Taxi Research Partners
Demand | Market | GIS | Fares

San Diego
Taxi Fare Standardization Report

Table of Contents

San Diego 1

Taxi Fare Standardization Report 1

Table of Contents 2

1. Acknowledgements 5

2. Introduction and Project Description 6

2.1 Introduction 6

2.2 Study Purpose 7

2.3 Methodology and approach 7

2.4 Market Segments and User Groups 8

2.5 Study Conclusions / Recommendations 9

3. Taxi Fares and fare standardization 10

3.1 Taxi Fare Structures and Taxi Fares in San Diego 10

3.2 Demand for and Use of Taxis in San Diego 14

3.3 Internal Factors Affecting Taxi Costs / Income in San Diego 15

3.4 Additional and External Factors affecting Taxi Costs / Income in San Diego17

3.5 Application to taxi tariffs in San Diego / Taxi Tariff Standardization 19

4. Data Collection and Review 20

4.1 Surveys undertaken 20

4.2 Survey Overview 20

4.2.1 Review of peer city locations 20

4.2.2 Public Surveys 24

4.2.3 Stakeholder Surveys 26

4.2.4 Driver Surveys 27

5. Market Segmentation / Categorization 28

5.1 User Segments 28

5.2 Driver Segments 29

5.2.1 Driver Hours Worked 30

5.2.2 Driver Operating Patterns 33

5.3 App Based Market Segmentation 35

6. Taxi Market Model 39

6.1 Taxi Costs 39

6.2 Baseline Costs 40

6.2.1 Dispatch Drivers - Full Time 41

6.2.2 Dispatch Drivers - Extended Hours 44

6.2.3 Street Drivers - Full Time 46

6.2.4 Street Drivers - Extended Hours 49

6.3 Additional Costs 50

6.4 Fuel Efficient Vehicles 53

6.4.1 Airport Drivers 54

6.5 Owner Drivers 56

6.6 Changes in operating costs 57

6.6.1 Production Cost Measurement 58

6.6.2 Production Cost Values 63

7. Market Response model 71

7.1 Measured Cost / Income Target 71

7.2 Application of Production Cost increase to mode tariff 72

7.3 Standardization of taxi tariffs 75

8. Impacts assessment 77

8.1 Scenario development and description - Standardization 77

8.1.1 Scenario testing - scenario 1 78

8.1.2 Scenario testing - scenario 2 80

8.1.3 Scenario testing - scenario 3 82

8.2 Impacts of Standardization 84

8.2.1 Standardization - Impacts on Passengers 84

8.2.2 Standardization - Impacts on Drivers 86

8.3 Scenario testing: Standardization at Production Cost 87

8.4 Airport vs. City Fares 89

8.5 Fare Discounting - posted tariff differentials 90

9. Conclusions and Recommendations 92

9.1 Tariff Review Methodology - Production Cost Measurement 92

9.2 Fare Standardization 93

9.3 Temporary cost spikes 94

9.4 Future reviews 95

1. Acknowledgements

Taxi Research Partners Ltd. (TRP) acknowledge the kind of input from many contributed to the study. We acknowledge and thank the Metropolitan Transit System for their commission and significant support in the delivery of the work. We would also underline the significance of input from the local taxi trade, other transportation providers, and key stakeholders for which we are grateful and appreciative.

2. Introduction and Project Description

2.1 Introduction

Taxi Research Partners Ltd. (TRP), and our project partners Nelson Nygaard have been engaged by the Metropolitan Transit System of San Diego (MTS) to undertake a review of the taxi tariff applied in San Diego. Our work addresses the levels of fares, the determination of a methodology for increases in the taxi tariff and the impacts of taxi fare standardization. The study includes a detailed review of taxi production costs, being the costs associated with the provision of taxi services, changes in costs thus defined, and the impacts of changes in the level applied to taxi fares through taxi tariff(s).

Taxi fares typically derive from a combination of charges applied to engagement, distance driven, time and a range of extras defined in advanced and measured in the provision of a trip. The constituent elements can be, and generally are, defined or approved by a taxi licensing authority - the MTS in the case of San Diego. A majority of cities in the US, but not all, define a precise taxi tariff - the statement of allowable fare components - though this is not the case in San Diego, with the exception of trips originating at San Diego International Airport. The San Diego taxi tariff is currently defined as a maximum level, allowing a radio service the ability to advertise and charge less than their competitors. Individual radio services, branded taxi 'companies', are free to define fares up to the maximum allowed by the MTS, subject to the individual service tariff being notified to the MTS, the rate being displayed upon the vehicle using decals in a defined font; and taximeters being certified as complying with the agreed rates.

San Diego International Airport (SAN) differs from the MTS approach in that it defines and updates a specific tariff applied to all trips originating from the airport. Differences between MTS approved fares and those defined by the airport can result in a differential between the fares charged in the same vehicle dependent upon the origin of the trip, between airport and non-airport originating trips. A vehicle serving both city and airport and charging different rates for non-airport trips compared to airport originated trips is required to have a taximeter equipped to measure in either rate, with the driver selecting the appropriate rate on engagement. The proportion of vehicles with differing airport and non-airport rates is somewhat reduced by a number of companies choosing to align non-airport trip rates to those defined by the airport, though this does not apply across all services.

The market is defined in common with many other US cities around taxi brands (sometimes called colors), based on radio services, with a market in the choices of drivers and owners as to which service they choose, though this choice may be diminished dependent on the contractual relationships between vehicle owner, medallion[1] owner, and driver. While all radio services have a requirement to provide radio dispatch, the extent to which this is used and the extent of technologies applied to dispatch differs between services, often reflected in the rates that may be charged, whether directly to owner operators or via lease rates to lease drivers. These differences result in a split in the patterns of services offered by different categories of driver, whether emphasis is placed on dispatched trips, stand or hailed trips. The costs and take home

[1] The term 'medallion' relates to the permit or license required to operate a taxi. Medallions are restricted in numbers issued in San Diego. A range of terms can be used for medallions, defined in detail in section 3.1

driver earnings are also affected by lease rates as well as numbers of hours typically worked. Lease arrangements can differ and are generally separate from radio service control, although these operate in a free market reflecting an equilibrium between medallion owner cost and market demand / ability to pay.

2.2 Study Purpose

The study has the dual purpose of measuring change in cost and income allowing recommendation of a method of updating the San Diego taxi tariff; and assessing the impacts of moving to a standardized fare. In making recommendations on fare levels and changes to fares we felt it important to recommend a taxi rate that: 1) allows taxi operators and drivers to recover operating costs and earn a reasonable income; and 2) provides a consistent method by which taxi fares may be updated in the future using a clear and transparent process of analysis. The study also provides a recommendation of responses to significant sudden changes in operating costs that may be associated with spikes in individual cost elements, such as might be experienced in fuel costs. The study also recommends the adoption of a standardized fare, described in subsequent sections.

2.3 Methodology and approach

The study has adopted a data led analysis approach to assess the impacts of changes in the level, structure and application of taxi fares in San Diego. The study includes a review of methods applied in cities across the USA, building a San Diego specific taxi market model, San Diego public, stakeholder and driver experiences.

The approach requires and follows from the study team identifying the dynamics of the taxi market, its variations and nuances. We have achieved this by developing a detailed review across the city of San Diego, its airport and suburbs. The review includes the identification of relationships within the taxi industry, between key stakeholders involved in the production of taxi services, advisory and policy oriented advocates; and between the public and the trade. The study has also identifies the current use of new vehicle types, some recently labeled as TNCs[2], and behavioral choices currently made in the use of and choice between services. Primary survey and data collection exercises have been undertaken to identify the relationships and choices impacting on the taxi industry. These are summarized as:

- Review of approaches adopted in peer city locations;
- Public Survey, based an intercept across all area of the city using tablets, resulting in 689 responses;
- Driver Survey, based on a paper questionnaire, distributed and collected directly from drivers, resulting in 286 responses;
- Structured interviews of key stakeholders, including owners and radio services;
- Operation data mining, using electronic data specific to dispatch and operational information, based on over 500,000 records.

[2] See section 3.1 for a detailed lexicon of common terms.

Our analysis recognizes the different impacts of changes in levels of taxi fares on a range of users and differing segments within the industry itself. In short, no one passenger, driver or operating company experiences the same circumstances as any other. In recognizing this we have identified passenger categories, as well as driver groups, allowing for comparisons between groups on a consistent basis. The differing segments are identified on the basis of differing elasticities of demand, which influence choices to use a taxi; social, spatial and demographic differences. The study team also considered differing driver groups based on operating patterns, and the impacts of new technologies and new service types on the ability of the taxi driver and the wider taxi industry to operate effectively.

Two econometric models were developed specific to the San Diego taxi market, a base cost model allowing the identification and measurement of costs of production in the taxi industry, stratified by driver type; and a more detailed taxi market model allowing the identification of impacts arising from changes in the rates charged and structure applied to the taxi tariff. The taxi market model allowing the measurement of impacts across a range of passenger 'types' including vulnerable passenger groups, that arise from changes in the taxi tariff, and the associated impacts on demand and thus driver income.

The combination of the taxi cost and market models allowed for the testing of scenarios, a method of defining a range of fare policies to identify the potential and impacts arising from the policies thus identified. Scenarios were developed in association with the MTS and other key stakeholders to reflect a full range of potential outcomes, and are described in detail in subsequent sections of this document.

2.4 Market Segments and User Groups

The study team recognize that any change in the rates or structure of a taxi tariff will impact on differing users and stakeholders differently. This applies equally within the taxi trade as to the passenger groups using taxis. Equally changes in taxi tariff will have a continued and iterative impacts as the longer term impacts may differ from short term changes in demand. These include impacts directly associated with the trade and those following from secondary, competing and alternative transport markets. In order to fully identify impacts the team identified a range of driver, trade and public groups, summarized here and set out in more detail in subsequent sections. Differing relationships were also identified in terms of lease arrangements, and cost, also impacting on the wider cost and market choices. The groups defined below can exist in isolation or combination, creating a wider matrix of market participants discussed in detail in subsequent sections.

Identifiable driver groups include:
- Part Time Drivers
- Full Time Drivers
- Drivers working Extended Hours

Identifiable operating patterns chosen within driver groups included combinations of:
- Drivers responding mainly to dispatch trips
- Drivers responding mainly to hail and stand trip engagement

- Drivers operating predominantly at the airport
- Drivers operating predominantly from non-airport trips

2.5 Study Conclusions / Recommendations

The study draws a series of conclusions based on our analysis. On the basis of a measured review of taxi operating costs we conclude that there has been an increase in production costs of 1.187%, in the 12 month period to January 2014. We have used this cost increase as the basis for analysis of effective changes to tariffs.

The study concludes that, on balance, fare standardization has a net benefit to the market and that a single standard fare structure should be adopted. The team tested the impacts of adopting an existing tariff, one of those currently charged in San Diego, but have concluded that none of these achieve the goals of reflecting costs and changes to costs. We have therefore recommended a new tariff be adopted of $3.00 flag, $3.20/mile, and $26/hour waiting. We recommend a change to the included distances applied to flag drop, at 1/10th mile; and a charging increment of $0.20 for subsequent distance. This is described in more detail in subsequent sections.

The study concludes that a role exists for fare discounting in a limited number of markets. As discounting across the entire market may reduce driver incomes inappropriately it is recommended that discounting be permitted post tariff application, ie: a discount applied to a standard tariff. We anticipate that some companies may choose to offer targeted promotions, percentage discount or dollar amount savings as part of their marketing strategy.

The study concludes that a very limited application of fuel cost supplements may be appropriate, based on variation between pump prices and trend prices for gasoline in excess of $0.50/gallon. Supplements should not exceed an additional $0.20/ trip for every $0.50 variation in gasoline price. We recommend that any such supplement be applied only at the request of the majority of the taxi trade, and that the onus lies with the taxi trade to demonstrate that the conditions have been met for its application.

The study recommends that tariff reviews be undertaken on an annual basis with each review resetting baselines, ie: no analysis exceeds 12 months review.

The study recommends that MTS approach the San Diego International Airport to apply the standardized fare rates and update methodology as applied in the city. It is anticipated that an airport departure supplement, currently $2 will remain in force notwithstanding this recommendation.

3. Taxi Fares and fare standardization

Our work has focused upon the identification of costs associated with providing taxi services in San Diego, options associated with adopting a standard taxi fare in San Diego, its measurement and impacts arising from its update.

Taxi fares are significant in providing a measured return to a taxi driver, but also play a role in the economics of the wider taxi industry, and will influence the extent to which taxis are used. To fully assess the impacts of taxi fares and changes in fares we considered it necessary to identify the full range of relationships within the taxi industry, between the public and their use of taxis, and between market participants including differing driver types, ownership and controls. We undertook a robust review of the market in all its elements, using these findings as a basis for our analysis of fares in the city.

3.1 Taxi Fare Structures and Taxi Fares in San Diego

Any taxi fare represents a composite calculation based upon a pre-determined tariff that can be measured using a taximeter or other similar device. A variety of terms are applied reflecting the history of taxis and the structure of the charge in any one location. While no one term may be any more accurate than any other, we feel it appropriate to use a terms consistently in our report. We have therefore defined terms used in this document as follows:

Figure 1: Lexicon of common terms

Term used in this document	Definition
Taxi Fare	The total amount paid by a passenger (passengers) for a single trip, based upon measurement of time and distance, plus extras / supplements as appropriate, defined in a taxi tariff and measured using a taximeter or similar device.
Taxi Tariff	(AKA: Taxi Meter Rate, Fare Table) The definition of charging rates based on a specified combination of time, distance and extras. Typically amounts for initial engagement (flag), amounts per unit of distance and time, and for specific extras. Many cities, including San Diego require the display of a taxi tariff visibly, as an external door display (decal) in the case of San Diego.
Taximeter	A certified and hard fitted device measuring variables defined in the taxi tariff. Taximeters normally comply with current weights and measures legislation - as measuring devices, and can be mechanically sealed after inspection.
Initial charge	(AKA: Flag / Flag drop / drop) The initial charge levied for use of a taxi, applied to all trips regardless of total distance or time. Initial charges typically include a defined distance without additional charge.

Term used in this document	Definition
Distance charge	The amount of money that is charged per increment of distance or any fraction thereof.
Time charge	The amount of money charged for an increment of time while a taxi is stationery in service, or fractions thereof.
Increment	The measurement of a unit of time or distance used in charging. Typically as a fraction of a mile or fraction of an hour, thus an increment of distance may be defined as 1/10th of a mile. It is normal that increments are charged 'in advance' for any fraction of that unit.
Extras	Published additional charges (typically included on the taxi tariff / decal) made on top of measured time and distance rates. These may include additional costs such as an airport charge made to departing taxis.
Decal	An identification or notice printed as an adhesive transfer for display on a vehicle. Once attached a decal usually requires professional removal, ie: may not be tampered with or removed by public.
Supplement	An additional or supplementary charge (surcharge) made in addition to the published taxi tariff in specific circumstances. Examples include fuel surcharges that may be applied in response to a defined change in fuel cost.
Fare Box	A term related to income received from taxi fares. The term originates from cash received being deposited in a fare box within a vehicle, but also extends to payments received by credit card or other means, that may include invoicing for contracted trips. The total fare box amount is the total amount of income received by a driver for trips before costs are subtracted.
Driver Earnings	The level of personal driver income that remains from fare box (plus any additional income - such as 2nd driver rental) after all costs have been subtracted. We have included tips to drivers in the measurement of driver earnings, but excluded any federal income taxes that may be imposed on driver earnings.
Taxi Medallion	The taxi 'medallion' is the permit or vehicle license that is required for legal operation as a taxi in most cities. A variety of terms can be and are applied to the medallion or its equivalent across cities; and within San Diego city a range of differing names are used. Our use of the term medallion refers to the vehicle operating permit currently in force. A number of 'ownership' models apply to the medallion, with the majority of (but not all) San Diego drivers leasing use of a medallion.
Medallion Cap	A defined constraint on the numbers of taxi medallions that are available and in circulation.
Airport Permit (Taxi Vehicle)	San Diego International Airport provides access to airport taxi stands to vehicles and drivers using an additional permit and payment of a fee per use (barrier lift). All taxis picking up at the airport are required to have this permit. Permit options include permits valid for one (of two) or both airport terminals.

Term used in this document	Definition
Airport Barrier Lift Fee	In addition to an annual airport permit, each taxi trip through San Diego International Airport is charged an additional fee, currently $2/trip. The fee is recoverable through an airport 'extra' included on the taxi tariff.
Factors of Production	Relate to elements associated with the delivery of a taxi trip, described as factors of production. These are most often associated with the costs of delivering a trip (production costs), but also extend to demand impacts. Factors of production are extended to include physical requirements - such as inspections etc., and licensing requirements - such as obtaining correct licenses, both of which have an associated cost, which may differ from an estimation of value.
Production costs	(Costs of production) The identifiable dollar value of a factor of production.
Radio Service	A defined taxi brand with unique colors and marketing name. Radio services vary between those offering comprehensive dispatch services, and those that provide minimal dispatch. The levels of dispatch are typically reflected in the charges levied for membership.
Taxi Regulator	The taxi regulator is the person / body responsible for maintaining operational control on the taxi industry in the public interest. Regulation can apply to Quantity, Quality and Economic controls (QQE factors) applied, in San Diego, by the Metropolitan Transit System of San Diego (MTS) and its agents.
Dispatch Drivers	Drivers who concentrate on trip engagements received via a radio service dispatch system. This does not preclude engagement via street hail or stand, but rather relates to drivers with a predominance of trips from dispatch.
Street Drivers	Drivers who concentrate on trip engagements received via street hail or taxi stands. As with Dispatch drivers this is not exclusive to street engagement, but rather relates to drivers with a predominance of trips from street hail and stand.
Airport Drivers	As per Dispatch and Street drivers, this is a non-exclusive definition for drivers with a predominance of trips from the San Diego International Airport (SAN). Airport drivers tend to be charged a higher amount for lease and an airport departure fee.
QQE (QQE Factors)	An abbreviation referring to Quantity, Quality and Economic controls placed on the taxi industry. Quantity controls typically relate to the numbers of vehicles or vehicle medallions that may be available. Quality control can relate to vehicle safety control, vehicle design and condition as well as to requirements for service levels and accessibility. Economic controls most commonly apply to the determination of taxi fares, which may be precisely defined or set as maxima, but may also apply to lease cap control. San Diego applies an element of all three controls (QQE), but does not require lease caps.

Term used in this document	Definition
CPI	Consumer Price Index. A commonly used measure of price inflation, measured using a 'basket of costs' and defined on a regional basis across the USA.
IPI	Industrial Price Index. A specialist measure of price inflation affecting specific industrial sectors. Measured using a basket of costs specific to a defined industry sector. May also be referred to as a Taxi Cost Index when applied to the taxi trade, see section 4.
Transportation Network Companies (TNCs)	TNCs represent a relatively new market segment, associated with transport services booked directly via smartphone application (app). TNC is a new categorization initially defined by the California Public Utilities Commission (CPUC), with a series of similar categories in other US states and some US cities. The term applies to new vehicle types beyond the scope and licensing control applied to taxis. A range of other terms have also been applied to this sector including 'Rideshare' as well as trade names associated with the technology companies providing apps on a single platform, across platforms and/or associated with a variety of license categories. There are a series of significant variations within the app market, with a variety of impacts on the traditional taxi market. These are discussed in detail in subsequent sections.
SAN	We have used the San Diego International Airport (Lindbergh Field) IATA code - SAN for consistency throughout this document.

Taxi fares in San Diego reflect a practice common across US cities of making charges for initial engagement, time and distance, with defined extras. Charges are displayed externally on San Diego taxi vehicles allowing intending and potential passengers to be aware of charging structure in advance of use. The city differs from other locations in that taxi tariffs can vary between companies, with a range of tariffs applied up to a maximum set by the Metropolitan Transit System of San Diego (MTS).

San Diego airport tariff rates may also differ from those used for non-airport trips, and are defined by the airport authority. Unlike non-airport originating trips, all airport originating trips are required to use the same tariff. This difference, in fare setting, has the effect that all airport originating engagements should be charged at the same rate, while non-airport originating engagements may differ.

San Diego Taxi Tariff rates may be increased following one of three models:

- SAN Airport tariff rates increased against a defined CPI measure on a regular review by the airport authority,
- Non-Airport maximum rates increased against a measured variance from mean on a regular review by the MTS,

- Non-Airport company specific rates changed up to the MTS defined maximum on request from the company.

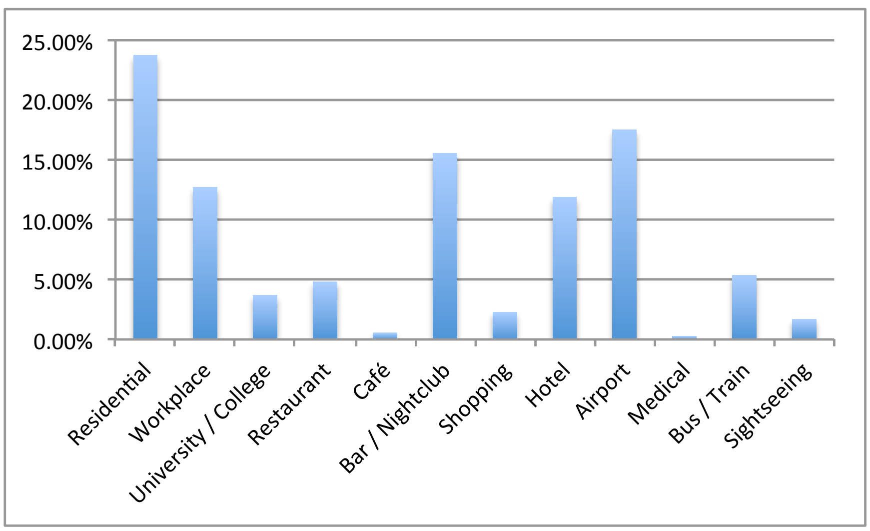
Taxi tariffs are significant in that driver earnings may be directly related to the amount of income received through the fare box, but also relate to the economics of the wider taxi industry including the markets associated with lease payments; and on the demand for and use of taxis in San Diego.

3.2 Demand for and Use of Taxis in San Diego

Demand for and use of taxis, and the nature of demand has a direct impact on the effectiveness of any given tariff. Demand for taxis can be affected by a number of factors, including price. Changes in taxi tariff are likely to impact on the numbers of trips being made, affecting the extent to which increases in tariffs result in increases in driver earnings. Equally reductions in tariff, or lower comparative tariffs, may result in an increased level of demand - price elasticity of demand; with a similar response related to the apparent and perceived quality of vehicles and service received. It is also notable that demand, and elasticities of demand, vary by user group, with a wide range of user 'types' across differing demographics.

