

Structure of Nepal's Trucking Industry: Results from a Nationwide Survey

Prepared by

Dr Biswo Poudel

Kathmandu University School of Management (KUSOM)

Executive Summary

1. This report includes outcomes from a nationwide survey of trucking industry in Nepal. Using stratified random sampling method, 1000 truck owners were sampled from different regions of Nepal. Information about the workforce, financing environment, and working environment of the trucking industry were collected. In doing so, more than 100 variables related to the Nepalese trucking industry were measured.
2. There are at least 39 local trucking entrepreneur's association (TEA) in Nepal who dictate the rule of trucking operation for about 30,000 trucks along 429 recognized routes, despite the fact that they don't have any legal authority. TEAs are able to attract membership primarily because of their promise to help truck owners in need. These quasi-insurance offers from TEAs fulfill the void in financial services offered by existing insurance companies. Three reasons primarily explain the popularity of TEAs among truck owners: (a) rise in mass based justice system due to the breakdown of enforcement ability of local government (b) small size of truck owners and hence their inability to absorb economic shocks and (c) nationwide attraction to unionization in Nepal in the last several decades.
3. Nepal is dominated by small truck owners, who on average own 2.4 trucks. The owners come from transportation industry itself and 70% of them don't have another salable skill. This forces them to ensure their survival at any cost, which they often do by forming collusive groups, which occasionally restricts supply in the market. Our survey reveals that such group formation manifests itself in the form of delayed permit issuance by TEAs in many routes.

Therefore, despite recent clampdown on the financial activities of TEAs, they remain important players in Nepal. Our survey also reveals that truck owners continue to see TEAs as a source of insurance in case of accidents and 93% of those surveyed say they plan to continue their affiliation with them.

4. The typical truck owner operate on a highly hostile and competitive environment: small owners overwhelmingly rely on themselves to get loads. Load availability is highly asymmetric in that almost 60% trucks get loads less than one fifth of time while returning from the destinations. Basically all of the owners use cellphones and employ no other communication devices to track the vehicles. Bribery is a common feature in all aspects of trucking industry operations: it is paid to get the route permits from government and the TEAs; it is also paid to the operatives of different agencies which stop trucks on their way to their destinations. The truck operators are attacked by mobs when accidents happen. They also attract the wrath of the rival truck owners belonging to other TEAs if they load goods from the regions they are unfamiliar with. Insurance firms are not offering diverse enough services and that a small truck owner finds himself in such a cornered position that he self-selects into one of those TEAs to protect his interest.
5. Syndicates impose costs on the overall economy in the form of deadweight loss. We calculated the cost to be \$27.5575 million dollars per year. We also estimated that in 2014, out of the 9.1% inflation rate of Kathmandu valley, 11% was due to the syndicates (i.e. in the absence of

syndicate, the inflation rate should have been 8%). Furthermore, deadweight loss due to syndicate accounted for 2.6% of total GDP growth.

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1. Introduction

1.1 What is this study about ?

This study identifies different aspects of Nepalese trucking industry such as average number of trucks at firm level, costs of operating trucks, load procurement pattern and nature of systems (such as license) under which they operate in different trucking routes. We differ from previous studies (such as the one carried out by Nepal Economic Forum on behalf of USAID) in terms of the detail we try to uncover.

Nepalese truck industry, due to the almost absence of any other form of non-livestock based transportation service, currently plays a vital role in the country's economy. Since Nepal's first road fit for motor transportation was built in 1956AD only, Nepal almost exclusively depended on livestock for all kind of transportation needs before that. A slow, small rail served routes between Janakpur and Jayanagar, and Raxaul and Amlekhgunj, and a ropeway connected Hetauda and Kathmandu before 1956, but once the road was constructed, it quickly became the preferred mode of transportation and the demand for trucks gradually increased.

There is theoretically no legal barrier to entry in the trucking industry: the prospective truck operator purchases a truck, and obtains the permit from the government to operate in the route of her choice. The permit is issued either from Department of Transportation Management (*Yatayat Byabastha Bibhag, DOTM*) or Zonal offices of DOTM (*Anchal Yatayat byawastha bibhag*). These agencies currently issue permits for 429 national routes and numerous other local routes. The number of national and local routes is changing over time as Nepal is currently witnessing a surge in road construction.

In reality, however, the process of being a truck operator is complicated and sometimes it is well nigh impossible to operate a truck in the route of one's preference. Access to credit is not uniformly distributed among the Nepalese population. It is common to find the actual operators being different from the truck owners, as those who have better access to credit tend to rent the trucks out to those who have difficulty in getting credit from banks (see details in chapter 1.4). After registering at the government's transportation bureau, the truck owners also need to take membership of one of many local Trucking Entrepreneur's Associations (TEA). These associations are often the major organizations that negotiate on behalf of these truck owners with the government, insurance companies and also set the price at the routes under their jurisdiction. Equally importantly, they also restrict nonmembers from operating at the route where they are influential.

There are two major transportation entrepreneur's associations in Nepal. One of these, *Nepal Truck Yatayat Mahasangh* (FTTEN), is dedicated to the truck operators, whereas the other organization *Nepal Yatayat Rashtriya Mahasangh* (NTNF) takes trucks, buses and even tractor owners as its members. Each of these associations has affiliated local, often route based, member associations, which are in some way autonomous. These associations are loosely organized, at least in a local level. Both of these associations don't have any official record of the number of trucks that are affiliated with them. In deed, some TEAs don't have a proper office and all their records are kept in a diary of the president of the respective TEAs. Generally, the decision to enforce syndicate (i.e. restricting supply of service) is taken locally. Though government is the authority on issuing route permits, these associations tend to have a say over who gets such a permit in most, if not all, of the routes. It is not uncommon to see these associations vandalizing vehicles not belonging to them in their particular route.

Politically, there are two other private organizations that provide some kind of balance to the whim of these trucking organizations. The first is Chambers of Commerce, which represents well connected businessmen who feel being cheated by the price fixing behavior of the truck owners. The second is the transporters' association (*Nepal Dhuwani Byawasayi Sangathan*), which also opposes the arbitrary behavior of the truck owners. The truckers are often vilified in media, which either are controlled by or depend on the advertisement and other largesse of wealthy industrialists from the Chambers of Commerce, or, more properly, the Federation of Nepalese Chambers of Commerce and Industries (FNCCI). The truck operators generally don't deny that they restrict the supply, but they point out that if they were not to do so, due to the glut of trucks in the country, the truck owners would have to operate their truck at the marginal cost (rather than average cost of operation) and thus incur the net loss. [see FTTEN Smarika,2013]

The precise modus operandi of the major truck associations is relatively opaque. Many of these associations don't have proper record of their members. Some of these associations don't have their office either, and are run by the chairman of the association whimsically. These associations have also run afoul with legal authorities and regulatory agencies such as insurance board (IB) recently. Their activities related to insuring members against the accidents are deemed illegal by IB. However, the government hasn't moved against these associations actively. These associations are still very active in negotiating minimum rental price with the government or in bargaining on behalf of the truck operator involved in an accident. In Nepal, as law and order situation melted down during the civil war era, mobs became powerful and operated with impunity. It was common, after a truck accident involving some

casualty, to see the local irate mob blocking the highway (called *chakkajam*) until a very high, arbitrarily set, compensation demand was paid.

Most of the dominant TEAs offer services precisely to address this situation: members who are fully insured are taken fully care of by TEAs in case of accident: not only these TEAs help negotiate with the aggrieved party, but also help the truck owners get insurance policy, pay all the agreed upon compensation to the victims including medical costs and free the impounded truck from the government's administrative offices. Such services are highly valued by the truck operators. These days, most of the truck operators take minimum mandated insurance (Rs 500K for third party death, and Rs 800K for third party damage) and then take TEA membership. The process of claiming insurance money from the insurance companies is often considered very difficult by the truck operators and hence this service is highly prized by them.

1.2 Regulatory Agencies in Trucking Sector

Government of Nepal is the sole regulatory agency to guide the evolution of trucking industry in Nepal. It builds highways, issues permits to operate trucks, and provides regulatory frameworks governing various issues such as access to credit, insurance premiums and route permits. Furthermore, as the petroleum products in Nepal are imported by the government only, government indirectly fixes the cost function of the truck operators. On top of that, the government also fixes fare of truck routes, though the enforcement of such fares is very unusual.

Truck Entrepreneur Associations (TEAs), as explained earlier, are quasi-regulatory agencies. They rely on their location and organizational power to enforce the supply restrictions and price fixing in the routes they represent. The list of currently active TEAs is given in the appendix (See appendix 20 for the list and services offered by them including the membership charges). There are 39 TEAs currently, and since they keep on splitting and uniting, so the number can only be approximated. However, we believe that the number given in the appendix is the correct and exhaustive list of TEAs for now. From our interviews with the chairpersons of the different truck association, we calculated that a total of 18812 trucks were currently registered with different TEAs. The total trucks/ Crane/ Excavators/ Dodger registered in the last 23 years, according to the Transportation Management Bureau, is 49404 (Appendix 22). However, since the numbers of cranes/excavators/dodgers are very small fraction (10%, at most) of this total, the total number of trucks registered in the past 23 years is likely to be around 45000. According to a raw

estimate provided to us by the experts of the field, each year 40~50 trucks are involved in serious enough accidents that they are subsequently scrapped. This further reduces the total maximum number of trucks currently in Nepalese roads to be around 44000. However, trucks more than 16 years old are rare, and this further reduces total truck numbers possibly running in Nepalese roads by about 30%. Hence it is likely that there are about, at most, 31000 trucks in Nepalese roads rightnow. Notice that although number of trucks registered in transportation office is rising each year, the number of trucks for 2047BS(1990AD) provided by the government was cumulative number for all trucks before that year. 31000 is also a reasonable number if we just count the total trucks registered in the last 16 years.

Since trucks are required to pay some membership charge to be operating in the road, the total number of trucks affiliated to an organization represents the correct lower bound of the total number of trucks plying in Nepalese roads rightnow. This leads to our estimate of trucks running in Nepal being somewhere in between 19000~31000.

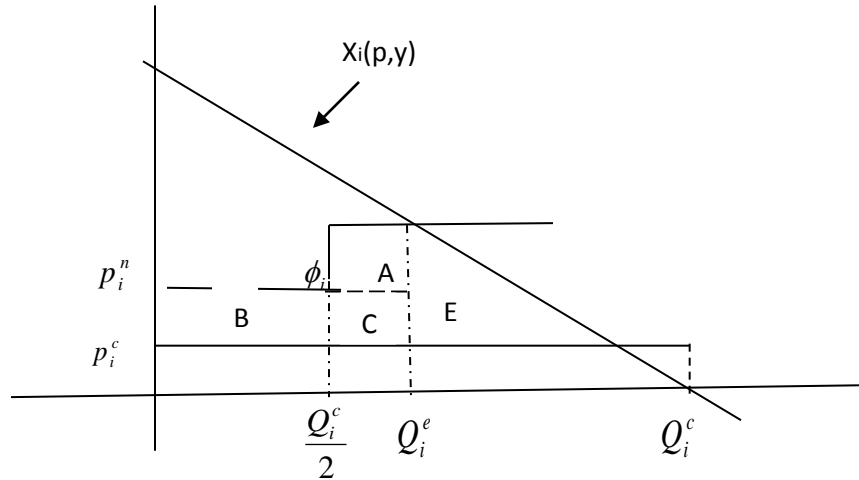
Our conversation with the entrepreneurs revealed that except for Narayani, Gandaki, Banganga, Butawal TEA, other TEAs don't provide additional insurance services (appendix 20). This may lead to the lower affiliation rates of trucks in the TEAs in those regions where these organizations are active. Furthermore, some of the trucks are registered with private industries. Many old trucks and locally operating trucks also are unlikely to be TEA members. Relatively poor truck owners may also choose to take risk, which is uncertain, rather than pay a certain insurance premium. These facts imply that our lower estimate is truly a lower estimate.

The last column of the table of TEAs also provides the current charge paid by members to the TEAs. These are official figures in that they were provided by a TEA official to us. The charges are not same for all, and in deed, perhaps due to the increasing competition among TEAs, some TEAs have introduced different categories of membership (and attendant charges). Because of new regulations introduced by the insurance board (IB) in the last three years, TEAs are now a lot weaker than they were in the past. In particular, each truck is now required to be insured, for its passengers as well as for third party damages, with a legally sanctioned insurance company which has rendered risk pooling by TEAs redundant. IB claims that the TEAs are still trying to extract the concession to allow them to insure their members, but it is unlikely to happen anymore.

1.3 Impact of TEAs on the Market

TEAs affect the economy by enforcing the odd even rule in which odd number trucks are allowed to load one day and even number trucks are allowed to load another day. This introduces distortion in the market. There are different variants of odd even rule (for example, 7 days odd even rule), but our analysis below focuses mainly 2 days odd even (Jor Bijor) rule.

Diagrammatically, the market for the odd even regime system (2 days Jor Bijor) is given as follows:



(The market for trucking services under odd even regime in one trucking route)

Let subscript in this representation indicate the route, i.e. $x_i(p, y)$ is uncompensated demand curve of truck users in route i . We suppose that the truckers were acting competitively before the Jor-Bijor system was applied in this route. Let (p_i^c, Q_i^c) be the cost and quantity in competitive environment, which by definition is an efficient outcome. Suppose, the TEAs decide to raise the cost to p_n while imposing the 2 days jor bijor system. This system will restrict the supply to the half of the trucks supplied in efficient system (assuming that, in the efficient system, the market was clearing, the total supply at the time has to be Q_i^c). If average waiting cost of the truck users (due to the shortage of the truck) is ϕ_i and the market clearing amount of truck in the new system is Q_i^e , we should get the market structure as given above.

Clearly, in this new system, the truck operators gain only B+C (assuming zero discounting rate for 1-day applied to C), while A and E will be deadweight loss to the economy. Analytically, the deadweight loss is given as

$$DWL_i = \int_{p_c}^{p_n + \phi} x_i(\tau, y_i) d\tau - (p_i^n + \phi_i - p_i^c) \frac{Q_i^c}{2} - (p_i^n - p_i^c) \left(Q_i^e - \frac{Q_i^c}{2} \right)$$

Clearly, nationwide DWL is the sum of the deadweight loss along each of these routes, assuming these losses are uncorrelated with each other. Hence, if there are N total routes in a country, then the following is the representation for nationwide deadweight loss.

$$DWL = \sum_{i=1}^N DWL_i$$

Notice that there is some controversy regarding how to calculate the “theoretically correct” DWL. *Hausman(1981)* believes that one should use compensated demand function to estimate DWL. Going from Marshallian(uncompensated) to Hicksian(compensated) demand function is not difficult, but it still requires going through some mathematical intricacies. In general, one solves for associated indirect utility function, expenditure function and Hicksian demand function once an estimation of Marshallian demand curve is found (see *Hausman(1981)* for the detail). However, *Willig(1976)* has suggested that when income elasticity of demand is small, one may use Marshallian demand function like we have done above. Furthermore, even *Hausman(1981)* suggests that for goods that form small part of overall budget, using Marshallian demand function to estimate deadweight loss provides a good approximation.

