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Working Paper

Diagnostic Report on the Bus Transport Sector

PIDS Discussion Paper Series, No. 2015-02

Provided in Cooperation with:

Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Briones, Roehlano M.; Gundaya, Debbie M.; Domingo, Sonny N. (2015) : Diagnostic Report on the Bus Transport Sector, PIDS Discussion Paper Series, No. 2015-02, Philippine Institute for Development Studies (PIDS), Makati City

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Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

Diagnostic Report on the Bus Transport Sector

*Sonny N. Domingo, Roehlano M. Briones
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DISCUSSION PAPER SERIES NO. 2015-02

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January 2015

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Diagnostic Report on the Bus Transport Sector

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Abstract

The bus transport sector evolved from a highly regulated and concentrated market with a handful of players in the 1970s to a more liberalized albeit still regulated market with hundreds of small operators. Major reforms in bus transport regulation were carried out in the early 1990s and 2000s among which were more liberal policy and a supposed moratorium on new franchises. The current market operates under a complicated regime where regulation and enforcement is shared by several agencies. Market inefficiencies manifest in too many operators and buses, and indiscipline in the road adding to traffic congestion problems in the Metro. The fragmented nature of both the sector's regulatory and supply side impedes synchronization among stakeholders and incurs huge costs to industry operators and the riding public.

Keywords: bus transport sector, congestion cost, transport policy, competition policy

1.0 Introduction

Population in the Philippines is projected to reach 102.9 million in the year 2015 (PSA 2014), with a majority residing in dense urban areas like Metro Manila. Given dynamic economic activities in these communities and a low level of motorization at around 9 cars per 1,000 people, the need for

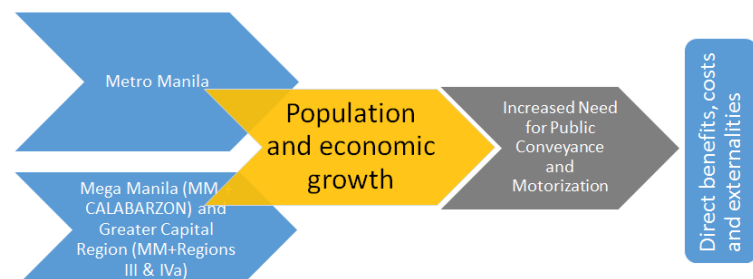


Figure 1. Increased motorization needs in urban agglomerations

increased public conveyance and motorization is evident. The agglomeration of these issues results to congestion concerns not only on living spaces, but also on public infrastructure including road networks (see Figure 1).

Public transportation in the Philippines in general is fraught with problems inadequate road infrastructure and traffic congestion around urban areas. In Metro Manila alone, an average of 191 persons live per hectare within a relatively small area of 620 km². Around 2 million vehicles were also recorded in 2010 to have plied its 1000 km of road infrastructure. Several modes of mass transportation operate in Metro Manila, including (a) 4 rail transport lines: Light Rail Transit 1, Light Rail Transit 2, EDSA-Mass Transit (MRT-3) and PNR south commuter line, and (b) road-based transport: public utility buses (PUBs), taxis, public utility jeepneys (PUJs), Asian Utility Vehicles (AUVs), Tricycles (TC) and pedicabs (bicycles with sidecar) (Figure 2).

Travel with intra and intercity routes often require commuters to avail of two or more types of transportation. Buses operate along the main thoroughfares such as the Epifanio Delos Santos Avenue (EDSA), Jeepneys operate along secondary roads, AUVs have fixed routes of no more than 15 kilometers, and Tricycles and pedicabs seat only one to three people at short distances in residential areas and arterial roads.

Among the road-based transportation options, buses offer more in terms of affordability and efficiency as they carry more people using less road space. With inadequate mass transport infrastructure in the city, buses become an indispensable alternative for the commuting public.

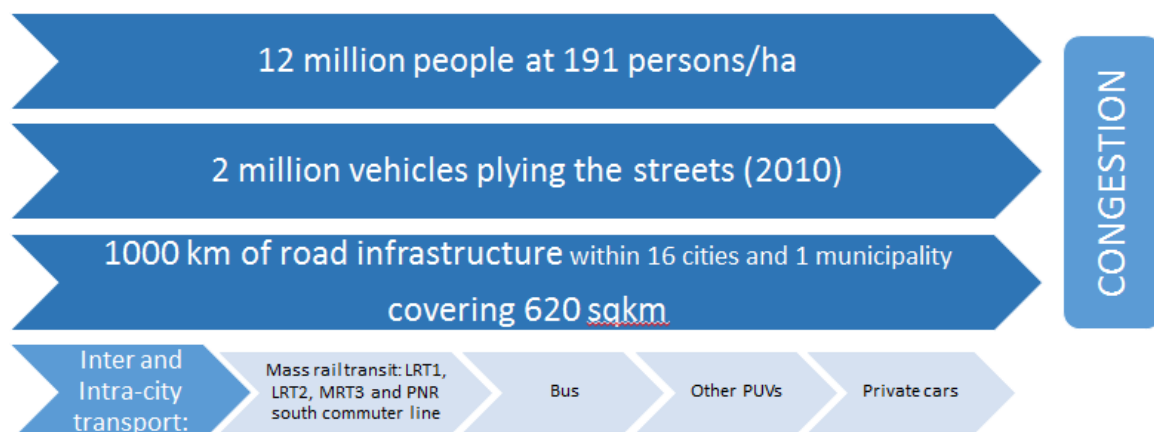


Figure 2. Congestion issues in Metro Manila

The welfare impacts of regulatory reforms for public conveyance, particularly for the bus transport sector, must be viewed within the context of other factors. These include the carrying capacity of road infrastructure, economic and social activities in covered areas, optimal vehicular flows including the number of buses and other PUVs, and mix of alternative modes of transportation.

This paper provides a diagnostic report on the regulatory and industry issues affecting the operation of buses in the country, particularly in Metro Manila. It also provides a cost benefit analysis on the congestion problem affecting the bus sector and the commuting public.

2.0 Regulatory and Institutional Framework in the Bus Sector

Franchises for route operation of buses, taxis, jeepneys and AUVs are regulated by the Land transportation Regulatory Board (LTFRB) while those for tricycles and pedicabs are regulated by local government units (LGUs). For the purpose of this study, we focus on institutional and policy matters which have direct implication on the bus sector.

Major reforms in bus transport regulation were carried out in the 1990s and 2000s. In the mid-70s, bus operation in Metro Manila was provided by four private consortia and the Metro Manila Transit Corporation, a government-owned entity. The government gradually allowed the formation of more consortia that by late 1970s a total of 14 groups were operating with at least 100 units each.

Although liberalization policies and principles have been attempted over the past three decades, the sector's policy backdrop remains predominantly conservative and regulated.