The study team undertook a wide ranging public survey, set out in detail in section 4, which identified both trip characteristics, figure 2 , and user income demographics, figure 3. The survey also identified differing price elasticity of demand by group, suggesting a relatively inelastic market with a small number of key groups showing differing elasticity and demand characteristics, discussed in subsequent sections.

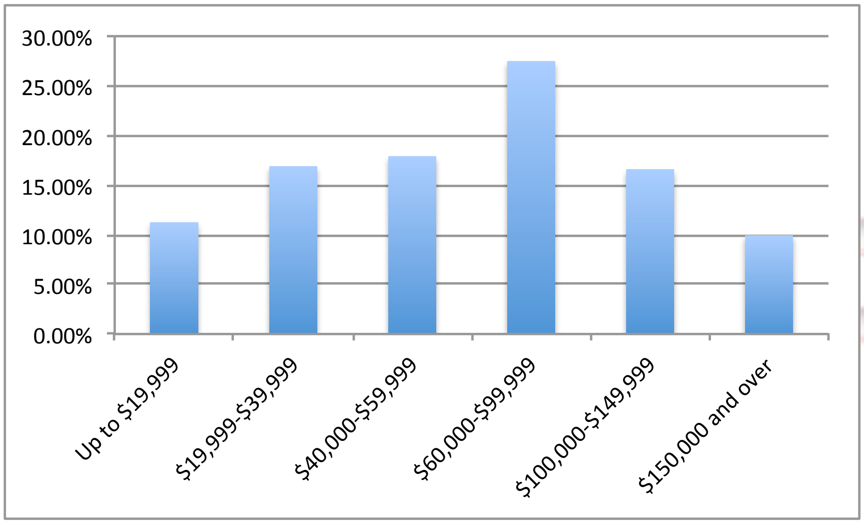
Figure 2: Trip Characteristics - Trip Origin



Source: Public Survey

Residential trips remain the majority trip origin at 24%, with airport trip origins the second most frequently reported trip (17%). Night time activities, trips from Bars & Nightclubs (15%) and Restaurants (5%) also scored highly. Trips from shopping locations, which often include 'low income' trips represented a relatively small percentage of the trip origins, as did medical trips (0.28%), but as these categories may include vulnerable trip users they have been considered in more detail in subsequent sections.

Figure 3: Taxi user demographics, Income



Source: Public Survey

Income distribution also suggests a more frequent use of by middle and higher income bands, though it is apparent that taxi use is spread across all income brackets.

3.3 Internal Factors Affecting Taxi Costs / Income in San Diego

In addition to the numbers of trips being made - the demand for taxi services, economic relationships exist between taxi drivers, taxi radio services, vehicle and medallion owners. These relationships are internal to the taxi industry as they reflect costs and charges made of the industry itself, and may be considered a part of the factors of production. Internal factors may consist of a variety of relationships including contractual requirements at one end of the spectrum, to free market relationships at the other. Internal factors in San Diego are concentrated around the relationship between drivers and: vehicle owners, medallion owners and radio services. These are summarised in figure 4, which also provides an overview of the nature of the relationship.

It is noted that regulatory controls applied to internal relationships can differ between locations, with significantly different market outcomes associated with differing forms of control. Regulation is currently applied to the numbers of medallions issued in San Diego; with further controls on maximum fares and vehicle inspections, applied by MTS. There are no regulated price caps nor restrictions in place in San Diego affecting the market for the lease of medallions within the defined number (medallion cap). The impact of these market constraints are discussed in more detail in subsequent sections.

Figure 4: Internal factors affecting San Diego taxi costs

Internal Market Relationships	Description
Driver / Owner / Radio Service	Each vehicle is required to be subscribed to a defined radio service, being the company under whose 'colors' the vehicle operates. The primary relationship exists between the vehicle owner (which need not be the driver) and the radio service. Radio services differ in the levels of services provided, typically reflected in the numbers of calls relayed via a radio, and operate in a free market. Costs associated with radio services are borne by the vehicle owner, and will be passed on to a driver through the vehicle lease where the driver is not the vehicle owner. There are no mandated constraints on the charges that may be levied by a radio service, with charges reflecting market equilibrium.
Driver / Owner	A driver may be a vehicle owner (owner operator) but need not be so. The majority of drivers in San Diego do not own their vehicle, nor the associated medallion, but rather lease a vehicle with medallion. There are no mandated constraints on the charges that may be levied by an owner, nor the precise contractual detail, with a number of equilibrium points visible depending on the extent of use. A lease is typically defined to include costs associated with medallion and subscription to a radio service and is market led. Effectively a lease driver experiences lease cost and fuel cost alone.
Owner / Radio Service	An owner need not be affiliated to any one radio service, though radio service officers may also be owners. Vehicles are affiliated in the open market to a defined radio service under whose colors they then operate. An owner may move between services.
Taxi Regulator / Driver / Owner / Radio Service	The taxi regulator (MTS) influences the operation of the taxi market through controls placed on QQE factors. The regulator does not require nor does it set or advise on lease rates.

Internal market factors are significant in determining the impacts of changes in the level of fares, in that changes in the base income entering the industry, as may alter with a change in taxi fares, has a ripple effect on the other market relationships. Equally changes in the costs associated with internal market relationships impact most heavily at the driver level as these costs can only be met be a reduction in driver earnings.

A fundamental element in the calculations defined in subsequent sections is that driver earnings can be calculated as the remaining income from Fare Box after all other costs have been removed. This is expressed:

$$DY = \sum_{x-i} Yf - (Cl + Cg + Co)$$

Where:

DY = Driver Earnings
Yf = Total income through Fare Box
Cl = Costs associated with lease
Cg = Costs associated with gasoline / fuel
Co = All other operating and licensing costs

The calculation of costs and changes in costs can be applied as an initial indicator of appropriate fare levels and increases in taxi tariff. A similar, cost based, approach to that adopted by San Diego International Airport in determining increase in tariff in line with CPI, but not currently applied in non-airport taxi tariffs. The measurement of changes in costs provides an indication of reducing levels of earnings as a result of changes in operating costs, it does not fully account for changes in earnings that result from external factors affecting the taxi market, user price elasticity of demand, or impacts arising from changes in market conditions such as new market entrants.

3.4 Additional and External Factors affecting Taxi Costs / Income in San Diego

External factors, or externalities, relate to market factors outside a defined market area - in this case taxi costs. An externality can be defined as the cost or benefit that affects a party who did not choose to incur that cost or benefit. In defining taxi costs this might include other modes which may be seen as alternatives to taxis that may detract from the demand for traditional taxi services (diversion) and external economic circumstances that facilitate or reduce the need to travel at all (suppression), was well as positive benefits that may accrue from taxi use, such as a reduction in overall auto ownership, environmental and access benefits. Additional factors are also included, those that fall within the control of the taxi industry, but beyond the direct measurement of changes in cost alone, which may include the definition of quality standards, or the external impacts of vehicle types on demand.

While external factors are not directly created by the the traditional taxi industry, nor in the measurement of costs, many will impact on the relationships between costs and income - identified in previous sections in relation to defining taxi tariff. We have therefore identified a range of factors influencing earnings beyond the measurement of change in cost alone that are appropriate in defining taxi tariff set out in figure 5, below. These are discussed in more detail in subsequent sections.

Figure 5: Additional and external factors affecting San Diego taxi costs / income

Additional and External Market Relationships	Description
Demand - Price Elasticity of Demand	The impact that changes in fare levels have on the number of taxi trips being made. An increase in the cost of a product impacts on the equilibrium point, between supply and demand. A product that is said to be inelastic will experience little decline in demand as prices increase, and equally a limited increase where a price falls. An elastic product will experience a large change in demand as price changes. the taxi market differs in price elasticity between user types, resulting in turn in a range of impacts from a change in tariff. Price elasticity of demand may also be affected by service quality and its perception, discussed in subsequent sections.
Complementary and Competitive Services	The relationship between taxis and other transportation is more complex than in other markets, as the taxi offers both complementarity, for example where a taxi forms part of a chain of transport: to/from airports, distribution from a train station etc.; and competition where a taxi is taken instead of a trolley trip or vice versa. An additional complementary role exists where taxis are used in one direction only for example where a trip is made to an entertainment venue by transit, and return by taxi. In contrast, TNCs offering taxi-like services typically operate in direct competition.
Diversion to alternatives	TNCs and other competitive alternative services impact on the use of taxis following changes in the taxi fare (price elasticity of demand), and changes in the prices charged by the alternatives (cross elasticity of demand), as well as a result of changes in the (relative / perceived) quality of the taxi and its alternatives.
Latent Demand	Latent Demand and its corollary market suppression relate to the numbers of trips that are not made (suppressed) as a result of a number of factors including affordability, which is related to price elasticity of demand; availability, which may be associated with fleet size, time and location; and suitability, which may include vehicle design and (perception of) service levels.

The relationship between the measurement of internal, additional and external costs allows a more detailed review of the impact of a change in the taxi tariff that may be expressed as:

$$DY = \sum_{x-i} Yf - (Cl + Cg + Co)$$

$$Yf = \triangle Tx.i$$

Where:

DY = Driver Earnings
Yf = Total income through Fare Box
Cl = Costs associated with lease
Cg = Costs associated with gasoline / fuel
Co = All other operating and licensing costs
Txi = Tariff charged

3.5 Application to taxi tariffs in San Diego / Taxi Tariff Standardization

Having identified range of market relationships in the San Diego taxi market it is possible to define costs associated with the provision of taxi services, changes in costs experienced by the industry and potential changes in the taxi tariff that these costs predicate. The same concepts also allow measurement of impacts arising from changes in the taxi tariff, and the impacts that arise from moving to a standard fare in San Diego.

In subsequent chapters we measure base operating costs associated with the Taxi Industry in San Diego, changes in those costs, relationship between costs and appropriate taxi tariff, and impacts arising from such changes. It should be noted that the nature of these changes impact on the market differently, with very different levels of demand across user groups, and income levels by driver type. Market segments are set out in detail in chapter 4, which also describes differences between driver categories, and comparative income in the current market.

In chapter 5 we quantify changes in the production costs associated with providing taxi services and define market scenarios that we test to ascertain impacts of:

- Taxi Tariff Standardization
- Taxi Tariff increase
- Structural changes in the taxi tariff

Subsequent chapters consider market segments and categorization, cost and market models, and optimal fare structures. In chapter 8 we identify a taxi fare model and methods for its update that allow for assessment of change in cost and appropriate taxi tariff responses in to the future. The study concludes, in chapter 9, by presenting our recommendations including a method of measuring standardized taxi fares, methods for updating taxi tariffs in light with ongoing and potential future changes in the market for taxi and taxi-like services.

4. Data Collection and Review

Our work included a number of data collection exercises including a series of surveys and primary data analysis undertaken in the course of our study. We have set out a description of our surveys, other data sources, and the analysis in this chapter. A description of the Data outputs is included in this chapter, with a review of their application in subsequent sections of this document.

4.1 Surveys undertaken

Data collection exercises were undertaken specific to three areas of analysis: a review of the demand for taxi transport, a review of the supply of taxi transport, and a review of the methods of regulating the market. The latter, methods of regulation, included assessment of the methods adopted in other locations (peer cities) in defining and reviewing taxi fares. The team undertook the following surveys:

- Review of approaches adopted in peer city locations;
- Public Survey, based an intercept across all area of the city using tablets;
- Driver Survey, based on a paper questionnaire, distributed and collected directly from drivers;
- Structured interviews of key stakeholders, including owners and radio services;
- Operation data mining, using electronic data specific to dispatch and operational information.

4.2 Survey Overview

Surveys were completed over the course of the project. Public and driver surveys were undertaken in San Diego by a locally based survey team. A number of issues arose in obtaining appropriate response numbers, a requirement being that a sufficient and representative sample / response rate was achieved to allow confidence in conclusions drawn. In this section we detail the surveys and data collection undertaken.

4.2.1 Review of peer city locations

The team undertook a review of taxi fares and rate setting methodologies in 40 cities across the USA. Peer cities were asked to identify the basis for fare setting in their location, current fare rates and fare structures, as well as a review of the approach adopted in the setting of fares, where this was undertaken by the city. A number of locations provided more detailed information related to the analytical approaches used in defining changes to taxi fare rates. A detailed review of the methodologies applied in peer city locations is included in a separate document.

Figure 6 illustrates taxi fares between the main US cities surveyed, set out in order from the lowest cost to the highest cost of taxis. The comparison identifies San Diego as a relatively expensive city for taxi use. While this measurement is an appropriate starting point for any such analysis, the actual comparison between cities should be undertaken within the context of individual circumstances. As both geography and economic circumstances differ, any comparison should also consider differences in context and operating cost ie: the direct comparison between locations may fail to identify the full range of issues that need be considered. These are discussed in more detail in subsequent sections.

Figure 6: Comparative Taxi Fares[3] (1,2, 5 miles) in peer cities (in increasing cost order based on 2 mile cost)

City	1 Mile Cost based on flag & distance	2 Mile Cost	5 Mile Cost
Dayton	$3.00	$5.00	$11.00
Detroit	$3.90	$5.50	$10.30
Dallas	$3.85	$5.65	$11.05
Atlanta	$4.25	$6.25	$12.25
St Louis	$4.55	$6.55	$12.55
Columbus	$4.55	$6.58	$12.65
Indianapolis	$4.60	$6.60	$12.60
Chicago	$4.85	$6.65	$12.05
Anchorage	$4.25	$6.75	$14.25
Annapolis	$4.25	$6.75	$14.25
Denver	$4.50	$6.75	$13.50
Little Rock	$4.75	$6.75	$12.75
Austin	$4.50	$6.90	$14.10
Miami Dade County	$4.50	$6.90	$14.10
Houston	$4.75	$6.95	$13.55
Louisville	$4.70	$6.95	$13.70
Fairfax County	$4.96	$6.96	$12.96
Nashville	$5.00	$7.00	$13.00
New York (Yellow Taxis)	$4.50	$7.00	$14.50
Tampa	$4.60	$7.00	$14.20
New Oreleans	$5.25	$7.25	$13.25
San Antonio	$4.67	$7.27	$15.07
Minneapolis	$4.70	$7.45	$15.70

[3] Fares based on Flag and Distance calculation. San Diego fares calculated using Yellowcab non-airport rate.

Charlotte	$5.00	$7.50	$15.00
Cincinnati	$5.50	$7.50	$13.50
Montgomery County	$5.50	$7.50	$13.50
Washington DC	$5.39	$7.55	$14.03
Seattle	$4.90	$7.60	$15.70
Portland	$5.10	$7.70	$15.50
Boston	$5.00	$7.80	$16.20
Buffalo,NY	$4.80	$7.80	$16.80
Los Angeles	$5.25	$7.95	$16.05
Madison	$5.60	$8.00	$15.20
Philadelphia	$5.77	$8.07	$14.97
Las Vegas	$5.70	$8.30	$16.10
San Francisco	$5.70	$8.45	$16.70
San Diego	$5.50	$8.50	$17.50
San Jose	$5.90	$8.90	$17.90
Honolulu	$5.90	$9.10	$18.70

Source: Peer Review

Few locations differ in the underlying structures on which taxi fares are based, with the vast majority of US cities applying a combination of flag, distance and time charges[4]. Differences are visible in the rates of charges applied, contributing to the differing 'positions' as illustrated in figure 6, with a number of further differences related to distances included in initial engagement charges, surcharges and extras. These are set out in more detail in the Peer City Review[5], but do suggest a variety of approaches may be adopted in defining a taxi tariff.

Underlying fare setting methodologies were also included in the peer review. The analysis addressed three areas: approach adopted to identify appropriate rates of change, frequency at which reviews were undertaken, and specific factors that may trigger a rate review. Individual approaches to fare setting were typically defined into one of four common methods, see figure 7.

[4] Phoenix, AZ does not define set fares; Charlotte NC does not include distance in initial charges. Louisville KY has a significantly higher initial charge but includes a 1 mile distance.

[5] See document: 1311 2901 JC San Diego Peer city methodological review

Figure 7: Common methods of fare review

Name/Acronym	Method	Description
Peer	Peer Comparison	Based on reported changes in other locations considered peer cities, and applied directly.
CPI	Consumer Price Index	Based on changes in CPI measured by statistical agency. Often using individually defined elements of CPI. Can include a weighting factor applied to common elements.
TCI / IPI	Taxi Cost Index / Industrial Price Index	An increase based on locally measured metrics specific to the taxi industry. This is often referred to as a Taxi Cost Index as the measurement seeks to identify those costs within the local taxi trade, but actually refers to the wider costs of the taxi industry in that it can be used to measure comparative industrial prices across the taxi market including those of (taxi-like) competitors.
Trade	Trade led increases	Increases based on the stated costs presented by the taxi trade.

Source: Peer Review

Seven locations[6] also provided detailed data in respect of fare calculations allowing for a more detailed comparison of methodologies applied, set out in detail in the peer city methodological review (ibid). Fare reviews vary significantly in frequency, time between reviews split between defined period or undertaken in response to a request for an update; with similar levels of variation in the choice of analysis method undertaken (fig 7). Of the cities providing details a majority chose to define fare increases using a basket of costs defined against specific CPI metrics or revealed IPI. As these approaches are similar and can be considered in respect of the Taxi Industry the term Taxi Cost Index (TCI) is widely applied. Index measurements typically are based on a definition of cost components at a given point in time and calculated as those costs increase. The basic cost components are important as these form the underlying base for increases, but it should also be noted that these components may change over time. This is particularly visible in the case of fuel, where this is included as a cost, in that fuel efficiencies have improved significantly over time, the impact of which is a reducing cost base for fuel costs.

In common with its peers, the San Diego airport authority also applies a a defined methodology (CPI) when increasing fares for trips originating at SAN airport. Fare increases affecting other San Diego trips, those that do not originate at SAN, are not based on a measured index, but rather on a defined maximum value at the discretion of the taxi radio service.

A subset of the respondents also noted factors arising from and impacting on the measured change in fares. Fairfax County suggested a link between increases in fares, achieved in Fairfax County using an IPI

[6] Fairfax County, Houston, Miami, Montgomery County, San Francisco, Toronto (Canada), and Glasgow (UK)

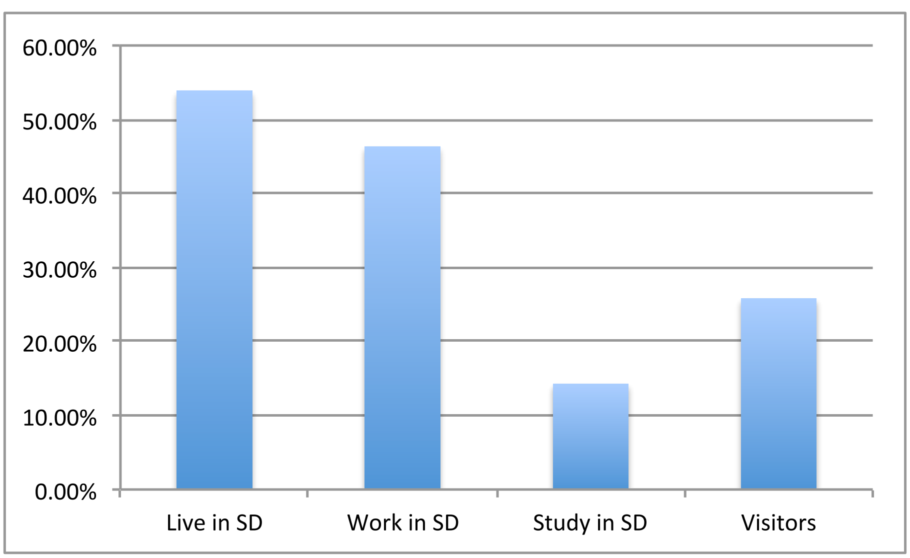
approach, and the total numbers of trips - an effect related to the price elasticity of demand; while Houston commented that infrequent reviews could result in excessive changes in taxi fares that, while correctly measured, may not be appropriate for application. Other economic relationships were also noted, by peer cities, between income derived as a result of a specific taxi fare and the costs associated with taxi leases. A number of cities have chosen to control the maximum charges that may be made for taxi leases, notably San Francisco, though this was applied only in a minority of cities.

4.2.2 Public Surveys

Public surveys were undertaken using a tablet intercept methodology. Public surveys resulted in just under 700 responses considering a wide range of issues affecting the use of taxis in San Diego. Respondents were asked a range of questions related to their use of taxis and taxi-like vehicles in general, and questions pertaining to their last taxi journey. This allows a realistic snap-shot of uses to be drawn and analyzed. Survey respondents were drawn across all communities and all demographics allowing for differing responses to be identified across differing user groups.

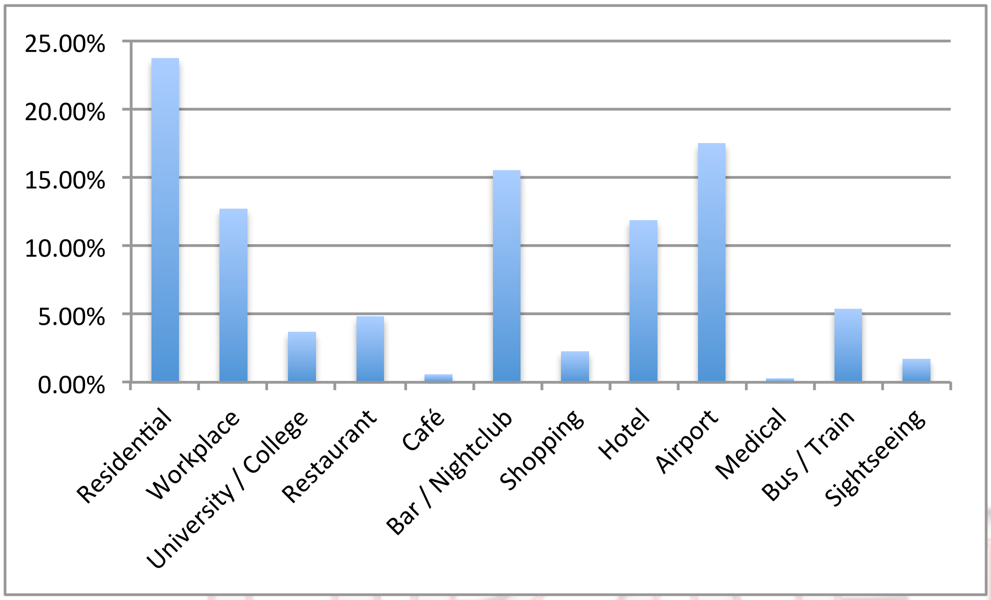
Respondent profiles are illustrated in the figures below. Approximately 25% of all respondents were visitors to San Diego, who neither lived, worked nor studied in the city, with the remaining respondents split between those living within the city, and those regularly traveling to it. 28% of all respondents live and work in the city, around half of all respondents living in the city; with 10% of all respondents both living and studying in the city.