1.4 Buying trucks in Nepal

A major argument of TEAs , to support their supply restriction policies, is that it is too easy to buy trucks in Nepal. In the past, as almost all of the trucks in Nepal were sold by Sivradi Tradings, a firm associated with the erstwhile royal family, policies conducive to purchasing trucks were in place, quickly leading to the glut of trucks in Nepal. Two previous studies have indicated that Nepal has almost six times more trucks per kilometer of available highway than India[our study doesn’t support that claim]. These studies have been cited in the annual yearbook of a major TEA to support their supply restriction policies.[See, smarika, FITTEN, 2013]

Our investigation revealed that, while it used to be easy to buy the trucks in the past, the access to credit has become very difficult recently. Banks provide loans to purchase trucks under Hire Purchase system, and an average truck chassis currently costs about 2.7 million rupees. However, banks generally

don't provide loans to new firms or persons which don't have experience in trucking industries, unless they provide additional collaterals (such as land and building). The new buyers also need to show sufficiently high income, and incomes are not easily verifiable in Nepal. Most of the prospective truck purchasers are small time transportation workers, and banks tend to be suspicious of their income statements.

The major problem currently faced by new purchasers is that they are not in a position to inject equity for purchasing new trucks. Banks, if everything else is satisfactory to them, provide 70% of total chassis price (on the basis of VAT bill) as a loan. However, the body of a typical truck costs almost 1.0~1.5 million rupees, and these body builders generally don't issue VAT bills, and so, banks don't provide loans for building body. Hence new purchasers have to inject almost half of the total price of the trucks. This is generally beyond what most of the people in trucking industries can afford.

Banks were liberal in providing credit to the truck owners in the past. However, they faced a lot of problems in collecting credit dues in the past. They seized many trucks from the market, but were unable to sell them in the second hand market on time due to the problem known to economists as lemon market problem. People are generally afraid that seized vehicles are unreliable and are not willing to pay high amount for them. Consequently, they have become very strict in issuing new loans recently.

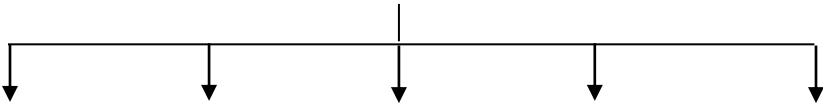
Difficulty in getting credit has generated a new class of owners in Nepal who have good reputation with the banks and are able to take loans cheaply, but then loan the trucks to others at higher prices.

(2) Data and the Survey Strategy

The goals of the current survey were to understand the average firm size, modernization level, average fleet age, cost structure, market structure, the type of individuals involved, regulatory difficulties faced by them, presence or absence of market barriers for their efficient operations in Nepal's trucking industry. We also wanted to provide data for possible estimation of the deadweight loss due to the syndicates in Trucking Industry. Schematic representation of survey strategy is given below:

From TEAs

From Non TEAs



Same regions as
"from TEAs"

Cluster

Narayani

Bagmati

Gandaki

Koshi

Lumbini



...

...



Narayani TEA
Terai TEA
...
(See appendix 2 for full list)
###

Bhaktapur TEA
Manohara Local Truck and Minitruck Entrepreneur Association
Nepal Truck and Container
###

Gandaki TEA
Paschiman chal TEA
Gandaki Midsize TEA
###

Biratnagar TEA
Koshi TEA
...
###

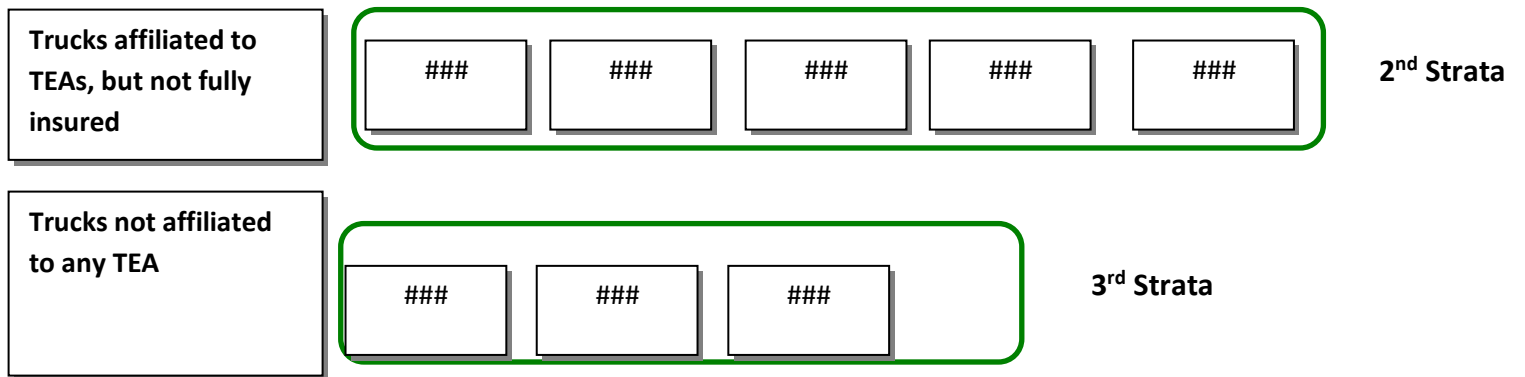
Lumbini TEA
Banganga TEA
Nepal India Transportation Entrepreneur TEA
...
###

Districts selected should cover the whole country (see explanation below)
1st Strata

Locally Operating TEAs

Trucks affiliated to TEAs, with full options for insurance





Total sample (in a range of 1000)

1. Truckers affiliated to at least one TEA, and taking insurance as their membership option
2. Truckers affiliated to TEAs , but not taking insurance as their option
3. Truckers not affiliated to any TEAs

Explanation: We propose the following sampling strategy.

First, the strata partitioning the overall truck population are designed as follows. The first stratum contains the trucks that are affiliated to at least one of the Transportation Entrepreneur Associations (TEAs) as full members and have taken full insurance options. Insurance options was the primary draw of Narayani Transportation Entrepreneur Association (NTEA), presently the most dominant TEA in the country, when it was first established circa 1980s. The second stratum includes the trucks that are the members of the TEAs, but are not taking full insurance as their options. These ordinary members pay significantly less amount as a membership fee (appendix 20). TEAs normally lobby for them, help them in conducting bargaining with the administration as well as the complainants when accidents occur. However, these trucks handle the financial transactions, including claims from the insurance companies, themselves.

The third stratum includes trucks that are not affiliated to any TEAs. It is believed that these trucks are not numerous, and they are often in the regions which are just getting the road networks. They may

also be in the regions with active TEAs, but are either too old, or don't drive very far from their base, and are generally confident that they are not likely to have any administrative issues. They may also be owned by the individuals for whom even the membership fee is a significant amount of money or who are excessively risk loving.

We have selected five dominant regions as our clusters—Narayani zone, Bagmati and vicinity, Koshi and vicinity, Lumbini and vicinity and Gandaki and vicinity. The clusters are given the names of zones but they are not limited to the zones named. According to the government's Transportation Management Divisions, these zones have seen the highest number of vehicle registrations in the recent years (See figure 1). The appendix 2 provides the full list of such TEAs in those clusters. We picked TEAs from these unions in these clusters in a proportionate (in terms of population) way. From each of these clusters, we sampled the three strata suggested above. At the end, we collected 5% of our samples from non-affiliated members, 70% of the trucks were fully insured, and 25% were partially insured.

3. Truck Entrepreneur's Associations(TEAs)

3.1 Origin of TEAs

TEAs arose out of a genuine need to protect the interest of truck owners who used to face serious problems in the aftermath of the accident involving their truck. Because of the weak law and order situation in Nepal, people often relied on mutual arbitration, rather than going to the court. Moreover, the third party insurance offered by insurance companies generally used to pay small amount (Rs 1 Lakh) and was not legally mandatory until 2012AD. Accidents, therefore, necessarily entailed a negotiation process between victims and the truck owners. Truck owners who were insured also found it difficult to get compensation by the insurance companies. Clearly, the owners felt they would be strengthened if they negotiated as an association, rather than an individual. In views of many truckowners we talked to, TEAs removed all 'uncertainties' in their professional life.

Early TEAs promised help in case of accidents in the following two major ways, (a) By guaranteeing to pay third party damages (often by utilizing the TEA's welfare fund or *bhalai kosh*) and (b) by conducting negotiations with the third party, police and insurance companies on behalf of the truck owner. Both of these services were valued highly by ordinary truck owners. This was the main reason behind the initial popularity of TEAs.

To sustain the TEAs, not only the truck owners had to benefit, but the TEA executives themselves also needed to benefit. TEAs benefitted by collecting membership fees, for sure, but more than that, they benefitted by forcing insurance companies to pay false claims. In our personal communications, Insurance Board (IB) officials cited the following two major avenues through which TEA officials benefitted: (a) by taking benefit of the fact that according to existing insurance schemes, while passengers were paid Rs 1 lakh in case of accidental death, the third party death were paid Rs 5 lakh. TEA executives usually forced insurance companies to categorize the passenger deaths as third party deaths. (b) by insuring trucks TEAwise. It was common for TEAs to strike a deal with the insurance firms for the insurance of a certain number of trucks that they would claim was their total membership number. So, if a TEA had 1000 trucks as its members, it would claim it had 500 member trucks. Whenever a truck was involved in an accident, they would claim that the truck was insured as part of such TEAwise insurance. IB suspected that benefits made from such crooked deals were evenly split between insurance company owners, executives and the TEA officials. (IB has clamped down on such practices in the last two-three years.)

The TEAs have evolved from their early avatar as facilitators in the claim processes and are now regarded more as unions who set rules in their territories of influence and resort to vandalism to enforce those rules. The most frequent loading policy in Narayani TEA, Terai TEA are, for example, the so called 'seven days rule': a truck can load only 7 days a month. (This is an ongoing restriction policy currently). In the past, TEAs had frequently enforced Jor-Bijor (Even-Odd) system. Under such a system, trucks with odd number plate loaded goods one day, while trucks with even number plate loaded goods the next day. Several other variants of this system have been frequently tried by major TEAs operating in important trade corridors recently. Examples are 2-days Jor Bijor System (under which odd vehicles may pick up the load the first two days and even vehicles pick up the other two days) and 3-days Jor-Bijor system, once a week system (in which a truck may load only once a week) and once a month system. TEAs also fix rent so that, despite getting fewer transportation contracts, the truck owners still make more money than in business-as-usual environment.

Generally, these supply restricting systems are imposed when the demand for trucks is deemed to be low. The low season is generally considered to be Jyestha-Bhadra (Mid May to Mid September, coinciding monsoon season). When demand for the services of trucks is low, the dominant TEAs meet and decide the kind of restrictions they would impose on truck services. Narayani TEA has traditionally been the major player in all these decisions. When demand increases, they generally lift these

restrictions. This is obviously not a rule. In 2013, when calamity struck along Tatopani-Kathmandu highway, the truck operators there enforced once-a-month rule and hiked the rent to Rupees six lakh per trip(a whopping 1400% increase from their usual fare of forty thousand rupees per trip).

Since the TEAs don't have legal power, nor do they have sufficient manpower to enforce these systems, there used to be a lot of violations of these supply restriction policies adopted by these TEAs. However, lately TEAs inform their local branches and/or affiliates of their decision regarding the supply restriction as soon such decisions are made. The local branch members then become proactive in enforcing these decisions. Furthermore, TEAs also won't help the disobeying trucks if they run into an accident or other administrative hassles. The heads of these TEAs now believe that such disobedience is negligible.

Like many other organizations in Nepal, the TEAs often quarrel with each other. Such quarrels are primarily motivated by personal leadership desire, but sometimes political parties also get involved. Sometimes, the TEAs split because of leadership tussle in a local level (this happened recently in Gandaki TEA). On the other hand, some TEAs have merged recently (for example Pawa TEA). In some regions, there are two or three truck entrepreneur associations. It can be guessed that such splits have made it more difficult to enforce any decision at the local level. Small and divided TEAs are normally unable to deliver important services to their members as well as enforce their allocation rules.

3.2 Automobile Related Accidents

Roads are relatively recent phenomenon in Nepal. 2 districts (out of 75) are yet to see road, and many districts adjacent to high Himalayas, as well as near western Nepal, have seen roads only relatively recently. Similarly, both economic activities and number of vehicles plying in zones such as Karnali, Seti, and Mahakali are small.

Conflict resolution process in Nepal used to emphasize local solutions. Village heads have traditionally held quasi-legal power. Government run courts are notoriously slow, and newspapers regularly carry news of extremely delayed justice resolution in these courts. For example, four members of a Chaurasiya family in Birgunj committed suicide after the family *won* court case, because after so many years of legal battle, the family was exhausted financially and their victory only confirmed their depleted actual possession. The lack of faith in government institutions have made people incredulous of promises made by government officials.

The early entrants in truck industry were actually people with some resources. For example, a truck used to cost Rs 2 million in Nepal about 8 years ago, but that amount would have bought 2 acres of land in many regions of Terai. Rightnow, most of the land that can be used to make a house costs, on average, twenty times more. Truck price has remained relatively constant, and this has made it easy to own trucks for landed class. Truck ownership is no longer a symbol of affluence. In fact, many of the truck owners are very likely to be dependent on the income from the truck to run their day to day affair. They are not socially powerful. This fact has two implications: First, after an accident, the victims demand a high compensation from truck owners because of the old belief that the truck owners come from landed class. Second, the truck owners are unlikely to be able to fulfill the demand, because in reality they are not very rich. This often leads to a protracted negotiation due to the mismatch of expectation and reality.

3.3 Government's Minimum Cost Determination Mechanism

The government of Nepal regularly determines the maximum suggested rent a truck can charge in the routes it was given permission to operate on. Ironically, this system of suggesting rent was established at the request of truck operators themselves who felt besieged by the charges coming in the media about them charging exorbitant prices and causing inflation in the market. The government takes the following factors into account in making its operating cost calculation:

- (a) Salary and allowance to the drivers and helpers.
- (b) Taxes identified as income tax, transport tax, renewal tax, permit cost, fitness tax, pollution tax and municipality tax.
- (c) Insurance
- (d) Maintenance costs identified as engine overall cost, gear and differential cost and general maintenance
- (e) Battery cost
- (f) Depreciation
- (g) Interest payment of truck
- (h) Overhead cost such as parking and others
- (i) Variable costs such as fuel, diesel, tyre and lubricant

Besides these, government adds the 15% of book value as a margin for the truck operator and calculates the average fair for distance travelled.

The truck operators normally agree that it is the exhaustive list of the total cost, except for the “jaach pass” (the tax to be paid to travel in each route every trip).

Appendix 21 below provides a suggested cost of government in Birgunj Kathmandu route.

4. Results

The following are the results from our survey.

4.1 Ownership Structure

We find that 59% of the truck owners are solo truck owners. 70% of these solo truck owners were previously employed in transportation industry. The distribution of truck size (i.e. the number of trucks owned) of a firm is given in appendix (1). An overwhelmingly large number of truck owners own only one truck. The median truck owner owns one truck, and on average, the owners own 2.4 trucks (with standard deviation 3.96). Owning 3 trucks would put someone in 75th percentile and owning 6 trucks would put him in 95th percentile. Ownership of 20 trucks corresponds to 99th percentile.

These results confirm what is generally observed in Nepalese trucking industry: most of the owners are poor individuals. Many of these joined trucking industry as a help and worked their way up to become the truck owner. 70% of these owners don't have another salable skill and hence, exit from the trucking industry is not an option for them. It provides some explanation for their aversion to competitive market with frequent exit possibility.

The median truck in Nepal is 5 years old, and on average, the trucks are 6.4 years old (with standard deviation 4.6 years). The distribution of the truck age is given in appendix (2). On average, the trucks have travelled 247620 kilometers. There is a large standard deviation (347492Km) for this. The median truck has travelled 135743 kilometers. For the distribution, see appendix(3).

Employee size of of Nepalese truck firms is also quite small. On average, they have 3.2 employees (Standard deviation 4.07). Median firm has 2 employees. This is consistent with the number of trucks we have calculated. More interesting is the fact that about 53% of the firms have only 2 employees, while 10% of the firms have 1 employee only. Many of the trucks in Nepal have two staffs, often one of them being the owner himself.