Presently the market operates under a complicated regime where regulation and enforcement is shared by several agencies. There is also a confusing mix of liberal and conservative policy, coupled with selective enforcement resulting to implementation failures & regulatory capture. These manifest in the form of the operation of illegal buses and proliferation of kabit system where a bus owner enters the market through arrangement with an operator with an established franchise. Market inefficiency is also exhibited in the presence of too many operators and buses adding to the traffic congestion problems.

Department Order No. 92-587 (1992) formalized the liberalization policies in the industry by providing a set of rules for entry and exit as well as fare-setting, namely:

- **Entry and Exit** – the department order liberalized the entry and exit to the industry supposedly to to enhance the level of competition fare-setting and quality of service among operators. The policy specifies that each bus route should have at least 2 operators. An operator who develops a new route will be given a concession to operate solely for 2 years, after which the route will be opened to at least one additional operator. A new entrant will be allowed to operate in an existing route if the entrant satisfies any of the following conditions: 1) the new operator is able to provide a more efficient/cost-effective service than existing operators; 2) the new operator introduces quality or service improvements and/or innovative/technologically-advanced services; 3) the route warrants additional capacity; 4) practice of existing operators result in lack of competition; 4) the existing operators has ceased operation; and 5) the existing operator/s have violated the terms of their franchise rules and regulations.
- **Franchise Terms** - a certificate of public convenience (CPC) or franchise describes the route and service area and is valid for five years and can be renewed up to three times.
- **Fare Determination** – under the directive, the government regulates bus fares only for ordinary non-airconditioned buses. Two factors are considered in fare determination: public acceptability and financial viability for operators. A fare schedule (minimum and per-kilometer fare) is set by the LTFRB after a mandated public hearing.

To be able to operate and provide adequate and quality bus transport service to the commuting public, an operator must first secure a Certificate of Public Convenience (CPC) as specified in section 15 of Commonwealth Act No. 146 (Public Service Law). Section 15 of CA No. 146 specifically indicates that the granting of CPC must ensure that “the operation of said service and the authorization to do business will promote the *public interests* in a proper and suitable manner.” Aside from these regulations, the applicants must also undergo financial and technical evaluation by the LTFRB so as to assess if they are indeed capable of starting and maintaining their operations (DOTC and UP NCTS 2012). In practice the approval of franchise applications has led to a proliferation of operators.

Labor standards and compensation arrangements among bus operators and their drivers and conductors have shifted over the years. The “boundary system” of compensation where the daily

earnings of drivers were based on how well they competed with other bus drivers for passengers within franchised routes has been a major contributor to indiscipline on the road. Recent attempts to curb this practice led LTFRB to issue Memorandum Circular No.2012-001 where part-fixed-part-performance based compensation is enjoined. The directive, however, is still less than satisfactory as drivers and conductors are still unduly burdened with operational risks.

Notwithstanding these reforms, congestion remain a serious problem for bus operators as validated by previous studies (JICA, 1997; 2009) and interviews with stakeholders. In an attempt to address congestion issues, government imposed a moratorium on the issuance of franchises for provincial buses in 2000, followed by a nation-wide moratorium on all new buses and new franchise in 2003. A further attempt to reduce the number of buses plying Metro Manila was through the ‘Bus Rationalization Program’ of 2007. There is also a 15-year old age requirement for public utility buses. These policies at face value would be an effective barrier to entry. Nonetheless, the respective entry and prolonged stay of new operators and buses were made possible through sectoral accommodations and temporary suspension of the moratorium on issuance of new CPCs.

Department Order No. 92-587 (1992) also showcased an experiment in the deregulation of fare-setting in the case of air-conditioned buses. However, a Supreme Court decision in 1994 disallowed the complete freedom of operators to arbitrarily adjust bus prices. Fare revision therefore still entails administrative processes which go through the LTFRB and the Commission on Audit (COA) and a mandated public hearing.

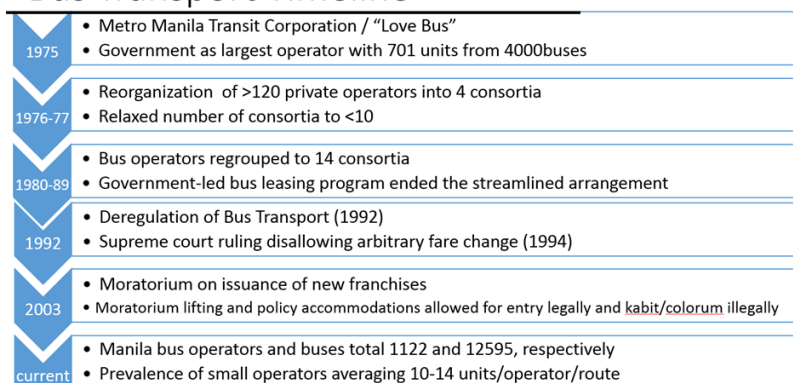
The essence of the 1992 liberalization policy is still in effect albeit the existence of a moratorium on franchise issuance as indicated in the year 2000-2003 directives, 15-year age requirement for vehicles, and the regulated fare-setting for all PUVs. Industry accommodations have also allowed new operators to bypass the moratorium directive, while selective enforcement (or non-enforcement in this case) has allowed older buses to service the public. Here lies the confusion and contradiction in policy. Box 1 also shows the implication policy mixes as the bus market evolved over the years. It narrates an example in competition-related policy reforms, which had impacted the market structure of the sector.

Box 1:

Contradiction in Competition Policy

Experts agree that the golden years of the bus sector were experienced by the country during the time when the sector players were agglomerated into a few big organizations/ corporations. It started in 1976 when the government, under martial rule, ordered the

Bus Transport Timeline



reorganization of private operators into 4 consortia with the government-owned Metro Manila Transit Corporation (MMTC) as the fifth operator. At that time, the MMTC was the biggest bus operator, owning almost 20 percent of all units plying the streets. By 1980, the bus operators had regrouped to 14 functional consortia, allowing for ease in regulation and in-sector policing. However, a parallel bus leasing program by the government which culminated in 1989 compromised the sector's agglomerated structure, decreased its market concentration, and flooded the sector with reconditioned imported second-hand buses. This started the unfettered evolution of the bus sector into what it is now: fragmented with literally thousands of operators operating an oversupply of units within franchised routes. This evolved setting comes with a price: uncontrollable traffic congestion, indiscipline in the streets, and increasing marginal social costs.

3.0 Sectoral Regulation and Enforcement

Regulation and enforcement in the bust sector are shared by several agencies. These Institutions have evolved over the years in response to changing sectoral landscape and policy, but still retained the essence of decades past. Figure 3 shows the institutional reincarnates of regulatory bodies over the years.