Figure 8: Public survey respondent split local user / visitor



Source: Public Survey

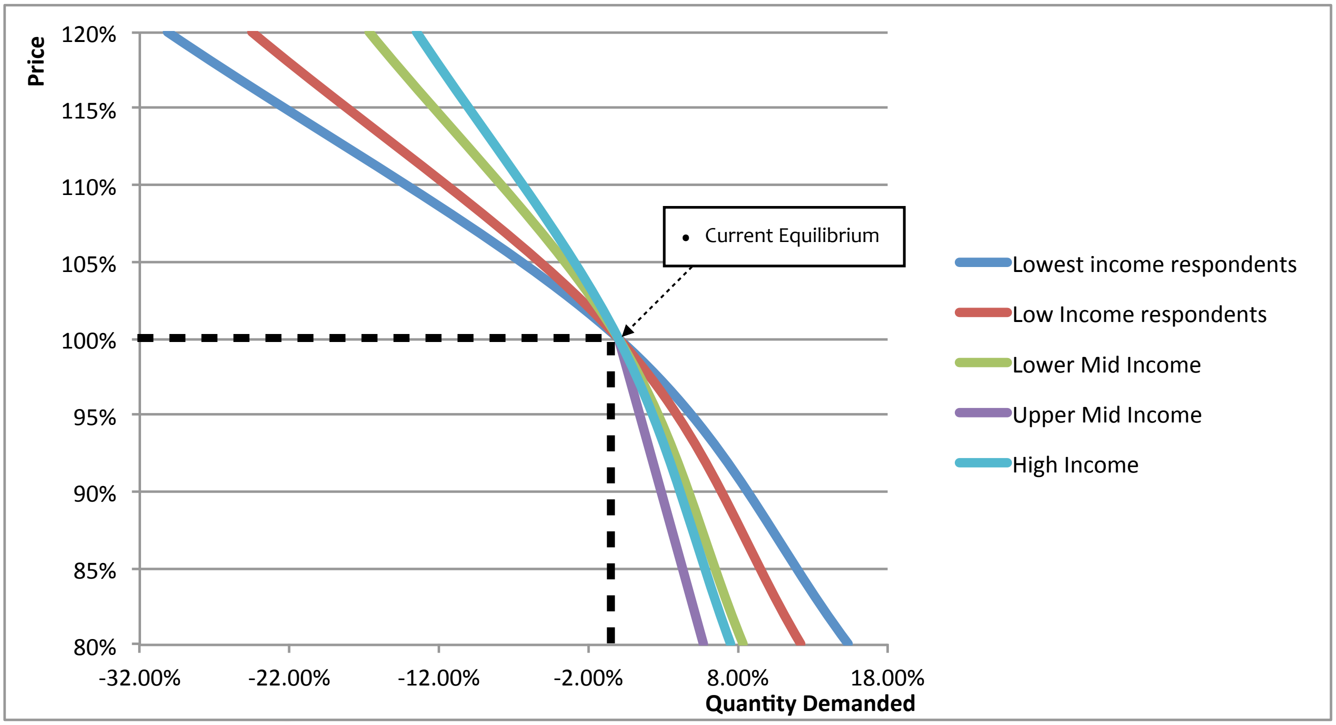
Figure 9: Public survey respondent trip origins



Source: Public Survey

Trip origins are also included to distinguish between differing uses of taxis and allow for the identification of differing impacts from changes in fares based on the price elasticity of demand for particular user groups. Price Elasticity of demand relates to the sensitivities of user groups to changes in fares. Effectively this is the extent to which a change in price impacts on the demand for a product. Elasticities reflect personal choice and can relate to both immediate headline price and perception of value, which may include quality. We have identified typical elasticity values across user demographics and trip origin. Figure 10 illustrates changes in demand for taxis following changes in price. A detailed review of the impacts resulting from differing price elasticities of demand is set out in section 7.

Figure 10: Price Elasticity of Demand by user income - Response in demand / change in taxi fare



Source: Public Survey

The calculation suggests that taxi users of differing incomes will respond differently to changes in price. Figure 10 illustrates the PED for users of differing incomes. Lower income taxi users, illustrated by the dark blue line, are the most price sensitive group (demonstrate the highest price elasticity). A small increase in price produced the greatest reduction in use in lower income groups. High income groups, in contrast, were relatively inelastic and were less likely to decrease use of taxis following a price increase. Small reductions in price also impact on the groups differently, with low income groups showing a small increase in use from a price reduction, though all income groups appeared relative inelastic for larger price reductions.

Higher income trips show less variation and become less elastic as income levels increase. Higher income elasticities remain relatively stable, and are not widely influenced by either price drop nor price increase, suggesting that the key factor in use is not that of price, or price alone.

4.2.3 Stakeholder Surveys

Stakeholder and Institutional Surveys were undertaken to identify a wider range of impacts affecting the supply and use of taxi services. Stakeholder surveys followed a structured interview methodology, based on individual and small group meetings. The surveys followed a standard pattern of defined questions but also allowed for the identification of additional areas of discussion. Stakeholders included the MTS, the City of San Diego, Hotel and Motel representatives, visitors association, taxi unions and representative groups, and a cross section of owners and taxi radio services.

4.2.4 Driver Surveys

Driver surveys were undertaken to establish the range of operating patterns, issues and factors affecting the supply of taxis in San Diego. Surveys were based on a paper questionnaire circulated and collected across a broad cross section of taxi drivers. The team considered it important that a representative sample of drivers were given the opportunity to participate across a variety of differing operating patterns. Questionnaires were therefore distributed at stand, in the SAN airport holding area, at the Sheriff's licensing facility, at the MTS training and inspection facilities. The survey was also made available on-line using a unique code system comprising stated address and recorded IP address. The unique code reduces the potential for multiple entries using the on-line system, with a similar precaution on paper responses based on name.

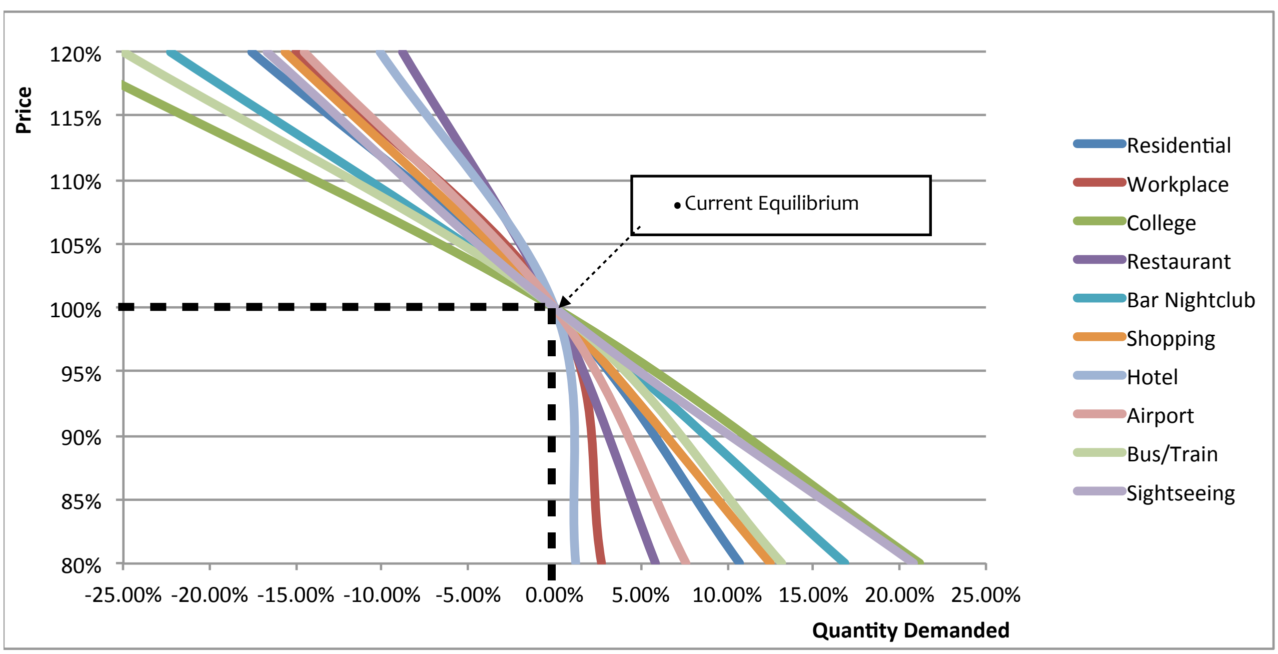
5. Market Segmentation / Categorization

Market responses vary across differing user groups and across differing operating patterns. Differences can exist in all areas of the market and apply equally to the choices made by passengers, intending passengers, drivers and the wider taxi trade. As these responses both impact upon and are affected by changes in fare levels and fare structure, the study team have sought to identify the range and nature of market relationships in the San Diego taxi market. The identification of differing market segments, and the likely responses in each category provides a more detailed review of impacts than may be undertaken in respect of a single 'taxi market'.

5.1 User Segments

The market for taxis comprises a broad cross section of users that differ in terms of demographic profile and income, and may be further defined in terms of trip purpose and trip profile. Differing user groups, differentiated by income, demonstrate differing Price Elasticity of Demand, illustrated in figure 10, above, and are likely to respond differently both to changes in the fare structure and in level of impact and hardship that may follow a fare increase. In Figure 11 we illustrate the same measurement (PED) as it impacts on differing trip purposes.

Figure 11: Price Elasticity of Demand by trip purpose - change in Quantity Demanded / change in Price



Source: Public Survey

Steeper curves suggest a more inelastic market, where large changes in price have little impact on the levels of use. Hotel and Restaurant trips are largely unaffected by changes in price - in both these trip types large changes in price result in very limited change in the numbers of trips made. In short, trips from Hotels and Restaurants that would have been made by taxi, continue to be made by taxi even where price is increased, while few additional trips are made where price is decreased. Workplace trips are also inelastic in the instance of price reduction, there being few additional trips in the instance of discounting, but appear more elastic in response to fare increases - numbers of workplace trips decline in response to a price hike.

College / University trips appear the most elastic, together with trips to/from sightseeing and train/bus origins. Small changes in fare affected all three groups both where fares are increased, and where fares are discounted. College users of taxis were the most elastic user group, representing the greatest fare sensitivity of any group. Student users also represent the most positive market for discounting, with a likely increase in customer numbers exceeding costs in promotions.

Correlation is also visible between elasticities identified in relation to income (figure 10), and those associated with trip purpose (figure 11). Trip purposes that may be associated with higher income activities, such as restaurant trips, Hotel trips and workplace trips, demonstrate inelastic demand. Elastic trip purposes include college trips, trips to/from trains and shopping. Trips to/from bars and nightclubs appear more elastic than trips to/from restaurants, suggesting a greater willingness on the part of bar users to move between modes of transport, including new forms of door-to-door transport (apps) discussed in more detail in subsequent sections.

5.2 Driver Segments

In addition to passenger segments, distinct differences can be seen between drivers in San Diego. Differences are often associated with the numbers of working hours a driver may typically work, but should also extend to differing operating patterns - whether working predominantly from dispatch, street hail etc., and the ownership models - mainly associated with leasing arrangements. This provides a wide ranging matrix of driver types, illustrated in figure 12, below. It should also be noted that no precise definitions are possible as drivers can vary their working hours and method of engagement to a greater or lesser extent. This flexibility can also lead to differences in measurement, with a range of differing, and mutually exclusive, views on working hours expressed to the study team.

Figure 12: Driver Segmentation

Category	Description	Sub Categories
Driver Hours Worked	Numbers of hours 'in service' expressed as a weekly total. Hours in service are defined as those over which a driver is available to accept trip engagements. For a driver accepting trips via dispatch only this relates to the times at which a radio is logged on and in service. Drivers hours in service necessarily include all times when a driver is available, not just those where a driver is engaged with passenger.	Part Time Drivers Full Time Drivers Extended Hours Drivers
Driver Operating Patterns (Engagement Method)	The method by which drivers are engaged. The distinction relates to the primary engagement methods, see below. Engagement methods can have a significant impact on the numbers of trips received.	(Mainly) Dispatch Trips (Mainly) Hail / Stand trips Airport Non-Airport trip origins
Ownership (Lease)	Ownership, of vehicle and medallion, can vary between those who own and operate using their own vehicles, to drivers who lease vehicle with medallion. The nature of ownership impacts on costs that are experienced by the driver.	Owner Operators Lease drivers leasing for 12 hrs daily Lease drivers leasing for 24 hrs daily Lease drivers leasing on a weekly basis (for 12 or 24 hours per day)

5.2.1 Driver Hours Worked

A range of estimates have been expressed in terms of the numbers of hours a driver may choose to work in a day / week. While the final choice of drivers working hours will normally fall to the driver - how many hours does a driver chooses to be available - the identification of actual hours is significant in that it impacts directly on a nominal 'wage' or wage equivalent. The greater the number of hours worked in achieving a weekly income, the lower the equivalent hourly wage.

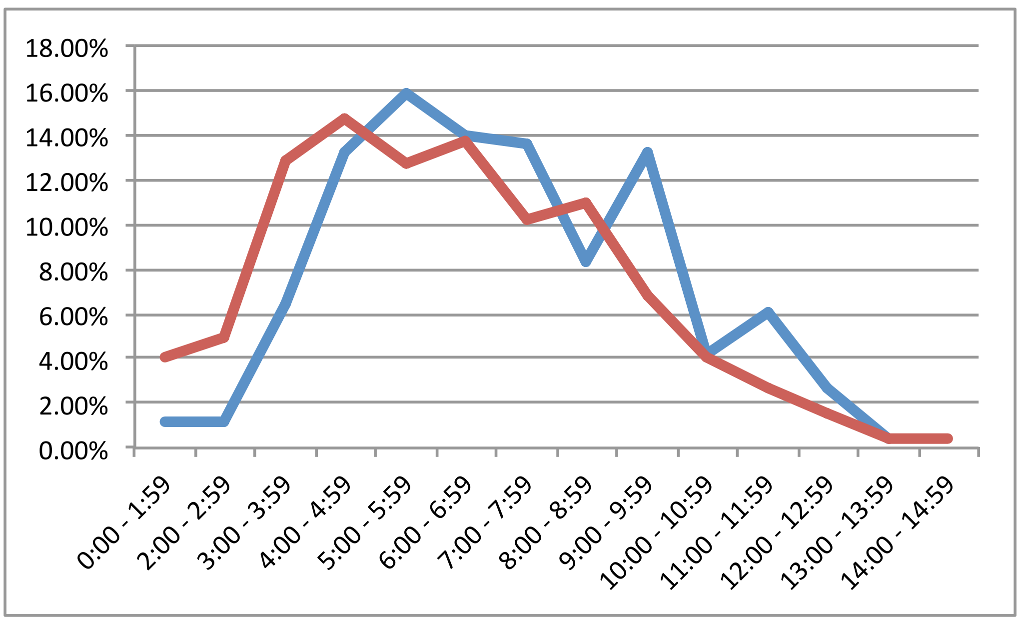
The study team have identified three categories which we have applied to drivers hours: Part-Time Drivers, Full Time Drivers, and Drivers working extended hours. The categories reflect a cross section of working practices that may be identified in most cities, while the actual working hours may differ between driver. In order to define typical working patterns we have used two primary sources of data, trip records provided in the form of electronic information, and driver self reported questionnaires.

Dispatch Data - Hours Worked

Two large dispatch companies provided trip-by-trip records setting out driver ID and trip times. Data provided by one company also included log on and log off times, effectively start of day and end of day times. In the second company dataset we used time of first trip call to time of last trip drop off, and rounded this figure up to represent round shift hours. Trip dispatch records were requested across four months representing winter, spring summer and fall operating patterns and each provided between 40,000 and 60,000 trip records for each dataset. Having established working hour patterns for the dispatch market represented in the trip records we then selected mode values, those being the most frequently worked, as a representative value for part time, full time and extended hours working.

Figure 13 illustrates the distribution of working hours across differing dispatch companies, the mean of which, figure 14, is used as a definition for driver typical working hours in dispatch service.

Figure 13: Distribution of working hours, dispatch drivers



Source: Electronic dispatch records

Figure 13 illustrates, despite some differences between companies, similar patterns are identifiable for both part time and full time drivers, with both data sources suggesting a long tail of drivers working extended hours, with a peak visible in one. A mean value, based on the distribution multiplied by numbers of drivers is set out in figure 14.

Figure 14: Dispatch Drivers Hours worked (daily)

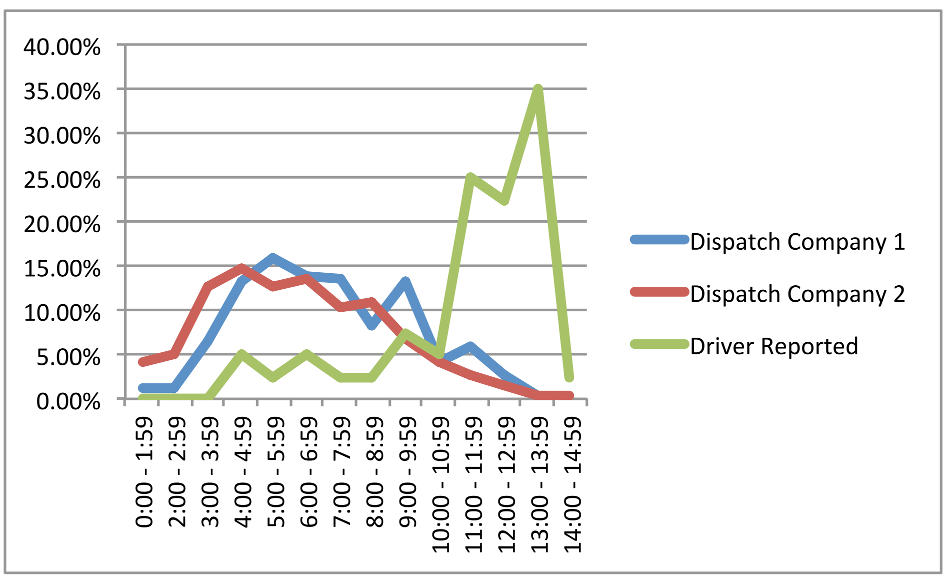
Category	Hours worked / day
Part Time	5.25
Full Time	7.75
Extended Hours	9.75

Source: Calculated from electronic dispatch records

Driver Survey Hours Worked

A different picture emerges in the instance of stated hours indicated in driver surveys. Self reported driver hours appear to suggest longer overall shift hours, see figure 14, though this may be explained, in part, by the differing driver operating patterns, described in section 5.2.2, below. Two patterns are visible and highlighted on the green line, that correlation exists between the driver reported patterns and this visible from electronic data records for driver hours between 0 - 8 hour shifts, with significant divergence for 'extended hours' from approximately 9 hour shifts upwards.

Figure 14: Distribution of working hours, driver reported



Source: Electronic dispatch data and driver survey

While, in the first instance the divergence between electronic and driver reported hours may appear irreconcilable, the extent of correlation between dispatch and driver reported figures should indicate that the latter peak, driver reported hours above 9 hour shifts, relates to street hail trips without significant dispatch business. Effectively that drivers relying on street hail and stand engagement alone work significantly longer hours than those who concentrate on dispatched trips. As this choice impacts on the economic costs and benefits that may accrue to drivers it is considered in more detail below.

5.2.2 Driver Operating Patterns

Operating factors affecting drivers extend beyond the choice of hours and can include company choice, ownership and lease, and preference between radio dispatch, hail and stand engagement. Engagement methods may be summarized as including:

- Dispatch via radio service
- Street Hail
- Taxi Stand (non-airport)
- Airport Taxi Stand
- App based dispatch to taxi driver
- Personal contact via cellphone (non dispatch)

A driver is able to choose the methods of engagement most preferred, to a greater or lesser extent, partly dictated by the extent of dispatch available through a given radio service or whether they hold an airport permit, both of which relate to a further economic choice and potentially a trade off between costs and benefits; but may equally relate to personal preference, home location etc. A trade off may relate both to the actual additional costs of permits etc. and to the waiting times between passengers.

Mainly Dispatch
Drivers who choose to operate mainly to dispatch via radio services appear to receive the highest number of trips. On average a dispatch driver receives between 1 and 2 dispatch trips in every hour based on electronic datasets from radio services. Not all radio services can provide this level of calls, leading to the potential between radio services known to provide a reliable supply of dispatched trips, and those where drivers are more inclined to other forms of engagement.

Mainly Street Hail and Taxi Stand
The alternative to dispatch trips relates to street hail and stand. With the exception of the airport, street hail and stand engagements may be considered interchangeable, as drivers are open to accept hails on the

way to a stand and vice versa. There are significantly fewer stand and hailed trips when compared to dispatch trips, with the result that a driver concentrating on the hail and stand market alone is likely to be worse off than a driver working for a radio service with an effective dispatch system.

Airport Taxi Stand

A distinctly different pattern is observed for airport originating trips than for those seen elsewhere in the city. Airport originating trips tend to be longer than those originating elsewhere and are thus more lucrative. Most airport drivers also appear to prefer pick ups from the airport rather than the city, with an increased incidence of empty return running than seen in other engagement methods. This does not apply to part time drivers serving the airport, who appear to split their time more evenly between airport and non-airport pickups.

Combinations of engagement methods

It should be noted that a significant number of combinations are possible in the selection of engagement methods often, but not exclusively, in the choice of the driver. Personal choices may relate to areas that are preferred, or that appear to reflect economic decisions on the part of the driver. A trade off exists between a driver choice between radio services with advanced dispatch capability and radio services with a more limited dispatch system with a higher number of street pick ups. Similarly many drivers, but not all, with an airport operating permit choose to concentrate on pickup from the airport stand. Economic decisions also follow from the diverse nature of the current taxi tariff, discussed in more detail in section 6, below. Figure 15 illustrates the divergence between radio services by type, and highlights economic trade offs between driver segment, radio service and preferred engagement methods.

Figure 15: Engagement method by service type[7]

Service by type	Primary Engagement	Notes
Airport	Airport Stand only	Plus $2 airport fee recovered from fare, ie: income neutral
Large Dispatch	Radio	
Limited Dispatch	Hail / Stand	

A trade-off exists for drivers between dispatched trips netting a lower income per trip and hailed trips netting a higher income per trip. Lease rates also tend to be higher for large dispatch operations, though these are generally not controlled by the radio services themselves; with a further additional cost for airport permitted vehicles. A critical point arises as to whether a driver is able to achieve as many trips from

[7] 'Airport' origins listed as a service due to uniform charge

the cruising market as from dispatch, or whether a radio service with dispatch produces sufficient additional trips to offset any additional costs.

5.3 App Based Market Segmentation

A further market segment relates to the emergence of app based technologies affecting the taxi market. A range of apps exist and are rapidly growing in the taxi market. In this respect it is necessary to extend the taxi market beyond the supply of traditional taxis alone. The market may thus be considered to include any on-demand small vehicle operating against bookings, hail and stand engagement. It is noted that the only vehicles able to respond legally to hailing are taxis. The wider taxi market is illustrated in figure 16.

