

Implications of Competition Reforms in Rice and Bus Transport Sectors for Consumers and Producers in The Philippines



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Rijit Sengupta
Project Coordinator, CREW project

Abbreviations

ASEAN:	Association of Southeast Asian Nations
AUVs:	Asian Utility Vehicles
BAS:	Bureau of Agricultural Statistics
BLT:	Bureau of Land Transportation
BoT:	Board of Transportation
CIF:	Cost-Insurance-Freight
COA:	Commission on Audit
CPC:	Certificate of Public Convenience
CSQs:	Country-Specific Quotas
CUTS	C-CIER: CUTS Centre for Competition, Investment and Economic Regulation
CREW:	Competition Reforms in Key Markets for Enhancing Social & Economic Welfare in Developing Countries
DCR:	Diagnostic Country Report
DoJ:	Department of Justice
DOLE:	Department of Labour and Employment
DOTC:	Department of Transportation and Communication
DPWH:	Department of Public Works and Highways
EDSA:	Epifanio De Los Santos Avenue
FAOSTAT:	Food and Agriculture Organization Corporate Statistical Database
FOB:	Freight-On-Board
FX:	Filcabs
GAMS:	General Algebraic Modeling System
HHI:	Herfindahl-Hirschman Index
IAC:	Inter-Agency Committee
JICA:	Japan International Cooperation Agency
LGUs:	Local Government Units
LTFRB:	Land Transport and Franchise Regulatory Board
LTC:	Land Transport Commission

LTO:	Land Transportation Office
MAV:	Minimum Access Volume
MBOC:	Marginal Bus Operators' Cost
MEC:	Marginal External Cost
MMDA:	Metro Manila Development Authority
MMTC:	Metro Manila Transit Corporation
MOTC:	Ministry of Transport & Communication
MRT:	Mass Transit
MSC:	Marginal Social Cost
NEDA:	National Economic Development Authority
NFA:	National Food Authority
NFD:	Net Food Disposable
NTP:	National Transport Policy
OFC:	Office for Competition
PDP:	Philippine Development Plan
PNP:	Philippine National Police
PSC:	Public Service Commission
PUBs:	Public Utility Buses
PUC:	Public Utility Commission
PUJs:	Public Utility Jeepneys
QRs:	Quantitative Restrictions
ROI:	Return on Investment
SEPO:	Senate Economic Planning Office
SUA:	Supply and Utilisation Account
TC:	Tricycle
TOC:	Traffic Operations Centre
TWIST:	Total Welfare Impact Simulator for Trade
WISER:	Welfare Impact Simulator for Evaluating Research
WTO:	World Trade Organization

Executive Summary

Overview

This report, the Diagnostic Country Report (DCR) for the Philippines, is a product of the diagnostic or the research phase of the project entitled *Competition Reforms to Enhance Social and Economic Welfare in Developing Countries* (CREW). The project is being implemented by CUTS Centre for Competition Investment & Economic Regulation with support from DFID, UK and BMZ through GIZ, Germany. The three year project aims to demonstrate the implications of competition reforms on producers and consumers in order to attract the attention of policy makers in developing and least developed countries towards effective implementation of competition.

The project is being implemented across four countries, namely, Ghana, India, the Philippines and Zambia, where the common sectors are bus transport and staple food. The project countries were selected keeping in mind the need to capture contrasting reforms and their implications across developing and least developed countries, whereas the sectors were selected because of the high impact they have on common man.

As in many developing countries, post-colonial policy in the Philippines pursued industrialisation via import substitution. This led to concentration in the manufacturing sector and protected domestic markets. With the return to democracy in 1986, numerous reforms were implemented, which were salutary in subsequent economic development, but were not enough to dramatically alter the level of market concentration in many industries. Improved competition and efficiency remains thwarted by remaining entry barriers, such as franchises and licensing requirements of the government.

The Office for Competition (OFC) was created by Executive Order No. 45, series of 2011, designating the OFC of Department of Justice (DOJ) as the country's Competition Authority. It is responsible for the investigation and prosecution of cases involving violations of the competition legislation and its enforcement to protect consumers and supervise behavior of players in markets, among others. The country, however, is yet to adopt a 'modern' competition law. The process of having a modern competition law is, however, at an advanced stage in The Philippines – with observers hopeful that the new law will be embraced before the national elections to be held in 2016. Such a law would have the main objective of fostering consumer welfare, safeguarding markets from unfair competition, and promoting economic efficiency.

Regulatory agencies that have been mandated to supervise the two focus markets covered in this study are Department of Transportation and Communication (DOTC), through the Land Transport and Franchise Regulatory Board (LTFRB) and Land Transportation Office (LTO), for bus transport and the National Food Authority (NFA) for rice.

Staple foods

The rice sector is regulated by the National Food Authority under a highly interventionist regime aimed at food security and price stabilisation. Past research on rice industry shows a high degree of competition in the domestic market, from paddy production to retail marketing.

The NFA participates in the rice market as a trader, but not enough to significantly affect paddy prices. Even as domestic production is growing, the increase in consumption has outpaced the growth in supply, leading to a growth in imports. The domestic price on average has been higher than the border price. Since 1995 the most significant reform in rice policy was in the realm of trade liberalisation, mainly due to compliance with World Trade Organisation (WTO) rules. Furthermore, in recent years the NFA has relaxed its exercise of import monopoly by authorising private traders to implement the government's import quota.

Consistent with previous studies done on the rice supply chain, a rapid appraisal finds that the paddy and rice supply chain is multi-layered with many competing players in each layer. At the farm level, farmers have a choice of buyers competing in their communities—traders have buying stations, independent agents match producers with millers with the best prices for a fee, and members of trading cooperatives actively solicit business for their organisation in consideration of patronage rebates. To get supplies, mills use competitive pricing. Entry into the rice business is easy if capital, supply source, and potential market are available. NFA licensing and registration requirements are not an issue.

With the many layers in the rice supply chain and the apparent number and variety of players in each level, it is difficult to imagine how one group of market players could influence market directions to their advantage. NFA data shows the existence of an ample number of market players. Moreover, the cost estimates and prices show no substantial margins as these are apparently limited to 2 per cent or less of the cost of raw materials up to the wholesale level and 5 per cent at the Metro Manila retail level. Interviewees consistently say that the competition is really stiff, especially with tight paddy supplies, a situation that was pronounced at the time of the interviews.

In one aspect though, competition is seriously curtailed, namely, entry into the import business. The NFA maintains a statutory monopoly; in conjunction with a self-sufficiency target, this has led to a declining import quota and an intensifying protection of domestic producers. Rice importation policies need to be rational and effective in protecting not only the interests of producers but also consumers and other market participants. Huge differences in the costs of bringing in imports and moving domestic supplies to consumers makes smuggling lucrative. Moreover, according to the key informants, quantitative restrictions on imports as exemplified by NFA's regulations allow the concentration of legally imported supplies in the hands of a few.

Through the use of a simulation model called the Total Welfare Impact Simulator for Trade (TWIST), both the consumer and producer welfare were computed under varying degrees of import controls. Actual and counter-factual scenarios were developed for the 2013 rice market using TWIST. Analysis indicates that if quantitative restrictions were eliminated and

rice imports were allowed to freely enter the country, total rice imports would have reached 4.20 million tons, a tenfold increase over actual imports. Such high level of imports would have brought down the retail price of rice to P19.80 /kg from P33.08 /kg, and the wholesale price down to P17.66 /kg from P30.04 /kg. Clearly, consumers would have benefited from free trade given the low market price of rice. Consumer surplus would have increased by P178,075.65mn. However, this would have led to a P33,985.01mn reduction in producer surplus. In total, the economy would have benefited by as much as P138,464.10mn.

If instead the import quota were maintained at the previous year's level of 1,000,000 tons, prices would have fallen. At the retail level, price of rice would have decreased from P33.70 /kg to P31.52 /kg. At the wholesale level, price would have dropped by P2.18 /kg. Consumer surplus would increase by P25,706.18mn; however, producer surplus would decrease by P6,598.97mn. The overall impact would have been a P25,203.32mn increase in economic surplus.

This paper recommends that the government should reconsider its protectionist rice policies. Relaxing the import quota under private sector participation in trade is welfare-improving, but ultimately a stop-gap measure. A more permanent reform is tariffication; a properly-set tariff level under a liberalised import policy, allowing anyone to bring in rice with the payment of moderate tariffs, can still confer some protection to producers (avoiding severe dislocation), provide more stability to domestic supplies and prices, and deter any attempt to control stocks for the purpose of manipulating prices.

Bus Transport

The bus transport sector evolved from a highly regulated and concentrated market in the 1970s to a liberalised market composed primarily of small operators. Major reforms in bus transport regulation were carried out in the early 1990s in order to liberalise the market.

The market now operates under a highly complicated regime where regulation and enforcement is shared by several agencies resulting in implementation failures and regulatory capture in the form of operation of illegal buses and proliferation of 'kabit' system where a bus owner enters the market through arrangement with an operator with established franchise. Further, market inefficiency manifests in many operators and buses resulting in traffic congestion. The study focuses on two routes in Metro Manila, and two inter-city routes connected to Metro Manila. These routes were selected to represent or illustrate the issues not only being confronted in regards to these routes but also in the broader context of the sector. 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.

In order to curb the oversupply of buses, the government imposed a moratorium in 2000 on provincial buses and in 2003 on all buses. Further, in addition to the moratorium in 2003, Route Rationalisation Programme 2003 was implemented in order to reduce the number of buses going through Epifanio De Los Santos Avenue (EDSA) super corridor. However, from the number of buses and operators in the market, it is evident that the reforms have not been effectively implemented and have failed to meet their objectives. Interviews with bus operators 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 P150,000 per unit. The official franchise rate is only P510 for the first 2 units and P70 for each additional unit. Further, in terms of competition, cut throat competition prevails in the market as is evident from the existing Boundary System which allows the drivers and conductors to pay a fixed amount (per day) to the operators and keep the excess amount as profits. During the peak hours, many drivers are seen driving rashly in order the pick passengers at the earliest.

One of the competition issues that emerged during the research was the fare. It was found that in spite of the high level of competition, the bus fares are still high. Currently, the fares are revised by the Land Transport Franchise Regulatory Board through a process of public hearing after a petition for fare revision is submitted by the franchise. In order to arrest this issue, the LTFRB is under the process of revising its fare setting mechanism.

Under the research, cost-benefit analysis was undertaken in order to analyse the implications of congestion due to the excessive buses. Results showed that the value of time wasted due to traffic congestion is immense. Reducing bus trips will ease congestion and permit faster travel time on average; buses can also achieve faster turnover hence passengers can expect equal availability of bus service. It needs to be borne in mind that Metro Manila also has a fairly high density of cars, with numbers ever-increasing over the years. Therefore, any decongestion policy will also have to somehow take this into consideration. Merely regulating the number of buses (means of transport for ordinary people) without any concurrent strategy for applying the principle of decongestion on other vehicles (especially personal vehicles like cars) will neither solve the issues nor will be politically appealing.

The assessment of the bus transport market reveals that effective decongestion (involving implementation of the moratorium of 2000) can lead to a decrease in bus trips by 20 per cent within the EDSA super corridor, while still sufficiently servicing existing passenger demands. This would have yield a 'savings' for the country at net present value of P13.2bn in the medium term (3 years) and P19.86bn in the long term (6 years) at 12 per cent discount rate. Such benefits of decongestion cannot be overlooked by policymakers – and there is need for engaging them with this evidence.

Offhand, proper enforcement of existing traffic and transport policies, particularly on franchise agreements, could result in the targeted decrease in buses plying the routes. Obviously, if the first option is to be taken, such limits should not be overly restrictive and go the opposite extreme, leading to failure of contestability and the rise of market power. Targeting the number of operators will require deeper analysis of the scope and capabilities of the regulator *vis-a-vis* the bus operators, and is beyond the scope of this DCR.

1. Introduction

Competition reforms seek to promote a market environment in which no party or group is able to assert its dominance over market outcomes. Competition is expected to result in lower prices and better quality for consumers; meanwhile producers as an industry benefit from an open playing field (though reform may be opposed to the interest of an erstwhile dominant market player).

Competition enforcement is fair to weak in many developing countries, and needs to be strengthened to ensure that competition reforms lead to measurable and demonstrable welfare gains. Developing and least developed countries are faced with resource constraints, and policy makers need to make difficult choices/decisions while allocating scarce resources between various public policy areas. For resources to be made available to implement competition reforms in developing countries, it is necessary that impacts of competitive markets on consumers and producers are properly demonstrated and explained to policy makers (and development partners as well). However, there is lack of a comprehensive approach for measuring such impacts.

CUTS Centre for Competition, Investment & Economic Regulation (CUTS C-CIER) has undertaken a project entitled ‘Competition Reforms in Key Markets for Enhancing Social & Economic Welfare in Developing Countries’ (*CREW Project*). The project is being executed in Ghana, India, The Philippines and Zambia and across two common sectors: staple food and passenger transport. One of the main goals of this project is to demonstrate the benefits of competition reforms for consumers and producers, so that greater attention and support can be provided to this issue by policy makers.

In the Philippines, the DCR covers rice, the country's main staple. The DCR aims to identify existing concerns of consumers and producers in the Filipino rice sector and propose market reforms to help address these concerns, and estimate benefits thereof. More specifically its objectives are:

- review trends in the rice sector in The Philippines, particularly policies affecting the market and competition in various components of the rice value chain;
- describe the state of competition in the Philippine rice industry;
- assess the impact of past and current competition reforms (i.e. reforms enhancing competition in the market) on consumers and producers, and based on this assessment make recommendations; and
- identify concerns (of consumers and producers) and assess the potential impact of reform measures that can help address such concerns.

For passenger transport, the DCR focuses on bus transport services. The DCR examines:

- the institutional and regulatory framework governing the bus transport sector;
- major competition reforms in the sector and analyses the impact of the reforms on the welfare of consumers and producers; and
- further priority reforms to improve competition and efficiency in the sector.

This DCR should be useful to policy makers and stakeholders in the competition reform agenda of the Philippines.

Report Structure

Chapter 2: Background

The first chapter presents a brief discussion on the reforms in the overall economic policy in general and competition policy in particular in the light of the post 80s economic liberalisation. The chapter also deliberates on the overall policy paradigm and some recent changes in the focus sectors of staple food and bus passenger transport.

Chapter 3: Competition Reforms in Staple Food Sector (Rice) and Implication on Beneficiaries

The chapter assesses the important reform measures relating to the rice market in terms of impact on market structure, competition and welfare on farmers and consumers. Further the chapter links the impact of the select reforms on the consumers and farmers.

Chapter 4: Competition Reforms in Bus Transport Sector and Implication on Beneficiaries

The chapter assesses the important reform measures relating to the passenger bus transportation market in terms of impact on market structure, competition and welfare on operators and passengers. The chapter also draws the linkage between the reforms and the impact on passengers and operators.

Chapter 5: Way forward

This final chapter summarises the way forward based on the key findings of the study.

2. Background

History of Economic and Competition Reforms

As in many developing countries, post-colonial policy in the Philippines pursued industrialisation via import substitution. Domestic manufactures were shielded by tariffs, quantitative restrictions, and administrative allocations. This led to concentration in manufactures and protected domestic markets (Medalla, 2002a). An indirect result was the effective protection of agriculture, partly through the trade regime, and more importantly due to exchange rate overvaluation (Intal and Power, 1991). In the 1970s an authoritarian government came into power, which reinforced import substitution, and introduced an interventionist regime in agriculture, spearheaded by several state-owned enterprises, some of which received favourable market access or outright monopolies, e.g. in sugar, rice, and fertiliser (David, 2003).

The bankruptcy of the import substitution model became apparent as the country fell into a deep economic and political crisis in the mid-1980s. The turning point came with the return to democracy in 1986. The new government disengaged from import substitution, relaxing and eventually repealing most quantitative restrictions, initiated rounds of unilateral tariff reduction, and lifted monopolies and export taxes affecting agriculture. Deregulation and privatisation was also instituted to remove barriers to competition and improve factor mobility (e.g. liberalisation of capital markets and floating of exchange rates).

Major reforms have been introduced since the late 1980s. In 1987, the power generation was opened up by terminating the monopoly of the state-owned National Power Corporation. Similarly, in the early 1990s, telecommunications was liberalised. Shipping was likewise deregulated by removing controls on first and second class passenger rates. This was followed by the air industry, in which restrictions on domestic routes were eased and pricing regulations repealed (Aldaba and Aldaba, 2014).