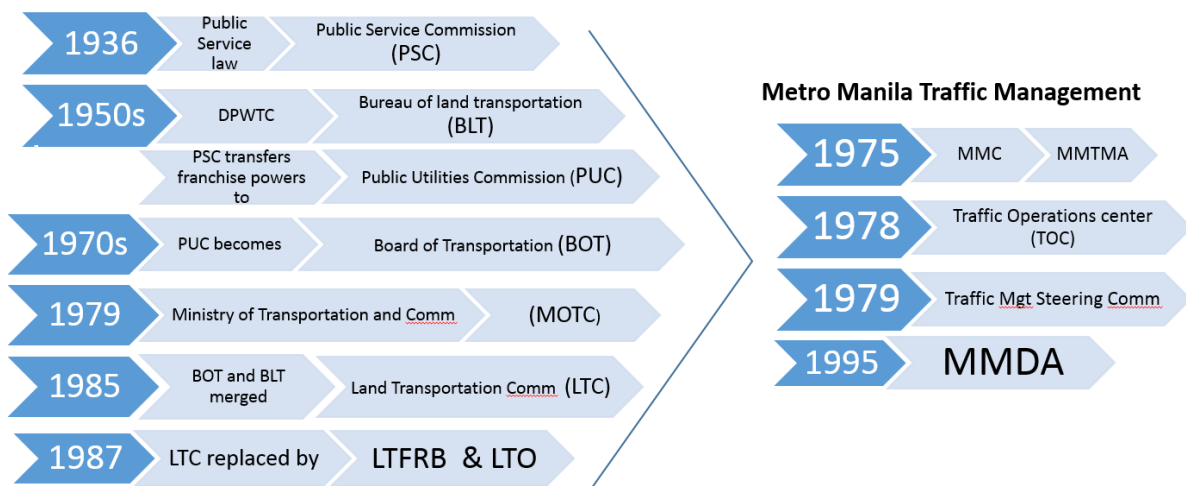


Figure 3. Regulatory and institutional timeline in the bus sector

Presently, the bus transport sector is governed by the Department of Transportation and Communication (DOTC) through its line agencies, the Land Transportation Franchising and Regulatory Board (LTFRB) and the Land Transportation Office (LTO). The two line agencies respectively manage the economic and safety regulations with the sector. The LTFRB regulates entry and exit of bus operators and sets/regulates bus fares; the LTO helps implement the said regulations through its registration and inspection functions. Traffic regulation is undertaken by other agencies which include the Metro Manila Development Authority (MMDA), the Philippine National Police (PNP) and the relevant Local Government.

Also indirectly involved through planning and development of road infrastructure are the Department of Public Works and Highways (DPWH) and National Economic Development Authority (NEDA) (see Table 1).

Table 1. Agencies/Institutions involved in the Land Transport System and its Functions

Agency	Laws/Regulations Creating the Agency	Mandate/Functions
Department of Transportation and Communications (DOTC)	Executive Order Nos. 125 and 125-A as amended by EO No. 226	Serves as the primary policy, planning, programming, coordinating, implementing and administrative government agency on the promotion, development and regulation of a dependable and coordinated network of transportation and communications systems, as well as in the fast, safe, efficient and reliable transportation and communications services
LTFRB: Attached to DOTC	Executive Order No. 202	To promulgate, administer, enforce, and monitor compliance of policies, laws, and regulations of public land transportation services except tricycles and non-motorized vehicles.
Land Transportation Office (LTO) – Attached to DOTC	Executive Order Nos. 125 and 125-A as amended by EO No. 226	Responsible for the (i) inspection and registration of motor vehicles; (ii) issuance of licenses and permits; (iii) enforcement of land transportation rules and regulations; (iv) adjudication of traffic cases; and (v) collection of revenues for the government
Metro Manila Development Authority (MMDA)	Republic Act 7924	Perform planning, monitoring, coordinating and implementing functions where appropriate, and in the process, exercise regulatory and supervisory authority over the delivery of metro-wide services within Metro Manila
Department of Labor and Employment (DOLE)	Republic Act 4121	Monitors the compliance of bus operators with Department Order No. 118-12, Series of 2012 (The Rules and Regulations Governing the Employment and Working Conditions of Drivers and Conductors in the Public Utility Bus Transport Industry) and provides technical assistance on how to comply to the said DO
National Economic and Development Authority (NEDA)	Presidential Decree No. 107	Responsible for the creation and coordination of policies in transport (roads, maritime, air, etc.) in the Philippine Development Plan

Sources: DOTC; LTFRB; LTO; DOLE; The World Bank [2005]

4.0 Competition in the Bus Sector

In another light, managing competition within the bus sector, either intentionally or by accident, has been a key issue over the years for regulators. Government decision makers had always looked for the right formula in balancing the concerns of sectoral stakeholders as evidenced by how policy and institutions had evolved.

Competition policies in the bus transport sector—in the form of transparent rules for entry and exit, fare setting, and regulatory mechanisms that promote competition—can potentially have positive impacts by providing bus operators with a competitive environment and the public with affordable and efficient bus service.

In the selected areas alone there are nearly 60 operators with an average of 15 buses per operator. The selected routes fairly represent the existing conditions in the field, and aptly illustrate the issues being confronted within the broader context of the sector.

Based on the Herfindahl-Hirschman Index (HHI), which ranged from 0.10 to 0.40, the study finds that there is substantial competition in the bus transport sector. Although alternative modes of transport are available to the commuting public, the market for the bus sector is well defined by patrons who opt for low cost and accessibility in their means of conveyance. Data indicate the presence of numerous operators (over a thousand) with a few buses per operator (11 to 14 on average) in the major routes (Table 2).

The indicator of market structure adopted in the bus transport study the Herfindahl-Hirschman Index (HHI):

$$H = \sum_{i=1}^N s_i^2 ,$$

where s_i is the market share of firm i in the route, and N is the number of bus operators. The higher the HHI is compared to $1/N$, the less competitive is the bus market in the route. Market share in this instance refers to the captured share of the bus firm or operator in a given franchised route, which is dependent on fleet size and approved seat capacity. The commuting public is unlikely to differentiate among the hundreds of bus operators within specific routes. Hence, market share is more of a function of aggregate seat capacity rather than perceived service quality.

Market structure was determined as follows:

$$\text{Substantial competition: } \frac{1}{HHI} \leq \# \text{ of operators}$$

Table 2. Number of Operators and Buses, Manila Bus Routes

Route	Number of operators	Number of buses	Average no. of bus/operator
Manila EDSA Route	266	3,711	14
Manila Non-EDSA Route	128	1,632	13
Manila-Provincial North Bound	371	3,684	10
Manila-Provincial South-Bound	357	3,568	10
<i>TOTAL</i>	<i>1,122</i>	<i>12,595</i>	<i>11</i>
Alabang-Fairview	21	341	16
Baclaran-Novaliches	17	171	10
Manila-Baguio	7	240	34
Manila-Lucena	8	132	17
<i>TOTAL</i>	<i>58</i>	<i>862</i>	<i>15</i>

Source: LTFRB.

