,700 (w/good driving record)
Vehicle Depreciation Cost	$8,000
Maintenance	$4,000
Gasoline	$4,500
Motor Vehicle Tax	$1,000
General & Administrative Costs	$1,715
Medallion Loan	$18,000 (1,500 per month) *Estimate rate price
Tires	$300

OWNER/DRIVER COST AND REVENUE ANALYSIS

Start-up Costs
$55,460

Gross Revenue as an Independent Medallion Owner
$90,747

Operating Expenses
$41,215

Net Income from Taxicab Operations
$90,747 minus $41,215 = $49,532

Increase in medallion prices from 2002 to 2003
$25,000

This systematic delineation of cost is essential input for the discussion of asset valuation in Section 3 of this report.

The above NYC-TLC cost/revenue data are summarized below in XLS format for a representative cab:

TABLE 5

New York Presentation

Start-Up Costs:	
Medallion Cost[21]	$50,000
License & Fees	1,400
Taxi Conversion	4,000
TLC Hack-Up	50
Medallion Tin	10
Total Start-Up Costs	55,460
Annual O&M	
Liability Insurance	3,700
Vehicle Depreciation & Cost	8,000
Maintenance	4,000
Gasoline	4,500
Motor Vehicle Tax	1,000
General and Administrative Costs	1,715
Medallion Loan	18,000[22]
Tires	300
	41,215

[21] Assumes 20% deposit. Acquisition price $250,000 ($50,000/.20 =$250,000)
[22] Assumes annualized debt service of $18,000. The discrete level annualized cost factor (LACF), inclusive of principal and interest. See Section 3.

Estimated Gross Revenues	90,747
Operating Revenues	
Gross Revenues - O&M	49,532

NYC-TLC has provided two pieces of information that might help answer the question: how much would a San Francisco medallion sell for? This question was posed during Matt Gonzales's presidency of the San Francisco Board of Supervisors. In "To Ballot or Not to Ballot – Proposed Measure would Allow Sale to Drivers of Taxi Permit Rights," the comment was made "How much a San Francisco Taxicab permit would sell for is a matter of conjecture and controversy." In Section 3 – "Asset Valuation" – an analysis is presented as to how a capital good can be valued prior to any sale. Sellers and buyers rely on this technique to develop reservation and/or demand/buy prices.

The NYC-TLC has calculated the cost elements for a representative taxicab-operator. NYC-TLC has conducted actual medallion-auctions. Orthodox asset valuation of a capital good (taxicab medallion) calls for discounting the present value of the net income stream. This is not a perfect replication of a market exchange (actual revealed preferences), but the best assessment possible short of putting up a "for sale" sign.[23] NYC-TLC also has recorded actual prices generated from the sale of medallions. Comparing NYC-TLC actual sale prices and values estimated by using capitalization techniques (with their debt, cost, and revenue assumptions) reveals that there is a statistically correlative convergence.

The total fixed or start-up costs equal $255,460.[24] These costs must be recovered through the revenue stream. To annualize these costs on a discrete basis, multiply $255,460 by the level annualized cost factor (LACF). The LACF: i*(1+i)^t.(1+i)^t-1; where i is the annual discount/interest rate and t is the number of years. If a trader assumes a 10 percent discount/interest rate, the LACF would equal .10*(1+.10)^t/(1+.10)^t-1; where ^ is raised to the power and t equals the number of years and * means multiplication and / division. For t = 20 years and I = .1 (10%) the LACF equals 0.11746. Multiplying 0.11746 by

[23] Price seekers generate additional information as a function of service costs over time. When the anticipated marginal gain equates the marginal cost of an additional unit of search a transaction will occur.
[24] Table 3 start-up costs plus $50,000/.20 amortized at an appropriate discount rate.

$255,460 equals $30,006. This amount will cover the opportunity forgone in interest and principal payments to offset an investment of $255,460 at 10 percent for 20 years.

Table 6 shows the schedule (discrete discounting) of debt service for an initial investment of $255,460, repaid over 20 years at a fixed-interest rate of 10 percent. This debt is figured into the equation for assigning a value to acquiring a taxicab. Both Tables 6 and 7 use NYC-TLC data to assess the value of a representative NYC taxicab medallion. All values are expressed in constant dollars. The discount (interest) rate is expressed in real terms. Implied future inflationary trends are not subsumed.

Table 6 shows the debt service required to amortize the total start up costs of $255,460 over a 20-year period, at a 10 percent discount rate. Table 6 has five columns.

1. Year
2. Annual discrete debt service components
3. Interest payments/year
4. Amount applied to principal/year
5. Cumulative principal

Table 7 is a composite breakout by year for:

1. Year
2. Estimate gross revenues
3. Total O&M/year – variable costs
4. Annual debt service (fixed costs)
5. Fixed plus variable costs
6. Net gross revenues per cab
7. End-of-year (EOY) net present value at 10 percent[25]
8. Cumulative present value
9. Table 5 assumes a 20-year vehicle life

[25] Yellow Cab Coop - XLS – Sheet 1

TABLE 6

Debt Service Retirement Schedule
10-percent for 20 years on $255,460

Year	DEBT SERVICE	Interest	Principal	Total Principal Repaid
1	$30,006	$25,546	$4,460	$4,460
2	$30,006	$25,100	$4,906	$9,366
3	$30,006	$24,609	$5,397	$14,763
4	$30,006	$24,070	$5,937	$20,700
5	$30,006	$23,476	$6,530	$27,230
6	$30,006	$22,823	$7,183	$34,413
7	$30,006	$22,105	$7,902	$42,315
8	$30,006	$21,314	$8,692	$51,007
9	$30,006	$20,445	$9,561	$60,568
10	$30,006	$19,489	$10,517	$71,085
11	$30,006	$18,438	$11,569	$82,653
12	$30,006	$17,281	$12,726	$95,379
13	$30,006	$16,008	$13,998	$109,377
14	$30,006	$14,608	$15,398	$124,775
15	$30,006	$13,068	$16,938	$141,713
16	$30,006	$11,375	$18,632	$160,344
17	$30,006	$9,512	$20,495	$180,839
18	$30,006	$7,462	$22,544	$203,383
19	$30,006	$5,208	$24,799	$228,182
20	$30,006	$2,728	$27,278	$255,460
TOTAL	$600,125	$344,665	$255,460	

