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RESEARCH ARTICLE

ZONAL REGULATION OF MINIBUS TAXI TRANSPORT SERVICE: A SOLUTION OR CONFUSION? EVIDENCE FROM TAXI TRANSPORT SERVICE IN ADDIS ABABA, ETHIOPIA

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ABSTRACT

Population growth and ever increasing urbanization have lead to the rapid growth and expansion of cities, which have been overwhelmed by a sudden increase in travel demand. Urban transportation is a critical concern in most developing countries. Ethiopia is no exception as an increasing urbanization is taking place. Like other African cities, Addis Ababa has experienced physical expansion and rapid population growth which has created high transportation demand. In Addis Ababa, since car ownership is very low, majority of residents depend on public transport, which is shortly supplied. Minibus taxi transport service is one of the public transport services which has greater modal share next to walking in the city. Until 2011, taxi transport was unregulated by the government with regard to route selection. They were operating every parts of the city without any restriction of routes. This created big opportunity for taxis to operate in areas where there is profit. This in turn results in discrimination; places that are far from the city center were not getting taxi service. For this response, the government has introduced zonal taxi transport system. The purpose of this study has been to assess the effect of zonal taxi transport system on the level of taxi transport service with special reference to Addis Ababa, Ethiopia. The study has been focused on the changes brought by the regulation into taxi transport service, the existing level of taxi transport service and taxi users' level of satisfaction towards taxi transport service after the regulation put into place. In order to undertake this study, survey questionnaire, interview and observation were carried out to collect primary data from sample respondents in the study area. Both qualitative and quantitative techniques were used for analyzing the data. In addition to the above sources, relevant literature and essential documents were also reviewed. The findings of this study showed that the regulation has brought many changes in the taxi transport industry. With zonal taxi transport system, taxi station attendants are legally organized, taxi owners are organized and established taxi owners' association, the idea of taxi zoning came into place, each taxi has forced to have a destination sign posted at the roof of each vehicle and taxi operators must post taxi transport tariff inside the vehicle. The study result also revealed that since taxi operators stick to one route, their livelihood is highly affected. The regulation has affected them negatively as compared to the situation before zonal taxi transport system. On the issue of service quality, the study showed that taxi operators' behavior, the way taxi users get into taxis, waiting time to get taxis, time to reach taxi terminals and comfort of seating in taxis are those that are improved by zonal taxi transport system. However, the regulation does not bring any change with regard to time spent onboard, waiting environment for taxis at taxi terminals, responsiveness of transport bureau towards transport related problems, theft and traffic congestion as compared to the situation before zonal taxi transport system.

INTRODUCTION

Urban transportation is a critical concern in most developing countries. An efficient transportation system plays an important role in shaping the daily lives of citizens. Lack of affordability and accessibility to adequate transportation system can develop social exclusion (Ahmed *et al*., 2008). Transport is a crucial infrastructure that is needed to the economic and social development of cities. It is one of the social facilities which are offered with the objectives of improving social welfare (Nyarirangewe and Mbara, 2007). Transport enhances the people's livelihood frameworks by facilitating mobility and accessibility to services. Through the breaking of socio-economic and spatial isolations, transport is a basic instrument for poverty alleviation. Despite transport has enormous contribution to the socio-economic development of cities, in developing countries, there are several factors that contribute more to the severity of their transportation problems. Population growth and ever increasing urbanization have lead to the rapid growth and expansion of cities, which have been overwhelmed by a sudden increase in travel demand. By comparison, the supply of transport infrastructures and services has lagged far behind the demand. On the top of that, facilities for pedestrians and cyclists are almost non-existent because public sector finances are very limited that funding for urban transport, as a result, people are forced to share the road with motorized vehicles that make people more vulnerable to car accident (Puncher *et al*., 2005). According to the Population Division of the Department of Economic and Social Affairs of the United Nations, by 2050, 67 percent of

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the world population is projected to reside permanently in urban areas (UN, 2012). In Ethiopia, 16.1 percent of the country's total population is living in urban areas. With the growth rate of 2.1 percent, the population of Addis Ababa was 2,738,248 (CSA, 2007). Like many African cities, Addis Ababa has experienced physical expansion and rapid population growth. This has led to increased costs of infrastructure and basic urban services (Minwuyelet, 2005). City sprawl can results in low population density which in turn causes high travel cost. As a result, the government cannot afford to develop transport infrastructure. This in turn has created challenge for the city government to meet the transportation demand of the people. When the population increases, it is common that cities expand to accommodate the people. However, public transport has failed to reach all the demands of the population due to a huge mismatch between transport supply and demand for it. In terms of vehicle stock, Addis Ababa holds 75 percent of the total vehicle in Ethiopia. In 2004, out of the total 400000 vehicles of the country, 130000 vehicles were located in Addis Ababa (Fikadu and Tegegn, 2013). Public transport in Addis Ababa consists of conventional bus services which are provided by the public owned Anbessa City Bus Enterprise, minibuses which are operated by private sectors, conventional taxis and buses exclusively for employees of large organization (World Bank African Regional Scoping Study, 2002).

According to the information obtained from Addis Ababa Transport and Road Authority (AATRA), the authority has regulated taxi transport by introducing zonal taxi transport system in 2011 to reduce the problem of equity in terms of accessing taxi transport service in the city. For this purpose, the city has divided into five zones which include Asko, Megegnagna, Bole, Saris and Torhailoch with the number of routes 42, 38, 31, 31 and 24 respectively. These zones have been served by thirteen taxi owners association. Each taxi association has a specific route in its territory, and each taxi is supposed to operate on the assigned route and with a fixed fare based on the distance they travelled. Each taxi posted destination signs on top of their vehicles. To administer the system well, there are also taxi station attendants who are organized by the government as micro enterprises to maintain taxis' order at taxi terminals. The very importance of the system according to the office is to reduce time and money by preventing the taxi drivers not to cut the long route into short distances that costs passengers, to distribute and available taxis in different parts of the city to serve the people in an equitable manner.

In addition, the regulation has enacted to the reduce waiting time for taxis by making taxis available on the assigned route, to improve speed of taxis by reducing congestion, to improve taxi operators behavior by providing training on how to handle taxi users, to improve the ways to get passengers into taxis, to improve the waiting environment at taxi terminals, and to protect passengers from theft by maintaining discipline at taxi terminals. According to Puncher *et al* (2005), rise in population growth, low incomes and extreme inequality is the main factors for causing transport problems in developing countries. Even though the nature and extent of the problems vary from country to country, developing countries face unplanned and haphazard development at the suburban fringe without adequate infrastructure, limited network of roads, extremely congested roads with an incompatible mix of both motorized and non-motorized vehicles travelling at different speed and extreme transport related pollution, noise and other environmental impacts. This reality is also true for Addis Ababa. According to Gebyehu and Takano (2007), the road network in Addis Ababa is limited in extent, low capacity, on-street parking is prevalent, and the pavement condition is deteriorated. The city is also expanding very fast due to the rural-urban migration and natural population growth.

Road transport is the most dominant mode of transport in Ethiopia. According to Fekadu and Tegegn (2013), 99.31 percent of the total passengers use road transport for their mobility in Ethiopia. The major public transportation modes in Addis Ababa are buses and minibuses (usually called taxi in Addis Ababa). There are few car owners. The majority of the city residents are dependent on walking, buses and taxis. In this regard, 2.2 million people in Addis Ababa depend on public transport; 3.6 million trips are undertaken in daily basis (Tilahun, 2014). Unlike other cities in the country, bicycle use is insignificant because of topographic inconvenience (Gebyehu and Tanako, 2007). In terms of modal split, Anbessa buses and minibuses have respective shares of 10.9 and 20.6 percent, whilst the share of private cars is only 5 percent. The highest share i.e. 60.5 percent is taken by walking and the remaining 3 percent listed as others. Addis Ababa is being served by 350 Anbessa buses. This is not to meet the demand and is supplemented by more than 10,000 private minibus services (Addis Ababa Chamber of Commerce and Sectoral Associations, 2009).

It is true that various modes of public transport should be adequately available in cities to help people move from place to place for different purposes. However, the increase in population growth coupled with the economic growth and the expansion of the city create high demand of transportation service for the increasing mobility demand of the people. The existing public buses are insufficient to accommodate this high demand. To address this problem, the government has made interventions by introducing 495 midi buses with a capacity of 25 passengers in 2006 from China. The government has also encouraged private owners to participate in providing public transportation services (Birhane *et al*., 2013). With regard to taxi transport service, to make taxi transport equally accessible and available to the people in the city, as a panacea, the government introduced zonal taxi transport system, where taxis distribute in each zone to provide transportation service to the users. Before the government's regulation of taxi transport, the taxi operators used to serve the most profitable routes and clients, cutting the long route that one wish to move into short distances that costs passengers in terms of money and time, asking passengers for higher price during peak hours and discriminatory provision of transport service were some of the common practices in the city. As a result, the government has regulated the taxi operation system by introducing zonal taxi transport system. The regulation was introduced in 2011 but up to the best knowledge of the researcher, the effect of the regulation on the level of taxi transport service has not yet been assessed. This is, therefore, the reason why the researcher

becomes motivated to work on the issue. Hence, the aim of this study is to explain the effect of zonal taxi transport system on the level of taxi transport service in the city.