Not surprisingly, the HHI index shows *substantial competition* (Table3). The intra-city routes (Alabang-Fairview and Baclaran-Novaliches) have 21 and 17 registered operators, respectively. The HHI index for the routes are close to zero, indicating relatively large number of operators with small fleet. There are less registered operators in the inter-city routes (Manila-Lucena and Manila-Baguio) with 8 and 7 operators, respectively.

Table 3. Market Structure of the Bus Transport Sector, Selected Routes

Route	HHI	1/HHI (a)	Number of operators (b)	Level of competition
Alabang-Fairview	0.087	11.5	21	substantial
Baclaran-Novaliches	0.070	14.3	17	substantial
Manila-Lucena	0.220	4.5	8	substantial
Manila-Baguio	0.405	2.5	7	substantial

Source: Authors' calculation.

The large number of operators appears puzzling given the moratorium in place since 2000. Interview with bus operators also revealed that the moratorium is not binding since it is still possible to acquire a new franchise if one is willing to pay a stiff fixer's fee of 150,000 pesos per unit. Compare this with the official franchise rate of only 510 pesos for the first 2 units and 70 pesos for each additional unit. Though excessive entry into the sector leads to congestion and possibly suboptimal profits, the low market concentration and high number of operators are indicative of positive profit from bus operation. This constitutes the incentive for entry into the sector.

5.0 Benefit Cost Analysis of Congestion

The following benefit-cost analysis for the bus transport sector relates to the congestion aspect of franchise regulation. Road safety is another important concern; unfortunately there is not enough information to parametrize benefits and costs of improved road safety regulation. This section attempts to measure the costs and benefits from reducing bus congestion in Metro Manila along selected traffic routes.

5.1 Framework of Analysis

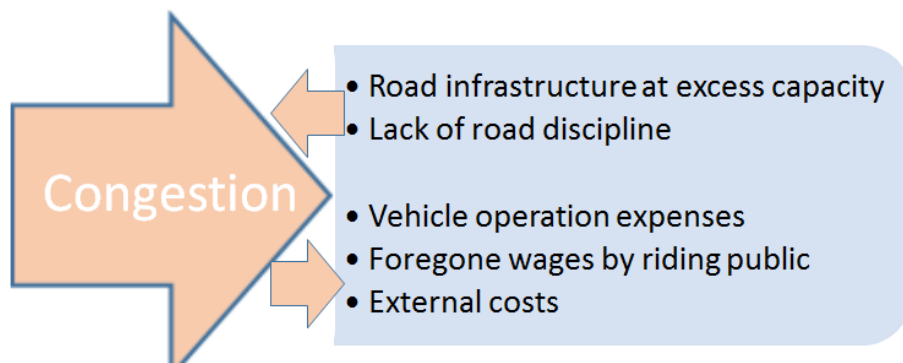


Figure 4. Congestion Causal Diagram

Traffic congestion costs and externalities arise as travel time is delayed when infrastructure capacity reaches a level of saturation. Absence of perfect information usually leads private motorists to use a road network even if the

saturation level or maximum vehicle flow capacity has already been reached. In the case of public transport like buses, oversupply in certain routes clog the system resulting to time delays and corresponding external costs and business operation costs.

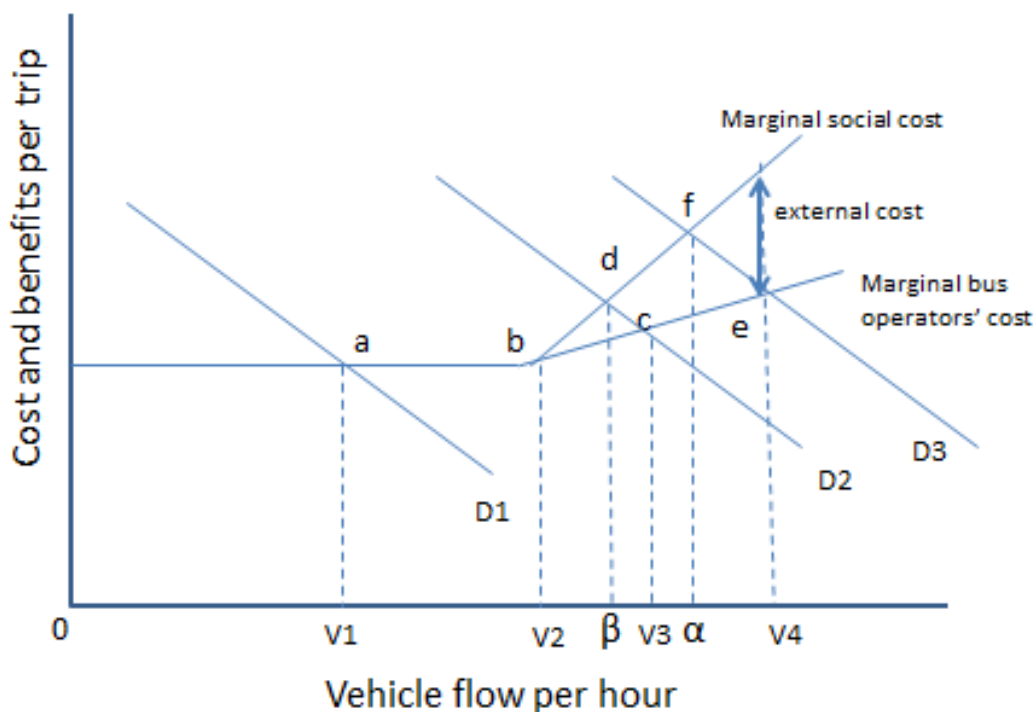


Figure 5. Bus Congestion Marginal Cost and Benefit Framework

Figure 5 presents the theory of urban public transport congestion as defined by cost and benefit per trip to passengers and bus operators given infrastructure demand and congestion rates. Demand curves D1, D2 and D3 illustrate motorists' increasing demand on the use of a particular road infrastructure. As can be inferred from the diagram, between vehicle flow rates of 0 and V2, the assumed road carrying capacity, there is no congestion. Once this point is breached due to shifts in road use demand D2 and D3, marginal costs are incurred by passengers and operators from the accompanying traffic congestion. Thus, the total marginal social cost (MSC) per trip due to traffic congestion at a given demand level D is computed as the sum of marginal external cost (MEC) and marginal bus operators' cost (MBOC). The parameters are respectively computed from the opportunity cost of wasted time for working passengers and decreased revenue runs and attached costs for bus operators.

$$MSC_t (\text{marginal social cost of congestion}) = MEC_t + MBOC_t$$

Where MEC_t is a function of time delay due to congestion, number of passengers affected, and prevailing wages rate; while $MBOC_t$ is a function of decreased revenue runs and operating cost per bus-km (consisting of driver-conductor commissions, fuel and lubricant costs, and repair and maintenance costs) at time t . The goal for traffic managers in this case would be to move traffic flows to optimal rates/levels (from $V3$ to β and $V4$ to α) where marginal social costs equal marginal social benefits (Allport 1998, Button 2010). We estimate the movement in marginal social cost as traffic de-congestion is assumed given hypothetical policy augmentations.