TABLE 7

Estimated Annual and Cumulative Present Value

Year	Estimated Gross Revenues	Variable Total O&M Table 2	Fixed DEBT SERVICE	Fixed plus Varable	Net Gross Revenues Per Cab	End of Year Net Present Value at 10%	Cumulative Pre. Value 10%
1	$90,747	$41,215	$30,006	$71,221	$19,526	$17,751	$17,751
2	$90,747	$41,215	$30,006	$71,221	$19,526	$16,137	$33,888
3	$90,747	$41,215	$30,006	$71,221	$19,526	$14,670	$48,558
4	$90,747	$41,215	$30,006	$71,221	$19,526	$13,336	$61,894
5	$90,747	$41,215	$30,006	$71,221	$19,526	$12,124	$74,018
6	$90,747	$41,215	$30,006	$71,221	$19,526	$11,022	$85,040
7	$90,747	$41,215	$30,006	$71,221	$19,526	$10,020	$95,060
8	$90,747	$41,215	$30,006	$71,221	$19,526	$9,109	$104,169
9	$90,747	$41,215	$30,006	$71,221	$19,526	$8,281	$112,449
10	$90,747	$41,215	$30,006	$71,221	$19,526	$7,528	$119,977
11	$90,747	$41,215	$30,006	$71,221	$19,526	$6,844	$126,821
12	$90,747	$41,215	$30,006	$71,221	$19,526	$6,222	$133,043
13	$90,747	$41,215	$30,006	$71,221	$19,526	$5,656	$138,698
14	$90,747	$41,215	$30,006	$71,221	$19,526	$5,142	$143,840
15	$90,747	$41,215	$30,006	$71,221	$19,526	$4,674	$148,515
16	$90,747	$41,215	$30,006	$71,221	$19,526	$4,249	$152,764
17	$90,747	$41,215	$30,006	$71,221	$19,526	$3,863	$156,627
18	$90,747	$41,215	$30,006	$71,221	$19,526	$3,512	$160,139
19	$90,747	$41,215	$30,006	$71,221	$19,526	$3,193	$163,331
20	$90,747	$41,215	$30,006	$71,221	$19,526	$2,902	$166,234
TOTAL			$600,125			$166,234	

Table 7 combines annualized fixed and variable costs and evaluates the present value of a net income stream (total revenues minus [fixed + variable] total costs). These calculations (Section 3) do not assume inflation and use a real inflation rate. No effort is made to subsume tax and other income impacts.

The present value of a perpetual annuity of $19,526 at 10 percent is $195,200. This is higher than the present value calculated for 20 years of $166,234 as shown in Table 6. A discount rate of 5 percent would increase the present value of a perpetual annuity of $19,526 to $390,520. A 20 year stream with a 5 percent discount rate would also cause the capitalized value of holding a taxicab medallion for 20 years to increase by a correlative amount.

TABLE 8

Combined Asset Valuation
Using NYC-TLC Numbers and assuming a 10 Percent Borrowing and Discount Rate

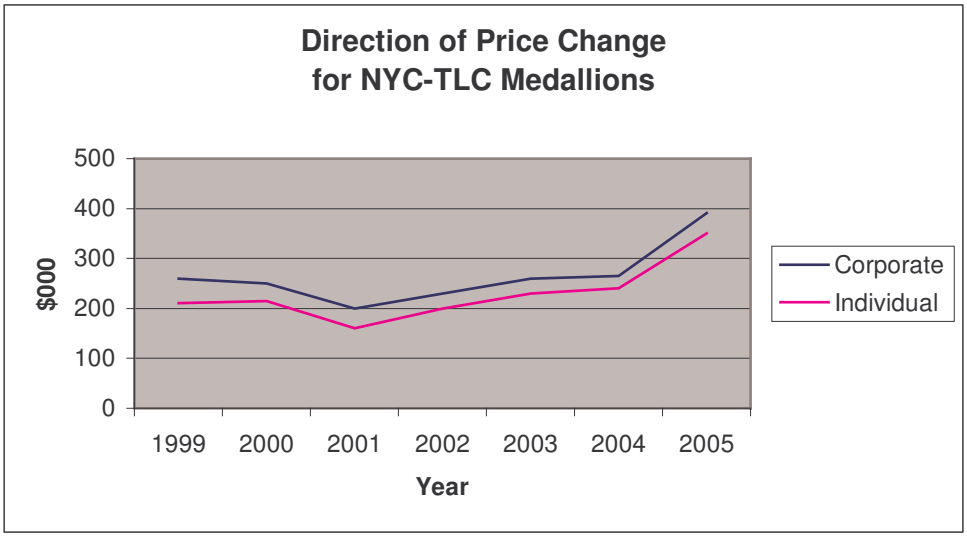
Year	Estimated Gross Revenues	Variable Total O&M Table 2	Fixed DEBT SERVICE	Fixed plus Variable	Net Gross Revenues Per Cab	End of Year Net Present Value at 10%	Cumulative Pre. Value 10%
1	$90,747	$41,215	$30,006	$71,221	$19,526	$17,751	$17,751
2	$90,747	$41,215	$30,006	$71,221	$19,526	$16,137	$33,888
3	$90,747	$41,215	$30,006	$71,221	$19,526	$14,670	$48,558
4	$90,747	$41,215	$30,006	$71,221	$19,526	$13,336	$61,894
5	$90,747	$41,215	$30,006	$71,221	$19,526	$12,124	$74,018
6	$90,747	$41,215	$30,006	$71,221	$19,526	$11,022	$85,040
7	$90,747	$41,215	$30,006	$71,221	$19,526	$10,020	$95,060
8	$90,747	$41,215	$30,006	$71,221	$19,526	$9,109	$104,169
9	$90,747	$41,215	$30,006	$71,221	$19,526	$8,281	$112,449
10	$90,747	$41,215	$30,006	$71,221	$19,526	$7,528	$119,977
11	$90,747	$41,215	$30,006	$71,221	$19,526	$6,844	$126,821
12	$90,747	$41,215	$30,006	$71,221	$19,526	$6,222	$133,043
13	$90,747	$41,215	$30,006	$71,221	$19,526	$5,656	$138,698
14	$90,747	$41,215	$30,006	$71,221	$19,526	$5,142	$143,840
15	$90,747	$41,215	$30,006	$71,221	$19,526	$4,674	$148,515
16	$90,747	$41,215	$30,006	$71,221	$19,526	$4,249	$152,764
17	$90,747	$41,215	$30,006	$71,221	$19,526	$3,863	$156,627
18	$90,747	$41,215	$30,006	$71,221	$19,526	$3,512	$160,139
19	$90,747	$41,215	$30,006	$71,221	$19,526	$3,193	$163,331
20	$90,747	$41,215	$30,006	$71,221	$19,526	$2,902	$166,234
TOTAL			$600,125			$166,234	