These liberalisation initiatives, however, do not guarantee competitive markets, as other factors may come into play, e.g. the presence of non-tradables, industries with high transport costs, perishables, and services, as well as persistence of regulatory and structural barriers to entry (Medalla, 2002a). In fact, the nation's wealth continues to be highly concentrated. In numerous industries concentration ratios remain high; many of the dominant firms are members of conglomerates owned by a small group of elite families; many of these in turn wield political power. Only about a hundred political clans control virtually all elective positions at the national level. Concentrated industries include petroleum, iron and steel, fertiliser, pulp and paper, home appliance manufacturing, tobacco manufacturing, telecommunications, shipping, and supermarket retail. De-concentration is thwarted by remaining entry barriers, such as franchises and licensing requirements of government (Abad,

2002). Other rules and regulations that may affect competition include: business registration requirements; land zoning; labour laws; intellectual property; environmental regulations; and investment rules and incentives (Medalla, 2002b).

Philippines is one of the few countries in the ASEAN region that does not have a national competition law yet. In 2007 ASEAN leaders had agreed to the establishment of the ASEAN Economic Community in 2015. It was also agreed that all ASEAN Member States would have a national-level competition legislation by 2015¹. While Philippines does not have 'modern' competition legislation, it does have several competition-related laws and regulations.

The 1987 Philippine Constitution (Article XXII, Sect. 19) states: "The State shall regulate or prohibit monopolies when the public interest so requires. No combinations in restraint of trade or unfair competition shall be allowed." The Penal and Civil Codes respectively define criminal and civil liabilities for specified anti-competitive behaviour. The Consumer Act (RA 7494) of 1932 promotes consumer product quality and safety standards, and prohibits deceptive and unfair sales practices, such as through fraudulent weights and measures, product service warranties, and the like.

A major competition reform enacted in 1991 was RA 7581 or the Price Act. The Act aims at protection of consumers by stabilising the prices of basic necessities and prime commodities, and enact measures against undue price increases during emergency situations. Basic necessities include rice, as well as corn, and other foodstuffs. The Act criminalises acts of price manipulation and combination, namely: hoarding, profiteering, and formation of cartels.

By virtue of Presidential instruction (Executive Order 45 of 2011), the Department of Justice (DOJ) has been designated as the country's competition body. The DOJ established an Office for Competition (OFC) to enforce competition policy, investigate cases of possible violations, and prosecute violators. There are, furthermore, sector-specific legislations on competition. Republic Act 8479 provides for Downstream Oil Industry Deregulation Act (1998); Republic Act 9136 is the Electric Power Industry Regulation Act (2001). Sector-specific regulators have been established as well, such as the National Telecommunications Commission, Electricity Regulatory Commission, the Metropolitan Waterworks and Sewerage System Regulatory Office, the Land Transport Franchise and Regulatory Board (LTFRB), the National Food Authority (NFA), and the Sugar Regulatory Agency. These regulators have within their sectors, the mandate of promoting development, social objectives (e.g. universal coverage), and competition. Of special concern of course is the overlap between the activities of the competition authority and those of the sector regulators (Aldaba and Sy, 2014).

¹ <http://www.asean.org/archive/publications/ASEANRegionalGuidelinesonCompetitionPolicy.pdf>

The overlap can be seen in the statement of duties and responsibilities of OFC based on Executive Order 45:

- a. prosecute violators to prevent, restrain and punish monopolisation, cartels, and combinations in restraint of trade;
- b. enforce competition policies and laws to protect consumers from abusive, fraudulent, or harmful corrupt business practices;
- c. supervise competition in markets by ensuring that prohibitions and requirements of competition laws are adhered to, and to this end, call on other government agencies and/or entities for submission of reports and provision for assistance;
- d. monitor and implement measures to promote transparency and accountability in markets;
- e. prepare, publish and disseminate studies and reports on competition to inform and guide the industry and consumers; and
- f. promote international cooperation and strengthen Philippine trade relations with other countries, economies, and institutions in trade agreements.

In short, the OFC is given the mandate to enforce all competition-related laws, without delimitation by sector. In fact, duty and responsibility seems to empower it to take the lead in supervising competition in markets. A useful way of distinguishing the roles of the sector regulators from that of OFC is that the former focus on competition enforcement, whereas the latter specialise in criminal aspects of competition law. It is also the competition enforcer of last resort, stepping in when sector regulators may be in remission of their duties, perhaps due to regulatory capture.

Discussion of Reforms Undertaken in the Selected Sectors

The rice sector is regulated by the National Food Authority (NFA), which participates in the rice market as a trader. Even as domestic production is growing, the increase in consumption has outpaced the growth in supply, leading to a growth in imports. NFA holds a statutory monopoly on importation of rice.

This Report shows that the paddy and rice supply chain is multi-layered with many competing players in each layer. At the farm level, farmers have a choice of buyers competing in their communities, traders have buying stations, independent agents match producers with millers with the best prices for a fee, and members of trading cooperatives actively solicit business for their organisation in consideration of patronage rebates. To get supplies, mills use competitive pricing. Entry into the rice business is easy if capital, supply source, and potential market are available. Since 1995 the most significant reform in rice policy was in the realm of trade liberalisation, occasioned by the country's accession to the WTO. In recent years the NFA has relaxed its exercise of import monopoly by authorising private traders to implement the government's import quota.

Meanwhile, the bus transport sector evolved from a highly regulated and concentrated market with a handful of players in the 1970s to a more liberalised 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 many operators and buses, and indiscipline in the road adding to traffic congestion problems in Metro Manila and key urban communities. There is also the proliferation of illegal non-franchised buses and *kabit* system where a bus owner enters the market through arrangement with an operator with established franchise. The fragmented nature of both the sector's regulatory and supply side impedes synchronisation among stakeholders and incurs huge costs to industry operators and the riding public.

The DCR undertakes a case study focusing on two routes in Metro Manila, and two inter-city routes connected to Metro Manila. 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. A cost-benefit analysis implemented in this DCR shows the tremendous magnitude of benefits from implementing an effective regulatory regime that addresses the congestion problem along the main intra-city route. There is therefore significant scope for undertaking further reform in terms of rationalising competition in the congestion-prone bus transport sector.

3. Competition Reforms in Staple Foods Sector (Rice) and Implication on Beneficiaries

The Rice Sector of the Philippines

The rice sector is regulated by the NFA under a highly interventionist regime aimed at food security and price stabilisation. Presidential Decree No. 4 of 1972 established the charter of the NFA (then called the National Grains Authority). The NFA was established to encourage grains production and productivity and assure a "fair return" on investment of producers. Its mandate is to maintain food security in staple cereals in times and places of natural or man-made calamity/emergency, as well as stabilisation of staple cereal supply and prices. To do so it was given a broad set of powers, including:

- maintain a national buffer stock;
- procure and sell grain;
- monitor grain storage;
- seize stocks in case of hoarding;
- establish and enforce standards in grading, sampling, and inspection;
- register, license, and supervise warehouse, mills, and other businesses related to grains;
- control the importation of grains so as to maintain parity between domestic and world prices; and
- control the export of grains.

The NFA also regulates a number of rice-related processing and servicing activities, namely:

- mechanical drying, threshing, and other post production equipment
- transportation
- milling
- warehousing
- manufacture of rice-based and corn-based products
- grains packaging
- retailing/wholesaling
- importing/exporting/indenting

Each of these activities requires a license from NFA, which is typically valid for a year and subject to renewal.

Competition regulation in the rice sector is guided by relevant provisions in the Constitution and the Price Act. The enforcement agency for the case of rice is the NFA. In recently highly publicised campaigns, the NFA has joined other law enforcement agencies (such as the Philippine National Police, Bureau of Customs, and National Bureau of Investigation) in

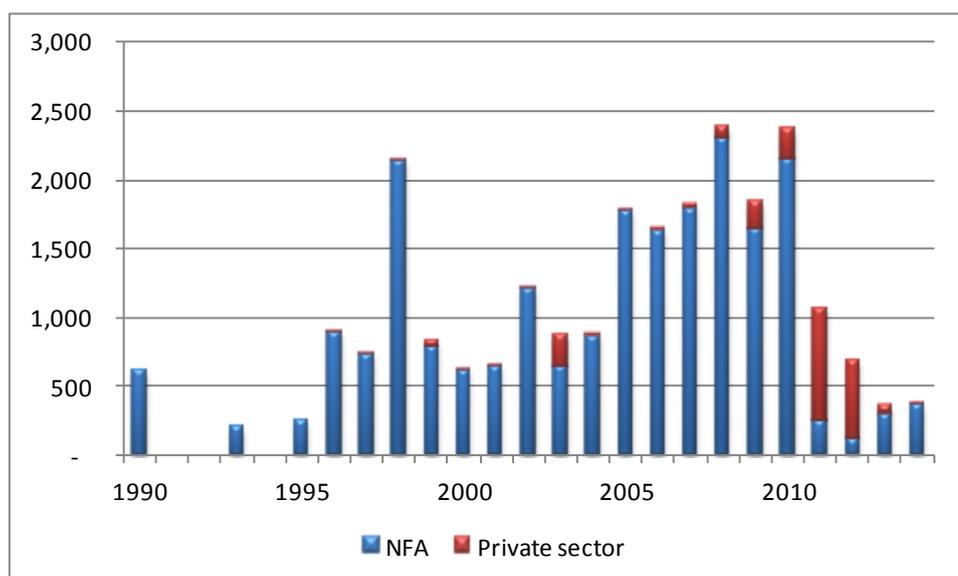
investigating suspected smugglers and hoarders, revoking licenses of rice traders conducting illegal practices, and impounding stocks of errant traders.

Since 1995 the most significant reform in rice policy was its compliance with WTO rules and decisions. In 1995 the Philippines acceded to the World Trade Organisation (WTO), particularly articles on conversion of quantitative restrictions (QRs) into equivalent tariffs (tariffication). However the Philippines obtained a Special Treatment for rice up to 2005, allowing it to maintain its rice QR. Nevertheless the country conceded a minimum market access, ranging from 30,000 tons in 1995 up to 224,000 tons in 2004. Volumes within the market access charged a maximum tariff of 50 per cent. Upon expiration in 2005, the country negotiated and obtained an extension of its special treatment for rice up to 2012. In exchange the country raised its minimum access to 350,000 tons, of which 163,000 were in the form of Country Specific Quotas (CSQs) to Thailand, China, India, and Australia. In practice, the high prices of rice produced in these countries tend to limit the usage of CSQs by private traders. Currently, the Philippines has applied for an extension of special treatment with the WTO up to 2017, in the meantime maintaining *status quo* in its import policy while approval is pending.

RA 8178 (1996) Agricultural Tariffication Act, converted trade barriers into tariffs, to meet the country's WTO obligations. However RA 8178 specifically exempted rice; rather, it confers the NFA the authority to undertake direct importation of rice, or allocate the import quota among licensed importers.

One positive development was the shift to private sector importation beginning in 2008, which intensified in 2010 onwards. In 2008, the allocation to private importers was only 200,000 tons, of which only 76,000 was actually imported; total imports that year totaled 2.2 million tons (Figure 1). Private sector engagement was low due to very high world prices prevailing at the time; moreover as explained above, the CSQ scheme prevented importers from selecting their least cost supplier. By 2011 the private sector (inclusive of farmer organisations) was allowed to import 660,000 tons, 77 per cent of that year's import quota of 860,000 tons. However the annual import quota is now restricted to the minimum market access owing to the self-sufficiency target of 100 per cent by 2013, to be sustained up to 2016. In 2013 the import quota is 350,000 tons, of which 163,000 is assigned to the private sector under the CSQs.

Figure 14: NFA and private sector import arrivals, 1990 – 2013 ('000 tonnes)



Source: NFA.

Import allocation policy ceded some responsibility for price stabilisation to the private sector; it also eased some fiscal pressure on NFA as imported stock could be released by the private sector at prevailing market prices, rather than by the NFA under its low-price retail distribution programme. However as private sector importation was carried out under an overall QR regime, with its allocation mechanism later being questioned for lack of transparency, the reform did not significantly alter the distortionary features of the NFA import monopoly.

The input distribution system for rice is characterised by low levels of government intervention. In this study it is posited at the level of the farm, producing paddy (husked, or rough rice); there is of course a prior input distribution system, for which the state of competition is fairly well characterised (Box 1).

Past research on rice industry shows a high degree of competition in the domestic market, from paddy production to retail marketing. As early as the mid-1960s, analysis by Mangahas and Recto (1966) of rice market found that price changes at one level of the marketing system are typically reflected with little change in the marketing margin, at other levels. Market power if any is only transitory or of local significance. This was echoed in the analysis of Mears and Anden (1970), which shows that "hoarding" of *palay* or milled rice during the off-season does not necessarily create abnormal profit to the trader; when opportunity costs of storage are taken into account, both farmers and traders face a high probability of loss from holding paddy rice for sale after harvest. The astute trader may realise profit, but even so may sustain losses in some years; it is unrealistic to suppose that a farmer with less familiarity and information could fare better.

In the mid-1980s, studies on rice marketing continued to emphasise recurrent themes of multiple market layers, numerous players, and the pervasiveness of government intervention.

During that period, when the degree of self-sufficiency was greater than the past decade, Umali and Duff (1992) found that there was a diversity of prices throughout the marketing chain, generally reflecting differences in grain quality. Competition in the private marketing system had been steadily increasing in rice retail, wholesale, and transportation sectors, as well as in warehousing. However, rice processing was not as competitive as government licensing served as an entry barrier.

Box 1: The Rice Input System

The main variable inputs to rice production are fertiliser, agro-chemicals, and seed. According to BAS data, agro-chemicals account for less than 3 per cent of total production cost; seed has a similar share, while fertiliser accounts for 10 per cent of production cost. Only 29 per cent of seeds is certified as hybrid seeds; the rest is "good seeds" (purchased but not certified) or farmers' own seed. Privately-bred seeds (distributed by large agribusiness companies) account for just 10 per cent of all rice seeds (Sombilla and Quilloy, 2014).

Meanwhile in the case of fertiliser, over 70 per cent of domestic supply is sourced from imports. It can be shown that domestic and world prices of urea (the most important form of fertiliser) are integrated, in the sense that the margin between world and domestic price is mostly explained by marketing cost. Import permits are not required, although importers need to be licensed and imported products need to be registered. Tariffs on imports are minimal; 85 per cent of imports are from free trade partners for whom the preferential rate is zero. There have been no major fertiliser subsidy schemes since 1986. The fertiliser distribution system is characterised by numerous players; as of 2009 there were 483 licensed handlers in the fertiliser industry, spanning importation, distribution, repacking, export, and manufacturing. Of these, 134 were listed as importers; 7 handlers were also listed as end-users (e.g. large plantations). Many more handlers are farmer cooperatives or associations (e.g. sugar planter organisations) who distribute fertiliser to their members. Briones (2014) finds that fertiliser handlers report no major issues in obtaining licenses and registering fertiliser products. Moreover, domestic and world markets are integrated, i.e. arbitrage opportunities between world and domestic prices are exhausted. (This of course does not rule out cartelisation in the world markets, which may artificially elevate world prices).

In the 2000s, government implemented the Hybrid Rice Commercialisation Programme, the flagship project to boost rice productivity in the country. The programme promoted dissemination of hybrid rice varieties combined with seed and fertiliser subsidy. The programme was terminated in 2010 by the succeeding administration. Criticisms of the programme had been mounting, first from farmer organisations themselves (GRAIN, 2005), as well as from government managers and auditors due to fund anomalies. Since then there have been no major subsidy programmes for rice seeds and fertilisers. The lack of opposition to the closure of the programme suggests that intended beneficiaries never felt substantial benefits from the subsidy allocations due to the aforementioned leakages.

The authors also examined the issue of market integration, i.e. the degree to which trading activity arbitrages away differences in space or level of marketing, leaving only "pure" (opportunity) costs of transport and marketing. They found that wholesale and retail levels of

the market were integrated, although the degree of connection between farm and wholesale markets was much lower.

The integration result is consistent with that of symmetry of price changes found by Reeder (2000). Using official data on farm gate, wholesale, and retail prices, he finds that traders do adjust their prices upwards when cost increases; they are equally likely to pass on falling costs by providing price discounts. There is no evidence to support the view that traders over-react to unanticipated market news (i.e. of shortages); shocks tend to propagate from the farm level, to the wholesale, and then the retail level. Finally, Rufino (2008) finds that regional wholesale prices of regular milled rice are well integrated in the long run; moreover, even short-run deviations from long run equilibrium dissipate rapidly. Apparently by the 1990s, entry barriers were not affecting the competition across space, given the study's failure to detect arbitrage opportunities across regions.

A study from the mid-1990s (Bordado et al, 1996) compared the marketing of paddy rice by farmer cooperatives and traders in selected regions of the Philippines (Cagayan Valley, Central Luzon, and Southern and Central Mindanao). The study tests the notion that market intermediaries are earning rents, that can be arbitrated by farmers who directly market their produce to millers or even wholesalers (i.e. taking over the rice milling themselves). It shows that the cost of marketing of PGs on average was higher than that of traders (table 3). The highest cost was in Bicol (P48 per kg), which incurred considerable expense for cooperative overhead (i.e. manager's fee, commission for staff, and depreciation). The highest cost in Southern and Central Mindanao can be attributed to higher transport cost compared to that of Luzon.