5.2 EDSA Super Corridor

The study applies this framework to the main trunkline of all north and southbound bus routes, the Epifanio Delos Santos Avenue (EDSA), particularly its 'super corridor' from Magallanes to East Avenue (Figure 6).

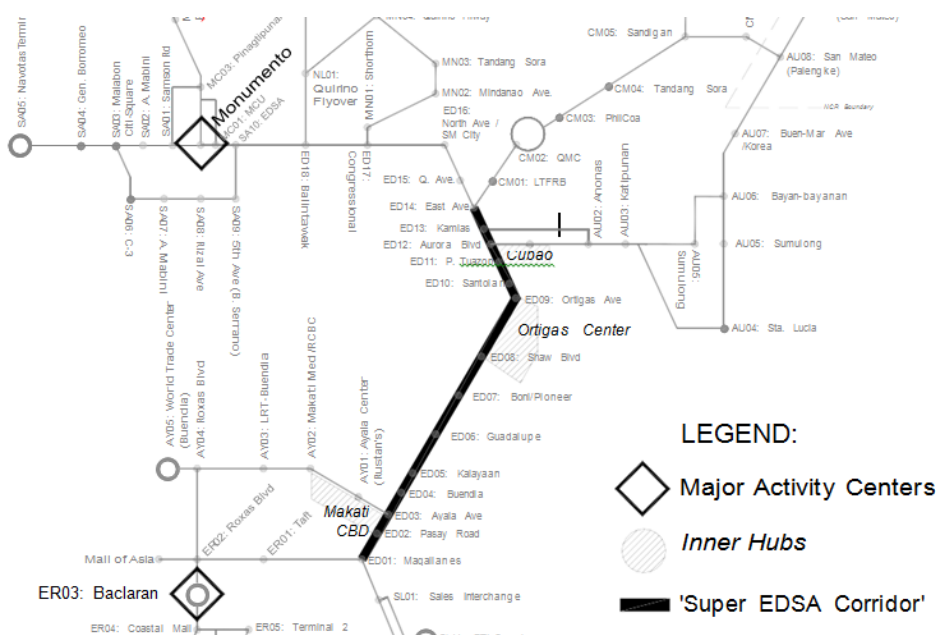


Figure 6. EDSA Super Corridor (Transportas Consulting 2006)

Limiting the route range served the study well as traffic congestion on EDSA’s super corridor is reflective of the overall bus transit situation in Metro Manila. It accounts for the largest number of passenger flows generated by business districts (Makati and Ortigas) as well as several malls (Ayala Center, Megamall, SM City, Araneta Center). Previous studies also point to the suboptimal situation with EDSA: JICA (2014) estimated that a 50% bus reduction in EDSA is possible without substantial decrease in service level; while, PLANNADES (2007) found that bus occupancy rate within EDSA was as low as 52%. The welfare situation is further highlighted when considering that the poor spends around 20% of their income on transportation (Figure 7).

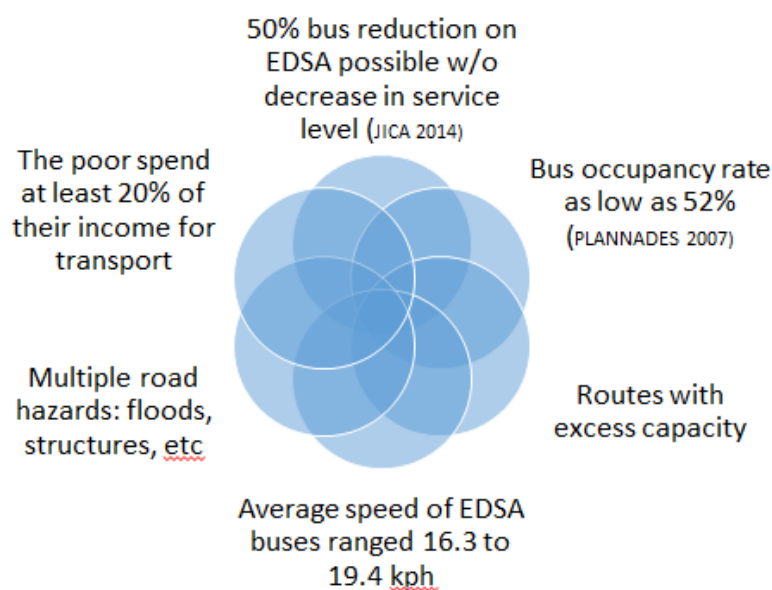


Figure 7. Key Statistics on Bus Operations in EDSA

5.3 Input Parameters

Transportas Consulting Co. (2006) estimated that around three-fourths of all daily total person trips in the metro are carried by public transport. They concluded that there is an excess of buses on the 30 operational routes with load factors well below capacity, except for some short sections during AM peak hours. On a typical weekday, load factor averaged 51.3%; slightly lower at 47.5% on a weekend. For selected sections of the network, the load factors were also well below desirable thresholds – even during peak hours. The excess bus capacity will be further highlighted if existing bus productivity can be improved to service nearly a million daily passengers on a typical weekday. The volume of commuters dips by about 20% on weekends, but bus-trips remain relatively the same. Considering all these, and adopting a more conservative stance, this analysis assumes a 20% reduction in bus trips along the super corridor, accounting for the excess 20% that plies the Magallanes to East Ave route on a daily basis. It is further assumed that this level of bus traffic would be able to service the current daily passenger volume (see Table 4).

Table 4. Mean daily supply and demand situation within the EDSA super corridor

Super Corridor	Daily Passenger Volume		Actual Bus Trips		Bus Trips		
	NB	SB	NB	SB	Required	Excess	Percent Excess
Magallanes- Ayala	115,652	128,554	4,156	4,216	7,005	1,367	0.16
Ayala-Guadalupe	120,272	112,181	4,156	4,216	6,668	1,705	0.20
Guadalupe- Aurora	113,177	101,839	4,156	4,216	6,168	2,205	0.26
Aurora- East Ave	134,052	102,820	4,144	4,074	6,794	1,424	0.17
Magallanes-East Ave (aggregate)	483,153	445,394	16,612	16,722	26,635	6,701	0.20

Note: passenger volume and bus trips are counted per major stop within the north bound (NB) and southbound (SB) routes

Source: Transportas Consulting (2006).

Clearly, there is an excess supply of buses plying the major thoroughfares of Metro Manila especially during off-peak hours of the day. This congestion scenario results to time delays for public commuters as well as decreased revenue runs for bus operators. Related literature has also shown diminishing revenue runs on a bus-kilometer basis for fleet operators in the city. Estimated average revenue runs over the past two decades were 184 bus-km in 1996, 172 bus-km in 2002 and 162 bus-km in 2006 (Transportas Consulting 2006, Montalbo 1997, Kobune 2002). Table 5 presents estimates on revenue runs and operational costs per bus per day as broken down into driver and conductor commissions, fuel and lubricants, and repair and maintenance.