The capitalized value (bid/sell) is impacted by the borrowing rate, expected discount (interest) rate, forecasted fare-structures, expected cost-elements (gasoline, maintenance, etc.), anticipated fare/demand responses (elasticities) and numerous other multivariate factors. Auctions and market transfers (exchanges) are great mechanisms for lowering information and transaction costs and tend to be nondiscriminatory in selecting winners and losers.

The NYC-TLC auction and transfer system has some of the elements proposed in SF legislation. There are, however, significant differences and those differences are on the equity side that is valued as part of San Francisco's social welfare function. The proposed S.F. legislation does not permit the type of market-share concentration allowed in New York.

APPENDIX 1

Figurative Representation of NYC-TLC Historical Medallion Asset Value



SECTION 3

Asset Valuation of a Representative Cab
What is the value of a taxicab?

The privilege of holding a taxicab medallion is a capital good. It is a durable good in that significant revenues are realized by the permit-holder over the life of the permit. Since Proposition K was enacted in 1978, permits have been issued essentially free of charge. Under Proposition K, medallions are not auctioned or traded. Medallions are issued based on public need and necessity and allocated on a queue basis. The charges for a medallion are limited to related administrative costs.

In 1998, Proposition K was partially amended upon the passage of Proposition D. Proposition D transferred the taxicab regulatory responsibilities of the Police Commission to a new Taxi Commission. The Taxi Commission is made up of seven commissioners:

- One member from the senior or disabled community
- On driver who does not hold a taxicab medallion
- One manager in a taxicab company (either a medallion holder or company representative)
- One member from the hospitality industry
- One member from the labor community
- One member from the neighborhoods
- One member from the general public not affiliated with any of the other categories[26]

Detailed regulations are laid down by the Taxi Commission under Propositions K and D and in the San Francisco Municipal Police Code. These regulations create a broad regulatory framework, including but not limited to:

- Issuance of sufficient licenses to ensure public convenience and necessity, while keeping the taxicab industry a viable investment sector
- Response time goals
- Dispatch practices

[26] Summarized from *San Francisco Planning and Research Center, 2001 Report*, Appendix C, Current Taxicab Service in San Francisco.

- Training
- Vehicles
- Taxi sharing
- Ratemaking

By its failure to internalize the income associated with the privilege to hold a permit, the City and County is deprived of an opportunity to share the present value of the discounted future income streams associated with ownership of the medallion and thus fully recover the cost of taxicab regulations. By allowing taxicab auctions and a right to transfer, the City and County could benefit in two ways:

- By retaining the entire proceeds from the auction of a new or repossessed permit, and
- By receiving a transfer fee for every transfer-transaction involving an existing taxicab medallion.

The City and County would create an ongoing revenue source (the gift that keeps on giving), and taxicab medallions would be transferred so that market prices would act as social coordinators, allocating medallions to users who placed the highest marginal value on medallion-acquisition. In other words, the revenues to the City would be based on the asset value, not on merely covering the cost of program administration. The City and County would not sell these medallions. The privilege to hold a medallion by any natural person would be strictly regulated. These regulations are delineated in the attached "Ordinance Providing for Regulation of Taxicab Operations."[27]

The privilege of holding a taxicab medallion endures conditionally over time. This makes it a capital good. Its value is derived from present and future income.[28] With an auction system and market transfers, the discounted acquisition price of a medallion would not be greatly different from the original purchase price. This section deals with use of capital theory, a subset of orthodox economic analysis, to place a value on the privilege of holding a City owned taxicab-medallion to provide taxicab services in San Francisco. [29]

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[27] See Section 1, Appendix 1 "Ordinance Providing For Regulation of Taxicab Operations."
[28] See case study of asset valuation in Section 2 using actual NYC-TLC data.
[29] Alchain and Allen, *University Economics*, 2nd Edition, Wadsworth Press, Belmont, Calif., 1967: Chapter 14 – *Cost and Output Programs*

A price is an exchange ratio. A price contains a lot of information. No *deus ex machina* will step forward to reveal a price. Value (price) can be approximated by use of present value capitalization techniques. The City and County in conducting an auction might set a reservation price (floor) for a medallion based on its estimation of capitalized value. Bidders will probably use the same type calculations in setting their bid prices. Bidders will estimate net revenues based on efficiency criteria, market projections, and cost assumptions, and discount these net revenues to a capitalized value using their own planning discount rates.