Literature Review

Regulation of Public Transport: Developing countries perspective

According to Sohail *et al*. (2006), transportation is aimed to move people and goods where they want to move safely, quickly and affordably. Land based transportation system comprises minibuses (research focus area), buses, taxi, train, metro, tram and para-transport vehicles like rickshaw, bicycles and motorcycle taxis. Regulation of public transport is a mechanism that the government put to control fare, quality, route assignment and checking the extent of transport accessibility. In this article two groups are identified with different views with regards to regulation of public transport. The first group supports the theory called Public Interest Theory of Regulation. It asserts that regulation is needed for the protection and benefit of the society at large. The common protection of collective interests through the government-organized regulation of private companies is the very objective of regulatory regime both in the developing and developed countries. Government-organized regulation of private companies ensures comprehensive service provision to rule out social and financial differences mounting between area and people. To protect customers and employees by commencing safety and quality standards, controlling the quantity of services and prices by regulating the entry of new transport operators, governments participate in the transport market.

Regulation has prospective significances to serve the society by getting policies of the government into practice as efficiently and effectively as possible. However, in the public choice model, the regulators are considered as self-interested utility-maximizers driven by power, salary and patronage; has pro-regulatory political interest while making decisions. It also may suffer from inefficiency resulting from problems of 'morale' or 'bureaucratic inertia' from the context of the public sector (Sohail *et al*., 2006). Advocators of deregulation or privatization assert that the state should set minimal regulations to make sure that there is fair competition and safe operation of transport services. Deregulation of public transport is aimed to maximize competition in public service delivery for a certain route or encourage the number of independent operators for competition on the route. They argue that deregulation has cost advantage, reduces fares, reduce public expenditure; improve public service levels, greater innovation and greater responsiveness to the needs of travellers. However, according to Sohail *et al*. (2006), the argument for retaining a degree of regulation in the provision of public transport is made on the basis that regulation is needed to ensure the provision of public transport service for all especially the urban poor. Contrary to the advocators of deregulation, Gwilliam (2001) came up with a point that competitive bus operation is far from positive in developing countries. From the dangerous, anti-social nature and inefficient use of resources perspective, competition has negative impact on the poor. For example, in Lima, Combi-taxis are considered as the most dangerous because of their accidents on the community; the driver pick-up and drop off passengers in the middle of the road that could invite the passenger to car accidents. The other point is that there is serious personal security problem of transport in developing countries. For example, in Lima, Peru fear of harassment and theft is ranked as the biggest concern among women public transport users. Therefore, due to the above problems, some countries return to state monopoly, for example, in Jamaica, bus industries has been renationalized, and in Kuala Lumpur, minibuses decided to provide service on the hands of government favoured company. With regard to regulation of fare of transport by the government, Gwilliam also indicated that problem will arise in regulation of fare, if the government set the fare without regard to its effect on operator's finance. This leads to loss of quality service because if the fare is set by the government without consulting the taxi operators, there is no possibility for taxi operators to generate more that could replace and maintain their cars. Therefore, Gwilliam recommended that when the government wants to restructure fare, the government should invite to taxi associations to discuss on the issue because it affects their livelihood. Sohail (2006) supplemented his previous idea with example that deregulation may result in poor driver's behavior on the road to get more passengers, increase traffic congestion and fare increases if subsidies are get rid of so that it negatively affects the urban poor. Therefore, to make the public transportation service accessible and affordable, regulations from the government should be put into place.

Public Transport and Urban Livelihood

Urban public transport is a means to access other services and livelihood assets particularly for the urban poor. To get out of social, economic and physical isolation, affordable public transport is very essential (Sohail *et al*., 2006). In Tanzania, Dar es Salaam, has faced difficulty to cope with the demographic and spatial/physical expansion of the city to meet the indispensible need of its community, particularly, the urban poor. When the city is physically expanded due to natural population growth and urban-rural migration, it requires high effort to provide infrastructure especially transport. Because, inadequate provision of transportation service in cities will results in inaccessibility of jobs, heath services and others that determine their livelihood. The daldalas, taxi operators, for example, wanted to provide transport service by choosing the most profitable route and clients. Due to this reason, outreaching of the poor in the outskirts of the city became more complicated. This in turn deteriorates the possibility of working in the city center and this creates exclusion in different social, economic, political and spatial spheres (Pochet *et al*, 2003). Hence, transport plays a great role in social cohesion and to access goods and services that are basic to livelihood. The role of transport for livelihood involves income generation, access to health, education and social networks with extended families and friends. Transport is a source of asset for too many urban poor in developing countries, particularly in Africa and Asia. Access to transport influences the assets available to the person and this in turn is influenced by the person's asset. The person's financial asset influences whether the person is able to afford public transport.

The same is true for the natural assets of the community. The natural asset of the community also influence the transportation cost, for example, being the area terrain, hill or mountainous increases the transportation cost (Sohail, 2005). Access to public transport allows poor households to participate in multitude of activities such as petty trading, small scale service provision and working in factories as permanent or causal laborer. Transport plays significant roles in making their livelihood diversified. However, Axhausen and Schonfelder (2003) argued that high cost of transport, long distance from home to bus stop, long distance from bus stop to relative's or friend's place, absence of car ownership or inaccessibility of public transport make the person not to fully participate in social aspects. This would affect the livelihood of the person. This is why Sen (1999) cited in Jaramillo *et al* (2012) reasons out that it is not lack of food opportunities that hinder development in one nation rather it is lack of access to food and opportunities. Hence, according to her, if opportunities are easily accessed by the urban poor, they can easily escape from vicious circle of poverty.

Factors Influence Travel Behavior

Having the knowledge of the reasons of choosing one mode of transport over the other and the travel behavior is a basic issue. However, travel behavior is a complex issue. Beirao and Carbral (2007) argue that for each journey, people have different choice of transport mode. Each mode has different characteristics and cost. Moreover, people may have a different modal choice for different journey, and they may also use more than one mode of transport at different time. Convenience, comfort, speed, individual freedom and service quality are some of the determinant factors to choose one mode over another. In their study of understanding attitude towards public transport and private car, Beirao and Carbral (2007) also added that individual characteristic and life style, the type of journey, the perceived service of performance of each transport mode and situational variables are factors that influence modal choice of transport. Finally, they concluded that in order to increase the use of public transport, the service should be wished for the way that provides accommodation of the frequency and image of service needed by the users so that potential users can be attracted too.

Dell'oliho *et al.* (2011) conducted a research on the quality of service desired by public transport users. In this research, they identified that waiting time, cleanliness and comfort are basic variables that public transport users most valued, but the extent to which they are valued differs based on the group of public transport users. Even though they are given less value by the users, they also identified deriver's kindness, bus occupancy and journey time as variables that determine the desire of public transport. In urban corridor of Harare, Zimbabwe, Nyarirangwe and Mbara (2007) came up with the idea that fare charged for low-income groups are the main decision making variable for modal choice whereas for high-income groups service quality that is waiting time, travel time and comfort determine their modal choice decision. They added that, if the demand for public transport is inelastic due to inadequate service or alternatives, low-income groups will face a serious challenge. It means that when there is no alternative mode of public transport, the commuters are forced to pay what they already asked to pay. Hence, the demand will become inelastic; this makes the taxi operators more profitable because of their monopoly of transport provision in the city. The challenge becomes even more serious where travel distance is relatively very long. If fare of public transport increases over time, it leaves the poor society not to access the transport facility. This in turn restrains access to jobs, services or in general opportunities that triggers poverty in the city in particular and the country in general.

MATERIALS AND METHODS

Description of the Study Area

Addis Ababa, the capital city of Ethiopia, is found at the heart of the country and is located at 9°02'N to 9.03°N 38°44′E to 38.74°E (Fikadu and Tegegn, 2013). It has 10 sub cities with 99 kebeles (See Figure 4.1 below). Addis Ababa covered the area of 530.14 square kilometres. In 2007, Addis Ababa's population was 2,738, 248 with a growth rate of 2.1 percent (CSA, 2007) and an aggregate population density of 4,847.8 persons per square kilometre (Gebeyehu and Takano, 2007). By 2020, the city is expected to host 6-7 million inhabitants (Fikadu and Tegegn, 2013). The city has experienced several planning changes which have influenced its physical and social growth. Road network of the city is limited in extent and its capacity is low. On-street parking is prevalent and the pavement condition is deteriorating. Even though the number of pedestrian in the city is increasing time to time, 63 percent of the road network is without sidewalks. This contributes to the increasing pedestrians' causes for car accident in the city (Gebeyehu and Takano, 2007).

