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Contents

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Employment Generation Potential of the Rice Value Chain: The Case of Mlang, North Cotabato in Mindanao

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ABSTRACT

This paper aims to examine the employment generation potential of the rice value chain. It analyzes the issues in the chain and the strategies to address them, including their impact on job generation. A value chain framework was used in the analysis focusing on the case of Mlang, North Cotabato. Both primary and secondary data were utilized. Key informant interviews and focus group discussions were applied to collect primary data. Two rice farmer surveys in Mindanao by the World Bank (2014) and Catholic Relief Services (2015) also served as inputs.

Using the job estimation for Mlang, the total jobs generated in the rice value chain in North Cotabato is estimated at 23,011 from a total area of 125,731 hectares (ha) in 2014. For Mindanao, an estimated 221,796 jobs were generated from a total of 1,189,266 ha of harvested area in 2014. A range of issues affecting the performance of the rice value chain from production, postproduction, to marketing can be addressed by enhancing profitability through improved productivity, pricing, lowering cost, and diversifying income sources through intercropping, processing, and product differentiation. Implementing these strategies particularly to address severe constraints can potentially generate 36,672 additional jobs.

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INTRODUCTION

Rice is an important crop not only because it is a staple in the Philippines but also because many farmers and laborers depend on it as their main source of livelihood. In Mindanao, about 1.2 million hectares (ha) are planted with rice, which accounts for 25 percent of the country's total area for rice production. The estimated number of jobs from rice production in Mindanao is more than 350,000 based on an estimate of one full-time job for every 3.3 ha cultivated per season (Dy 2013).[2] This excludes jobs generated in postproduction and marketing. The value of annual wages in rice production in Mindanao amounts to more than PHP 42 billion (Appendix 1).

Rice is also a major factor in job generation in Mindanao particularly in provinces where the poverty incidence and prevalence of conflict are high. Majority of these poor provinces are also the top rice-producing provinces in Mindanao, contributing about a third of Mindanao's total rice production (Appendix 2). The poverty incidence of 47.8 percent in these regions is higher than the average of 37 percent and 22 percent for Mindanao and the Philippines, respectively.

Landless and poor farmers in Mindanao are given opportunities to get a share of the harvest in exchange for labor particularly in harvesting. In most cases, they use their share for their own consumption. Farmers who own their land also retain 15–30 percent of their total production for home consumption. Since many of these farmers depend on their own produce, this becomes a problem in cases of drought, flooding, and war or conflict in the area.

This paper recognizes the importance of agricultural productivity and its impact on postproduction activities including processing and trade in the rice value chain, particularly in terms of job creation. It tries to determine whether or not improvement in agricultural productivity creates jobs, not only within the production node of the chain but also in the processing and trade nodes. It also aims to examine how the issues in the rice value chain, other than those affecting agricultural productivity, affect job generation potential and job quality.

PREVIOUS STUDIES

Primary agriculture, or the production node of the agri-based chain, can absorb and generate more employment as the agribusiness or postproduction nodes of the chain expand and develop (Balisacan et al. 2011). This is expected as agribusiness increases demand for raw materials supplied by primary agriculture or the production node of the chain. As agricultural productivity increases, the volume of production increases that can increase demand for labor and eventually enhance labor productivity.

Rice is a major source of employment in the rural areas. Dy (2013), for example, estimated that one full-time job is generated for every 3.3 ha of land cultivated per season. The country's total of 4.7 million ha of rice land should be able to generate 1.4 million jobs. However, this estimate covers only rice production in the value chain. Other than this, no studies have been found that provide an estimate of jobs generated in the other nodes of the chain such as milling, wholesaling, and retailing.

Javier (2014) argued that mechanization and intensifying the use of hybrid rice varieties will help increase the farmers' income. Although mechanization will displace labor, it will address the high cost of labor in rice production in the Philippines. The cost of labor per hectare in the Philippines is PHP 19,000 compared to only PHP 3,700 and PHP 3,300 for Thailand and Viet Nam, respectively (Bordey 2014).

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[2] assumed 240 man-days per year

METHODOLOGY

A value chain framework was used to determine the jobs created in the various nodes of the chain and to analyze the impact of addressing issues and opportunities in the chain on the number of jobs.

Using the framework in Appendix 3, current jobs per node in the chain were estimated, which serve as the baseline, following the methodology developed by the World Bank Mindanao Jobs Report Team (WB 2015). Jobs are estimated based on full-time equivalent (FTE) units with 8 hours per day, 26 days a month, and 12 months a year totaling 312 days per year. This is about 2,496 hours a year at 8 hours of work per day. However, the number of people identified as employed is higher than the actual number of people with full-time jobs due to the seasonality and nature of farm activities of farmers who work less than 8 hours per day. This methodology was modified to include additional aspects particularly in assessing how constraints and opportunities affect the number and quality of jobs in the chain. Constraints in the chain were examined and used as basis for the recommendations. The direct and indirect effects of these recommendations on the number and quality of jobs created were also identified.

There are variations in the value chain that affect the number and quality of jobs that can be created directly and indirectly. These include differences in the types of farms in terms of the degree of mechanization, or whether they are irrigated or rainfed, lowland or upland, or into the traditional, organic, or commercial variety. These differences affect cropping intensity and level of productivity, which in turn affect job generation. Also, the ability of farmers to adopt mechanization or to access credit and better markets depends on whether they are organized or not.

These variations on the types of farms and the presence of farm organizations and degree of processing represent different "strands" of the value chain, which also vary across locations as well as their horizontal and vertical dimensions.

A case approach was used to provide a more detailed analysis of the strands' variations in the chain. The analysis focused on the municipality of Mlang as the main producing municipality of North Cotabato and also the top producing province in Mindanao. Mlang is also home to Don Bosco Multi-Purpose Cooperative (DBMPC) that produces organic rice using traditional varieties of brown, red, and black rice.

It should be noted, however, that the effects of addressing the issues in the chain on job generation depend on the cases and chains covered, particularly the level of technology used that substitutes labor with other inputs such as machines. Some of these cases have fixed proportions technology which simply do not allow for substitution of inputs on input prices change. Others, however, can substitute labor with machines such as the use of tractors by farmers or mechanical dryers by millers. Thus, there are limitations in terms of the aggregate estimates of job generation.

Data used in the analysis came from both primary and secondary sources (Appendix 4). Primary data were collected through key informant interviews and focus group discussions. A total of 28 informants were interviewed that included irrigated and rainfed farmers, organic and conventional farmers, traders, millers, and government agencies. Three focus group discussions consisted of one participated in by rainfed farmers, irrigators' association members, and a field officer of a seed company, a group from the local government, and another group consisting of millers/traders and processors, including members of DBMPC.

Secondary data were also sourced from government agencies, provincial and municipal agriculture offices, and the municipal development planning office. These surveys lacked details on jobs, thus, only the number of workers in production and postproduction activities were used primarily to validate data collected from key informant interviews.

EMPLOYMENT GENERATION POTENTIAL IN MLANG, NORTH COTABATO

North Cotabato is one of the top three provinces in Mindanao in terms of the average volume and area devoted to rice production from 2005 to 2014, accounting for 12 percent of the total volume produced (Appendix 2). The value chain map for North Cotabato is shown in Appendix 5.

Mlang is the top rice-producing municipality in North Cotabato, accounting for 20 percent of the total volume of production and 18 percent of the total area planted to rice in the province (PAGRO 2014). About 64 percent of the 22,868 ha in Mlang is irrigated. It has 37 barangays with 8,636 rice growers, or an average of 2.6 ha per grower. In terms of production, Mlang produced 116,692 metric tons (MT) or 5.10 MT/ha in 2014, which is 7 percent above the provincial average of 4.8 tons per hectare.

Two "strands" in the rice value chain in Mlang were examined in terms of job creation: the organic rice produced by the DBMPC and the inorganic/commercial rice (hybrid and certified seeds). Data from this analysis were used to estimate total employment for the municipality, province, and the entire Mindanao. Given the limitation of this case approach, available data from surveys conducted in Mlang and some municipalities in North Cotabato under the World Bank study (2014) and Farmer Alliances for Resource Strengthening and Marketing project (CRS 2015), including secondary data from the provincial agricultural office of North Cotabato, were used.

Organic rice from DBMPC

The DBMPC chain (organic strand) generates 0.53 full-time jobs per hectare from production to retailing (Appendix 6). Given a total of 320 ha under the cooperative, this chain generates about 176 full-time jobs, the bulk of which are in production which accounts for 62 percent of the total jobs generated. This is followed by postproduction and processing with 27 percent and 11 percent, respectively. They have 268 farmers with an average production of 60–80 bags (1 bag = 60–65 kilograms [kg]) of *palay* per farmer per season.

DBMPC leases 200 ha for six years since 2011 and plans to expand to 700 ha due to increasing demand for their product. Farmers who hire maintainers for their farms pay 12-percent share of the total production. This share is also applied to farms leased by the cooperative that has maintainers. The cooperative has 14 full-time field employees who help manage the leased farms.

Carabao is still widely used in plowing, wherein two persons take turns to cover one hectare within a day. Plowing is done twice per cropping as well as rotavation using turtles. A turtle is operated by two persons covering one hectare per day, while leveling or plaining is done by one person within three hours. Plowing and rotavation both cost PHP 2,500/ha while leveling is PHP 1,000/ha for two activities. It takes two persons to maintain the dike for a two-hour work. The prevailing rate is PHP 200/day regardless of the number of hours. Transplanting is done by 20 persons covering one and a half days. The contract rate for transplanting is PHP 4,500/ha. In terms of full-time equivalent, land preparation and planting generated a total of 0.05 FTE.

Crop management

Labor for crop management is not as limited as during the planting season since spraying and fertilizing can be done by one to two persons only. Payment for fertilizing is at PHP 50/sack and PHP 25/tank, respectively, or PHP 200/laborer. Weeding is done three to five times per cropping period and would need four persons to finish the work in six hours per activity. Labor for weeding is paid per day at an average of PHP 175.

Spraying of chemicals is not allowed in organic farming, thus weeding cost and labor is more than doubled. In lieu of chemicals, farmers plant pest-repellent crops near the plantation for two days per cropping. Spraying liquid fertilizer is done up to 10 times per cropping, consuming about 10 tanks/ha or PHP 250/ha per activity. In terms of FTE or jobs per hectare, crop management generated a total of 0.27.

Harvesting and postproduction

Harvesting is done manually by 20 people for one day, averaging 60 bags/ha. Productivity ranges from 48 to 77 bags consisting of 60–65 kg of palay. The farmer is paid by getting a share of the harvest at a ratio of 25:2 or 2 bags for every 25 bags harvested, or PHP 330/day if the price of palay is PHP 22/kg. Threshing is handled by six persons at an average capacity of 30 sacks/hour. Hauling of palay from the field to the buyers' pick-up areas takes 10 minutes for a distance of 50–100 meters. It takes two persons to haul 60 bags and are paid PHP 15/bag. In terms of FTE or jobs per hectare, postproduction activities generated a total of 0.15.

DBMPC picks up palay from the farm and brings its own laborers to haul. A 60-bag production can be hauled by five persons in 30 minutes and paid PHP 4.50/bag. DBMPC uses a canter truck with a capacity of 80 bags, while their bigger trucks have a capacity of 200 bags. During dry season, it takes one and a half days to dry a sack of palay, and as long as five days during rainy season. Laborers are paid PHP 12/bag regardless of how long it takes to dry the palay. In terms of FTE, hauling and drying generated a total of 0.04.

DBMPC maintains one full-time worker to man their warehouse that has a capacity of 10,000 bags of palay. Milling employs about seven persons including the operator, but requires up to 10 persons during peak season. It takes five people to pack about 200 one-kilo packs per day. Delivery or trucking is done by three people—the driver, his helper, and the laborer. The driver is paid monthly, the helper daily, while the laborer is paid by the number of bags hauled at PHP 5/bag. The average truck capacity per delivery is 135 bags, taking seven hours to and from Mlang to Davao City. Rice for export is brought to Davao City. DBMPC maintains three retail outlets (Davao, Kidapawan, and Manila) with about three personnel to man the retail store. In terms of FTE, processing and marketing generated a total of 0.06 jobs.

In this chain, a total of 83.43 man-days per cropping, or a total FTE of 0.53 jobs/ha, is created from production to retailing.

Commercial (inorganic) rice from Mlang, North Cotabato

Majority of rice farmers in Mlang plant commercial or inorganic rice using hybrid and inbred varieties, generating about 75.36 man-days or FTE of 0.48 from production to retailing (Appendix 7). Given a total of 22,868 ha in Mlang, this chain generates about 10,977 full-time jobs, the bulk of which is in production that accounts for 46 percent of the total jobs generated. The data used to estimate jobs generated for commercial rice are based on the production of inbred seeds in irrigated areas.

A farmer with an irrigated area can produce 100 bags of 62.5 kg or 6.2 MT/ha. Productivity ranges from 80 to120 bags/ha. With irrigation, some farmers can plant more than twice a year. Those in rainfed areas may also plant twice a year but have to invest in water pumps. Farmers who can no longer till their own land due to old age hire maintainers.

Transplanting is done by about 10 persons per hectare for two days, while some farmers hire 25 persons to do the job in one day. Hybrid seeds are expensive and are treated with utmost care, thus the time spent in pulling and transplanting is almost doubled. Some laborers prefer to be paid on

a daily basis. Farmers hire laborers from other barangays or other municipalities when laborers in the area are limited, with a contract price of PHP 4,500/ha or an individual wage of PHP 150–200/day. Due to the high cost and limited supply of labor during planting season, majority of the farmers in Mlang opt for direct seeding or broadcast planting where only one person is hired for four hours at only PHP 1,000/ha. However, this is not common for hybrid production. In terms of FTE, land preparation and planting generated a total of 0.04.

Crop management, harvest, and postproduction

Labor for crop management is not limited since it is handled by maintainers or by the farmers themselves. Laborers hired for fertilizing are paid PHP 250/day. Those hired for spraying are paid by the number of tanks sprayed, at PHP 25/tank. Fertilizing can be done in four hours by one person, while spraying can be done by one person covering one hectare with 10 tanks for five to eight hours. Spraying is done six times per cropping, while fertilizing is done three times. Weeding is done by one person for two hours per cropping. In terms of FTE, crop management generated a total of 0.18.

Harvesting is done manually by about 25 people for one whole day, at 80–120 bags/ha. The payment scheme is a sharing ratio of 25:2 or two bags for every 25 bags harvested. However, there are cases when harvesters are hired through a contractor, who pays them a minimal PHP 150–200/day including meals.

Threshing is handled by seven persons with a thresher capacity of 30 sacks/hour. It takes four persons to haul 100 bags and are paid PHP 10/bag. In terms of FTE, postproduction generated a total of 0.18.

Traders and millers pick up palay from the farm, bringing their own laborers to haul. A total of 50 bags can be hauled by five people for 30 minutes and paid PHP 4.50/bag. It is estimated that a person can handle 40 bags/day.

It takes almost two days to dry a sack of palay during dry season, but as long as five days during rainy season. Laborers are paid PHP 7/bag regardless of how long it takes them to dry the palay. A miller has a 0.75-hectare solar dryer with a capacity of 2,000 bags. A person can handle 15 bags at a time.

Milling employs a machine operator and four laborers. The operator is paid PHP 1.70/sack while the other four laborers receive PHP 4.50/sack to be divided among themselves. The milling machine has a capacity of 40 sacks/hour with a milling recovery of 65 percent. Hauling of rice from the warehouse to the truck is at PHP 2/bag during nighttime but only PHP 1.50/bag during daytime. A person can haul one bag in three minutes. A 10-wheeler truck is used to haul with a capacity of 520 bags. A miller has two full-time employees—the manager/scaler/bookkeeper and one maintenance staff.

Transport and marketing

Trucking is done by three people—the driver, his helper, and the laborer. The driver is a regular employee paid at PHP 4,000/month, the helper is paid PHP 150/day, while the laborer is paid PHP 5/bag.

A wholesaler also employs 7–15 people during peak season for about 45 days only. They can sell up to 300–800 bags/day. On the average, 500 bags are hauled by 11 people for 10 hours. A retailer, on the other hand, maintains one full-time staff who mans the retail store that can sell about 100 sacks of rice in a month.

From production to retailing, a total of 75.36 man-days per cropping, or a total of 0.48 FTE is created.

Commercial (inorganic) rice with intercrop in Mlang, North Cotabato

In Mlang, there are about 20–50 farmers who intercrop rice with watermelon, and about 5 percent who intercrop with mongo. For farmers intercropping watermelon with rice, about 21.50 additional man-days per hectare is required or 0.07 FTE (Appendix 8).

Seedling preparation of watermelon requires 10 people working eight hours per ha. The cost of labor is usually PHP 200/day and is done three weeks before rice is harvested. For planting, it would take 15 people working eight hours to cover one hectare.

Watermelon needs to be watered at least three times a week, or daily for 52 days from planting to harvesting. It would take about four people working two hours a day to water and fertilize. Full-time laborers are hired at PHP 5,000/cropping covering 2.2 ha. Harvesting is done two to three times per cropping. Each harvest requires two people working two hours a day per ha. The average volume of production is 23 tons/ha per cropping.

Mongo, on the other hand, requires 13.40 man-days or 0.04 FTE per ha per cropping (Appendix 9). Mongo seeds are directly thrown in the rice field two weeks before rice is harvested. It can be done by one person for two hours in one day.

Mongo harvesting activity is done three times per cropping per year. It would take about 10 people to harvest mongo for three hours in one day. Drying and cleaning can be done by one person and would take five hours per day for three days per harvest. Mongo production is usually done by the farmer himself. The average volume of production per ha is 50 kg of cleaned mongo.

Comparison between organic and nonorganic rice potential for job creation

Activities in rice production between organic and commercial/inorganic are similar. However, there are variations in some activities particularly in the production node which affect cost, productivity, and requirement for manpower.

Organic rice production generates 0.11 more jobs per ha (FTE) than inorganic rice. The difference is most noticeable in crop management. Manpower requirement for crop management in organic rice production is almost double compared to inorganic. Spraying of herbicide is prohibited, thus, requiring more labor for weeding. Pests and diseases are controlled the natural way by placing *madre de cacao* leaves and insect-repellent plants around the production areas. Inorganic rice production, on the other hand, simply requires spraying chemicals.

While postproduction activities are similar, jobs created in terms of FTE vary. All postproduction activities are based on the productivity of each strand. Organic production yields 60 bags/cropping while that for inorganic can reach up to 100 bags. This difference in productivity translates to a higher labor requirement for postproduction activities. For organic rice, jobs created per hectare is only 0.15 FTE compared to 0.18 FTE for inorganic rice.

With processing and marketing, inorganic rice also generates more jobs per ha compared to organic rice, particularly in this case where productivity is less for organic rice. Also, the chain of DBMPC is shorter because they are vertically integrated such that they perform different functions in the chain from production to processing, wholesaling, and retailing. Value chain vertical integration usually improves the coordination of the chain of activities which enhances the performance in terms of cost, quality, and volume (Riisgaard et al. 2008). For inorganic rice, more jobs are generated since marketing involves wholesale and retail, and the produce passes through more actors in the chain.

In terms of compensation and quality of work, both organic and inorganic rice have the same pool of workers in Mlang particularly in production and crop management. However, in terms of processing and marketing, DBMPC pays better such that workers that dry palay were paid higher

than for inorganic rice. Organic palay are dried and milled separately from inorganic rice and, thus, it is critical that the quality of work is observed. DBMPC does not pay less than the minimum wage to their staff.

Estimate of jobs generated

Appendix 10 shows the summary of jobs generated per ha for the two chains analyzed. This also includes jobs generated per ha for the case of rainfed rice using 1.43 croppings per year, or seven croppings in the span of five years.

The total jobs generated in Mlang is derived by using jobs per ha estimates (FTE) from the sample cases in Appendix 10, and multiplied by the number of ha in the municipality. Data from the Provincial Agriculture Office do not include or distinguish organic rice from inbred rice. Thus, total hectarage for inbred rice was disaggregated into organic and inorganic rice (irrigated) by deducting the actual area of 320 ha of DBMPC. Since DBMPC has two croppings per year, the area is multiplied by two.

Based on this estimate, the total jobs generated in Mlang is 4,249 jobs from its total harvested area of 22,868 ha in 2014 (Appendix 11). Despite the more labor-intensive production of organic rice, it only contributed 4 percent of the total jobs generated in the municipality. This is because organic rice only accounted for 2.8 percent of the total hectarage in the municipality. Inorganic rice under irrigated areas contributed 81 percent of the total jobs, while rainfed areas contributed 15 percent.

Following the job estimation for Mlang, the total jobs generated in the rice value chain for North Cotabato is based on the estimated jobs generated from the sample cases and actual areas planted with rice in North Cotabato. Using these data, the total estimated jobs in North Cotabato from planting rice in 125,731 ha in 2014 is 24,564 jobs (Appendix 11).

The bulk of the jobs are generated from inorganic/inbred rice contributing 94 percent of the total jobs in the province. Organic rice contributed 4 percent, while only 2 percent came from hybrid-producing areas. North Cotabato in general has a very low adoption rate of hybrid varieties mainly due to the high cost of seeds and their lack of suitability to the area.