68% of the respondents considered themselves primarily as a transportation sector employee. The others were primarily engaged in nontransportation industries such as manufacturing, trading, farming etc. Among those who were engaged in other professions, 7.5% were manufacturers. This implies that about 2.5% of the total trucks belonged to manufacturers. Similarly, farmers accounted for 33% and traders accounted for 31% of those who identified themselves as belonging primarily to non transportation sectors.

Due to the small size of almost all businesses in Nepal, trucks hardly need to hire other trucks to fulfill their obligations. Most of the truck owners(70%) say they don't hire other trucks to carry goods. It also indicates that people requiring trucking industry services themselves assess whether they need additional trucks, and if so, they would go out and look for trucks themselves. 30% of the truck owners say they have hired trucks to fulfill their load transportation obligations. Even among these 30% truck owners, most have hired trucks only a few times. The primitive nature of Nepalese trucking Industry can also be observed by looking at the information regarding the number of times these truck owners have hired outside trucks. Only 25% of those who have hired outside at least once in a year have hired more than 60 times a year. This indicates the absence of professional transporters with frequent outside trucking needs. Clearly, either the professional transporters buy trucks when they have demand, or they have very low demand for transportational needs.

4.2 Truck Entrepreneur Associations (TEA)

As we mentioned earlier, TEAs form an integral part of Nepal's transportation sector. Originally, they provided an avenue for pooling risk to the truckers, but increasingly, as law and order situation in Nepal has weakened, their power as a truckers' union has been an important assets in negotiating for the interests of the truckers in an environment of flux and lawlessness. This has contributed to continued popularity of these associations.

We found that 80.25% of the trucks in our sample were affiliated with a Truck Entrepreneur's Association. To determine the ratio of trucks affiliated with TEAs to those not affiliated with TEAs, we first collected data from Dhangadhi (Attariya), Bhairahawa, Hetauda, Pokhara and Birtamod. We stayed at a popular police post, and asked only one question to passing trucks: whether they belonged to a TEA

or not. We had previously calculated the total number of trucks belonging to TEAs by using telephone interview with the chairmen of these TEAs. Based on this, we had decided the number of trucks from TEAs and nonTEAs that we would like to interview.

It is not costless to be a part of a TEA. On average, a truck pays Rupees 1252. 0 (with standard deviation Rs 1141.72) and a median truck pays Rs 1200 as a membership fee to the TEAs. An overwhelming majority of these truckers (93%) plan to continue their membership. Only 4.4% said they don't plan to continue and 2.5% were unsure about their continuation plan.

An absolute majority of truckers were of the view that they joined TEAs to protect against unexpected events arising out of accidents(54%).An almost equal Percentage of truckers (17%) cited two other reasons as their primary motive in joining TEAs: (a) to get business and (c)due to the fact that they couldn't operate without being a part of TEAs. Hence most of the truckers felt incentives (such as insurance, network) were more important factors than intimidation (of not being able to operate without being a part of TEA).

4.3 Modernization Level

All (100%) trucks we surveyed said they used mobile phones, but not GPS, in communicating with each other and the owners. This probably attests to the penetration and affordability of mobile services in Nepal. It also indicates the primitiveness of Nepalese trucking industry: since the fleet size is small, the industry doesn't use GPS transmitters to track the trucks.

After the survey was done, we recently met several truck owners to verify our results. In our communication, we found that one truck entrepreneur, Dilip Dharewal, from Biratnagar has recently started using GPS transmitter to track trucks in his firm. But he remains the only exception so far.

4.4 Utilization Level

Trucks on average reported to have operated 220 days per year(with standard deviation 83.9 days) per year, with median truck operating 220 days as well. Our question on utilization level was intended to

extract information on the extent of syndicate. It seems trucks on average are operating on 60% of total days possible, probably indicating a mild level of average nationwide syndicate intensity.

Truckers reported that they served a large number of clients. The active number of clients, on average, was 62.01(with standard deviation 106.1) and the median number of clients was 10. The average was therefore driven by the large right tail .

One interesting fact is 62% of the truckers reported that their number of clients has increased recently, while only 13% said that the number has decreased. Rest of the truckers claimed the number has remained stagnant. It reflects the increasing economic activities in Nepal in recent years. Consistent with this finding, only 9% truckers said their most important client accounts for more than 50% of their business. 27.09% said their most important client(MAC) accounted for less than 5% of their total business. Furthermore, 23.74% said their MAC accounted for 5-10% of their business. Likewise, 16.2% said their MAC accounted for 11-25% of their business and 19.8% said the MAC accounted for 25-50% of their business.

More than half of the trucks always carried goods produced by others, and a median truck carried 100% of goods produced by others. (See appendix 7) Furthermore, many trucks reported that they get no subcontract from others. The distribution of subcontract percentage shows concentration around extreme values: almost half of all the trucks either get all of their loads as a subcontract from others or they get none. This indicates the lack of networking in Nepalese market. (See histogram on percentage of load they get as a subcontract in appendix 8).

A total of 57.4% trucks said that they get loads only 0-20% times during the return trip. Additional 20.5% trucks said they get loads only 21-40% times during the return trip, 10% said they get loads 40-60% times during the return trip, and only 11.9% trucks said they get load of any kind more than 60% of the return trips.

A total of 41.99% trucks said that, on average, they get loads of only 0-20% of their total capacity on their way back in the return trip. Additional 23.54% trucks said they get 21-40% of their capacity in the return trip, 16% said they get 40-60% of their capacity, and only 18.4% trucks said on average they get more than 60% of their capacity during the return trip.

Only 1.73% of the trucks surveyed said they charge 80-100% of their regular price during the return trip. On the other hand, 50.37% said they charge less than 20% of their regular price during the return trip; 23.21% said they charged 21-40% of their regular price and 18.27% said they charged 41-60% of their regular price during the return trip. The rest (6.42%) said they charged 60-80% of their regular price during the return trip.

A total of 55.7% of the trucks said the drivers are allowed to stop unscheduled on their way to the destination cities, where as the rest said the drivers are not allowed. Out of those who said the drivers are allowed to make unscheduled stops, 63.84% of the truckers said drivers are allowed to stop unscheduled because drivers demand such concessions from the owners. Additionally, 19.19% said the main reason behind such allowance is the slow business, forcing owners to try to pick up passengers on their way to the destination. Interestingly, 6.28% indicated that drivers are allowed to stop because of third party setting. Generally, the transportation entrepreneurs have their connections with the local police or revenue officers in different checkpoints, and they don't want their trucks to pass through these checkpoints when the desired officers are not manning them. Trucks wait in small towns nearby until time is appropriate for them.

4.5 Regulatory Environment

Licenses related regulatory restrictions are the most important regulatory restrictions in many truckers' view . with 76.14% citing license raj as the most restrictive effect in their profession. 18.07% cited road safety related regulations as being their major restriction, where as 11.08% cited axle load related regulations. Less than 1% cited insurance regulation as the most important regulatory restriction in their profession. In line with this, when asked whether they needed to get permit before operating in their current route, only 2.96% said they didn't need any permit. But despite license being cited as a major restrictive effect, 95% of the respondents said that it took them less than 30 days to get the license to operate.

About 20% of total respondents in our survey admitted to having paid at least some money to get the route permit from the government, which every respondent said was mandatory in their route. Almost everyone of those belonging to Gandaki Yatayat admitted of paying Rs 2,00,000.00 but the median

truckers who admitted having paid at least some money paid Rs 5,000.00 to get the permit and the average amount paid as a bribe to get the route permit was Rs 71566.07 (with standard deviation being Rs 94190.24). The spread of bribe amount was quite large: people reported paying as low as Rupees 50 as a bribe. The histogram of the bribe paid indicates bimodal distribution: most of the bribe paid are in small amount (close to zero), but a significant amount was also concentrated around Rs 2,00,000.00 (see appendix 8).

78.93% respondents said that they needed permit from non-governmental agencies (TEAs) to operate on their route. The permission from TEAs was relatively fast: the median trucker said it required 5 days to get the permit and 95% of all respondents said they received it within one month. The distribution of days required to receive such permit (for the bottom 95%) is given in appendix 9. Among those who responded to our questions, 24.81% said bribe was expected of them to get the TEA permit. Of those who said they paid bribe for the permit, the range of bribe paid was Rs 200-15000 with average payment being Rs 4604.76 (with standard deviation Rs 4626.06) and median payment being Rs 2500. Besides these two permits (government route permit and TEA permits), there seemed to exist other permits in some routes as well. 8.57% of respondents reported that they had to receive other permits before they could start their business and the median time taken to obtain such permit was 7 days . Some (4) people reported paying almost Rs 5000 to obtain such permit, but otherwise, bribe was not expected for such a permit.

Truckers reported as many as 10 agencies stopping them on the highways. 27.84% of the truckers in our sample said that they are stopped by 2 agencies. Similarly, 23.2% said they were stopped by 3 agencies and 14.18% said they were stopped by 4 agencies. 15.2% said they were stopped by 5 agencies, where as 10% said they were stopped by 6 agencies (see appendix 10). 74.3% truckers in our sample said they pay bribe to speed up the proceedings when stopped by these agencies, and the median bribe amount paid during a trip was Rs 500. The distribution of bribe has a very long right tail which has been a recurring feature of all our data. The average bribe paid during a trip was Rs 1030.2 (standard deviation being Rs 1947.2). Importantly, 39.15% respondents said that the amount of bribe paid is independent of the type of cargo being carried. Rest, almost 60%, thought it was somewhat important to very important. Other factors that affect the amount of bribe paid to the inspectors from regulatory agencies include overload, road condition, failure to renew permits and licenses, distance to be travelled, and the occasion of festivals.

Truckers were evenly split about the type of environment they were operating in, with 36.86% saying they are operating in imperfectly competitive environment. During our interview, many TEA officials had insisted that freight allocation system was active only occasionally, in particular when the demand is low. Among the respondents, 44.04% said they have freight allocation system(FAS) active for 0-3 months a year, and 14.68% said they have .FAS active for 3-6 months a year. A quarter of the respondents (24.77%) said the FAS system was active 9-12 months each year. We also found that price fixing and freight allocation went together: 32.23% of the respondents said TEA fixed price for 0-3 months in a year, 28.31% said they fixed price for 3-6 months, 5.42% said price fixing happened for 6-9 months and 34.04% said the price was fixed 9-12 months. The price fixing predictably is above the government set minimum price: 70.48% said the price is fixed below government set price only 0-25% of the times. 10.1% said the price was fixed below government's minimum price more than 50% times. Most of the truckers said they honored the price fixed by TEAs. 59.9% said they never negotiate the fixed price, where as 36% of the respondents said they occasionally negotiate despite the price being fixed. The rest, 4.1%, said they always negotiate irrespective of the price.

Truckers don't think Jor-Bijor system is effective in getting them business all the times. 59.29% of the respondents said they get loads only 20% of the times when the jor-bijor system is in place. Only 2.5% of the respondents said they get load 90-100% of times when the jor-bijor system was in place. 13.57% of the respondents said they get load 21-40% of the times and 12.5% said they get load 41-60% of the times during the time when the jor-bijor system is effective. About 6% said they get load 80-90% of the times. This despite the fact that 58.13% of our respondents said they had preferred customers (who would give them load regularly) and 33.13% of the respondents said they charged these preferred customers differently.

4.6 Expenditure

The median driver is paid Rupees 9000 as a monthly salary. The average monthly salary paid to the driver is Rs 9383.33 (with standard deviation 3998.3). The distribution of the salary is given in appendix 11. The median salary of the helper is Rs 2000, and on average the helper is paid Rs 3138.71 (with standard deviation Rs 2296.56). Helpers are paid as low as Rs 300 per month and as high as Rs 12000 per month. Their salary distribution is given in appendix 12. Drivers are paid somewhere between Rupees 0-

11000 as an allowance per trip, with the median driver being paid Rs 800 and the average driver is paid Rs 1076.49(standard deviation: 1061.62). Helpers are similarly paid an average allowance of Rs 426.76 (with standard deviation :417.29) and the median helper is paid Rs 300 per trip.

Trucks reported making, on average, 25.28 trips(standard deviation being 127.08) per month, with the median truck taking 8 trips per month only. Each of these trips are on average 3029.03 kilometers (standard deviation being 2639.12Km) and the median trip is 2500 Km long.

Almost half of the truck operators told us that they don't pay income tax (51.1% of all respondents). Among those who said they pay some amount of income tax, the average payment is 18621.53 (standard deviation being 18102.12) and the median payment is Rs 15000. The distribution of tax paid by the trucks (conditional on them paying at least a positive amount) is given in appendix 13. An average truck operator reported paying Rs 2246.76 as a transport commission per trip (standard deviation being Rs 3925.30) and the median operator reported paying Rs 850, among those who reported paying it. Transport commission, in our definition, is the commission money paid to the transport companies which help the owners get the goods for supply.

The respondents also gave a varying answer on how much they pay for billbook renewal as evidenced in appendix 14. The average yearly payment for billbook was Rs 12499 (std deviation 11643.3), and the median payment was 14000. Similarly, on average, the truck operators reported paying Rs 6101.01 per year as a route permit, with the standard deviation being Rs 9743.15. The median payment was Rs 3100. Similarly, the median trucker reported paying Rs 1200 as a yearly fitness tax. The corresponding figure for average tax was Rs 3452.32 (with standard deviation being Rs 4968.81). Strangely, only 35% reported paying Rs 400, and other reported widely varying number, the distribution of which is given in appendix 14. Similarly, trucks on average paid jaach paas tax of Rs 709.45 (Rs 714.92), with the median truck paying Rs 400. Similarly, the average truck paid Rs 2810.78 (standard deviation being Rs 3684.36) and the median truck paid Rs 1200 per year as a municipal tax. The median truck also reported paying Rs 550 as a pollution tax per year, where as the average truck reported paying Rs 1792.5 (standard deviation 3556.02). The median truck reported paying Rs 35000 per year in insurance. On average, the truckers said they pay Rs 34,418.83(with standard deviation 18129.74) in insurance.

The median truck reported Rs 50,000.00 as an average yearly cost for engine maintenance. The average truck reported Rs 63608.91 (with standard deviation 43034.24) the yearly maintenance cost. The appendix 15 provides the distribution for engine maintenance cost. The median truck also spends Rs 50000 in yearly gear and differential maintenance cost. The average truck spends Rs 42875.81 (with standard deviation being Rs 59186.74) in this category. For other miscellaneous costs, the median truck reported Rs 25000, and the average truck reported Rs 44071.45 (with standard deviation Rs 52435.76). The distribution of other is given in appendix 17. Furthermore, the median truck reported spending Rs 10,000.00 in battery and an average truck paid Rs 11816.25 (with standard deviation being Rs 6763.58). Regarding other overhead costs, the trucks reported that on average they spend Rs 55597.58 (with standard deviation being 85489.27). The median overhead cost report was Rs 28000. The distribution of the overhead cost is given in appendix 18.

The median truck required 330 ml diesel to travel 1 km. The average diesel requirement for the truck was 347ml (standard deviation being 213 ml). An average truck operator reported his monthly gas cost to be Rs 1,38,958.80 (standard deviation being 118000.40), and a median truck operator reported his monthly gas cost to be Rs 100000.00. The median lubricant cost for the trucks is reported to be Rs 5600, average lubricant cost is Rs 8886.8 (with standard deviation being Rs 9894.0). Similarly, as for tire cost, the trucks on average spend Rs 196832.4 in tire per year (standard deviation being Rs 163702.3). The median tire cost is Rs 150000.00. The distribution for annual tire cost is given in appendix 19.