In Addis Ababa, the major transportation modes are conventional buses which are operated by the government and taxis which are operated by private sectors. Although buses have 30 seats each, they do have the capacity to accommodate 100 people in a crowded condition. There are also small taxis (4 seats) and large taxis (12 seats). There is no rail transport in the city. Since car ownership in the city is insignificant, most of the residents are depend on buses and taxis for their mobility. Walking is the main means of transportation for most residents of the city. Bicycle usage is almost none because of the inconvenience of the topography of the city. According to Ethiopian Road Authority (2005) quoted by (Gebeyehu and Takano, 2007), taxis and buses provide 60 and 40 percent of public transport in the city respectively. Addis Ababa is experiencing horizontal growth but public transport service is not proportionately growing to accommodate the demand. Minibus taxis have problems such as bad derivers' behavior, excessive increase of fare and high accident rate (Gebeyehu and Takano, 2007). Anbessa city bus enterprise is the only bus company which is mandated to provide public transport service in the city. It operates a fleet of 524 conventional buses and provides schedules services along 93 routes in the city. It is subsidized by the city council and serves 40 percent of all public transport passengers. In terms of modal split, Anbessa as a sole conventional city bus operator and minibuses (privately operated) have respective shares of 10.9 and 20.6 percent, whilst the share of private cars is only 5 percent. The

highest share i.e. 60.5 percent is taken by walking and the remaining 3 percent listed as others. Shortage of finance and the reduction of subsidy from the government are the major challenges for the poor performance of buses. On the contrary, there is a year by year increment of bus users in the city (Gebeyehu and Takano, 2007). In 2005, the number of taxis operating in Addis Ababa was 14,083. Out of this 12,283 had 12 seats and 1800 had 4 seats. Nonetheless this research is strictly relying on 12 seat taxis because zonal taxi transport system is introduced to them. By 2005, 11,806 taxis were inspected and registered by Addis Ababa Transport Authority (see table 4.4 below). Taxis are operated by the private sectors and were not enforced by the government. Even though the fare is high in comparison with buses, public transport services are highly dependent on taxis (Gebeyehu and Takano, 2007).

Research Strategy

The type of this research is both exploratory and explanatory because it was conducted with an objective to answer the question does the zonal taxi transport system improve the level of taxi transport service of Addis Ababa, and it seeks to answer the questions 'what' and 'how' (Yin, 2003). The main research strategy of this study is survey combined with case study design. Survey research strategy is fits with the research question of this study. Survey based research enabled the researcher to collect data by using questionnaire from a group of people at a single point in time. Since this research was done on the effect of zonal taxi transport system on the level of taxi transport service, it required broad coverage within a limited period of time. In survey research strategy, it is possible to generalize the result to the total population. Moreover, case study design is mixed with survey strategy because of the range of types of data (interview and observation) for triangulation purpose. Moreover, it allowed investigating the interaction of different factors that contribute to this study. Finally, a mix of qualitative and qualitative approaches was used concurrently to measure and describe the variables in order to obtain meaningful results. The mixed approach enables the researcher to collect both forms of data at the same time during the study, and it is important to integrate the information in the interpretation of the overall result (Creswell, 2003).

Data Sources

To achieve the objectives of this study, data was obtained from both primary and secondary data sources. The primary data were collected from taxi users' responses and offices that are responsible for public transportation provision in the city. The secondary data were obtained from articles, journals, policy documents, reports and various documents related to the issue. With regard to data collection method, questionnaire, interview, secondary data or archived data and observation were employed.

Sample Size and Sampling Techniques

The researcher used non-probability sampling techniques. For the zonal taxi transport system purpose, the city is divided into five zones by the government namely, Saris, Tor Hailoch, Bole, Megenagna and Asko. The researcher has considered all zones to obtain representative sample respondents. By considering time, budget and homogeneity of taxi users in the city, the researcher has taken a total of 100 sample respondents. In convenience and purposive sampling technique, a general rule about sample size is that quality is more important than quantity. There is no specific recommendation about sample size for these techniques (Koerber and McMichael, 2008). They also added that as long as researchers recruit a sample that is diverse enough to fulfil their objectives, sample size can be considered adequate. For each zone, therefore, the researcher has assigned equal quota (20 respondents). The respondents were selected by employing convenience sampling technique because they were asked to fill in the questionnaire at the taxi stops while they are waiting for taxis at taxi terminals and when they were onboard. With regard to taxi station attendants, the researcher has chosen one respondent from each zone conveniently when they were on duty. For drivers and conductors, the researcher has also chosen one from each zone by using convenience sampling technique when they had break time at the terminal on the issue of the effect of the system on their livelihood and service quality. Purposive sampling was used to select the respondents for interview from Addis Ababa transport bureau and taxi transport association. Since the researcher believed that the interviewees are knowledgeable on the study area, the researcher has chosen respondents purposefully. One person from each office was interviewed by employing purposive sampling technique about the effect of the system on the level of taxi transport service.

Data Analysis Techniques

The information obtained from questionnaire was edited, coded and entered into SPSS. Consequently, it was analyzed using descriptive and inferential statistics. To compare the mean of satisfaction of taxi users on the service quality of zonal taxi transport service across zones, ANOVA test was applied. Furthermore, mean, frequency table, cross tabulation and percentages were used to explain the collected data. Information obtained from semi-structured interview was analyzed using software called Atlas.ti. Moreover, secondary data and observation were also used in the study in the way that ensures validity for the research.

Reliability and Validity

Ensuring validity and reliability is the most important issue in research. Reliability is defined as 'the extent to which results are consistent over time and an accurate representation of total population under study, and if the results of a study can be reproduced under similar methodology, the research instrument is considered to be reliable' (Joppe, 2002 as cited in Bashir *et al*, 2008). Reliability is highly related with the degree of consistency of results, stability of results over time and result's similarity within a given time frame. It can be achieved by checking the consistency of the questionnaire using test-retest over time. For this study, reliability has been guaranteed by preparing questionnaire and interview guides by avoiding questions having varied meaning. After a careful and rigorous design of questionnaire, pre-test was made before

conducting the research. Every steps of data collection has documented well. During interview, notes have been taken and the observation has also been supported by photographs. Finally, the data collected through survey questionnaire has edited, coded and entered into SPSS and the information gathered via interview has stored in software called Atlas ti. These have made this research reliable. Even if reliability is necessary for this research, it is not sufficient. Validity has also been ensured. Validity 'determines whether the research truly measures what it was intended to measure or how truthful the research results are' (Bashir *et al*, 2008). In this research, validity has achieved by avoiding leading and provoking questions from the questionnaire. Construct and content validity were also achieved by developing interview guides and questionnaire on the indicators and variables. Moreover, by spending enough time on the field and also by employing multiple data collection techniques to support the findings, validity has achieved and bias also minimized.

RESULTS AND DISCUSSION

This chapter presents the outcomes and analysis of data regarding the effect of zonal taxi transport system on the level of taxi transport service in Addis Ababa, Ethiopia. It presents findings which were obtained from taxi users, Addis Ababa transport bureau, taxi owners association, taxi operators and taxi station attendants. The data were collected from sample respondents through questionnaire and semi-structured interview and from secondary data. In this chapter, the variables under consideration are availability, affordability and quality of service of taxi transport service. To see the effect of zoning on the level of taxi transport service in the city, a cross-sectional survey employing structured questionnaire was used to collect primary data from100 sample taxi users who are using taxis as a transport mode before and after the regulation has introduced. From the 100 questionnaires distributed, 100 of them were collected by enumerators with close supervision of the researcher. In addition to the survey questionnaire, semi-structured interviews with transport bureau, particularly the transport operation main department, representative of taxi owners' associations, taxi operators and taxi station attendants were made.