About 221,796 jobs were created in Mindanao from a total area harvested of 1,189,266 ha in 2014 (Appendix 11). This is based on the job estimates from the sample cases in Mlang, multiplied by the total number of ha harvested in Mindanao. Of the total jobs generated, only 1 percent is from organic rice and 3 percent from hybrid rice production. This is because only 5 percent of the total area harvested in Mindanao is organic, while only 2 percent is hybrid. Total jobs generated from the production of inbred rice in Mindanao is 96 percent.

CONSTRAINTS TO JOB CREATION

There are many constraints that directly and indirectly affect job creation. Factors that affect prices, productivity, and costs, which in turn affect profits, influence decisions of actors in the chain to expand or reduce investments. Hence, these factors affect job creation.

Inputs and production node

Determining the extent or severity of constraints is based on their effects on the profitability of the enterprise particularly on costs, productivity, and price. In terms of production costs, based on a survey of 87 farmers in Mlang (WB 2014), the main costs incurred are inputs and labor which account

for 26 percent and 22 percent to total production costs, respectively. Bureau of Agricultural Statistics data in 2012 also showed a similar distribution of costs. Given this production cost structure, it is not surprising that based on a survey of 240 farmers in North Cotabato and Sultan Kudarat (WB 2014), farmers identified the high costs of inputs as one of the top production constraints (Appendix 12).

Inadequate access to better seeds

Farmers currently utilize three types of seeds with different levels of productivity. In North Cotabato, these are the hybrid, certified, and good seeds (PAGRO 2015). About 75 percent of the 125,000 ha are planted with good seeds, while 24 percent and 1 percent are planted with certified and hybrid seeds, respectively (Appendix 13). However, in terms of productivity, they vary significantly. In irrigated areas, hybrid seeds produced an average of 6.22 tons/ha while certified seeds and good seeds produced 5.33 tons and 5.04 tons, respectively (Appendix 13). The difference in productivity between hybrid and good seeds is 23 percent and compared to certified seeds, its productivity is 17 percent higher. This means that productivity of certified seeds is only 6 percent higher than good seeds.

One of the reasons for the low adoption of hybrid seeds is their high cost. Another reason is the tendency for heavy infestation during wet season, as experienced by some farmers. In fact, at a time when the government subsidized the cost of using hybrid seeds, many farms in North Cotabato have been attacked by leaf blight, which discouraged the farmers from using them (Key informant interview 2015). The high cost of producing hybrid seeds and the associated risks involved, as well as the limited capital to follow the required production protocols despite potential higher yield and income, limit their adoption.

High cost of fertilizer and pesticides

The high cost of fertilizer and pesticides decreases their use in the farms, resulting in less need for labor and eventually resulting in low volumes of produce, hence, low harvests. This decreases productivity and profit, thus limiting expansion.

The cost of fertilizer (13%) and pesticides (6%) account for almost 20 percent of total production costs based on a survey conducted in North Cotabato (WB 2014). This survey showed that the cost of inputs can be higher by 7 percent if supplied by financiers. The price of urea and potash is highest in the Philippines compared to other countries, particularly China, India, Viet Nam, Thailand (same price with the Philippines for urea), and Indonesia (Bordey 2014).

Insufficient access to irrigation

When access to irrigation is insufficient, there is a decreased use of labor due to limited cropping frequency and lower volume of produce. This also keeps farmers from intercropping, thus no additional labor is created.

This situation exists because many of the farms have not yet been irrigated, while some existing irrigation facilities need to be rehabilitated. Rainfed areas depend on rain and water pumps. However, in some areas in Mlang, the use of water pumps is not economical. The water source is too deep and would consume more fuel. Because of this, farmers plant rice during rainy season only, or one cropping per year. Limited water also results in low production at 50 sacks/ha in one year.

In North Cotabato, about 70 percent of the total number of ha planted to rice are irrigated (Appendix 14). The remaining 30 percent are rainfed, of which 23 percent are lowland and 7 percent is upland. In Mindanao, about 64 percent of the total number of ha planted to rice are irrigated, which is lower compared to the national average of 69 percent.

Limited access to credit

Limited access to credit decreases labor due to low productivity and, hence low labor use for postproduction activities. In addition, it decreases profit, thus limiting expansion.

Total production cost based on the survey (WB 2014) in North Cotabato is more than PHP 50,000/ha. Farmers will need this amount to buy seeds and fertilizer and hire labor. They have to borrow money for production and to pay for daily expenses. Their main source of financing is their own capital, while others borrow cash from relatives and friends or acquire inputs from traders.

Due to limited capital, farmers were unable to buy the necessary production inputs and high quality seeds, thus affecting their productivity. Based on the survey, farmers, particularly those who did not get financing, were unable to apply the required inputs.

High labor cost

High labor cost decreases labor and profitability, thus limiting expansion. Labor cost in North Cotabato accounted for 22 percent of the total production cost (WB 2014). One of the reasons behind this is the low supply of labor particularly in the last five years. For example, labor cost for transplanting was only PHP 2,200–2,500/ha two years ago. Today, it costs PHP 4,000–4,500/ha. In fact, some laborers working in Mlang come from other municipalities like Kabacan and even outside the province.

Another reason is the low level of mechanization (Bordey 2014; Javier 2014). According to Bordey (2014), labor use in rice is high in importing countries like the Philippines and Indonesia but low in rice-exporting countries like Viet Nam and Thailand. There are several reasons why some machines are not being adopted by farmers. One factor is their suitability. A drum seeder, for example, will get stuck in the mud if the water is too deep. Another is the difficulty of shifting to mechanization, which would disturb existing labor arrangements.

Limited intercropping

Intercropping increases jobs. However, intercropping in rice production is limited in North Cotabato (WB 2014; CRS 2015).

The potential of intercropping to increase farmers' incomes has not been fully exploited compared with other countries (Javier 2014). According to the International Rice Research Institute, it has many advantages that include expanding food and income sources, increasing farm productivity, and minimizing risks such as pest and diseases associated with monoculture (IRRI 2015). But this system would only be feasible in areas where access to market and water is adequate, with sufficient rainfall and good soil. This is true for the rice farmers in Barangay Buayan in Mlang who planted mongo and watermelon as intercrops for rice. Watermelon basically needs daily watering, and the usual irrigation alone is not enough. Irrigation is sometimes diverted to another area and thus, water is pumped up from a river. However, very few farmers are intercropping with watermelon due to the high cost of production. Although a farmer may get a profit as much as PHP 100,000/ha, inputs and labor costs require a minimum of PHP 50,000/ha (Appendix 15). In addition, the price is erratic, ranging from PHP 6 to PHP 10/kg.

Postharvest

Insufficient drying facilities

Insufficient drying results in low selling price and, in effect, decreases profitability and income, thus limiting expansion. Farmers sell wet palay to buyers. Even if the price is higher by PHP 1.00–2.00/

kg for dried palay, farmers opt to sell them wet due to limited drying facilities especially during wet season. Based on a survey (WB 2014), farmers perceived drying to be laborious and an additional cost. Furthermore, they need immediate cash. The price difference cannot cover the delays, the cost of drying, and risk of losses when palay is exposed to rain. Drying fees contribute only 2 percent of the total cost. However, the price is further discounted by about PHP 1.30/kg or a reduction of an average of 4.5 kg/sack when the palay is very wet. Because of this, some farmers perform "skin drying" especially during wet season to avoid further discounting of price. Skin drying is a preliminary step that takes only three to four hours using a waterproof canvass spread on roads or on multipurpose drying pavements. Full drying takes two days or more to achieve a 14-percent moisture content which can be classified by buyers as "dry".

Poor road conditions from the farm to postharvest facilities and markets

Poor road condition increases labor since manual and animal hauling are needed especially during wet season. This increases cost and decreases profitability, thus limiting expansion. This is a prevailing issue for farmers especially in distant barangays where roads become impassable to trucks during heavy rains (WB 2014). It is difficult for farmers to bring inputs to the farm and transport palay to drying areas. They use motorcycles, animal power, and manual hauling which are more expensive ways of transporting inputs and produce.

Due to the poor road conditions, some farmers opt for a pick-up arrangement. While this lowers the cost of transport, however, it limits price options since they are forced to sell directly to those who offer to pick up their produce (WB 2014).

Limited storage facilities

These issues are related to the fact that many producer organizations are weak and not competitive in providing marketing services. These issues lower the price and decrease profitability, hence restricting expansion.

Farmers in North Cotabato store small amounts of their harvest mainly for home consumption. Storing rice to take advantage of higher prices would be difficult for individual farmers due to the limited volume and high cost of storage. It is also difficult for organized farmers to encourage other farmers to sell to their organization for lack of storage facilities due to limited funds.

Processing

Power interruptions that cause delays and increase milling cost

A problem faced by traders was the frequent power interruption in North Cotabato that delayed the milling process. Consequently, this delays the supply from traders to wholesalers. Power interruptions which last up to eight hours per day delay the milling process and increase cost. Laborers are forced to work overtime when the power is restored.

Marketing and other issues

High cost of transportation

Aside from the high cost of fuel and the long distances, another factor affecting the cost of transportation is the road condition. In the case of trader/financiers in North Cotabato, the farms are usually inaccessible especially during rainy days. Bad road conditions cause delays in travel time and increase the cost of fuel and vehicle repairs and maintenance. To avoid being stuck in bad

roads, trucks are not loaded to their optimum capacity, reducing the cargo weight by 20 percent and therefore increasing the transport cost per unit of palay. In addition, the delays affect the repayment of their financing. In effect, farmers would not be eligible for financing the next time and would not be able to plant for the next cropping season. This would mean a decrease in job opportunity.

Weak producer organizations

Survey data showed that rice farmers who were organized had better productivity and profits compared to those who were not. The average productivity of rice farmers in the municipalities of Mlang, Midsayap, and Pikit in North Cotabato, and Lambayong in Sultan Kudarat was 6.3 tons, compared to 5.8 tons for those who were not organized. Their net income was also higher by 65 percent compared to those who did not belong to any farmers' group, earning PHP 31,845. However, there are few examples of successful producer organizations that help address issues such as accessing better prices, managing common service facilities, and credit. But for those with weak producer organizations and low productivity and profit, expansion is not an attractive option.

Limited access to effective and sustained extension services

One of the reasons for low productivity in rice is limited access to effective and sustained extension services. Agricultural extension services have been devolved from the national agencies such as the Department of Agriculture to local government units (LGUs). However, most LGUs have limited resources and manpower to provide these services effectively. In the case of rice, many of them are dependent on the programs of national agencies. Some LGUs have only one agricultural technician for every five barangays. With low productivity, expansion for rice production is not an attractive option.

EFFECTS OF ADDRESSING CONSTRAINTS ON JOB CREATION

Direct and indirect effects on job creation can be realized if recommendations to address, particularly the severe constraints, are implemented. The effects can be calculated using the baseline jobs estimated.

It is assumed that a total of 31,118 potential jobs would be created in Mindanao if recommendations listed in Appendix 16 are implemented. Only recommendations that have a direct impact on job creation are considered. Other recommendations that are assumed to indirectly affect job creation are discussed in the next section.

Adequate access to better seeds

Access to better seeds will generate about 1,833 additional jobs. Currently, areas harvested with hybrid rice represent only 2 percent of the total rice areas in Mindanao, while the national average is 4 percent as of 2014. Increasing it further to 10 percent would generate 7,036 more jobs. The necessary additional areas can be taken or converted from irrigated areas currently planted with inbred seeds. Since hybrid seeds produce a higher volume of production, this would translate to more jobs created in the postproduction stage.

Sufficient access to irrigation

Increasing the current irrigated areas from 64 percent in Mlang, 70 percent in North Cotabato, and 65 percent in Mindanao to 80 percent would generate additional 627, 2,114, and 30,231 jobs

in Mlang, North Cotabato, and Mindanao, respectively. It is assumed that these additional areas would be rainfed having one cropping only, thus, once irrigated will have two croppings and generate almost double the number of jobs.

Intercropping of irrigated areas

Only 2 percent of irrigated areas planted with inbred seeds were identified as rice farms adopting the "rice-rice-watermelon/mongo" production system in Mlang. Assuming that Mlang has the same percentage of intercropped areas as the whole of Mindanao, about 6,357 jobs would be generated for Mindanao. Few farmers are intercropping with watermelon due to the high cost of production and the fact that it is labor intensive. Assuming an additional 5 percent of irrigated areas would be intercropped with watermelon, an additional 71 jobs would be created in Mlang, and 371 and 3,805 in North Cotabato and Mindanao, respectively.

Increased organic rice production

Currently, organic rice-producing areas in Mindanao constitute less than 1 percent. With the increasing demand for organic rice both in domestic and export markets, expansion for organic rice production areas becomes attractive. Increasing organic rice-productive areas to 5 percent would generate 2,739 additional jobs in Mindanao. If these areas are further increased to 10 percent, 3,074 more jobs would be generated. Organic rice production generates more jobs than conventional rice.

Better road conditions from farm to postharvest facilities and markets

With better road conditions, transporting and hauling palay from the farm to postharvest facilities would be faster and less costly. During rainy season, some roads are usually impassable, doubling the hauling time and cost. It is assumed that 50 percent of the areas are affected by bad road conditions during wet season. Once addressed, there would be about 481 less jobs from transport and hauling services. However, temporary jobs would be created for the road repair and maintenance. Eventually, expansion for rice production becomes attractive when income is increased due to decreased postharvest expenses.

Mechanization

There would be a reduction of jobs with the use of the drum seeder for planting, combine harvester for harvesting and threshing, and flat-bed dryer for drying. Assuming that 5 percent of lowland areas for both rainfed and irrigated are mechanized, jobs would be reduced by up to 5,638 in Mindanao. Drum seeders and combine harvesters are available in some areas. However, very few use them due to issues of suitability to the area particularly during rainy season. Moreover, the drum seeder is designed such that seeds are distributed thinly and would require more replanting when they fail to germinate, not to mention its limited availability especially during planting season. The combine harvester, on the other hand, is not popular since it was only recently introduced to farmers. Flat-bed dryers are available in Mlang but are seldom used because they are considered laborious and, moreover, only a few units are available.

If mechanization is further increased by about 10 percent, the reduction in jobs can reach to 11,277. However, reduction in labor also reduces costs and, subsequently, increases profit.

Each of the recommendations also has indirect effects on job generation. For example, adequate access to better seeds would not only increase jobs but also increase the farmer's volume of production and productivity, which would then result in increased profit. Similarly, more irrigation increases productivity and profit. While mechanization reduces labor, it lowers the cost to produce and, subsequently, increases the farmers' profit. Other recommendations also have similar indirect effects.

Direct effects of the aforementioned recommendations on job creation would result in 31,118 additional jobs. Their indirect effects, including the other recommendations on improving access to credit, peace and order conditions, enhancing extension services, among others, are estimated to result in 5,554 more jobs. This assumes an expansion of 4 percent in area or an additional 48,000 ha due to better profits in rice production. The average growth of Mindanao in terms of rice production area from 2005 to 2014 was only 1.5 percent. This could increase further if farmers invest in higher levels of technology such as the use of hybrid seeds and better fertilization and pest management.

Considering both direct and indirect possible effects of implementing these recommendations, employment in Mindanao would be increased by 36,672 more jobs (Appendix 17).

CONCLUDING COMMENTS

Clearly, rice contributes substantially in terms of job generation particularly in conflict areas where the poverty incidence is high. Majority of the jobs created is in the production node that provides opportunities particularly for the landless farmers. However, there are severe constraints particularly in the production node that limit job generation. Nevertheless, aggregate estimates generated should be applied with caution since they were based on cases in the chain where the level of technology or substitution of labor with other inputs varies. The suggested strategies, if implemented, are expected to significantly enhance job generation potential. However, the net benefits of implementing these strategies will have to be examined. Further research in terms of quality of jobs and cases to cover other locations can provide more insight into the impacts of these constraints and help improve estimates from the case covered in this research.

APPENDIXES

Appendix 1. Estimated number of jobs generated in Mindanao, 2014

Region	Area in Hectares	Annual Jobs* Generated (with 2 croppings)	Total Annual Wages** (in PHP thousand)	Total Cost of Investment/ Production Cost/ Working Capital (in PHP thousand)
Zamboanga	163,096	95,939	5,871,456	6,189,330
Northern Mindanao	161,414	94,949	5,810,904	6,677,374
Davao	103,822	61,072	3,737,592	5,347,871
SOCCSKSARGEN	346,906	204,062	12,488,616	15,136,203
Caraga	174,170	102,453	6,270,120	6,178,158
ARMM	217,422	127,895	7,827,192	8,337,264
Total Mindanao	1,166,830	686,371	42,005,880	48,283,425
Philippines	4,739,672	2,788,042	170,628,198	201,317,575

*(1.7 hectares: 1 full-time job)

** Based on 2015 latest wage in agriculture

SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos City

ARMM = Autonomous Region in Muslim Mindanao

Sources: Department of Labor and Employment (2015); Philippine Statistics Authority [PSA] (2015)

Appendix 2. Top rice-producing provinces in Mindanao, 2005–2014

Province	Area				Volume				
	Area in Hectares		Percent Share to Mindanao		Volume (in metric tons)		Percent Share to Total		Jobs Generated
	Average 2005–2014	2014	Average 2005–2014	2014	Average 2005–2014	2014	Average 2005–2014	2014	2014
North Cotabato	126,919	129,452	12	11	477,397	530,029	12	12	76,148
Sultan Kudarat	114,081	115,605	11	10	404,582	440,496	10	10	68,003
Maguindanao	142,130	154,935	13	13	404,786	386,534	10	9	91,138
South Cotabato	81,829	87,268	8	7	302,325	344,892	8	8	51,334
Bukidnon	78,976	94,175	7	8	325,319	426,641	8	10	55,397
Zamboanga del Sur	70,231	75,171	6	6	302,848	341,395	8	8	44,218
Agusan del Sur	64,094	87,973	6	8	208,112	292,019	5	7	51,749
Lanao del Sur	58,914	59,220	5	5	170,894	164,117	4	4	34,835
Zamboanga Sibugay	44,218	44,352	4	4	159,066	173,535	4	4	26,089
Lanao del Norte	39,565	40,214	4	3	151,852	171,770	4	4	23,655
Other Mindanao provinces	262,602	278,465	24	24	961,631	1,047,877	25	24	163,803
Mindanao	1,083,558	1,166,830	100	100	3,868,813	4,319,305	100	100	686,371

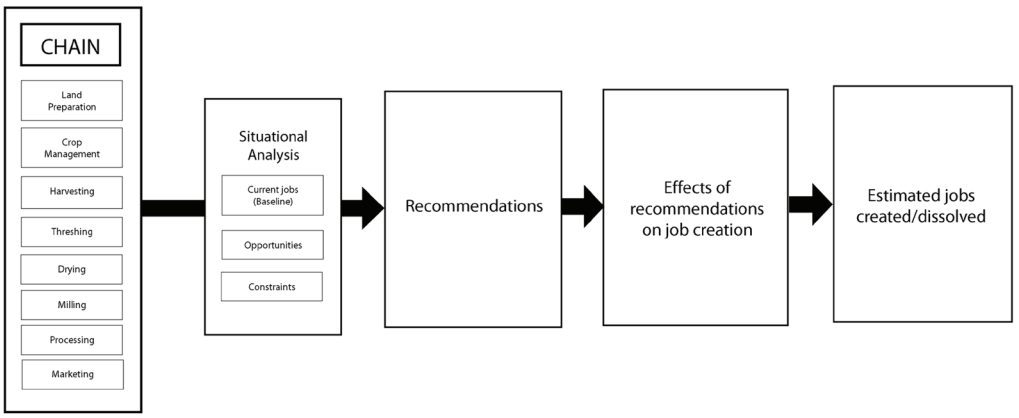
Source: PSA (2015)

Appendix 3. Data sources used in the analysis

Type of Data	Source of Data	Number
Primary data	*Key informant interviews*	8
	Farmers	7
	Millers/Traders	2
	Input suppliers (seeds, fertilizers, etc.)	2
	Processors	4
	Government	10
	Irrigators association	3
	Focus group discussions	3
	Rice farmers, irrigators, input supplier	5
	Local government unit	4
	Processors	4
Secondary data (surveys)	Survey of rice farmers from a World Bank study on logistics in North Cotabato and Sultan Kudarat (2014)	240 farmers
	Survey of rice farmers in Mindanao from FARM project CRS (2015)	260 farmers