4.7 Constraints

For an absolute majority of the truckers (84.56%), the primary constraints they faced when they started the business was related to the access to credit. The rest (15.44%) cited license Raj as the primary constraint. Furthermore in their view, roads are quite congested. Only 7.52% of the trucks said the roads they operate on are not constrained. 52.18% said the roads are very congested and 40.29% said the roads are somewhat congested. Furthermore, 34.38% said they don't encounter any mechanical failure during their trip, 52.4% said they encounter 1-2 mechanical failures every 10 trips and 13.22% said they encounter more than 2 mechanical failures during every 10 trips. 13.35% of the respondents said in case of mechanical failures they don't find help nearby. 54.37% said the helps are available but they charge a lot, and 32.28% said helps are available easily in their route. Also, 8.54% said they encounter strikes more than 2 times in every 10 trips, where as 43.41% said they encounter strikes on average during 1-2 trips every 10 trips. The rest said strikes are rarely encountered, and didn't consider them as a constraint. Only half of the respondents (49.63%) said fuel shortage was not a constraint for

them. 43.46% respondents said they encounter fuel shortage during every 1-2 trip out of 10 trips, where as 6.91% said they feel the pinch of fuel shortage more than 2 trips in every 10 trips.

Truckers were evenly split about the road safety. About half (54.08%) said roads are safe, where as 5.87% said the roads are riddled with criminals and 40.05% said the roads are somewhere unsafe because of the presence of criminals.

(5) Impact on Economy and Prices

5.1 Impact on Economy

We now study the impact of trucking syndicates on the overall economy. A precise estimate requires us to estimate Harberger's polygon given in chapter 1.3. Since it requires estimating the demand curve for the services of trucking industry, a question requiring considerably more time and beyond the scope of current study, we provide the estimate based on approximations.

The formula for estimating the DWL was given as follows:

$$DWL_i = \int_{p_c}^{p_n + \phi} x_i(\tau, y_i) d\tau - (p_i^n + \phi_i - p_i^c) \frac{Q_i^c}{2} - (p_i^n - p_i^c) \left(Q_i^e - \frac{Q_i^c}{2} \right)$$

We use the following parametric form for the Marshallian demand,

$x_i(p, y_i) = \zeta y_i - \alpha p$, where the demand for trucking services is inversely related to the fare, and is positively related to the income level. ζ, α are parameters entering the demand function. This demand function is a corridor level, yearly demand function and will be interpreted as such. This demand function can be derived by aggregating individual demand curves, which will facilitate its interpretation.

For example, suppose y_{ij} is the income of individual j in corridor i and that $\beta = \frac{\alpha}{N}$ is the intercept

associated with price in the individual demand curve, $x_{ij} = \zeta y_{ij} - \beta p$. Then,

$$x_i(p, y_i) = \sum_{j=1}^N x_{ij} = \zeta \sum_j y_{ij} - N \cdot \beta p = \zeta y_i - \alpha p.$$

We first derive the deadweight loss in the catchment area of Birgunj. Given that Birgunj custom accounts for 52% of the total imports and has traditionally slightly more than 50% of the total customs

revenue, we estimate that the national deadweight loss is roughly twice that of Birgunj. Since most of the goods are inelastic, we assume α is very small and $\zeta = \frac{219}{10000000}$, which is roughly the total number of trips trucks make in Birgunj area in a year (365×600 trips per year, given that on average 600 trips a day are made via Birgunj customs) divided by yearly GDP for Birgunj's catchment area (about $\frac{1}{2}$ of national GDP of \$20 billion dollars).

Upon solving, we get

$$DWL_i = \varphi_i (p_i^n + \phi - p_i^c) - \frac{\alpha}{2} [(p_i^n + \phi)^2 - p_i^{c2}] - (p_i^n + \phi - p_i^c) \frac{Q_i^c}{2} - (p_i^n - p_i^c) \left(Q_i^e - \frac{Q_i^c}{2} \right)$$

We parameterize $p_i^c = \$180$, $p_i^n = \$220$. This is generally the price hike observed during the syndicate. Furthermore, we set $\phi = \$25$: this is the additional cost a truck incurs when it has to wait for a day. We used the rate of warehouse in Birgunj custom to calculate this value. Given that it costs Rs 0.25 to store 1 kilograms, it takes Rs 2500 per day to store materials carried by a 10-ton truck. The final ingredient in this estimate is Q^e . We argue that it should be 60% of Q^c (which is # of trucks in competitive equilibrium). This roughly reflects the fact that trucks reported being able to operate only 60% of time in our survey. We use $Q^c = 12500$, roughly half of all trucks plying in Nepal.

Assuming $\alpha \rightarrow 0$, we can calculate the DWL for Birgunj region as \$13.77875 million dollars. The nationwide estimate for deadweight loss is therefore \$27.5575 million dollars.

5.2 Impact on prices

Finding the impact of syndicates on prices was nontrivial. Nepal Rashtra Bank (NRB, Central Bank of Nepal) collects and publishes data on CPI index for both Kathmandu valley and Terai region (including Birgunj). While the food and beverage costs are generally lower in Terai than in Kathmandu, the difference in CPI index is actually lower in rainy season than in winter. Since syndicates are imposed during the rainy seasons, this difference is actually counterintuitive, and generally, it indicates that CPI index as such as not much useful to estimate the impact of syndicates in prices.

The impact of syndicates on prices must be lower in Terai and in the regions adjacent to India. Not only it is cheaper to transport goods from India to these regions, people can simply walk over to India and

buy goods and thus nullify the price impact. The impacts are felt more significantly in distant hills and in Kathmandu valley. Here we provide the estimate of price transmission for Kathmandu valley.

Since the average value of goods imported per day is 785.2 million Rupees, assuming half of these enter Nepal via Birgunj, where 600 trucks travel each day, the value of goods carried by each truck is NRS 6,54,333. Given average fare increase ($p_i^n - p_i^c$ above) of Rs 4,000.00, and likelihood that only half of the trucks are being operated in any given day while others have to spend Rs 2500 as a warehouse storage fee per day, the cost increases by Rs 5200 on average for a given truck. Importers we talked to admitted that they make 20~30% profit in their imports. For our estimate, we use 25% profit as a benchmark level. Given the inflation rate of 9.1% for 2014, this implies that in the absence of syndicate induced cost increase, the inflation rate would have remained 8.00%, and hence almost 11% of total inflation can be attributed to the syndicate.

5.3 Impact on overall poverty

According to the data from the World Bank, Nepal's GDP in 2013/14 was \$19.29 billion dollars and it grew by 5.48% at the time. Our deadweight loss data is for 2014. Assuming the same growth rate for 2014, we note that GDP grew by approximately, 1.05 billion dollars in 2014. The loss due to syndicate (27.55 million dollars) is, therefore, 2.6%.

(6) Conclusion

We have provided an exhaustive detail of the trucking industries in Nepal: their organization, modus operandi, information on the personnels working in these industries, costs involved and so on. The study is exhaustive in the sense that we have taken data from all around the country, representing almost every route.

Apart from others, we have found that the market is made up of small entrepreneurs who began their careers in the trucking industry itself. Barrier to entry in the market mainly comes from the difficult access to credit, and a parallel permit system run by both the government and TEAs. TEAs are still dominant in setting price and supply of the trucks, though truck owners negotiate around them as well. Like everything else in Nepal, the trucking industry and the role of TEAs are also changing over time, mainly because of increasing assertiveness of insurance board and other regulatory bodies.

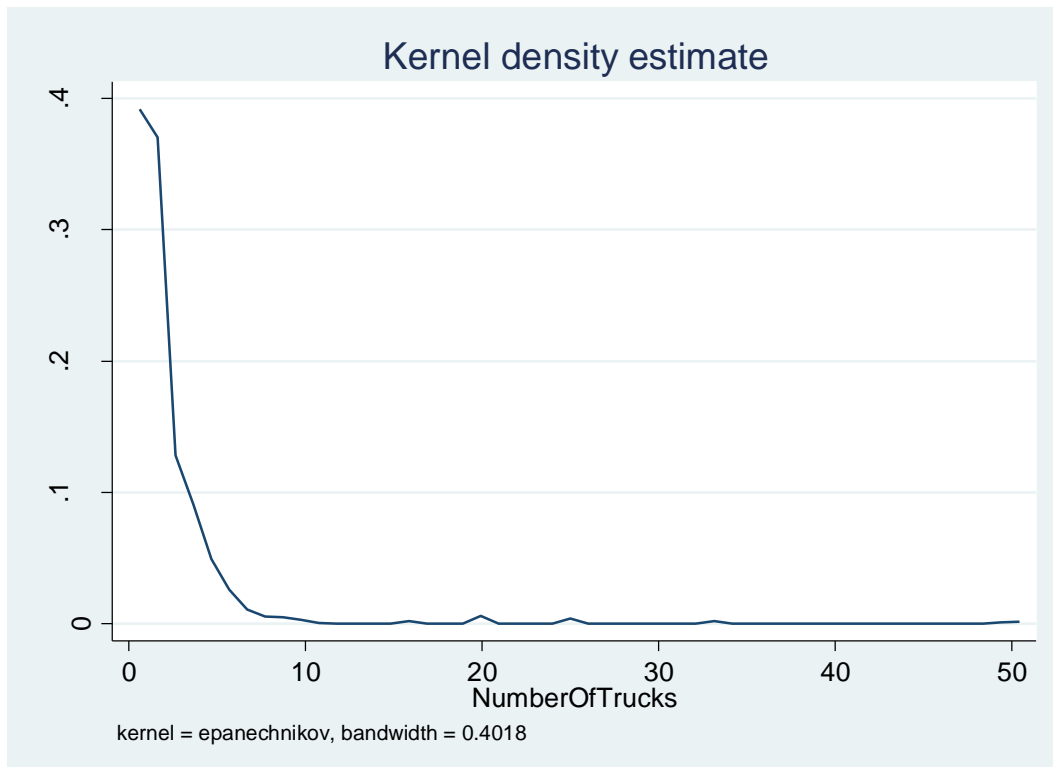
Syndicates, we found, affect the country's economy negatively. The loss economy wide was estimated to be \$27.55 million dollars in 2014 dollars, accounting for 2.6% of net GDP growth. The loss also accounted for 11% of the total inflation in Kathmandu.

References

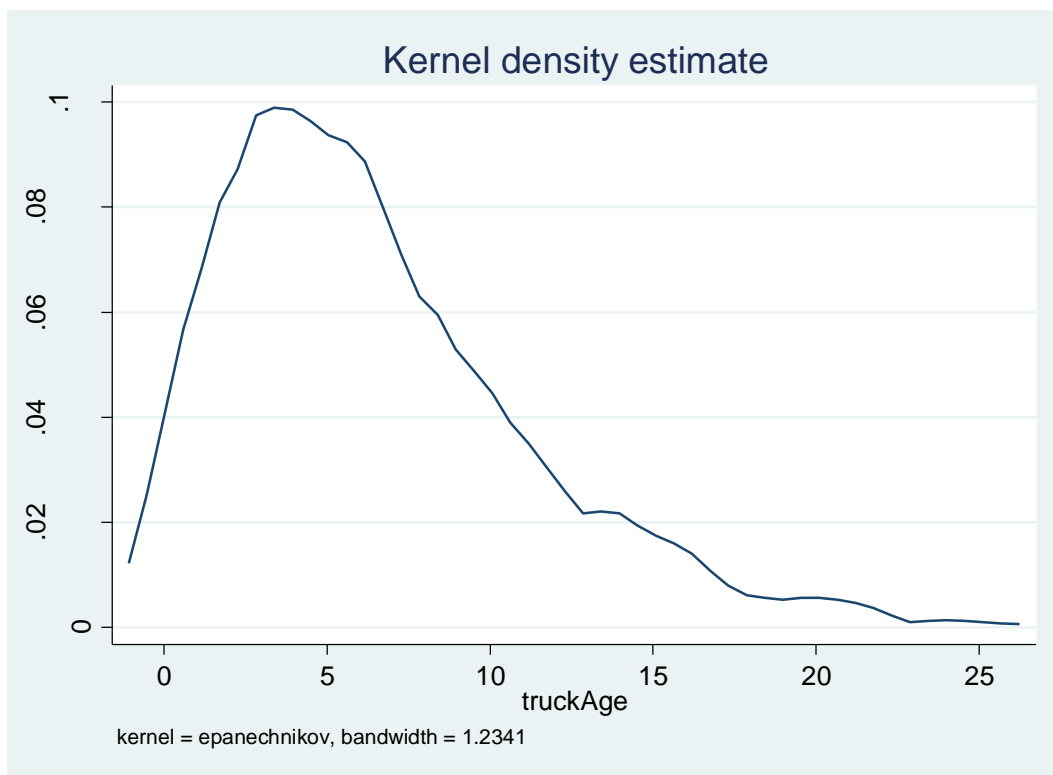
1. FITTEN Smarika (2013), FITTEN headquarter, Kathmandu
2. Hausman, J. A. (1981). Exact consumer's surplus and deadweight loss. *The American Economic Review*, 662-676.
3. Willig, R. D. (1976). Consumer's surplus without apology. *The American Economic Review*, 589-597.

Appendix:

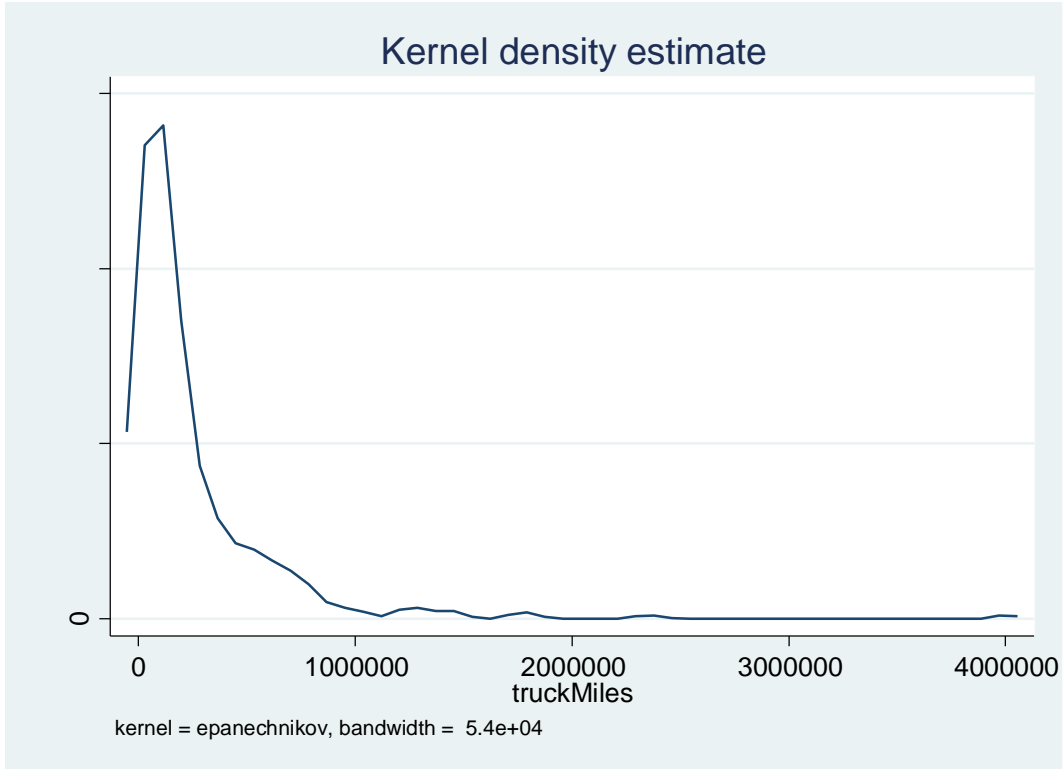
(1) Number of Trucks per firm



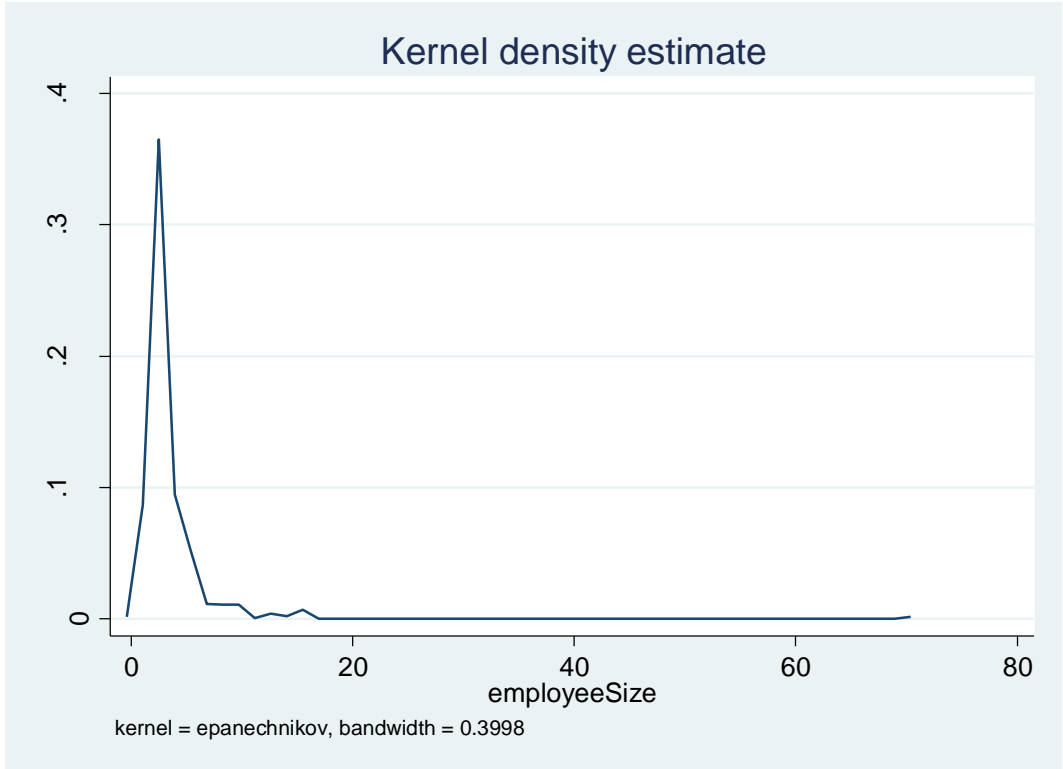
(2) Age of a truck



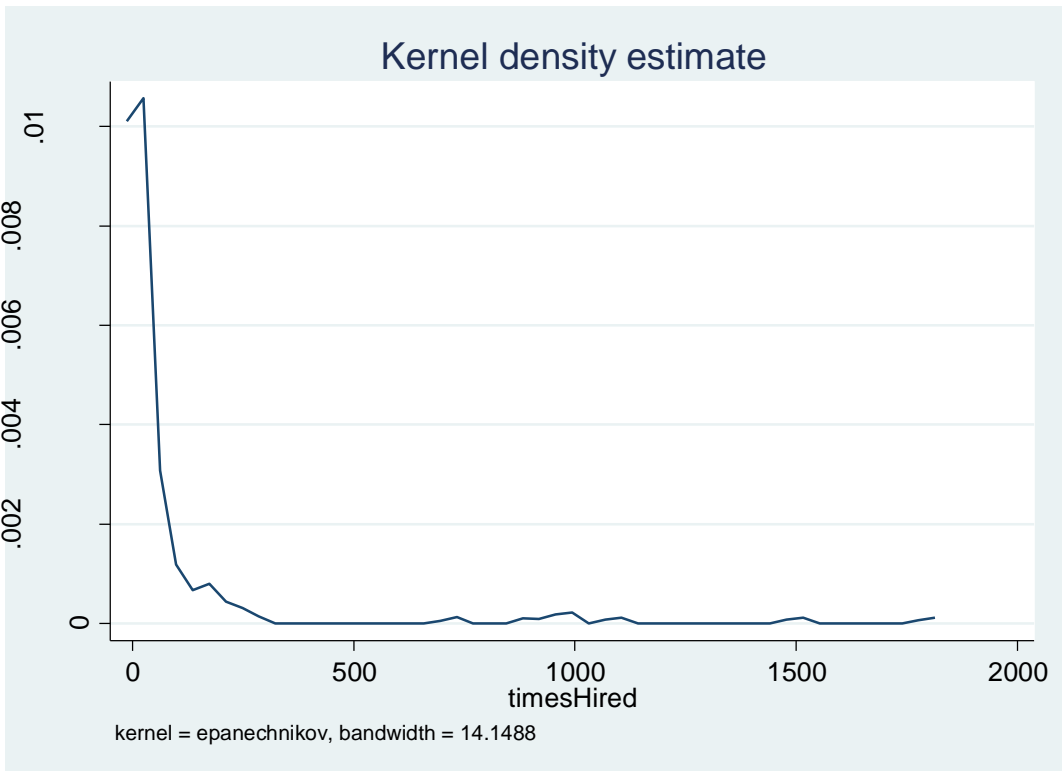
(3) Total kilometers run by a truck



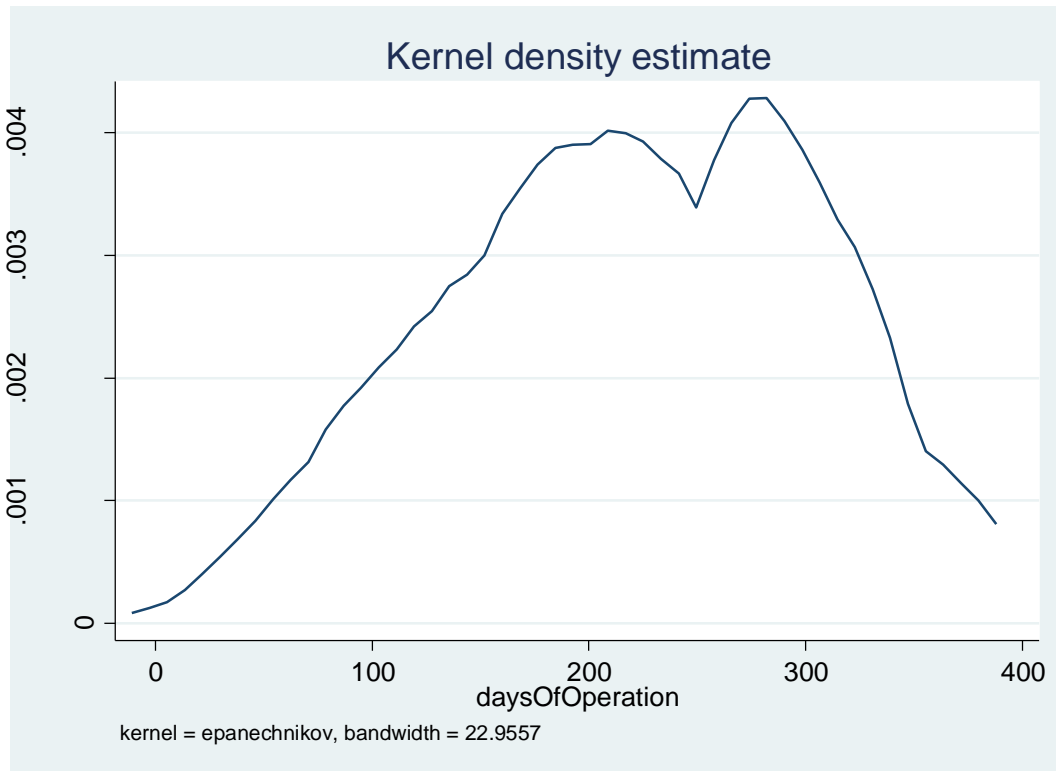
(4) Employee size of a Trucking firm



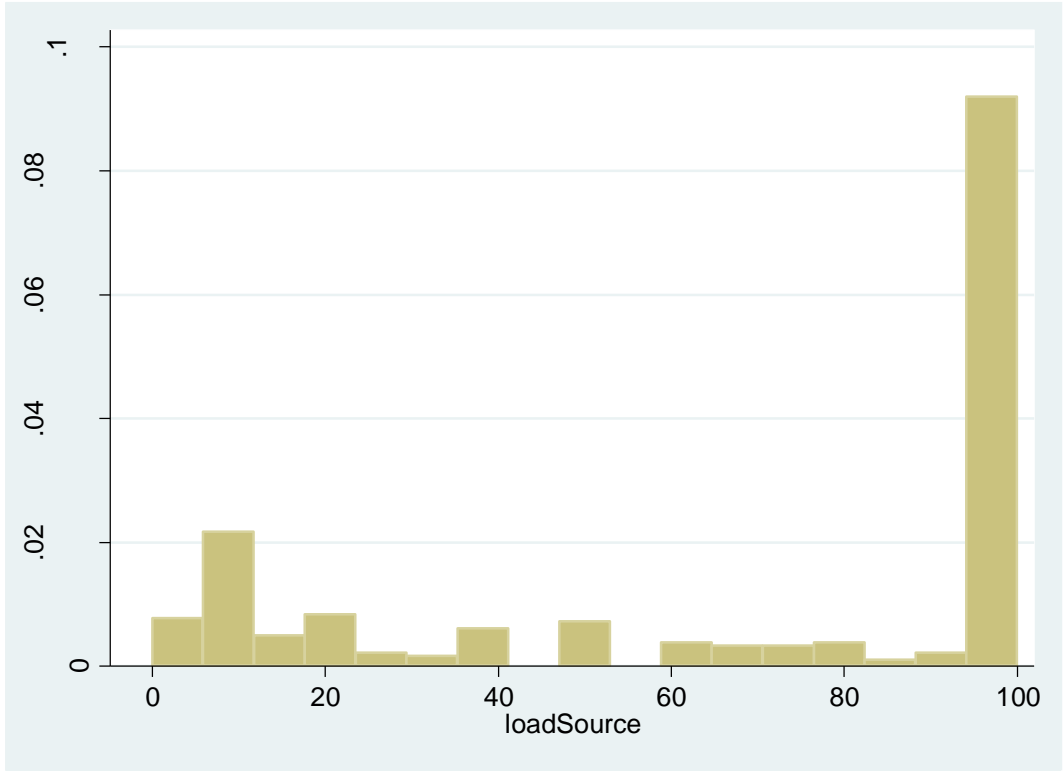
(5) Number of times hired per year



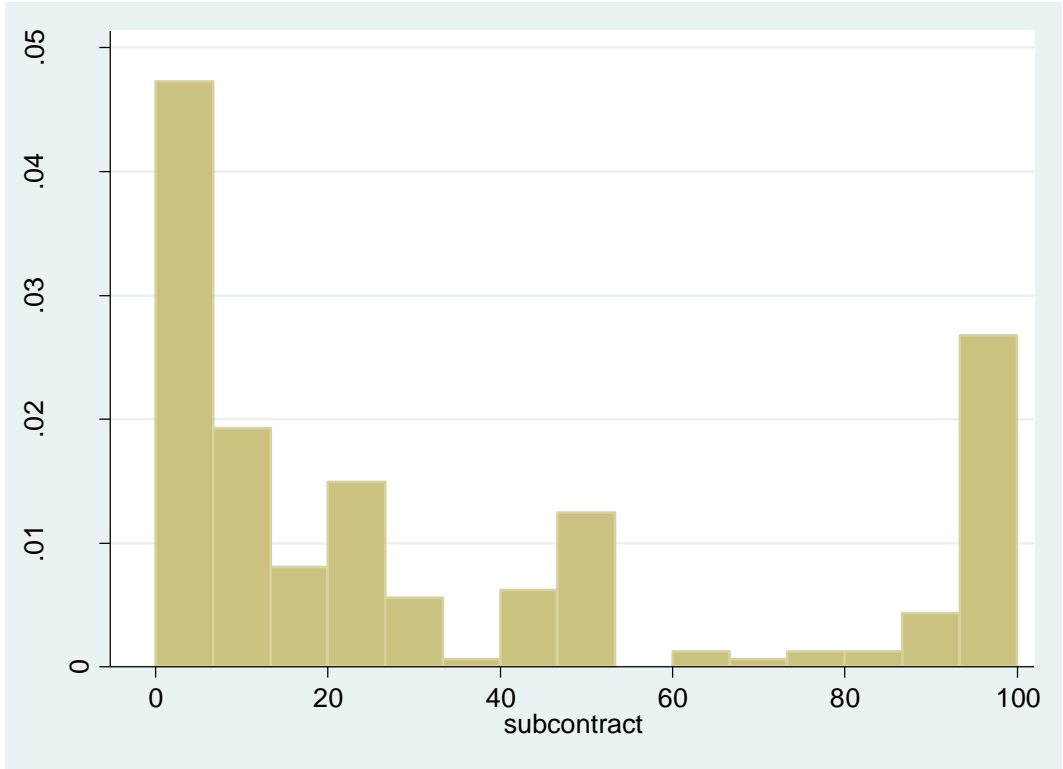
(6) Days of operation per year



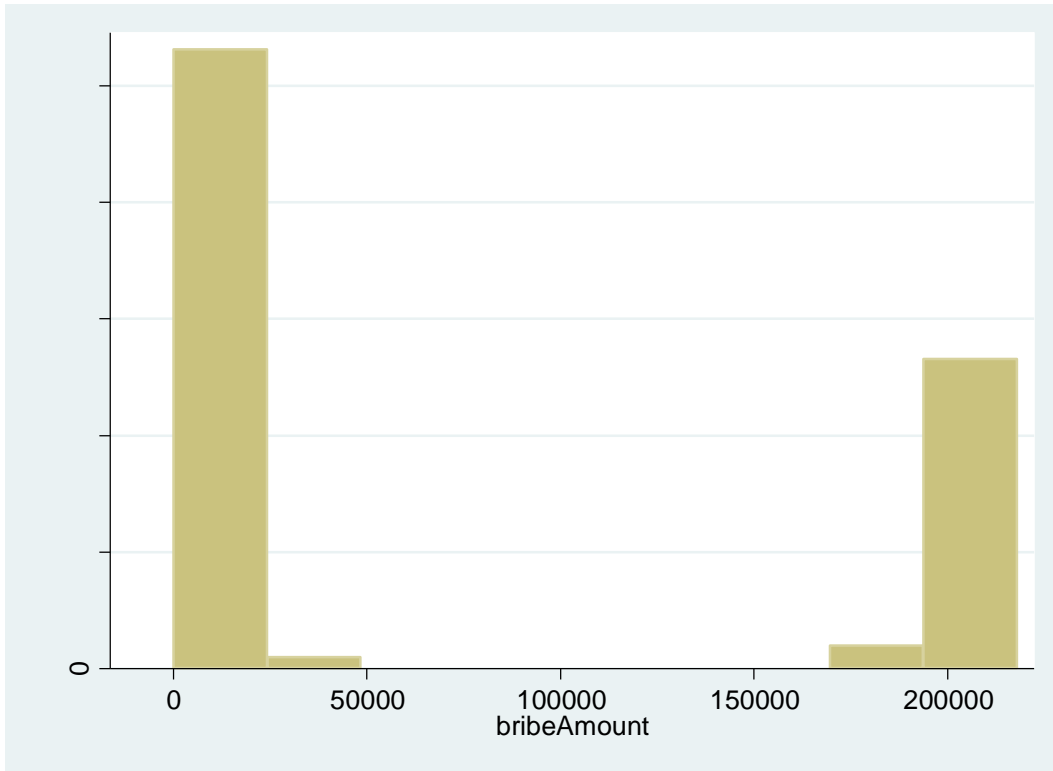
(7) % of total volumes produced by other firms