Figure 16: Wider Taxi Market participants[8]

Segment	Technology	Example of company*
Traditional Taxi	App booking operating via radio service	Taxi Magic
Traditional Taxi	App booking operating direct to driver	Hailo
Limousine License	App booking operating via existing service	Flywheel
Limousine License	App booking operating direct to driver	Uber
TNCs	App Booking operating direct to driver	Sidecar
Floating Car Rental	App and car based booking without driver	Car2Go

Note: Car2Go is a trade name of Daimler Mobility and refers to an instant self driver rental. Car2Go services are floating, in that they operate from a street curb rather than a defined rental station. It is included as the vehicle technology allows for trips that may otherwise be fulfilled by taxis. * - List is not exhaustive

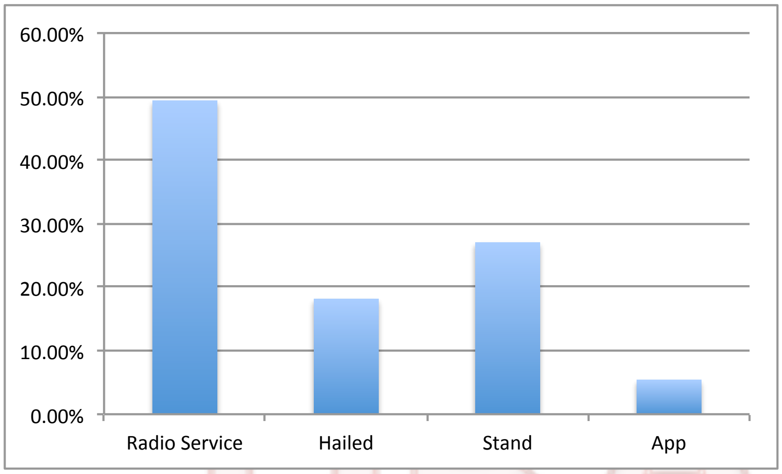
Impact on Demand

App technologies have created a significant discussion within the taxi industry and across taxi users. The technologies have advanced rapidly with differing functions being added and refined at all times. The app provides a rapid access point to vehicle booking and can support, add to or replace many existing taxi radio service functions. Arguments related to legality and operational parameters of new technologies are set out in a wide range of third party publications and are referred to in this document only where directly relevant to the definition of the taxi market and its operating costs. This said, the development of the app has two primary impacts in relation to the fare study, the impact on demand for taxis, and the impact on traditional operating practices that form part of the tariff calculation.

[8] Company names are given as examples only. A wide range of additional and competitive suppliers exist in each segment. Not all service types are available in San Diego at the time of writing

The public survey indicates an increasing acceptance of apps, while their use remains limited in the current taxi market, see figure 17, the development of apps has a significant impact on the market, see figure 18.

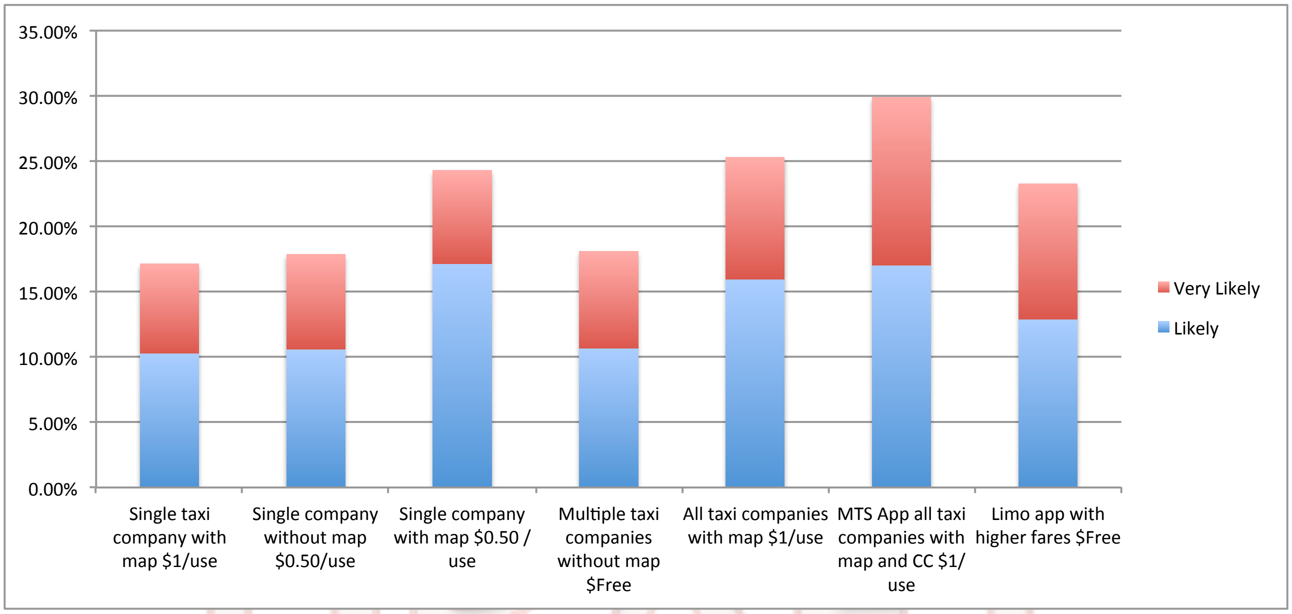
Figure 17: Primary Engagement Methods



Source: Public Survey

Figure 17, which **excludes** airport engagements, highlights the primary methods used to access a taxi. The public survey suggests a concentration on dispatched trips using radio services, representing just under half of all trip engagements. Radio services dispatch trips against traditional phone bookings, but have also moved to accepting internet and some app based bookings, discussed in more detail below. Hailed and stand engagements collectively represented 45% of engagement, and include engagements made using a taxi from a hotel forecourt. App bookings of all types reflect the remaining 5.4% but should be considered against stated intent. Questions within the public survey suggest interest in app bookings is increasing, see figure 18; which will impact, in turn, on the development of the taxi market.

Figure 18: Stated Intent, use of apps



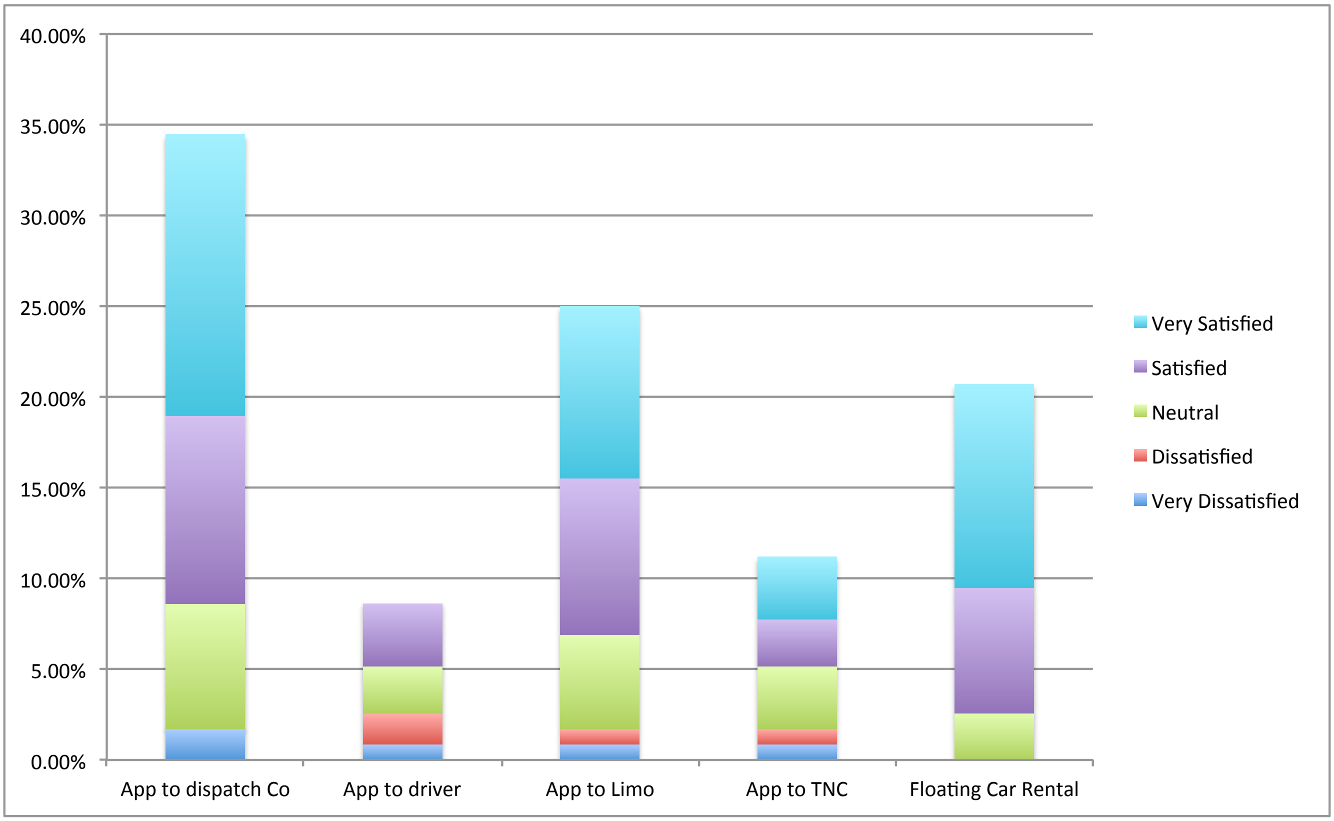
Source: Public Survey

Figure 18 illustrates the stated choice to use app based engagement methods, comparing the relative uptake of seven differing app formats with variations on numbers of fleets included, cost of use, availability of mapping within the app and ability to pay within the app.

The current baseline of 5% use is exceeded in all instances, suggesting an increasing desire to use apps within the taxi market, with particular gains where apps provide access to mapping and credit card payment. The highest stated intent (30%) related to an MTS branded app allowing payment by credit card. 23% of all respondents also indicated an intent to use apps providing access to Limousines, such as the Uber and Flywheel apps, which in turn impacts on the numbers of trips that may be delivered via the traditional taxi fleets.

Satisfaction level was also considered significant in identifying the current market and potential change arising from new booking technologies. Respondents were asked to score apps on the basis of their satisfaction with the quality of service received via the app / app booking. We included floating car hire in the analysis as these vehicles provide an alternative service. The results are set out in figure 19, and highlight three peaked technologies. Apps that provide bookings via existing radio services scored the highest satisfaction ratings. These include apps that are branded to specific radio services and those which allow for the selection of a specific radio service. Apps that book to Limos were also highly scored. Instant car hires also received a high score and stood out as the only technology with no negative comments.

Figure 19: Satisfaction by 'new' booking technology



Source: Public Survey

The combination of stated intent and satisfaction levels in the current market suggest that new technologies are currently developing within a growing market. This does not imply that all services can remain mutually beneficial, nor that the growth in one service type does not detract from others, but rather that the current growth of technologies has not resulted in a sudden catastrophic loss from one market type. It is noted that this balance may remain even where market loss is experienced as the taxi market moves toward a new equilibrium reflecting mature competition.

Where the market reaches a new equilibrium market growth for any one market participant is less likely to be accommodated from an increasing number of trips and is more likely to be achieved at the expense of other market participants.

6. Taxi Market Model

The taxi market model provides a San Diego specific measurement of primary market factors, current demand and supply within the San Diego market, production costs associated with providing a taxi service in the city, and incomes across a range of driver groups identified in the previous section. The Market model comprises two elements, a review of taxi costs experienced in the market including their application to determine driver income, and a market response model identifying the impacts of changes in: 1) Base Taxi Tariff, 2) Taxi Fare Structure and 3) external factors impacting on the taxi market.

In the first test, the taxi market model was applied to identify the production costs associated with providing taxi services and an estimate of approximate earnings across a range of driver types.

6.1 Taxi Costs

Taxi costs vary dependent upon a wide range of factors both within and outside the control of the driver / operator. Distinctions can be drawn between owner operators, typically owning vehicle and medallion, and lease drivers. Differences in costs also exist between vehicle types, and may also reflect the levels of 'buy-in' services that are felt appropriate. 'Buy-ins' include costs that may not be experienced n the provision of basic taxi services, but are widespread and may be prerequisite in some service types. Examples of 'buy-ins' include airport permits, but may also extend to choice of radio service, where choice is possible, between services providing advanced dispatch capabilities, and those with basic provision. The extent to which choice is possible may vary between driver categories, as may the allocation of some of the costs, see figure 20.

Figure 20: Cost categories and Driver categories[9]

Cost Category	Owner Operator	Lease Driver
Vehicle Costs	Vehicle Purchase Finance Cost Maintenance (parts) Maintenance (Labor) Vehicle Inspection Vehicle Cleaning	Vehicle Lease
Insurance Costs	Primary vehicle liability insurance	Included in lease

[9] This table is illustrative and not intended to provide an exhaustive list of costs nor an exhaustive application to driver type

Cost Category	Owner Operator	Lease Driver
Infrastructure Costs	Training costs Vehicle License Medallion Costs Medallion financing Radio service costs App fees Credit Card Fees	License costs App Fees Credit Card Fees
Fuel Costs	Gasoline per use	Gasoline per use

Separate markets apply to most elements within the list of costs, with the exception of directly controlled license and testing costs. The extent of control applied by the MTS is common across many cities, where markets for gasoline, vehicle purchase and maintenance are not within the scope nor ability of the regulator to control. In common with a majority of US cities, the MTS also avoids intervention in the lease market. While the majority of locations allow an open market in taxi leases, not all do, with a smaller number choosing to regulate the nature of the contract and place a maximum lease rate (eg: Boston).

The identification of production cost, and the measurement of changes in base costs levels allows for the identification of an initial response. Thus an overall increase in the costs of production for the taxi industry may suggest an increase of 10% in fares. This does not consider the wider range in factors, however, in that differing driver types experience differing cost structures and cost levels. Part time drivers and those receiving smaller numbers of trips will experience higher fixed costs per trip when compared to a mean average driver. Moreover, as the public response to changes in fares may include decline in use following an increase, the relationship between production costs and taxi tariff is more complex than the initial review suggests.

6.2 Baseline Costs

An initial baseline has been created against which updates in taxi tariff and fare structure may be compared. The baseline equates to a series of calculations of operating costs for taxi drivers across the driver segments identified in previous sections. As no individual driver will take home the same amount as any other, the baseline calculation calculates an indicative amount appropriate for comparison.

6.2.1 Dispatch Drivers - Full Time

The following section provides a review of baseline earnings with primary methodology for drivers operating mainly in response to dispatch calls. The methodology is then applied for other driver types. Figure 21 sets out the key parameters for the driver group. The calculation shown relates to full time drivers using a mode average. Two further categories are also measured, part time drivers and drivers working extended hours. These are discussed in subsequent sections.

Figure 21: Driver Profile - Full Time Dispatch Driver

Metric	Measure	Description
Responds to Dispatch Calls	80%	Proportion of all trips this driver accepts from dispatch. High percentage indicates an advanced dispatch system
Responds to Hail / Stand	20%	
Responds to other engagement	0%	
Percentage of all engagement at airport	0%	Driver does not work from the airport (SAN). It is unlikely that the vehicle will be licensed for use of the airport taxi stand

In the first measurement we measured the costs and income for a driver working full time for a radio service with an advanced dispatch system.

A full time dispatch driver was identified as a driver receiving 80% of trips via the dispatch system, with an additional 20% of trips arising from hailed or stand markets. The split was defined to reflect the practice of drivers accepting small numbers of hailed trips, for example before logging on, or between dispatch calls, but recognizes that the significant majority of calls are received via a radio service. A series of operating and cost assumptions are also necessary, see figure 22, based on observed and reported measurement, described below.

It should be noted that we have used an annual equivalent measure to allow for comparison of like-for-like figures. This should not be read to indicate that all drivers are employed all year, but rather to provide a comparative annual income were a driver to work all year.

Figure 22: Driver operating variables - Full Time Dispatch Driver

Metric	Measure	Description
Number of weeks worked in a normal year	50	Number of weeks in service per annum
Hours worked in a 'Full Time' day	7.75	See below
Trips received per day via dispatch	8.06	See below
Trips received through hailing / stand	2	See below
Include tips in calculation	Yes	An amount is included for tips based on IRS guidance of tip income
Working Hours	Mode value (FT)	Uses a mode measurement for hours based on dispatch data
Gas Price	$3.68	US Gallon

The analysis was based on the calculation of income derived through fare box and costs experienced by each driver type. Three datasets were used in this calculation: data derived from the public survey, used to define trip distribution and choices made in terms of engagement method; data derived from electronic dispatch records, which provides defined numbers of dispatched trips, a breakdown of driver hours worked while responding to dispatch calls; and a driver survey indicating operating statistics for drivers whilst not driving for dispatch companies, and an indication of costs experienced. A description of our approach to collecting data is set out in more detail in section 4, above.

In the case of a driver working predominantly for dispatch we have used records from two large radio services to identify hours driven in service, numbers of trips made and trip length. A mode value is taken to provide the most common working hours and this is then averaged across the two fleets. The fleets represent the most active radio dispatch services, being those with an advanced dispatch system and thus the most likely to be used by drivers concentrating on dispatch trips. Dispatch drivers working 'full time' work an average of 7.75 hours in a day as logged on to a dispatch service. The same driver, working full time and concentrating on dispatch trips will receive, on average, 8.06 trips via the dispatch system, and will also undertake 2 trips from hailed or stand engagements. The average trip length for non-airport originating trips was 5.37 miles, based on dispatch data, allowing for the calculation of income as set out in figure 23, below.

We have used the most common taxi tariff to determine the mile based income for this trip. Using the same driver characteristics, we calculate the costs incurred in providing the service. For a lease driver these include the cost of the lease itself, fuel costs and a small number of infrastructure costs, see figure 24. The calculation is then applied, figure 25, where all costs are paid the remaining income from fare box represents a take home wage.

Figure 23: Full Time Dispatch Driver daily income

Metric	Measurement	Unit	Sub Totals	Totals
Numbers of Trips	From Dispatch		8.06	
	From Hail / Stand		2	
	From other methods		0	10.06
Average Trip distance	With passenger	5.37 miles		
Income	From Flag	Trip count * $2.80	$28.17	
	From Distance	Trip count * 5.3 * $3.00	$159.95	
	From Time	Proportion @0.069	$11.04	
	From Extras	Non-airport origins	$0.00	
	From Tips	@10%	$19.92	
Average Daily Income				$219.07
Equivalent Annual Farebox Income				$48,500.00

Figure 24: Full Time Dispatch Driver daily costs

Metric	Measurement	Unit	Sub Totals	Totals
Daily Trip Count			10.06	
Lease Costs	Daily equivalent lease (see text)		$65	
Fuel Costs	Trip miles with passenger	Trip count * 5.37	54.0222	
	Trip miles in positioning	Trip Count * 4.83	48.5898	
	Fuel efficiency (traditional veh.)	16 mpg		
	Gasoline / US Gallon	$3.68	$22.38	
Average Daily Costs				$87.38
Equivalent Annual Costs				$19,700.00

Figure 25: Full Time Dispatch Driver income

Metric	Source / Description	Totals
Annual Vehicle Income	From figure 23: Equivalent Annual Farebox Income	$48,500.00
Annual Vehicle Costs	From figure 24: Equivalent Annual Costs	$19,700.00
Rounded Take Home wage	Annual Equivalent Wage: Farebox income - Annual Costs	$28,800.00
Equivalent Hourly Rate		$16.50

Note: Figures may vary slightly due to rounding

The calculation, outlined above, suggests that a Full Time driver working predominantly for a dispatch company with a small number of hailed trips has an annual equivalent take home wage of $28,800 - before federal income taxes. This is summarized in figure 25a. Costs are calculated on the basis of figures provided in driver surveys and reflect a mean average of costs experienced by drivers operating for radio services with advanced dispatch systems. Variations may be expected between companies and in different lease agreements with the result that some drivers may receive a higher take home income, some lower. Street drivers, those concentrating on street pick-ups, are more likely to receive lower incomes and work longer hours, set out in more detail in subsequent sections.

Figure 25a: Annual Cost / Income table, full time dispatch drivers (non-airport)

DISPATCH DRIVER - FULL TIME					
LEASE - TRADITIONALLY FUELED VEHICLE					
NON-AIRPORT					
		Annual Costs			Annual Income
Vehicle / Infrastructure Costs		$14,526.57		Flag	$6,200.87
	Fuel Costs	$5,195.44		Distance	$35,212.06
				Time	$2,429.63
				Tips	$4,702.82
	Total Annual Costs	$19,722.02		Total Annual Income	$48,545.37
Annual Income	$48,545.37				
Annual Costs	$19,722.02				
Income - Costs	**$28,823.36**				
Approximate hourly income	$16.48				

Note: Figures may vary slightly due to rounding

6.2.2 Dispatch Drivers - Extended Hours

The full time earnings potential, calculated in the section above, are derived from driver hours recorded by dispatch companies and measured as a mode average for full time activity. In the driver survey a number of drivers indicated that their working hours were, in fact, longer. We have identified these as drivers working extended hours (extended hours drivers), and this is visible in the third peak in figure 13. It is noted that this peak relates to drivers accepting a majority of trips from dispatch. A further, and more distinct, peak relates to the extended hours of street drivers, discussed in more detail in subsequent sections. Typical characteristics applying to dispatch drivers working extended hours are set out in figure 26.

Figure 26: Driver operating variables - Extended Hours Dispatch Driver

Metric	Measure	Description
Number of weeks worked in a normal year	50	Number of weeks in service per annum
Hours worked in a day - Extended Hours	9.74	
Trips received per day via dispatch	11.1	
Trips received through hailing / stand	2.8	
Include tips in calculation	Yes	
Working Hours	Mode value (FT)	Uses a mode measurement for hours based on dispatch data
Gas Price	$3.68	Gallon, regular gasoline, San Diego mean

Where all other factors remain the same, the extended hours dispatch driver works an additional 2 hours per day, receiving just under 4 additional trips in this period. Where lease cost and fuel costs remain the same, the driver is able to spread capital costs over a greater number of driven miles, resulting in a lower lease per mile value. This has the effect of increasing the total potential take home income as illustrated in figure 27.

Full time and extended hours dispatch drivers also worked fewer days in dispatch service than street drivers worked on street. It is possible, indeed likely, that dispatch drivers also worked as street drivers on 'off days', allowing them to supplement income above that received in dispatch days alone. This additional income would have the impact of increasing annual take home pay above the amounts illustrated above, and would further offset costs associated with fixed costs, including lease costs.