System Changes brought by zonal regulation of minibus taxis

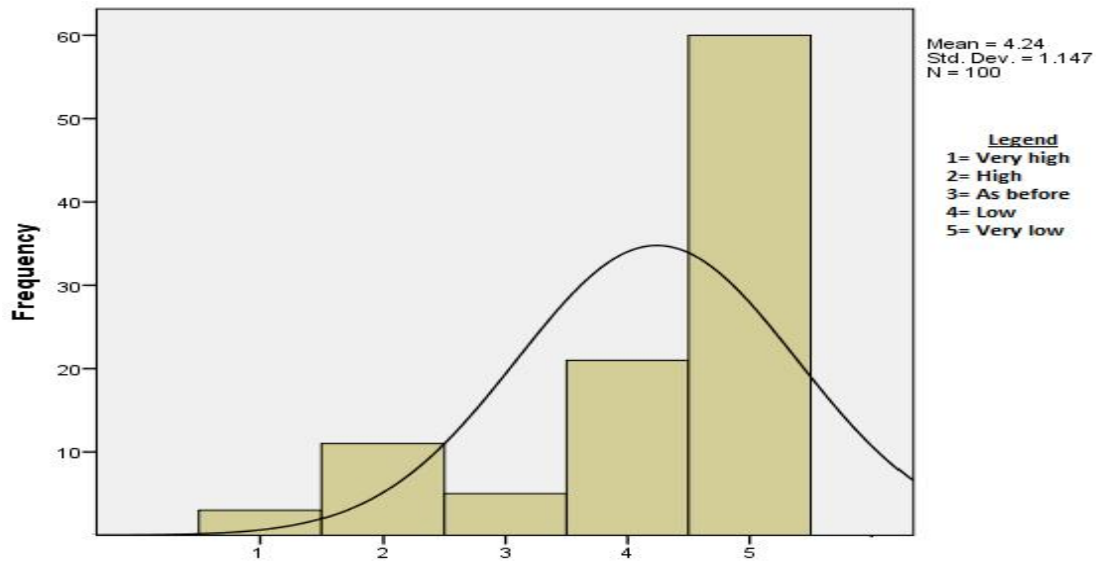
Until 2011, in Addis Ababa, minibus taxis (usually called taxis) were not restricted in terms of areas or routes in which taxi drivers may operate. Taxi operators used to operate on areas where there is plenty of profit and they do not operate in areas far from the city center. However, on 2011, zonal taxi transport system was introduced. Zonal taxi transport system is a system where the city is divided into taxi zones; taxi owners are organized into associations, then taxis are assigned to each zone and taxi route to serve the residents of the city. Under this system, in principle, taxi operators cannot work outside their zones and routes. Working on the assigned route is applicable from 7:00AM in the morning to 8:00 PM in the evening. The system obliged taxi owners to have a destination signs on the roof of their vehicles and stickers which indicate the name of taxi associations on the side of the vehicles. There are reasons for the introduction of zonal taxi transport system. Some of the reasons are indicated by Addis Ababa Transport Bureau, Transport Operation Department chairperson. He stated the reasons as, As you know, Ethiopia is growing and the people are migrating to cities. Addis Ababa is one of the cities that entertaining migrants from rural parts of the country. In the city, people are working in the center and living in the outskirts of the city. To get the people into work places, transport is crucial. On the contrary, taxi drivers do not want to work outside of the city center plus they prefer to work places where there is more profit. Therefore, to reconcile the issue, supervision is inevitable. Zoning is a system to deal with such kind of gap between supply and demand for taxi transport service in the city. The system is also important to reduce traffic congestion by distributing taxis all over the city. Furthermore, the system prevents taxi users from theft at taxi terminals. Even though the system could not eradicate the problem fully, it reduces a little bit (Interview with Addis Ababa Transport Bureau, Transport Operation Department chairperson, 2014). For administering the system, 2500 taxi station attendants are organized by the government as micro and small enterprises and 160 taxi controllers have been hired by the 13 taxi associations. Taxi station attendants, literally referred to as '*tera askebari*' are responsible for maintaining discipline at taxi terminals. As a return, they have been receiving 3 to 4 birr per trip per vehicle. Taxi controllers have the responsibility of checking the availability of taxis by taking attendance on their designated routes. When taxis are not available on their routes, taxi controllers have penalty tickets to punish them.

Commuters' Perception towards the Effect of Zonal Regulation of Taxis on Quality of Taxi Transport Service

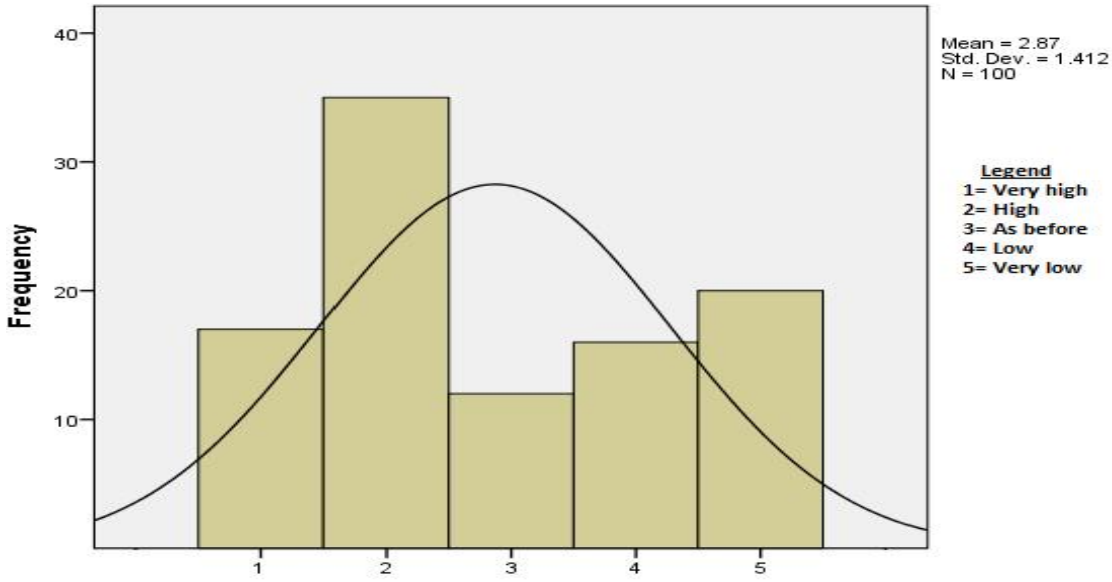
Service quality of public transport service can be evaluated by asking the perception of users towards service quality. The perception of taxi users' on quality of service delivery is measured as compared to the situation before the introduction of zonal taxi transport system. Five indicators are identified to measure taxi users' perception towards quality of service delivery. The indicators are time spent onboard/speed, comfort of seating in taxis, taxi operators' behavior, the way to get into taxis at terminals and theft at taxi terminals.

Time spent onboard

Speed or time spent onboard is one of the dimensions that one can use in measuring customer satisfaction towards public transport. In this regard, the respondents were asked their level of satisfaction on time spent on board to travel the same distance as compared to the situation before zonal taxi transport system is introduced. Graph 1 above present taxi users' satisfaction level on time spent onboard as compared to the situation before zonal taxi transport system has came. Of the total respondents, the level of satisfaction of 60 percent of respondents on time spent onboard is very low while 21 percent of respondents reported that their satisfaction level is low as compared to the situation before the regulation. 11 percent of respondents responded that their level of satisfaction on time spent onboard is high whereas 3 percent of them are very highly satisfied with time spent onboard as compared to



Graph 1. Taxi users' satisfaction level on time spent onboard as compared to the situation before the regulation



Graph 2. Taxi users' Satisfaction level on taxi operators' behavior as compared to the situation before the regulation

the situation before zonal taxi transport system. The remaining 5 percent of the respondents replied that time spent onboard is similar as before zonal taxi transport system. The observation done by the researcher during field work also indicated that there are reasons for the very low satisfaction of majority of taxi users on time spent onboard after the regulation are: first, in some places there is railway construction in the city that has created road congestion. Therefore, this can hinder the transportation service of the city. Second, some of the routes are narrow that cannot accommodate two or three vehicles at a time and the traffic management system is very poor, and there is no sufficient traffic light. These have created congestion on the road. Congestion in turn has increased the time spent onboard. Third, most of the vehicles are aged. This indicates that zonal taxi transport system does not bring any improvement on time spent onboard for majority of taxi users in the city rather, according to the respondents; the problem is getting worse after the regulation put into place.

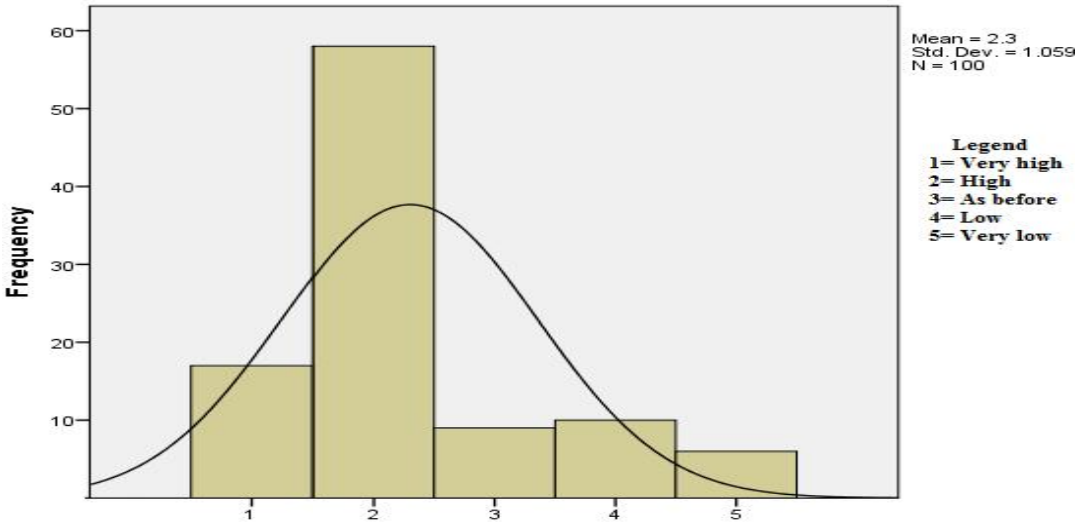
Table 1. One-way ANOVA test on taxi users' level of satisfaction on time spent onboard

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9.940	4	2.485	1.962	.107
Within Groups	120.300	95	1.266		
Total	130.240	99			

A one-way ANOVA was used to test for differences in the mean of satisfaction level of taxi users on time spent onboard or speed between the five zones in the city as compared to the situation before the introduction of zonal taxi transport system. According to table 1 above, taxi users' satisfaction on time spent onboard as compared to the situation before zonal taxi transport system is not significantly differed across the five zones, $F(4, 95) = 1.962$, $P = .107$.