Bidding among the qualified buyers for the supply of available medallions will produce market prices. If these prices exceed the City and County's reservation price, the privilege to operate will be awarded to the highest qualified bidder.[30] The privilege will be exchanged for the highest approved bid price. This privilege can later be transferred among qualified operators. The owner and prospective transferee will most certainly set a reservation and offer price in a similar manner as described above. These potential exchange prices will subsume the transfer fee.

Throughout the world, where permitted, this "secondary market" has led to the emergence of taxicab-medallion brokers, who specialize in trading and exchanging medallions. Many people wishing to transfer medallions use these specialized brokerage services because they see them as cost effective in reducing transaction and information costs.

Auctions and personal transfer trades allow the market to do much of the heavy lifting in allocating these scarce resources (medallions) to the virtually unlimited market of prospective buyers with different subjective marginal valuations. The Taxicab Commission still maintains regulatory power in matters relating to ratemaking and service attributes.[31] San Francisco benefits in perpetuity from this proposed system. Taxicab operators benefit because medallions are allocated to those who place the highest marginal value in use for such an acquisition. The efficiency and service criteria are best achieved when these functions are met through the market mechanism.

[30] It is assumed that the City would place a reservation/demand to hold price on medallions being submitted for auction.

[31] Tariff means rates, but the definition can be expanded to mean rates and conditions of service, of which remains unchanged by the new proposition.

An asset is equal to its net present value (NPV). The NPV is current value of the future net stream of goods and services that an investment will yield. Discounting the net value of that stream at an appropriate interest (discount) rate derives the NPV. Three methods for discounting are presented below.

1. Discrete Discounting: Using the net income stream (revues minus costs) and discounting on an annual (end of year), discrete basis.

Formula:

$$NPV = \sum_{t=1}^{n} \frac{R_t - C_t}{(1+i)^t}$$

Where:

NPV = Net Present Value
t = time in discrete years
n = Period of operation
i = Planning discount rate
R_t = Revenues generated in time t
C_t = Costs incurred in time t

Example:

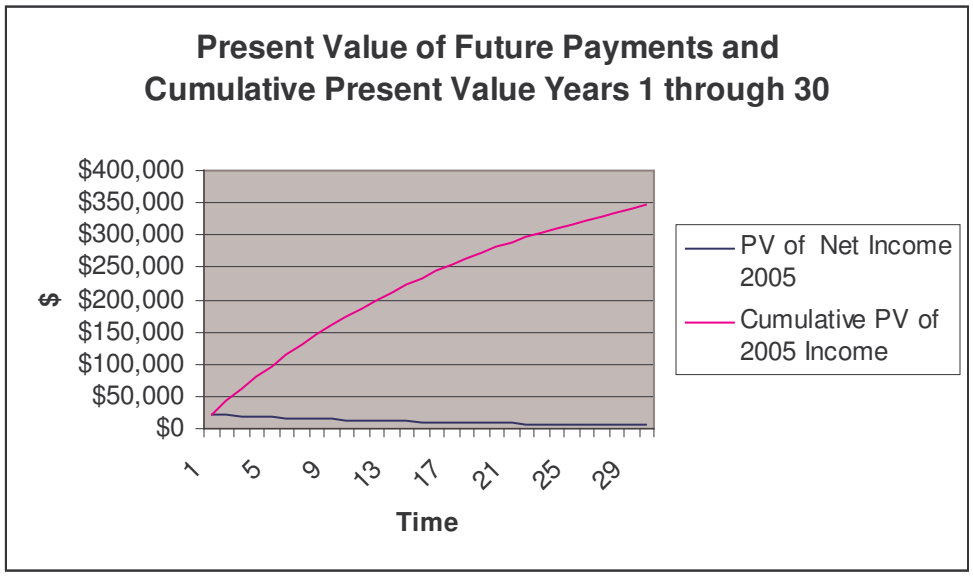
Using the Yellow Cab Cooperative, Inc. Audit Report of April 30, a per-cab net income of $22,532 was calculated for 2005 (See Section 3, Attachment 1). Assuming a real discount rate of 5 percent and no inflation (see following discussion on appropriate discount rate and meaning of the term), Table 9 illustrates the present value per future payment and the cumulative present value of these future payments for years 1 through 30.

TABLE 9
Present Value, Annual Cumulative

	PV of Net Income 2005	Cumulative PV of 2005 Income
1	$21,459	$21,459
2	20,437	41,897
3	19,464	61,361
4	18,537	79,898
5	17,655	97,552
6	16,814	114,366
7	16,013	130,380
8	15,251	145,630
9	14,524	160,155
10	13,833	173,987
11	13,174	187,161
12	12,547	199,708
13	11,949	211,658
14	11,380	223,038
15	10,838	233,876
16	10,322	244,198
17	9,831	254,029
18	9,363	263,392
19	8,917	272,308
20	8,492	280,801
21	8,088	288,888
22	7,703	296,591
23	7,336	303,927
24	6,987	310,913
25	6,654	317,567
26	6,337	323,904
27	6,035	329,939
28	5,748	335,687
29	5,474	341,161
30	5,213	346,375

Figure 2 graphically illustrates the data in Table 9.

Figure 2
Present Value, Annual and Cumulative



2. Annualized perpetuity: An annualized perpetuity is a stream of payments over an infinite (very long) time period:

$$PV = \frac{NR}{i}$$

Using the Yellow Cab Cooperative, Inc. Audit Report of April 30 and a calculated per-cab net income of $22,532, an infinite series would yield a present value of $450,643.