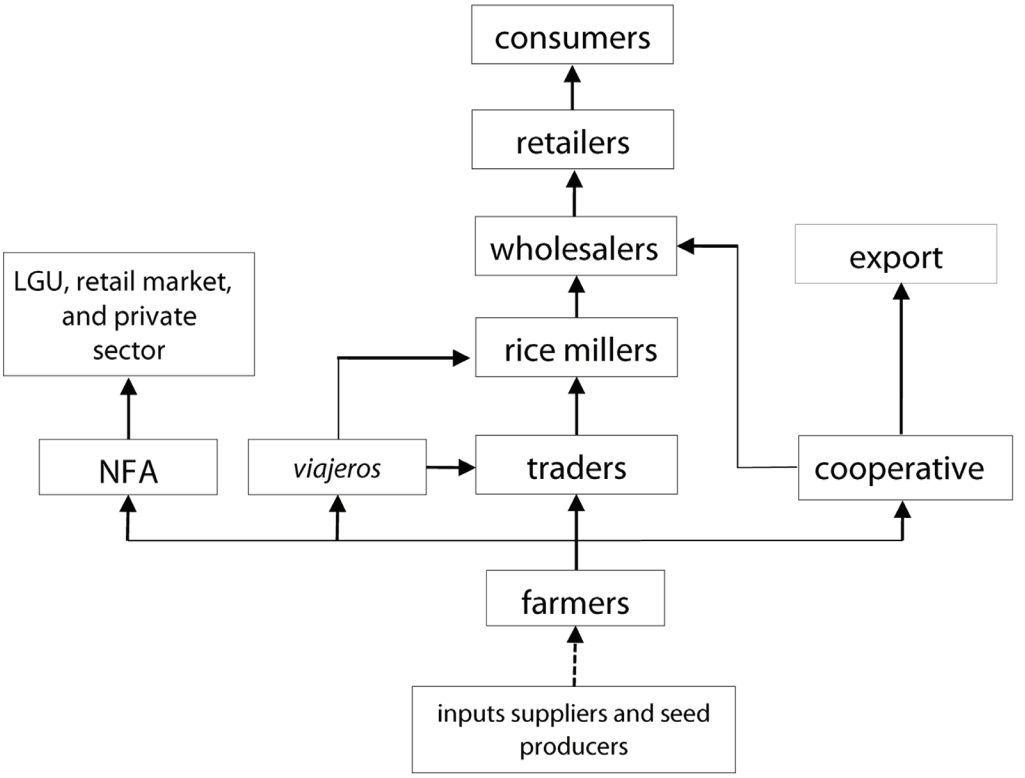
Source: Authors' compilation based on key informant interviews; World Bank [WB] (2014); Catholic Relief Services (2015)

Appendix 4. Jobs value chain analysis



Source: WB (2015)

Appendix 5. Rice value chain map in North Cotabato



LGU = local government unit; NFA = National Food Authority
Sources: Authors' rendition based on key informant interviews (2015); WB (2014)

Appendix 6. Mlang rice value chain jobs generation per hectare (organic/irrigated area)

Actor/Node	Activities	Man-days / Season (per hectare)	1 year FTE (2 seasons)
Farmers	*Production*	50.83	0.33
	Land preparation	8.32	0.05
	Crop management	42.51	0.27
	Postproduction	22.75	0.15
	Harvesting	20	0.13
	Threshing	1.5	0.01
	Hauling	1.25	0.01
Trader Wholesaler-miller Cooperative	*Processing*	9.81	0.06
	Hauling	0.38	0.00
	Drying	6	0.04
	Milling	1.17	0.01
	Packing	1.28	0.01
	Trucking	.99	0.01
Wholesaler	Marketing	.03	0.00
Retailer			
Total		83.43	.53

FTE = full-time equivalent
Source: Authors' compilation based on key informant interviews (2015)

Appendix 7. Mlang rice value chain jobs generation per hectare (inbred/irrigated area)

Actor/Node	Activities	Man-days / Season (per hectare)	1 year FTE (2 seasons)
Farmers	*Production*	34.13	0.22
	Land preparation	6.25	0.04
	Crop management	27.88	0.18
	Postproduction	28.54	0.18
	Harvesting	25	0.16
	Threshing	1.46	0.01
	Hauling	2.08	0.01
Trader Wholesaler-miller Cooperative	*Processing*	9.50	0.06
	Hauling	0.63	0.00
	Drying	6.67	0.04
	Milling	1.80	0.01
	Trucking	0.41	0.01
Wholesaler	*Marketing*	3.20	0.02
Retailer	Wholesaling	1.79	0.01
	Retailing	1.41	0.01
Total		75.36	0.48

FTE = full-time equivalent
Source: Authors' compilation based on key informant interviews (2015)

Appendix 8. Job generation from watermelon production activities in Mlang, North Cotabato

Activities	Man-day/Hectare/Cropping	Full-time Equivalent
Seedling preparation	4.55	0.01
Planting	6.82	0.02
Watering and fertilizing	9.45	0.03
Harvesting and hauling	0.68	0.00
Total labor	21.50	0.07

Source: Authors' compilation based on key informant interviews (2015)

Appendix 9. Job generation from mongo production activities in Mlang, North Cotabato

Activities	Man-day/Hectare/Cropping	Full-time Equivalent
Broadcast (*sabwag*) planting	0.25	0.0008
Spraying	0.38	0.0012
Harvesting	9	0.0288
Drying	0.38	0.0012
Cleaning	3.38	0.0108
Hauling	0.02	0.0001
Total production and postharvest	13.40	0.04

Source: Authors' compilation based on key informant interviews (2015)

Appendix 10. Jobs generated per hectare of rice by type of seeds and type of water source

Node	Jobs Generated per Hectare of Land		
	Organic	Inorganic/Inbred (irrigated)	Rainfed*
Production	0.33	0.22	0.03
Land preparation	0.05	0.04	0.02
Crop management	0.27	0.18	0.01
Postproduction	0.15	0.18	0.03
Harvesting (manual)	0.13	0.16	0.03
Threshing	0.01	0.01	0.00
Hauling (field to highway)	0.01	0.01	0.00
Processing	0.06	0.06	0.01
Hauling (highway to millers)	0.00	0.00	0.00
Drying (dry season)	0.04	0.04	0.01
Milling and packing	0.02	0.01	0.00
Trucking	0.01	0.00	0.00
Marketing	0.0002	0.02	0.01
Overhead	0.00	0.00	0.00
Wholesaling	0.00	0.01	0.00
Retailing	0.00	0.01	0.00
Total labor	0.53	0.48	0.08

* 1 cropping per year

Source: Authors' compilation based on key informant interviews (2015)

Appendix 11. Jobs generated in Mlang, North Cotabato, and Mindanao by type of seed and type of water source

Nodes	Total Jobs Generated*		
	Mlang	North Cotabato	Mindanao
Number of hectares harvested	22,868	125,731	1,189,266
Production	1,893	10,977	97,516
Land preparation	469	2,576	24,203
Crop management	1,425	8,400	73,314
Postproduction	1,577	9,110	83,141
Harvesting (manual)	1,379	7,968	72,688
Threshing	102	564	5,300
Hauling (field to highway)	97	578	5,152
Processing	553	3,167	28,895
Hauling (highway to millers)	36	205	1,899
Drying (dry season)	387	2,215	20,294
Milling and packing	105	604	5,453
Trucking	25	143	1,250
Marketing	180	1,026	9,691
Overhead	0	3	25
Wholesaling	100	572	5,407
Retailing	79	451	4,259
Total labor (rice)	4,204	24,280	219,244
Intercropping	45	284	2,552
Total labor	4,249	24,564	221,796

*Based on hectares planted in 2014

Sources: Bureau of Agricultural Statistics (2012); Provincial Agriculture Office [PAGRO] (2014); *Sunstar* (2014); Don Bosco Multi-Purpose Cooperative (2015)

Appendix 12. General cost structure of rice for the municipality of Mlang, North Cotabato

Mlang	Average per Kilo	Share to Total Costs (%)
Production cost		
Seeds	0.81	7.1
Chemical fertilizers	1.41	12.3
Pesticides/Herbicides	0.67	5.9
Labor		
Family labor	0.77	6.7
Hired labor	1.42	12.4
Transport of inputs	0.28	2.5
Interest expense	0.18	1.5
Irrigation	0.16	1.4
Equipment	0.47	4.1
Depreciation	0.53	4.6
Land rental		
Sacks		
Total expense	6.62	58.1
Postproduction cost		
Thresher and harvester costs	0.21	1.8
Personal share	3.37	29.4
Drying fees	0.17	1.5
Transport costs		
Farm to dryer/storage	0.12	1.0
Farm/dryer to buyer	0.17	1.5
Fuel cost	0.02	0.2
Labor cost (hauling)	0.04	0.3
Food	0.28	2.5
Losses	0.40	3.5
Total postproduction cost	4.77	41.7
Total cost	11	
Logistics cost	1.41	11.6
Volume sold (in kilograms)	0	
Average price	0	
Total sales	0	
Net profit	2.94	

Source: WB (2014)

Appendix 13. Total area harvested and productivity in North Cotabato by type of seed, 2014

Type of seed	Total Number of Hectares	Percent to Total	Area Harvested in Hectares (Irrigated)	Production (in metric tons)	Productivity
Hybrid	1,420	1	1,420	8,834	6.22
Certified	30,635	24	25,521	135,965	5.33
Good	93,676	75	60,936	307,206	5
Total	125,731	100	87,877	452,005	

Source: PAGRO (2015)

Appendix 14. Percentage of irrigated rice areas in North Cotabato, 2014

Municipality/ City	Irrigated		Rainfed		Total		Percent Irrigated
	Area Harvested (ha)	Production (MT)	Area Harvested (ha)	Production (MT)	Area Harvested (ha)	Production (MT)	
Alamada	886	4,243	2,865	9,393	3,751	13,636	24
Aleosan	314	1,308	3,096	13,119	3,410	14,428	9
Antipas	3,034	13,646	920	3,529	3,954	17,175	77
Arakan	1,878	6,647	516	1,364	2,394	8,011	78
Banisilan	201	598	4,843	15,072	5,044	15,670	4
Carmen	5,785	30,956	1,006	3,922	6,791	34,878	85
Kabacan	13,080	65,319	887	3,792	13,967	69,111	94
Kidapawan City	1,688	7,079	414	1,737	2,102	8,816	80
Libungan	3,294	15,973	616	2,363	3,910	18,335	84
Magpet	1,037	4,339	128	531	1,165	4,870	89
Makilala	1,933	9,391	0	0	1,933	9,391	100
Matalam	6,518	32,526	3,111	12,883	9,629	45,409	68
Midsayap	12,116	69,170	3,215	13,819	15,331	82,989	79
Mlang	14,526	81,296	8,342	35,396	22,868	116,692	64
Pigcawayan	4,361	18,688	1,138	4,580	5,499	23,268	79
Pikit	1,342	6,013	3,921	15,233	5,263	21,246	25
President Roxas	4,777	22,176	1,256	3,887	6,033	26,062	79
Tulunan	11,108	62,636	1,580	6,794	12,688	69,429	88
Total	87,877	452,004	37,855	147,412	125,731	599,417	70

ha = hectares; MT = metric tons
Source: PAGRO (2015)

Appendix 15. Sales and cost of one hectare of watermelon production

Particulars	Amount in PHP	
Sales		150,681.82
Inputs and labor	50,000.00	
Seedlings	2,386.36	
Seeding	909.09	
Planting	1,363.64	
Harvesting	12,600	
Total cost		67,259.09
Profit		83,422.73

Source: Authors' compilation based on key informant interviews (2015)

Appendix 16. Direct effect of the following recommendations to employment in the production and postharvest nodes in Mlang, North Cotabato, and Mindanao

Recommendations	Direct Potential Impact on Employment (Increase or decrease in jobs)		
	Mlang	North Cotabato	Mindanao
Input/Production			
Adequate access to better seeds	16	263	1,833
Sufficient access to irrigation	627	2,114	30,231
Increase organic rice production	13	56	1,369
Intercropping of 10 percent of irrigated areas	71	371	3,805
Better road conditions from farm to postharvest facilities and market	(9)	(60)	(481)
Mechanization (planting, harvesting, and drying) of about 5 percent of lowland areas (both irrigated and rainfed)	(108)	(642)	(5,638)
Total	609	2,102	31,118

Source: Figures were derived by converting the number of man-days to job equivalent for one year. Data were gathered from key informant interviews.

Appendix 17. Potential impact of recommendations on employment in Mindanao

Recommendations	Potential Impact on Employment in Mindanao (Increase or decrease in jobs)		
Input/Production	**Direct**	**Indirect**	**Total**
Adequate access to better seeds	1,833	Increase in profit and income due to: Increase in volume of production Higher productivity Increase in price Decrease in cost Lower transport cost Increase in profit and income will create need for area of expansion (assumed at 4% additional land areas for hybrid and inbred with irrigation)	
Sufficient access to irrigation	30,231		
Intercropping of 10 percent of irrigated areas	3,805		
Increase organic rice production	1,369		
Mechanization (planting, harvesting, and drying)	(5,638)		
Better road conditions from farm to postharvest facilities and market	(481)		
Strengthen producer organizations			
Improve peace and order conditions			
Enhance access to effective and sustained extension services			
Improve access to credit			
Address high cost of fertilizer and pesticides			
Improve storage facilities (farm)			
Improve power supply			
Enhance adoption of intercropping and farm diversification			
Adequate drying facilities			
Enhance product differentiation			
Improve road conditions and ongoing repair and maintenance in major roads			
Total	31,118	5,554	36,672

Source: Figures were derived by converting number of man-days to job equivalent for one year. Data were gathered from key informant interviews.

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The Fertilizer Industry and Philippine Agriculture: Policies, Problems, and Priorities[1]

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ABSTRACT

The fertilizer policy in the country has evolved from pervasive interventionism in the 1970s to today's market-oriented regime. Government has abandoned price policies and subsidies, focusing rather on standard setting, quality regulation, and training. Over the same period, domestic demand for fertilizer has continually increased, though recently, resurgent fertilizer prices have reduced total utilization. Evidence suggests that farmers (at least in the case of rice) are underapplying fertilizer, forfeiting efficiency gains at the margin. On the supply side, imports have in the past few decades emerged as the main source of fertilizer, as domestic production has dwindled. With deregulation, numerous private sector players have taken over its distribution; analysis of the supply chain points to low marketing margins. Integration analysis fails to find systematic arbitrage opportunities between the domestic and world markets. Within the domestic market, however, there remain large disparities in prices across regions. Priorities for research and policy are therefore understanding the behavior of farmers in terms of fertilizer application, and addressing internal price disparities, perhaps by improved transport infrastructure and logistics.

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OVERVIEW

Mineral fertilizer makes a tremendous contribution to the productivity of Philippine agriculture. This paper examines this contribution and the role of fertilizer policies in the development of the fertilizer industry, and outlines a way forward for continuing the development of the industry. The paper focuses on several questions as key policy issues:

Are farmers applying the right amount of fertilizer? Economic theory shows that fertilizer use is optimized when its marginal contribution (in value terms) equals its price. Too much or too little application of fertilizer may raise cost per unit output and erode agriculture's competitiveness.

Is the price of fertilizer too high? The *Philippine Development Plan 2017–2022* (NEDA 2017, p. 252) affirms the need to review market competition in key inputs to production such as fertilizer and seeds. In a competitive market, the price of fertilizer (relative to output) will be brought down to its marginal product; in the presence of market power, price may not be competed down to this benchmark.

Is market structure a factor in keeping fertilizer prices high? Perhaps there are still policies that introduce barriers to entry and related distortions in the fertilizer market.

The paper concludes with a discussion of remaining areas for further research, as well as implications on the country's policies related to fertilizer demand and supply.

EVOLUTION OF FERTILIZER POLICY

During the postwar period, growing fertilizer demand was mostly met by increasing domestic production, supported by incentives and price policies. David and Balisacan (1981) summarize the postwar history of the fertilizer industry up to the 1970s. During the 1950s, the fertilizer industry was regarded as a "new and necessary" industry exempted from taxes and customs duties. Market policies in the form of controls and tariffs on fertilizer imports raised the domestic price of fertilizer. Government also extended subsidies, e.g., distribution of discounted fertilizers to sugar planters' cooperatives.

In 1973, government intensified interventions in the fertilizer industry, first establishing a Fertilizer Industry Authority (FIA) to regulate prices, imports, production, and marketing. Over the next two years, the authority imposed two-tier pricing: with food producers able to access fertilizer at an administered price that was lower than the market price. A supervised credit program was simultaneously launched, which incorporated a fertilizer subsidy. After 1975, the authority continued its price-targeting policy by imposing a quantitative restriction (QR).

In 1977, Presidential Decree (PD) No. 1144 reorganized FIA into the Fertilizer and Pesticide Authority (FPA). The PD assigned FPA a regulatory function over both fertilizers and pesticides to ensure the safety and efficacy of products sold in the market. However, the authority retained the mandate to "determine and set the volume of prices, both wholesale and retail, of fertilizer and fertilizer inputs".

In 1986, government began a series of reforms that allowed a much greater scope for market allocation and pricing. FPA ceded administrative controls (Alcala 2012), abandoned the QR, and the price-setting function (OP 1992). Import duties were also reduced over a series of tariff reduction programs. Currently, applied rates are in the range of 1–3 percent (Table 1). The Agriculture and Fisheries Modernization Act of 1997 furthermore allows duty-free importation by enterprises engaged in agriculture, conditional on direct use by these enterprises, i.e., plantations, aquaculture operators, farmer cooperatives, etc.

Table 1. Tariff rates for fertilizer products, Philippines (2015)

AHTN Code	Item	MFN[b] Rate	FTA Partner Rate[a]
3102.10.00	Urea	1	0
3102.21.00	Ammonium sulphate	3	0
3103.10.10	Superphosphate	1[b]	0
31.04	Potassic fertilizers	1	0
3105.20.00	Blended fertilizers	3	0

AHTN = Association of Southeast Asian Nations (ASEAN) Harmonized Tariff Nomenclature
MFN = most favored nation; FTA = free trade agreement
[a] ASEAN countries plus Australia, China, Japan, Korea, and New Zealand. India is a free trade partner by virtue of the ASEAN India Free Trade Agreement. However, fertilizer imports from that country are levied MFN rates.
[b] For feed grade superphosphate, the tariff rate is 7 percent.
Source: Tariff Commission (2015)

Together with opening the domestic market to foreign competition (thus making fertilizers cheaper), government has retreated from extending fertilizer subsidies. The remaining incentive for the sector is indirect, namely, the exemption of sale and importation from the 12 percent value-added tax.

As mentioned earlier, fertilizers were part of the package of technology promoted under *Masagana 99* based on subsidized credit and inputs. Even without subsidy, mineral fertilizers continued to be a prominent fixture in the country's agricultural programs. After an initial enthusiasm over the new technologies, in the 1980s and 1990s, the government began to promote judicious and scientific use of agri-chemicals under Integrated Pest Management and balanced fertilization and site-specific nutrient management (SSNM). SSNM is defined as the dynamic field-specific management in a particular cropping season to optimize supply and demand according to their variation in time and space (Dobermann and Witt 2004).

Regulations on importation and manufacture are now directed toward maintaining product quality and standards. Imports need not be accompanied by a permit; instead, licensed fertilizer importer-distributors can bring in registered fertilizer products. An import license is good for one year (subject to renewal) and may be obtained within three days of filing. Requirements for a license are as follows:

- Duly accomplished and notarized application form (original copy) with documentary stamps
- Business Name Registration Certificate (Securities and Exchange Commission/Department of Trade and Industry/Cooperative)
- Copy of latest income tax returns and financial statements
- Copy of Distributorship Agreement/Certification with mother company
- List of distributors and dealers per province by region (for importer-distributors)
- Product registration approval of all fertilizer grades to be sold
- Inspection and recommendation by the FPA regional/provincial officer on their area coverage
- Registration of fertilizer warehouse
- Filing and license fee

Registration of fertilizer products is good for three years, and will take not more than 265 days for new products and only 65 days maximum for renewal (FPA 2016). Requirements for registration are:

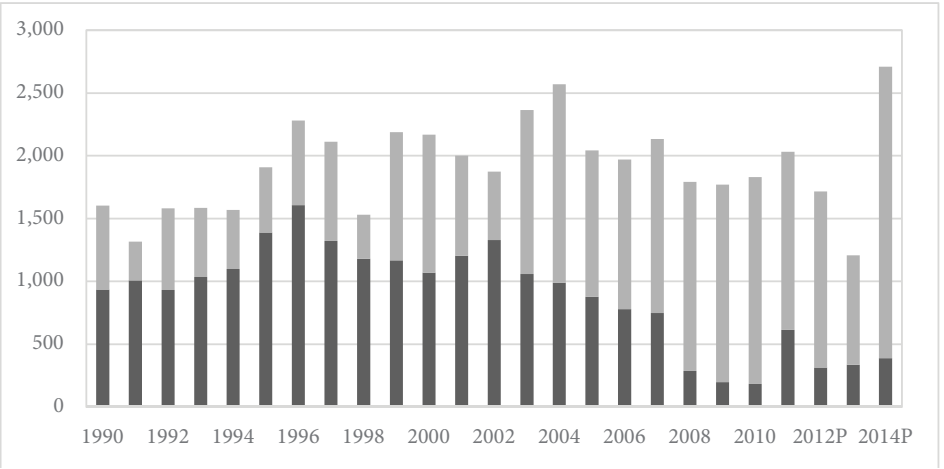
- Schematic diagram/production process
- Sample of the product for confirmatory analysis at any FPA accredited laboratory
- Proposed label or bag
- Certificate of analysis from the source/country of origin
- Brochure/pamphlets of exporting/manufacturing firm or company profile
- Test for pathogens
- Bioefficacy data: test crop
- Experimental Use Permit (if applicable)
- Completeness of data
- Filing and registration fee

DEMAND-SIDE ISSUES

Trends in fertilizer consumption

Consumption has followed an upward trend since 1990, punctuated by occasional sharp declines. Figure 1 presents estimates of fertilizer consumption from 1990 onward using supply and utilization accounts from the Philippine Statistics Authority. Consumption is proxied by net supply, i.e., production plus net imports. Consumption has been on an upward trend since 1990, suffering a major decline in 1998 due to the nationwide drought brought about by El Nino. Note that consumption subsequently recovered to a peak of 2.6 million tons in 2004. Since then, consumption has declined, with another abrupt drop in 2008 when world fertilizer prices soared.