Cooperatives paid higher prices to farmers. They also obtained higher prices from its buyers, i.e. traders earn lower margin than cooperatives. The higher margin of cooperatives enabled them to earn a slightly higher profit despite higher costs (about P0.18 per kg more); in particular the village-based traders in Bicol and Southern and Central Mindanao realised "very low" profits. Hence the notion of excess rent accruing to market intermediaries is unfounded. Nevertheless, traders earned a higher Return on Investment (ROI).

Table 1: Marketing efficiency indicators, sample cooperatives vs. traders in selected regions of the Philippines, 1993

	Cooperative	Trader
Marketing cost (pesos per kg)	0.29	0.26
Buying price (pesos per kg)	4.88	4.79
Selling price (pesos per kg)	5.36	5.20
Margin (pesos per kg)	0.48	0.41
Return on investment (percent)	3	6

Source: Bordado et al (1996)

Hayami and Kikuchi (2000) conducted a reconnaissance of the marketing system in Laguna province in 1995 – 1997 from paddy procurement to retail. Their study revealed the "highly competitive" nature of rice marketing in the locality. Countless middlemen compete in the procurement of paddy; these include small community-based collectors, who virtually any villager can engage with. These buyers compete with numerous rice mills; in one municipality (Pila, Laguna), as many as nine mills compete for paddy rice. These mills are also competing with other mills, not only in Laguna, but also in other provinces. Widening procurement area allows mills to obtain rice over different harvesting seasons and thereby avoid excess capacity; hence no mill, even large ones, exercises monopoly power. Intense competition is also observed between wholesaling of rice by mills to retailers, and in retailing to consumers.

The authors do observe long-term trade relationships between farmers and collectors, collectors and rice mills, and rice mills and retailers, often with credit tying; however such relationships are motivated by savings in transaction costs arising from possible opportunism, and reduction of risk, rather than exercise of monopoly or monopsony power. "Farmers, middlemen and consumers continue to maintain long-term trade relationships so long as it is beneficial to them, but it is very easy to switch trade partners if the present relationship is found to be unsatisfactory. Thus the market is highly 'contestable' if not perfectly competitive (pp. 204 – 205)."

The most recent study to use primary data traces the value chain from the farm to the wholesale level (Dawe et al 2008), comparing two similarly situated marketing channels in Thailand and the Philippines. The gross marketing margin in Thailand is much smaller (US\$16 per ton, compared to US\$67 per ton in the Philippines). Marketing costs are 100 per cent of the gross marketing margin in Thailand, and 55 per cent that of the Philippines (US\$29 per ton). The most important source of the difference in marketing cost is the higher interest rate for working capital in the Philippines, accounting for 58 per cent of the difference in marketing costs. Nevertheless the large difference in net margin implies some excess profit in the Philippines, i.e. a positive and significant difference between gross margin and measured marketing cost.

In principle, the excess profit should encourage expansion by existing players, as well as entry of new players, until the excess is competed away. Hence persistence of excess profit may be explained as follows: first, new players are not necessarily low cost traders, i.e. the low cost traders have already entered the market; second, low cost traders already in the market face constraints in gaining access to working capital, forestalling expansion of their operations; third, there may be large hidden costs of doing business in the Philippines which may be constraining entry and expansion of low cost traders; and fourth, entry of more efficient foreign investors (e.g. from Thailand) into domestic rice trade may be prevented by statutory barriers against foreign investment in the rice business.

Some past studies suggest that marketing inefficiency in the Philippines manifests in many rather than few traders. Tadem (2002) alleges that rice marketing in the Philippines involves a network of middlemen working closely with rice cartels which control 90 per cent of the country's rice supply. The biggest is the "Binondo rice cartel" composed of Filipino-Chinese traders. Intal and Garcia (2005), refer to a so-called "rice cartel" composed of seven Chinese families, associated with Binondo due to two streets in Chinatown characterised by a heavy concentration of large rice wholesalers in Manila. However, the existing literature debunks this view of a cartelised market.

Dawe *et al* (2008) note that allegation of a cartel is certainly not true between farm gate to the mill, or from the wholesale to the retail levels. In fact it is likely that large marketing margins are perhaps due to proliferation of traders, leaving scale economies in trade unexploited. It takes about 18 marketing agents (traders and millers) to process 90,000 tons of dry palay, compared to one miller in Thailand. As discussed above, the efficient traders/millers are unable to expand their operations, unlike those in Thailand. The authors do concede that collusion may still occur among the "very large traders" who operate at the wholesale level. However they compare the marketing margin at wholesale-to-retail stage between Bangkok and Manila; while the latter is lower, the difference is only P0.33 per kg of palay; adjusting for higher capital costs in Manila, the upper bound estimate of the excess margin due to collusion. Even if collusion exists, it exerts only a small influence on the market price.

The rice marketing chain covered in this study is shown in figure 2. Typically, the farm produce is sold to traders, who then sell paddy rice to rice mills. Rice millers process the paddy into milled rice. From the mill, the rice goes to wholesalers, who may also obtain milled rice from importers; rarely is rice imported in paddy form. Wholesalers then sell it to retailers, which in turn are divided into traditional retail outlets (rice sold in public or wet markets, or roadside stalls), as well as modern retail outlets (i.e. supermarkets and retail chains). The latter are often pre-packed and sealed, whereas the former are often sold loose.

Figure 2: Schematic of the rice marketing chain

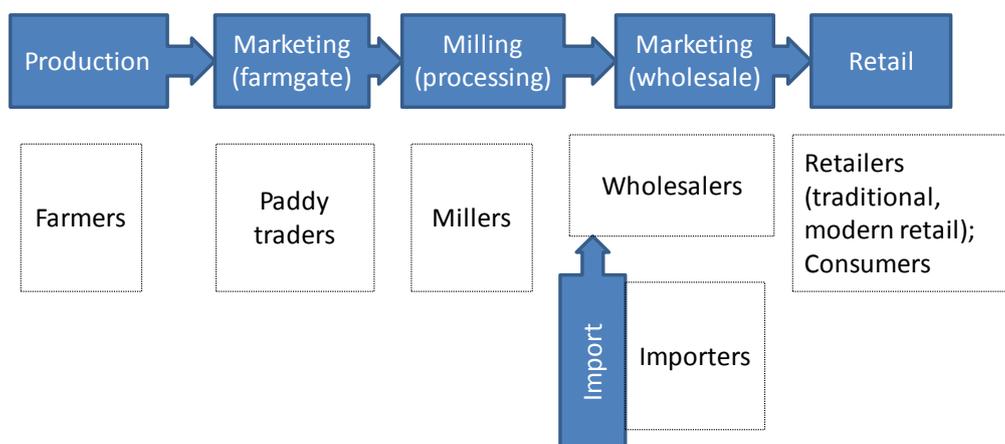
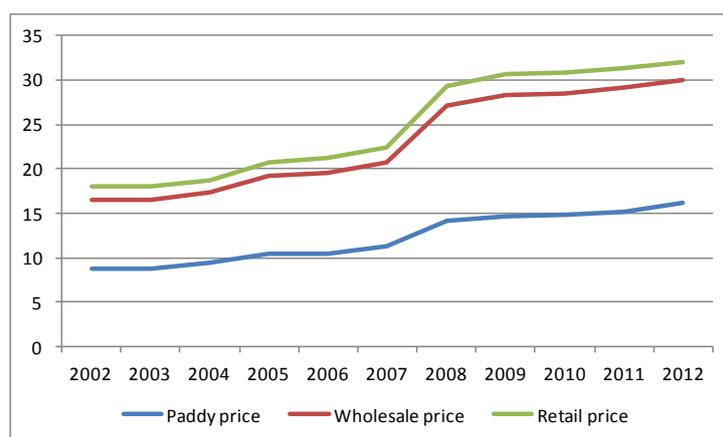


Figure 2 is a simplification of a much more complicated state of affairs in the marketing chain. There may be multiple layers especially between farmers and millers, working as consolidators, commission agents, independent traders, etc. Millers may also procure directly from farmers or sell to retailers; likewise wholesalers can be simultaneously importers and/or retailers.

Note that the price spread in the marketing chain is narrower at the retail level, compared to the wholesale level. The trend in price at the paddy, wholesale, and retail levels are shown in Figure 3.

Figure 3: Paddy wholesale, and retail prices, national averages



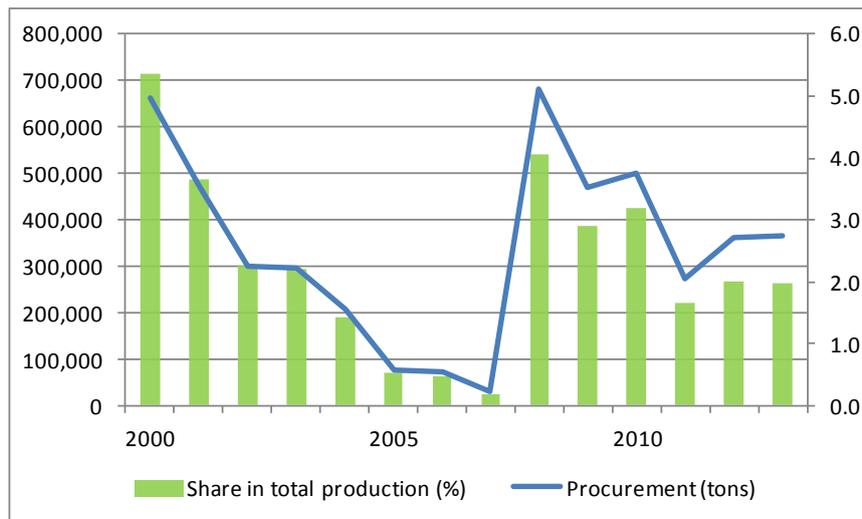
Source: BAS CountryStat.

The price spread (as a share of retail price) ranges from 6 to 8 per cent at the wholesale-to-retail level; the price spread at the paddy-to-wholesale level is much wider, ranging from 40 to 44 per cent. This is likely a reflection of higher costs along that segment of the chain, as it covers processing (e.g. processing cost and quantity adjustment for milled rice recovery) as well as assembly cost from paddy farmers to millers.

Competition Concerns in the Rice Sector

The NFA participates in the rice market as a trader, but not to an extent that its procurement activity significantly affects paddy rice prices. For rice, the NFA does paddy procurement, storage and distribution. Based on NFA's historical data on volume of paddy procurement, the trend shows varying degrees of paddy procurement throughout the last decade (Figure 4). Although it annually sets a target, there appears to be no consistent threshold level for paddy procurement. For instance, in 2005 up to 2007, procurement levels were below 100,000 ton. Then, in 2008, it shot up to 683,402 tons, which was the highest record since 1980.

Figure 4: NFA procurement, 2000 - 2013



Source of basic data: NFA (procurement) and FAOSTAT and BAS (production)

NFA support prices for paddy rice have been rising over time since 1990 (Table 2). In the 1990s the support price was fixed at 6 pesos/kg, raised in the late 1990s to 10 pesos/kg, again fixed until 2006.

Table 2: NFA palay basic support price and wholesale and retail price of rice to consumers, 1990-2014, in pesos/kg

Year	NFA Support Price	NFA Selling Price of Rice			
		Wholesale price, well-milled rice	Wholesale price, regular milled rice	Retail price, well-milled rice	Retail price, regular milled rice
1990	6.00	6.50	6.50	7.00	7.00
1991	6.00	8.00	7.00	8.65	8.40
1992	6.00	8.50	7.75	9.15	8.40
1993	6.00	9.50	-	10.25	-
1994	6.00	9.50	-	10.25	-
1995	6.00	9.50	-	10.25	-
1996	8.00	14.00	13.00	15.00	14.00
1997	8.00	14.00	13.00	15.00	14.00
1998	8.00	14.00	13.00	15.00	14.00
1999	9.00	14.00	13.00	15.00	14.00
2000	10.00	14.00	13.00	15.00	14.00
2001	10.00	16.00	15.00	18.00	16.00
2002	10.00	16.00	15.00	18.00	16.00
2003	10.00	16.00	15.00	18.00	16.00
2004	10.00	16.00	15.00	18.00	16.00
2005	10.00	17.00	15.00	18.50	16.00
2006	10.00	17.00	15.00	18.00	16.00

Year	NFA Support Price	NFA Selling Price of Rice			
		Wholesale price, well-milled rice	Wholesale price, regular milled rice	Retail price, well-milled rice	Retail price, regular milled rice
2007	11.00	17.00	15.00	18.00	16.00
2008	17.00	28.00	23.50	30.00	25.00
2009	17.00	28.00	23.50	30.00	25.00
2010	17.00	26.00	23.00	28.00	25.00
2011	17.00	26.00	25.00	28.00	27.00
2012	17.00	26.00	25.00	28.00	27.00
2013	17.00	30.00	25.00	32.00	27.00
2014	17.00	30.00	25.00	32.00	27.00

(-) No Regular Milled rice in CY 1993, 1994, and 1995

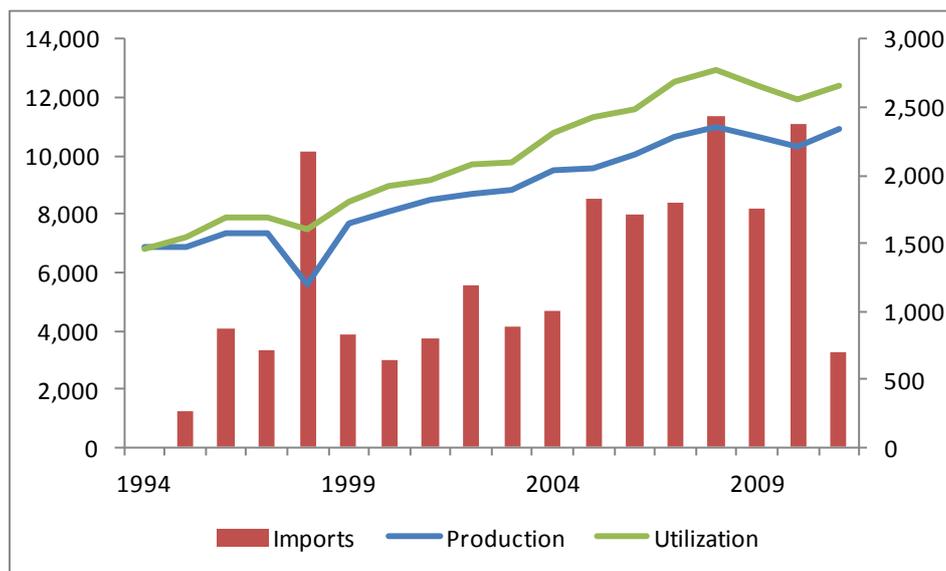
Source: NFA

The sharpest adjustment came in 2008 when the support price was raised to P17 /kg, where it has been held since. SEPO (2010) states that NFA's support price is determined from the analysis of the Rice Inter-Agency Committee (IAC), which then recommends to the Secretary of Agriculture the procurement price. Likewise the NFA Management makes a recommendation to the NFA Council. Upon recommendation of the Agriculture Secretary and NFA Council, the President makes a final decision on procurement price. In 2008 the President ordered the NFA to increase its procurement price to P17 /kg amid the crisis in the world price of rice.

The procurement price of NFA together with its financial health determines its ability to compete with private traders for palay stocks. In the 1990s, the support price was approximately at parity with farm gate prices (P5.90 /kg in 1991 – 1995, and P8.30 /kg in 1996 – 2000). This condition would hold until the mid – 2000s (average of P9.46 /kg in 2001 – 2005); however in 2005 the farm gate price hit P10.76 /kg. During this period the NFA was also experiencing financial difficulties as it was perennially in cash deficit, which was partially addressed by increases in national government subsidies starting from 2005 (Cororaton, 2011). In 2008 the high support price allowed NFA to increase its procurement again, up to a maximum of 4 per cent of domestic output; in 2013 – 2014 farm gate prices have been striking the P20 /kg level and above, again eroding competitiveness of NFA procurement.

Even as domestic production is growing, the increase in consumption has outpaced the growth in supply, leading to a growth in imports. In 1994, domestic production of milled rice was 6.8 million tons, with nearly identical quantity of domestic utilisation (figure 5).

Figure 5: Milled rice output, utilisation, and imports, 1994 - 2011



Source: BAS CountryStat.