Figure 27: Annual Cost / Income table, extended hours dispatch drivers (non-airport)

DISPATCH DRIVER - EXTENDED HOURS					
LEASE - TRADITIONALLY FUELED VEHICLE					
NON-AIRPORT					
		Annual Costs			Annual Income
	Vehicle Costs	$13,879.63		Flag	$8,361.80
	Fuel Costs	$6,869.12		Distance	$46,587.17
				Time	$3,214.51
				Tips	$6,222.04
	Total Annual Costs	$20,748.75		Total Annual Income	$64,385.53
Annual Income	$64,385.53				
Annual Costs	$20,748.75				
Income - Costs	**$43,636.77**				
Approximate hourly incom	$20.75				

6.2.3 Street Drivers - Full Time

A further category relates to drivers who concentrate on the street hail and taxi stand markets. Street drivers tend to receive fewer trip engagements through dispatch services, though this does not exclude engagement using this method. A number of taxi companies concentrate on the street market, offering a reduced dispatch service when compared to larger radio services. A correlation also exists between company type and fare, suggesting companies with a reduced dispatch service also charge higher taxi tariffs. Lease rates may also be lower for drivers using companies with a reduced dispatch capability, effectively mirroring lower service dues, though this relationship is not linear and reflects the wider market for taxi lease arrangements. Effectively a driver may choose to trade off lower entry or lease costs with a lower number of dispatch calls, for higher trip by trip income. In the following examples we calculate costs and income for street drivers receiving no dispatched trips. In this section we calculate cost and income for the companies with the highest current taxi tariff. A driver profile for street drivers is illustrated in figure 28.

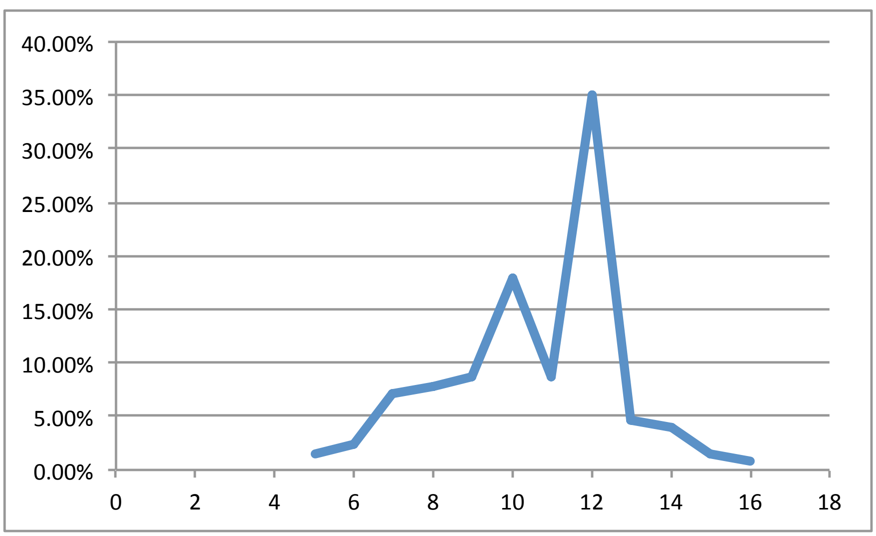
Figure 28: Driver Profile - Full Time Street Driver

Metric	Measure	Description
Responds to Dispatch Calls	0%	Relates to drivers accepting few if any dispatch calls.
Responds to Hail / Stand	100%	
Responds to other engagement	0%	App engagements are defined separately below.
Percentage of all engagement at airport	0%	Driver does not work from the airport (SAN). It is unlikely that the vehicle will be licensed for use of the airport taxi stand

Working Hours

In figure 14 (section 5) we highlighted the patterns of working hours and differentiated between dispatched and street drivers. In figure 29 we concentrate on the upper quartiles, using driver survey data for drivers concentrating on hail and stand market, showing peak values at 10 hours and 12 hours worked per day. While this figure differs from the mode average values established from dispatch records, which suggests dispatch drivers work fewer hours, it is reasonable that this reflects street driver hours where few dispatch trips are taken.

Figure 29: Driver reported working hours - street drivers



Source: Driver Survey

Further variables required in the calculation relate to the identification of trip numbers, trip distance and positioning. To establish these numbers we have used a combination of data from the public survey, which allow calculation of split between engagement methods; measured dispatch trip number using electronic data; and stated working hours. Excluding app engagements, street hail and stand engagements account for 45.22% of all trips made. This figure includes engagements made by members of the public walking to hotel forecourts / entrances where taxis may often wait, but excludes engagement at the airport stand, which we have considered as a separate market. Using a mean average value across radio services for trips dispatched (using radio services with advanced dispatch), this suggests an average demand of 0.916 street trips for every 1 dispatch trip. It is also necessary to weight this figure to account for the relative numbers of drivers seeking street engagement rather than working predominantly for dispatch trips, where street hails can effectively be picked up by either street drivers (majority of trips), or dispatch drivers (minority reflecting engagement split for dispatch drivers). Using the dispatch driver engagement split of 80%/20% dispatch to street work, where the number of trips available to street only drivers is reduced by the proportion of trips picked up by 'mixed engagement' dispatch drivers the following base statistics are calculated, see figure 30.

Figure 30: Driver operating variables - Full Time Street Driver

Metric	Measure	Description
Number of weeks worked in a normal year	50	Number of weeks in service per annum
Hours worked in a day - Full time driver	10	
Trips received per day via dispatch	0	
Trips received through hailing / stand	6.596	
Include tips in calculation	Yes	
Working Hours	Mode	Based on driver survey responses
Gas Price	$3.68	US Gallon

It is noted that 'street drivers' in this definition are assumed to engage trips from street hail and taxi stand alone. Effectively the income illustrated, see figure 31, excludes any additional trips that are received through dispatch, apps etc. These represent an additional source of income that has not been included. The measure of income **without** dispatch or app bookings therefore represents a lower estimation for drivers working street hail and stand trips working for the mode hours values (working hours = 10 / day - figure 31; working hours = 12 / day - figure 32).

Variation is also possible within these brackets, with a number of street drivers reporting shorter working days - who will receive a lower hourly rate as the capital costs are higher per mile driven; and a number of street drivers working longer hours, receiving a higher hourly rate as capital costs per mile decrease. Drivers may also make location choices affecting income, whether these are related to a favored location within the downtown core or a suburban location.

Figure 31: Annual Cost / Income table, full time street drivers

STREET DRIVER - FULL TIME					
LEASE - TRADITIONALLY FUELED VEHICLE					
NON-AIRPORT					
		Annual Costs			Annual Income
Vehicle and Infrastructure Costs		$17,909.81		Flag	$6,219.22
	Fuel Costs	$4,706.54		Distance	$35,509.73
				Time	$2,756.44
				Tips	$4,742.57
	Total Annual Costs	$22,616.35		Total Annual Income	$49,227.97
Annual Income	$49,227.97				
Annual Costs	$22,616.35				
Income - Costs	**$26,611.62**				
Approximate hourly income	$8.86				

6.2.4 Street Drivers - Extended Hours

We have also calculated the potential earnings of street drivers working for extended hours. As with dispatch drivers, those working for longer hours are able to offset fixed costs across a larger number of miles, reducing the per mile cost and increasing the potential earnings level per mile driven. Figure 32 illustrates potential cost and income for street drivers working extended hours.

Figure 32: Annual Cost / Income table, extended hours street drivers

STREET DRIVER - EXTENDED HOURS					INCOME
LEASE - TRADITIONALLY FUELED VEHICLE					
NON-AIRPORT					
		Annual Costs			Annual Income
	Vehicle and Infrastructure Costs	$17,909.81		Flag	$7,372.18
	Fuel Costs	$5,579.06		Distance	$42,092.76
				Time	$2,904.40
				Tips	$5,621.78
	Total Annual Costs	$23,488.88		Total Annual Incom	$57,991.12
Annual Income	$57,991.12				
Annual Costs	$23,488.88				
Income - Costs	**$34,502.24**				
Approximate hourly income	$9.57				

The calculations suggest that street drivers tend to receive a lower take home amount than those working predominately for dispatch, and subsequently work longer hours. The difference accounts for some of the differences observed in other reports pertaining to the San Diego taxi market, and suggests annual equivalent driver incomes between $27,200 and $45,600 depending on the choices made. A small number of drivers can take home higher sums as a result of working longer hours, while those choosing to work fewer hours will receive proportionately less. It should be noted that this difference is not a straight line, with part time drivers likely to take home significantly less per hour than those working full-time and extended hours.

6.3 Additional Costs

As in the case of income, a variation in costs is a natural consequence of drivers choosing between different locations, making different lease choices, including between fuel efficient and more traditional vehicle types. It should be noted that a disincentive currently exists to use more fuel efficient vehicles, discussed in section 6.4, below. Vehicle related costs are likely to become more of an issue to the San Diego taxi driver, as the most common traditional vehicle, the Ford Crown Vic, has ceased production, and will gradually withdraw from the market. This is likely to have the impact that differences in lease costs between fuel efficient and traditional vehicles are likely to become less distinct. This is discussed in section 6.4.

Additional costs appear to relate to payments made for ancillary services, particularly in the case of lease drivers, which may relate to an additional charge for maintenance, dispatch services or other facilities normally contained within a 'full service' lease package. It is noted that these structures are not in themselves inappropriate if constituted in the lease arrangements, but are somewhat more opaque as only a relatively few drivers report additional charges. The presence of 'undocumented' payments can not be verified, nor monetary values applied, and have thus been excluded from the calculations. Of Lease Driver responses to the driver survey, 2.6% of respondents indicated an additional payment for maintenance, with a mode average value of $300/month. This reflects a very small proportion of the lease driver respondents, but should be considered as a potential extra cost that may be faced by some members of the driving community. An additional calculation has been undertaken in respect of both full time dispatch and street drivers, illustrated in figures 33 and 34, demonstrating the impact of this additional cost on annual and potential hourly income.

It is highlighted that the calculation of an income is indicative rather than precise, as the exact amount depends on driver, owner and passenger choice.

Figure 34: Full Time Dispatch Driver with additional maintenance cost of $300/month

DISPATCH DRIVER - FULL TIME				
LEASE - TRADITIONALLY FUELED VEHICLE, WITH ADDITIONAL MAINTENANCE COSTS				
NON AIRPORT				
		Annual Costs		Annual Income
Vehicle / Infrastructure Costs		$14,526.57	Flag	$6,367.46
Fuel Costs		$5,335.03	Distance	$35,475.84
Additional Costs - Maintenance		$3,600.00	Time	$2,447.83
			Tips	$4,738.05
Total Annual Costs		$23,461.60	Total Annual Income	$49,029.18
Annual Income	$49,029.18			
Annual Costs	$23,461.60			
Income - Costs	**$25,567.58**			
Approximate hourly income	$14.62			

Figure 34a: Full Time Street Driver with additional maintenance cost of $300/month

STREET DRIVER - FULL TIME				
LEASE - TRADITIONALLY FUELED VEHICLE, WITH ADDITIONAL MAINTENANCE COSTS				
NON-AIRPORT				
		Annual Costs		Annual Income
Vehicle / Infrastructure Costs		$17,909.81	Flag	$6,143.48
Fuel Costs		$4,649.22	Distance	$34,482.77
Additional Costs - Maintenance		$3,600.00	Time	$2,379.31
			Tips	$4,605.41
Total Annual Costs		$26,159.03	Total Annual Income	$47,610.97
Annual Income	$47,610.97			
Annual Costs	$26,159.03			
Income - Costs	**$21,451.94**			
Approximate hourly income	$7.14			

6.4 Fuel Efficient Vehicles

In the preceding sections, we have considered the costs and income associated with running a traditionally fuelled vehicle. This sector is dominated in The San Diego taxi market is dominated by the Ford Crown Victoria. The 'Crown Vic' is widely used in taxi service in a great number of US cities, often as a result of its widespread use in police fleets and cascaded to taxi fleets. The Crown Vic achieves relatively low fuel efficiencies compared to more modern vehicle designs, and in particular the adoption of hybrid vehicles in to Taxi fleets. The most popular hybrid in taxi service in San Diego is the Toyota Prius. The Prius achieves significantly better fuel efficiencies when compared to the Crown Vic, being a critical factor in its success in the fleet. The vehicle also commands a higher lease rate which results in a reduction in the benefits achieved through lower fuel bills. Figure 35 illustrates the impact of driving a hybrid vehicle on cost and potential income.

Figure 35: Annual Cost / Income table, full-time dispatch drivers - Fuel Efficient Hybrid vehicle

DISPATCH DRIVER - FULL TIME					
LEASE - FUEL EFFICIENT VEHICLE					
NON-AIRPORT					
		Annual Costs			Annual Income
	Vehicle / Infrastructure Costs	$19,042.78		Flag	$6,367.46
	Fuel Costs	$1,707.21		Distance	$36,158.07
				Time	$2,494.91
				Tips	$4,829.16
	Total Annual Costs	$20,749.99		Total Annual Income	$49,849.60
Annual Income	$49,849.60				
Annual Costs	$20,749.99				
Income - Costs	**$29,099.61**				
Approximate hourly incom	$16.64				

A driver leasing a Hybrid vehicle makes a significant saving in fuel costs, but this is offset by the additional vehicle lease costs for the use of the vehicle. A full-time dispatch driver driving a traditional fuel Crown Vic is has a potential annual earning rate of $31,284 after costs but before personal taxation. The same driver leasing a hybrid vehicle has a potential annual earning rate of $30,360 in a year.

Vehicle purchase patterns differ between the traditional Crown Vic and the Hybrid Prius, which may be a deciding factor in the different lease costs seen in each sector. Hybrid vehicles are much more likely to be purchased new or as recent model used cars compared to traditional fuel vehicles. New vehicles entering the fleet are also likely to be maintained in taxi service, while traditional fuel cars enter the taxi fleet at a more advanced age, and are removed from service in a far shorter period. Effectively the choice falls between a new vehicle run for its serviceable life in the taxi trade, and a used vehicle purchased at retirement from other service (such as police work) and driven for a short period until scrapped.

While the impact of higher lease costs - leading to lower earnings in hybrid vehicles, highlights a disincentive in adopting greener vehicles (effectively the market currently encourages use of less fuel efficient vehicles) this may prove to be transient or short lived. As the Crown Vic has ceased production a market readjustment is occurring, and appears to be in favor of much newer hybrids entering from new / recent used. The impacts of this are discussed in section 6.6.

6.4.1 Airport Drivers

Drivers providing service at San Diego International airport experience differing costs and income compared to drivers who concentrate downtown. The category includes drivers departing from official airport stands in one or both airport terminals, driving permitted vehicles and paying a $2 additional charge for each trip, recoverable as an extra from the taxi tariff.

Airport drivers benefit from longer trips originating from the airport, resulting in higher incomes per trip, but will usually experience higher lease payments for airport permitted vehicles. Airport drivers are also able to work dispatch, street hail and stand trips from the downtown, though the extent to which this occurs differs by driver group. Full time drivers appear to split their driving evenly between airport and non-airport trip origins (46% of FT pick ups are from the airport), while drivers working extended hours appear to concentrate more on the airport itself (69% of ET pick ups are from the airport) suggesting that a driver working extended hours is more likely to return empty to the airport. Fewer part time drivers serve the airport than full time drivers, which is likely to reflect the higher lease costs of airport permitted vehicles. Figure 36 illustrates the costs and income that may be experienced by a full time airport driver.

Figure 36: Annual Cost / Income table, full-time airport drivers

DISPATCH DRIVER - FULL TIME				
LEASE - FUEL EFFICIENT VEHICLE				
AIRPORT				
		Annual Costs		Annual Income
	Vehicle / Infrastructure Costs	$21,300.89	Flag	$6,675.29
	Fuel Costs	$2,077.89	Distance	$44,343.02
	Airport departure costs	$2,193.31	Time	$3,059.67
			Airport dep extras	$2,193.31
			Tips	$5,922.32
	Total Annual Costs	$25,572.09	Total Annual Income	$62,193.61
Annual Income	$62,193.61			
Annual Costs	$25,572.09			
Income - Costs	**$36,621.52**			
Approximate hourly income	$20.94			

Full time airport lease drivers appear able to offset additional costs as a result of longer airport trips, while the airport 'barrier lift' charge is offset by an additional tariff extra allowing this to be passed directly to the customer. Full time airport drivers driving fuel efficient vehicles are able to exceed the income levels achieved by non-airport drivers using the same vehicle, and exceed income levels of dispatch drivers driving traditionally fueled vehicles. Figure 37 illustrates the costs and income potential for airport drivers driving extended hours.

Figure 37: Annual Cost / Income table, extended hours airport drivers

DISPATCH DRIVER - EXTENDED HOURS				
LEASE - FUEL EFFICIENT VEHICLE				
AIRPORT				
		Annual Costs		Annual Income
	Vehicle / Infrastructure Costs	$20,352.09	Flag	$7,808.49
	Fuel Costs	$2,599.17	Distance	$55,217.20
	Airport departure costs	$2,565.65	Time	$3,809.99
			Airport dep extras	$2,565.65
			Tips	$7,374.64
	Total Annual Costs	$25,516.91	Total Annual Income	$76,775.97
Annual Income	$76,775.97			
Annual Costs	$25,516.91			
Income - Costs	**$51,259.07**			
Approximate hourly income	$24.38			

6.5 Owner Drivers

An owner driver experiences many of the same market factors as a lease driver, responding to the same patterns of demand and taxi tariffs as lease drivers; but differ in that vehicle and medallion costs that would generally be included in the lease fall directly to the driver. This can result in a range of additional individual costs to the owner operator, offset by savings associated with not having a lease cost. Figure 38 illustrates the costs and potential income for a full-time owner driver, operating a traditionally fueled dispatch vehicle, and for a street owner driver (figure 38a).

Figure 38 Annual Cost / Income table, full-time owner drivers - Dispatch

DISPATCH DRIVER - FULL TIME				
OWNER OPERATOR - TRADITIONALLY FUELED VEHICLE				
NON-AIRPORT				
		Annual Costs		Annual Income
	Vehicle Purchase	$1635.00	Flag	$6,367.46
	Vehicle Finance	$420.85	Distance	$36,158.07
	Vehicle parts and servicing	$2362.72	Time	$2,494.91
	Infrastructure/Insurance	$3172.64	Tips	$4,829.16
	Fuel Costs	$5,335.03		
	Medallion Purchase	$4833.33		
	Medallion Finance	$3443.75		
	Total Annual Costs	$21203.32	Total Annual Income	$49,849.60
Annual Income	$49,849.60			
Annual Costs	$21203.32			
Income - Costs	**$28,646.28**			
Approximate hourly income	$16.38			

Figure 38a Annual Cost / Income table, full-time owner drivers - Street Driver

STREET DRIVER - FULL TIME				
OWNER OPERATOR - TRADITIONALLY FUELED VEHICLE				
NON-AIRPORT				
		Annual Costs		Annual Income
	Vehicle Purchase	$1,635.00	Flag	$5,588.37
	Vehicle Finance	$420.85	Distance	$31,907.79
	Vehicle parts and servicing	$2,362.72	Time	$2,201.64
	Infrastructure/Insurance	$3,172.64	Tips	$4,261.51
	Fuel Costs	$5,335.03		
	Medallion Purchase	$4,833.33		
	Medallion Finance	$3,443.75		
	Total Annual Costs	$21,203.32	Total Annual Income	$43,959.31
Annual Income	$43,959.31			
Annual Costs	$21,203.32			
Income - Costs	**$22,755.99**			
Approximate hourly income	$7.57			

6.6 Changes in operating costs

In section 4 we outlined the methods by which peer cities undertook fare reviews. As most cities define taxi tariffs as predefined charges it is a reasonable outcome that changes in the costs of producing a service should be recoverable from a similar change in the defined taxi tariffs. This poses two questions, however, the impact of changes in tariff on the demand for taxi use, and how any change may be reasonably measured. Figure 11, section 5, and figure 10 illustrate the relative price elasticities of demand for taxi services in relation to different trip purposes and different income levels respectively. A traditional viewpoint may suggest that the taxi market is relatively inelastic, that large changes in price have a very limited impact on demand, but this is not the case across all user groups. or all trip purposes. In number of cases the market may be suggested to be elastic, that a small increase in fare will lead to a significant reduction in the numbers of trips being made. In short, an increase in taxi tariff of a given percentage does not equate to an increase in income of the same amount. The impact of these elasticities are discussed in section 7, Market Response Model.

6.6.1 Production Cost Measurement

In our review of peer cities we identified four common methods of measuring changes in the costs experienced in providing taxi services. The methods range between locations, as do the values measured in each. Figure 39 illustrates the four methods, with definitions, and the practical impacts of their application. It is noted that the identification of production costs / cost measurement does not equate to recommended fare increases, see section 7. A review of each method and their application is set out in subsequent text.

Figure 39: Production Cost Measurement

Method	Definition
Peer Comparison	The identification of increases in tariff from other cities and their direct application
Consumer Price Index (CPI)	The identification of increases to CPI (and elements measured in CPI) and their application to the taxi market
Taxi Cost Index / Industrial Price Index	The identification of increases to a range of taxi specific costs, which may include weighting of cost elements) and their application to the taxi market
Trade led increases	Increases based on the stated costs presented by the taxi trade.

Peer Comparison

The first method of measuring change in operating costs relates to the comparison of rates between locations. The method has the benefit of simplicity, that no actual calculation is required in the 'target' city, but lacks any real measurement of costs specific to the city under review. The measurement relies on the accuracy of cost measurements applied in other locations, which may experience differing economic circumstances, see figure 40, below, differing cost structures or market factors. These differences make the application of a general comparison of peer rates a questionable measure at best.

Consumer Price Index (CPI)

The use of a consumer price index (CPI) has a significant benefit over peer comparison in that it uses a distinct and recognized price variable that has a wide history of application. CPI provides a measure of the average change in prices over time in a fixed market basket of goods and services. The US Bureau of Labor Statistics (BLS) publishes CPI values for two population groups[10]:

1. CPI for All Urban Consumers (CPI-U) which covers approximately 88 percent of the total population, and
2. CPI for Urban Wage Earners and Clerical Workers (CPI-W) which covers 29 percent of the total population.

[10] US Department of Labor, Bureau of Labor Statistics, Consumer Price Index, San Diego. Doc# 14-290-SAN

CPI-U includes, in addition to wage earners and clerical workers, groups such as professional, managerial, and technical workers, the self-employed, short-term workers, the unemployed, and retirees and others not in the labor force. Both CPI-U and CPI-W are based on measurement of the prices of food, clothing, shelter, and fuels, transportation fares, charges for doctors' and dentists' services, drugs, and the other goods and services as they affect the target groups. Figure 40 illustrates changes in CPI-U experienced in San Diego, California and the United States. The comparison suggests that the basket of all urban costs have generally risen faster in San Diego than that in California as a whole or that experienced across all the USA. Effectively the cost of living has risen more quickly in San Diego than other US locations.