Figure 1. Annual consumption of fertilizer in '000 tons, 1990–2014

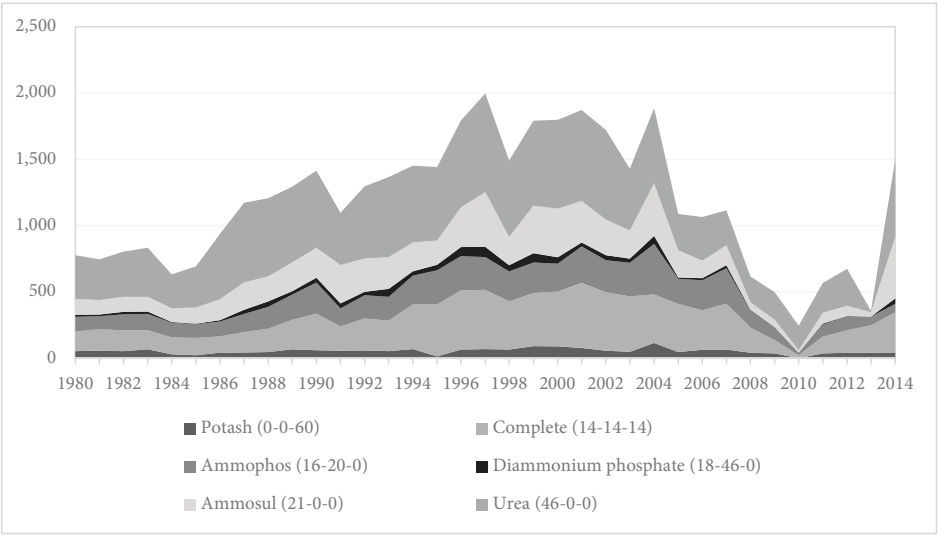


Source: CountrySTAT (Philippine Statistics Authority [PSA] n.d.)

Also noticeable in Figure 1 is the diminishing importance of domestic production in meeting demand. Domestic production accounted for at least 70 percent of consumption in the mid-1990s. However, by 2008–2010, the share of domestic production in consumption had fallen to an average of 12 percent. Domestic production could not keep pace with rising demand, which increasingly shifted to imports to take advantage of reduced trade barriers.

The most popular type of fertilizer in the country is nitrogen fertilizer. The major types of fertilizer in the country are potash (0-0-60), complete NPK (nitrogen, phosphorus, and potassium (14-14-14), ammonium phosphate (16-20-0), diammonium phosphate (18-46-0), ammonium sulfate (21-0-0), and urea (46-0-0). The main type of fertilizer consumed has usually been nitrogen based. Until recently, next in importance are phosphate-based fertilizers (Figure 2). The largest shares in consumption are urea and ammonium sulfate, which account for about half of quantity sold in recent years. The next in rank is complete NPK fertilizer, accounting for one-fifth to a quarter of fertilizers sold by volume.

Figure 2. Utilization of fertilizer by major type in '000 tons, 1980–2012



Source: Fertilizer and Pesticide Authority (2014)

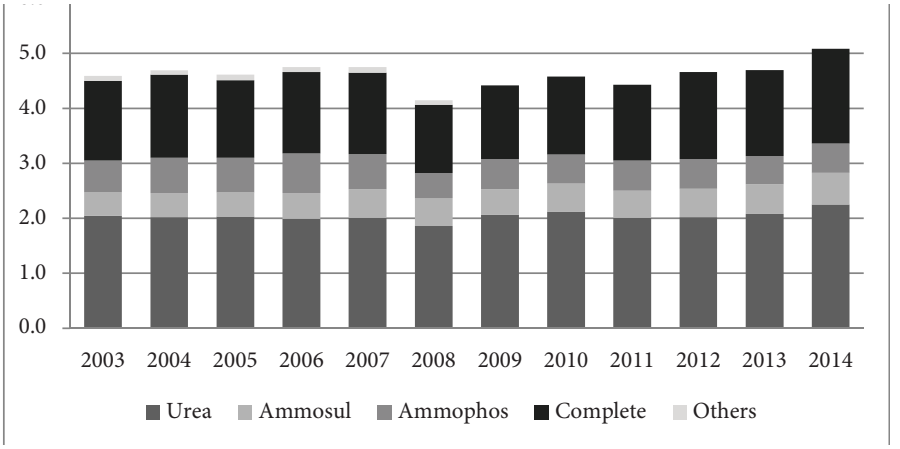
The major users of fertilizer are cereals, followed by fruits and vegetables, and sugarcane. About 60 percent of fertilizer consumption goes to food crops, mainly rice and corn (Mojica-Sevilla 2006). This is consistent with Bunoan-Olegario (2011) who estimates that rice accounts for 38 percent of fertilizer use, followed by maize (21 percent). The next major users are fruits and vegetables, at 19 percent; sugarcane accounts for 7 percent; and other crops, 15 percent.

For both paddy rice and maize, fertilizer application has ranged between 200 and 250 kilograms (kg) per hectare (ha), with paddy rice being slightly higher (Figures 3 and 4). In both, the biggest item is for urea, about 100 kg/ha for either crop. The next biggest category is complex NPK fertilizer, between 70 and 80 kg/ha for paddy rice, and 55–65 kg/ha for maize.

Table 2 reports fertilization rates by major crop, based on actual nutrient applied (instead of fertilizer quantity). By proportion of area harvested, the extent of fertilizer application is widest with rice, followed by sugarcane, maize, palm oil, potato, and tobacco. Highest nitrogen fertilizer rate is found for sugarcane, potato, and cocoa. Sugarcane also exhibits the highest fertilization rate for phosphorus at 55 kg/ha (together with potato); the highest fertilization rate for potassium is rubber, followed by palm oil.

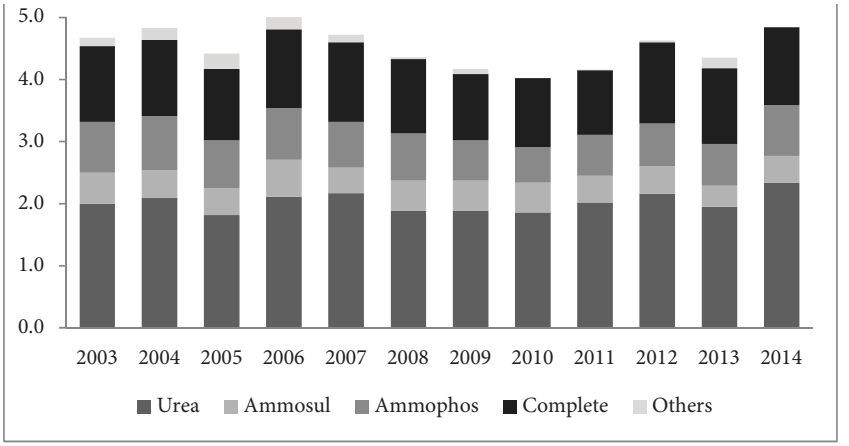
Fertilizers account for a significant but still minor share in production cost (Table 3). The highest shares are observed for several types of fruits and vegetables, and lowest for root crops, with cereals in between (about 10–5 percent share). The high fertilizer costs for fruits and vegetables apparently

Figure 3. Fertilization rate in 50-kilogram bags per hectare for paddy rice, 2003–2012



Source: CountrySTAT (PSA n.d.)

Figure 4. Fertilization rate in 50-kilogram bags per hectare for maize, 2003–2012



Source: CountrySTAT (PSA n.d.)

contradict the data in Table 2. The latter, though, pertains to the average for all vegetables, which includes many categories grown with lower intensity, such as peanut and mungbean (as seen in Table 3).

Impact and efficiency of fertilizer application

Fertilizer, combined with the adoption of modern crop varieties, was a major contributor to growth in agricultural productivity. Prior to the dissemination of IR-8—the prototypical "miracle rice" variety—only 14 percent of farmers applied fertilizer before transplanting and 41 percent after transplanting (Castillo 1975, citing Sumayao 1969). For the same group of farmers, in their fourth season of planting IR-8, 37 percent applied fertilizer before transplanting and 54 percent after. By the 1990s, close to 100 percent of farmers in irrigated areas apply mineral fertilizer (Horstkotte-Wesseler 1999).

Table 2. Extent and rate of fertilizer application, by type of nutrient, 2001

	Extent of Area Harvested (%)	Fertilization Rate (kg/ha)		
		Nitrogen	Phosphorus	Potassium
Rice	85	51	15	11
Sugarcane	80	85	55	30
Maize	80	58	16	10
Palm oil	80	75	25	70
Potato	80	85	55	45
Tobacco	80	75	20	55
Cocoa	50	85	45	45
Fruits	50	75	35	40
Vegetables	50	0.1	0	0
Coffee	40	0	0	0
Rubber	40	25	15	80
Coconut	30	20	15	10
Other crops	30	25	15	10
Groundnut	20	40	30	20
Soya	20	20	30	10

Source: Food and Agriculture Organization (2006)

The advantage of modern over traditional varieties is higher yields, larger yield increases, higher maximum yield fertilizer levels, and higher average productivity of fertilizer. The average maximum yield increase due to fertilizer during the dry season is 3.1 tons/ha in the case of modern varieties, but only 0.7 tons/ha for traditional varieties. The increment is smaller during the wet season, but still substantial (Barker et al. 1985).

Average productivity measured by the ratio of kg of rice per kg fertilizer was higher for modern varieties by 8.9 kg rice/kg fertilizer during the dry season and by 6.2 kg rice/kg fertilizer during the wet season. The coefficient of variation of yield implies that modern variety yields are less variable than traditional variety yields; that is, at any given level of applied fertilizer, there is a higher probability of receiving the expected yield with the modern varieties than with the traditional varieties. Hence, the country's rice output grew by 3.27 million tons over the period 1965–1980. Of this increment, 1.01 million tons or 30 percent could be attributed to increased fertilizer use (Herdt and Capule 1983).

These findings continue to hold in the post-Green Revolution period, i.e., fertilizer continues to contribute significantly to output. A panel data set covering the period 1995–1999 generated an estimate of output elasticity of fertilizer application of 0.11 (Shively and Zelek 2003). Using another panel data set spanning the period 1996–2007, Mariano et al. (2010) estimate the output elasticity of fertilizer for irrigated systems at 0.08.

In the case of rice, fertilizers are still being applied at below profit-maximizing levels. A number of studies indicate that Filipino rice farmers are applying insufficient quantities of fertilizer. In one study by the International Rice Research Institute (IRRI) (conducted in the latter half of the 1990s), farmer's practice is contrasted with SSNM (Gines et al. 2004). SSNM led to a significantly

Table 3. Fertilizer cost as a share in total cost, 2002–2011 (%)

	2002	2004	2006	2008	2010	2011
Cereals						
Maize	13.8	19.1	20.6	29.8	14.8	15.7
Paddy rice	8.3	12.7	13.9	16.1	10.0	11.1
Fruits						
Watermelon	14.4	20.3	22.4	30.6	21.5	25.4
Mango	9.8	14.1	15.8	15.8	20.1	23.6
Pineapple	16.9	24.1	27.6	27.6	21.8	21.3
Root crops						
Cassava	6.0	8.7	9.5	16.2	10.7	11.2
Sweet potato	5.5	8.1	8.8	14.1	8.6	8.6
Vegetables and others						
Tomato	17.1	22.9	25.8	34.2	24.8	27.2
Cabbage	16.0	20.5	21.3	33.0	24.4	24.4
Potato	12.0	15.8	17.8	26.1	22.3	22.1
Eggplant	26.2	18.3	20.1	28.2	21.0	21.3
Cauliflower	13.5	20.5	22.2	29.8	21.7	20.0
Bittermelon	9.5	13.9	15.2	21.4	14.6	18.2
Onion bulb	n.a.	n.a.	16.0	20.4	16.7	14.9
Garlic	n.a.	n.a.	9.7	15.5	9.5	10.1
Stringbeans	5.1	7.7	8.6	13.5	8.5	9.9
Peanut	1.2	1.8	2.0	3.2	1.9	2.3
Mungbean	0.4	0.6	0.6	0.9	0.5	0.6
Coffee	13.7	18.9	20.9	26.1	17.2	20.4

n.a. = not applicable
Source of basic data: CountrySTAT (PSA n.d.)

larger fertilizer cost. In their sample, rates of N were similar in SSNM and farmer practice (about 110 kg/ha), but more P and K were applied in the first year. Average fertilizer cost in SSNM was 45 percent higher than under farmer practice, even as average yields were 11 percent higher. In general, farmer practices tended to remain unbalanced, applying an average of 30 percent less P and 130 percent less K than SSNM.

Pingali et al. (1998) compared the marginal productivity of fertilizer with the ratio of fertilizer to rice prices. In 1985 and 1986, based on farm-level data, the marginal product of 1 kg fertilizer was estimated at 15.3 kg/ha during the wet season, and 8.3 kg/ha during the dry season, evaluated at the sample means (84.2 kg/ha and 133.6 kg/ha during dry and wet seasons, respectively, based on product weight). The marginal product is far above the ratio of fertilizer to paddy rice price, equal to 4.1. Fertilizers are still contributing positively to profitability in rice farming. On the other hand, this implies that fertilizer is being underutilized in Philippine farms. In contrast, for Indonesian farms, the marginal product (2.7 kg paddy/kg fertilizer) is close to but above the input/output price

ratio (1.7). Average fertilizer application in the Indonesia sample is 176 kg/ha (product weight) in irrigated areas, whereas in the Philippines, the average fertilizer application (wet and dry seasons) is 109 kg/ha.

Another IRRI study suggests that Filipino rice farmers may be mismanaging nitrogen fertilizer application (Dawe et al. 2007). Data from a rice farmer survey spanning 1988–2002 is contrasted with computed optimal N based on experimental trials. The comparison suggests that farmers tend to overapply N during the wet season and underapply N during the dry season (31–55 kg gap from optimal). For irrigated areas, bridging the gap may result in up to a one-ton yield increment—a substantial increase (compared with the yield of irrigated systems in 2012 of 4.2 tons/ha).

What accounts for this systematic underapplication of fertilizer is not clear. Mataia and Dawe (2007) rule out one possible reason, which is access to credit. Another potential explanation, namely, risk aversion, has been ruled out in Abedullah and Pandey (2004) at least for the case of favorable rainfed environment in the Philippines. Other reasons may be the sheer lack of knowledge of farmers on the techniques of determining correct fertilizer application. Deeper analysis is needed to pinpoint the explanation.

SUPPLY-SIDE AND MARKETING ISSUES

Sources of fertilizer supply

There are few players in domestic fertilizer production. Currently, domestic production of fertilizer is obtained from five firms. The largest is Philippine Phosphate Fertilizer Corporation (PHILPHOS), originally a Philippine government corporation established in 1980 and privatized in 2000. PHILPHOS produces for both the export and domestic market. Fertilizer production is subject to large-scale economies, limiting the number of domestic manufacturers. However, the market as a whole need not be an oligopoly if there is strong competition from imports.

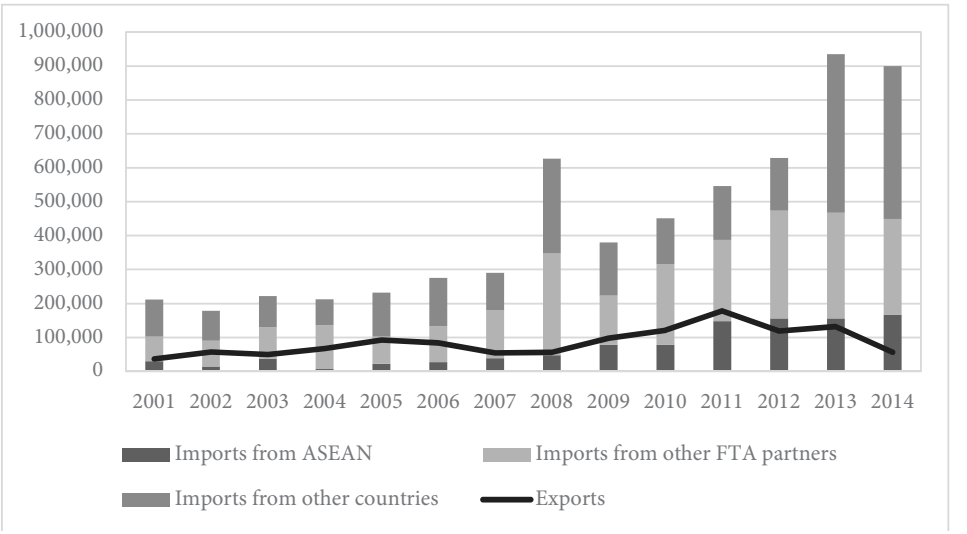
Fertilizer imports by value have been rising. Importation peaked in 2008, declining in 2009 as the domestic market adjusted to the high fertilizer prices. Since then, imports have recovered (Figure 5). Exports are far lower with a much more erratic trend (but a downward direction is observed since 2011). Up to 2011, imports were mostly sourced from the Association of Southeast Asian Nations (ASEAN) and other free trade partners, i.e., China, Japan, Korea, and Australia, for which the import duty is zero. Together with the tariff exemption of agricultural enterprises, imports of fertilizers into the Philippines are effectively duty free. Since 2013, however, imports from other countries have increased rapidly.

The main type of fertilizer imported (by value) is nitrogenous fertilizer (Figure 6), consistent with fertilizer usage patterns shown in Section 3. The Philippines has no domestic source of ammonium, as any domestic natural gas deposits are prioritized for use of the power and fuel industry. Domestic production depends mainly on imported raw materials such as rock phosphate, anhydrous ammonia, sulfuric acid, and other finished fertilizer grades, which are needed in the blending process of fertilizer production (Alcala 2012).

The fertilizer supply chain and market structure

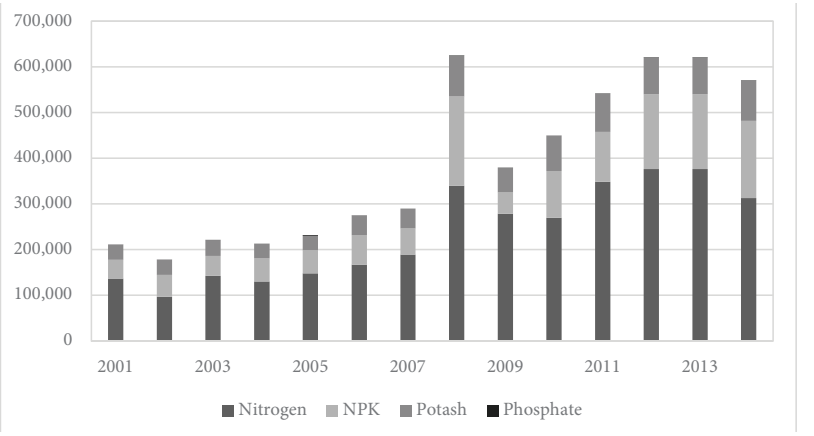
Fertilizer marketing passes through three levels, namely, importers/manufacturers, distributors/wholesalers, and dealers/retailers (Figure 7). Distributors typically operate in one province and sell to dealers who, in turn, sell to end-users, i.e., farmers. Distributors can also sell directly to farmers or

Figure 5. Imports and exports of fertilizer, 2001–2012 (in USD '000)



ASEAN = Association of Southeast Asian Nations; FTA = free trade agreement
Source: Trademap (International Trade Centre [ITC] n.d.)