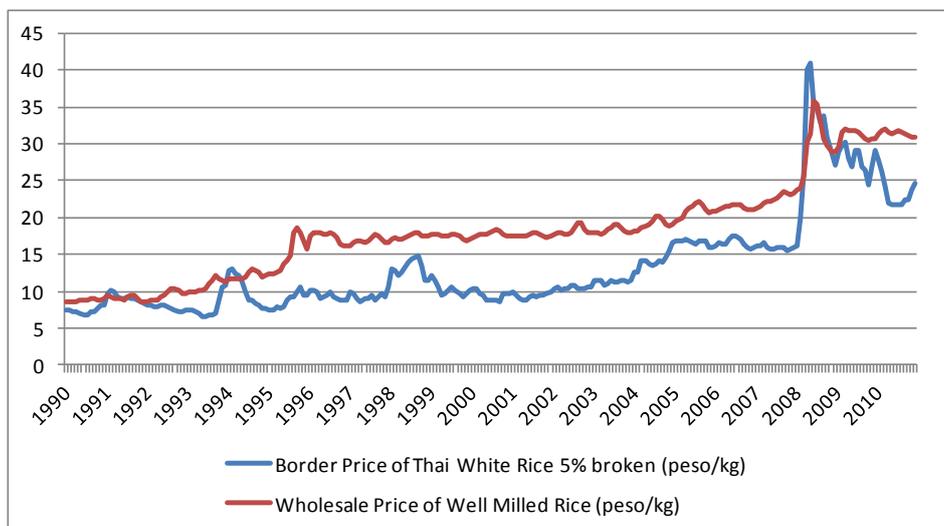
By 2010 domestic production reached 10.9 million tons, while domestic utilisation reached 12.4 million tons. In the long run the gap between production and utilisation (supply and demand) must be bridged by imports, which have increased from an average of 0.4 million tons (1994 – 1996) to 1.6 million tons (2009 – 2011). This highlights the increasing importance of foreign supply in meeting domestic demand since the 1990s.

The domestic price on average has been higher than the world price. Despite growing importance of imports, the domestic price of rice has been consistently above the border price. In figure 6 the domestic price of rice is proxied by the national average wholesale price of well-milled rice; the border price is proxied by the landed price of Thai white rice 5 per cent broken, converted to peso using the market exchange rate.

The average nominal protection rate (the difference between the border price and comparable domestic price as a share in the border price) is 45 per cent. The world rice price crisis of 2008 narrowed the gap between domestic and border prices; however since then the difference has reappeared.

As discussed earlier, difference in marketing cost accounts for part of the difference. However, this is only a minor part; in 2002, between Thailand and the Philippines, the difference in mark-up from paddy to wholesale (in paddy equivalent) is six percent, and mill gate to wholesale is 17 per cent. (Dawe *et al*, 2008). However the difference in paddy price is about 66 per cent. Price of paddy rice is much higher in the Philippines due to higher production cost (Cabling and Dawe, 2007). Again, restrictions in imports allow domestic production to expand, causing an increase in domestic price to incentive farmers to bear the increasing marginal production cost.

Figure 6: Monthly border and wholesale prices of rice, 1990 - 2011



Source: BAS CountryStat.

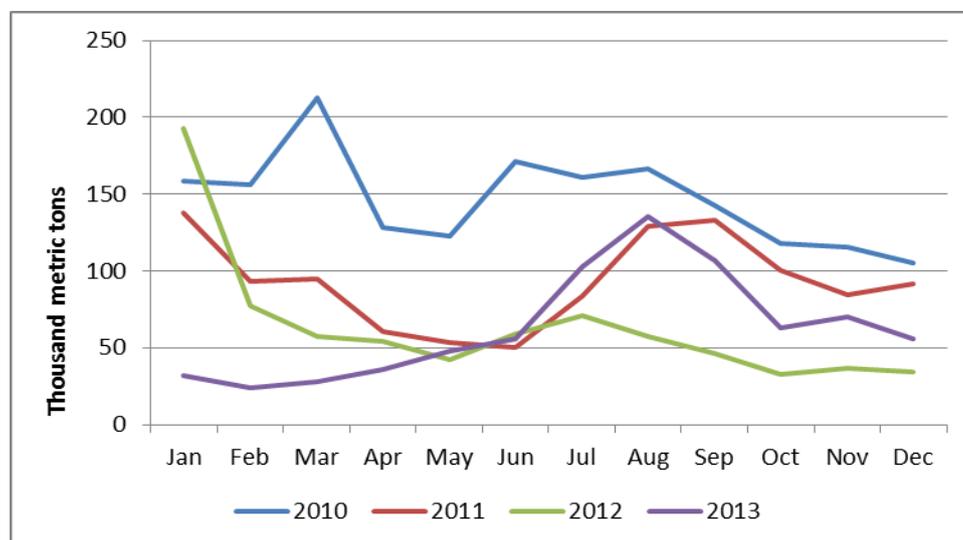
NFA manages to stabilise retail prices, but keeps domestic prices high by means of an import monopoly. The NFA maintains a buffer stock of about 15 days' worth of national consumption at any one time, with a required inventory of 30 days on July 1 of every year. Rice milling is outsourced; the NFA does sell milled rice under its distribution program. NFA rice currently sells at P26 – 28 /kg through accredited retailers; compare this with prevailing retail prices of about P32 – 36 per kg. In 2010 to 2013, NFA rice distribution averaged 1.1 million tons of milled rice per year (figure 7). During the first half of 2013, the volume of rice distribution was the lowest among the years being compared in figure 6, but it increased toward the latter part of the year.

Umali and Duff (1992) had shown that government intervention in the 1970s had kept consumer prices low, putting the pressure on farm gate prices; however due to insufficient resources and an unrealistically low floor price, government was unable to defend paddy prices. Market integration improved after 1983, after government reduced its role in the market. More recently Yao *et al* (2007), using regression analysis, show that the NFA exerts only a mild influence on farm gate and retail prices at the national level, and exerts significant influence in only a few regions. Intal *et al* (2012), using a different regression model, on the other hand show that NFA distribution is able to contribute to price stability at the retail level. However, they confirm that NFA procurement was unable to stabilise farm gate prices. The reason is that NFA procurement accounts for only a small percentage of paddy production; but is a much bigger share of distribution.

However while NFA has managed to stabilise (to some extent) consumer prices, its charter grants it an import monopoly. This starkly anti-competitive policy is responsible for keeping domestic prices above the world price. The monopoly is administered according to an annual import quota. The import quota is decided by the NFA Council, the governing body of the

Authority, which is chaired by the Secretary of Agriculture. The quota is decided upon recommendation of an Inter-Agency Committee on Rice and Corn, which evaluates the supply and demand situation to determine the country's import requirement.

Figure 7: NFA total rice distribution, by month, Philippines (2010-2013)



Source: NFA

In the 2000s the implicit protection rate averaged 45 per cent (Briones and Parel, 2011). Partial equilibrium analysis by Roumasset (2000; cited in Cororaton (2005), estimates the excess burden of NFA operations (including its import monopoly) at P49bn. Cororaton and Cockburn (2006) extend this analysis using general equilibrium analysis and find that a shift from the import monopoly to free trade has a net effect of reducing poverty, through a reduction in consumer price, despite the accompanying reduction in producer price.

Controversy over NFA operations has led to frequent leadership changes. In 2013, the NFA administrator was replaced and the NFA transferred from Department of Agriculture to the Office of the President. As there has been no change in NFA functions and policies, the current administration clearly perceives the problem as mainly procedural or operational (i.e. failure to store and release stocks, failure to distribute rice, failure to apply audit and other controls on the use of funds, failures in procurement, etc.) rather than policy-related.

Potential Impact of Competition Reforms in the Domestic Rice Market

To assess the relevance of competition reform in the staple food sector, the study adopted the rapid appraisal method based on interviews of key informants. Informants were selected from each of the nodes of the Metro Manila value chain, beginning at retail market in Manila, tracing it back to the biggest rice-producing province in the country, Central Luzon, 3 hours north of Manila by car. Interviews were conducted for consumers and retailers (in Metro Manila), a wholesaler and rice mill in Greater Manila (Metro Manila and periphery), the National Food Authority, as well as rice miller, wholesaler, palay trader, and farmers in Central Luzon.

As discussed earlier, the review of literature indicates the key competition distortion in the staple foods sector is the statutory import monopoly of NFA. The study developed a model for economic surplus analysis, called the Total Welfare Impact Simulator for Trade (TWIST). The model is derived from the Welfare Impact Simulator for Evaluating Research (WISER), described in Briones and Galang (2012). It follows the same framework in Roumasset (2000) and runs in General Algebraic Modeling System (GAMS). Equations and GAMS code are shown in the annexure.

Two scenarios are examined: first is free trade; the second is an increase in the import quota. Free trade is the limiting case of competition reform in international trade; this is implemented in TWIST by setting the wholesale price equal to the border price. Meanwhile the import quota scenario maintains the current policy but implements it more flexibly, i.e. avoiding the more onerous protectionism incurred by self-sufficiency targeting.

The limitation of the economic surplus model is that analysis is restricted to a single market layer; the supply chain is kept in the background (i.e. as a set of fixed marketing margins). However, without performing the numerical computation, we may surmise the following directions of change: reducing the level of protection would lead to reduction in domestic price at all layers (farm gate, wholesale, retail); reduced domestic production and related inputs (hiring of labour, purchase of fertiliser, deployment of farm equipment, etc.); and increased domestic consumption.

Quantitative impact assessment of prospective competition reform is performed in section 9. This section deals with the results of the rapid appraisal in the staple foods sector to characterise the rice supply chain so as to assess the relevance and implications of competition reform in the staple foods sector. A profile of the respondents interviewed for the rapid appraisal is shown in the table 3 below.

Table 3: Profile of key informants

Number	Sector	Place of Operation
2	Farmer/ Cooperative	Pangasinan
1	Cooperative Miller/Wholesaler	Nueva Ecija
2	Trader/Wholesaler/ Retailer	Pangasinan
2	Miller/Wholesaler	Pangasinan
2	Miller/Wholesaler	Nueva Ecija
3	Miller/Wholesaler	Bulacan
2	Wholesaler	Metro Manila
2	Retailer	Metro Manila
2	Consumer	Metro Manila
5	NFA	Metro Manila, Bulacan, Nueva Ecija, Pangasinan

Most of the rice sold in Metro Manila comes from paddy produced in Pangasinan, Nueva Ecija, Isabela, Cagayan, Tarlac, Pampanga and Bulacan (regions 1, 2 and 3). Region 4 typically supplies the south; i.e. Davao, General Santos, Cebu and Leyte, because access to shipping facilities makes doing so more lucrative compared to competing in Metro Manila. Region 5 is typically rice-deficit and also gets rice from Region 4. There have been reported cases of rice coming from Cebu into Metro Manila but industry analysts think that this is possibly rice smuggled from outside the country.

Farmers typically sell dry paddy on pavements under the sun to (a) paddy traders who set up buying stations in the farming communities, (b) millers who buy through independent agents that operate in the area, and (c) cooperatives which trade for their members. Some cooperatives and mills also have mechanical dryers but these are viewed as mainly for emergency use during the storm season because solar drying is definitely more efficient.

Farmers may also sell to NFA (though as shown earlier, NFA accounts for only a small share of paddy output). A farmer or a farmer cooperative can sell to the NFA upon acquiring a passbook to log transactions. The passbook can be obtained by filing the necessary paperwork, i.e. for individual farmers, a certificate of land title, and certificate of farmer status issued by the Department of Agriculture. Farmers with passbooks simply bring their paddy to the nearest NFA buying station. The NFA then inspects, weighs, and values the stock, and makes payment. However some studies have shown that the average farmer is discouraged from selling to NFA owing to the paperwork (i.e. securing the passbook), stringent requirements for moisture content and quality, and even promptness in making cash payment (SEPO, 2010).

Traders who do not have mills also sell the paddy to millers or pay to have these milled and then sell the rice to wholesalers or retailers. Traders interviewed in Pangasinan have the paddy milled in nearby mills and sell the rice directly to consumers and to other retailers in surrounding municipalities although one brings some paddy to a miller/wholesaler in Bulacan. Traders generally put up buying stations and have stores to transact business but no significant warehouses.

Millers have warehouses where paddy and rice can be stored. Paddy stocks store longer and are thus intended for future sales while milling is done in anticipation of rice being sold in a few days. The big mills/warehouses, with capacity to store paddy longer, are reported to be in Nueva Ecija and Isabela while Pangasinan and other Luzon provinces generally have small to medium sized mills/warehouses. Millers interviewed in Pangasinan and Nueva Ecija buy directly from farmers, picking up the produce after volume and price agreements are made through their own or independent agents and profess going out of their province, notably to Tarlac and Isabela, in search of paddy. They also buy from paddy traders who deliver to their mills and likewise mill for traders. They eventually sell the rice to wholesalers in Pampanga, Metro Manila, Cavite, Laguna and Rizal with one miller in Nueva Ecija shipping to Cebu and Cagayan de Oro.

In 2012, the NFA price exceeded the trader's price (P17 /kg for NFA, compared to P14.35 to P16.22 /kg for traders). By 2013 traders had matched or exceeded the fixed NFA price (paying P16.93 to P17.79 /kg). In 2014, the fixed NFA price was consistently below the private trader's price, which was hitting P20 /kg by March-April).

Bulacan hosts small millers/wholesalers, many in Intercity, an industrial estate where about 125 small rice mills do brisk 24-hour business buying and milling paddy and essentially acting as rice staging area for wholesalers and retailers in Manila. This privately-developed property in Bocaue is strategically located and, due to the number of adjacent independent mills/warehouses competing for the business, is known to offer very competitive prices to paddy traders and rice buyers as well as traders in need of milling services. Those who go to Intercity are described as “guerilla type” traders – they are not as established and they do not deal in big volumes. An NFA official estimates that some 70 to 80 per cent of rice going through Intercity get distributed in Metro Manila and Southern Tagalog. The rest may go to Visayas. Another private property near in Bulacan, the Golden City, is currently being developed for the same purpose and now hosts around 15 small mills/warehouses.

Wholesalers, mostly supplying retailers in the wet markets, normally maintain stocks good only for 2-3 days in Metro Manila warehouses. The stock is refilled regularly from own or contact mills/warehouses outside Manila which usually stock paddy enough for three months. Retailers in Manila get stocks from wholesalers, mostly once or twice a week. Some pool together requirements and buy the pooled requirements from Intercity. Retailers are present, often more than one, in all the markets in Manila as well as in community commercial areas.

Degree of Competition

The interviews revealed very strong competition among the current players in practically all levels of the supply chain, at least among the places visited. At the farm level, interviewees report that farmers have a choice of buyers located within their communities due to the presence of a number of buying stations and agents competing for the product. Thus, farmers easily get the highest price for paddy, especially now that supply is tight. Some farmers still get production and/or harvesting loans from traders but these traders are forced to give them the highest price come harvest time rather than lose out to another buyer and risk not being able to collect the loan. One trader says, “What is giving up a few centavos per kilo paddy compared to losing the loan amount due to non-payment?”

Competition in the paddy production centers increases further as agents, who get 10 centavos per kilo of paddy sold with their referral, prefer to be independent. These agents normally ask around for the highest offer from trader and mill contacts not present in the community but ready to pick up the produce once a transaction is agreed on. They strive to get the highest price for the producers because their business sustainability relies on their reputation of ability to get the best deals. Farmer members of trading cooperatives add to the competition as they also actively solicit business for their organisation in consideration of patronage rebates.

Mills that buy paddy and sell rice earn through volume traded because competition keeps margins low at about P30 – P50 per 50 kilo sack of rice traded. They need to price at prevailing market levels when they buy and sell because a difference of 5 centavos per kilo paddy or P10 per sack of rice will send customers to the next buyer/mill/seller.

Millers also learn to be very flexible to maximise the use of their facilities and recoup investments, operating expenses and interest on loans. To get supplies, they buy both from traders delivering to their mill and directly from producers through their own buying stations and independent agents in the farming communities. While they generally buy the paddy they store and mill, they also offer milling services at P60 per sack for those who do not want to sell their paddy and prefer to trade rice. Some mills also have mechanical dryers which paddy suppliers can use for a fee but, if the sun permits, they also use their yards as no-cost drying pavements just to hold on to customers who face difficulty in drying paddy. As noted above, mechanical dryers are not a good investment, requiring fuel and, for the flatbed drier, manual shifting, while any pavement under the sun dries paddy faster at no cost.

A farmer interviewed narrates how he delivered his wet paddy to the mill to dry during some rainy season but the mechanical dryer had a queue. While waiting, the sun shone so he asked the miller if he could just spread out his paddy in the miller's yard to which the miller agreed as long as the farmer did his own shifting. He did and sold his dried paddy to the mill before those in the dryer queue did. One miller says that he lowers his rice selling price to accommodate regular wholesale customers who haggle because he figures that he already earned in drying and milling, and even when he did not, he earns goodwill.

In Intercity, where warehouses are smaller, the rate of stock turn-over is the key to earnings. They are very conscious of prevailing prices because very small differences in price offerings matter where more than 100 mills exist side by side. Buyers and sellers normally go through agents who stand at the Intercity's two gates. These agents are independent of the mills and generally point the buyer or seller to the mill currently offering the highest prices or having the stocks or space.

An Intercity miller interviewed competes for buyers by ensuring that he has some minimum amount of stocks for each of the varieties or qualities of rice. He notes that retailers have boxes of different rice qualities and prices offered to consumers. Since most of those who go to Intercity are the small and less established traders, they are likely to need the various varieties when they buy. To better categorise and improve the quality of his stocks, he invested in additional equipment like colour sorter and polisher.