Figure 40 CPI based inflation rate comparison CPI-All Urban, San Diego, California, United States

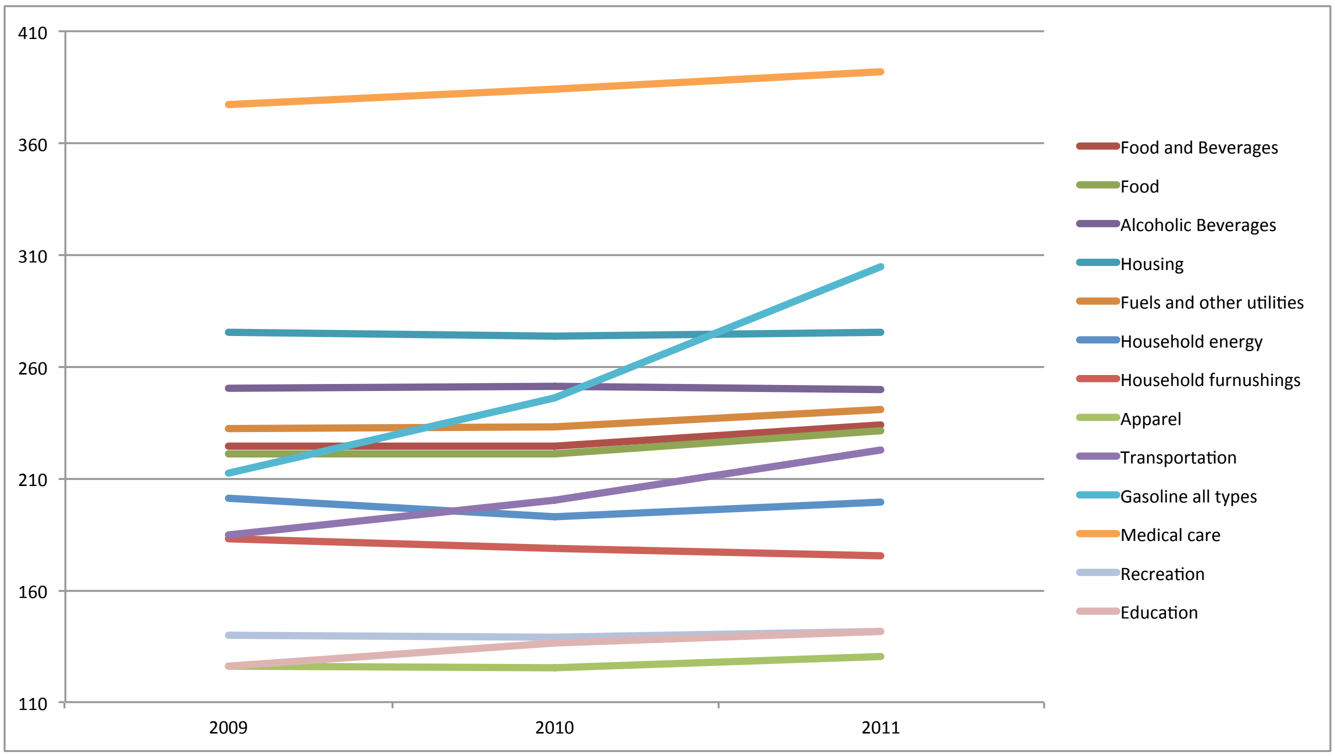
Year	San Diego		California		United States	
1982 = 100	Index	Change	Index	Change	Index	Change
2000	182.8		173.8		172.2	
2001	191.2	4.60%	181.7	4.55%	177.1	2.85%
2002	197.9	3.50%	186.1	2.42%	179.9	1.58%
2003	205.3	3.74%	190.4	2.31%	184.0	2.28%
2004	212.9	3.70%	195.4	2.63%	188.9	2.66%
2005	220.6	3.62%	202.6	3.68%	195.3	3.39%
2006	228.2	3.45%	210.5	3.90%	201.6	3.23%
2007	233.3	2.23%	217.4	3.28%	207.3	2.83%
2008	242.3	3.86%	224.8	3.40%	215.3	3.86%
2009	242.3	0.00%	224.1	-0.31%	214.5	-0.37%
2010	245.5	1.32%	226.9	1.25%	218.1	1.68%
2011	252.9	3.01%	232.9	2.64%	224.9	3.12%

Sources: National University System Institute for Policy Research; CA variables computed by the California Department of Industrial Relations; US Department of Labor, Bureau of Labor Statistics

CPI is generally applied as a single measure, effectively the cost of inflation over time, whether at local, state or federal levels. The BLS suggests a current annual CPI-U rate of 1.7% for San Diego in the period 2012-2013 (ibid), that the total costs of the basket has increased. In the same release the bureau also indicates that the increase was not consistent across all component parts. Gasoline prices had fallen by 3.8% across the region, while other energy prices had risen considerably (electricity +14%; natural gas +18.7%). Figure 41 illustrates the variation in components (expenditure categories) for the period 2009 - 2011.

As with any individually identified industry, the taxi industry experiences some, but not all elements used to measure the CPI-U. Moreover the proportions of any element consumed by the taxi industry may differ from 'typical consumption'. A taxi driver consumes considerably more gasoline than an office worker, and is thus more susceptible to changes in that cost element. Changes in motoring related cost elements are likely to have a disproportionate effect on the taxi industry, while changes in many others have limited effects, or no effect at all. These differences are considered in more detail in the development of an Industrial Price Index, see next section.

Figure 41: Change in expenditure categories, San Diego, 2009 - 2011



Source: US Department of Labor, Bureau of Labor Statistics

Figure 41 illustrates differing changes in costs as contained within the CPI-U, demonstrating significant differences between the rates of change in differing expenditure categories. The use of a single CPI figure applied to the taxi industry would not accurately reflect the changes in costs experienced by the industry, as a general CPI figure includes a range of cost inputs that are not experienced by the taxi industry. Alternatives which benefit from the consistent methods applied in the measurement of CPI include the identification of elements within the index that apply to the taxi industry, and the inclusion of more detailed analysis of industrial price changes / change in the costs experienced by the taxi industry.

Industrial Price Index (IPI) / Taxi Cost Index

The third measure relates to the use of an Industrial Price Index. IPI is a generic term that addresses any industry specific measurement with alternative terms including Taxi Cost Index (TCI) or Taxi Cost Model (TCM). The application of IPI to a specific industry will further require the definition of variables contained within the index, but these are location specific, rather than generic, and should be addressed at a local level.

In defining an index for San Diego, we have identified a number of factors affecting the production costs of taxi services, though not all costs apply to all within the industry. A specific issue arises in terms of the lease costs experienced by drivers, which may reflect a broader series of market relationships than those impacting on owner operators. Moreover, as the MTS does not seek to control nor restrain the market for taxi leases, the interrelationships between taxi tariff and lease rates is a matter of market response rather than present limitation. Figure 42 sets out the costs that are experienced by differing market participants and issues arising.

Figure 42: IPI costs, San Diego Taxi Drivers

Taxi Production Cost	Owner Operators	Lease Drivers*	Issues
Vehicle Purchase	Yes	No	Differing life cycles experienced across fleet by vehicle type. Reduction in availability of Crown Vic
Finance Cost	Yes	No	
Maintenance Costs (parts)	Yes	No	Variable costs associated with differing vehicle types and driving patterns
Maintenance Costs (labor)	Yes	No	Variable costs associated with differing vehicle types
Vehicle Inspection	Yes	No	
Vehicle Cleaning	Yes	Yes	Requirement for clean vehicles does not proscribe any frequency nor standards
Insurance Costs	Yes	No	
Training Costs	Yes	Yes	
Vehicle License	Yes	No	
App Fees	Yes	Yes	Variable costs associated with differing apps
Credit Card Fees	Yes	Yes	Costs can vary
Gasoline	Yes	Yes	Varying costs dependent upon vehicle type and driving style

Notes: A significant number of production costs are passed onto a lease drivers through the cost of the lease, see below.

It is noted that many of the costs identified in figure 42 vary dependent upon vehicle type and driving style. This said, the identification of changes in costs, across a defined driver population, effectively changes to the IPI basket, will provide a consistent base measurement of cost that allows for the calculation of a taxi fares, set out in more detail below.

A further complication exists, however, as a result of differing costs experienced by differing driver populations, including owner drivers and lease drivers. With a few exceptions, as described in relation to driver survey results, the majority of lease drivers experience costs associated with the lease (80.2%)[11] and the cost of gasoline (19.8%) alone, with wider production costs included in the lease itself. This arrangement is common in many US cities and is sometimes referred to as 'gas and gates'.

Lease owners operate in a distinct market in their own right, experiencing differing costs and income structures than lease drivers. Incentives for vehicle purchase and investment decisions will also differ from owner operators, reflecting both the market for lease rental and a differing income structure. The separation of a lease owner from the traveling public may also lead to differences in interpretation of costs between driver and lease owner, with a fear being described to the survey team that increases in taxi tariffs were lost to (excessive) increases in lease rates. While the perception may relate to a misinterpretation[12], the impact of changes as affecting the lease market should also be considered as a legitimate factor impacting on the costs of production experienced by a driver.

Owner operators also experience differing cost structures to those of the lease driver, who faces many of the costs that are included within the lease rates paid by lease drivers. A composite index is constructed, based on changes in fuel costs (affecting all drivers) and a proportionate value associated with vehicle purchase, maintenance and insurance, infrastructure and operating costs, providing an element addressing both costs experienced by owner drivers, and costs affecting lease owners. It is noted the adoption of a composite index does not remove the ability of a lease owner to increase charges above the rate of the Industrial Price Index, nor to reduce lease rates comparative to other owners to provide market advantage, these being a correct response within a market for lease provision. An additional check may be built in to this process to track lease costs over time to ensure correct market responses.

Trade led increases

A fourth measure relates to the identification of tariff increases by the taxi trade. The approach differs from previous measurements as it does not seek to identify changes in the costs incurred in the provision of taxi services at an authority level, but rather to validate or approve stated changes in cost presented by the

---

[11] The proportion of lease costs @80.2% of all costs refers to a Full time street lease driver. Differing driver types will experience differing proportions, with drivers working extended hours experiencing lower proportionate costs associated with lease; part time drivers, a higher proportionate cost.

[12] Some drivers reported that an increase of a given percentage was lost to an increase in lease rates. While this is not directly reflected in changes in lease rates, which operate independently in a distinct market between driver and lease owner, increases in tariff may impact as to what the market may bear. It is important to note that an increase in lease costs of 5% following an tariff increase of 5% DOES NOT equate to a loss of increase to lease.

trade. The current San Diego system allows for a trade led increase subject to a defined maximum, allowing for variations in price between companies and, significantly, the potential for discounting within the market.

While trade led increases may also present issues in the measurement of costs differing between operators, and between operators and authorities, the relative simplicity of its structure may have benefits in application. Additional arguments may also relate to the ability of the trade to promote price competition, though this may in itself lead to significantly differing points of view.

6.6.2 Production Cost Values

In drawing conclusion between differing methods of measuring taxi production costs, we have concluded that an IPI methodology based on composite costs experienced across the trade provides the most accurate measurement. The composite draws from factors that are included within the CPI-U measurement, and focuses on the costs experienced within the taxi industry.

Peer based methodologies are unlikely to provide a review reflecting the costs experienced in the San Diego taxi fleet, and are further challenged by the assumption that peer city reviews fully reflect costs on a consistent basis. We also do not consider that trade led increases provide a consistent measure that would be perceived as a neutral measurement, but do recognize the role of trade in determining costs and the potential benefits that may be associated with market discounting / market responses. The latter issues are discussed in more detail in section 7, market response modeling.

Figure 43 sets out the production cost variables used in the subsequent sections of this document and sources of their measurement. Two variables are of significance, the identification of percentage change over a review period, and the approximation of amount. It is noted that actual amounts are likely to vary between drivers, reflecting differences in driving patterns etc. The inclusion of dollar values allow for the identification of cost proportions, the percentage role that any single element contributes to total cost, allowing for a weighting of changes in cost to reflect actual expenditure. A review of each of the cost elements is set out below the table. Cost proportions are defined using current (2013 / 14) costs, and are defined as falling into one of three elements:

- Fuel costs, based on the measured trip miles and vehicle efficiencies
- Vehicle and Infrastructure costs, based on measured elements set out below figure 43, and
- Personal income, defined as the amount left after all costs have been deducted from all income

As all drivers experience a differing cost/income pattern, a single measure will affect differing drivers to a differing extent. We have therefore based calculations of income and cost proportion on a full time reference driver working full time as a lease driver on street. This group represents the largest driver group and the lowest earning group in the city. The selection of this driver group for reference ensures that no individual driver group working full time is unable to benefit from tariff reviews.

Figure 43: Industrial Price Index - Taxi Cost

	Measurement base	Cost Proportion	Data Source / Notes	Values 2013/14	Change over previous 12 months	Change x proportion
FUEL COSTS						
Fuel	$ / Gallon regular gasoline	9.38%	gasbuddy.com values for Jan - Jan	$3.68	1.66%	0.156%
VEH/INFRAST						
Vehicle Purchase Cost	Weighted vehicle cost depreciated over 6 years	9.88%	KBB / Dealership	$2305.20	4.776%	0.472%
Vehicle Finance (Interest)	Mission Fed CU / CPI-U	2.54%		$593.36	-10.4%	-0.264%
Vehicle parts and servicing	Driver costs / CPI-U vehicle repair	10.13%		$2362.72	-2.02%	-0.205%
Insurance Costs	CPI-U	13.60%		$3172.64	3.452%	0.469%
EARNINGS						
Wages	0.5 x OES Transportation + 0.5 x CPI-U	54.47%		$26,990.15	1.025%	0.558%
		100%		TOTAL CHANGE IN COST		1.187%

Measurement of the Taxi Cost Index suggests a total increase in production costs of 1.187%, in the 12 month period to January 2014.

Fuel Costs

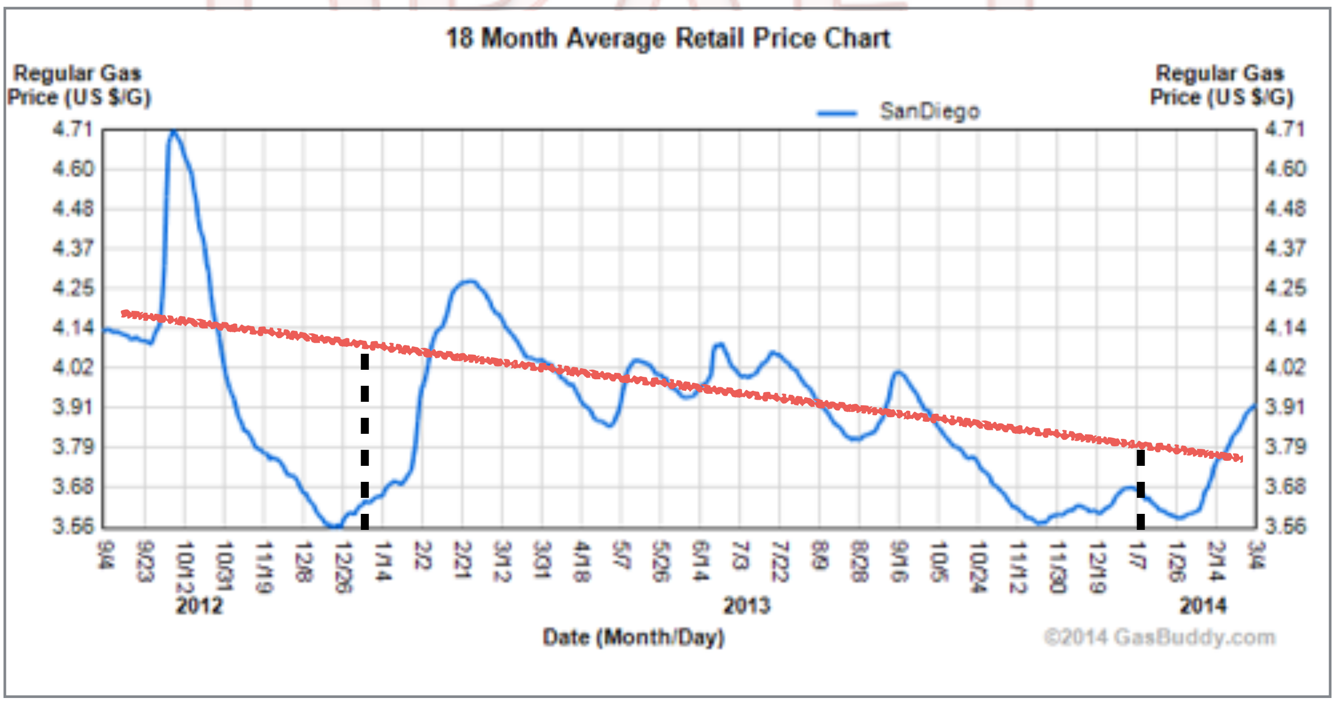
The San Diego taxi market is dominated by two vehicle types, the Ford Crown Victoria - a traditional gasoline fueled vehicle; and the Toyota Prius, a Gasoline/Electric hybrid. Other vehicle types exist within the fleet smaller proportions, with the vast majority of vehicles capable of operating on regular gasoline. Gas costs represent 9.38% of all costs[13].

[13] All costs are based on the operating and personnel costs of a Full time lease street driver.

Identifying trends in the price of regular gasoline provides a measure of changes in this cost element, see figure 44. A large number of gas price websites are available, with little variation in the data provided. We have used GasBuddy.com to track gasoline prices over the past 18 months.

Measuring the gas price at the same time from one year to the next provides an indication of the change in prices at two points in time. Regular gasoline cost, on average, $3.68 on January 7th, 2014; compared with $3.62 on the same date in 2013, this represents an increase of 1.66%. The figure can be said to reflect a like for like comparison, but does not fully represent the gas price, however, as prices will often fluctuate, as seen in this period.

Figure 44: Gas Price fluctuation



Source: Derived from GasBuddy.com

The use of a specified point in time indicates, in this instance a marginal increase in the price of gasoline, while the trend in gas prices over the same period has been downward - gasoline has become cheaper. This leads to a fundamental question, whether the use of point-to-point provides a more accurate measure, or trend line prices. The trend line for the same period has fallen from a trend line value of $4.08 in January 2013, to a trend line value of $3.79 in January 2014, a fall in gas prices of 7.11%.

The use of trend line prices suffers two issues, it is accurate only when applied over a longer term and continuous period. A driver who works for a shorter period, some months only in a year, will lose out where the trend line lies below the actual gas price. It is also likely that visible differences between the price at the pump and the trend line price will create tension or disagreement with the trade in application.

The use of point-to-point prices (spot prices) are also likely to result in disadvantage to the driver where the spot price lies below the trend line. A potential solution relates to secondary fuel pricing charges, allowing for the use of spot price measurement, reducing likely disagreement between regulator and trade, with a secondary measure for temporary spikes in gas costs. On this basis, the operating costs associated with fuel has increased by 1.66%.

Vehicle Costs

The allocation of costs to vehicle purchase and maintenance is more complicated than the measurement of changes to fuel costs. The majority of drivers do not incur a vehicle cost directly, but pay for vehicle purchase, maintenance and upkeep through a lease arrangement. The inclusion of the measured vehicle cost, therefore, addresses the changes felt by owner drivers in the purchase and use of a vehicle, and as one of the factors influencing the market for lease.

The San Diego market is currently dominated by 2 vehicle types, a traditionally fueled vehicle (Crown Vic), and a fuel efficient vehicle (Prius), of which the Crown Vic has ceased production. The traditional vehicle route to the market, from a secondary market to taxi service is therefore restricted and declining. The impacts of changes in vehicle supply will be felt over time as the proportions of used vehicles alters. It is therefore appropriate to adopt a vehicle cost calculation that will adapt to account for changes in the market. We have adopted the following principals:

- The most common traditional and most common fuel efficient vehicles are included in the calculation
- A single consistent vehicle price source is used. We have used the Kelley Blue Book.
- The vehicle type cost is calculated in proportion to its incidence within the fleet
- Base specification models are used to define price and proportion
- Traditional vehicles purchased used with an average age of 4 years on entering taxi service[14]
- Fuel efficient vehicles purchased new[15]
- A vehicle service life of 6 years is applied based on straight line depreciation to zero[16].

[14] Used vehicle age is applied on a consistent basis to allow for comparison of like-for-like costs. The used vehicle age may vary.

[15] Fuel efficient vehicles are based on new purchase for comparison on a like-for-like basis. Vehicle purchase patterns may vary.

[16] Does not require a vehicle to be scrapped at 6 years service and is used for comparison on a like-for-like basis. Vehicle life patterns may vary

On the basis of these principals, the following formula is applied:

$$\sum_{vtt}\left[\frac{Pvtt+T+F}{SL}\right]\alpha vtt+\sum_{vth}\left[\frac{Pvth+T+F}{SL}\right]\alpha vth$$

Where:

Pvtt = Price of traditional vehicle at purchase, using fair value with no additional options
Pvth= Price of fuel efficient vehicle at purchase, using fair value with no additional options
T = Tax rates applied
F = DMV Fees applied
SL = Life in Taxi Service

It is noted that the change in availability of the Crown Vic will impact on the total cost included in this element. It is proposed that calculation of traditional vehicle costs continue to be based on the majority vehicle within this category. This will alter over time and should be updated as the vehicle mix changes. On the basis of the formula set out above, vehicle costs within the fleet have increased by 4.776%.