Figure 6. Fertilizer imports by product type, 2001–2012 (in USD)

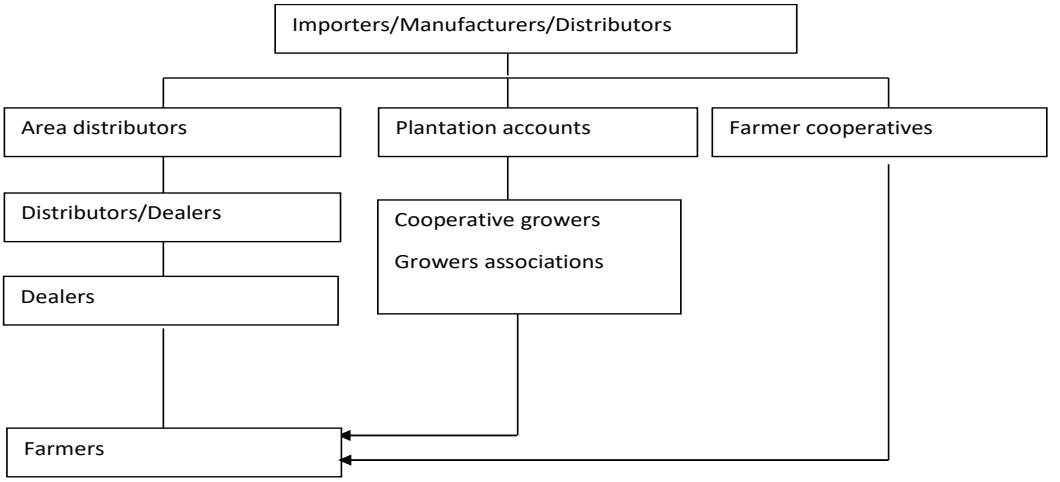


NPK = nitrogen, phosphorus, and potassium
Source: Trademap (ITC n.d.)

large plantations, and may also have a dealer's license. In some areas, there may be area distributors whose operations span multiple provinces and who supply distributors. As discussed earlier, imports can also be done by large plantations and farmer cooperatives.

As of 2012, there were 483 licensed handlers in the fertilizer industry, spanning importation, distribution, repacking, export, and manufacturing. Of these, 150 were listed as importers. Much of importation is done within the region (in 2012, 68% of imports by volume originated from ASEAN countries and China). Eight handlers were also listed as end-users. Many more handlers are farmer cooperatives or associations (e.g., sugar planter organizations) who distribute fertilizer to their

Figure 7. Schematic diagram of key players in the fertilizer market



Source: Bunoan-Olegario (2011)

members. Hence, even if there are entry barriers to fertilizer marketing, these are not so high as to limit the number of players.

Pricing along the supply chain

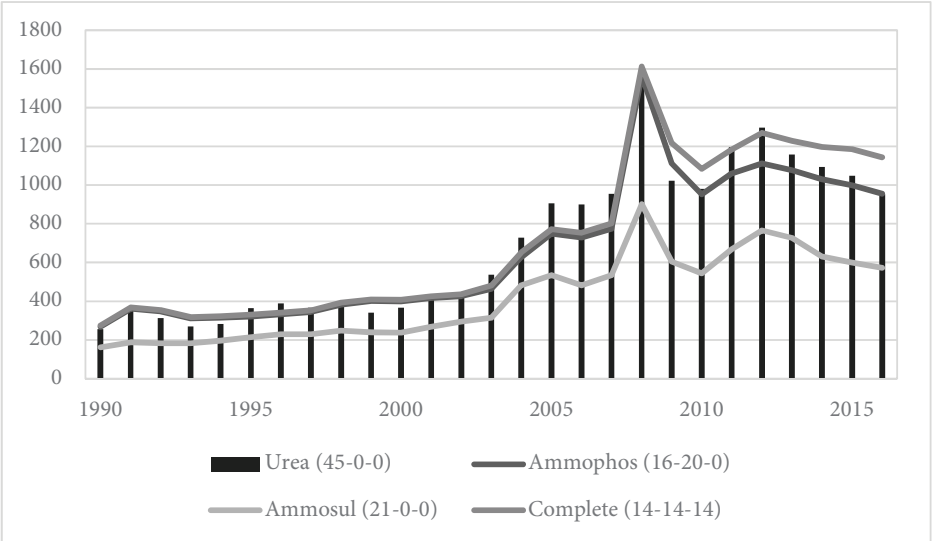
Official data on fertilizer price pertain to retail or dealer's prices. Prices of the four major fertilizer grades were on a relatively gradual upward trend from 1990 onward, accelerating in 2007, and culminating in a price spike in 2008, before receding in 2009 (Figure 8). Thereafter, prices resumed their more gradual upward trend. By 2011, fertilizer prices were much higher than in 2007. This, to a great extent, accounts for lower fertilizer application after 2007. From 2012 onward, though, fertilizer prices have been on a decline, reflecting a softening of petroleum prices.

Figure 9 presents a longer time series (1980–2015), which is only available for urea. The series is presented in both nominal and real terms (at 2010) prices. Prices rose dramatically in the early 1980s. The price of fertilizer in real terms averaged PHP 1,515/bag in 1980–1985, during a period of strong government intervention punctuated by a severe balance-of-payments crisis in 1983–1985. With the economic recovery and shift to a more open regime, real prices of fertilizer fell sharply in 1986, remaining at low levels (with an average of PHP 826/bag in 1986–1990). Aside from intermittent volatility, urea was to remain relatively inexpensive in real terms, until the oil price boom of the 2000s.

Unfortunately, there is no official data on prices at the level of the wholesaler and importer. Some information is available from key informant interviews, compiled in Table 4. The table is a semistylized disaggregation applicable to the northern island of Luzon where rice farming is widespread, and distance between dealers and distributors, as well as distributors and the nearest shipping port, are within two hours or less of land transport.

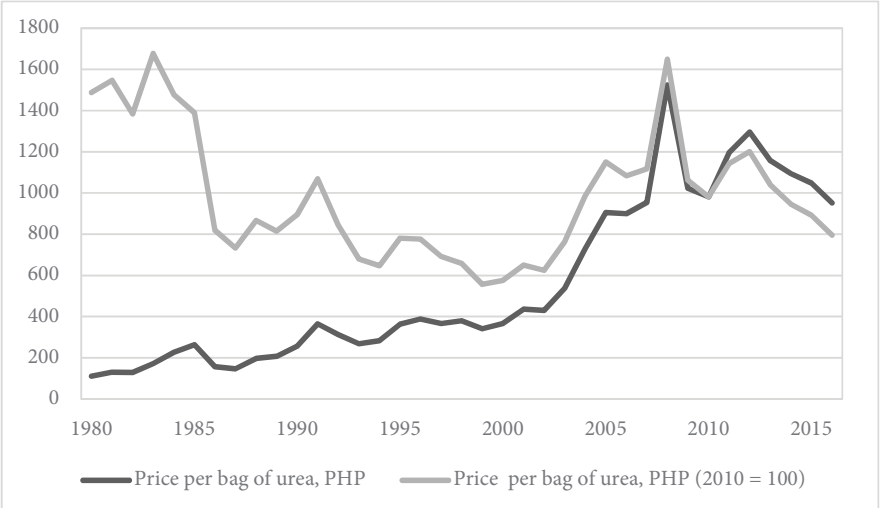
At the end of the chain are the dealers, who state that their markup is ordinarily PHP 30 per 50-kg bag, or about USD 0.71/kg (based on 2013 exchange rate of PHP 42.44/USD). This may occasionally fall even lower for long-time customers, or when they need to dispose of stocks, especially toward the beginning of the rice harvest season (the lean season for fertilizer sales). The miniscule margin is

Figure 8. Dealer's prices per 50-kilogram bag of fertilizer in PHP, national average, 1990–2016



Source: CountrySTAT (PSA n.d.)

Figure 9. Dealer's price per 50-kilogram bag of urea, national average, 1980–2015, nominal and real PHP (2010 = 100)



Source: CountrySTAT (PSA n.d.)

fixed, even during the period of soaring fertilizer prices, as in 2008. However, any attempt to adjust the markup would be counterproductive as farmers can easily shift to other dealers.

A key informant at the distribution node is located in Ilocos Norte. This distributor supplies dealers all over the province. They have been in the business since 1978. Their main fertilizer products are urea and complete NPK. Their main source is a large importer who lands the product in Port Poro Point located in the Ilocos Region. These days, the purchase price of the product is about PHP 1,000/bag for urea and PHP 1,050/bag for NPK (equivalent to USD 471/ton and

Table 4. Breakdown of markup and cost along the supply chain for imported urea, PHP per 50-kilogram bag, late-2013

	Selling Price[a]	Gross Markup	Net Margin (PHP per bag)	Net Margin (percent over selling price)[b]
Dealer	1,090	30	~30[c]	2.8
Distributor	1,060	60	~50[d]	4.7
Importer	1,000	86	~30[e]	3.0
Exporter's price (cost, insurance, and freight, bagged)	914	239[f]	-	-
Export price (free on board, bulk)	675	-	-	-

[a] Importer's actual price; distributor and dealer estimated from markups

[b] As a proportion of selling price

[c] For both informants, associated costs are trivial, as fertilizer forms only a small portion of deliveries of the agri-trading retail shop.

[d] According to the informant, the only nontrivial cost is that for delivery. Estimated from a delivery charge of PHP 3,500 for 25 tons of transport

[e] The implicit cost of PHP 56 is consistent with port and customs clearance charges of about PHP 20/bag (PHP 10,000 per container), estimated from Manila International Container Port tariff schedule, and transport cost of PHP 36/bag (PHP 18,000 per container) estimated by two trucking companies. According to the fertilizer importer, other cost items on a per-bag basis are minimal.

[f] Implicit markup only. Free on board price from World Bank Pink Sheet (WB 2013).

Blank denotes information not available.

Sources: Informant interviews and references cited

USD 495/ton, respectively). They sell this to their dealers with a markup of PHP 50/bag, plus delivery fee. They could not raise the markup without risk of losing their buyers to other distributors from adjoining provinces.

Lastly, an importer based in Metro Manila provided data on prices in the last quarter of 2013, as follows (in USD):

NPK (14-14-14):	475
16-20-0:	362–370
Urea (46-0-0):	425–442
Ammosul (21-0-0):	220–232
Muriate of potash:	450–454
18-46-0:	533–540

The informant claims that the margins vary depending on the competition. However, the normal margin is only 3 percent on price export (i.e., cost, insurance, and freight plus charges). They are not able to raise their margin beyond this due to the fact that they only have less than 10 percent of the market share in fertilizer trading due to stiff competition.

Lastly, all the informants state that licensing and product registration requirements are straightforward and easy to comply with. The FPA normally processes license renewal in just one day.

Domestic and border prices

David and Balisacan (1981) provide early estimates of the implicit tariff rate on fertilizer. In the latter half of the 1970s, the weighted average implicit tariff for urea is 16 percent, 27 percent for ammonium sulphate, 86 percent for muriate of potash, and -4 percent for mixed fertilizer (NPK). The policy stance at the time appears to be protective of domestic industry (except for mixed fertilizer). This is consistent with domestic resource cost (DRC) and shadow exchange rate (SER) estimates by Illo (1978), which found that domestic nitrophosphatic fertilizer has a DRC/SER far in excess of 1 (at low historical world prices).

More recent estimates of the nominal protection rate are unavailable in the absence of average wholesale price data. Figure 10 juxtaposes retail and world price data for urea from 1990 onward. In the figure, "spread" is defined as the ratio of the average national monthly retail price to the world price (in free on board), converted to pesos using the market exchange rate.

Both world and domestic prices are highly variable (standard deviations are PHP 6,000 and PHP 7,700, respectively). The spread is anywhere from 1.1 (in 2008) to 3.0 (in 1999). World and domestic prices are highly correlated (correlation coefficient of 0.95). Note, however, that the spread tends to be larger when the world price falls and shrinks when world price rises. This seems consistent with fixed markups, at least at the dealer level, as suggested by key informant interviews. The association, of course, is strongly influenced by the market exchange rate. For instance, during the Asian financial crisis, the world price of urea fell by 34 percent, implying a spread of 3.2 had the exchange rate remained constant. Instead, the peso price of the dollar soared, limiting the spread to its actual value of just 1.9.

A high correlation of domestic and foreign price suggests a domestic market that is well integrated with the world market. That is, arbitrage opportunities between domestic and foreign prices are rapidly dissipated. Such absence of arbitrage opportunity is an important indicator of the degree of competition in the domestic market. The following undertakes a more formal test of integration between domestic and world markets.

Market integration

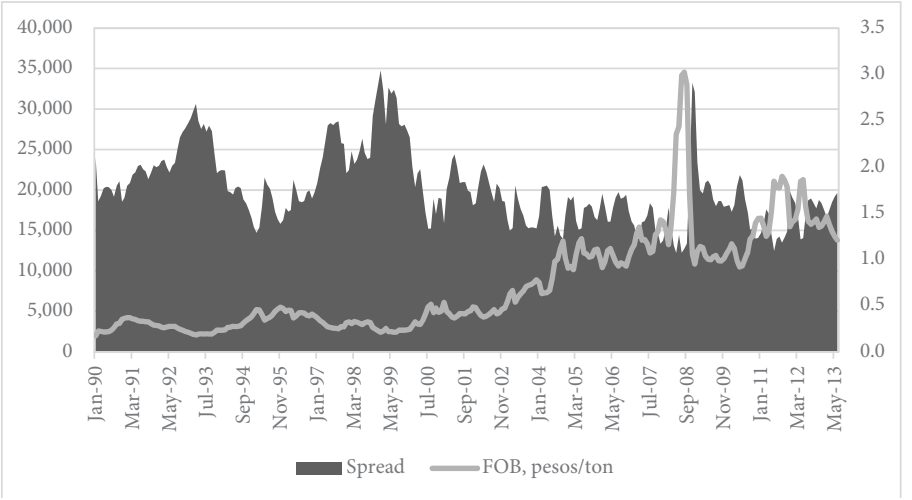
Following Fackler and Goodwin (2001), the concept of market integration adopted here invokes transmission of shocks between spatially separated markets—in this case between domestic and foreign market for fertilizer. Simple transmission can be tested by applying Granger causality, which checks whether shocks in one market (i.e., world) evoke significant responses in another market (i.e., domestic). Denoting monthly domestic and world prices (in common currency) as, respectively, DP_t, WP_t, with β_0, β_1, β_2 as parameters, and ε_t an error term. Taking natural logarithms (denoted by lower case), the posited relationship is as follows:

$$dp_t = \beta_0 + \beta_1 wp_t + \varepsilon_t \qquad (1)$$

The bivariate case traces from Richardson (1978), which handles prices in original or logarithmic form, and can incorporate other variables. For the markets considered here, another important source of systematic variation is the exchange rate. Hence, let the domestic price be expressed in local currency and the redefined world price in USD; denote the monthly exchange rate by ER_t. Equation (1) can be extended as:

$$dp_t = \beta_0 + \beta_1 wp_t + \beta_2 er_t + \varepsilon_t \qquad (1)$$

Figure 10. Monthly price of urea (Black Sea FOB), in USD per ton, and domestic price spread



FOB = Free on board
Source of basic data: World Bank (2013)

The relationship can be estimated by ordinary least squares if $\varepsilon_t \sim N(0,\sigma^2)$. However, finite variance may be violated if both time series are random walks. Prior to estimating (1), there is a need to check if the time series are I(0) stationary. If the series are not stationary but are stationary in first differences, i.e., I(1), then equation (1) can still be estimated if there is a set of parameters for which the following holds:

$$\varepsilon_t = dp_t + b_0 + b_1 wp_t + b_2 er_t \sim I(0) \qquad (1')$$

With multiple time series, if vector autoregression (VAR) of dp_t, wp_t, er_t on lagged values is I(1), the presence of a cointegrating relation (1') can be determined. The model determining the time series itself is a vector error correction (VEC) model of the form:

$$\Delta \mathbf{y}_t = \mathbf{\Pi} \mathbf{y}_{t-1} + \sum_{i=1}^{p-1} \mathbf{\Gamma}_i \Delta \mathbf{y}_{t-i} + \varepsilon_t \qquad (2)$$

Here the y_t vector is a 1x3 element vector consisting of time-series variables of interest, while p is the maximum number of lags in the VAR model. The VEC form is useful as it provides information about the speed of adjustment to the long-run equilibrium relationship expressed by the cointegrating equation corresponding to (1). A similar approach is taken in previous studies of developing country agriculture, such as a multicountry study of the Food and Agriculture Organization (Rapsomanikis et al. 2003), a study of the fish market in India and the Philippines, respectively (Shinoj et al. 2008; Garcia and Salayo 2009). The market integration test is implemented in several steps:

Step 1. Test for stationarity: For all three time series, the test rejects I(0) stationarity but fails to reject I(1) stationarity (Table 5).

Table 5. Results of Dickey-Fuller tests in STATA

Variable	P-value for Z(t)	Decision
Domestic price	0.7297	Reject
Domestic price (-1)	0.0000	Fail to reject
Foreign price	0.6089	Reject
Foreign price (-1)	0.0000	Fail to reject
Exchange rate	0.2951	Reject
Exchange rate (-1)	0.0000	Fail to reject

Note: All variables are expressed in natural logarithms.
Source: Author's calculation

Table 6. Results of VAR model estimation with Wald test for Granger causality

Variable and Lags	Coefficient	z-statistic	P>z	χ^2 - statistic	P > χ^2
Domestic price (logs)	-	-	-	143.23	0.000
Domestic price (-1)	1.46	31.3	0.000	-	-
Domestic price (-2)	-0.52	-13.02	0.000	-	-
Foreign price (logs)		-	-	6.43	0.040
Foreign price (-1)	0.15	11.29	0.000	-	
Foreign price (-2)	-0.11	-6.86	0.000	-	
Exchange rate (logs)		-	-	2.74	0.250
Exchange rate (-1)	0.24	3.98	0.000	-	
Exchange rate (-2)	-0.19	-3.16	0.002	-	

VAR = vector autoregression
Source: Author's calculation

Step 2. Determine lag structure: The Hannan-Quinn information criterion and the Schwarz Bayesian information criterion, both point to lags of up to two periods.

Step 3. Estimate a VAR model and apply causality test: Estimates from the VAR model are shown in Table 6. Coefficients of the lagged variables are all statistically significant (based on the z-statistic). Not surprisingly, the hypothesis that lagged values of domestic price (in logs) do not Granger-cause the domestic price is rejected. Similar results hold for foreign price. Lastly, the null of no Granger causality from exchange rate (in logs) to the domestic price cannot be rejected. Nevertheless, the lagged values of the exchange rate individually have significant coefficients (at 1% significance). In short, domestic price and foreign price Granger-cause the domestic price.

Step 4. Apply Johansen test for existence of cointegrating vector(s): The Johansen test involves a null hypothesis of zero to three cointegrating vectors. Results are summarized in Table 7. The hypothesis of no cointegrating relation is rejected (52.2053 > 29.68); however, the hypothesis of at most one cointegrating relation cannot be rejected (7.24 < 15.41). The existence of a single cointegrating vector becomes the working hypothesis in the VEC model.

Table 7. Statistics from the Johansen cointegration test

Maximum Rank	Trace-statistic	5-percent Critical Value
0	52.2053	29.68
1	7.2483	15.41
2	3.3811	3.76
3	-	-

Source: Author's calculation

Step 5. Estimate parameters of cointegrating vector using VEC: VEC analysis is presented in Table 8. At the top of the table are the estimates of the cointegrating equation, which capture the long-run relationships. With domestic price variable restricted to a coefficient of unity, the signs of foreign price and exchange rate coefficients are negative as expected. The coefficients are all statistically significant at 1-percent level (or even lower). The values imply a transmission elasticity of about 0.82 from world to domestic prices (holding exchange rate constant); a similar transmission elasticity holds for changes in the peso-dollar exchange rate (holding world dollar prices constant).

The short-term adjustment relation is shown in the bottom part of the table. When the value of cointegrating equation is positive, i.e., the domestic price is "too high", then an increase in its value causes 0.06-percent decline in the domestic price of the next period. The difference is small on a monthly basis but adds up to a sizable proportion on an annual time scale. Note that in the short-run adjustment equations, the coefficients of logdom in the D.logfob and D.logpusd equations are not significant, consistent with the notion of a small open economy and small sector (i.e., fertilizer alone does not affect the market exchange rate).

Domestic fertilizer price dispersion

The abovementioned results analyze integration between average domestic price and a benchmark world price. It does not address subnational issues, i.e., whether or not domestic prices within the

Table 8. Results for VEC analysis using Johansen maximum likelihood

Variable	Coefficient	z-value	P>z
Cointegrating vector:			
Domestic price (in logs)	1.0000		
Foreign price (in logs)	-0.8222	-27.15	0.000
Exchange rate (in logs)	-0.8397	-14.45	0.000
Constant	-2.0334		
ECM (log of domestic price)			
Log of domestic price (-1)	-0.0569	-5.10	0.000
Change in log of domestic price (-1)	0.5209	12.86	0.000
Change in log of foreign price (-1)	0.1083	6.97	0.000
Change in log of exchange rate (-1)	0.2030	3.38	0.001
Constant	0.0022	1.71	0.088

VEC = vector error correction; ECM = error correction model
Source: Author's calculation

country are themselves integrated. Across the country, there is a wide dispersion in retail prices of fertilizer based on the dealer's price index (Table 9). Relative to the national average, the cheapest fertilizers are found in Ilocos, Cagayan Valley (in the north); Western Visayas (central); and Davao Region (south). The most expensive fertilizers, meanwhile, are in the Autonomous Region in Muslim Mindanao (ARMM) and Eastern Visayas, which also happen to be among the poorest regions of the country. Variations in fertilizer prices (as gauged by the standard deviation) are similar across fertilizer grades, i.e., in the range of 6–9 percent. The widest range in the index is for urea, followed by ammonium sulfate.