Where:
NR = Constant net revenues (revenues minus costs)
i = Planning discount rate

3. Growing Perpetuity: Sometimes the payments in perpetuity are not constant but instead, increase at a certain growth rate (g) as depicted in the following time li
ne:

$$PV = \frac{NR}{i_m - g}$$

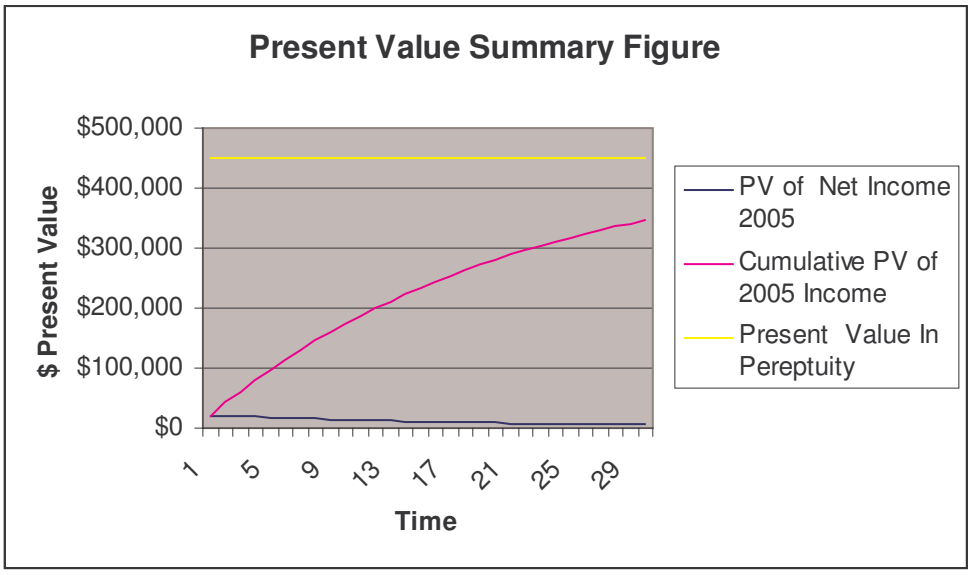
Where:
i_m = Monetary discount rate
g = growth
NR = Net Revenues

In this case, for simplicity, assume the growth is tied to general inflation and is 2 percent. This will increase (see discussion below) the monetary planning discount rate from 5 percent to 7 percent, to offset inflationary expectations.

The present value of a perpetual series will be $22,532/(0.07-0.02) = $450,643.

Figure 3 summarizes the present value of holding a capital asset for different numbers of years. The perpetual annuity with growth and a monetary interest rate and the constant dollar amount using a real discount rate are shown (under the simplifying assumptions) to be equal. Figure 3 shows that the longer an asset is held, the closer the present value of a discrete annual series approaches the value of an infinite series[32].

Figure 3
Present Value Summary Figure



[32] See *Engineering Economy: A Manager's Guide to Economic Decision Making,* Third Edition, AT&T. McGraw-Hill Book Company, New York:1977, p. 421.

Interest rate/discount rate

Using a discount to capitalize future monetary income streams is fundamental to the concept that earlier availability is more valuable than later availability.[33] Alchian and Allen summarize:

> The rate of interest is (a) a measure of the relationship between present amounts of a good and amounts of future goods for which they can be traded; (b) a measure of the maximal rate of growth of wealth; (c) a measure of the price of earlier availability of a good; and (d) the time premium paid for borrowed wealth.[34]

The nominal interest/discount rate (i) reflects two considerations: the basic rate of interest (the rate of interest that would exist in the absence of any inflationary assumptions) and the adjustment for the anticipated rate of rise in the price level. The specific planning discount rate for any entity will depend on subjective valuations as to the projected paths of real and inflationary trends. These relationships are shown in the following Table Number 10.

[33] Alchian & Allen, *University Economics*, 3rd. Edition, Wadsworth Publishing Company, Belmont, California, 1972, Chapter 11.

[34] Note – A reading of Chapter 11, University Economics, will help clarify why it is a misnomer to refer to the interest rate as merely the "time value of money."

TABLE 10

Constant and Nominal (inflation) Values

Time	Net Income Constant Dollar 2005	PV of Net Income 2005	Cumulative PV of 2005 Income	2 Percent Inflated Dollar Income	Inflated $ Income Discounted I_m	Cum PV of Inflated Discounted i_m
1	$22,532	$21,459	$21,459	$22,983	$21,459	$21,459
2	$22,532	$20,437	$41,897	$23,442	$20,437	$41,897
3	$22,532	$19,464	$61,361	$23,911	$19,464	$61,361
4	$22,532	$18,537	$79,898	$24,390	$18,537	$79,898
5	$22,532	$17,655	$97,552	$24,877	$17,655	$97,552
6	$22,532	$16,814	$114,366	$25,375	$16,814	$114,366
7	$22,532	$16,013	$130,380	$25,882	$16,013	$130,380
8	$22,532	$15,251	$145,630	$26,400	$15,251	$145,630
9	$22,532	$14,524	$160,155	$26,928	$14,524	$160,155
10	$22,532	$13,833	$173,987	$27,467	$13,833	$173,987
11	$22,532	$13,174	$187,161	$28,016	$13,174	$187,161
12	$22,532	$12,547	$199,708	$28,576	$12,547	$199,708
13	$22,532	$11,949	$211,658	$29,148	$11,949	$211,658
14	$22,532	$11,380	$223,038	$29,731	$11,380	$223,038
15	$22,532	$10,838	$233,876	$30,325	$10,838	$233,876
16	$22,532	$10,322	$244,198	$30,932	$10,322	$244,198
17	$22,532	$9,831	$254,029	$31,550	$9,831	$254,029
18	$22,532	$9,363	$263,392	$32,181	$9,363	$263,392
19	$22,532	$8,917	$272,308	$32,825	$8,917	$272,308
20	$22,532	$8,492	$280,801	$33,482	$8,492	$280,801
21	$22,532	$8,088	$288,888	$34,151	$8,088	$288,888
22	$22,532	$7,703	$296,591	$34,834	$7,703	$296,591
23	$22,532	$7,336	$303,927	$35,531	$7,336	$303,927
24	$22,532	$6,987	$310,913	$36,242	$6,987	$310,913
25	$22,532	$6,654	$317,567	$36,966	$6,654	$317,567
26	$22,532	$6,337	$323,904	$37,706	$6,337	$323,904
27	$22,532	$6,035	$329,939	$38,460	$6,035	$329,939
28	$22,532	$5,748	$335,687	$39,229	$5,748	$335,687
29	$22,532	$5,474	$341,161	$40,014	$5,474	$341,161
30	$22,532	$5,213	$346,375	$40,814	$5,213	$346,375
	In perpetuity		$450,643			$450,643