To compete in niche markets that prefer premium quality rice, like restaurants, corporate and other institutional accounts, millers/wholesalers invest in mechanical weighing and packaging equipment. They brand their products and produce smaller packs of 5, 10 and 25 kilos for retail in supermarkets. One miller infuses his rice with plant-based fragrances like vanilla and pandan to enhance aroma. At the input end, they maintain a "suki" relationship with trusted sources in areas known to produce good quality paddy and buy at higher prices to

encourage farmers to invest in good production inputs. They buy everything the “suki” sells even if the crop quality does not meet the quality standard in order to maintain goodwill. On the other hand, institutional buyers do not offer term contracts; instead they issue purchase orders, some over a duration of three months, with prices following prevailing trends.

Rice wholesalers who cater to retailers in Manila also rely on volume for profits and maintain low margins of P20 - 30 per sack to compete. They offer payment terms of 15 to 30 days to maintain regular clients.

The retailers compete by offering variety and convenience. Many make available different types of rice in terms of quality and price so that there is something suitable for every shopping budget. Also, rice is only one among a variety of products these retailers sell. In fact, rice retailers are usually market variety stores or neighbourhood convenience stores, including supermarkets. Market and neighbourhood stores show rice offerings in boxes representing different prices and qualities from where rice is weighed and packed according to the customer’s order while supermarkets sell different brands and varieties of rice in 5, 10 and 25 kilo clear packs. Retailers generally price according to the price they buy the rice plus a margin of about P100 per sack. They can give discounts of up to P20 to those who buy 25 or 50 kilo sacks.

Majority of those interviewed say that they follow prevailing prices. Many paddy buyers i.e. traders and millers source price information from rice buyers, especially big established wholesalers around Metro Manila as well as in fast markets like Intercity. Then they work backwards, imputing their costs to arrive at their maximum paddy buying prices. They work out actual buying prices considering competition and supply conditions in their area.

Table 4 provides a breakdown of cost and margins in the rice marketing chain. Paddy during the time of the appraisal cost P18-20 /kg or P900 – 1,000 per sack. According to official data, farmers earned a net margin of P106 per sack in 2012. Milling costs are P60 /kg and milling recovery (rice produced from paddy) ranges from 60 to 65 per cent. Using 60 per cent recovery the cost of rice ex-mill is about P1,716 /sack. Transport costs of P70.00 /sack bring the rice cost ex-Manila at P1,786 /sack. A miller explains that the cost difference between low quality vs medium quality and medium quality vs high quality rice is P200 /sack. This means that low quality rice will cost around P1,586 /sack, medium quality will be around P1,786 /sack, while high quality rice will be around P1,986/sack in Manila excluding all the margins.

Table 4: Estimated costs and prices of rice, Metro Manila, in pesos per sack

Ex-Manila cost (medium quality)								
	Cost	% of total						
Palay price	1,000.00	92.7						
Milling cost	60.00	3.4						
Cost ex-mill	1,716.25							
Transport cost	70.00	3.9						
Total	1,786.25	100.0						
Cost in Manila								
	Low		Medium		High		Small packs	
Price (pesos/sack)	Cost	% of total	Cost	% of total	Cost	% of total	Cost	% of total
Ex-Manila cost	1,586.25	89.8	1,786.25	90.8	1,986.25	91.7	2,186.25	88.6
Repacking							100.00	4.1
Margins								
Trader's	20.00	1.1	20.00	1.0	20.00	0.9	20.00	0.8
Miller's	40.00	2.3	40.00	2.0	40.00	1.8	40.00	1.6
Wholesaler's	20.00	1.1	20.00	1.0	20.00	0.9	20.00	0.8
Retailer's	100.00	5.7	100.00	5.1	100.00	4.6	100.00	4.1
Total cost	1,766.25	100.0	1,966.25	100.0	2,166.25	100.0	2,466.25	100.0
Retail price (pesos/kg)	35.33		39.33		43.33		49.33	

Note: The milling recovery is 60.38 per cent; one sack = 50 kg.

Source: Authors' data (derived from the Rapid Appraisal Surveys conducted under the project)

An interviewed Metro Manila retailer says that their average margin is P100 /sack while the interviews with traders, millers and wholesalers suggest that their margins per sack, including storage costs, are about P20 for the trader, P40 for the miller and P20 for the wholesaler, or P80 cumulative up to the wholesaler and P100 for the retailer. Note that these are all dwarfed by the gross margin at the farm level, which reaches P584 per sack based on Philippines Statistics Authority – Bureau of Agricultural Statistics (PSA – BAS) cost and returns data.

Adding these to the costs, the computation places the price of rice in Metro Manila at about P35 /kg for low quality, P39 /kg for medium quality and P43 /kg for high quality, which are very near to what we are seeing now in the markets. Rice packed in smaller volumes is higher by P2 /kg (P100 per 50 kilos) when it leaves the mill and with wholesaler and retailer margins bigger, prices in the supermarkets are, not surprisingly, much higher.

Barriers to Entry

The interviewees say that entering the market would be easy if you have the capital and the supply source or the potential market. But the financial requirements are quite substantial. A 10,000 sack warehouse will easily require a minimum of P15mn for working capital for rice

alone at P1,500 per sack. Also, like any business, there is a learning curve and the first few years can prove very risky for a new entrant. In fact, many of the interviewees, despite their long years of operation, admit to still feeling vulnerable to the following risks: (a) bad weather severely limiting supplies that further intensify competition especially from the big players; (b) unplanned or hastily-decided imports and uncontrolled smuggling that make huge volumes of low-cost rice available after they bought stocks or sold on credit at higher prices; and (c) swindlers who get your trust through regular good orders but disappear once you give them credit. For the last reason, more than a few millers/wholesalers interviewed expressed reluctance to enter the Metro Manila market where the norm is for wholesalers to give 15 or 30-day term credit to retailers and where stories of swindling of those who tried to enter the market in the past abound.

While the NFA licenses all types of grains businesses from paddy trading, warehousing, and milling to wholesaling and retailing and registers rice facilities and equipment, further requiring that licenses and registrations be renewed annually, none of the interviewees had any issue with the same. For them, the requirements and procedures are clear and easy to comply with. The documentary requirements are the standard proofs of legitimacy of business, location and facilities layout plans, proofs of compliance with applicable zoning and environmental regulations and proof of insurance and guarantee of stocks. Provided the requirements are complete, the application can be processed and a temporary license can be issued in 30 minutes.

According to table 5, in 2013, there were a total of 95,000 licensed players in the rice market, majority of whom are in retail (54,000); next are warehouse operators (1,200). There are over 8,000 rice mills operating all over the country. Even specialised wholesalers number over 3,300. A large number of players (close to 10,000) are wholesalers who also operate a retail outlet. The number of retailers rose from 1990 to 2000; there may have been consolidation at the retail level since then. Likewise the number of rice mills has been on the decline since 1990. On the contrary, the number of licensed warehouse operators has been increasing from 1990 to 2010, before declining somewhat until 2013.

After licensing, there is little monitoring of registered businesses outside of processes involved in the estimation of commercial stocks which NFA does monthly by province or sub-province; i.e. provincial offices estimate total commercial stocks based on data on stocks from a sample of millers/warehouses, normally 100 per cent enumeration for big and a small sample for small players.

Table 5: Total number of applicants per line of activity: Philippines (1990-2013)

Line of Activity	1990	1995	2000	2005	2010	2013
TOTAL	127,038	116,622	123,249	112,319	109,447	94,629
Retail	66,422	63,218	77,193	70,433	66,960	54,032
Wholesale	4,628	4,873	3,614	3,073	3,065	3,314
Retail-wholesale	16,785	14,367	11,457	10,370	10,852	9,936

Line of Activity	1990	1995	2000	2005	2010	2013
Mill	12,739	12,324	10,469	9,672	8,383	8,288
Warehouse	8,809	10,679	11,042	10,912	13,130	11,783
Threshing	1,735	1,706	1,116	638	419	370
Shelling	614	553	330	199	125	125
Drying	104	213	473	496	496	645
Manufacture	1,265	488	357	234	209	221
Importing	188	60	165	153	160	95
Exporting	5	6	11	11	8	9
Indenting	29	18	27	15	12	7
Packaging	9	16	35	49	43	35
Transporting	6,103	5,460	5,293	4,815	4,693	4,842
Others	7,603	2,634	1,667	1,249	892	927

Source: NFA (GMOD-MRSD and ISD-IRD).

As for rice storage, as of December 2013, there are 450 NFA warehouses in the Philippines, which have a total capacity of 30.22 million metric tons of rice (**Error! Reference source not found.**). Only 6.33 million metric tons are stored in these warehouses, which is equivalent to only 20.93 per cent utilisation rate. The NFA data contrasts sharply with PSA-BAS data, which shows NFA stocks down to just 300,000 tons.

With respect to additional investments, many of the respondents are not keen about investing more to expand facilities. Some want to upgrade to make their operations more efficient but the aforementioned risks discourage them. They figure that rice areas are not getting bigger, the population is growing, and the incidence of adverse weather will be increasing so paddy supplies will always be tight. Also, the high paddy prices mean the traders and millers need more working capital to maintain the same level of operations so any additional investments go to the back burner. Moreover, they feel that the Bureau of Customs will never be able to control smuggling and smuggled rice, because it is tariff free and undocumented, is difficult to compete with. In fact, some in the industry would prefer that government allow imports as long as these are controlled, taxed, properly documented and transparent, because they can work around this.

Table 21: Summary of warehouse capacity (as of December 31, 2013)

Region	Total	Capacity			Utilisation (%)
		NFA-owned	Leased	Total	
Philippines	450	25,132,630	5,090,828	30,223,458	20.93
Ilocos Region	31	1,460,500	407,600	1,868,100	6.04
Cagayan valley	53	2,452,650	15,750	2,468,400	5.51
Central Luzon	63	4,166,200	630,500	4,796,700	15.63
Southern Tagalog	59	1,811,600	809,050	2,620,650	30.53

Region	Total	Capacity			Utilisation (%)
		NFA-owned	Leased	Total	
Bicol Region	41	872,076	931,298	1,803,374	25.23
Western Visayas	25	1,669,850	291,918	1,961,768	11.35
Central Visayas	15	968,500	235,000	1,203,500	45.68
Eastern Visayas	23	979,500	200,000	1,179,500	28.66
Western Mindanao	19	1,355,000	0	1,355,000	13.61
Northern Mindanao	20	1,965,000	7,712	1,972,712	33.14
Southern Mindanao	24	1,360,550	289,000	1,649,550	32.01
Central Mindanao	29	2,278,470	0	2,278,470	6.40
NCR	23	2,664,734	893,000	3,557,734	30.81
ARMM	11	273,000	290,000	563,000	13.35
Carag	14	855,000	90,000	945,000	29.45

Source: NFA

Substitute Products

Consumers buy rice according to ability to pay, but if the budget permits, they prefer rice that is white, has few brokers, and is fragrant. This is why those interviewed say that they will not buy the cheaper NFA rice, which they believe is of poor quality. The retailers say that the most demanded varieties are those of the medium-price range. Among the discriminating, one of the most preferred varieties is the high-priced dinorado known for being aromatic and slightly sticky.

Interviewed consumers claim that they will continue to consume the same amount of rice even though rice prices increase because available substitutes like bread and pasta are still more costly. They eat bread or pasta for convenience and variety of fare. They will cope with rice price increases by choosing what they feel is the best rice variety they can afford instead of the variety they really prefer. It is however accepted that instant noodles substitute for rice among the poor because of affordability and because of convenience for other income classes.

Interviewed consumers also say that they change rice varieties or the stores they buy from when they sense that the rice they get is not as they expected. Because stores present rice in boxes, one really does not know what one gets even if the retailers place the variety common names beside the prices to identify the contents of the boxes. It is widely known that not a few retailers or wholesalers - each one pointing to the other - mix poor quality stocks with higher quality rice just to move the former or to moderate prices for the latter. Thus a consumer may buy dinorado rice but actually get only 75 per cent dinorado rice. The assurance of quality is another reason why branded packed rice in supermarkets is priced much higher. In this regard, product labeling regulations on rice need to be better enforced while consumer awareness of rice quality standards need to be enhanced.

Anti-competitive Behaviour

Given the number of layers in the chain and the apparent number and variety of players in each level, it is difficult to imagine how one or a group of market players would be able to influence market directions to their advantage. In fact the cost estimates and prices show no substantial margins as these are apparently limited to 2 per cent or less of raw materials up to the wholesale level and 5 per cent at the Metro Manila retailer level. Interviewees consistently say that the competition is really stiff, especially with tight paddy supplies, a situation especially pronounced at the time of the interviews which were done following the end of the rice lean season (July to September) and around the occurrence in October of a typhoon that destroyed crops ready to be harvested in Nueva Ecija, the biggest rice producer in the country.

However, some respondents do not discount that a group may be able to control certain markets in certain situations. That the Philippines is an archipelago, there is lack of sufficient infrastructure and rice production is seasonal make possible circumstances in which certain groups are able to control the market. However given the empirical work cited earlier by Rufino, Reeder, and others, such control must be episodic and transitory, as rice markets are integrated across space. There may be differences across horizontal segments owing to transport costs (which can be significant due to the poor state of infrastructure in the countryside); however, accounting for these costs, arbitrage opportunities due to price differences are generally competed away.

In Metro Manila, it is opined that a group that can control 20 - 30 per cent of commercial supply, possible in September, may be able to influence price movements. The NFA accounts for 15 -25 per cent of the retail market during the lean season but the reputation of the quality of its rice makes it a less preferred product among many buyers, thus limiting its impact on the commercial sector. However, industry players are quick to point out that some price increase in September should be expected because palay stocks shrink by 1 - 2 per cent per month of storage and there are other storage costs incurred. Besides, storing and price speculation are legitimate business practices. The only issue is how many have the wherewithal to do so. Also, there is considerable risk in speculation because government allows some importation during the lean months and it cannot seem to control smuggling.

One wholesaler interviewed notes that the current importation quota distribution rules, where the importer has to bring in a minimum of 2,000 tons and as much as 5,000 tons, favour big players thus facilitating cartel-like behaviour. Two thousand tons of rice cost about US\$700,000 or P30.8mn (at US\$350 /ton ex Hanoi and P44 per dollar) without freight and tariff. If the system will allow smaller players to import, say a 10 or 20 ton container load, the supplies cannot be concentrated in a few big players. In this regard, many of the interviewees believe that the country will never be able to attain self-sufficiency and thus support some controlled importation policy. One interviewee points out that controlled and

transparent legitimate importation may not disrupt their market operations the way uncontrolled smuggling does.

To summarise: the rapid appraisal confirms the findings of the literature survey showing a competitive market structure for domestic rice production and marketing. However bringing in foreign stocks of rice is highly uncompetitive, being a statutory monopoly of the NFA. As discussed earlier we propose to analyse introduction of competition in rice importation using TWIST, in the next section.

Computing Impact of International Market Competition Reform

Economic Surplus Approach

As discussed earlier, the review of literature indicates the key competition distortion in the staple foods sector is the statutory import monopoly of NFA. The study developed a model for economic surplus analysis, called the Total Welfare Impact Simulator for Trade (TWIST). The model is derived from the Welfare Impact Simulator for Evaluating Research (WISER), described in Briones and Galang (2012). It follows the same framework in Roumasset (2000) and runs in General Algebraic Modeling System (GAMS). Welfare is measured by calculating areas of triangles corresponding to producer surplus and consumer surplus, based on linear supply and demand functions. These functions in turn are calibrated using baseline data, working backwards from elasticities to function parameters. Equations and GAMS code are shown in the annexure.

Two scenarios are examined: first is free trade; the second is an increase in the import quota. Free trade is the limiting case of competition reform in international trade; this is implemented in TWIST by setting the wholesale price equal to the border price. Meanwhile the import quota scenario maintains the current policy but implements it more flexibly, i.e. avoiding the more onerous protectionism incurred by self-sufficiency targeting.

It should be noted that the limitation of the economic surplus model is that analysis is restricted to a single market layer; the supply chain is kept in the background (i.e. as a set of fixed marketing margins). However, without performing the numerical computation, we may surmise the following directions of change: reducing the level of protection would lead to reduction in domestic price at all layers (farm gate, wholesale, retail); reduced domestic production and related inputs (hiring of labour, purchase of fertiliser, deployment of farm equipment, etc.); and increased domestic consumption.

Economic surplus analysis of trade policy reform uses baseline data for 2013, as follows:

	Data	Remarks
Quantity	11,601	thousand tons
Retail price	33.70	pesos per kg
Wholesale price	31.56	pesos per kg

Exchange rate	42.45	pesos per dollar
Quota	404.702	thousand tons
Border price	415.95	Vietnam white rice 5 per cent broken in dollars per ton
Elasticity demand	-0.5046	
Elasticity supply	0.28	

The retail price is 8 per cent higher than in 2011, when the import quota was much less restricted, at 1 million tons.