Vehicle Finance

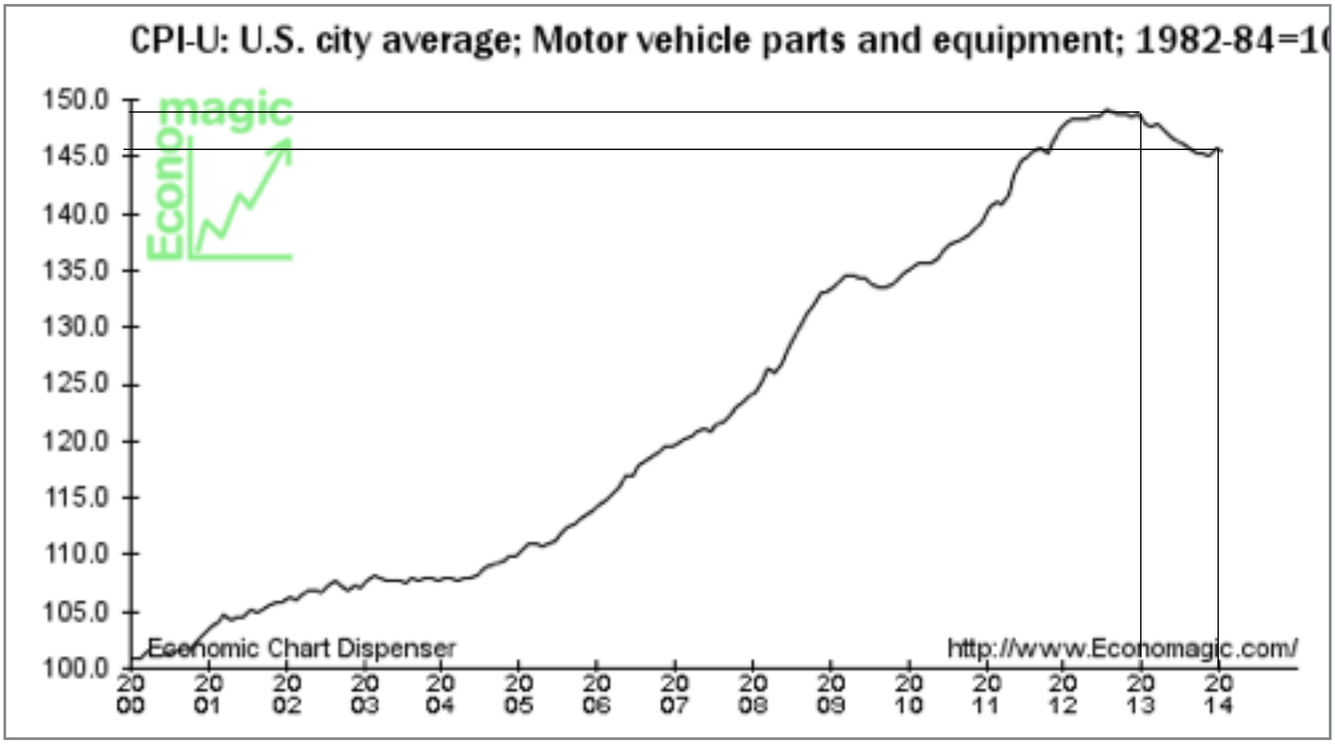
A vehicle finance rate has been sourced from Mission Federal Credit Union in San Diego, based on auto financing up to 72 months. The rate of 4.29% is then applied to the total composite vehicle costs to provide an annual cost for financing.

Maintenance Costs

The maintenance of a vehicle differs significantly between drivers and vehicle types. Reported costs of maintenance are limited to drivers providing an estimate, with an estimated annual cost in 2014 of $2,362. This is illustrated in figure 44, which sets out changes in motor vehicle parts and equipment.

An average maintenance cost of $2,362 per annum, is derived from the driver surveys and represents a current cost allowing for a proportion to be derived. The CPI-U figures also indicate a small decrease in the costs of motor vehicle parts and equipment, suggesting a decline in the overall costs of this element. On the basis of driver stated costs and measured CPI-U, the cost of maintaining a vehicle has fallen by 2.02% in the period 2012/13 - 2013/14 from $2,412 - $2,363.

Figure 45: Motor vehicle parts and equipment



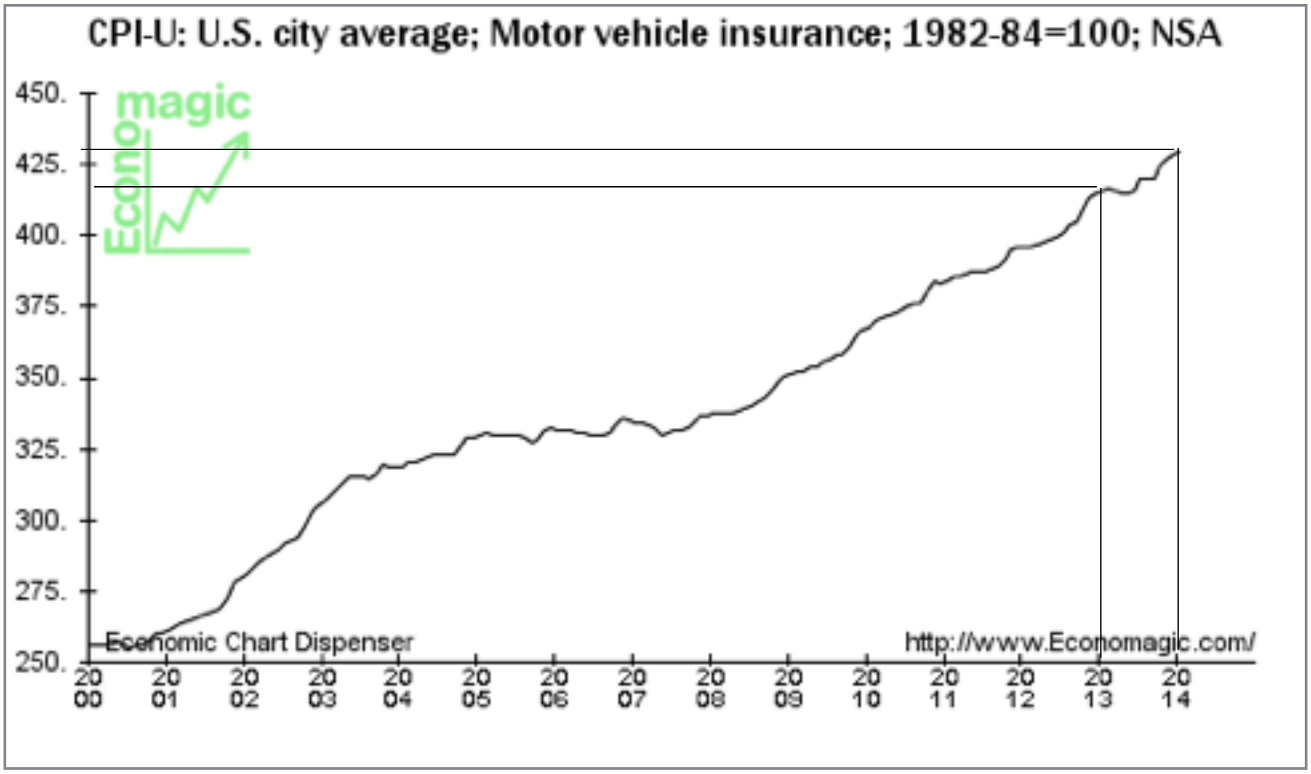
Source: economagic.com

Insurance Costs

Insurance is seen as an essential element in the provision of taxi services, and may be purchased individually by owner drivers or included within the lease arrangements of lease drivers. Its measurement will differ between drivers as no one individual driver or lease owner will experience the same costs as any other, but all will experience changes in costs reflecting changes in the market for insurance.

A mean cost is derived from driver surveys suggesting an annual insurance cost 2013/14 of $3,173. The stated amount is used to define the proportion of all costs, while CPI-U cost change indicates an increase in the cost of insurance of 3.452% in the period 2012/13 - 2013/14.

Figure 46: Motor Vehicle Insurance



Source: Economagic.com

Personal Income

The measurement of personal income is also included to ensure that changes in the taxi tariff also result in an increase to the potential earnings of the taxi driver. Personal income accounted for 54.47% of all costs of a reference driver, and is included at this proportion across all driver types. The inclusion of personal income does not imply an employer/employee relationship, nor additional responsibilities beyond those already defined within the taxi industry, but is included to ensure that the taxi fare review accounts for increases in potential earnings.

A value reflecting change in personal income is derived from equivalent trades rates defined as appropriate to San Diego, using San Diego OES Employment and wages data for Transportation and Material Moving from the State of California Employment Development Department[17]. The OES statistics suggesting a minimal increase in the wages earned within the transportation sector, of 0.35% in the period 2012 - 2013; and a fall in taxi driver earnings by 6.62% in the same period. In effect taxi drivers wages had dropped while the rest of the transportation sector had remained static. While it is inappropriate to seek to increase taxi driver earnings to the extent that would offset changed demand patterns, it is recommended that an

[17] Sourced from: http://www.labormarketinfo.edd.ca.gov/LMID/OES_Employment_and_Wages.html

increase in driver earnings is achieved through an equal combination of transportation sector OES (0.35%), and CPI-U (1.7%), resulting in an increase of 1.025%.

7. Market Response model

In preceding sections we identified production costs, baseline driver income and changes in the costs associated with providing taxi services. In this section we consider the nature of demand, and the changing demand for taxis and similar service types. We also consider the impacts that changes in the taxi fare are likely to have on demand for taxis.

7.1 Measured Cost / Income Target

In section 6.6.2 we identified that production costs are currently increasing at a rate of 1.2% per annum[18]. On the basis of this measurement it is logical that taxi tariffs increase to counter the increasing costs of production, and to continue to provide a defined level of income to the taxi driver. In defining a change in costs, the impact of a change in fare on demand should also be considered. In other words, as the fare increases loss of custom becomes a further potential impact. This loss may be estimated using the defined Price Elasticity of Demand calculations detailed above and summarized in figure 48 in relation to an increase in fares.

Figure 48: Changes in Demand by Production Type[19]

Trip Production	Incidence	PED	PED x Incid
Residential	29.07%	0.878	0.255
Workplace	15.57%	0.750	0.117
University / College	4.50%	**1.443**	0.065
Restaurant	5.88%	0.441	0.026
Bar / Nightclub	19.03%	**1.114**	0.212
Shopping	2.77%	0.782	0.022
Hotel	14.53%	0.506	0.074
Bus / Train	6.57%	**1.250**	0.082
Sightseeing	2.08%	0.834	0.017
	Composite PED	0.870	

PED Figures in **bold** indicate an elastic demand
Source: Public Survey.

[18] Rounded from 1.187%

[19] Based on measured Price Elasticity of Demand using existing trip mean (non-airport) and normalized straight line PED in response to changes to 20% applied to response rates by trip type.

PED measurement allows the estimation of passenger demand changes resulting from a change in fare. PED values lower than 1 indicate an inelastic demand where larger changes in price have a limited effect, while those with a value over 1 are elastic, and may result in a greater change in demand from a smaller change in fares.

The overall taxi market, measured as a composite of its trip types, demonstrates a PED value below 1 - ie: the market is relatively inelastic. In these circumstances an increase in fare will result in a lower loss of demand, and income, and has a net positive effect on driver income from a price rise. Specific sectors differ, however, notably: University, Bar and Nightclub, where a relatively elastic market is shown. In these instances the increase in fares will result in a net loss of income as more passengers move away from taxi use. In subsequent sections we apply the measured composite PED to the income calculations set out above, to demonstrate the impacts of changes in tariff against driver income including PED effects.

7.2 Application of Production Cost increase to mode tariff

Current San Diego taxi fares can vary between companies. In order to illustrate the impacts of a price increase we have used the most common fare (mode) in this section. We discuss the impacts of changes in fares applied to differing companies fares in subsequent sections. Figure 49 sets out the current mode taxi tariff, its current application to the mean trip distance, and the application of an increase in line with measured changes in production costs (figure 50).

Figure 49: Mode Taxi Tariff and application to mean non-airport trip

Mode Tariff					
	Cost	Unit	Included	Increment	Increment cost
Flag	$2.80	drop	0.1		
Distance	$3.00	mile		0.1	$0.30
Time	$24.00	hour			
Mean Trip					
Distance	5.37	Miles			
Drop			$2.80		
Distance Increments	52		$15.60		
Time factor @ 0.069			$1.08		
Tips factor @ 0.133			$2.07		
TRIP INCOME				$21.55	Includes time / distance / tip
Annual Income (Lease Dispatch Driver - FT)					
Annual Income		$49849.60			
Annual Costs		$19,861.60			
Income - Cost (take-home earnings)			**$29,988.00**		

Figure 50: Mode Taxi Tariff with Production Cost Increase and application to mean non-airport trip[20]

Mode Tariff					
	Cost	Unit	Included	Increment	Increment cost
Flag	$2.83	drop	0.1		
Distance	$3.04	mile		0.1	$0.30
Time	$24.28	hour			
Mean Trip					
Distance	5.37	Miles			
Drop			$2.83		
Distance Increments	52		$15.79		
Time factor @ 0.069			$1.09		
Tips factor @ 0.133			$2.10		
TRIP INCOME				$21.81	Includes time / distance / tip
Annual Income (Dispatch Driver)					
Composite PED	0.87				
Reduction in demand	1.03%	2289			
Annual Income		$49,924.62			
Annual Costs		$19,861.60			
Income - Cost (take-home earnings)			**$30,063.02**		
Comparative change in driver income					
Target increase	1.1870%	$30,343.96			
Baseline income			**$29,988.00**		From figure 49
Scenario Income			**$30,063.02**		
Actual Increase in income	1.176%	**-0.011%**			Loss of income due to PED

The inclusion of a PED variable is used to identify reduction in the demand for taxis that may result from a change in the taxi tariff. Figure 50 suggests that an increase in tariff of 1.187% results in an increase in driver income of 1.176%, effectively that the driver income does not increase at the same rate as the change in fare. Although it is noted that the difference is very small (0.011%).

[20] Taxi Tariff increases are applied without rounding to demonstrate impact of PED

Differences in PED are also notable for University/College, Bar/Nightclub and Bus/Train trip origins (relatively elastic market segments), where the loss in passengers is greater than the increase in fares. Drivers serving or concentrating on these trip origins are likely to be worse off as a result of the increase in tariff. Conversely, those serving or concentrating on Workplace, Restaurant and Hotel trip origins (relatively inelastic market segments) are likely to be better off.

Passenger PED elasticities can also impact positively on demand from price reductions. A reduction in taxi tariff may have the impact of increasing demand, particularly in relatively elastic segments, providing a market benefit to services known to discount, or providing specific targeted market promotions. Benefits may also arise to both passenger and some operators as a result of fare standardization, the adoption of a uniform city fare. As the San Diego fleet currently operates a range of tariffs, moving to a single tariff may have the effect of increasing demand from passengers from services charging higher than average fares, though the benefit of this move is likely to be spread across the industry, with a potential dis-benefit to drivers within the higher charging services.

7.3 Standardization of taxi tariffs

The following sections address the impact of moving to a standardized fare. A number of options are available in defining a standard fare which can include the adoption of an existing fare structure, being one that is already charged by one or more company (companies); the adoption of the existing airport fare structure; or the adoption of a new structure not currently charged by any company. As a number of companies already charge the airport fare, this would not necessitate a change for those companies.

We have identified three scenarios reflecting different options using fares already charged by one or more companies in San Diego, see figure 51. These are defined as Mode Fare, the fare currently charged by the most companies, median fare, a mid point fare, and a standardization at the maximum fare currently charged. It is noted that the Mode fare is also one of the lowest fares charged in the city, and mirrors that charged for airport departures.

Figure 51: Fare Standardization Scenarios

Senario Name	Flag	Drop %	Mile Rate	Waiting Time / hr
Standardization at Mode	$2.80	1/10	$3.00	$24
Standardization at Median	$3.00	1/16	$3.20	$26
Standardization at Maximum	$3.10	1/11	$3.30	$27

The three fare standardization scenarios are supplemented by a fourth, which varies from all fares currently charged, have been tested and are described in section 8.

8. Impacts assessment

In this section we calculate the impacts arising from changes in the taxi tariff in San Diego. Impacts can be felt by passengers, where changes in taxi fares affect the affordability of taxis, by drivers and by the wider taxi industry. Some taxi users will be more influenced by changes in tariff than others, and this is noted in particular for lower income groups and for some trip types. An example relates to student taxi users where an increase in taxi fare would reduce use. In this group any increase in income would be lost to a greater decline in use, with the result that drivers would be worse off with a fare increase than without, though the same does not apply to other user groups.

Impacts are tested on the basis of scenarios, defined 'what if' statements tested on an increasing level of application from Do Minimum to Do Maximum, reflecting a range of options open to the MTS.

8.1 Scenario development and description - Standardization

A series of scenarios have been defined as described below. Two main variables relate to fare standardization and fare increases reflecting changes in production cost. Standardization scenarios tested include:

Scenario 1: Fare Standardization at mode

Initial scenarios do not include a calculation of fare increase, but rather measure the impact of standard tariffs alone. Fare standardization at mode is based on the adoption of the most common tariff for all San Diego taxis. In the instance of San Diego, the mode rate is also the lowest charged in the city as a result of its adoption by a number of large dispatch companies. The main impacts of standardization relate to a reduction in fare per trip in radio services previously charging higher amounts, though this impact is felt by a minority of drivers. An increase in taxi use is also likely reflecting elastic nature of some trips. Passengers are likely to experience a benefit as a result of fare reductions in some radio services, particularly those focused on street engagement.

Scenario 2: Fare Standardization at median

The second scenario tests fare standardization at the current median rate. Standardization at median will impact on driver communities differently, with drivers in larger dispatch companies experiencing an increase in trip income but a reduction in passenger numbers; while drivers in companies with a higher tariff will experience a decline in trip revenue, but an increase in the number of passengers.

Scenario 3: Fare Standardization at maximum

The third scenario tests fare standardization at the current maximum rate. Standardization at maximum results in an overall increase in income for the majority of drivers, though not for those drivers currently working in the most expensive radio services. Negative impact on passengers are the most visible in this scenario with a number of groups showing significant loss. The measured impacts of standardization in all three scenarios are set out below.

8.1.1 Scenario testing - scenario 1

Each of the scenarios identified has been tested to demonstrate potential impacts on income and use. Figures 52 and 53 illustrate the impacts of standardizing fares to the mode fare. A mode fare is that which is most frequently charged, with the result that negative income impacts, where a driver may loose income as a result of moving to a lower fare, are limited to a smaller number of drivers than other scenarios. These are discussed in subsequent sections.

Figure 52: Scenario 1 impacts - annual income

Change in fare - average trip		**IMPACT**				**NON AIRPORT**
STANDARDIZATION AT MODE				Was	Becomes	Unit difference
Mode	0	No Change	No change in fare			
Median	-7.08%	Decrease in trip income	Fare Reduction	$23.59	$21.92	$1.67
Maximum	-10.68%	Decrease in trip income	Fare Reduction	24.54	$21.92	2.62
Change in income from existing trips						
Dispatch Driver Mode		No Change				
Dispatch Driver Median		Decrease in total income		$32,412.25	$28,823.36	$3,588.89
Street Driver Mode		No Change				
Street Driver Median	-13.21%	Decrease in total income		$24,612.04	$21,360.87	$3,251.17
Street Driver Maximum	-19.73%	Decrease in total income		$26,611.62	$21,360.87	$5,250.75
Increase / Decline in trips made						
			Change in trip no.	New Trips	Scenario Trip income	Impact on income
Dispatch Driver Mode		No Change				
Dispatch Driver Median		Increase in trip number	3.491%	77	$21.92	$1,694.98
Street Driver Mode		No Change				
Street Driver Median		Increase in trip number	3.491%	70	$21.92	$1,535.05
Street Driver Maximum		Increase in trip number	9.729%	195	$21.92	$4,277.99
Base trip income +/- change in demand						
			Baseline	Scenario	Difference	
Dispatch Driver Mode		No Change				
Dispatch Driver Median	-5.8432%	Decrease in income	$32,412.25	$30,518.34	$1,893.91	
Street Driver Mode		No Change				
Street Driver Median	-6.9727%	Decrease in income	$24,612.04	$22,895.92	$1,716.12	
Street Driver Maximum	-3.6554%	Decrease in income	$26,611.62	$25,638.86	$972.76	

Fare standardization has the impact of changing the market in a number of aspects, illustrated in figure 52. In the first scenario we tested the impact of standardizing the taxi tariff at the mode fare, the most common rate applied in San Diego for non-airport trips. We tested impacts using the following three steps:

- Change in income from existing customers that would result from a move to mode fares
- Change in the number of trips being made, including any growth in the market as a result of elastic demand
- Quantification of loss of income minus additional income from PED

Figure 53, below, illustrates the impact that such a change would have across a number of driver types. Where no change occurs, ie: where a radio service is already charging mode fare we have not included this as the income and potential market growth, remains the same.

Figure 53: Summary of impacts on driver income - Scenario 1 (Standardization to mode income)

IMPACT OF SCENARIO ON INCOME				
SCENARIO 1 - Standardization to mode				
	Do Nothing Take Home	**Scenario Take Home**	**Effective change**	**Satisfies production cost increases?**
Street Driver currently charging Median fare	$24,612.04	$22,895.92	-6.97%	NO
Street Driver currently charging Maximum fare	$26,611.62	$25,638.86	-3.66%	NO
Dispatch Driver currently charging Median fare	$32,412.25	$30,518.34	-5.84%	NO

Fare standardization to a mode rate has a positive impact in terms of passenger numbers and no negative impacts on any passenger group. The scenario does result in negative impacts on the taxi community, however, with a loss of income for drivers currently charging maximum and median fares, This loss of income is not recovered from market growth (additional trips), although market growth does exist. There are no negative impacts on passengers as the standardization represents a reduction or constant tariff across all user groups, and will likely result in an increase in trip number in passengers using services previously charging median and maximum fares.

8.1.2 Scenario testing - scenario 2

Scenario 2 tests the impacts of moving to a median fare. The scenario results in a mix of winners and losers as driver incomes increase above the measured rate of increased production cost discussed above, but will also have a negative impact on a large number of passengers as the most frequently charged fare (mode tariff) increases in this scenario. Figure 54 illustrates the impacts of applying a median fare across all non-airport taxi trips in San Diego.

Figure 54: Scenario 2 impacts - annual income

Change in fare - average trip		**IMPACT**				**NON AIRPORT**
STANDARDIZATION AT MEDIAN				Was	Becomes	Unit difference
Mode	7.14%	Increase in trip income		$21.92	$23.59	$1.67
Median		No Change				
Maximum	-3.87%	Decrease in trip income		$24.54	$23.59	$0.95
Change in income from existing trips						
Dispatch Driver Mode		Increase in total income		$28,823.36	$32,412.25	$3,588.89
Dispatch Driver Median		No Change				
Street Driver Mode		Increase in total income		$21,360.87	$24,612.04	$3,251.17
Street Driver Median		No Change				
Street Driver Maximum		Decrease in total income		$26,611.62	$24,612.04	$1,999.58
Increase / Decline in trips made						
			Change in trip %	Change in trip #	Scenario Trip Income	Impact on income
Dispatch Driver Mode		Decrease in trip number	-6.21%	-137	22.40	-3080
Dispatch Driver Median		No Change				
Street Driver Mode		Decrease in trip number	-6.21%	-125	22.40	-2789
Street Driver Median		No Change				
Street Driver Maximum		Increase in trip number	1.91%	38	$24	$919
Base trip income +/- change in demand						
			Baseline	Scenario	Difference	
Dispatch Driver Mode	1.77%	Increase in income	$28,823.36	$29,332.58	$509.22	
Dispatch Driver Median		No Change				
Street Driver Mode	2.16%	Increase in income	$21,360.87	$21,822.96	$462.09	
Street Driver Median		No Change				
Street Driver Maximum	-4.0621%	Decrease in income	$26,611.62	$25,530.63	$1,080.99	

Fare standardization to a Median fare produces a mix of benefits and negatives for both the taxi industry and the traveling public. Negative impacts in the taxi industry are limited to drivers previously charging the maximum tariff as a result of a fare reduction, see figure 55. The reduction impacts upon street drivers more than dispatch drivers, as a higher proportion of street drivers drive for companies with high fares compared to dispatch.