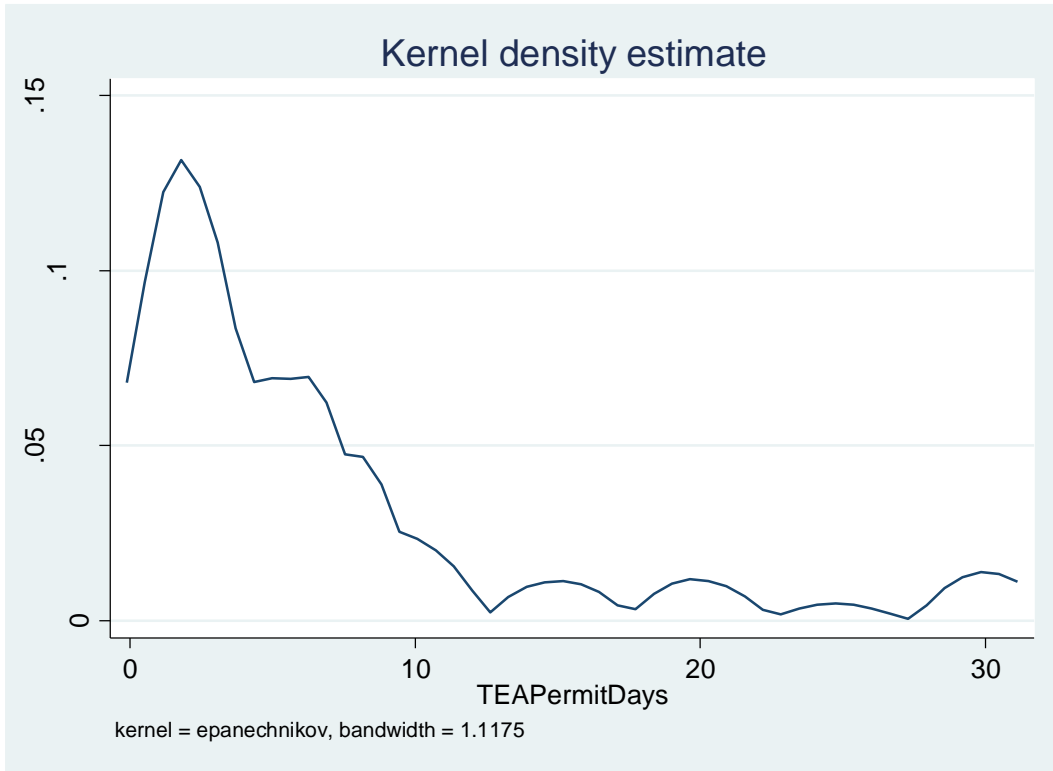
(8)% of total volumes subcontracted by other firms



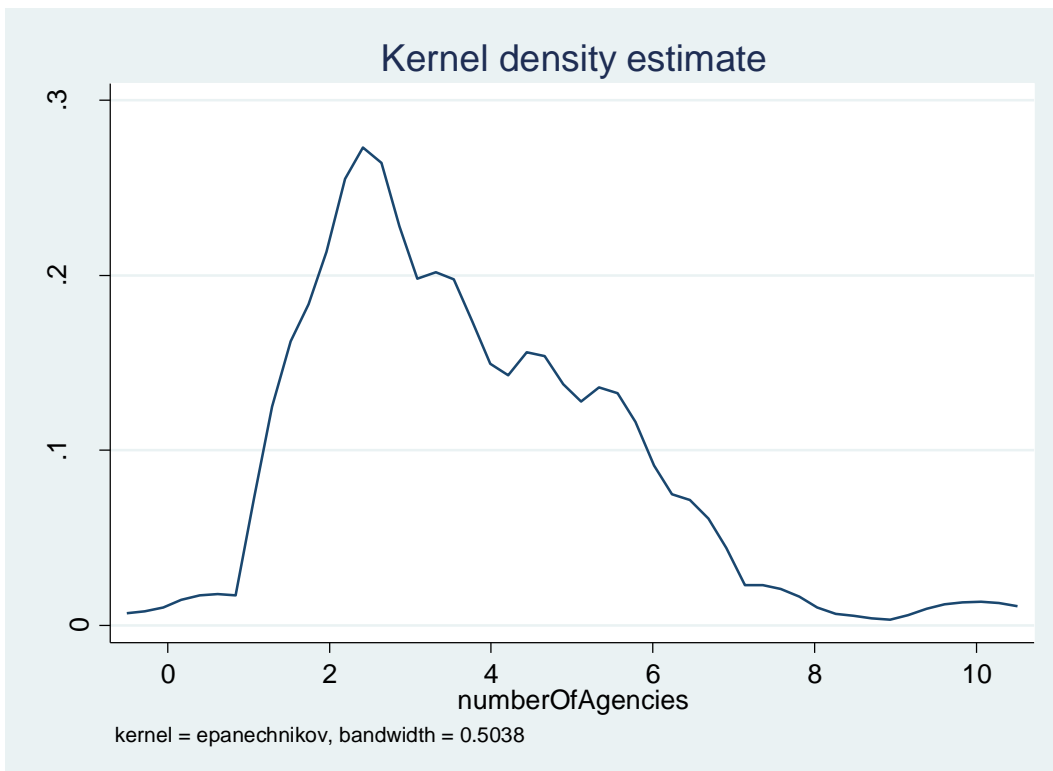
(8) Bribe paid to get route permit



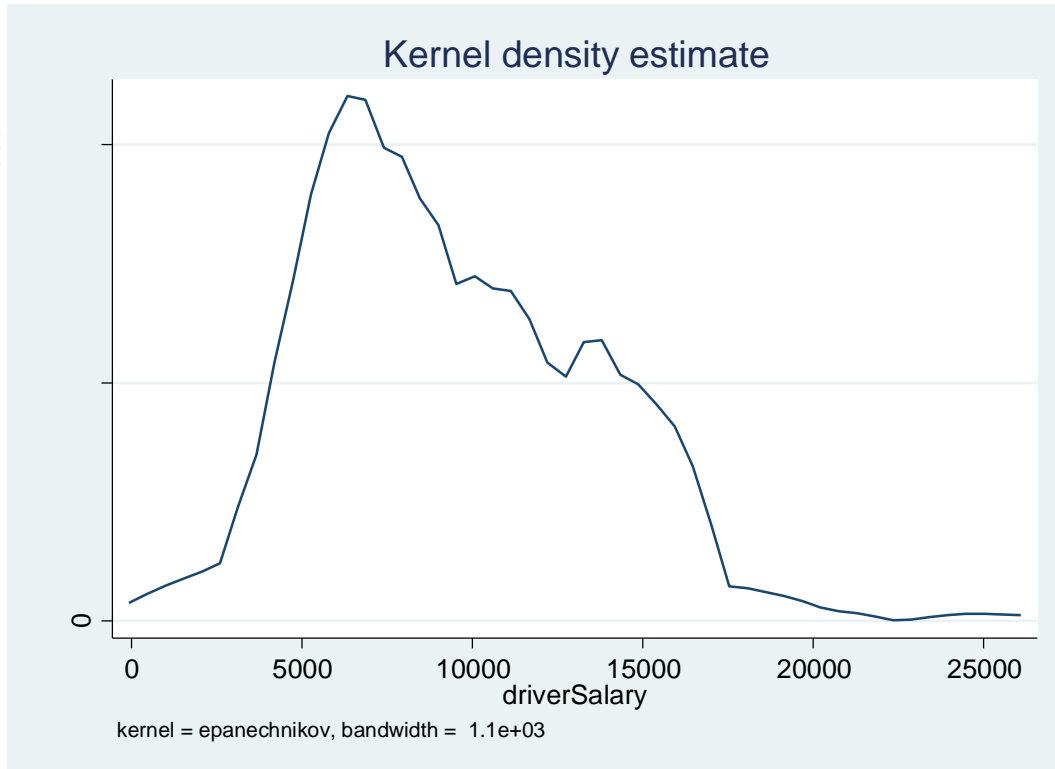
(9) Days required to get permits from TEAs



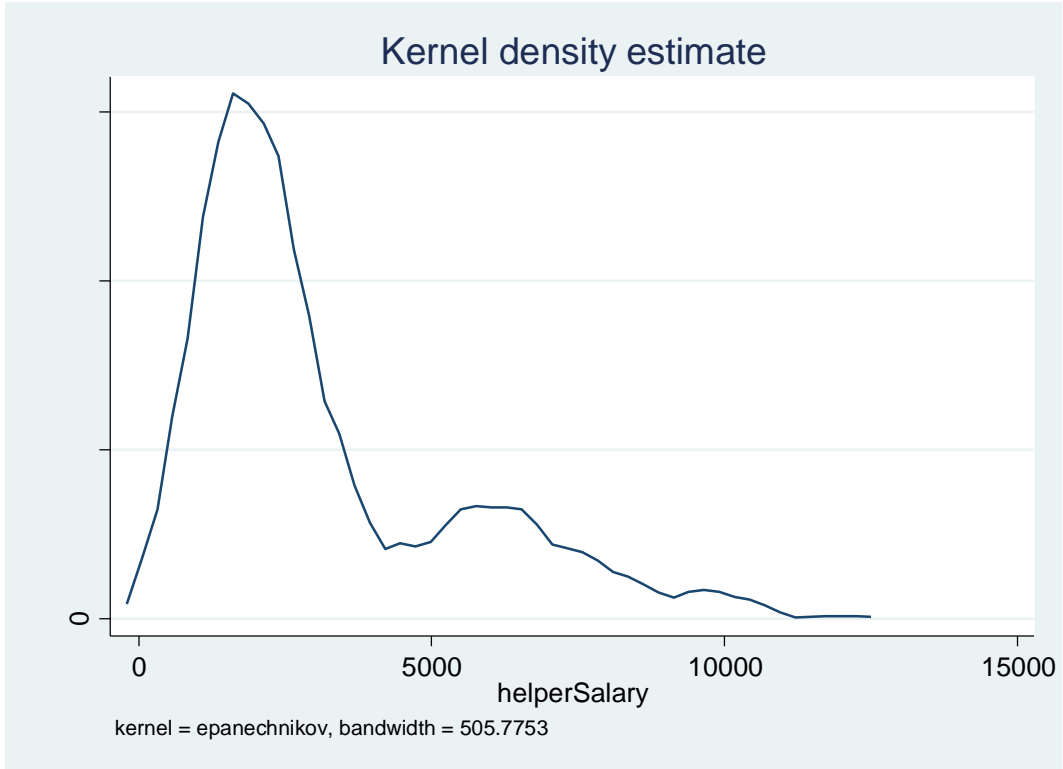
(10) Number of agencies stopping in highways