Taxi operators' behaviour

The quality of service that taxi operators are delivering can be affected by their behavior towards passengers. In this regard,



Graph 3: Taxi users' satisfaction level on the way to get into taxis at taxi terminals as compared to the situation before the regulation

the users are the one who can judge the behavior of both drivers and conductors. According to graph 2, out of the total respondents, the satisfaction level of 17 percent of taxi users on the taxi operators' behavior is very high while 35 percent of taxi users' satisfaction level is high. 12 percent of respondents said that the behavior of taxi operators is the same as before the introduction of zonal taxi transport system. 20 percent of the respondents responded that their satisfaction level on taxi operators' behavior is very low while 16 percent of respondents' satisfaction level is low on taxi operators' behavior. In the city, taxi operators had the behavior of dishonoring passengers. According to the information obtained from transport bureau, however, with the introduction of zonal taxi transport system, taxi operators have been taking training from transport bureau on how to treat commuters. In addition to this, the bureau added that, since taxi operators operating on a fixed route, it is possible to identify those who have violated commuter's right. As a result, the system by itself controls their behavior.

Even though transport bureau has given training, there are still commuters who have complained on taxi operators' behavior. During field work, the researcher realized that some operators were addictive with Khat, a drug that makes taxi operators highly stimulated so that it makes them to offense commuters. This can be one of the reasons that some commuters have complained that the regulation does not improve taxi operators' behavior. Some operators are mistreating commuters while they are onboard. Taxi station attendants are the one who are responsible for protecting commuters from taxi operators' offensive practices at terminals. Nonetheless, sometimes taxi station attendants are inefficient on protecting passengers from bad taxi operator's behavior. A one-way ANOVA was used to test for differences in the means of satisfaction level of taxi users on taxi operators' behavior between the five zones as compared to the situation before zonal taxi transport system. Based on the test table 2 above, the satisfaction of taxi users on taxi drivers and conductors behavior is not significantly differed across all the zones, $F(4, 95) = .768$, $P = .548$.

Table 2. One-way ANOVA test on taxi users' level of satisfaction on taxi operators' behaviour

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.300	4	1.575	.768	.548
Within Groups	194.700	95	2.049		
Total	201.000	99			

The way to get into taxis at taxi terminals

Taxi users in the study area have two approaches to get taxi services at terminals. The first approach is shoving, pushing and pulling among passengers to get taxi services at the terminal or the roadsides. It is a common practice in some parts of the city. This provides a fertile ground for pickpockets to steal wallets, bracelet, necklace and mobile phones. In the situation like this, for aged people and those who have child is difficult to struggle and to get the service. The second approach is queuing at terminals; by this passengers can get into taxis. This is a humble way of getting taxi service since there is no at least pushing and pulling among the service users (see the photograph below). Taxi station attendants are established as micro and small enterprises by the government to regulate the way how passengers keep turns to get into taxis; in return, they receive 3 to 4 birr per trip from each taxi. With regard to passengers' satisfaction level on the way to get into taxis, 17 percent of respondents have reported that the satisfaction level on the way to get into taxis at taxi terminals is very high while 58 percent of them responded that the satisfaction level is high as compared to the situation before the introduction of zonal taxi transport system. 10 percent of the respondents said that the satisfaction level on the way to get into taxi at taxi terminals is low while 6 percent of them said that the satisfaction level is very low (see graph 3 above). The remaining 9 percent of respondents replied that the way to get into taxis at taxi terminals is similar with the situation before the introduction of zonal taxi transport system. Before this regulation in place, there was no any discipline management at taxi terminals. However, zonal taxi transport system is came up with a solution that discipline is maintained

at taxi terminals by organized taxi station attendants. This makes most respondents satisfied.

Table 3. One-way ANOVA test on passengers' satisfaction level on the way to get into taxi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.800	4	3.700	3.654	.008
Within Groups	96.200	95	1.013		
Total	111.000	99			

A one-way ANOVA was also used to test the mean difference of passengers' satisfaction level towards the way to get into taxis between the five zones as compared to the situation before zonal taxi transport system. As presented in table 3 above, passengers' satisfaction level towards the way to get into taxis is significantly different across the zones, F (4, 95) = 3.654, P = .008.

Theft at Taxi Terminals

Safety and security are important measures of quality of public transportation service. In this study, theft at taxi terminals has been taken as one of the indicators to measure the passengers' satisfaction level as compared to the situation before the introduction of zonal taxis transport system. As it is clearly seen, graph 4 presents the responses of taxis users towards theft at taxi terminals in Addis Ababa. Based on their responses, the satisfaction level of 5 percent of taxi users on theft as compared to the situation before zonal taxi transport system is very high while 18 percent of respondents reported that their satisfaction level is high.

crime and stealing activities at terminals. Therefore, based on these responses, for most of the users, taxi zoning does not show improvement in reducing such bad activities as compared to the situation before. This implies that taxi station attendants are not working well in some taxi terminals in this regard. Taxi station attendants are the one who are responsible for protecting passengers from any theft or any other criminal activities by pickpockets or '*showa showa'* at taxi terminals.

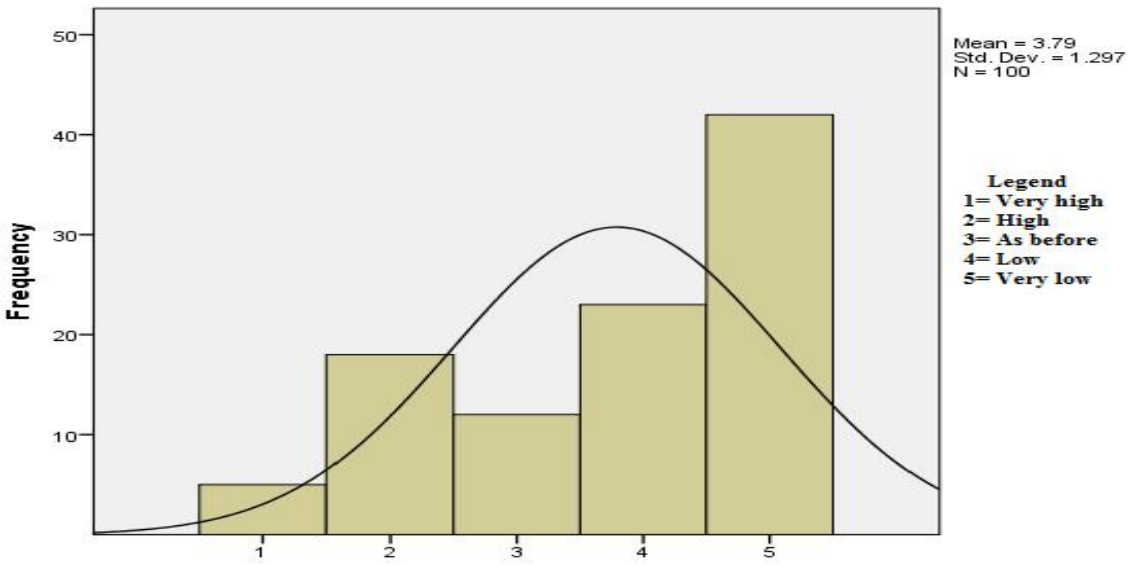
Table 4. One-way ANOVA test on Taxi user satisfaction level of passengers towards theft at taxi terminals

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.740	4	1.185	.696	.597
Within Groups	161.850	95	1.704		
Total	166.590	99			

A one-way ANOVA test was used to test the mean differences on the satisfaction level of passengers on theft at taxi terminals between zones as compared to the situation before zonal taxi transport system. The test result revealed that the mean is not significantly different across the zones, F (4, 95) = .696, P = .597 (see Table 4).