The PSA-BAS is the main reference for the production quantity. Under the Supply and Utilisations Account (SUA), the Net Food Disposable (NFD) is used as the basis for the supply and demand quantity. BAS defines it as “the volume of food commodity available in its original (unprocessed) form for human consumption”. The same source is used for the retail-level and wholesale-level prices of rice (pesos per kilo). Other important variables in the model are import quota and world price. The Philippines has import commitments to the WTO, which is the Minimum Access Volume (MAV) of 350,000 metric tons annually. The import quota is solely decided upon by the NFA through the NFA Council, which is headed by the Secretary of Agriculture. In 2013, 404,702 metric tons of rice was imported, compared to about one million tons in 2012.

The World Bank’s Pink Data is used to get the average nominal world price of Vietnamese rice (5 per cent broken) in dollars, which is considered as the Free -on-board (FOB) price. This is then converted to its estimated cost-insurance-freight (CIF) equivalent by dividing it by the computed ratio of FOB to CIF (0.95). The prevailing exchange rate for 2013 is adopted to transform the price from dollars to pesos.

Another important assumption made under the baseline case is the elasticities of supply and demand. The demand elasticity and supply elasticity are lifted from the study of Lantican et al. (2011) and of Edillon (2004), respectively. The primary runs correspond to the last column for demand elasticity of -0.5. The first two columns shown runs for sensitivity analysis using elasticity values of -0.25 and -0.75.

Results

Baseline run. Results are shown in table 7. The main set of estimates are found in the first column (under elasticity = -0.50). The monetary equivalent of the benefits enjoyed by consumers in 2013 amounted to P387, 389.72mn. On the other hand, producers enjoyed only P49,469.72mn. Importers gained P5,626.54mn from the rice market. Overall, the total economic surplus amounted to P442,485.98mn.

Alternative scenario 1: free trade. If quantitative restrictions were eliminated and rice imports were allowed to freely come in the country, total rice imports would have reached 4.20 million ton. Such high level of imports would have brought down the retail price of rice to P19.80/kg and P17.66/kg at the wholesale level. Clearly, consumers would have benefited

from free trade given the low market price of rice. Consumer surplus would have increased by P178,075.65mn. However, this would have led to a P33,985.01mn reduction in producer surplus. In totality, the economy would have benefited by as much as P 138,464.10mn above the baseline.

Alternative scenario 2: Increase in import quota. If the import quota were increased from 404,702 ton to 1,000,000 ton, prices would have fallen. At the retail level, price of rice would have decreased from P33.70/kg to P31.52/kg. At the wholesale level, price would have dropped by P2.18/kg. In terms of welfare, consumer surplus would have increased by P25,706.18mn. Conversely, producer surplus would have decreased by P6,598.97 mn. The overall impact of such reduction in the import quota would have been a P25,203.32mn increase over the baseline.

Table 7: Results of TWIST

	Elasticity of demand		
	-0.50	-0.25	-0.75
Baseline			
Imports	404,702	404,702	404,702
Retail price (P/kg)	33.70	33.70	33.70
Welfare measures (P millions)			
Consumer surplus	387,390	781,907	260,636
Producer surplus	49,470	49,470	49,470
Importers revenue	5,627	5,627	5,627
Economic surplus	442,486	837,004	315,732
Changes from baseline			
Free trade			
Imports	3,796,035	2,577,522	4,970,516
Retail price (P/kg)	-13.90	-13.90	-13.90
Welfare measures (P millions)			
Consumer surplus	178,076	169,605	186,240
Producer surplus	-33,985	-33,985	-33,985
Importers revenue	-5,627	-5,627	-5,627
Economic surplus	138,464	129,994	146,628
Increased quota			
Imports	595,298	595,298	595,298
Retail price (P/kg)	-2.18	-3.21	-1.67
Welfare measures (P millions)			
Consumer surplus	25,706	37,694	19,675
Producer surplus	-6,599	-9,554	-5,082
Importers revenue	6,096	5,065	6,611
Economic surplus	25,203	33,205	21,204

Source: Authors' calculation.

Finally, the runs for sensitivity analysis in table 7 (under elasticity headings -0.25 and -0.75) indicate the same pattern of results. Compared to the primary run, lower elasticity of demand than in the primary run leads to a smaller gain for the economy under free trade, owing to a smaller gain from consumer surplus. Meanwhile the gains from increased quota are greater mostly due to a greater gain from consumer surplus. On the other hand, higher elasticity of demand leads to a greater gain to the economy under free trade compared to the primary run, due to a greater increase in consumer surplus. Meanwhile the gains from increased quota are smaller compared to the primary run.

Again, these gains arise because restrictive import policies permit domestic prices to rise above world prices. Based on standard theory, the high domestic price does indeed raise the producer surplus (compared to the surplus under free trade price). However note that this is not the same as "monopoly profit" as higher surplus co-exists with price-taking behaviour of producers and traders in the domestic market. The higher producer surplus arises simply from the higher price to all units of output, whereas the higher price is needed to pay for the marginal cost of the last unit of output produced. Obviously, with repeal or relaxation of these restrictions, producer surplus must fall, to the detriment of farmers, as clearly indicated in table 21. One way to ease the burden of adjustment is to apply a moderate level of tariff, thereby striking a compromise between the benefits to consumers and the losses to producers.

Key Findings

Consistent with previous studies done on the rice supply chain, the rapid appraisal finds that the paddy and rice supply chain is multi-layered with many competing players in each layer. At the farm level, farmers have a choice of buyers competing in their communities—traders have buying stations, independent agents match producers with millers with the best prices for a fee, and members of trading cooperatives actively solicit business for their organization in consideration of patronage rebates. To get supplies, mills use competitive pricing. Entry into the rice business is easy if capital, supply source, and potential market are available. NFA licensing and registration requirements are not an issue.

With the many layers in the rice supply chain and the apparent number and variety of players in each level, it is difficult to imagine how one group of market players could influence market directions to their advantage. NFA data shows the existence of an ample number of market players. Moreover, the cost estimates and prices show no substantial margins as these are apparently limited to 2 per cent or less of the cost of raw materials up to the wholesale level and 5 per cent at the Metro Manila retail level. Interviewees consistently say that the competition is really stiff, especially with tight paddy supplies, a situation that was pronounced at the time of the interviews.

In one aspect though competition is seriously curtailed, that is, entry into the import business. The NFA maintains a statutory monopoly; in conjunction with a self-sufficiency target, this has led to a declining import quota and an intensifying protection of domestic producers. Rice

importation policies need to be rational and effective in protecting not only the interests of producers but also consumers and other market participants. Huge differences in the costs of bringing in imports and moving domestic supplies to consumers makes smuggling lucrative. Moreover, according to the key informants, quantitative restrictions on imports as exemplified by NFA's regulations allow the concentration of legally imported supplies in the hands of a few.

Through the use of a simulation model called the TWIST, both the consumer and producer welfare were computed under varying degrees of import controls. Actual and counter-factual scenarios were developed for the 2013 rice market using TWIST. Analysis indicates that if quantitative restrictions were eliminated and rice imports were allowed to freely enter the country, total rice imports would have reached 4.20 million tons, a tenfold increase over actual imports. Such high level of imports would have brought down the retail price of rice to P19.80 /kg from P33.08 /kg, and the wholesale price down to P17.66 /kg from P30.04 /kg. Clearly, consumers would have benefited from free trade given the low market price of rice. Consumer surplus would have increased by P 178,075.65mn. However, this would have led to a P33,985.01mn reduction in producer surplus. In total, the economy would have benefited by as much as P138,464.10mn.

If instead the import quota were maintained at the previous year's level of 1,000,000 tons, prices would have fallen. At the retail level, price of rice would have decreased from P33.70 /kg to P31.52 /kg. At the wholesale level, price would have dropped by P2.18 /kg. Consumer surplus will increase by P25,706.18mn; however, producer surplus will decrease by P6,598.97mn. The overall impact would have been a P25,203.32mn increase in economic surplus.

4. Competition Reforms in Bus Transport Sector and Implication on Beneficiaries

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 most urban centers, buses become an indispensable alternative for the commuting public. The welfare impacts of competition and other regulatory reforms for public conveyance, particularly for the bus transport sector, must be viewed within the context of the carrying capacity of road infrastructure, economic and social activities in covered areas, optimal vehicular flows including the number of buses and other public utility vehicles (PUVs), and private vehicles. This section provides a diagnostic report on the regulatory and industry issues affecting the operation of buses in the country.

Reforms Undertaken in the Bus Transport Sector Over Time

Major reforms in bus transport regulation were carried out in the early 1990s. In the mid-70s, bus operation in Metro Manila was provided by four private consortia and the Metro Manila Transit Corporation, a public-owned bus operator. The government gradually allowed the formation of more consortia with a minimum of 100 buses each. By late 1970s, 14 companies were operating with at least 100 units each. Although liberalisation policies and principles have been attempted over the past three decades, the sector's policy backdrop remains dominantly conservative and regulated.

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

- Entry and Exit – the control of entry and exit out of the industry is liberalised to introduce or enhance the level of competition in fares and quality of service. Each route is required to have a minimum of 2 operators. An operator who develops a new route will be allowed a maximum of 2 years to operate solely, 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;
 - 5) the existing operators has ceased operation;
 - 6) 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 – government regulates bus fares for both air-conditioned and ordinary non airconditioned buses. Two factors are considered in fare determination: public acceptability and financial viability for operators. A fare schedule (minimum and per-km fare) is set by the LTFRB after a mandated public hearing. An experiment in the deregulation of fare-setting in the case of air-conditioned buses was effected in 1992, 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.

Table 8: Regulations concerning entry and exit in the bus transport industry

Entry category	Details/characteristics
Entry and Exit from Industry	“The control in entry into and exit out of the industry shall be liberalised to introduce and/or enhance the level of competition in terms of the rates charged and the quality of service rendered by land transportation operations as provided by the Public Service Act.”
Entry to a monopolised route	“There shall be a minimum of two (2) operators in any route. Routes presently serviced by only one operator shall be immediately opened up for at least (1) additional operator of the same/better mode/type of service.”
Entry to a development route	“Operators that shall develop a route where there are no existing authorised operators/services shall be authorised to provide the required services. Operators on said route shall be afforded protection of investment for a maximum of two (2) years, after which, the link/route shall be opened for entry to at least one (1) additional operator.”
Entry to an already established route served by franchise operator(s)	<p>“This shall be allowed in, but not limited to, any of the following cases:</p> <p>The new entrant may be able to provide a more efficient and cost-effective, competitive service than the existing/authorised operators.</p> <p>The new entrant shall introduce quality of service improvements and/or innovative/technologically-advanced services superior to those provided by existing/authorised operators.</p> <p>The route warrants additional capacity and/or it has been determined that existing authorised operators therein have not been sensitive to an increase in demand and/or offer to increase capacity only after another operator has offered to increase capacity</p> <p>New entrants will be admitted in routes where the action or practices of existing/authorised operators result in the lack of</p>

Entry category	Details/characteristics
	<p>effective competition.</p> <p>The existing authorised operator(s) has/have been defiantly violating the Public Service Law and/or terms and conditions of its/their Certificate(s) of Public Convenience and/or LTFRB Rules and Regulations.”</p>

Source: DOTC and UP NCTS [2012]; Department Order No. 92-587 (1992)

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 authorisation 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.

Labour 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.

Following these reforms, congestion became a serious problem, based on previous studies (JICA, 1997; 2009) and interviews with stakeholders. In an attempt to address congestion issues, government imposed a moratorium on 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 Rationalisation Programme’ of 2007. Nonetheless, the respective entry and prolonged stay of new operators and buses were made possible through sectoral accommodation and temporary suspension of the moratorium on issuance of new CPCs.

The market operates under a highly complicated regime where regulation and enforcement is shared by several agencies. Bus transportation in the Philippines 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).

Table 9 enumerates the different institutions mandated to perform specific functions within the country’s land transportation system. Figure 8 presents the institutional and policy timeline relevant to the Bus sector.

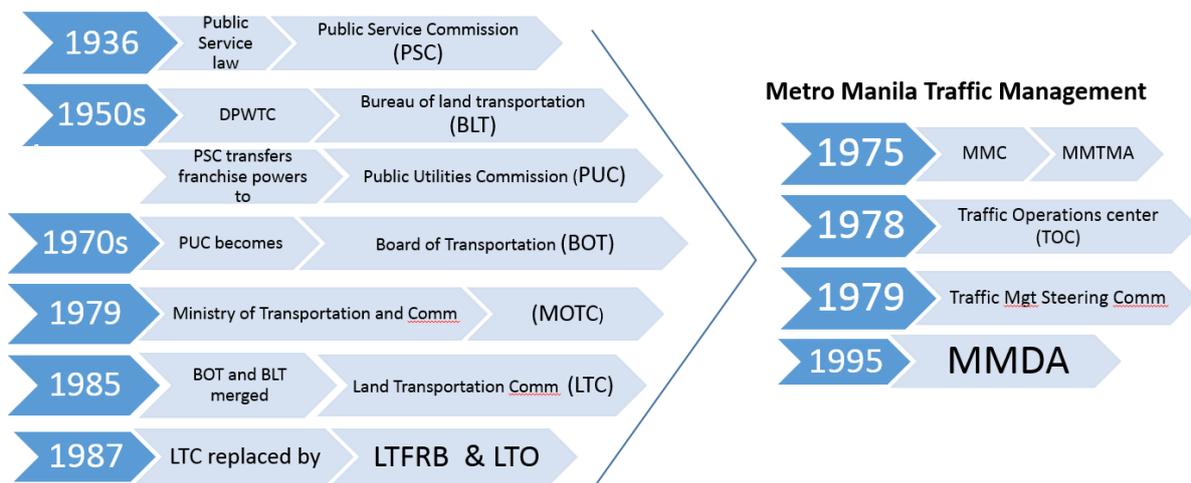
Table 9: Agencies/institutions involved in the land transport system and its functions

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-motorised 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 Labour and Employment	Republic Act 4121	Monitors the compliance of bus operators with Department Order No. 118-12, Series of 2012 (The Rules and Regulations Governing the

Agency	Laws/Regulations Creating the Agency	Mandate/Functions
(DOLE)		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]

Figure 8: Policy and institutional timeline in the bus sector



Market Structure and Competition in Bus Transport

The Philippines is a country of over 92 million people concentrated in highly dense urban agglomerations like Metro Manila. Given low motorisation (9 cars per 1,000 people) bus transport offers an affordable alternative mode of transportation. 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.

Public transportation in the Philippines is fraught with problems such as inadequate road infrastructure and congestion in the urban areas. The welfare impacts of competition reforms must thus be viewed within the context of other factors affecting the optimal number of buses

such as road networks, level of economic activity, and the availability and quantity of alternative modes of transportation.

Several modes of mass transportation operate in Metro Manila. Rail transport currently includes three lines: Light Rail Transit 1, Light Rail Transit 2 and EDSA-Mass Transit (MRT). Road-based mass transport consists of public utility buses (PUBs), public utility jeepneys (PUJs), Asian Utility Vehicles (AUVs or Filcabs/FX), and Tricycle (TC) or pedicabs. Buses routes are along the main thoroughfares such as Epifanio Delos Santos Avenue (EDSA), while jeepneys operate along secondary roads. While buses have designated stops, jeepneys stop at any point to pick up or drop off passengers.

AUVs (named after the type of vehicle used by the service) have fixed routes of no more than 15 kilometers and have lower capacity (7 to 11 persons) than buses and jeepneys. Tricycles and pedicabs are bicycles with sidecars that seat one to three people and ply short distances in residential areas and arterial roads. It is not unusual for a commuter to combine two or more types of transportation (e.g. tricycle, jeep and bus or Metro Rail) to travel from home to work. Franchise for operation of buses, jeepneys and AUVs are regulated by the LTFRB while those for tricycles and pedicabs are regulated by Local Government Units (LGUs).

In selecting the focus of the study, we considered the following: (1) demographic indicators such as population density and poverty incidence; (2) economic activity; and (3) observational accounts of experts and stakeholders in the sector.

For Metro Manila, route information from DOTC (2012) and demographic data are shown in table 10. Metro Manila is an agglomeration of 16 cities (Caloocan, Las Pinas, Makati, Malabon, Mandaluyong, Manila, Marikina, Muntinlupa, Navotas, Pasay, Pasig, Paranaque, Quezon City, San Juan, Taguig, Valenzuela) and one municipality (Pateros). Figure 9 shows key statistics relevant to the bus sector.