Table 5. Revenue runs and operational costs for different bus fleet sizes, compounded to present value

Operational detail	Fleet Size					
	>= 100	51 to 99	26 to 50	11 to 25	<=10	Aggregate
revenue run bus-km per month	5,238	5,003	5,359	5,878	3,175	5,172
revenue run bus-km per year	62,856	60,034	64,308	70,533	38,098	62,061
revenue run bus-km per day	187.07	178.67	191.39	209.92	113.39	184.7
Cost breakdown per bus per day	5,911	3,625	2,253	6,044	2,383	4,547
Driver& conductor daily commission	1,734	1,056	595	1,430	522	1,293
Fuel, oil, & lubricants per day	2,477	1,799	1,274	3,143	1,083	2,095
Repair & maintenance per day	1,700	770	383	1,469	779	1,160

Source: Montalbo and Ishida (1997)

A graphical presentation of the excessive bus supply situation within the 12km stretch of EDSA's super corridor is evident (Figure 8). This is seen in the difference between the authorized seat capacity of buses and the estimated passenger demand over the length of EDSA (Figure 11).

Transportas Consulting (2006) reported that the highest time-specific bus flow of 1,722 buses was recorded between Guadalupe and Bony Avenue from 06:00 to 09:00. The load factors during that period were 45.6% SB and 44.4%NB. To raise the peak-hour load factor to 100%, it would be necessary to reduce the frequency from 1,722 to 859. In terms of headways, the required reduction is from 1 bus per 11.2 seconds to 1 bus per 22.5 seconds. The oversupply on the super EDSA corridor is therefore around 50%. When applied to the base fleet of 3,414, the oversupply is as much as 1,700 units. When applied to the operational buses during that day, the excess is 1,012 buses.

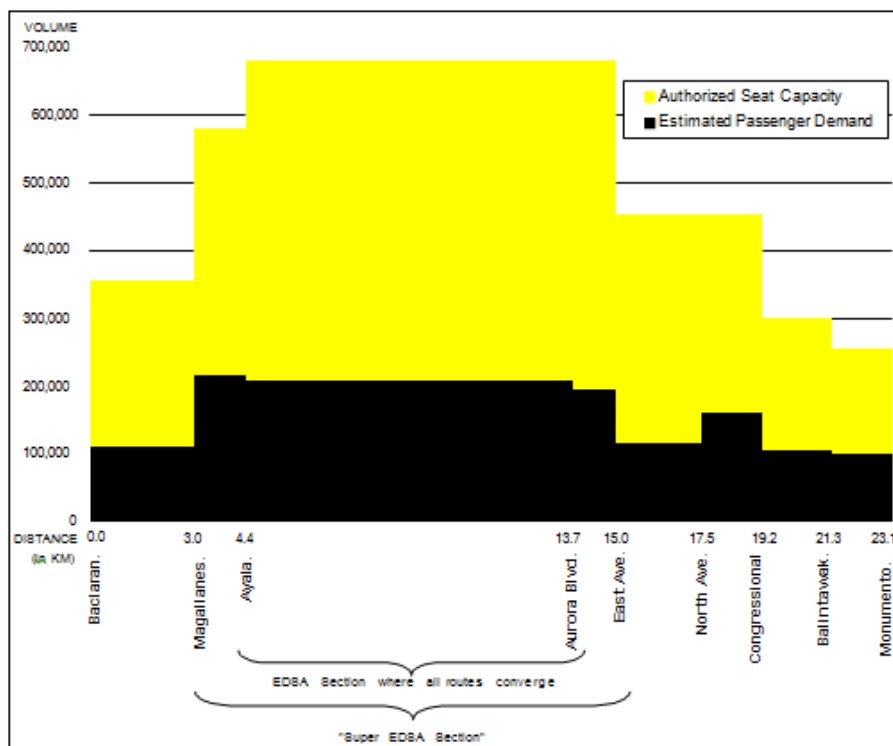


Figure 8. Authorized seat capacity and estimated passenger demand within EDSA (Transportas Consulting 2006)

Travel time within the super corridor’s 12km stretch ranged from 18to 138 minutes depending on the level of traffic congestion at certain times of the day. Policy measures to address Metro Manila’s congestion should strive to narrow down this huge delay in travel time. Figure 9 presents a scatter plot of bus travel times from Magallanes to East Avenue. It reflects the range of time delays while traversing the super corridor. Table 6 summarizes the key assumptions from the sections above and cites additional figures on minimum wages, and working days, travel times and decongestion levels.

5.4 Marginal Social Cost Estimates

Traffic congestion directly impacts the productivity of both the passengers and buses plying the routes along metro Manila’s thoroughfares as time delays cut the number of bus trips and eat up the passengers’ productive time at work. Estimating the marginal social costs due to congestion

issues indirectly relates to the benefit streams from improved vehicular flow as a result of better transport management or policy. The range of total marginal costs as a result of congestion are the same as the range of overall benefits accruing to passengers and bus operators once the congestion conundrum (or part of it) is solved.

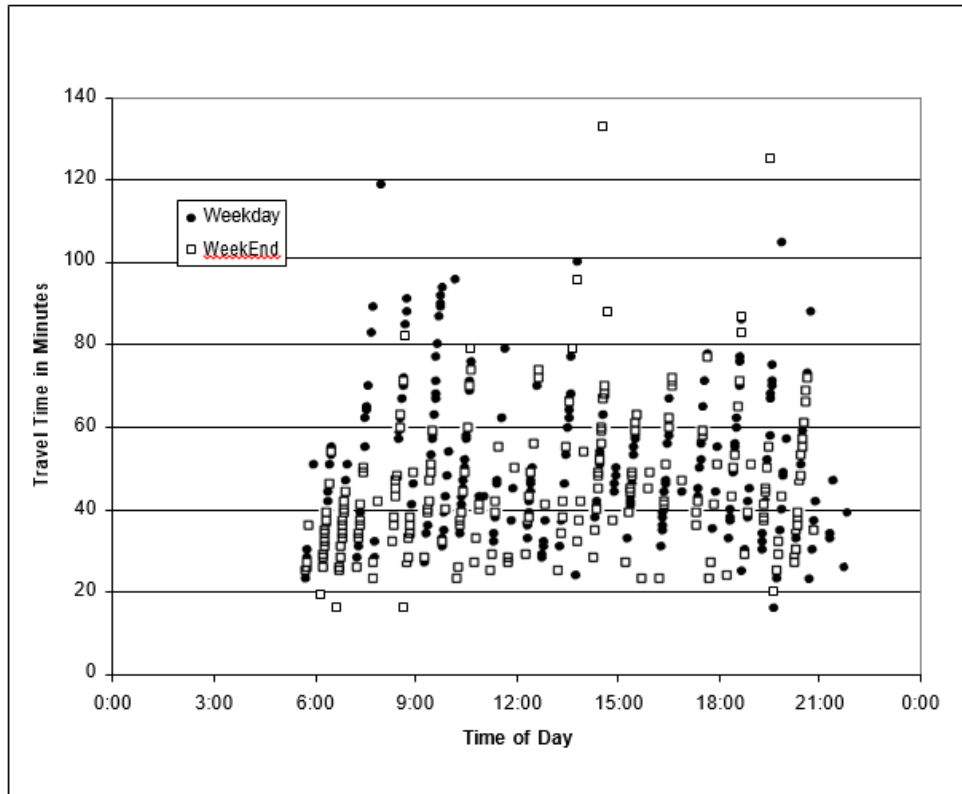


Figure 9. Bus Travel Time and Time of Day, EDSA, Magallanes to East Ave

Source: Transportas Consulting (2006)