Asset valuation can be calculated. The real value , however, ,will be known only if a medallion sells. Demand to buy and willingness to sell, establishing market prices, will be revealed only if actual trades take place. The best way to value a capital asset, such as a taxicab medallion *a priori actual* trades, is to use capital theory in conjunction with best effort assumptions as to future costs, revenues, and interest rates. These capitalized market-exchange simulations are only as good as the accuracy of the input assumptions.

A representative taxicab was valued. Four categories of assumptions were used:

- Costs
- Revenues
- Term interest structure (planning discount rates)
- Inflation

Individuals have different discount rates based on many factors such as age, gender, marital status, education, etc. In medieval times, the Anglo-Saxons were the borrowers. They placed a relatively higher value on current consumption, i.e., "eat, drink and be merry for tomorrow we die" versus the Scots who tended to be lenders because of their relatively higher valuation on future versus present consumption. Again, as noted in the text, the real interest rate is a function of time-preferences and time-productivity (exchanging present goods for future goods), while the monetary interest rate adds on the expected rate of inflation.

In addition to differing discount rates to value net future income streams, a myriad of other assumptions go into asset valuation. One might be an individual operator's assessment of his personal productivity. The average number of paying rides per shift might be 20. Around the average is a distribution function. One driver might value his cab based on 20-fare paying rides per 10-hour shift another at 30 and yet another at 15. These individual assessments (along with their own perception of all other cost and revenue sources) will set individual net forecasted revenues, which when discounted by their own planning discount rates, will determine the subjective capitalized value of acquiring a taxicab medallion.

Asset valuations – informally or formally – are continually revisited. These valuations establish a demand to acquire and/or a demand to exchange taxicab medallions. The proposed legislation establishes the parameters for allowing medallions to be exchanged in a way that allows them to be bid to their expected highest use value, albeit, the "invisible hand" does the heavy lifting in terms of gathering and exchanging information and transaction costs.

City taxicab riders benefit because when medallions are bid to their highest use value, with regulatory established fares, operators will have an added incentive to increase service levels to ensure a steady flow of customers-

revenues to amortize all the fixed and operating costs associated with holding a medallion. The City will benefit from receiving the revenues generated through auction-sales of new and repossessed medallion so in addition, every medallion transfer will generate more revenue, ensuring a continual flow of money to the City.

A representative schema for an individual medallion holder to assess cab valuation (to hold or offer a medallion for sale):

Schema – Spreadsheet to Compute
Asset valuation – Medallion – Offer/Bid Price

	Yr. 1	Yr. 2	Yr. 3	…….	Yr. N
Total Revenues					
Number of shifts					
Revenues per shift					
Total Revenues					
Costs					
Number of gallons					
Price per gallon					
Oil					
Other Maintenance					
Other Costs					
Insurance					
Depreciation					
Taxes					
Opportunity of medallion owner's time					
Debt Service					
Net Income					
Net Present Value at X%					

On January 8, 2004, *The Globe Investor*, reporting on Medallion Financial Corporation (NASDAQ: Taxi), noted:

> "The last time New York auctioned taxi medallions, the bids were at or above the previous price levels and the market value for all medallions increased generally. " The report goes on to state: "Over the past 70 years, taxi medallion prices have risen 13%, outperforming the Dow Jones Industrial Average over the same period, as well as many other long-term investment opportunities."[35]

Prior price increases in New York City and elsewhere will not necessarily repeat in San Francisco. However, it is clear that having the right to operate a taxicab with a medallion is a capital good. Adding the right to transfer this medallion, under appropriate regulatory constraints, enhances its value. While not making a medallion a purely transferable private-property right, the ordinance does give the owner and potential acquirer greater confidence that the future net revenue may be accrued/capitalized to the medallion holder.

The following discussion is taken from
http://www.netmba.com/finance/time-value/perpetuity/

An annualized perpetuity is a series of equal payments over an infinite time period into the future. Consider the case of a cash payment C made at the end of each year at interest rate i, as shown in the following time line:

Perpetuity Time Line

0 1 2 3 4 5 6 7 8 ……..

PC C C C C C C C C ……

Because this cash flow continues forever, the present value is given by an infinite series:

[35] January 8, 2004: http://www,globeinvestor .com/servlet//WireFeedRedirect…

$PV = C/(1+i) + C/(1+i)^2 + C/(1+i)^3 + \ldots$

From this infinite series, a usable present value formula can be derived by first dividing each side by (1 + i).

$PV/(1+i) = C/(1+i)2 + C/(1+i)3 + C/(1+i)4 + \ldots$

In order to eliminate most of the terms in the series, subtract the second equation from the first equation:

$PV - PV/(1+i) = C/(1+i)$

Solving for PV, the present value of perpetuity is given by:

$PV = C/i$

And/or

$NPV = NR/i$

Where NR = net revenues.