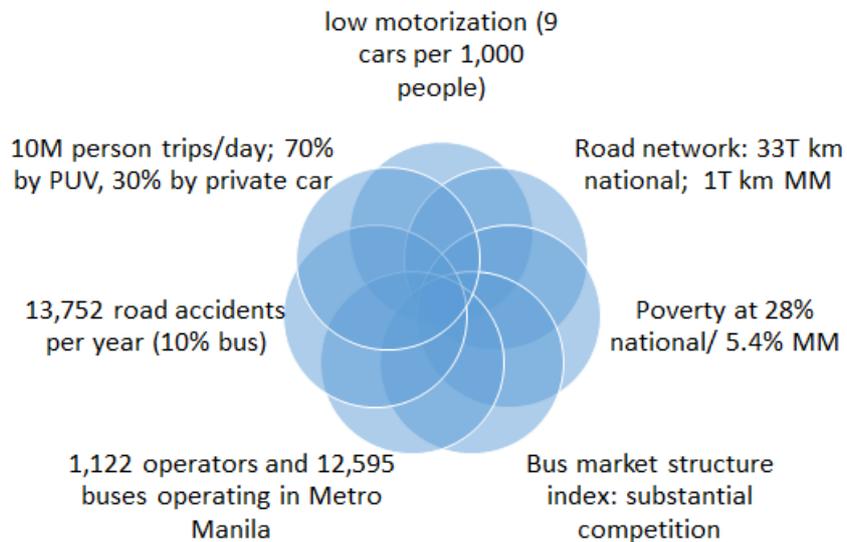
Table 10: Area, population, and poverty indicators, Metro Manila and selected provinces with connecting bus routes

	Land area (sq km)	Population (2010)	Density (person/sq km)	Poverty incidence (2012)
Philippines	343,448.32	92,337,852	269	27.9
Metro Manila	619.54	11,855,975	19,137	5.4
City of Manila	24.98	1,652,171	66,140	
Calookan City	55.80	1,489,040	26,685	
Las Pinas City	32.69	552,573	16,903	
Makati City	21.57	529,039	24,527	
Malabon	15.71	353,337	22,491	
Mandaluyong City	9.29	328,699	35,382	

	Land area (sq km)	Population (2010)	Density (person/sq km)	Poverty incidence (2012)
Marikina City	21.52	424,150	19,710	
Muntinlupa City	39.75	459,941	11,571	
Navotas	8.94	249,131	27,867	
Parañaque City	46.57	588,126	12,629	
Pasay City	13.97	669,773	47,944	
Pasig City	48.46	392,869	8,107	
Pateros	10.40	64,147	6,168	
Quezon City	171.71	2,761,720	16,084	
San Juan	5.95	121,430	20,408	
Taguig	45.21	644,473	14,255	
Valenzuela City	47.02	575,356	12,236	
Cordillera Administrative Region	19,422.0	1,616,867	83	28.7
Baguio City ^{a/}	57.51	318,676	5,541	6.0
Region IV-A	16,873.3	12,609,803	747	14.3
Lucena City ^{b/}	80.21	246,392	3,072	29.2
a/ Poverty incidence is at the provincial level (Benguet)				
b/ Poverty incidence is at the provincial level (Quezon)				

Sources: Philippine Statistical Authority.

Figure 9: Key statistics in the study area



For the inter-city routes, we focus on two routes in Metro Manila, selected on the basis of length of route, number of passengers and operators, and population density along the route. For the first intra-city routes we selected the route from Manila to Baguio City, which passes through major agricultural zones and terminates close to an export processing zone north of Manila. According to sector experts, this route also has among the most efficiently-run bus services. We also selected the route from Manila to Lucena City, which lies south of Metro Manila in the largest but poorest province in the Southern Tagalog region. The selected routes are described in the table 11.

Table 11: Description of selected bus transport routes

Route Name	Distance, round-trip	Characteristics	Alternatives
Intra-city:			
Alabang-SM Fairview (Lagro Commonwealth)	87.42 km	Busiest, highest number of operators, one of the longest routes, through EDSA and major residential and commercial areas	MRT (along the EDSA leg), jeepneys and AUVs (along Commonwealth)
Baclaran-Novaliches (EDSA Mindanao Av.)	64.6 km	One of the busiest routes, highest average number of passengers	Portions: AUVs, jeepneys
Inter-city:			
Buendia, Pasay - Lucena City, Quezon	254.27 km	Busy inter-city route that reaches the capital of one of the largest provinces in the Southern Tagalog region.	Entire route: car, PNR Portions: AUV, jeepneys
Cubao, Quezon City to Baguio City, Benguet	495.68 km	Busy inter-city route and has one of the most developed bus transportation based on quality of service.	Entire route: car Portions: AUV, jeepneys

Source: DOTC

We examined the state of competition in the major bus transport routes of Metro Manila (Table 12). In fact there are numerous operators (over a thousand) with a few buses per operator (11 to 14 on average) in the major routes. In the selected areas alone there are nearly 60 operators with an average of 15 buses per operator.

Table 12: Number of operators and buses, Manila bus routes

Route	Number of operators	Number of buses	Average number 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

Route	Number of operators	Number of buses	Average number of bus/operator
<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.

The large number of operators appears puzzling given the moratorium in place since 2000. Interviews 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 P150,000 per unit. However, the official franchise rate is only P510 for the first 2 units and P70 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.

Competition Concerns in the Bus Transport Sector

In the context of Manila's developing urban areas, designing a regulatory policy for the optimal level of buses needs to address both competition policy and congestion issues. An optimal level of regulation must take into consideration the level of economic activity and infrastructure development. The literature also points to inefficiencies in the market due to information asymmetry on both the sides of bus operators and the riding public. The challenge is to incorporate these concerns in future efforts to improve market efficiency and enhance competition in the bus sector.

The 2011-2016 Philippine Development Plan (PDP) has identified several challenges that currently face the transport sector. To tackle these challenges, the NEDA suggested for the adoption of a comprehensive long-term National Transport Policy (NTP) in the country. Some of the challenges are as:

- (i) lack of integrated and coordinated transport network;
- (ii) overlapping and conflicting functions of transport and other concerned agencies;
- (iii) transport safety and security concerns; and
- (iv) underdeveloped transport facilities in conflict-affected impoverished areas.

Another strategy raised in the PDP was the implementation of the Road Safety Action Plan which shall strengthen the country's safety and security policies on land transport. Box 2 describes a case of poor road safety enforcement; table 14 shows the number of road traffic accidents, by type of motor vehicle. In 2012 buses accounted for about 10 per cent of motor vehicles involved in accidents.

Aside from the PDP, the national government has partnered with international development organisations to come up with infrastructure development plans that would address land transport concerns and ameliorate problems due to traffic congestion. Among these initiatives are the National Transport Plan by AusAid (2010) and the Mega Manila Infrastructure Development Roadmap by JICA (2014).

Box 2: Bus transport safety

A specific case of inadequate transport safety and weak enforcement in bus transport sector is that of the Don Mariano Transport Corporation. A bus company suffered an accident which led to the death of 18 people last December 2013. With this, the license to operate (i.e. Certificate of Public Convenience) of the Don Mariano Transport Corp. has been suspended for 30 days (LTFRB 2013). In 2011, the said bus company also ranked highest in terms of the number of damage to property caused in Metro Manila. It was then reported that it has been operating with an expired Labour Standards Compliance Certificate which is issued by the Department of Labour and Employment on a regular basis (Padua 2013).

Table 13: Number of motor vehicles involved in accidents, by type (2008-2012)

	2008	2009	2010	2011	2012
Bus	1,443	2,146	2,692	1,707	1,316
Truck	1,519	2,912	3,099	2,422	1,770
Automobile	4,059	9,599	10,457	6,973	5,428
Jeep	2,194	2,353	1,864	1,316	879
Tricycle	1,659	1,638	1,578	1,389	925
Motorcycle	3,408	4,311	3,543	3,665	3,112
Other	836	390	359	473	322
Total	15,118	23,349	23,592	17,945	13,752

Source: PSA – NSCB.

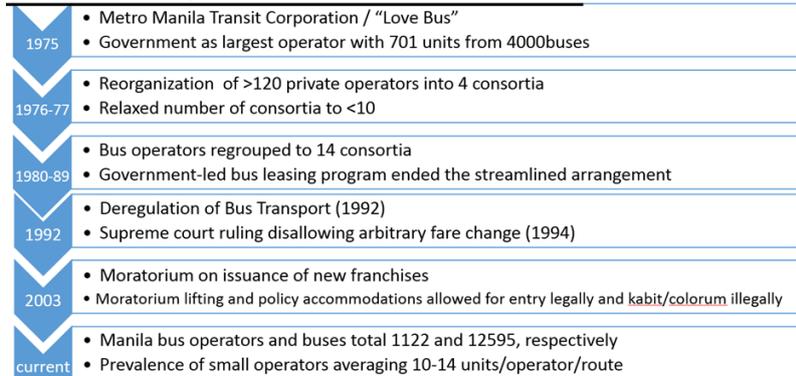
Further, managing competition within the bus sector, either intentionally or by accident, has been a key issue over the years. Government decision makers had always looked for the right formula in balancing the concerns of sectoral stakeholders as evidenced by how policy and institutions had evolved. Box 3 narrates an example in competition-related policy reforms, which had impacted the market structure of the sector.

Box 3: 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 organisations/corporations.

It started in 1976 when the government, under martial

Bus Transport Timeline



rule, ordered the reorganisation 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 per cent 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 programme 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: uncontrolled traffic congestion, indiscipline in the streets, and increasing marginal social costs.

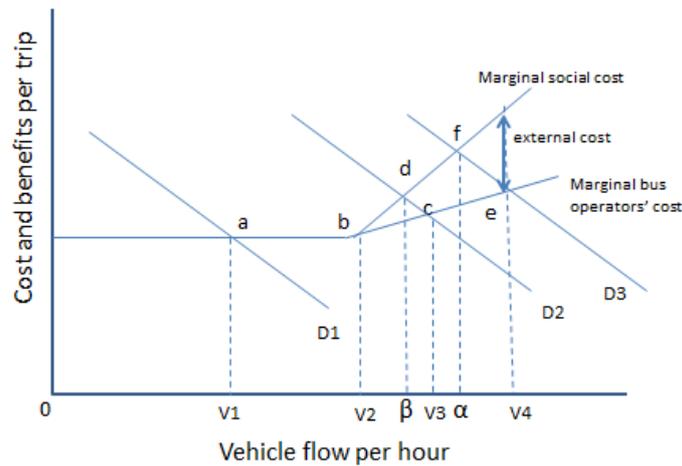
Potential Impact of Rationalising Competition in the Bus Transport Sector

Overview of the Cost-benefit Methodology

The following cost-benefit analysis for the bus transport sector relates to the congestion aspect of franchise regulation. Road safety and pollution are also important concerns; unfortunately there is not enough information on these to parametrise benefits and costs from improved regulations. This section attempts to measure the costs and benefits from reducing bus congestion in Metro Manila along the selected traffic routes. 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 in time delays and corresponding external costs and business operation costs.

Figure 10 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.

Figure 10: Bus congestion marginal cost and benefit framework



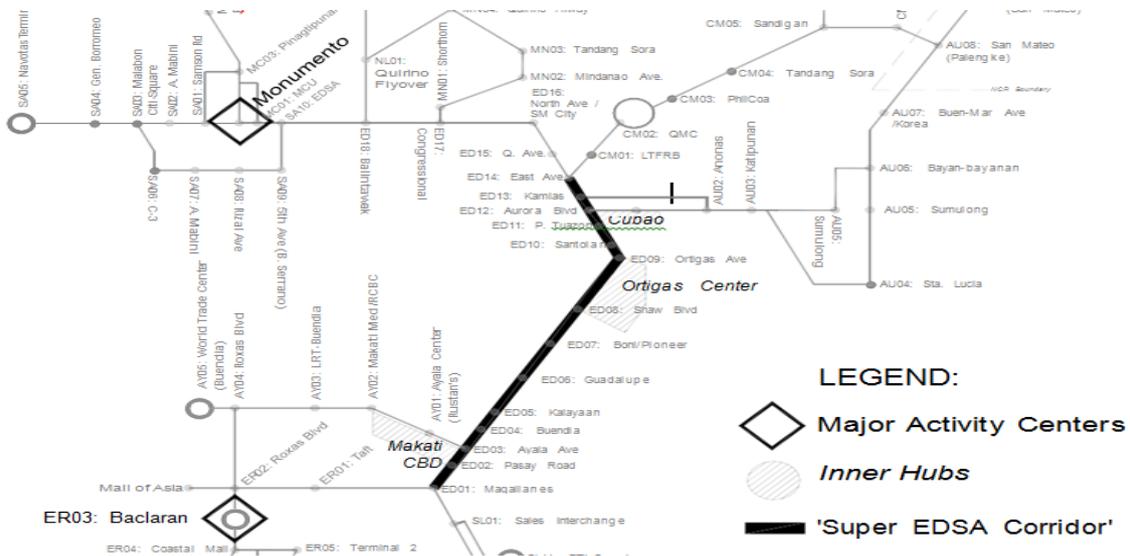
Once this point is breached due to shifts in road use demand D2 and D3, marginal costs are incurred by passengers and operators from the accompanying traffic congestion. Thus, the total marginal social cost (MSC) per trip due to traffic congestion at a given demand level D is computed as the sum of Marginal 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. We estimate the movement in marginal social cost as traffic de-congestion is assumed given hypothetical policy augmentations.

The study applies this framework to the main trunk-lines of all north and southbound bus routes, the EDSA, particularly its 'super corridor' from Magallanes to East Avenue (figure 11).

Figure 11: 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). Furthermore, the four intracity and intercity study routes mentioned in the previous sections of the paper also pass through certain sections of EDSA.

Results

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 peak hours. On a typical weekday, load factor averaged 51.3 per cent; slightly lower at 47.5 per cent 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 per cent on weekends, but bus-trips remain relatively the same. Considering all these, and adopting a more conservative stance, this analysis assumes a 20 per cent reduction in bus trips along the super corridor, accounting for the excess 20 per cent 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 15).

Table 14: 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 South Bound (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 in 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 16 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.

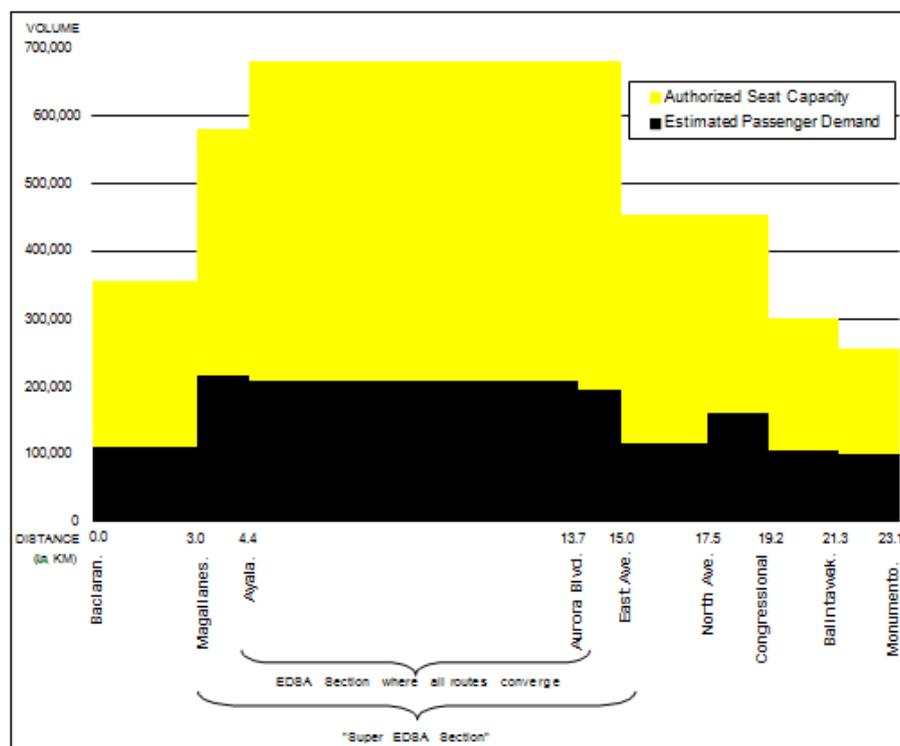
Table 15: Revenue runs and operational costs for different bus fleet sizes, compounded to present value from 1997 data

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 12 km stretch of EDSA's super corridor is evident (Figure 10). This is seen in the difference between the authorised seat capacity of buses and the estimated passenger demand over the length of EDSA (Figure 12). 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 per cent SB and 44.4 per cent NB. To raise the peak-hour load factor to 100 per cent, 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 per cent. 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 12: Authorised seat capacity and estimated passenger demand within EDSA



Source: Transport Consulting (2006)