Table 6. Key parameters for the computation of marginal social costs

Parameter	Value	Unit
Assumed total length of super corridor (km)	12.00	km
Assumed minimum travel time (minutes)	18	min/km
Assumed maximum travel time(minutes)	138	min/km
average travel time delay per km	10.00	min/km
assumed minimum wage	466	pesos/day
assumed number of working days	260	days/yr
number weekend days	105	days/yr
Assumed bus decongestion under optimal supply	20	percent of bus trips
Assumed dip in passengers over the weekends	20	percent

Results showed that the value of time wasted due to traffic congestion is immense. This is despite the focus of the estimation process on the public bus transport system within the 12 kilometer stretch of EDSA's super corridor. The annual **marginal social cost due to congestion was estimated**

at **PHP 5,508,971,237**. The figure is broken down into marginal external costs from **forgone wages of passengers** amounting to **PHP 4,569,759,077** and **marginal bus operators' cost of PHP 939,212,160** pesos. It is worth noting that the marginal cost due to forgone opportunities for the passengers is five times higher than the marginal bus operators' costs. Suppose the moratorium in the early 2000s were enforced more effectively than in practice, leading to a 20% reduction in bus trips per unit time. An effective decongestion policy that decreases bus trips by 20% within the EDSA super corridor will yield a **net present value of 13.2 billion pesos in the medium term (3 years)** and **PHP 19.86 billion in the long term (6 years)** at 12% discount rate.*

Table 7. Estimated time delays due to congestion along the EDSA super corridor

	Route Distance (km)	Time Delay due to Congestion (in Minutes)			Total delay for all Passengers per day
		Average bus delay per section	Northbound Passengers (NB) per day	Southbound Passengers (SB) per day	
Magallanes- Ayala	1.40	14.00	1,619,128	1,799,756	3,418,884
Ayala-Guadalupe	5.00	50.00	6,013,600	5,609,050	11,622,650
Guadalupe- Aurora	4.30	43.00	4,866,611	4,379,077	9,245,688
Aurora- East Ave	1.30	13.00	1,742,676	1,336,660	3,079,336

Table 8. Marginal costs from forgone wages of bus passengers, in pesos

	Forgone wages per minute	Wages Forgone daily	50% of passengers working	75% passengers working
Magallanes- Ayala	0.97	3,319,167	1,659,583	2,489,375
Ayala-Guadalupe	0.97	11,283,656	5,641,828	8,462,742
Guadalupe- Aurora	0.97	8,976,022	4,488,011	6,732,017
Aurora- East Ave	0.97	2,989,522	1,494,761	2,242,142
Magallanes-East Ave	0.97	26,568,367	13,284,183	19,926,275

* The official rate of the NEDA is 15%, which was set in the 1970s before capital account liberalization. For some purposes a lower rate is recommended; for instance, 12% has been suggested, consistent with more open capital markets in the country (Medalla, 2014).

Table 9. Estimated marginal bus operators' costs along the EDSA super corridor, in pesos

	Average route cost	Northbound buses	Southbound Buses	Total bus operating cost	Cost from excess bus trips/supply
Magallanes- Ayala	44.80	186,188.80	188,876.80	375,065.60	61,241.60
Ayala-Guadalupe	160.00	664,960.00	674,560.00	1,339,520.00	272,800.00
Guadalupe- Aurora	137.60	571,865.60	580,121.60	1,151,987.20	303,408.00
Aurora- East Ave	41.60	172,390.40	169,478.40	341,868.80	59,238.40
Magallanes-East Ave	384.00	6,379,008.00	6,421,248.00	12,800,256.00	2,573,184.00

Table 10. Total marginal social costs due to traffic congestion along the EDSA super corridor, in pesos

	Marginal Bus Operators Cost per day	Marginal External Cost per day 50%	Marginal Social Cost per day	Marginal Bus Operators' Cost per year	Marginal Social Cost per year (260 weekdays)	Marginal Social Cost per year (105 weekends)	Total marginal Cost per year
Magallanes- Ayala	61,242	1,659,583	1,720,825	22,353,184	447,414,468	145,835,363	593,249,831
Ayala- Guadalupe	272,800	5,641,828	5,914,628	99,572,000	1,537,803,285	502,557,554	2,040,360,839
Guadalupe- Aurora	303,408	4,488,011	4,791,419	110,743,920	1,245,768,953	408,850,768	1,654,619,721
Aurora- East Ave	59,238	1,494,761	1,553,999	21,622,016	404,039,848	131,779,957	535,819,806
Magallanes- East Ave	2,573,184	13,284,183	15,857,367	939,212,160	4,122,915,514	1,386,055,722	5,508,971,237

5.5 Lessons for Policy

The benefit-cost analysis implemented in this diagnostic report shows the tremendous magnitude of benefits from implementing an effective regulatory regime that addresses the congestion problem. Results showed that the value of time wasted due to traffic congestion is immense. Reducing bus trips eases congestion and permits faster travel time on average; buses can also achieve faster turnover hence passengers can expect equal availability of bus service.

Addressing congestion issues entails one to look at concerns arising from insufficient road infrastructure, immense vehicular flow, fragmented market structure, lack of traffic discipline, and poor regulatory enforcement (Figure 10). An effective decongestion policy that will lead to a decrease in bus trips by at least 20% within the Epifanio De Los Santos Avenue (EDSA) super corridor, while still sufficiently servicing existing passenger demands, will yield substantial returns in the medium and long term.