Comfort of seating in taxis

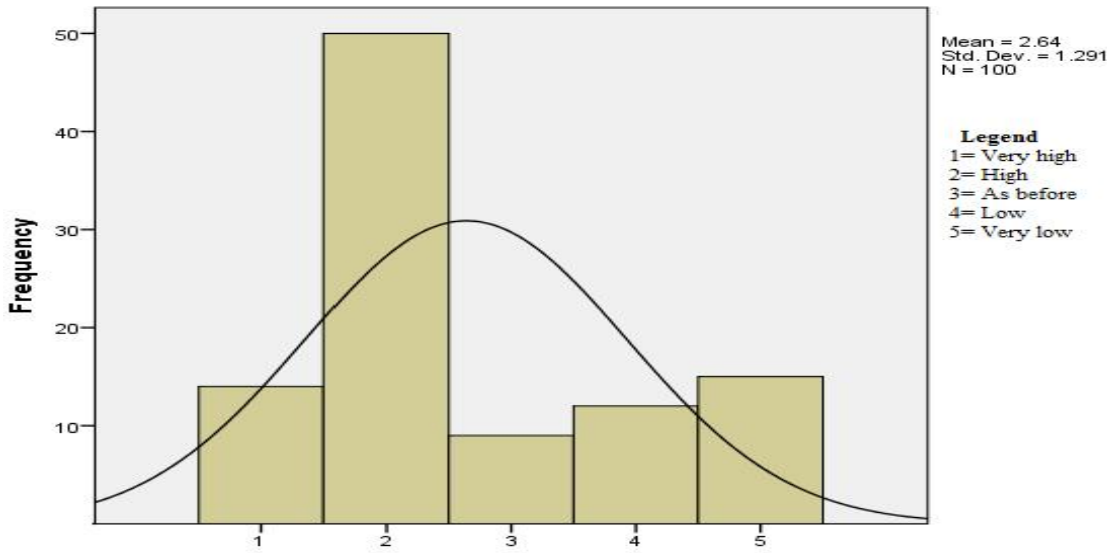
Quality of public transportation service can be measured by its comfort of seating. Taxi users must be served in a good manner for the services they paid and the service providers should provide what is expected to be provided for the users. In this regard, taxi users are interviewed about their satisfaction level on comfort of seat of taxis as compared to the



Graph 4. Taxi users' satisfaction level on theft at taxi terminals as compared to the situation before the regulation

Majority of the respondents (42 percent) said that their satisfaction level is very low whereas 23 percent of respondents' satisfaction level is low. The rest 12 percent of respondents replied that theft at taxi terminals is the same as the situation before the regulation has implemented. There are pickpockets who steal passengers' cell phone, wallet, bracelet and other luggage at taxi terminals. However, the very reason for the implementation of taxi zoning in the city was to prevent

situation before the introduction of zonal taxi transport system. According to graph 4.5, 14 percent of respondents responded that their satisfaction level on comfort of seating in taxis as compared to the situation before the regulation is very high while 50 percent of them reported that their satisfaction level is high. 12 percent of the respondents also reported that their satisfaction level on comfort of seating in taxis is low



Graph 5. Taxi users' satisfaction level on comfort of seating in taxis as compared to the situation before the regulation

while 15 percent of them are responded that they have a very low satisfaction level on comfort of seating in taxis. The remaining 9 percent respondents have replied that the quality of comfort of seating in taxis is the same as the situation before the commencement of zonal taxi transport system. Comfort of seat of taxis is one of the reasons for taxi users to prefer taxis over other city buses. Zonal taxi transport system prevents taxi operator to load more than 12 people. However, before this system being introduced, taxi operators were loading more than the seat's capacity which created discomfort on taxi users. Therefore, the regulation make the satisfaction level of most of the respondents on comfort of seating in taxis is high.

Table 5. Satisfaction level of taxi users on comfort of seating of taxis

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.040	4	3.260	2.037	.095
Within Groups	152.000	95	1.600		
Total	165.040	99			

A one-way ANOVA was used to test the mean differences of taxi users' satisfaction level on comfort of seat of taxis across the zones. The result revealed that the mean is not significantly differed across zones, F (4, 95) = 2.037, P = .095 (see table 5).

Availability of Taxi Transport Service

Public transport is adequate when it is available near or at the locations and times when users want to travel. This may be realized when taxi users can get every time they need it, when the distribution of taxis in the city is better and adequate to the people living around.

Waiting time to get taxi service

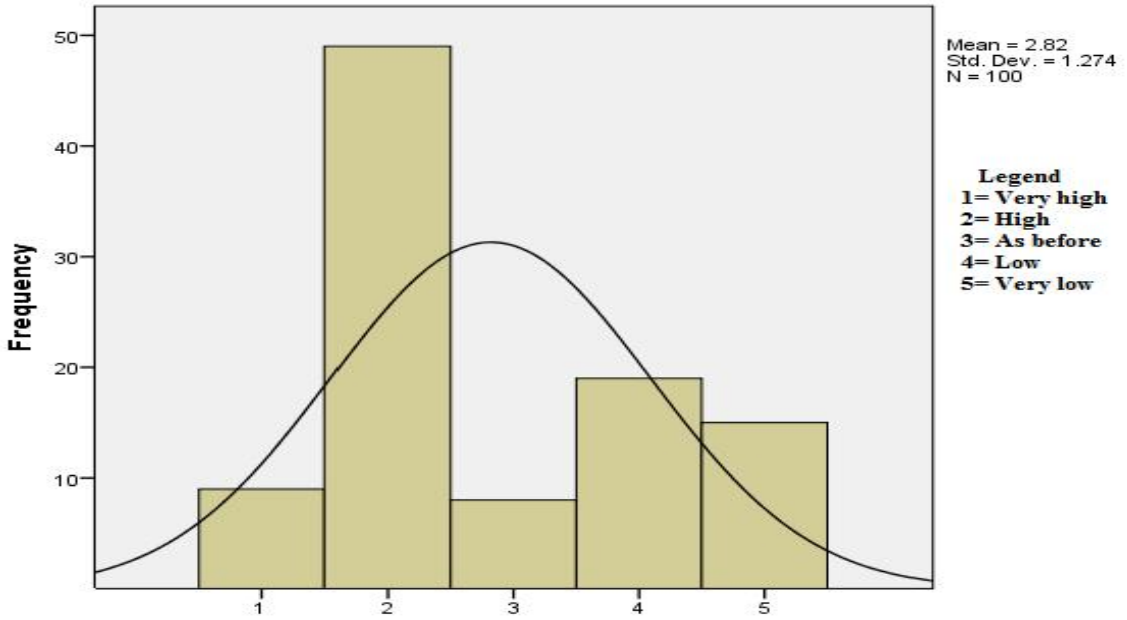
Waiting time to get taxis is different from time to time. The time that passengers wait for taxi is not constant throughout the day. It depends on the availability of taxis at the terminals and the arrival rate of taxis. In Addis Ababa, from 6:30 AM to 8:30 AM in the morning and from 1:30 PM to 2 PM in the afternoon are peak hours that people travel to their work places. There are many trips to work places, schools, and religious places during these times. Therefore, the waiting time for taxis in these hours is longer than other times. During these peak hours, Addis Ababa taxi users are waiting for taxis for 35.15 minutes on average.

Table 6. Waiting time of taxi users to get taxi transport service

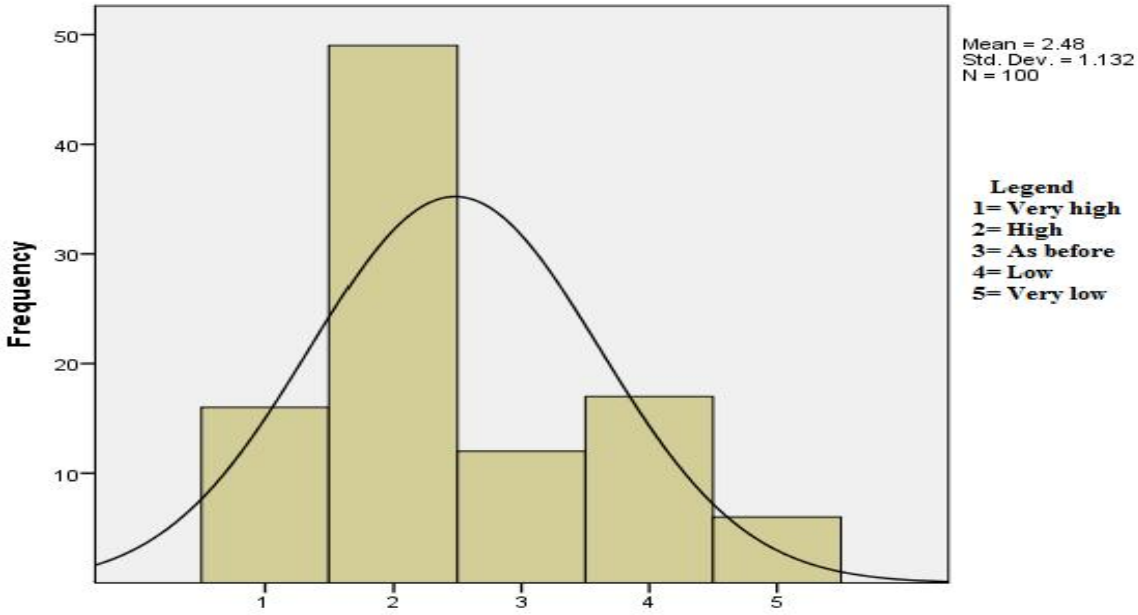
	N	Minimum	Maximum	Mean	Std. Deviation
On average, how long do you wait for taxi during peak hours?	100	5	60	35.15	16.056
Valid N (listwise)	100				

According to the respondents' response, the waiting time to get taxis at peak hours is getting lower than the situation before the introduction of zonal taxi transport system. From this one can conclude that before this system has introduced, taxi users were waiting for taxis more time than 35.15 minutes (See Table 6 above). In this regard, zonal taxi transport system makes taxis more accessible since the system allocates taxis in each route; the operators are serving the people on that route and zone. From the graph 6 below, the satisfaction level of 9 percent of the respondents on waiting time to get taxis during peak hours as compared to the situation before zonal taxi transport system is very high while 49 percent of the respondents reported that their satisfaction level is high. 19 percent of respondents replied that their satisfaction level on waiting time to get taxis during peak hours is low while 15 percent of the respondents responded that their satisfaction level is very low. The remaining 8 percent of respondents reported that waiting time to get taxis during peak hours is the same as the situation before the zonal taxi transport system.