The headline reduction in fare is compensated by a moderate increase in passengers, but this is not sufficient in itself to offset the reduction in its entirety. A large group of passengers is negatively affected as fares increase in radio services previously applying the mode tariff.

Figure 55: Summary of impacts on driver income - Scenario 2 (Standardization to median income)

IMPACT OF SCENARIO ON INCOME				
SCENARIO 2 - Standardization to median				
	Do Nothing Take Home	**Scenario Take Home**	**Effective change**	**Satisfies production cost increases?**
Street Driver currently charging Mode fare	$21,360.87	$21,822.96	2.16%	YES
Street Driver currently charging Maximum fare	$26,611.62	$25,530.63	-4.06%	NO
Dispatch Driver currently charging Mode fare	$28,823.36	$29,332.58	1.77%	YES

The Median fare also produces the closest approximation to Production Cost changes of any of the existing fares, as it results in effective change rates for drivers charging mode fares of 2.16% for street drivers, and 1.77% for dispatch drivers. While these tend to balance out against the relative loss to drivers charging higher fare rates, see section 8.2.1.

8.1.3 Scenario testing - scenario 3

The third scenario tests the impacts of applying a standardized tariff using the current maximum rate. This scenario is the most beneficial to the taxi trade as it ensures all taxi drivers receive an increase or maintain existing income levels. Figure 56 illustrates the impact of this scenario.

Figure 56: Scenario 3 impacts - annual income

Change in fare - average trip		**IMPACT**				**NON AIRPORT**
STANDARDIZATION AT MAXIMUM				Was	Becomes	Unit difference
Mode	11.95%	Increase in trip income		$21.92	$24.54	$2.62
Median	4.03%	Increase in trip income		$23.59	$24.54	$0.95
Maximum		No Change				
Change in income from existing trips						
Dispatch Driver Mode		Increase in total income		$28,823.36	$34,619.54	$5,796.18
Dispatch Driver Median		Increase in total income		$32,520.49	$34,619.54	$2,099.05
Street Driver Mode		Increase in total income		$21,360.87	$26,611.62	$5,250.75
Street Driver Median		Increase in total income		$24,710.09	$26,611.62	$1,901.53
Street Driver Maximum		No Change				
Increase / Decline in trips made						
			Change in trip %	Change in trip #	Scenario Trip Income	Impact on income
Dispatch Driver Mode		Decrease in trip number	-10.39%	-230	21.92	-$5,044.15
Dispatch Driver Median		Decrease in trip number	-3.50%	-78	23.59	-$1,830.70
Street Driver Mode		Decrease in trip number	-10.39%	-208	21.92	-$4,568.20
Street Driver Median		Decrease in trip number	-3.50%	-70	23.59	-$1,657.96
Street Driver Maximum		No Change				
Base trip income +/- change in demand						
			Baseline	Scenario	Difference	
Dispatch Driver Mode	2.61%	Increase in income	$28,823.36	$29,575.39	$752.03	
Dispatch Driver Median	0.83%	Increase in income	$32,520.49	$32,788.84	$268.35	
Street Driver Mode	3.20%	Increase in income	$21,360.87	$22,043.42	$682.55	
Street Driver Median	0.99%	Increase in income	$24,710.09	$24,953.66	$243.57	
Street Driver Maximum		No Change	$0.00	$0.00	$0.00	

Fare standardization to a Maximum fare results in the greatest levels of driver benefit as the effective fare has increased for the majority of drivers, previously charging the mode fare.

The impact on passengers is in direct opposition, with the majority of passengers experiencing an increase in taxi fares beyond that identified as a result of increases in production cost alone. Figure 57 illustrates the impacts of standardization to driver income, with impacts on passengers discussed in subsequent sections.

Figure 57: Summary of impacts on driver income - Scenario 3 (Standardization to maximum income)

IMPACT OF SCENARIO ON INCOME				
SCENARIO 3 - Standardization to maximum				
	Do Nothing Take Home	**Scenario Take Home**	**Effective change**	**Satisfies production cost increases?**
Street Driver currently charging Mode fare	$21,360.87	$22,043.42	3.20%	YES
Street Driver currently charging Median fare	$24,710.09	$24,953.66	0.99%	NO
Dispatch Driver currently charging Mode fare	$28,823.36	$29,575.39	2.61%	YES
Dispatch driver currently charging Median Fare	$32,520.49	$32,788.84	0.83%	NO

8.2 Impacts of Standardization

The impacts of moving to a standardized taxi tariff will differ reflecting the extent of change that differing driver groups and differing passenger groups experience. Impacts will tend to be opposed, with passengers experiencing a negative impact from a fare increase, while drivers are likely to experience a benefit from the same action. The extent of change is mitigated by the measurable loss of passengers resulting from an increase or a relative gain as a result of a price drop, an effect of PED, but this does not in itself remove the positive income on driver income of a price rise nor fully counter loss of income from a price drop.

This should not imply that any increase be avoided on the basis of negative impacts to the traveling public, but rather that any increase be justified against measured changes in the costs of production, in the medium and long terms, and against comparative public gain in relation to fare standardization.

8.2.1 Standardization - Impacts on Passengers

Figure 58 illustrates the impact of standardization on taxi users. Three standardization scenarios have been tested, standardization at each of: Mode fare, Median Fare and Maximum fare. Mode fare relates to the most common fare applied in San Diego. Median and Maximum are both higher rates and are charged by a small number of radio services, most commonly applied for street engagements. Impacts are felt differently across passenger types, with lower income and student groups the most elastic, and thus most negatively impacted by increases in fares.

It is also noted that changes in taxi tariff impact on different passenger groups unevenly. Lower income and shorter trips tend to be more impacted by increases in fares when compared to longer trips, as the price of a flag drop represents a greater proportion of total fare to this group. Any increase applied evenly across all tariff elements will result in this impact.

Net passenger impacts, fare / demand growth, remain positive for standardization at mode alone, Fare standardization at median or maximum rates result in negative impacts with significant increases in fares in both, with potentially significant negatives arising in the case of standardization at a maximum tariff. This should not argue against standardization, but rather that standardization at higher fare levels are less appropriate than those that result in a more controlled increase. As a result of this measurement a further scenario (PC Fare Increase) has been tested, described in section 8.3. The PC Tariff rate results in the closest approximation to changes in production costs, and is therefore carried forward to the recommendations of this report.

Figure 58: Scenario Impacts - all market

Scenario	Impact on Public	Extent of Impact	Impact on Trade	Extent of Impact	Satisfies production cost increases across mean fleet?
Standardization at Mode	Fare Impact: Reduction in Median and Maximum fares. Overall Demand Impact: Small Increase in demand	Relatively small number of passengers experience lower fares. Potential average change in fare level across fleet: -1.04%	Income reduction in drivers in few companies	Loss of income greater in 2/17 currently charging at maximum rate Potential average loss of income across fleet: -1.84%	NO
Standardization at Median	Fare Impact: Reduction in Maximum fares, increase in mode fares. Overall Demand Impact: Decrease in demand	Large proportion of companies 12/17 increase fares with a larger proportion of passengers experiencing higher fares Potential average change in fare level across fleet: +5%	Income reduction in very few companies. Income increase in majority of companies.	Loss of income in 2/17 radio services. Higher income levels in 13/17 radio services. Potential average gain in income across fleet: +2.1%	YES
Standardization at Maximum	Fare impact, Increase in all fares except those charged at maximum.	Largest proportion of companies increase fares. Potential average change in fare level across fleet: +9.9%	Income increase in majority of companies. No change in companies charging maximum.	Higher income for the majority of drivers. Potential average gain in income across fleet: +5.7%	YES
Standardization at Production cost rate, see below	Fare Impact: Reduction in Median and Maximum fares. Small increase at Mode rate	Small number of passengers experience lower fares, small increase in mean dispatch rate Potential average change in fare level across fleet:- +0.52%	Income increase in companies charging mode rate, decrease in all others.	Higher income for the majority of drivers. Some loss of income in median and maximum companies Potential average gain in income across fleet: +1.4%	YES

8.2.2 Standardization - Impacts on Drivers

An opposing relationship exists in the case of driver benefit when compared to passenger benefits. Higher fares support higher incomes, while lower fares are not offset by increased demand with the exception of demand in a small number of user groups. Standardization at Mode does not meet the increased costs of production measured in the early stages of this report.

Differing driver groups will also experience changes in earnings to a differing extent, with street drivers receiving the lowest incomes despite charging the highest fares. This group will be disproportionately impacted from standardization at mode, and at median to a lesser extent. The extent of this impact may also be affected by individual driver choice with drivers choosing to accept dispatch generally receiving higher incomes than those accepting street engagement alone.

8.3 Scenario testing: Standardization at Production Cost

In the previous sections it was noted that no existing tariff satisfies both production cost increase and net passenger benefit, although Median tariff approximated the increased cost if applied to all drivers. We also note that changes have an impact on shorter journeys to a greater extent, requiring a balance between the interests of the driver, achieving an effective increase in income in line with changes in the costs of production, and the interests of the passenger, that any increase be measured and avoids excessive or unjustified increases.

In light of this conflict we have developed a further test that seeks to ensure that changes in production costs are accommodated on average across the fleet. This scenario is based on the following principles:

- Fare increases should be measured and justifiable against changes in cost
- Fare increases be sympathetic and not result in excessive increases to lower income trips
- Consistent / standard fares are available across all city pick ups
- Fare increases match changes in costs for a mean full time driver. Part time drivers will receive proportionately less, drivers working extended hours will receive proportionately more.

On the basis of these assumptions we have tested the tariff illustrated in figure 59. It is noted that fare levels remain set in multiples of 10cents to avoid the need for drivers to carry pennies. Some rounding will result from this.

Figure 59: PC tariff

Senario Name	Flag	Drop distance	Mile Rate	Increment	Waiting Time / hr
Standardization at Production Cost	$3.00	1/10 mile	$3.20	1/16 mile	$26

Figure 60: Scenario 4 impacts - annual income

Change in fare - average trip		**IMPACT**				**NON AIRPORT**
STANDARDIZATION AT PC			Fare Change	Was	Becomes	Unit difference
Mode		Increase in trip income	7.39%	$21.92	$23.54	$1.62
Median		Decrease in trip income	-0.21%	$23.59	$23.54	-$0.05
Maximum		Decrease in trip income	-4.07%	$24.54	$23.54	-$1.00
Change in income from existing trips						
Dispatch Driver Mode		Increase in total income		$28,823.36	32412.25	$3588.89
Dispatch Driver Median		Decrease in total income		$32,520.49	32412.25	-$108.24
Street Driver Mode		Increase in total income		$21,360.87	$24,612.04	$3251.17
Street Driver Median		Decrease in total income		$24,710.09	$24,612.04	-$98.05
Street Driver Maximum		Decrease in total income		$26,611.62	$24,612.04	-$1999.58
Increase / Decline in trips made						
			Change in trip %	Change in trip #	Scenario Trip Income	Impact on income
Dispatch Driver Mode		Decrease in trip number	-6.42%	-142	21.92	-$3,119.03
Dispatch Driver Median		Increase in trip number	0.10%	2	23.54	$54.02
Street Driver Mode		Decrease in trip number	-6.42%	-129	21.92	-$2,824.73
Street Driver Median		Increase in trip number	0.10%	2	22.76	$47.30
Street Driver Maximum		Increase in trip number	2.01%	40	22.76	$916.33
Base trip income +/- change in demand						
			Baseline	Scenario	Difference	
Dispatch Driver Mode	1.63%	Increase in income	$28,823.36	$29,293.22	$469.86	
Dispatch Driver Median	-0.17%	Decrease in income	$32,520.49	$32,466.27	-$54.22	
Street Driver Mode	2.00%	Increase in income	$21,360.87	$21,787.31	$426.44	
Street Driver Median	-0.21%	Decrease in income	$24,710.09	$24,659.34	-$50.75	
Street Driver Maximum	-4.07%	Decrease in income	$26,611.62	$25,528.37	-$1,083.25	

Fare standardization in line with a PC measured index, illustrated in figure 60, provides a mean increase in driver earnings in line with measured changes in production costs, and results in a limited increase in the average fare paid for dispatch trips, with reductions in street hail and stand fares for companies previously charging median and maximum fares. Passengers taking short journeys, often those favored by lower income travelers, have been protected from excessive change to the extent possible avoiding the use of pennies.

The adoption of the PC Tariff also allows the continuation of the defined production cost methodology set out in previous sections, and included in our recommendations, see section 9. The application of the PC Tariff does not satisfy a desire stated by some to match city fares to those charged at the airport, nor does it allow for a company to offer a lower tariff, proposed to us by one. These issues are discussed below.

8.4 Airport vs. City Fares

In the course of our analysis, a number of stakeholders highlighted the benefits that would arise, in their view, from linking San Diego city fares to those charged from the airport. The arguments made were convincing and we agree with many of the benefits cited. Primary benefits relate to the avoidance of differences in fare for the same trip made in differing directions, and to the reduction in 'meter fraud', with the accidental overcharging of airport passengers by selecting the wrong tariff on dual tariff meters.

While we can not comment on the frequency of accidental overcharging, we agree that its potential would be eliminated by the adoption of a single fare structure. We also agree that using the same fare structure would reduce the confusion on the part of airport users, particularly new comers, that result from differing tariffs. It is noted that the latter element, confusion between differing tariffs, would be removed in the city fleet as a result of our recommendation to adopt a standard tariff.

In undertaking our measurement we have concluded that moving to the Mode Tariff across all San Diego taxis, effectively adopting the current rate required of airport departing passengers, does not satisfy the measured change in production costs. We also note that the San Diego International Airport operates its own fare reviews and update based on CPI. While we agree with the concept of a measured analysis, of which CPI is one approach, we do not feel that this fully identifies nor satisfies the changing costs experienced by the taxi trade.

We are not able to recommend standardization at the current airport rate of fare as this would not provide an equitable rate in the San Diego city fleet given the current differences between radio services in the city. Moreover, we have concluded that the methods of increasing fares adopted by the airport could not be guaranteed to fully cover changes in the costs of production in future reviews.

It may be an appropriate recommendation that the airport considers the adoption of the city fare, though we recognize this recommendation falls outside the scope of our study.

8.5 Fare Discounting - posted tariff differentials

Fare discounting was a further issue presented to the study team. Price discounting is a common market response to capture market share, whether from competitors or to stimulate market demand as a result of customer Price Elasticity of Demand. Fare discounting is permitted In the taxi mart in many European countries and in a smaller number of US cities where taxi tariffs are set as a price ceiling. The San Diego taxi tariff is currently defined as a maximum, with companies having the ability to determine and charge tariffs below this level.

A difference exists in the application of price ceilings, in that a number of cities in European countries permit prices to be negotiated at the time of use up to the defined maximum, whereas radio services in San Diego are required to define a tariff for their entire fleet, publish (including through the application of Decals) and certify fares. The impact of fare discounting has been mixed, with a more common feeling amongst the stakeholders that a standard fare would be more beneficial than a mix of fares between radio services. Indeed a number of taxi companies in San Diego already operate at the same fare level.

It is also questionable whether price competition is effective on the street, with the intending passenger having a limited opportunity to compare prices at stand and virtually no opportunity in the hailed market. Effectively price competition is most prevalent in pre-booked markets where consumer choices can be made with a wider range of information and access to multiple suppliers.

Our analysis also suggests a limitation to the extent to which price competition may result in an increase in demand. The limitation exists as a result of the relative PED across many taxi users. The majority of taxi users display relatively inelastic demand characteristics, meaning that a large change in price leads to a relatively small change in demand, with the composite of all users price and cross elasticity (PED / CED) also being relatively inelastic. A company offering a price reduction is unlikely to gain sufficient new customers to offset income lost from the price reduction. Notable exceptions to this include Student taxi users, Bar/ Nightclub taxi users and Sightseeing taxi users display relative elasticity, suggesting that price reductions in these groups are likely to lead to increased business that would compensate for and exceed loss in income from the reduction. As the market is, across a composite of all use types, relatively inelastic this suggests that targeted promotions to more price elastic groups would be more effective than a general discounting.

While we agree that discounting is a legitimate market response, we consider that the benefits of a defined standardized fare provide a wider benefit, discussed in detail in previous sections. A potential alternative exists in allowing for fare discounting and discount promotions within a standardized fare. This would preclude the use of separate fare by company, with the requirement that all taximeters be set to the standardized fare level; but would allow individual services to offer discounts/fare promotions allowing for discounting and the advertisement of promotions. Price competition in the pre-booked market segment, including discounting, does not rely on rates posted on vehicles and may be established clearly in on-line advertising, printed material or targeted discount.

9. Conclusions and Recommendations

In undertaking our study we have reviewed four primary areas, the measurement of taxi production costs, including changes to these; the identification of opportunity and impacts of fare standardization; the identification of market responses to changes in taxi fares; and the application and update of fares. Our work compares various methods of measuring taxi costs, and concludes that the adoption of an IPI Taxi Cost Index is appropriate and would serve the San Diego taxi market with greater levels of accuracy than its alternatives.

We also conclude that taxi users, and intending users, would be better served with a standard tariff, than with a range of rates. This does not preclude the opportunity for price discounting, and we feel that taxi services should be able to offer individual discounts, or targeted promotions, such as 10% discount or $1/off coupons, but that this discounting should be applied to a standard fare rather than the basis of the fare itself.

It is also our recommendation that fare reviews be undertaken on a regular basis. We recommend that this be undertaken on an annual basis and fare baselines updated on each occasion, even if no increase in fare is applied. We feel that this has the benefit of ensuring that any comparison with retail price inflation, by the pubic or press, is made on a like for like basis. We do not feel that extended time delay between reviews works in the interest of the public or trade as such delay may result in the identification of significant changes in cost that compare poorly with a perception of inflation, can not be fully applied and/or result in a loss of income to the taxi trade.

9.1 Tariff Review Methodology - Production Cost Measurement

A major element of our analysis has been the development of a tariff review methodology. Taxi tariffs can be updated using a variety of measures which typically range from a regulator led measured review of costs to an operator led response as to what the market may bear. The current methodology applied in San Diego represents a mix of regulator led tariffs determined by the San Diego International Airport and applied to departures from the airport alone, and an operator led response in the rest of the city to a defined maximum set by the MTS on the basis of variance from mean. The result of this is a series of different tariffs charged by different companies across the city.

Our analysis of tariff methodologies included review of approaches adopted in other US cities, including the methods by which tariffs are updated and applied, and similar calculations applied to the San Diego taxi market. In section 6 we concluded that a measured approach to tariff review was appropriate and worked in the interest of the traveling public and taxi trade, and recommend the adoption of a Tariff Review Methodology based on the measurement of an IPI Taxi Cost Index. We recommend that this index comprise measured change in the factors, set out in detail in section 6.

We also recommend that the taxi tariff be reviewed on a regular basis. It is our conclusion that a taxi review completed on a 12 month cycle provides the greatest benefit, reducing false comparisons - between taxi costs and inflation measured over differing periods - and reducing the impact of short term spikes in fuel costs discussed in more detail below. Tariff reviews that result in a zero increase in fares are also a valid outcome of this process and should be used to reset baselines on every occasion, ie: any new review is assessed on the previous 12 months alone.

Our analysis indicates an increase in production costs of 1.2% over 12 months, and would recommend this form the basis of updates to tariff.

9.2 Fare Standardization

In addition to the identification of a tariff review methodology, the study was also asked to look at the potential for taxi tariff standardization and the impact of any such move. Standardization relates to the adoption of a standard tariff across the city, allowing for a standard tariff, whether absolute or set as a maximum. A number of arguments exist both in favor of adopting a standard fare, mainly associated with clarity and equal treatment; and against, reflecting the competition that is possible where individual companies are able to define and advertise fares that are lower than those charged by competitors.

The study recommendation, that a standard fare is adopted relates to non-airport trip departures as the airport operates a differing tariff scheme. It is our view, however, that benefits would arise if standardization could also be applied to airport trip departures in addition to those in the city.

Standardization will have impacts on all market participants and will, by its nature, create winners and losers. The study tested a range of scenarios against the principles that any change should result in the greatest benefit and the least dis-benefit. Any change should result in a mean increase in income reflecting the measured change in costs defined in our measurement of changes in production costs. Any change in income should be based on the measurement of impacts to typical full time drivers. Drivers working part time are likely to receive a proportionately lower increase as a result of the ratio between fixed and variable costs; while drivers working extended hours are likely to receive a proportionately higher income for the same reason.

Our analysis looked at options including the adoption of one of the existing tariffs across all radio services, and have concluded that none of the existing tariff rates achieve an optimal outcome. The analysis indicates an optimal tariff lies between mode and median fares, set out in detail in section 8.3. The adoption of this tariff rate provides, on average, an increase in income consistent with the measured change in production cost.

9.3 Temporary cost spikes

The study team were also asked to consider the impact of temporary costs spikes on tariff and income. Spikes in costs most often relate to changes in the cost of gasoline, and are illustrated in figure 44, in section 6.6.2. The cost of gasoline has fluctuated significantly in the period of review, to the extent that a measurement taken from January 2013 to January 2014 may underestimate the cost by up to $0.70/gallon.

This under estimation may result in overestimation of mean driver income or result in a loss to drivers over a short term period. It can be argued that this fluctuation applies to a short term spike. Changes over the longer term are more likely to be remedied by each successive tariff review. The more frequent a review, the lower the negative impact of temporary cost spikes.

A number of cities have sought to reduce this impact by adopting fuel cost supplements in defined circumstances. While fuel cost supplements are a relatively crude method of mitigating income losses resulting from fuel spikes, some benefit can accrue from this. It is also noted that the cost of fuel is only a limited part of the total costs of operation, representing 20.6% of the costs experienced by a Full Time street driver, and is a cost purely in terms of distance travelled, resulting in a relatively low additional cost of around $0.04/mile driven in service for every additional $0.50 per gallon. Using an average trip distance calculation this would justify a supplement of $0.20 on a trip for each additional $0.50 that pump prices exceed trend costs.

We would recommend that a fuel cost supplement be permitted in a few, limited circumstances. We recommend that a fuel cost supplement is permitted where the mean at pump cost exceeds trend costs by $0.50 cents or greater. We also recommend that this supplement is NOT applied automatically, but requires an application to be made from a majority of the taxi industry, providing measurement to the MTS. The supplement should be removed as the pump costs fall below the $0.50 variation from trend. We also recommend that measurement of pump prices be made on the basis of weekly mean prices.

9.4 Future reviews

The study recommends that taxi tariff reviews be undertaken on the basis of annual assessment of changes to the IPI Taxi Cost Index. Changes in costs should be reflected in the taxi tariff where these are considered to be significant. Marginal changes or reviews where no change is recommended should, never-the-less, reset baseline figures, allowing the following reviews to refer back 12 months only.

The study recommends the adoption of a Production Cost basis for future analysis applied to a standard tariff described above.

We also recommend that the MTS seek adoption of the MTS standard fare by the San Diego International Airport.