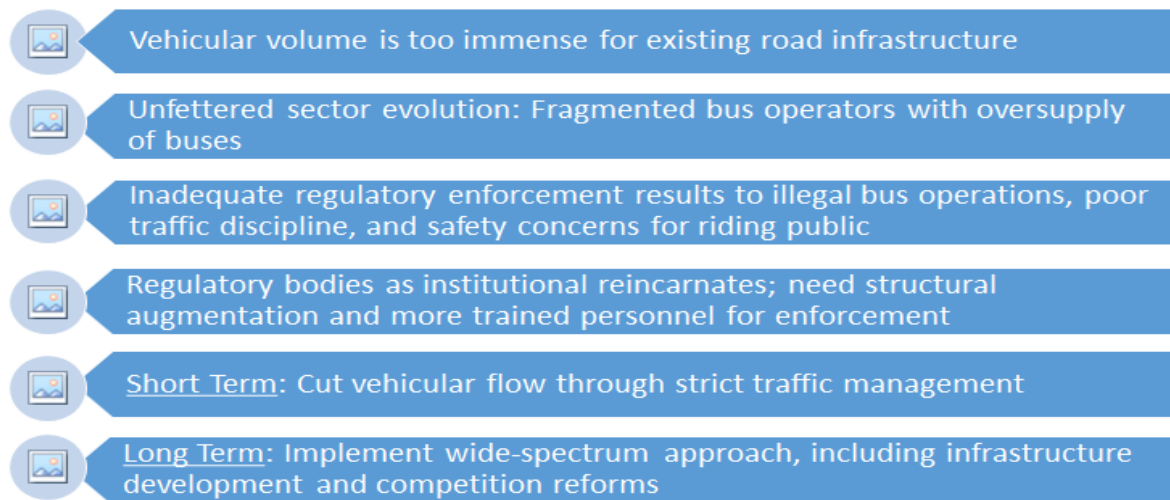


Figure 10. Lessons for Policy

Realizing these large benefits in the quickest and most practical way requires applicable regulatory regimes in possibly two fronts: (a) limit the number of buses and/or operators in the franchised routes; allowing for more effective monitoring and compliance, and (b) target the totality of vehicles using the routes, particularly private automobiles which constitute the bigger number of road users. The former touches a bit on competition policy, while the latter requires a wide spectrum approach to congestion management.

Proper enforcement of existing traffic and transport policy, particularly on franchise agreements, could help achieve the target decrease in buses trips. Note though that the preceding benefit-cost analysis is consistent with the segregation of buses and private vehicles along EDSA, with two lanes reserved for the former. Hence private vehicles will not be able to crowd-in should decongestion occur in the reserved lanes. The same issues on road safety can also be stringent implementation of appropriate safety regulations and corresponding compliance among industry operators. Again, the shortest way to push this is through enforcement of existing policy.

A semblance of organization among bus operators should be enjoined. In particular, regulation of numerous small players is unwieldy, compared to regulating a fewer number of players, whether corresponding to actual companies, or organized franchise holders. Regulatory controls on entry should not be overly restrictive and go the opposite extreme, leading to failure of contestability and the rise of market power.

The contention about the price possibly being too low and that increasing the bus fare may decrease the number of buses is a double-edged sword. Higher prices may indeed decrease the number of buses to a lower equilibrium. However, there is also the possibility that it will have the opposite effect and further increase the supply of buses along existing routes. Market inefficiency through information asymmetry, coupled with weak implementation of regulations, make this a likely occurrence.

Targeting the number of operators and regulating the general flow of traffic for all vehicles covering the full road network within Metro Manila will require deeper analysis of the scope and capabilities of the regulator vis-a-vis the bus operators and private motorists. The social costs of addressing congestion through other means should also be assessed in future studies. Such may include appropriate infrastructure improvements, development of mass transport systems, imposition of price control and road use fees, and information asymmetry remedies. Identifying the optimal equation and correct mix of policy is however beyond the scope of this diagnostic report.

6.0 Conclusion

Over the years, the bus transport sector had evolved from a highly regulated and concentrated market with a handful of players in the 1970s to a more liberalized albeit still regulated market with hundreds of small operators. The separation between the state and the bus market was tempered when the government disengaged from bus service provision through MMTTC. The challenge now is to rationalize its regulatory function and harmonize policy.

The essence of the 1992 liberalization policy is still in effect albeit the existence of a moratorium on franchise issuance as indicated in the year 2000-2003 directives, 15-year age requirement for vehicles, and the regulated fare-setting for all PUVs. Industry accommodations have also allowed new operators to bypass the moratorium directive, while selective enforcement (or non-enforcement in this case) has allowed older buses to service the public.

Market inefficiency manifests in too many operators and buses resulting to traffic indiscipline and congestion. This highly fragmented nature of the sector, both on the regulatory and supply side, results to poor synchronization among bus operators, public commuters, and government regulators as manifested in market inefficiencies.

It is clear that although excessive entry of bus operators into the sector and the apparent oversupply of bus seat capacity add to traffic congestion within major thoroughfares and suboptimal profits for

players in the sector. However, the low market concentration and high number of operators are indicative of positive cash flows/ investment outcomes from bus operations.

In the abovementioned premises reside the confusion and contradiction in policy, and the impetus to streamline the service being offered by the industry through apt competition policy.

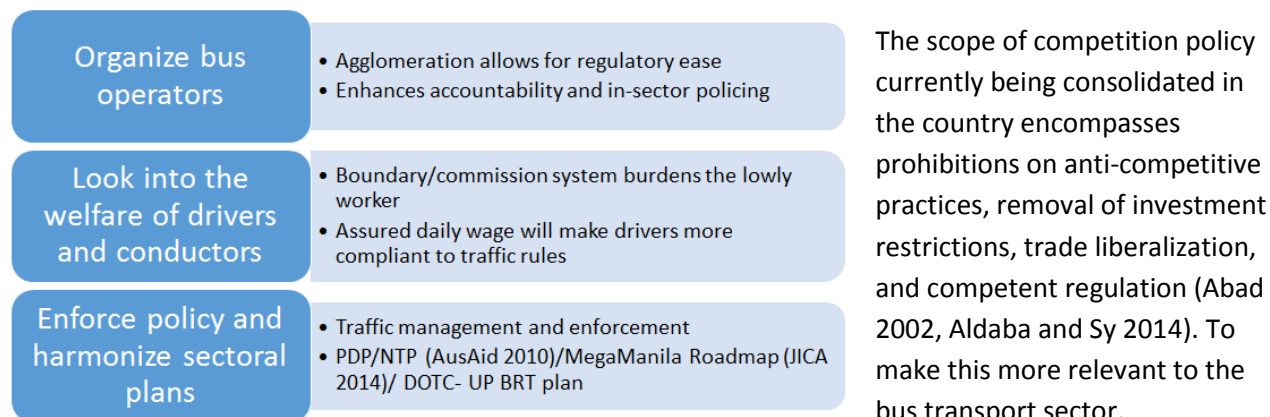


Figure 11. Entry Points for Advocacy

For instance, the numerous operators and the limited network of roads is akin to a common pool problem that left to unfettered competition, results to a less than optimal result in the form of traffic congestion. The challenge for the regulator is to come up with a way to maximize social welfare (availability of affordable mode of transportation at a timely manner) through a mode of contracting (allocating routes) that is self-regulating, i.e., incentive compatible such that operators deploy the optimal number of buses given the needs of the metropolis.

The way forward should optimize the trade-off between social costs and benefits of policy augmentation, execution, and enforcement. Due consideration should be given to the welfare of industry operators, the common worker including drivers and conductors, and the general commuting public.

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