A one-way ANOVA was used to test the mean difference on the level of satisfaction of taxi users on waiting time for taxis



Graph 6. Taxi users' satisfaction level on waiting time to get taxis during peak hours as compared to the situation before the regulation



Graph 7: Taxi users' satisfaction level on time taken to reach taxi terminals from home as compared to the situation before the regulation

during peak hours across the zones as compared to the situation before the regulation. The result showed that the mean is not significantly different across zones, $F(4, 95) = 2.276$, $p = .067$.

Time taken to access taxi terminals

Time taken to access taxi terminals from home or work place is one of the dimensions to look at on the performance of zonal taxi transport system towards making taxis accessible. For this purpose, taxi users were asked about their level of satisfaction on the time taken to access taxi terminals as compared to the situation before the introduction of zonal taxi transport system.

Table 7. Time taken by taxi users to reach taxi terminal from home

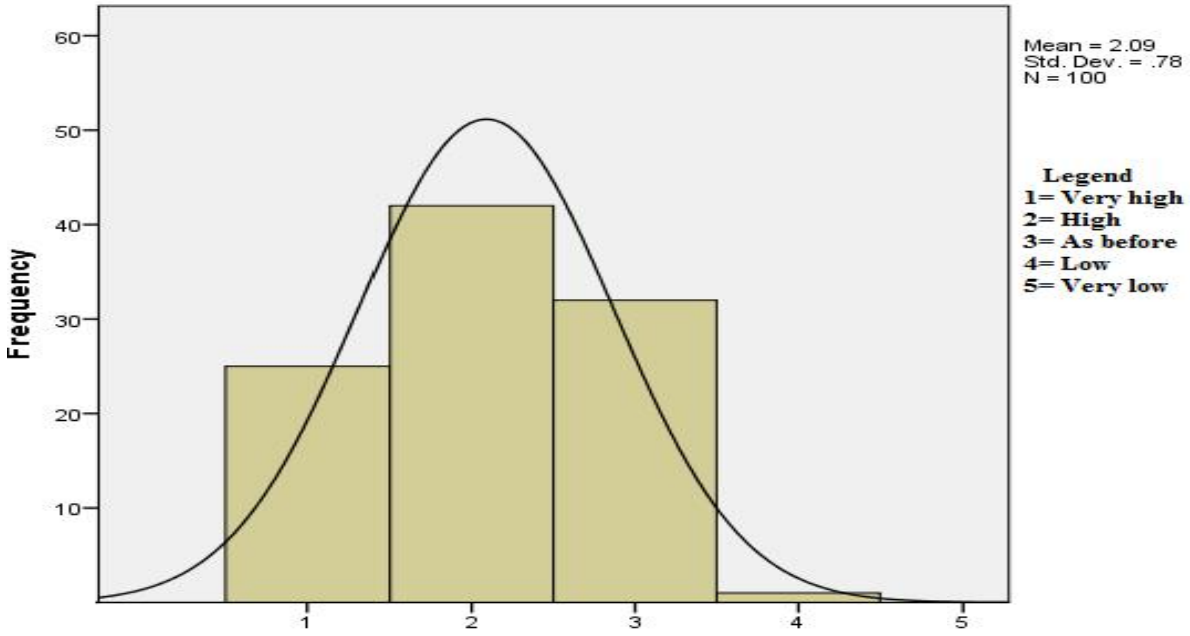
	N	Minimum	Maximum	Mean	Std. Deviation
On average, how many minutes do you walk to reach taxi stops from home?	100	1	30	10.65	6.502
Valid N (listwise)	100				

On average, taxi users walk 10.65 minutes to reach taxi terminals with a maximum of 30 minutes and minimum of a

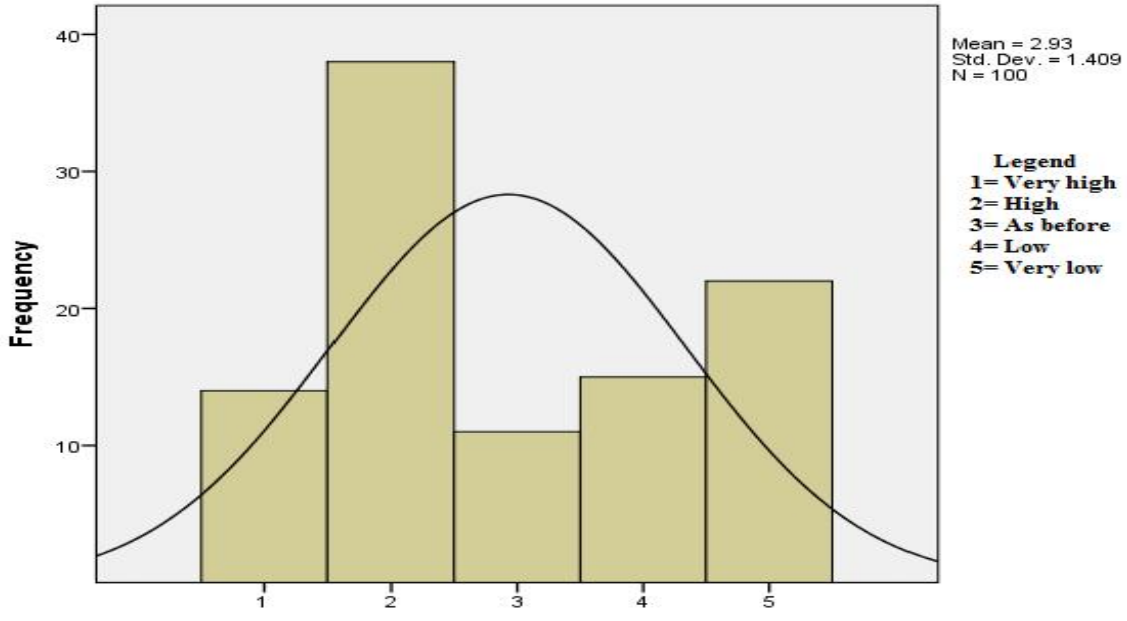
minute (See Table 7 above). The graph 7 above presents the satisfaction level of taxi users towards the time taken to access taxi terminals. 16 percent of respondents reported the satisfaction level on time taken to reach taxi terminals from home is very high while 49 percent of respondents reported that their satisfaction level is high as compared to the time taken to reach taxi terminals before zonal taxi transport system introduced. 17 percent of respondents responded that their satisfaction level is low while 6 percent of them replied that their satisfaction level is very low when they compared it with the time taken to reach terminals before the regulation. 12 percent of respondents have reported that the time taken to reach taxi terminals is the same as the situation before the introduction of zonal taxi transport system. The system has established many taxi terminals in the city so that taxi users can easily wait for taxis in the nearby taxi terminals.

Affordability of Taxi Transport

Affordability of public transport is a major concern for the urban poor. It is the amount of money that passengers have to spend for transport. It varies with income and the distance to be travelled by public transport users. In Addis Ababa city, fares for all public transport modes except taxis which have 4 seats are, in principle, controlled by the government. As a matter of policy, fare for Anbessa city bus kept lower than minibus taxis and subsidized by the government. For transparency purpose, under this system, the government has obliged taxi operators to post list of fare of taxi transport service in the vehicle. This is the result of zonal taxi transport system. The mechanism can prevent passengers from higher pricing by the conductor. The share of sample respondents' monthly income spent on tax transport in Addis Ababa ranges from 50 birr to 800 birr. The average share of taxi users' monthly income for taxi transport is 288.49 birr with standard devastations of 167 birr.