Galang (2014) has found that, in the case of urea, regional markets are integrated in the long run. This appears consistent with the results of this paper, which fails to find evidence of market

Table 9. Dealer's price index by region, average of 2010–2014 (Philippines = 1.00)

	Ammonium Phosphate	Ammonium Sulfate	Complex NPK	Urea	Average
Philippines	1.00	1.00	1.00	1.00	1.00
Luzon					
CAR	0.98	1.00	0.97	0.98	0.98
Ilocos	0.93	0.92	0.94	0.95	0.94
Cagayan Valley	0.95	0.92	0.93	0.94	0.94
Central Luzon	0.97	1.00	0.95	0.96	0.97
CALABARZON	1.10	1.11	1.04	1.03	1.07
MIMAROPA	1.09	1.13	1.04	1.06	1.08
Bicol	0.99	1.09	1.01	1.03	1.03
Visayas					
Western Visayas	0.93	0.89	0.95	0.92	0.92
Central Visayas	1.02	1.05	1.02	1.01	1.02
Eastern Visayas	1.15	1.17	1.10	1.11	1.13
Mindanao					
Zamboanga Peninsula	1.03	1.04	1.00	1.00	1.02
Northern Mindanao	1.05	1.03	1.01	0.99	1.02
Davao Region	0.94	0.91	0.97	0.94	0.94
SOCCSKSARGEN	0.96	0.92	0.97	0.94	0.95
Caraga	0.99	0.93	0.97	0.95	0.96
ARMM	1.00	1.02	1.13	1.19	1.09

NPK = nitrogen, phosphorus, and potassium
CAR = Cordillera Administrative Region
CALABARZON = Cavite, Laguna, Batangas, Rizal, and Quezon
MIMAROPA = Occidental Mindoro, Oriental Mindoro, Marinduque, Romblon, and Palawan
SOCCSKSARGEN = South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos City
ARMM = Autonomous Region in Muslim Mindanao
Source of basic data: CountrySTAT (PSA n.d.)

power in the fertilizer industry. The number of market players in the industry makes it highly unlikely for one or a small number of fertilizer dealers to control the market price, whether at the national or regional level. Nonetheless, the disparities in Table 9 are undeniable; these must therefore be attributed to transaction cost differences, perhaps due to meso-level gaps in infrastructure and logistics. Other sources of discrepancy may be at the micro level, due to tied credit-output transactions between farmer and trader causing failure of competition, especially in poorer and more isolated areas such as ARMM and Eastern Visayas. Explaining these interregional price differences warrants future research.

CONCLUSION

Summary and key challenges

The fertilizer sector has grown dramatically since the 1950s, owing to the adoption of modern technology in Philippine agriculture. From its initial concentration in export crops (mostly sugarcane), demand from cereals and other crops exploded after the Green Revolution in rice. Application of fertilizer realized the high-yield potential from modern technologies and varieties, which exhibited better fertilizer response compared to traditional varieties.

The policy regime has also evolved. Initially, policies aimed at establishing a strong domestic industry to substitute for imports by pursuing protectionist policies. This was followed by an even stronger interventionist approach that aimed at both protection of domestic investors and making cheap inputs (fertilizer, chemicals, credit) accessible to small farmers.

The current regime (beginning 1986) is market oriented. The market distortions over the previous three decades have largely been dismantled. Tariffs are now low; regulations are focused on maintaining product quality and safety; subsidies were eliminated, though strong incentives are in place through various exemptions such as from the value-added tax and tariff exemption for producer-importers.

However, significant challenges remain at two levels. First, at the market level, despite efforts of regulators and the private sector, the sale of substandard fertilizer is still being reported. However, how widespread the practice is remains unclear (beyond some anecdotes). A more serious challenge is the persistence of apparent inefficiencies in fertilizer marketing, as seen in the large discrepancies in pricing across adjacent regions for the same product. The fact that markets are competitive does not preclude inefficiencies in the fertilizer supply chain at least in some areas owing to poor transport infrastructure, weak logistics systems, and low investment. Addressing these inefficiencies is a priority area for public investment.

The second level is at the farm: rice farmers continue to apply suboptimal amounts of fertilizer, whether with the main nutrients (NPK) or the micronutrients (Mamaril et al. 2009). While knowledge dissemination does play a key role in remedying this—implying a more targeted extension program as a priority for rice farming—perhaps other factors are equally or even more important which, however, elude researchers to date.

Way forward

The foregoing suggests a few implications for policy and research. The first, of course, is to stay the course on the market-oriented regime in fertilizer policy. There certainly remains a persistent (though no longer vocal) constituency for interventionism, emphasizing fertilizer subsidies and industry protection. Inappropriate solutions to very real problems in the sector must always be resisted.

Identifying appropriate solutions is, however, far from easy. Priorities for further research involve evidenced-based analysis at both levels of the problem, i.e., the market and the farmer. The former warrants careful documentation of structure, conduct, and performance of fertilizer trading, along with assessment of binding constraints and choke points. On the other hand, the latter will entail a more flexible model building, together with primary data collection and hypothesis testing, to arrive at a comprehensive understanding of the farmer's goals, opportunities, and constraints. This will help improve the package of technologies, incentives, and infrastructure toward boosting competitiveness of smallholder systems in the Philippines.

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Can Cheap Oil Hurt Net Importers? Evidence from the Philippines

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ABSTRACT

Conventional wisdom suggests that oil price increases have a negative effect on the output of oil-importing countries. This is grounded on the experience of the United States between the 1940s and the late 1980s, where recessions were generally preceded by oil price increases. This paper evaluates the impact of oil price shocks on the Philippines—a developing country and a net oil-importing economy. Following Kilian's (2008) structural decomposition of real oil price change, we find indications that the 2008–2009 and 2014–2015 oil price drops may have lowered the Philippine economy's output growth, potentially due to the economy's reliance on remittances from abroad and the export market.

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INTRODUCTION

With its history of ups and downs, oil price has been in its deepest decline in 2014–2015 since the 1990s. Brent crude oil generally increased from about USD 20 per barrel in 1991 to more than USD 110 per barrel by mid-2008, before it slid down to less than USD 50 per barrel at the end of the year. It stabilized at USD 110 per barrel from 2010 to mid-2014 before it plunged by more than 50 percent by mid-2015. As with any other major economic phenomena, the sharp declines in the global crude oil price will create winners and losers.

Conventional wisdom suggests that unanticipated oil price increases have a positive effect on the output of oil-exporting economies while reducing that of oil-importing economies. Assuming the effect is symmetric, an unanticipated drop in the price of oil should be seen as a boon for net oil-importing economies and a bane to net oil exporters. This notion is supported by a number of studies, including the recent study by Oxford Economics (Bulloford and Sterne 2015), which postulates that the recent decline in oil prices increases gross domestic product (GDP) growth for most importing countries, with the Philippines gaining the most of the oil price slump, while Russia suffers at the bottom.

A major limitation of earlier studies was that they considered oil price shocks as exogenous. Modern literature recognizes that price shocks are symptoms of more fundamental economic developments that drive demand and supply of oil (Barsky and Kilian 2002, 2004; Kilian 2009), with different drivers having different effects. For example, when oil and gas prices fall due to an unanticipated increase in global supply of crude oil, people would have more money to spend on other goods and services. But when the world economy grows faster, for reasons unrelated to the global crude oil market, demand for crude oil grows, driving prices up including nonenergy goods. This inflationary effect may reduce consumption, thus dampening the earlier positive effect of an oil price drop. This complex dynamics of the global crude oil market makes it extremely difficult to assess the causal effect of an oil price change on macroeconomic aggregates without disentangling the factors that drive oil price movement.

The notion that an unanticipated increase in oil price can have serious negative impact on an oil-importing economy can also find basis from the experience of the United States (US) and other advanced countries. In a series of contributions, Hamilton (1983, 2009a, 2009b) provided empirical evidence for the negative relationship between oil price and the US macroeconomy. Meanwhile, Jimenez-Rodriguez and Sanchez (2005) and Jimenez-Rodriguez (2008) contributed to the literature by analyzing select Organisation for Economic Co-operation and Development countries, with results being generally the same with that of the US and only differing in magnitude. Surprisingly, only a few studies look into the effect of oil price shocks on emerging and developing economies, with limited focus on oil-importing economies. For example, Berument et al. (2010) analyzed the effect of oil price shocks on Middle East and North African countries and found that oil price increases have (1) a positive impact on output in most exporting countries but (2) an ambiguous effect on oil importers, depending on whether the price shock is driven by demand or supply factors.

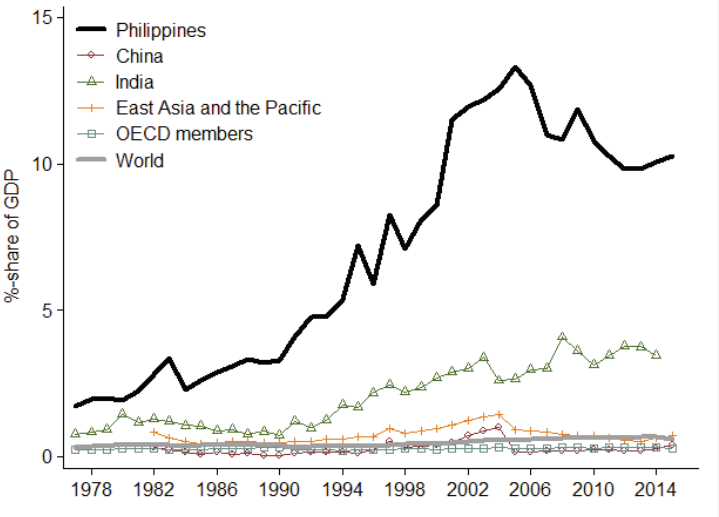
Recent developments in the crude oil market reignited interest in providing a global perspective to the macroeconomic impact and influence of oil price shocks. By using a two-country dynamic stochastic general equilibrium model, Bodenstein et al. (2011) illustrated that although oil importers experience a deterioration in the oil component of their trade balance, an improvement in the nonoil trade balance substantially dampens the effects on the overall trade balance. Kilian et al. (2009) empirically validated this theory by using a structural vector autoregressive (VAR) model of the global crude oil market. They found that the overall effect of an oil price shock on the current account

depends critically on the response of the nonoil trade balance, with oil-importing economies tending to experience an improvement in this balance and the opposite being the case for oil-exporting countries. Meanwhile, Rasmussen and Roitman (2011) found that the correlation of GDP and oil prices is positive. They also found that imports and exports move in the same direction as oil prices, which may be an indication that petrodollars gained by oil exporters during oil booms are likely to be recycled in the global economy through international trade. At the country-specific level, Mohaddes and Raissi (2013) found that oil price increases drive Jordan's output growth through their impact on external income and, in turn, on capital accumulation.

In this paper, we evaluated the dynamic impact of oil price shocks on the Philippine economy. Studying the Philippine economy in the context of an oil shock–macroeconomy relationship offers a number of advantages. First, the Philippines is among the top developing economies in terms of share of imported energy (i.e., oil, coal, and natural gas) to total energy use (Bulloford and Sterne 2015). Second, the Philippines has become increasingly reliant on external markets to boost its economy since the 1980s. For instance, in 2015, the country's exports make up more than 27 percent of its GDP, which is higher than the average share of middle-income countries. In 2014, the country ranked third in terms of the amount of personal remittances received from abroad, next to China and India. More interestingly, the share of personal remittances to total output is highest in the Philippines and significantly higher than the world and regional averages (Figure 1). Third, the top destinations of most overseas Filipino workers (OFWs) are oil-exporting countries, such as Saudi Arabia, United Arab Emirates, Qatar, and Kuwait. Thus, one can expect that any disturbance to global crude oil that affects these oil-exporting economies would have influence on the growth of the Philippine economy through remittances.

The country's energy dependence on oil imports and its reliance on external markets, particularly on remittances from oil exporters, make the Philippines an interesting case to empirically investigate the net effect of oil price shocks to a developing economy. For example, the 2008–2009 and

Figure 1. Personal remittances, 1976–2015



GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development
Source of raw data: World Development Indicators, World Bank

2014–2015 oil price drops are believed to have lowered the cost of fuel imports, which increased vehicle purchases or consumption of oil-dependent commodities, but at the same time, cut down total OFW remittances thus lowering total output. Moreover, it is not clear what was driving the oil price decline. As previously mentioned, different factors drive oil price movements, with each factor potentially having different implications on the country's macroeconomic aggregates.

Our major results can be summarized as follows: First, contrary to recent popular views that supply shocks cause oil prices to fall, we found strong evidence to suggest that these oil price shocks have been predominantly driven by a combination of aggregate and precautionary demand shocks. Second, the magnitude, duration, and direction of response of the Philippine economy to oil price shocks highly depend on whether changes in oil price are driven by supply or demand factors. Third, the oil price decline, which was primarily driven by demand shocks, may have lowered the growth of the Philippines' services and goods exports and, ultimately, its output, which suggests that not all oil price drops are beneficial to net oil importers.

EMPIRICAL STRATEGY

Historically, a number of researchers consider oil price shocks as exogenous. This is possibly because most of these shocks concurred with war-driven oil production shortfalls and geopolitical uncertainties in oil-exporting countries (Hamilton 1983; Guo and Kliesen 2005; Rahman and Serletis 2010; Melichar 2013). However, there is an increasing recognition that oil price shocks are associated not only with shocks on the current physical availability of oil but also with: (1) unanticipated changes in the aggregate demand and (2) shocks driven by uncertainties about the expected supply relative to the demand for oil (Barsky and Kilian 2004; Kilian 2009; Kilian and Murphy 2014). Another evidence suggests that, since the 1970s, exogenous changes in oil production are significantly less important in influencing global oil price compared to changes in precautionary demand for oil and global demand fluctuations (Kilian 2008). Macro aggregates may also have influence on oil prices. One channel is through monetary conditions, which may result in changes in the demand for oil and, eventually, in oil price (Barsky and Kilian 2002).

The endogeneity of oil price changes has implications on how researchers evaluate the influence of crude oil price changes on macroeconomic aggregates. Identifying the underlying demand and supply shocks in the global crude oil market helps us understand what is driving oil price changes and determine how macroeconomic aggregates are affected by different shocks influencing oil price changes (Kilian 2009). Hence, it is important to recognize the extent to which oil price changes are driven by one shock or another because it is plausible that different oil price shocks may have different effects on the Philippine macroeconomy.

In order to account for the potential endogeneity of crude oil prices, we used the VAR model proposed by Kilian (2009) to extract the underlying structural innovations behind each oil price shock (see equation 1). We updated the sample period up to 2015 to cover oil price changes. The model uses monthly data of $z_t = (prod_t, rea_t, rpo_t)$, where $prod_t$ refers to global crude oil production from the Energy Information Administration (EIA); rea_t denotes the index of real economic activity derived from the bulk dry cargo shipping rate index developed by Kilian (2009); and rpo_t is the

$$A_0 z_t = \alpha + \sum_{i=1}^{24} A_i z_{t-i} + \varepsilon_t \qquad (1)$$

refiner's acquisition cost of imported crude oil provided by EIA and deflated by the consumer price index from the US Bureau of Labor Statistics, which serves as proxy to global crude oil price.[2] Except for rea_t, which is stationary by construction (Kilian 2009), all of the series are period-to-period log-transformed differences. The sample period is 1974.1–2015.10.[3] We removed seasonal variation by including monthly dummies in the specification.

As in Kilian (2009), the following exclusion restrictions are imposed to the reduced form errors, e_t, in order to estimate the structural shocks underlying oil price changes:

$$e_t = \begin{pmatrix} e_t^{prod} \\ e_t^{rea} \\ e_t^{rpo} \end{pmatrix} = \begin{bmatrix} \alpha_{11} & 0 & 0 \\ \alpha_{21} & \alpha_{22} & 0 \\ \alpha_{31} & \alpha_{32} & \alpha_{33} \end{bmatrix} \begin{pmatrix} \varepsilon_t^{oil\ supply\ shock} \\ \varepsilon_t^{aggregate\ demand\ shock} \\ \varepsilon_t^{oil\text{-}specific\ demand\ shock} \end{pmatrix}$$

where $\varepsilon^k t$ denotes the serially and mutually uncorrelated structural shocks in each VAR equation $k=1,2,3$. The exclusion restriction implies the following: *Oil supply shocks* denote unanticipated changes in global crude oil production and are assumed not to respond to any change in the demand for oil within the same month. Kilian (2009) justifies this assumption by stating that adjustments in oil production are costly and the future state of the crude oil market has a lot of uncertainties, making oil production slow in responding to any demand shock. Shocks to global real economic activity are referred to as *aggregate demand shocks*.[4] The exclusion restriction assumes that oil-specific demand shocks, which increase oil price, will not lower real economic activity within the same month but only with a delay of at least one month. This assumption is consistent with the sluggish response of the major economies to major oil price increases observed in the sample period and in previous studies (e.g., Hamilton 1983). Finally, unanticipated oil price changes, here referred to as *oil-specific demand shocks*, denote shocks to changes in demand for crude oil not already captured by instantaneous shifts in aggregate demand for industrial commodities and supply of oil. These shocks include changes in precautionary demand for oil due to shifts in expectations about future demand relative to supply of oil. For example, crude oil price started to escalate in 1979, even though there was no significant disruption in the global crude oil production. The increase in crude oil price in 1979 was associated with the looming Iran-Iraq War which occurred in 1980 (Kilian 2009).[5] While the residual shocks in the model may also include other shocks (e.g., unexpected weather patterns and changes in preferences), there is evidence to support that the residual shock largely represents exogenous shifts in precautionary demand for oil.[6]

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[2] Some studies use monthly price data of Western Texas Intermediate crude oil while others use Brent crude oil as proxy to world oil price. We are agnostic as to which price data should be used, although these prices are highly correlated within the sample period.

[3] We recognize that the first oil embargo occurred between 1973 and 1974. Nonetheless, data on US refiner acquisition cost of crude oil start in 1974. While there are ways to estimate oil prices prior to 1974 (Barsky and Kilian 2002), we believe that this is beyond the scope of this paper.

[4] Kilian (2009) clearly distinguishes aggregate demand for industrial commodities in this context as opposed to aggregate demand for overall goods and services.

[5] The 1978–1979 Iranian revolution brought insignificant change in the global production of oil as Iranian cutbacks were more than offset by increased production elsewhere (Kilian 2009; Hamilton 2013).

[6] For detailed discussion, see Kilian (2009).

Figure 2 plots the historical evolution of the structural shocks implied by the VAR model. The shocks are expressed in annual averages for better readability. The spikes and drops in the figure notably capture the important oil price shocks in history as documented by Kilian (2009) and Hamilton (2013), and based on recorded US recessions from the National Bureau of Economic Research. For example, there was a global oil supply disruption in 1980, which was associated with the outbreak of the Iran-Iraq War. Meanwhile, the years 1978, 1979, and 1980 experienced large positive economic shocks attributed to the growing global economy. There was also an unanticipated increase in oil-specific demand in 1979, which was consistent with the increased uncertainties on the future supply of oil attributed to the geopolitical conflicts in the Middle East. These estimated structural shocks also capture the 2008 unanticipated fall in aggregate demand following the Great Recession, which also coincided with a drop in oil-specific demand due to low expectation on future demand for oil. In 2014, US oil production increased, causing a slight unexpected uptake in global oil production.

After estimating the monthly structural shocks in the global crude oil market, we performed historical decomposition of price changes over the same period following Burbidge and Harrison (1985). This technique decomposes observed oil price change at any period as a linear function of past orthogonal shocks. Historical decomposition thereby allows us to isolate the specific contributions of past oil supply shocks, aggregate demand shocks, and oil-specific shocks to the observed history of oil price changes. We then took the quarterly average of the estimated contribution of the shocks to oil price change in order to have the same frequency with the quarterly GDP estimates of the Philippines provided by the Philippine Statistics Authority for the period 1981.q1–2015.q4, as follows:

$$\hat{\zeta_{jt}} = \frac{1}{3}\sum_{i=1}^{3} v_{j,i,t}, \quad j = 1,2,3 \tag{2}$$

where $v_{j,i,t}$ refers to the estimated contribution of past orthogonal shocks to the oil price change in the *j-th* equation in the VAR model in the *i-th* month of the *t-th* quarter of the sample.