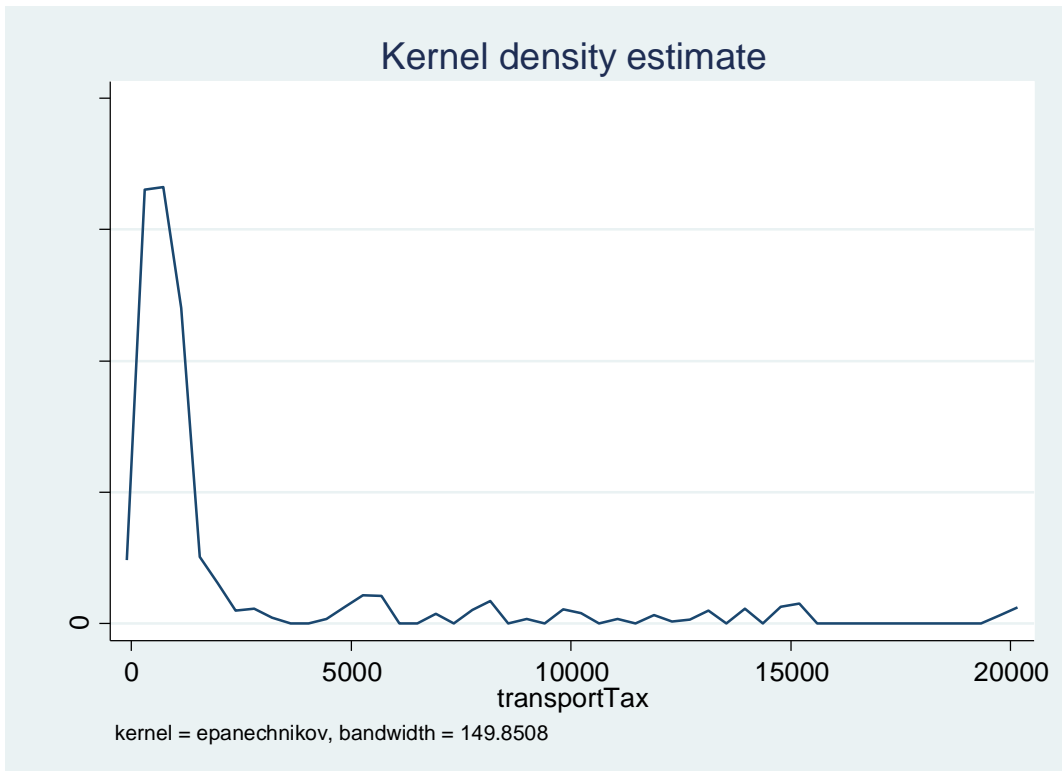
(11)Salary of the driver



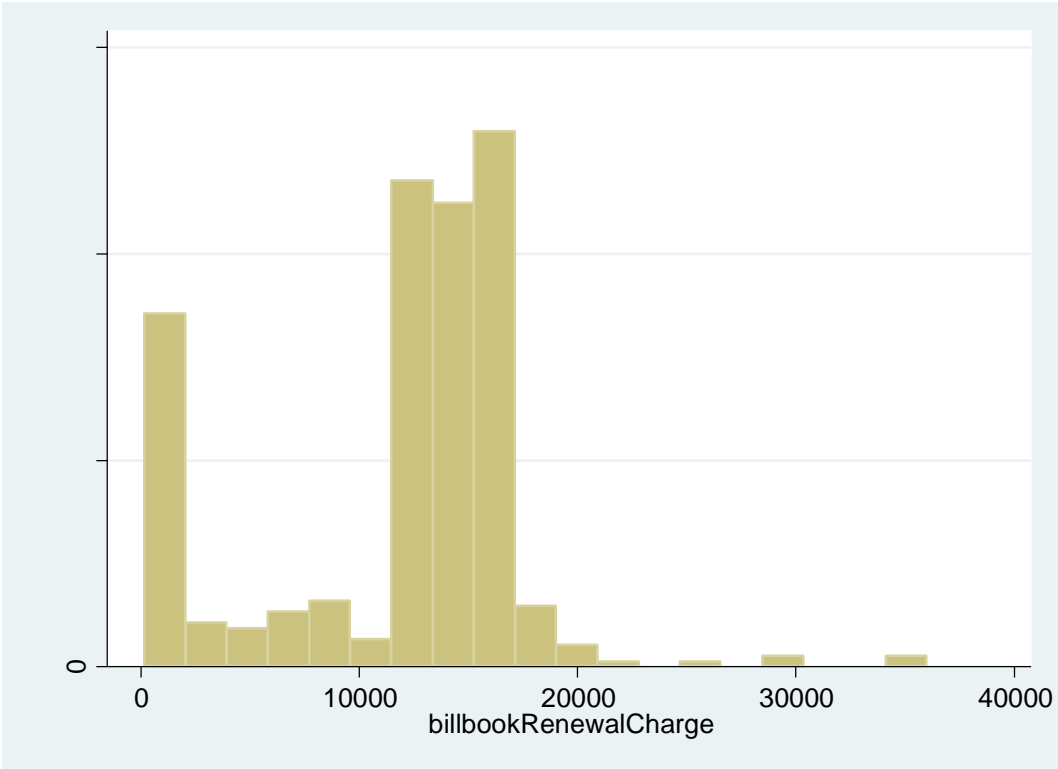
(12)Salary of the helper



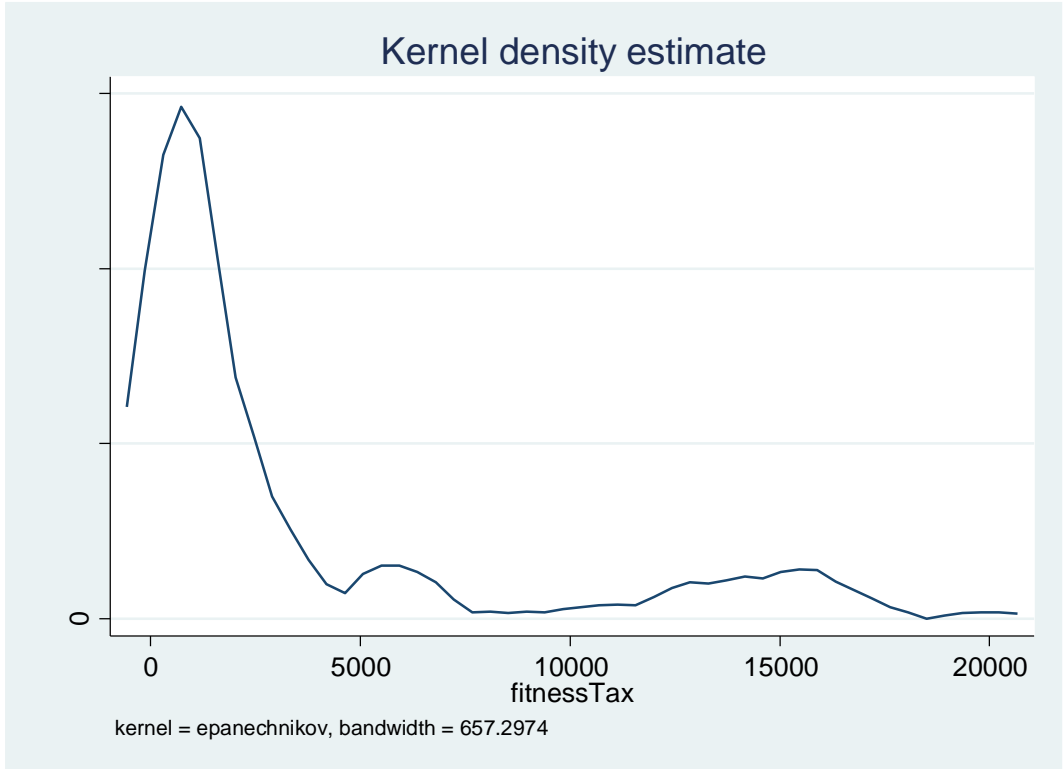
(13) Income tax paid by firms



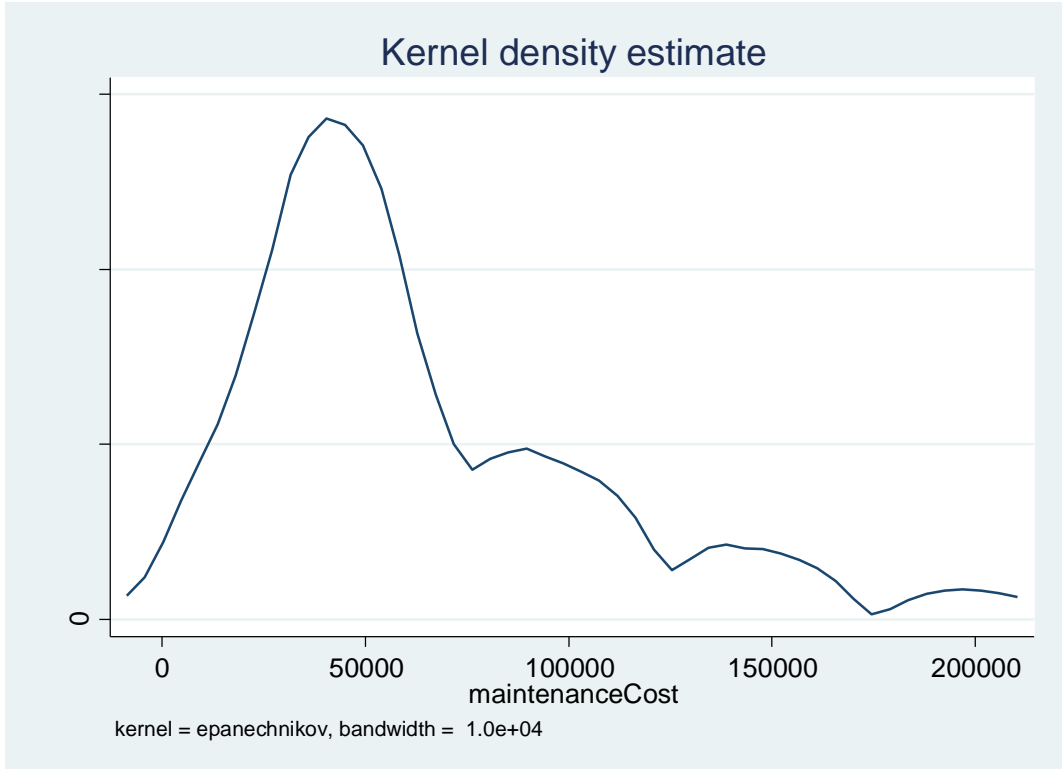
(14) billbook renewal charges



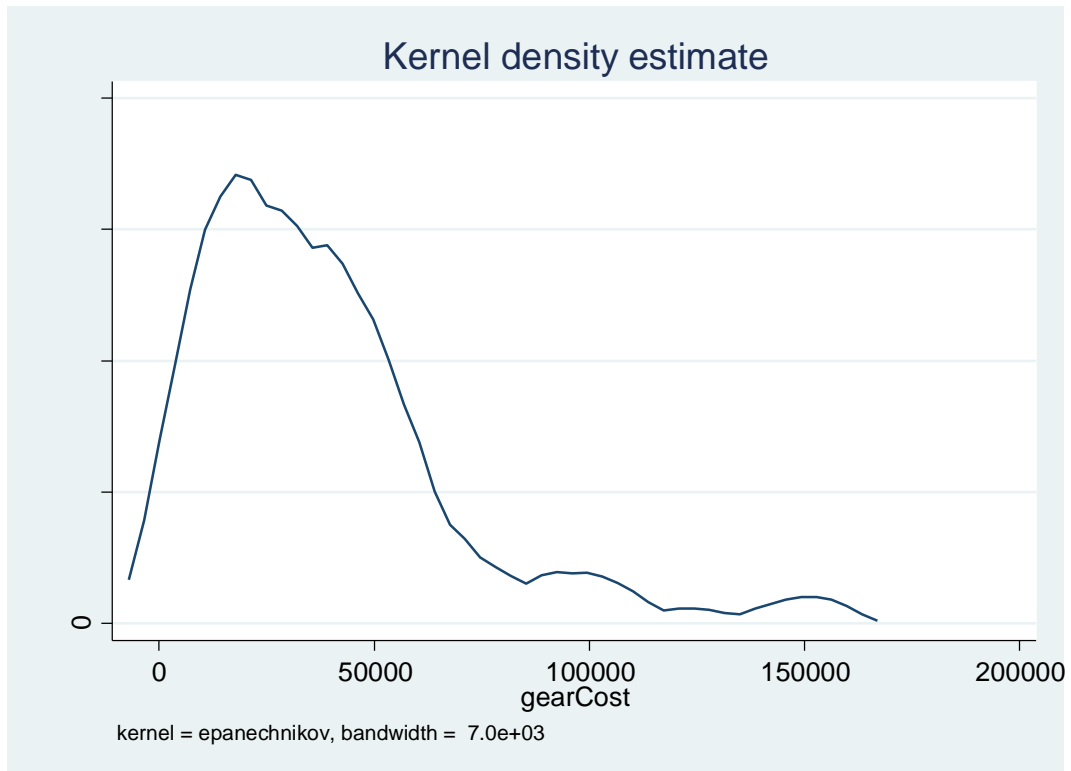
(14)Fitness charge



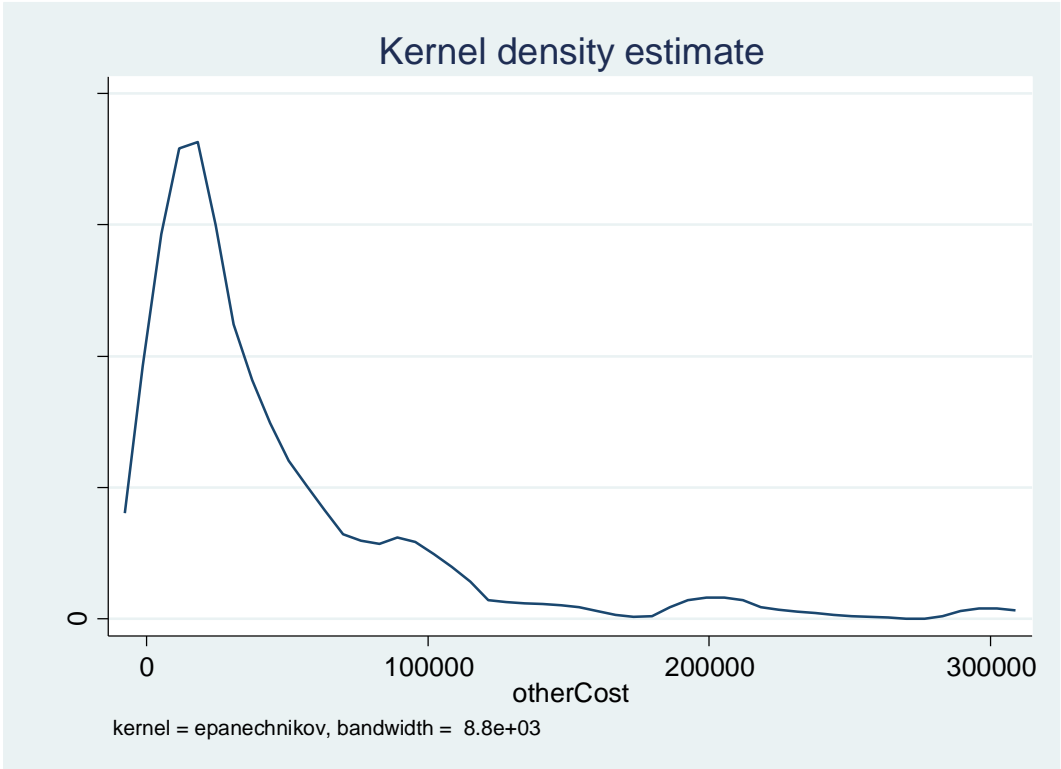
(15) Maintenance cost of an average truck



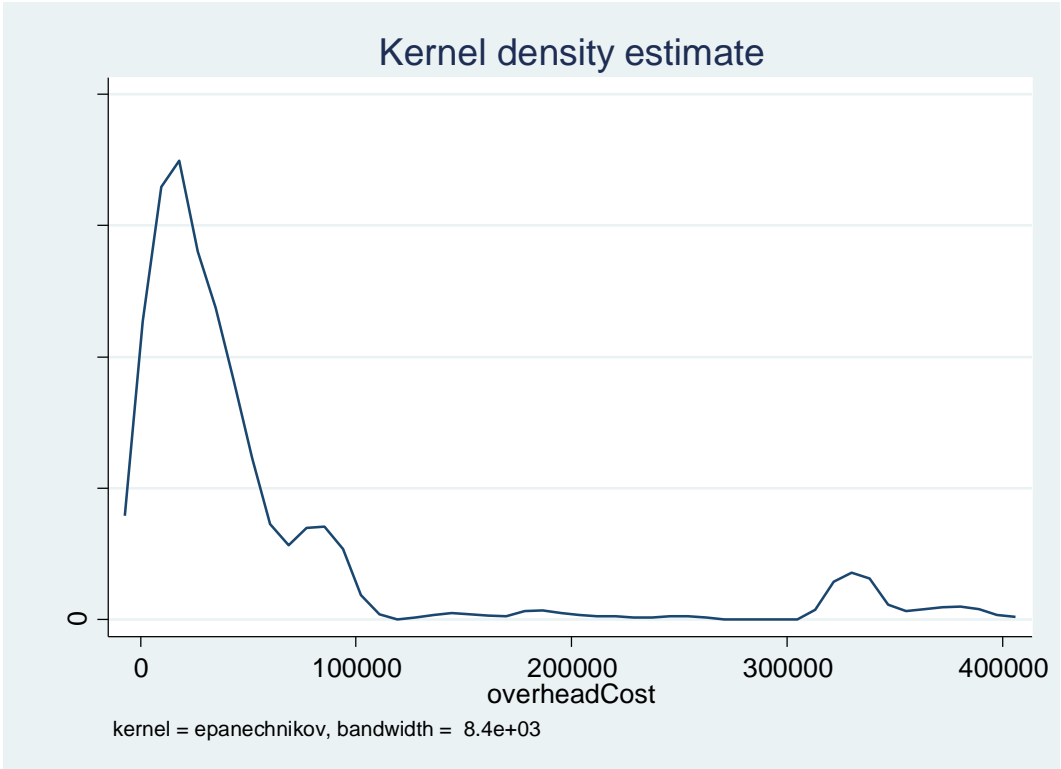
(16) Gear and differential cost of a truck