Graph 8: Taxi users' perception towards the fare of taxi transport service as compared to the situation before the regulation



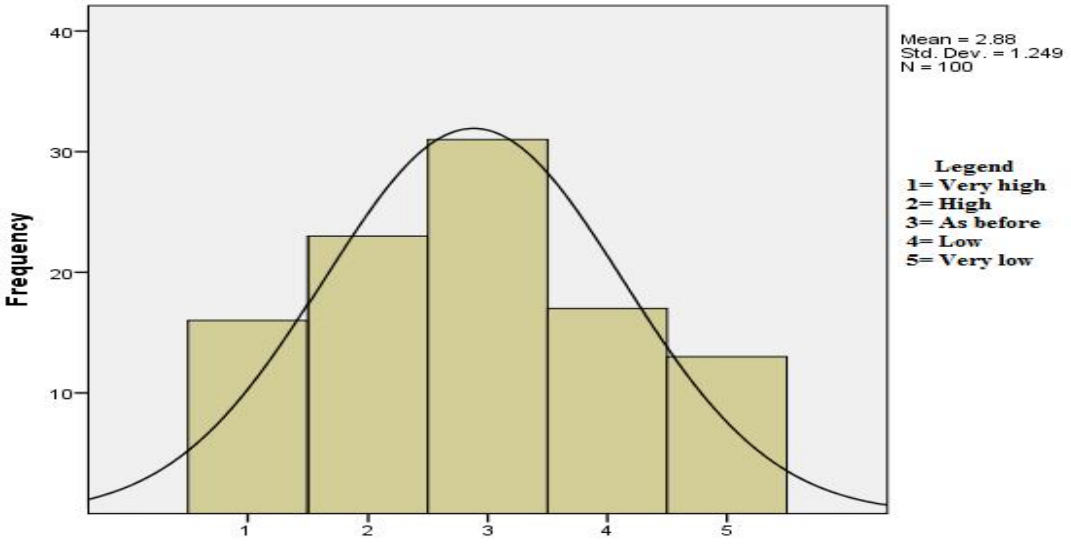
Graph 9. Taxi users' satisfaction level on pricing for the service as compared to the situation before the regulation

Table 8. A one-way ANOVA test on the share of taxi users' monthly income for transport

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	207937.240	4	51984.310	1.933	.111
Within Groups	2554579.750	95	26890.313		
Total	2762516.990	99			

A one-way ANOVA was used to test the mean difference of amount of money spent for taxi transport as compared to the amount of money spent for taxi transport before zonal taxi transport system across all the zones. The result revealed that the mean difference is not significant across zones, F (4, 95) = 1.933, p = .111 (see table 8 above). According to the income that taxi users earn monthly, taxi transport service fare is expensive. Therefore, taxi transport is not affordable for poor residents of Addis Ababa. However, they are using taxis and paying for the service because of the shortage of public transport modes in the city. Sample respondents were asked about the level of satisfaction on the fare of taxi transport in Addis Ababa. According to their response, 25 percent of respondents have reported that the fare of taxi transport service is very high while 42 percent of respondents said that the fare is high as compared to the situation before the introduction of zonal taxi transport system. The remaining 32 percent of the respondents are replied that the fare is the same as the situation before the regulation (see graph 8 above).

of the respondents also responded that they have low satisfaction level on the method of paying for taxi service for the service while 22 percent of the respondents have very low satisfaction level as compared to the situation before the regulation. The remaining 11 percent of respondents responded that the method of paying for taxi transport service is the same as the situation before the introduction of zonal taxi transport system. From graph 10, it can be seen that 16 percent of respondents stated that they have a very high satisfaction on their daily trips that taxi operators do not cut the trips into short distance as compared to the situation before the introduction zonal taxi transport system while 23 percent of them have high satisfaction level. 17 percent of respondents have reported that they have low satisfaction on their daily trips because of the practice of cutting trips into short distances that costs them more money as compared to the situation before zonal taxi transport system while 13 percent of respondents have very low satisfaction level. The remaining 31 percent of respondents said that the daily trips are the same as the situation before zonal taxi transport system. Higher pricing of taxi users by taxi operators is a challenge that urban poor residents do not afford public transportation, which is essential rather than discretionary for their life. If public transport is not affordable to the poor, residents will be isolated from so many social, economic and political affairs because taxi transport service will not be accessible.



Graph 10. Taxi users' satisfaction level on daily trips as compared to the situation before the regulation

Even though the tariff is fixed based on distance travelled, there are some operators asking taxi users for higher price. The regulation requires taxi operators to post the tariff inside the vehicle but some operators refuse to do it. Posting tariff in the vehicle is important for the passengers to refer the amount to be paid for the distance they travelled. In this regard, the researcher asked the satisfaction level of taxi users whether posting tariff inside the vehicle prevent them from higher pricing by the conductor. As presented in the graph 9 above, 14 percent of respondents agreed that they have very high satisfaction level with regard to the way they are paying for the service they had while 38 percent of them have high satisfaction level as compared to the method of paying for taxi transport service before zonal taxi transport system. 15 percent

They cannot access health services, schools and other infrastructure which are basis to their life. Furthermore, the practice of cutting routes into short distances by taxi operators contributes to commuters not to reach their final destination on time. This in turn creates problems on the work environment of the passengers because if passengers do not get into work places on time, their productivity and livelihood will be seriously affected. However, one of the reasons for the implementation of zonal taxi transport system is to prevent cutting of routes that passengers want to travel on a given route. Taxi operators earn more money by breaking routes and maximizing their frequency of trip. But this creates cost and discomfort for commuters.

Conclusions

Time spent onboard, waiting environment for taxis at taxi terminals, responsiveness of transport bureau towards transport related problems, theft and traffic congestion are not improved with zonal taxi transport system. With regard to time spent onboard, majority of the respondents (81 percent) reported that they are not satisfied with time spent onboard as compared the situation before the commencement of zonal taxi transport system. There is poor traffic management, poor road network and narrow road in the city which result in congestion. Congestion in turn slow down the speed of vehicles that produce longer time spent onboard. However, before this system has introduced, taxi operators has been used short distances that had short time to spend onboard. Now, the regulation does not allow them to do so rather they must operator on the assigned routes. Even though taxi terminals are established, the waiting environment for taxis at taxi terminals such as facilities like benches and shelter is not improved as compared to the situation before the regulation came into place. The facilities at taxi terminals are poorly supplied that dismay many taxi users. In this respect, 82 percent of the respondents are not satisfied with the facilities existed in taxi terminals in the city.

The Addis Ababa transport bureau should be responsive for any complain from taxi users on the issue of transport related problem. Nonetheless, it is not improved as compared to the situation before zonal taxi transport system. 73 percent of respondents the bureau's responsiveness towards grievances related to taxi transport. However, the bureau responded that there are different mechanisms for taxi users to present their cases to the bureau and the bureau is responding to the problem that taxi users faced with. The other indicators for taxi users' satisfaction towards zonal taxi transport system are theft at taxi terminals and traffic congestion. These are also not improved by zonal taxi transport system as compared to the situation before. 65 percent of respondents responded they are not satisfied with theft at terminals as compared to the situation before the introduction of zonal taxi transport system. Taxi station attendants are responsible for maintaining discipline at taxi terminals. However, in this regard, they did not do well.

Taxi operators' behavior, the way taxi users get into taxis, waiting time to get taxis, time to reach taxi terminals and comfort of seating in taxis are those that are improved as compared to the situation before zonal taxi transport system. With zonal taxi transport system, since taxi operators have been taking training on how to handle passengers, taxi operators' behavior has improved as compared to before. Half of the respondents are responded that they are satisfied with taxi operators' behavior as compared to the situation before the regulation. Taxi operators used to have bad behavior Taxi operators had also the behavior of picking up and dropping off commuters in the middle of the route that caused for car accidents in the city. However, after zonal taxi transport system, since taxi operators made formal employment contract with the taxi owners, they are responsible for any damage. Therefore, as compared to the situation before zonal taxi transport system, the behavior of taxi operators has improved.

The way to get into taxis is highly improved with zonal taxi transport system. 75 percent of taxi users are satisfied with the way to get into taxis at taxi terminals. Before zonal taxi transport system, taxi user used to push and pull each other to get into taxis at taxi stops. This created good opportunity for pickpockets to steal form commuters. However, after zonal taxi transport system, the transport bureau has organized taxi station attendants to maintain discipline at taxi terminals to safely get passengers into taxis. A significant number of taxi users do not get taxi service at the tie when they need. However, the waiting time to get taxi during peak hours i.e. from 6:30 AM to 8:30 Am in the morning and from 1:30 PM to 2 PM in the afternoon, is reduced as compared to the waiting time to get time to get service before the introduction of zonal taxi transport system. Since taxis allocated on the different routes, they are not operating based on their demand.

Therefore, residents had not the opportunity to get taxi previously, now they have the possibility to access them. As a result, the waiting time to get taxis in these places is reduced. The time to reach taxi terminals is also improved as compared to the situation before the regulation. Taxi terminals are established for the implementation of zonal taxi transport system so that taxi users can wait taxis at the nearby taxi terminals. Nonetheless, before the introduction of this system, taxis stop and wait taxi users wherever the taxi operators need. Taxi operators have been loading more that the capacity of the seats of taxis that made taxi user very dissatisfied. However, since the system restricted taxi operators from loading of more than 12 persons, each passenger has his/her own seat without any sharing. This creates comfort for passengers while they are travelling. Therefore, zonal taxi transport system has improved comfort of seating in taxis as compared to the situation before.

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