Thus, if a $10 annuity was received forever, with an interest rate of 5 percent its present value would be equal to $10./05 = $200. With an interest rate of 10 percent the value of the perpetuity would be $10/.10 = $100. For long-term investments, asset valuations can be well approximated by this technique. Price-seeking buyers and sellers can quickly determine the value of a cab-medallion, for a long-term investment, by dividing its expected net return (revenues minus costs) in equal amounts and apply a subjective discount rate.

For example a taxicab medallion, held as a long-term investment, with expected, constant net revenues of $25,000 and discounted at 5 percent, would have a capitalized asset value of $25,000/.05 = $500,000. At 10 percent the asset valuation would be $250,000.

The Present value of $25,000 received in the future at 5 percent discount is shown on Figure 4.

Figure 4
Present Value of $25,000 received in the Future at 5 percent

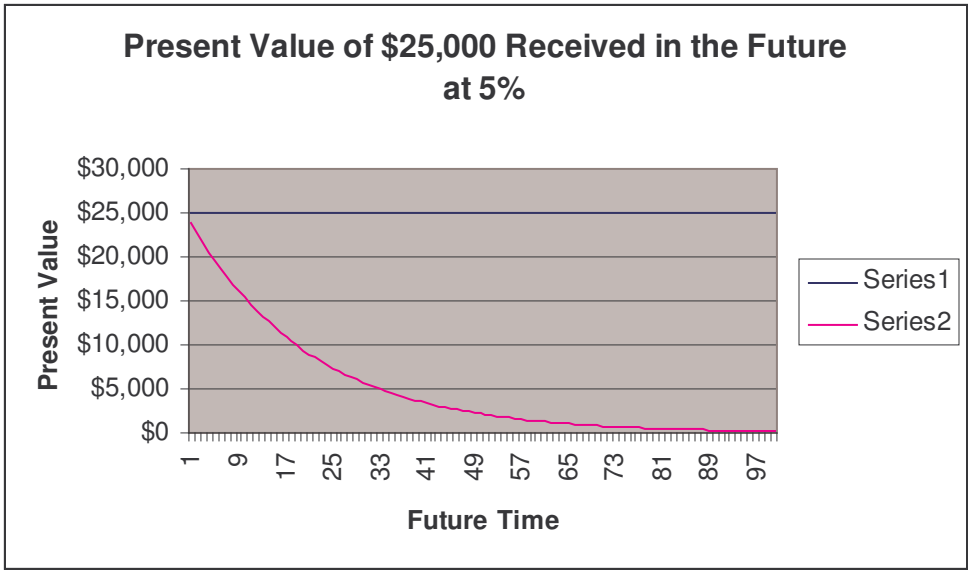
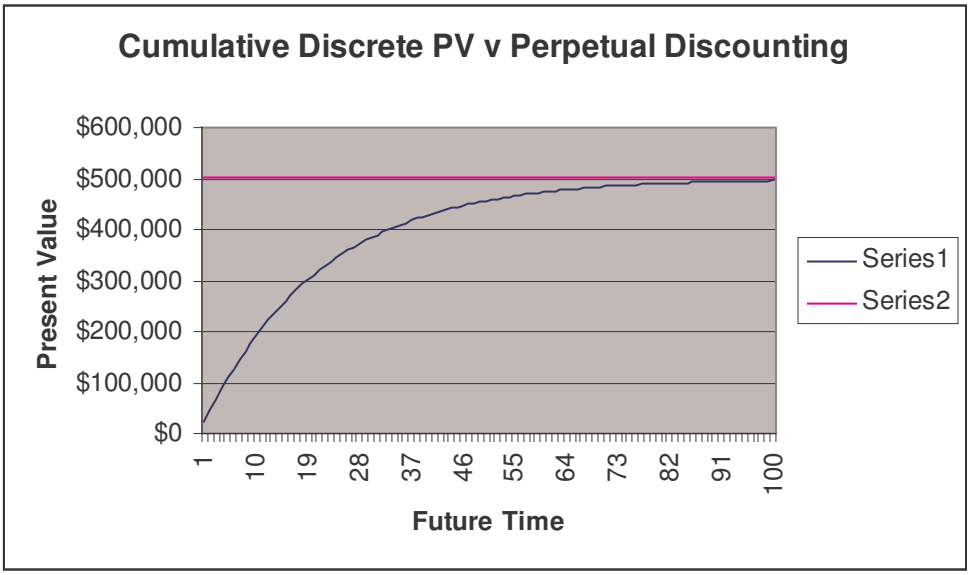


Figure 5 compares cumulative present value discounting with a perpetual discounting approach.

Figure 5
Cumulative Discrete PV v Perpetual Discounting



Growing Perpetuities

Sometimes the payments in perpetuity are not constant but, instead, increase at a certain growth rate (g) as depicted in the following time line:

0	1	2	3	4	……
PV	C	$C*(1+g)^1$	$C*(1+g)^2$	$C*(1+g)^3$	……

The present value of a growing perpetuity may be written:

$$PV = \frac{C}{(1+i)} + \frac{C*(1+g)}{(1+i)^2} \frac{C*(1+g)^2}{(1+i)^3}$$

To simplify this expression, first multiply each side by (1 + g) / (1 + i):

$$PV * \frac{(1+g)}{(1+I)} = \frac{C*(1+g)}{(1+I)^2} + \frac{C*(1+g)^2}{(1+i)^3}$$

Then subtract the second equation from the first:

$$PV - \frac{PV*(1+g)}{(1+i)} = \frac{C}{(1+i)}$$

Finally, solving for PV yields the expression for the present value of a growing perpetuity:

$$PV = \frac{NR}{i-g}$$

When C = $25,000
g = 2%
i = 7%
NVP = $25,000/(.07-.02)
NVP = $25,000/.05
NVP = $500,000

For this expression to be valid, the growth rate must be less than the interest rate, that is, $g < I$ [36].