We can examine the influence of these structural shocks on Philippine macroeconomic aggregates based on the specification:

$$\Delta y_t = \alpha_j + \sum_{i=0}^{12} \phi_{ji}\hat{\zeta}_{jt-i} + Qtr_k + \epsilon_t, \quad j = 1,2,3 \tag{3}$$

where y_t is a *nx1* vector denoting growth rates of each macroeconomic variable at period *t*, ζ_{jt} refers to the quarterly averaged contribution of structural shocks to oil price changes, *Qtr* are quarter dummies to account for potential seasonality in the macroeconomic variables, and ε is the usual model residual. Following Kilian (2009), the impulse response coefficient at horizon *h* in this regression model corresponds to ϕ_{jh}, which captures the transmission of the worldwide oil demand- and supply-related shocks to the local macroeconomy.[7]

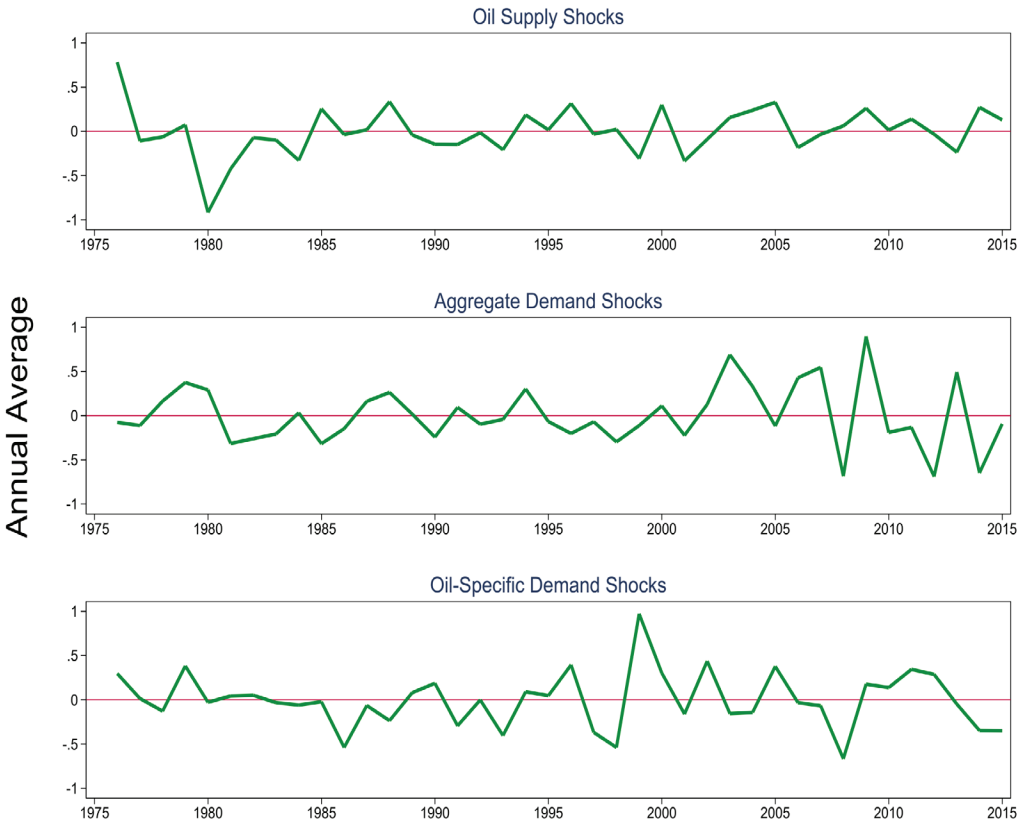
[7] We also estimate the impact of each oil shock on the Philippine macro aggregates following the estimation of impulse response function by local projections developed by Jorda (2005). We find that the qualitative results remain the same using a different estimation method.

In Kilian's (2009) original formulation, the impulse responses are based on raw structural innovations rather than the historical decomposition of oil price shocks. In this paper, we wish to highlight the influence on the local economy of the factors that constitute oil price shocks, thus the use of the decomposed series. In any case, the qualitative results when using structural innovations like those used in Kilian (2009) do not differ from the results we present here as more recent shocks receive greater weight in the historical decomposition.

RESULTS AND DISCUSSION

Figure 3 plots the relative contribution of each oil demand and supply shock to the movement of the real price of oil. Historically, the biggest contributions are due to aggregate demand shock and oil-specific demand shocks, consistent with Kilian (2009). Oil supply shocks are relatively stronger

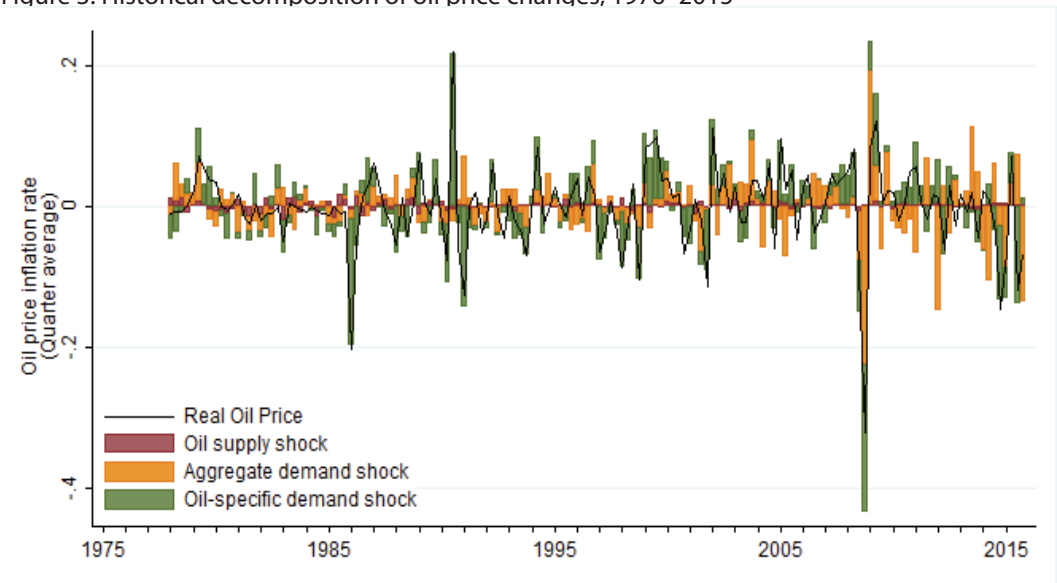
Figure 2. The historical evolution of the structural shocks, 1976–2015



Note: The figure illustrates the estimated structural residuals from the VAR model, averaged to annual frequency. The starting data is dictated by the availability of price data (proxied by refiner's acquisition cost of imported crude oil) from the US Department of Energy. While data are available from 1974.1, the VAR model allows for lags up to 24 months, which makes estimated shocks only available starting 1976.1.
Source of raw data: Energy Information Administration [EIA] (n.d.), Kilian (2009)

pre-1980s. Thereafter, these shocks only serve either to amplify oil price surges or lower oil prices at other times. Oil-specific demand shocks are relatively stronger in the late 1980s up to the early 2000s. The biggest drops, which were around 2008–2009 and 2014–2015, were mostly driven by both aggregate demand and oil-specific market demand shocks. This is in contrast with the popular view that the 2014–2015 oil price collapse was a manifestation of the unprecedented increase in US domestic crude production.

Figure 3. Historical decomposition of oil price changes, 1976–2015



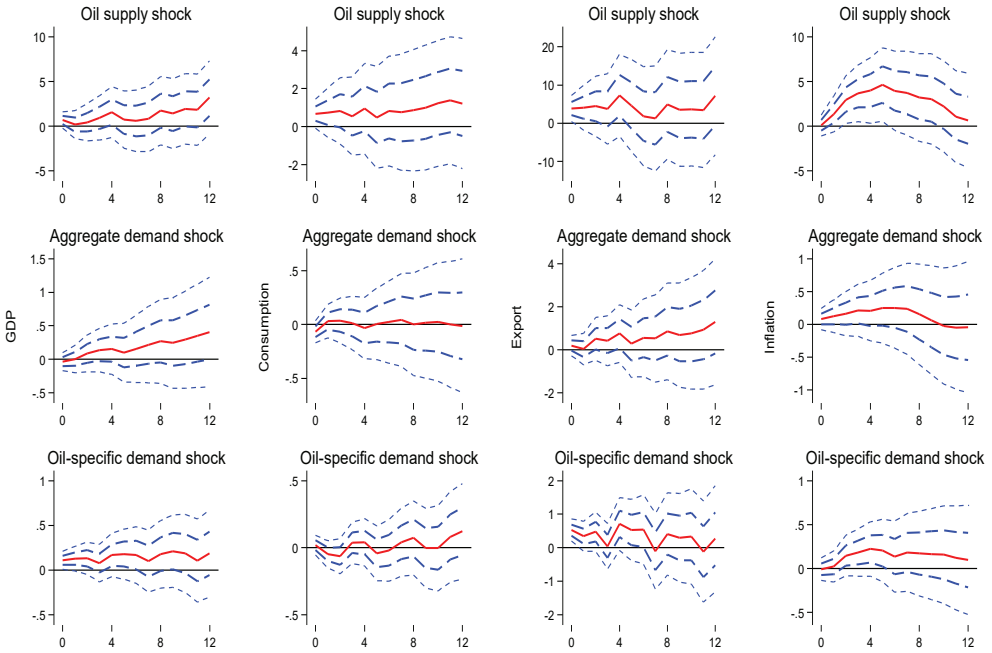
Sources: Authors' calculations

Figure 4 (first column) summarizes the cumulative response of the GDP growth rate of the Philippines, along with consumption, exports, and inflation.[8] Results show significant differences in how each structural shock in oil demand and supply underlying oil price changes influences the movement of key macroeconomic aggregates. Our estimates suggest that a 1-percent decrease in the price of oil driven by an unanticipated increase in the global supply of oil increases GDP growth by about 1 percent on impact, and its cumulative effect is increasing over time. The response of GDP growth is positive at all horizons, although one-standard error bands imply that the impact is mostly statistically insignificant. An unanticipated increase in aggregate demand, which increases oil price, induces a positive but statistically insignificant effect on GDP growth. The effect is generally increasing up to three years.

Meanwhile, a 1-percent increase in the world crude oil price, due to unanticipated increase in oil-specific demand, increases output growth by 0.11 percent. This result is striking because oil-specific demand shocks can be driven by uncertainties in the future demand for oil relative to supply of oil, which appears to benefit the Philippine economy in the short run (at the very least). The effect is also nontrivial given that the crude oil price declines are quite significant.

[8] It should be noted that the response is cumulated across the horizon, which means that the current oil price increases include the effect of previous oil price increases.

Figure 4. Cumulative responses of Philippine macroeconomic aggregates to each structural shock point estimates with one- and two-standard error bands



GDP = gross domestic product

Note: The figure shows point estimates (solid line) with one- and two-standard error bands (short- and long-dashed lines, respectively). Export includes earnings from both exports of goods and services.

Source of raw data: EIA (n.d.)

We also looked at the subcomponents of the economy's output to determine how each underlying structural shock to oil price changes influences output growth. For consumption (second column), only unanticipated supply shock influences consumption. This is fairly intuitive since, holding demand constant, a price decline driven by exogenous increase in global crude oil production (e.g., discovery of fracking) increases the purchasing power of consumers. This is supported by the significant decline (at two-standard error bands) in the consumer price index (last column) brought about by the supply shock-driven oil price decline. Meanwhile, a positive aggregate demand shock, in contrast, has two opposing effects: (1) the short-run stimulating effect of higher global demand which increases domestic consumption and (2) the growth-retarding effect of higher inflation due to higher oil prices. Our results imply the two effects generally offset each other, although none satisfies conventional statistical significance. The effect of oil-specific demand shock is generally small and statistically insignificant at all horizons.

Exports, which include earnings from sale of goods and services abroad, gain from any unanticipated increase in the global production of oil, which lowers global oil price, with a statistically significant (one-standard error) positive uptake after a year. Aggregate demand shocks have (if there is any) positive effect on exports and it is increasing up to one year. Interestingly, unanticipated increase in oil-specific demand, which increases crude oil price, significantly increases exports on

impact and is sustained up to two quarters, followed by a decline below an initial level in the third quarter, then rising again after a year. The effect after a year is statistically significant.

The key results can be summarized as follows: First, an unanticipated increase in oil supply, which brings down oil price, has immediate, short-lived, and statistically significant effect on output, consumption, and exports of the Philippines. This is fairly intuitive because oil supply shocks in this context are seen as a rightward shift in the aggregate supply curve of the economy, and are expected to drive down price, thus, reducing both the cost of production and consumption, holding other things constant. The findings for positive aggregate demand shocks are consistent with earlier findings in the literature, which suggest two opposing effects on output: (1) the short-run stimulating effect of higher global demand and (2) the growth-retarding effect of higher inflation due to higher oil (and presumably other commodities) prices. Finally, unanticipated increases in precautionary demand appear to be beneficial to the Philippine economy. This finding is consistent with other studies that look into the direct and indirect effect of oil price shocks through factor mobility (Mohaddes and Raissi 2013) and international trade linkages (Kilian et al. 2009; Bodenstein et al. 2011; Rasmussen and Roitman 2011).

Based on the above results, we can surmise that the recent oil price decline, which is primarily driven by demand shocks, may have slowed down the output growth of the Philippines. Lower oil price is a result of lower demand for industrial commodities and a gloomy outlook of future global economy. Both low actual and perceived global demand significantly reduced demand for Philippine exports, with stronger negative impact on service exports that are concentrated in oil-producing economies in the Middle East. This negative effect on output outweighs the increase in consumption, thus ultimately reducing total output of the economy.

CONCLUSION

Conventional wisdom suggests that oil price declines are generally good for oil importers. Previous studies, particularly those focusing on advanced oil-importing economies, provide empirical basis for why oil price increases are traditionally seen as boon to exporters and bane for importers. Quite surprisingly, literature on oil price–macroeconomy relationship applied to developing countries remains thin. Moreover, only a few looked into net oil-importing countries. In this paper, we took the Philippine economy as a test case to empirically assess how oil price shocks can influence an oil-importing developing economy and determine other potential mechanisms by which global crude oil price changes can benefit or harm an economy.

This study is far from being perfect. First, the uniqueness of the Philippine economy in terms of its reliance on foreign remittances can cast doubts on the ability of the study to generalize its results. Future research can improve on this study by looking at other labor-exporting countries, such as India, China, and the Pacific Islands. Second, we are agnostic on how much of the influence is due to exchange movement associated with oil price fluctuations. Presumably, exchange rates are also affected by oil price movements (and vice versa for the US case), which may greatly influence exports. How correlated is Philippine foreign exchange to crude oil price, and its implications on export and output growth, are questions that are beyond the scope of this study.

Despite these limitations, this study provided results that appeal to conventional wisdom, which makes it relevant both at the theoretical and policy fronts. In particular, we found evidence suggesting that recent oil price declines, which were largely driven by demand shocks, may have harmed the Philippine output growth. This is due to the fact that the economy is not only dependent

on oil imports but also on remittances and earnings from external markets. That said, the indirect (negative) effect on trade appears to outweigh the (positive) effect of lower crude oil and gas prices on the economy.

The central message of this paper is simple: Not all oil price shocks are alike and not all economies would respond similarly to the same underlying shock. Like any other economic phenomenon, oil price movements produce winners and losers. However, it is also probable that gainers are compensating losers in some ways through increased demand for cross-border goods or service exports. The net effect on a certain economy is ambiguous and largely dependent on the relative strength of the direct and indirect effects of oil price shocks.

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Philippine Telecommunications Laws and Regulations: A TPP Gap Analysis[1]

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ABSTRACT

This paper aims to promote competitive access for telecommunications providers. Among other things, it includes provisions for interconnection, access to physical facilities, and transparency. Reforms in these areas will likely benefit consumers and help businesses become more competitive.

There is a need, however, to determine if or what regulatory and policy reforms are necessary for the Philippines to qualify for entry into emerging new trade agreements such as the Trans-Pacific Partnership Agreement (TPPA). This paper uses the TPPA Final Text on Telecommunications (Chapter 13, Article XIII.4) released on February 6, 2016, to measure the Philippines' readiness to join the trade agreement.

Key recommendations include:

1. To ease restrictions on foreign ownership, the Philippines must address the constitutional provisions that constrain the growth and productivity of the country, either by amending the Constitution or through creative legislation that expands opportunities for foreign investment but in a manner consistent with the Constitution. Congress is well within its

[1] This paper was based on a report prepared under the United States Agency for International Development (USAID)-funded Trade-Related Assistance for Development Project titled, "The Philippines and the Trans-Pacific Partnership: A Readiness Assessment". The content of the study is the sole responsibility of the author(s) and does not necessarily reflect the views of USAID or the United States Government.

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powers to redefine "public utilities", so that it narrows the areas of the economy that would remain covered by the Constitution, and opens up more opportunities for foreign investment in previously protected sectors.

2. At the minimum, comprehensive amendments to Republic Act 7925 (Public Telecommunications Policy Act of 1995) must be in order, especially with respect to interconnection, unbundling of network elements, cross-subsidization, number portability, and the powers of the National Telecommunications Commission (NTC) to police the market players. Additional provisions may be necessary to allow the NTC to impose obligations on major players with significant market power, as well as to create a universal service fund.
3. Given the broad mandate and powers given to the newly formed Philippine Competition Commission (PCC), and the positive impact that addressing these issues may have on the environment for competition in the telecommunications sector, it may now be possible for the PCC and the NTC, working together, to bridge these gaps through a series of administrative issuances.
4. Ensure adequate competition in the sector that upholds the public welfare and promotes the international competitiveness of Philippine enterprises, for which information and communications technology services is a key input for enterprises and represent significant costs of doing business.

INTRODUCTION

The Trans-Pacific Partnership Agreement (TPPA) is a free trade agreement (FTA) aimed at creating a platform for economic integration across the Asia-Pacific region. It stands out from other FTAs due to its nature and scope: a "megaregional" trade agreement with negotiators also pursuing nontrade-related issues. While it was hailed as a state-of-the-art FTA that will link countries on both sides of the Pacific, a recent rise in protectionist policies has made it doubtful that the agreement will come into force. Nevertheless, the TPPA remains a model for future agreements in the region.

Twelve countries participated in negotiations for the TPPA. These are: Brunei, Chile, New Zealand, Singapore, United States, Australia, Peru, Viet Nam, Malaysia, Mexico, Canada, and Japan. Due to the United States' recent withdrawal from the trade agreement, there have been talks of the possibility of a version of the TPPA without the United States, or a shift in focus to negotiating other megaregional FTAs, such as the Regional Comprehensive Economic Partnership (RCEP) and the Free Trade Area for the Asia-Pacific (FTAAP).

The Philippines announced its interest in joining the TPPA in June 2015, and it is currently involved in discussions for both the RCEP and the FTAAP. There is a need, therefore, to determine if regulatory and policy reforms are necessary for the Philippines to qualify for entry into emerging new trade agreements such as the TPPA.

The focus of this paper is on telecommunications, an industry with issues that have increasingly gained attention in the past few years. Public telecommunications networks and services (PTNS) are vital for the effective functioning of the Philippine economy. In 2015, the gross value added of telecommunications was PHP 362 billion or 2.7 percent of the gross domestic product (GDP) (PSA

2016a). The industry also employed 1.0 percent (or approximately 381,000) of the working population (PSA 2016b). Aside from its contribution to GDP and employment, the public telecommunications infrastructure provides basic services that all people depend upon.

Unfortunately, the high price and poor quality of telecommunications services in the Philippines have become binding constraints to the country's development. According to the International Telecommunication Union (2015), the rates of information and communications technology (ICT) services in the Philippines are excessively prohibitive. In the ITU's ICT Price Basket (IPB), which measures the affordability of ICT services, the Philippines ranked 120th out of 170 economies as of end-2014.

Among the members of the Association of Southeast Asian Nations (ASEAN), ICT services in the Philippines are among the least affordable. ICT services in the country cost 5.9 percent of per capita gross national income, compared to the regional average of 3.4 percent. The IPB is based on three subbaskets: fixed telephone, mobile cellular, and fixed broadband services. The price of fixed telephone in the Philippines is highest among the ASEAN countries. Mobile and broadband are also relatively expensive, although prices are not as high as in the least developed countries (LDCs) of Laos and Cambodia.

And yet, despite the exorbitant rates being charged by operators, quality of services, particularly for broadband, remains poor. The Philippines is reported to have the slowest internet in the ASEAN, and among the slowest in the world. Based on data from Ookla Net Index for December 2014, the Philippines ranked 167th out of 190 countries. Average download speed in the country was recorded at 3.4 megabits per second (Mbps) while average upload speed was only 1.3 Mbps. To compare, the regional averages were 18.1 and 14.3, respectively.

The Philippines also scored low on reliability. Based on surveys, only 69 percent reported achieving the speed advertised by their provider. In contrast, the reliability rating of the other non-LDCs in ASEAN ranged from 89 to 100 percent.

The quality and cost of PTNS have a significant impact on economic growth and income inequalities in the country. As nearly every company, business, government, and person use telecommunications services, the lack of reliable and affordable access, particularly for the general public and small enterprises, is a constraint on development, competitiveness, and investments. Improving the provision and access to telecommunications services is critical for the Philippines to complete its transition from a factor- to an efficiency-driven economy.

The poor performance of the industry suggests that the policies and laws currently in place may need to be overhauled, or at least, revisited. Consistency with best international practice and experience in the crafting of laws, rules, and procedures could address the issues described above.

This paper on telecommunications of the TPPA is expected to promote competitive access for telecommunications providers. Among other things, it will include provisions for interconnection, access to physical facilities, and transparency. Reforms in these areas will likely benefit consumers and help businesses become more competitive.