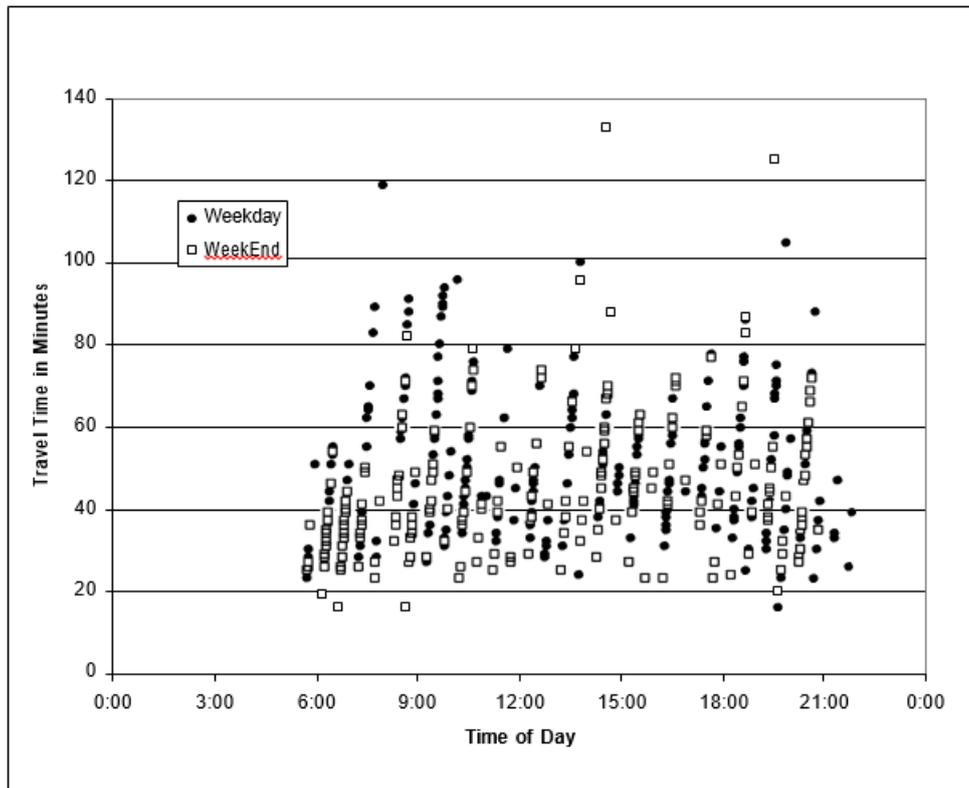
In spite of such gross under-utilisation of the seating capacity in the buses, there is a steady supply of buses in Metro Manila. This implies that running buses in Metro Manila region is a fairly attractive business proposition. Given that with such limited seat occupancy a bus operator can derive profits, raises questions about the 'level' of fares. Currently, the LTFRB, does not have a formula for automatic fare revision. Instead, petitions are put forth to the LTFRB by the operators and the same is addressed through public hearing, in consultation with the National Economic Development Authority (NEDA). To regularise the fare, the

Center for University of Philippines National Transport Studies is being consulted by the LTRFB to develop a fare formula.

In terms of travel time within the super corridor's 12 km stretch ranged from 18 to 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 13 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 17 summarises the key assumptions from the sections above and cites additional figures on minimum wages, and working days, travel times and decongestion levels.

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 13: Bus travel time and time of day, EDSA, Magallanes to East Ave



Source: Transportas Consulting (2006)

Table 16: 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 P5,508,971,237**. The figure is broken down into marginal external costs from **forgone wages of passengers** amounting to **P4,569,759,077** and **marginal bus operators’ cost of P939,212,160**. 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 (see tables 18 to 21).

If the moratorium in the early 2000s was enforced more effectively leading to a 20 per cent reduction in bus trips per unit time within the EDSA super corridor, it would have yielded a **net present value of P13.2bn in the medium term (3 years)** and **P19.86bn in the long term (6 years)** at 12 per cent discount rate.²

Table 17: Estimated time delays due to congestion along the EDSA super corridor

	Route distance (km)	Time delay due to congestion (in minutes)			
		Average bus delay per section	Northbound passengers (NB) per day	Southbound passengers (SB) per day	Total delay for all passengers 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

² The official rate of the NEDA is 15 per cent, which was set in the 1970s before capital account liberalisation. For some purposes a lower rate is recommended; for instance, 12 per cent has been suggested, consistent with more open capital markets in the country (Medalla, 2014).

Table 18: Marginal external 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

Table 19: 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 20: 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

Key Findings

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 liberalised 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 the dissolution of MMTC. The challenge now is to rationalise its regulatory function and harmonise policy.

The essence of the 1992 liberalisation 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 accommodation has 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 synchronisation among bus operators, public commuters, and government regulators as manifested in market inefficiencies. In the above-mentioned premises reside the confusion and contradiction in policy, and the impetus to streamline the service being offered by the industry through apt competition policy.

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. 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 P150,000 per unit against the official franchise rate of only P510 for the first 2 units and P70 for each additional unit thereafter.

It is clear that supply side issues 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 in the sector are indicative of positive cash flows/investment outcomes from bus operations. Data indicates the presence of numerous operators (over a thousand) with a few buses per operator (11 to 14 on average) in the major routes. In the selected areas alone there are nearly 60 operators with an average of 15 buses per operator. The evidentiary basis that there is oversupply or excess seating capacity within the studied routes is also well grounded in literature. The implemented bus rationalisation plan by LTFRB was also founded on this claim. JICA (2007, 1999) and PLANNADES (2013) further mentioned in their study that even a reduction in bus trips of as much as 50 per cent within the EDSA super corridor will still be acceptable given the current situation and will not compromise transport service for the commuting public.

The cost-benefit analysis implemented in this DCR shows the tremendous magnitude of benefits from implementing an effective regulatory regime that addresses the congestion problem. Results show 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. An effective decongestion policy that will lead to a decrease in bus trips by 20 per cent within the EDSA super corridor, while still sufficiently servicing existing passenger demands, will yield a net present value of P13.2bn in the medium term (3 years) and P19.86bn in the long term (6 years) at 12 per cent discount rate.

5. Conclusion and the Way Forward

Competition policy is in the process of being consolidated in the Philippines. It should be noted that the scope of competition policies is wide, encompassing anti-trust, prohibitions on anti-competitive practices, removal of investment restrictions and other entry barriers, trade liberalisation (i.e. openness to foreign competition), and competent regulation (to ensure a suitable level competition in cases of market failure, e.g. externalities).

In the rice sector, consistent with previous studies done on the rice supply chain, the rapid appraisal reported in this DCR finds that the paddy and rice supply chain is multi-layered with many competing players in each layer. The rapid appraisal also finds no evidence of any cartel-like behaviour in the areas studied. Margins are limited to 2 per cent or less of raw materials at all levels before retail. Profits are enhanced by volume, fast turnover of stocks, integration of operations across levels, and investments for quality consistency. The greatest threats to current players are weather risks and continuing tight local paddy supplies that spawn greater competition and increase management costs. The increased costs also highlight the lower cost option of bringing in foreign rice.

Rice importation policies need to be rationalised, to protect the interests not only of producers but also of consumers and other market participants. Huge differences in the costs of bringing in imports and moving domestic supplies to consumers makes smuggling lucrative. Quantitative restrictions on imports as exemplified by NFA's regulations raise the domestic price of rice and allow the concentration of legally imported supplies in the hands of a few. Tariffication – involving liberalised importation of rice subject to payment of import duty - can still confer some protection on producers, while reducing the price of rice, stabilising domestic supplies and prices, and deterring any attempt to control supplies to manipulate market prices.

Opposition to the above-mentioned reforms remains strong. Organised farmer groups constitute a strong lobby against import liberalisation; such organisations contain a mix of farmer types, i.e. these are not dominated by large farmers. In fact in rice, a farmer is already "large" when he or she cultivates about seven hectares – really large rice land holdings no longer exist due to the country's land reform programme (which had covered rice since 1972). The local miller's association is also active, but has not been described in the press nor in the literature as a significant lobby group. Tolentino and de la Pena (2012) have identified the following lobby groups:

- The NFA Employee's Association;
- The various service providers to NFA (trucking, logistics, warehouses, etc.);
- Financial institutions which lend to NFA;
- Network of corruption within NFA that exploits the difference between NFA retail price and market price, and between domestic market price and world market price

The last is quite significant: "The NFA selectively provides access to a favoured few to its stock of imported rice, which is likely to have been imported at the low border price, and which may be sold in the domestic market at the relatively high domestic retail price. Many of those favoured with access are the local political elites." (p. 196).

Such opposition appears formidable. However there are countervailing forces – namely the country's economic managers who are trying to arrest food price inflation and reduce the NFA debt; and WTO commitments of the country, which obligate it to undergo tariffication by 2017.

As we near 2017, it is crucial for policy makers to evaluate and weigh the pros and cons of renewing the QR and abolishing it. The economic losses suffered from the QR have already been discussed in the report. At the same time, if the QR is abolished, domestic farmers will be subject to international competition, which they are unprepared for. It has hence been argued by the some observers that the implications of the QR abolishment on the farmers, middle men, millers and the consumers be envisaged and accordingly a scheme be framed in order to prepare the rice supply chain for international competition. Unlike past reform efforts, which have ended in failure, the next few years should well be the turning point in staple foods competition policy in the country.

Meanwhile, competition reforms in the bus transport sector must consider the network characteristics of bus transport service. Such a regime may, to be feasible, entail organisation or possible agglomeration among operators. Obviously such a course should not be overly restrictive and go the opposite extreme, leading to failure of contestability and the rise of market power.

Realising these large benefits require a mixture of regulatory and administrative enforcement to optimise vehicular flows in major road networks. This is to decrease marginal social costs by closing in to the desired number of bus trips in given routes and lessening delays in travel time for commuters. Both have positive impacts on operators' direct expenses and commuters' forgone opportunity. To address this, the two options enumerated in the report included interventions within the bus sector in particular, and a wide spectrum approach for all road users (including private cars) as a whole. Proper enforcement of existing traffic and transport policy, particularly on franchise agreements, could help achieve the targeted decrease in buses trips and travel time delays. 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 organisation 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 organised 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.

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 correct mix of policies is however beyond the scope of this diagnostic report.

The way forward for the bus transport sector should optimise 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.

6. Annexure

Equations for TWIST

The TWIST model is a simple linear version of the standard economic surplus model: Let QD be quantity traded at the retail level, with corresponding retail price RP . On the other hand, let $QSdom$ be the domestic at the wholesale level, with corresponding wholesale price WP . Let QS be the domestic quantity and the volume of *quota*. The intercepts of the demand and supply functions are α and β , while their slopes are $Dslope$ and $Sslope$, respectively.

$$QD = \alpha - Dslope * RP$$

$$QSdom = \beta + Sslope * WP \quad QS = QSdom + quota$$

The difference between RP and WP is called the margin (*mar*).

Imports are computed as follows:

$$import = QD - QSdom$$

To calculate the consumer surplus (CS) and producer surplus (PS), it is important to solve first for WPe , RPe , QDe , $QSdome$, QSe (e denotes equilibrium), using $QS=QD$. The baseline is denoted by “0”:

$$Dslope = - \varepsilon_D * Q_0 / RP_0$$

$$Sslope = - \varepsilon_S * Q_0 / WP_0,$$

where ε_D and ε_S , denote the elasticity of demand and supply, respectively.

The **consumer surplus** is computed as follows:

$$CS = 0.5 * QDe (Dinter - RPe),$$

$$\text{where } Dinter = \alpha / Dslope.$$

The **producer surplus** is calculated as follows:

Case 1. $\beta > 0$; $Sinter < 0$

$$PS = 0.5 * QSdome (WPe - Sinter) + 0.5 \beta * Sinter,$$

where $Sinter = \beta / Sslope$.

Case 2. $\beta < 0$; $Sinter > 0$

$$PS = 0.5 * QS_{dome} (WPe - Sinter)$$

To compute for the net revenues from imports, use the following formula:

$$netimprev = import * (RP - mar - BP)$$

Finally, the **total welfare** or the **economic surplus** is computed as follows:

$$ES = CS + PS + netimprev$$

GAMS Code

```

***** DATA
$call =xls2gms r=sheet1!a1:b10 i=c:/TWIST/TWISTinput.xlsx o=input.inc
Table INPUT(*,*)
$include input.inc

***** MODEL
Parameters
eldem, elsup, QD0, QSdom0, QS0, RP0, WP0, mar, BP0,
DSlope, SSlope, alpha, beta,
Dinter, Sinter, quota;
Variables
RP, WP, QSdom, QS, QD, ED, IMPORT;
Equations EqQD, EqQSdom, EqQS_QR, EqWP, EqRP, EqIMPORT;
EqQD..
QD =e= alpha - DSlope*RP          ;
EqQSdom..
QSdom =e= beta + SSlope*WP        ;
EqQS_QR..
QS =e= QSdom + quota              ;
EqWP..
WP =e= RP - mar                   ;
EqRP..
ED =e= (QD - QS)*(QD - QS)        ;
EqIMPORT..
IMPORT =e= QD - QSdom              ;
Model TWISTQR /EqQD, EqQSdom, EqQS_QR, EqWP, EqRP, EqIMPORT/ ;

***** CALIBRATION
eldem = INPUT("Elasticity_demand", "Market");
QD0   = INPUT("Quantity", "Market")*1000;
RP0   = INPUT("Retail_price", "Market")*1000;
DSlope = -eldem*QD0/RP0;
alpha  = QD0 + DSlope*RP0;
Dinter = alpha/DSlope
Display alpha, DSlope, Dinter;

```

```

Elsup = INPUT("Elasticity_supply","Market");
WP0 = INPUT("Wholesale_price","Market")*1000;
mar = RP0 - WP0;
quota = INPUT("Quota", "Market")*1000;
QS0 = QD0;
QSdom0 = QS0 - quota;
SSlope = elsup*QSdom0/WP0;
beta = QSdom0 - SSlope*WP0;
Sinter = beta/SSlope
Display beta, SSlope, Sinter;

```

```

BP0 = INPUT("Border_price","Market")*INPUT("Exchange_rate","Market");

```

```

Option NLP = Minos5;
Solve TWISTQR minimizing ED using NLP;

```

***** CHECKS

```

Parameter ChRP,ChQD, ChIMPORT;
ChRP = 100*(RP.L - RP0)/RP0;
ChQD = 100*(QD.L - QD0)/QD0;
ChIMPORT = IMPORT.L - quota;
Display ChRP, ChQD, ChIMPORT;

```

***** WELFARE

```

Parameters CS0, PS0, netimprev0, ES0;
CS0 = 0.5*QD.L*(Dinter - RP.L)/1000000 ;
PS0$(beta > 0) = (0.5*QSdom.L*(WP.L - Sinter) + 0.5*beta*Sinter)/1000000 ;
PS0$(beta<0) = (0.5*QSdom.L*(WP.L - Sinter))/1000000 ;
netimprev0 = (IMPORT.L*(RP0 - mar - BP0))/1000000 ;
ES0 = CS0 + PS0 + netimprev0 ;

```

```

Display Dinter, Sinter, CS0, PS0, netimprev0;

```

Parameter

```

WP1,RP1, QD1, QSdom1, QS1, import1, CS1, PS1, netimprev1,ES1,
deltCS1, deltPS1, deltnetimprev1, deltES1;

```

```

$include tariffication

```

```

*$include adjust quota

```

***** REDUCED QUOTA

```

quota = 186000
Solve TWISTQR minimizing ED using NLP ;
WP1 = WP.L ;
RP1 = RP.L ;
QSdom1 = QSdom.L ;
QD1 = QD.L ;
import1 = IMPORT.L ;
netimprev1 = (RP1 - mar - BP0)*import1/1000000 ;

```

```

CS1          = 0.5*QD1*(Dinter - RP1)/1000000          ;
PS1$(beta > 0) = (0.5*QSdom1*(WP1 - Sinter) + 0.5*beta*Sinter)/1000000  ;
PS1$(beta < 0) = (0.5*QSdom1*(WP1 - Sinter))/1000000  ;
ES1          = CS1 + PS1 + netimprev1                  ;
deltCS1      = CS1 - CS0                               ;
deltPS1      = PS1 - PS0                               ;
deltES1      = ES1 - ES0                               ;
Display WP1, RP1, import1,
deltCS1, deltPS1, deltES1                             ;

```

***** TARRIFICATION

* Assumes that imports are positive even with tariff

```

Parameter tar          ;
tar = 0                ;
WP1 = BP0*(1 + tar)    ;
RP1 = WP1 + mar        ;
QSdom1 = beta + SSlope*WP1 ;
QD1 = alpha - DSlope*RP1 ;
import1 = QD1 - QSdom1 ;
netimprev1 = (RP1 - mar - BP0)*import1/1000000 ;
CS1          = 0.5*QD1*(Dinter - RP1)/1000000          ;
PS1$(beta > 0) = (0.5*QSdom1*(WP1 - Sinter) + 0.5*beta*Sinter)/1000000  ;
PS1$(beta < 0) = (0.5*QSdom1*(WP1 - Sinter))/1000000  ;
ES1          = CS1 + PS1 + netimprev1                  ;
deltCS1      = CS1 - CS0                               ;
deltPS1      = PS1 - PS0                               ;
deltES1      = ES1 - ES0                               ;
Display WP1, RP1, import1,
deltCS1, deltPS1, deltES1                             ;

```

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