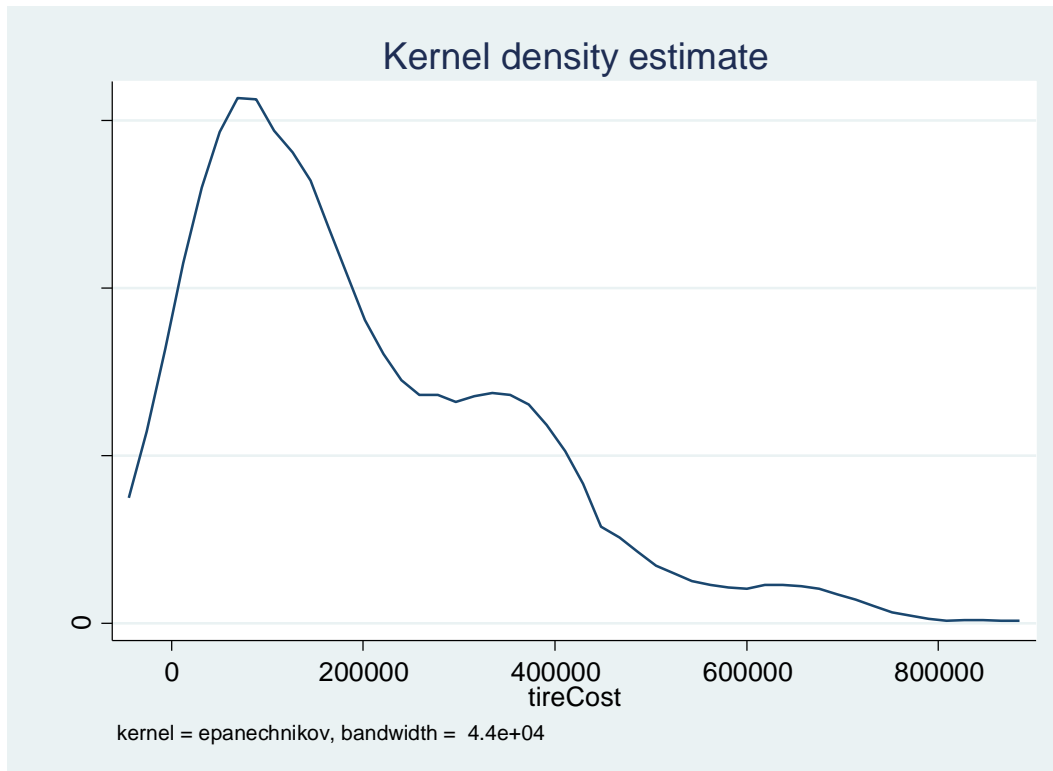
(17) Other miscellaneous costs



(18)Overhead costs



(19)Tire costs



20. List of TEAs listed under Nepal Truck Yatayat Mahasangh(FTTEN):

S. N O	Organization Name	Chairman	Number of Trucks	Telephone/Mobile	Membersh ip offered	Membershi p cost
1	Pawa Nepal Mechi T.E.A	Shriram kharel	156	023-543529/9852672121	Single	RG- 30,500 RN- 2100/yr
2	Biratnagar T.E.A	Binod khadka	223	021-523651/9852021591	Multiple	RGF- 17000 RN- 3000/yr RGP-7050 RN-3000/yr
3	Koshi T.E.A	Bidhapati Upadhyaya	800	025-580590/025580590	Single	RG-10,100 RN- 18000/yr
4	Purwanchal Truck Syndicate	J.B Khadka	255	025-533180/9852045234	N/A	N/A
5	Himali T.E.A	Om bhakti Mainali	115	035-420240/9852835001	Single	RG-25000 RN- 200/yr
6	Janakpur Anchal T.E.A	Babu Saheb Shah	150	041-522191/9854026635	Single	RG- 3500
7 47	Terai T.E.A	Om Karki	1500	053-521347/9855024108	Single	RG-10,000
8	Narayani T.E.A	Gokarna Parajuli	4600	057-521034/98550	Single	RG- 30,000 RN-

				67616		1200/month
9	Nepal T.E.A	Rohit Shrestha	300	01-4036157/9841213323	Single	RG- 15000 RN-3000
10	Gandaki T.E.A	KrishnaHari G.C	900	061-521490/9856021871	N/A	N/A
11	Paschimanchal T.E.A	Ganesh Panta	300	071-438552/9857020938	Single	RG-100,000 RN- 500/yr
12	Band Ganga T.E.A	Altarfahaman Kha	600	076-550097/9857020516	Single	RG-25000 RN-1200/month
13	Ratpi Anchal T.E.A	Janak Praxharal	185	082-561482/9857820052	N/A	N/A
14	Bheri Anchal T.E.A	Mohan Singh K.C	199	081-550336/9848021560	Single	RG- 35000 RN-1200/month
15	Mid western T.E.A	Prakash Adhikari	615	083-521399/9858021879	N/A	N/A
16	Seti Mahakali T.E.A	Meghraj Bhatta	635	091-526355/9858420570	N/A	N/A
17	Dhankuta T.E.A	Mohan	25	026-	No reg	No reg

		Shrestha		520060/98420 61693		
18	Sarlahi T.E.A	Rajan K.C	200	046- 530490/98540 35463	Single	RG-2500 RN-1000
19	Rautahat T.E.A	Sudip Raj Kandel	150	055- 540253/98550 40128	N/A	N/A
20	Tanahu T.E.A**	Devkumar Shrestha	120	065- 560608/98560 23985	Simple Objective Associative Special	RG-1400 RN-300 RG 3000 RN- 1500 RG 3000 RN-1500 RG- 100,000
21	Karnali Anchal T.E.A	Karma Buda	200	057- 520143/98483 20543	Permanent temporary	RG-40000 RN-1500 RG-20000 RN-1500
22	Nepal Truck Container T.E.A	Raj Kumar Paudel	980	01- 6635040/9851 021832	N/A	N/A
	TOTAL		13208			

**** Tanahu TEA offers four types of memberships: Simple, Objective, Associative and Special.**

Simple Membership only provides support to the truck owners by giving the association name. It does not include any kinds of benefits. Objective and associative registration are similar in terms of benefit offered but these registration are done according to the route where the trucks operate. And includes insurance benefits in case of undetermined circumstances. Special

registration provides the truck owner the entire benefits of insurance and Valai kosh and this registration need not be renewed, it is for full time.

List of trucks under Nepal Yatayat Rastriya Mahasangh:

S.NO	Organization name	President	Number of trucks	Contact number	Membership offered	Membership cost
1	Garuda TEA	Kapil Pandey	25	9855055932	Single	RG-10,000 RN- 1500
2	Bhaktapur Truck EA	N/A	407	6612970		
3	Om Halesi Transportation Entrepreneur Association	Shatrughan Karki	130	9852820684	Single	RG-70,000 RN-1000/yr
4	Far Western Truck and Tractor Enterpreneur Association	Padam Singh Raul	150	9858420566	Single	RG-15,500 RN-500/yr
5	Waling Truck EA	Chet Narayan Shrestha	52	9856027590	N/A	N/A
6	Nepal T.E.A	Rajendra Shrestha	1100	01-4036157/9851035548	Single	RG-18000 RN-1000
7	Gandaki Midsize Truckers	Dharma Raj Adhikari	205	9856027444	N/A	N/A

	Association					
8	Nepal India Transportation Entrepreneur Welfare Association	Sunil Bishta	175	9847060082	Single	RG-32000 RN- 1000/month
9	Bheri Karnali Truck and Tractor Entrepreneur Association	Surya Raut	180	9858051183	N/A	N/A
10	Lumbini TEA	N/A	70	987024684/0 61-520088	Single	RG- 10,000 RN- 50/day
11	Truck TEA, Dang	Bharatnath Yogi	200	9857830561	Single	RG- 20,000 RN- 1500 yearly
12	Kalaiya TEA	N/A	185	053-551260	N/A	N/A
13	Nepal Tripper &truck TEA		18	01-4288640 9851045581	Single	RG- 5000 RN- 1000/year
14	Kathmandu Mini truck TEA	Narayan Ghimire	30	9841405949	Single	RG-5000 RN-1000 yearly
15	Municipality Mini truck TEA	Nir Ratna Newa	35	01-5535300	Single	RG-5000 RN-1000 yearly
16	Koteshwor		18	N/A	Single	RG- 5000

	Minitruck TEA					RN- 1000/year
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S.N	description	Rate	quantity	Rate per year	Average (from survey) [Rounded]
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17	Manohara Local Truck and Mini Truck TEA	N/A	25	N/A	Single	RG- 8000 RN- 1500/year
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** for organizations 12-17 above, the truck size, registration and renewal are just an approximation and are provided by Ramesh Bohora Karyalaya pramukh Nepal Truck Yatayat Mahasangh.*

NOTE:

*RG- initial registration charge paid to the transportation association by the truck owners.

*RN- Membership Fee renewal charge to paid by the truck owners

*RGF- registration fee for the full membership

*RGN- registration fee for the partial membership

(P.S these all registration fees are paid at once at the initial registration of the trucks)

*S.NO 17 does not provide any kind of membership to the truck owners, instead it provides membership through Koshi TEA and Purwanchal TEA

Appendix 21: Current operating cost of a typical truck in birgunj-Kathmandu corridor

1	Salary and allowance				
	a) driver	7000/Month	1		9383/Month
	b) helper	1000/ Month	1		3138/Month
	c) Allowance	600/day	2		906/day for driver 359/day for helper
2	Taxes				
	a) Income tax	11,500/year			18621
	b) Transport tax	600/per tip			2246/per trip
	c) Billbook Renewal	380/ Month			1041/month
	d) Permit	12000/year			6101/year
	e) Fitness	200/year			3452/year
	f) Pollution	80/year			
	g) Jaach Paas	75/per trip			709/trip
	h) Municipality	3000/year			2810/year
3	Insurance	6000/month			2868/month
4	Maintenance				
	a) Engine overall	45000 for 4 years			63608/year
	b) Gear + differential	Gear oil 50000 4 year Crown – 37000 for 3 years			42875/year
	c) General maintenance	5000/ month Air 100			3672/month

		Grease 150			
5	Battery	17000 / 2years			20000/2 years
6	Depreciation	10 % / Year			
7	Interest	12% / Month			
8	Overhead				55597/year
	Variable costs				
9	Diesel				138958/month
10	Tyre	32,000/Year			196832/year
11	Lubricant	Crown oil: 7000 Gear Oil: 2800 Mobil: 9750			8868.8/month

****Transport tax, income tax, permit & Renewal is to be paid to the government***

****Municipality charges is to be paid to the local municipality where the vehicle belongs to.***

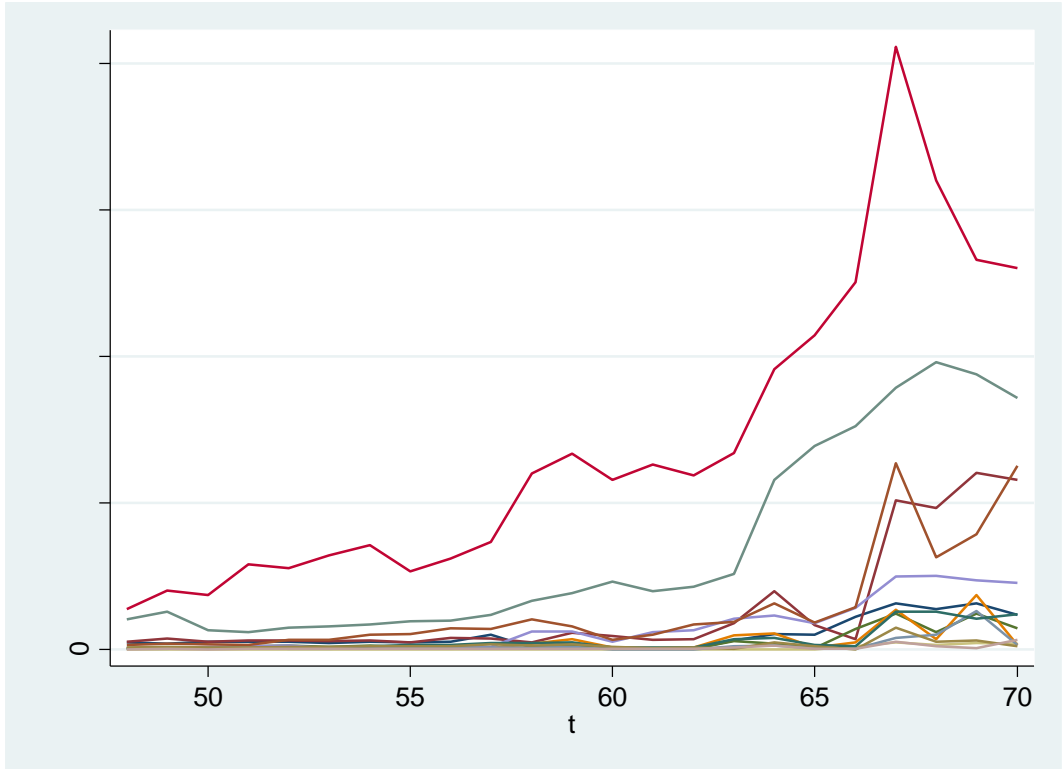
Appendix 22: Total Number of trucks registered in Nepal

Year	Total Numbers
046/47	6532
047/48	834
048/49	1524
049/50	1491
050/51	1740
051/52	1629
052/53	1151
053/54	907
054/55	1291
055/56	978
056/57	829
057/58	1271
058/59	1798
059/60	1212
060/61	1477
061/62	1592
062/63	2263
063/64	3278
064/65	3594
065/66	3643
066/67	4524
067/68	1969
068/69	1333
069/70*	2544

(Note: Year is in Bikram Sambat. Bikram Sambat is 56 years 8 months ahead of AD. Hence 069/70 roughly corresponds to 2012/13 AD. Year reported above changes at June 15th.)

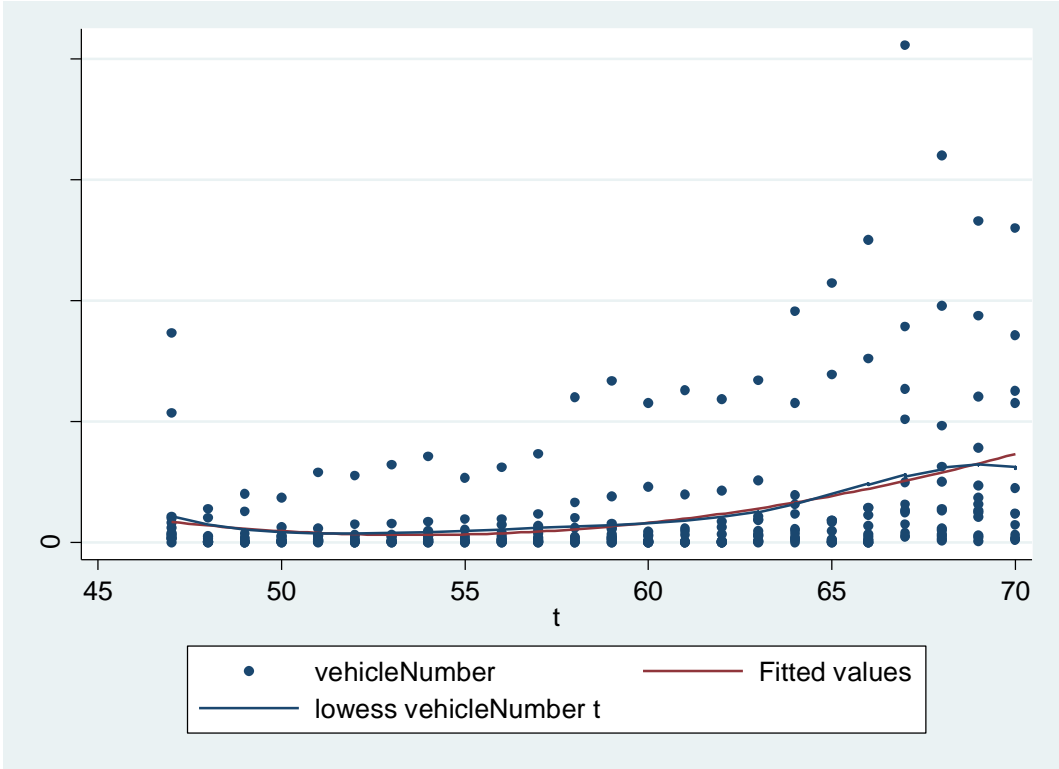
*-First 9 months only.

Appendix 23. Spatial (Zonal) Distribution of Vehicle Registration in Nepal from 2047-2070



(Note: The plot above shows the total vehicle registration in 13 zonal offices of Nepal since 2047. The highest number of vehicle registration was seen in Bagmati zone, followed by Narayani zone. Karnali zone is not represented above, as it doesn't have any vehicle registration office yet.)

Appendix 24: Time trend of total vehicles in Nepal



(Note: When fitting vehicle numbers over time, the quadratic fit is almost similar to nonparametric fit (lowess). The vertical axis shows the total number of vehicle registered, and the horizontal axis shows the years (2047-2070). The quadratic fit had both coefficients of t and t_square significant and R-square was 0.42. Quadratic regression of log vehicle number on time also shows that the growth rate of total vehicle is increasing by 2% each year.)