In New York City, there are two types of medallions:

- Individual medallion – sold in lots of one to prospective owner-drivers and fleets
- Fleet medallions sold only in pairs to fleet operators

Boston also auctioned a bunch of medallions in order to raise funds for a new convention center. Likewise Chicago has auctioned new medallions in recent years. Note: Chicago does permit license transfers. The transfer fee is based on historical values generated by recent historical sales

The Reason Foundation in a series of articles titled "Entrepreneurship and Regulation" (Footnote http://wwww.Reason.org/ps277.html) states that "the urban taxicab industry provides a unique lens through which the regulatory climate of a city can impact economic opportunity." Adding: "The taxicab industry is one of the most heavily regulated low-skilled businesses in the Nation, a legacy in part, of its early treatment by city governments as a public utility."[37]

The Reason article notes "In practice most cities regulate industry to the point where entry is difficult, if not impossible." Reason argues against "artificial scarcities"; adding ". . . the number of gypsy cabs plying the streets of Los Angeles is 4,000."[38] Reason concludes this phenomenon (which brings no revenues to the city) is a direct result of strict barriers to entry.

Reason delineates the general methods employed by U.S. cities to regulate taxicabs; noting that many of these methods vary between regulatory jurisdictions:

- Twenty-four hour service recommended where taxicab companies are required to provide round-the-clock, seven-days per week service;

[36] See *Engineering Economy*, p. 421.
[37] See earlier discussion on public utilities especially comments by Alchian, Allen & Demsetz, et al.
[38] Dana Berliner, "Driving off Economic Opportunity" *Los Angeles Times January,* 31, 2000.

- Citywide service agreements that effectively prohibit part-time and niche companies from providing services to specific markets or neighborhoods;
- Public hearings for all new applicants to start a new business, where applicants bear the burden of proof to demonstrate that a market exists for these services, allowing anyone to object to the application, including the fledgling company's competitors;
- Zoning ordinances that prevent small businesses from operating out of their areas;
- Gaps on the number of vehicles permitted to operate;
- Minimum fleet sizes requiring new cab companies to invest in the substantial number of new cabs (often 15 or more) before they can begin providing a service;
- License fees which can range from as little as $100 per company to $1,500 or more; and
- Off-street parking requirements for out-of-service cabs that virtually eliminate the possibility of running a home-based business or micro enterprise."[39]

Reason[40] believes taxicab regulations are different in different cities because of the political climate and pressure from interest groups specific to each particular jurisdiction. Reason briefly critiqued the regulatory system in a number of U.S. cities.

BOSTON

Taxicabs are regulated by the Massachusetts Department of Telecommunications and Energy (DTE).[41]

Boston has a three-tiered process to license cabs.

Step 1. The prospective cab company operation must obtain a medallion to obtain the legal right to own and operate a taxicab.

Step 2. A separate license must be obtained allowing him/her to operate a taxi company and hire or contract with drivers.

[39] Reason, ibid p.10 of 88.
[40] Reason, ibid p.12 of 88.
[41] Denver taxicabs are also state regulated.

Step 3. The operator must obtain a license from the City of Boston to operate a taxicab and collect fares.

Boston separates ownership from possession of a medallion. In Boston, a medallion is an entitlement to apply for a license to operate a taxi company. The Hackney Division of the Boston Police Department enforces the medallion rule. Reason notes that most Boston cabbies are not owner/operators, but employees of contractor medallion owners.

DALLAS

Reason argues that the Dallas approach is stifling to business. According to Reason, entrepreneurs must apply to the Dallas City Council, have a minimum of 25 cabs ready to seek fares and specify that they will own, contract, or otherwise operate the proposed taxicab service. Reason concludes "The latter requirement ensures, in principle, that licenses are not sold to independent operators. In 2000, these licenses amounted to $6,000/year. "Cab companies, according to Reason, said that the most odious regulatory start-up costs were those associated with the demand that Dallas cab operators use vehicles no older than five years. Reason stated that the vehicles were generally three or less years old to ensure operators would pass the three tests per year conducted by Dallas.

MADISON

In 1999, the city of Madison, Wisconsin, convened a Subcommittee on Taxicab Deregulation. The final report, issued in August 2000, recommended a few changes in the Madison regulatory structure. Reason noted that the overall effect of the recommended rule changes was that it became a near impossibility for single cab companies to be formed [Reason http://reasen.org/ps277.html, footnote no. 33]. Peter Carsteusen, a professor of law at the University of Wisconsin, stated ". . . that the local regulations may violate provisions of the state antitrust laws, because, among other things, the city used regulations more intrusive than necessary to accomplish legislative goals.[42]

[42] Reason, ibid. and http://www.taxi-1.org/papers.html, deregulator.

OTHER

Kramer and Mellor[43] quote a 1974 study by the United States Department of Transportation stating that "The U.S. DOT found that regulators restricting entry and preventing discounting of fares cost consumers $800 million annually adjusted for inflation to 1992 dollars. Moreover removal of these restrictions would create 38,000 new jobs in the taxi industry.[44] These conclusions on economic loss as a function of regulatory interference mirror similar comments about the loss in GDP (GNP) points resulting from the creation of the ICC.[45]

SUMMARY

There are opinions pro and con regarding how to regulate/deregulate the taxicab industry. Reason, for example, supports full reliance on market forces for every attribute of the taxicab industry. Others support more or complete regulation. This research concludes that complete deregulation would not be appropriate for San Francisco. The current SF regulatory structure for setting rules and rates can be maintained effectively, but San Francisco will benefit by allowing taxicab auctions and transfers to efficiently allocate medallions and also generate additional revenues for the City.

[43] http://www/cascadepolicy/org/bgc/kramer.htm
[44] Figures from A. Webster, E. Wiener and J. Wells, "The Role of the Taxicab in Urban Transportation, December 1974 . . ."
[45] See above discussion on G.W. Hilton, UCLA 1968.