ACCESS TO AND USE OF PUBLIC TELECOMMUNICATIONS NETWORKS AND SERVICES

Under Chapter 13 of the TPPA, each state party has the obligation of ensuring that access to and use of any public telecommunications service, including leased circuits, offered in its territory or across

its borders, are provided at reasonable and nondiscriminatory terms and conditions.[3] Hence, each party shall ensure that service suppliers of the other party are permitted to:

1. Purchase or lease, and attach terminals or other equipment that interface with a public telecommunications network;
2. Provide services to individual or multiple endusers over leased or owned circuits;
3. Connect leased or owned circuits with public telecommunications networks and services, or with circuits leased, or owned by another enterprise;
4. Perform switching, signaling, processing, and conversion functions; and
5. Use operating protocols of their choice.[4]

Interconnection between public telecommunications service providers or entities (PTEs) in the Philippines is already mandated to be provided on a reasonable and nondiscriminatory basis (Public Telecommunications Policy Act of 1995). Executive Order (EO) No. 59, issued in 1993, required compulsory interconnection between authorized public telecommunications carriers and specifies that "interconnection shall at all times satisfy the requirements of effective competition and shall be effected in a nondiscriminatory manner." Subsequent regulations complemented and reinforced the provisions of EO 59.

The operation of a public telecommunications network, however, is considered to be a public utility which can only be operated by Filipinos or corporations or associations with at least 60 percent of its capital owned by Filipino citizens (Public Service Act of 1936). Under current jurisprudence, "Full beneficial ownership of 60 percent of the outstanding capital stock, coupled with 60 percent of the voting rights, is constitutionally required for the State's grant of authority to operate a public utility" (Gamboa vs. Teves 2011). This effectively blocks service providers from other TPPA parties from accessing or using the Philippines' PTNS, as they will be unable to resell or offer their services to the public without complying with the aforementioned ownership requirement.

The restrictions on foreign participation in telecommunications services stem from the nationalistic provisions of the 1935 Constitution, whose authors were anticipating future political independence, and retained in the 1987 Constitution. Since the Constitution does not define "public utilities", the Public Service Act (PSA) of 1936 is usually used as a statutory reference to determine whether or not a business was a public utility. The PSA regulates "public services" and defines it to include "wire or wireless communications system[s]",[5] among others.

Unfortunately, the limitation on foreign ownership imposed on the industries enumerated in the PSA has now become a barrier that diminishes the Philippines' competitive capacity. Perhaps most significantly, the restrictions have constrained foreign direct investments (FDIs) to the Philippines. According to data from the World Bank, the Philippines has one of the lowest FDI inflows in the ASEAN at USD 5.84 billion in 2015, compared to a regional average of USD 13.00 billion (WB 2016). In order to transition to a developed economy, the Philippines needs considerably more FDIs. Relaxing the policy on the participation of foreigners will increase the entry of larger risk capital and strengthen the capital base of PTNS.

The experience of other countries has shown that relaxing foreign ownership restrictions can significantly increase FDIs, enhance competitiveness, and accelerate economic growth. Increasing competition and openness in the telecommunications sector allows access to higher quality services,

[3] TPP Final Text (2016), Article 13.4 (1)
[4] TPP Final Text (2016), Article 13.4 (2)
[5] Commonwealth Act No. 146, Section 13 (b)

lower prices, and technology transfer. In contrast, discriminatory regulation impedes investments to the detriment of consumers and economic development.

To ease these restrictions on foreign ownership then, the Philippines must address the constitutional provisions that constrain the growth and productivity of the country, either by amending the Constitution or through creative legislation that expands the opportunities for foreign investment but in a manner consistent with the Constitution. For instance, Congress would well be within its powers to redefine "public utilities" by amending the PSA, so that it narrows the areas of the economy that would remain covered by the Constitution, and opens up more opportunities for foreign investment in previously protected sectors.

There is also a requirement under the TPPA for the state parties to ensure that an enterprise of a party may use public telecommunications services for the movement of information in its territory or across its borders. This includes use for intracorporate communications and for access to information contained in databases or otherwise stored in machine-readable form in the territory of either party.[6] Measures necessary to ensure the security and confidentiality of messages may be taken as long as it is not applied in an arbitrary or unjustifiable discrimination or as a disguised restriction on trade in services.[7]

Generally, there is no issue with respect to intracorporate access to and movement of information in the Philippines, as enterprises of another party can freely enter into agreements with suppliers of such services operating within the Philippines. Such access to intracorporate information is, of course, subject to national security and privacy considerations (Data Privacy Act of 2012).

The TPPA further requires that state parties shall ensure that no condition is imposed on access to, and use of, PTNS, other than as necessary to safeguard the public service responsibilities of PTNS suppliers, in particular their ability to make their networks or services available to the public or protect their technical integrity.[8] Conditions for access to and use of PTNS may include:

1. The use of a specified technical interface, including an interface protocol, for connection with those networks or services;
2. The interoperability of those networks and services;
3. Type approval (or Certificate of Conformity) of terminal or other equipment that interfaces with the network and technical requirements relating to the attachment of that equipment to those networks; and
4. A licensing, permit, registration, or notification procedure which, if adopted or maintained, is transparent and provides for the processing of applications filed thereunder in accordance with a party's laws or regulations.[9]

As PTNS in the Philippines are owned and operated by private entities, access to and use of their network is dependent on negotiations between contracting parties. However, public utilities are not allowed to "provide or maintain any service that is unsafe, improper, or inadequate or withhold or refuse any service which can reasonably be demanded and furnished…" (Public Service Act of 1936).[10]

On access by PTEs to public telecommunications networks, the Philippines has already provided for mandatory interconnection for all duly authorized PTEs under Republic Act (RA) No. 7925 or the

[6] TPP Final Text (2016), Article 13.4 (3)
[7] TPP Final Text (2016), Article 13.4 (4)
[8] TPP Final Text (2016), Article 13.4 (5)
[9] TPP Final Text (2016), Article 13.4 (6)
[10] Commonwealth Act No. 146, Section 19

Public Telecommunications Policy Act of the Philippines. The said law provides that interconnecting carriers shall negotiate on access charges or revenue-sharing arrangements, which is submitted to the telecommunications regulatory agency, the National Telecommunications Commission (NTC), for information. Should the parties fail to agree on the same, they may submit the dispute to the NTC for resolution.

SUPPLIERS OF PUBLIC TELECOMMUNICATIONS SERVICES

Interconnection

Interconnection refers to the linking with suppliers providing public telecommunications services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier[11] (WTO 1997). As defined under Philippine law, specifically Section 2 of EO 59, it is "the linkage, by wire, radio, satellite, or other means, of two or more existing PTEs with one another for the purpose of allowing or enabling the subscribers or customers of one PTE to access or reach the subscribers or customers of the other PTE".

Interconnection is fundamental to the success of a competitive telecommunications market and thus one of the most critical issues in the industry today. Without such arrangements, subscribers of one PTE would be unable to access the subscribers of other PTEs. Because interconnection rates and terms are negotiated bilaterally between firms, they are strongly affected by the relative bargaining strengths of the PTEs. Operators with fewer subscribers, for instance, have weaker bargaining power since dominant PTEs have little incentive to grant favorable terms to a minor market player.

The TPPA requires that each state party shall ensure that suppliers of public telecommunications services in its territory provide, directly or indirectly within the same territory, interconnection with suppliers of public telecommunications services of the other party at reasonable rates.[12]

Likewise, each party shall ensure that a *major* supplier in its territory provides interconnection for the facilities and equipment of suppliers of public telecommunications services of the other party:

1. At any technically feasible point in the major supplier's network;
2. Under nondiscriminatory terms, conditions, and rates;
3. Of a quality no less favorable than that provided by the major supplier for its own like services, for like services of nonaffiliated services suppliers, or for its subsidiaries or other affiliates;
4. In a timely manner, and on terms and conditions, and at cost-oriented rates, that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the suppliers do not have to pay for network components or facilities that they do not require for the service to be provided; and
5. On request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.[13]

Philippine regulation already provides for interconnection of PTEs under Section 5 of NTC Memorandum Circular (MC) No. 14-7-2000, i.e., "interconnection should be ensured to any

[11] TPP Final Text (2016), Article 13.1
[12] TPP Final Text (2016), Article 13.5 (1) and (2)
[13] TPP Final Text (2016), Article 13.11 (1)

technically feasible point in the network, under nondiscriminatory terms, conditions (including technical standards and specifications) and charges and of a quality no less favorable than that provided for its own like services or for like services of nonaffiliated service suppliers or for its subsidiaries or other affiliates; and in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-based charges that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components for facilities that it does not require for the service to be provided." The circular likewise outlines the procedure for interconnection negotiations which is given a 90-day timetable for execution, and allows recourse to the NTC. This is in compliance with the TPPA that requires each party to make publicly available the applicable procedures for interconnection negotiations with a major supplier in its territory.[14]

More expansively, Section 10 of this regulation requires all PTEs, with respect to interconnection:

1. To provide interconnection at cost-based charges in a manner sufficiently unbundled;
2. To negotiate in good faith with other PTEs regarding the terms and conditions of interconnection agreements;
3. To interconnect directly with the facilities and equipment of other PTEs to allow access to all types of services available to the customers of both parties;
4. To install network features, functions, and capabilities necessary for interconnection;
5. To provide nondiscriminatory access to network elements at any technically feasible point on charges, terms, and conditions that are just and reasonable;
6. To provide unbundled network elements in a manner that allows requesting carriers to combine such elements in order to provide telecommunications service;
7. To make available to other PTEs on a timely manner all data and other relevant information necessary to ensure an efficient, timely, and reliable interconnection; and
8. Not to abuse information obtained from competitors in relation to interconnection with the latter.

While the Philippines' regulations on interconnection are compliant with the TPPA standard, as earlier discussed, such guarantees do not extend to interconnection with PTEs of other countries seeking to operate in Philippine territory.

The TPPA further requires that interconnection with a major PTE should be through:

1. A reference interconnection offer (RIO) or another standard interconnection offer containing the rates, terms, and conditions that the major supplier offers generally to suppliers of public telecommunications services; or
2. Terms and conditions of an interconnection agreement in effect;[15]
3. And that suppliers of public telecommunications services of another party have the opportunity to interconnect through negotiation of a new interconnection agreement.[16]

Such requirement is already found in Philippine regulation. In order to facilitate interconnection and promote transparency, NTC came out with MC 10-7-2007, wherein Section 3.2 mandated the development of reference access offers (RAOs). As similarly provided under the TPPA, a RAO is the default offer of a public telecommunications entity for access services provided to requesting service

[14] TPP Final Text (2016), Article 13.11 (4)
[15] TPP Final Text (2016), Article 13.11 (2)
[16] TPP Final Text (2016), Article 13.11 (3)

providers (or access seeker). It contains prices and sufficient details to allow an access seeker to weigh the offer without having to negotiate directly with the access provider.

Unfortunately, however, implementation is another matter entirely. No PTE has ever submitted a RAO for NTC's approval. A major PTE in the Philippines reportedly asserted that the commission cannot compel telecommunications entities to reveal interconnection terms with other carriers, characterizing such information as trade secrets (*ABS-CBN News* 2010). Interconnection agreements between PTEs have thus remained undisclosed to the public and even the NTC itself, except for very general terms that do not disclose costs and pertinent terms and conditions. While there may be a vestige of compliance with the standard that a major PTE in the Philippines file all interconnection agreements to which it is party with its telecommunications regulatory body,[17] the NTC itself discloses that the information contained therein is extremely limited (Cabarios 2015).

The Philippines is therefore noncompliant with the requirement under the TPPA that if a major supplier in the territory of a party has a RIO, the party shall require the offer to be made publicly available,[18] including interconnection agreements in effect between a major supplier in its territory and other suppliers of public telecommunications services in its territory.[19]

Number portability

The TPPA requires that each party shall ensure that suppliers of public telecommunications services in its territory provide number portability without impairment to quality and reliability, on reasonable and nondiscriminatory terms and conditions.[20]

Number portability refers to the ability of a customer to transfer an account from one service provider to another without requiring a change in number. It reduces switching costs (that is, the costs that consumers incur as a result of changing suppliers) and increases competition. Without number portability, consumers are tied to the usage of their number. This barrier to exit can be used by incumbent operators to exploit monopolistic or dominant power.

Since switching costs lock users, firms need fewer resources to keep subscribers. Customers are then likely to receive higher prices and poorer service. There can also be price discrimination, such as higher rates for old customers. Moreover, switching costs are an additional barrier to entry for new operators, limiting the competitive constraint from potential competition and strengthening the market power of incumbent firms.

Number portability is a measure that has been used extensively and successfully in other countries to promote competition in telecommunications. However, there is no regulation that mandates number portability in the Philippines at the present time. Past efforts of the NTC to introduce number portability was met by strong opposition from the incumbent public telecommunications operators who argued that the measure would be too costly to implement. This argument, however, has limited basis given that number portability has already been successfully implemented in economies smaller than the Philippines, and is even offered free of charge in many countries.

Access to telephone numbers

The TPPA requires a state party to ensure that suppliers of public telecommunications services of the other party are afforded nondiscriminatory access to telephone numbers.[21] NTC MC No. 11-5-94

[17] TPP Final Text (2016), Article 13.11 (4)
[18] TPP Final Text (2016), Article 13.11 (5)
[19] TPP Final Text (2016), Article 13.11 (5)
[20] TPP Final Text (2016), Article 13.5 (4)
[21] TPP Final Text (2016), Article 13.5 (5)

provides for the numbering plan within the country, which establishes the minimum functional dialing characteristics and capabilities that the national switching network, and switching equipment and accessories comprising the said network, must comply with. This is publicly available and PTEs are obligated to conform to this regulation.

ADDITIONAL OBLIGATIONS RELATING TO MAJOR SUPPLIERS

Equal treatment

The TPPA requires equal treatment to be accorded by a major supplier in a party's territory to suppliers of public telecommunications services of the other party, as to itself, its subsidiaries, its affiliates or nonaffiliated service suppliers regarding the availability, provisioning, rates, or quality of like public telecommunications services, and the availability of technical interfaces necessary for interconnection.[22]

This requirement is met in the context of interconnection by NTC MC 14-7-2000, which obligates an access provider to provide nondiscriminatory treatment to access seekers, at no less favorable terms than the former affords to itself or its subsidiaries or affiliates; nondiscriminatory treatment to customers of the interconnecting party, at no less favorable terms than it affords to its own customers; nondiscriminatory dealing with interconnecting parties in relation to the technical and operational quality of the services it provides.

Contrary to the TPPA requirement on equal treatment, which has the objective of opening up competition to suppliers of public telecommunications services of other state parties, the equality of treatment clause in RA 7925, which pertains to equality of treatment in the grant of legislative franchises,[23] actually ensures that major suppliers in the Philippines retain their incumbent advantage vis-à-vis smaller players or new entrants. This clause could only have a procompetitive effect when a new domestic player or a major supplier in another state party, with sufficient resources at par with the current incumbents, enters the Philippine telecommunications market.

Considering that foreign telecommunications providers cannot be given a legislative franchise to operate a PTNS, this is not bound to happen, unless, as previously noted, the Constitution is amended or legislation excluding telecommunications services from the definition of "public utilities" is subsequently enacted.

The TPPA also prohibits a party from proscribing the resale of any public telecommunications services, and requires each party to ensure that a major supplier in its territory does not impose unreasonable or discriminatory conditions or limitations on the resale of its public telecommunications services.[24] While the Philippines makes no such prohibition of reselling, especially to suppliers of public telecommunications services of another party, said suppliers cannot offer these services for sale in the territory of the Philippines, which renders said TPPA obligation inapplicable to the Philippine context.

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[22] TPP Final Text (2016), Article 13.7

[23] "**Section 23.** *Equality of Treatment in the Telecommunications Industry.* Any advantage, favor, privilege, exemption, or immunity granted under existing franchises, or may hereafter be granted, shall *ipso facto* become part of previously granted telecommunications franchises and shall be accorded immediately and unconditionally to the grantees of such franchises: Provided, however, that the foregoing shall neither apply to nor affect provisions of telecommunications franchises concerning territory covered by the franchise, the life span of the franchise, or the type of service authorized by the franchise."

[24] TPP Final Text (2016), Article 13.9

The current Philippine regulatory framework leaves arrangements of reselling of services to the contracting parties. This is only limited by the statutory requirement that no person shall commence or conduct the business of being a public telecommunications entity without obtaining a franchise[25] from the legislature, and a certificate of public convenience and necessity from the NTC.

An exception for obtaining a legislative franchise exists for value-added service providers (VAS), provided it does not put up its own network.[26] However, this is subject to: prior approval of the NTC; other providers of VAS are not discriminated against rates nor denied equitable access to facilities; and separate books of account are maintained for the VAS.

Unbundling of network elements

Unbundling requires incumbents to allow other operators to lease specific elements of a telecommunications network. Since some inputs of the network are available only from certain operators and cannot easily be duplicated, competition in downstream telecommunications services would be exceedingly difficult if these inputs are not available at suitable prices.

Unbundling of network elements allows competing operators to enter the market and provide services with considerably less sunk cost. New entrants can then offer competing services to customers without duplicating infrastructure or simply reselling the services of incumbent PTEs. Unbundling increases entry by reducing entry costs and intensifies competition in the provision of services. In addition, it can advance the introduction of new services even while relying on the existing network and technology.

The TPPA requires the state parties to provide its telecommunications regulatory body the authority to require a major supplier in its territory to offer access to network elements on an unbundled basis on terms and conditions, and at cost-oriented rates, that are reasonable, nondiscriminatory, and transparent for the supply of public telecommunications services.[27]

NTC guidelines on the subject provide that:[28]

1. An access provider may provide to an access seeker, for provision of a telecommunications service, access to its network elements on an unbundled basis.
2. The provision of access to unbundled network elements includes the provision of a connection to an unbundled network element independent of the access provider's providing interconnection to the access seeker.
3. An access provider shall provide an access seeker access to an unbundled network element, along with all of the unbundled elements features, functions, and capabilities, in a manner that allows the requesting PTE to provide any telecommunications service that can be offered by means of that network element.
4. An access provider may provide, on such commercial terms and conditions that are just, reasonable, and nondiscriminatory, any technically feasible method of obtaining interconnection or access to unbundled network elements at a particular point upon request by an access seeker.

However, the same circular also provided that existing agreements on a bundled basis shall continue to be in force and effect, until the NTC shall have reestablished rates and settling

[25] RA 7925, Section 16
[26] RA 7925, Section 11
[27] TPP Final Text (2016), Article 13.10
[28] NTC MC No. 14-7-2000, Sections 56–59

procedures.[29] Thus, the implementation of the unbundling has not been enforced. According to the NTC, it is extremely difficult to do so citing common costs, and at any rate, it has no power to compel submission of information from the PTEs (Cabarios 2015). This reinforces the need for new legislation to clarify and expand the powers of the NTC.

Leased circuits services

A major supplier in a state party's territory is required to provide service suppliers of another party leased circuits services that are public telecommunications services in a reasonable period of time on terms and conditions, and at rates that are reasonable and nondiscriminatory, and based on a generally available offer.[30] Hence, each party shall provide its telecommunications regulatory body the authority to require a major supplier in its territory to offer leased circuits services that are public telecommunications services to service suppliers of the other party at capacity-based, cost-oriented prices.[31]

The foregoing is governed by negotiations between contracting parties. Moreover, under RA 7925, PTEs shall offer leased line service to VAS providers at the same quality and at a price not higher than the prevailing leased line prices offered by the PTEs to the public. PTEs shall not deny requests by VAS providers for leased line service. If a PTE is unable to provide leased line to a VAS provider, said PTE shall inform in writing, copy furnishing the commission, the requesting VAS provider of the reasons for denial of request. The commission may require the PTE to further substantiate its denial of the request.[32]

Colocation and access to poles, ducts, conduits, and rights-of-way

Another obligation for state parties is to ensure that a major supplier in its territory provides to suppliers of public telecommunications services of the other party in the party's territory physical colocation of equipment necessary for interconnection or access to unbundled network elements based on a generally available offer, on a timely basis, on terms and conditions, and at cost-oriented rates, that are reasonable and nondiscriminatory.[33] However, if physical colocation is not practicable, the party shall ensure that a major supplier in its territory provides an alternative solution, on the same terms as the above.[34]

Rules on physical colocation are already found in NTC MC 14-7-2000, where the chapter on Standards of Physical and Virtual Colocation (Section 65) states that "(s)ubject to fair and nondiscriminatory compensation arrangements, and to the extent technically feasible, an access provider shall provide physical colocation and virtual colocation to access seekers on a first-come, first-served basis; Provided, that in case the compensation arrangements for colocation are not contained in the interconnection agreement, the delay in the negotiation for and execution of compensation arrangements shall in no way be a cause for the delay in the execution of interconnection agreement and actual interconnection of the parties."

TPPA requires each party to ensure that a major supplier in its territory affords access to poles, ducts, conduits, and rights-of-way owned or controlled by the major supplier to suppliers of public telecommunications services of the other party in the party's territory on a timely basis, on terms

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[29] NTC MC No. 14-7-2000, Section 64
[30] TPP Final Text (2016), Article 13.12 (1)
[31] TPP Final Text (2016), Article 13.12 (2)
[32] RA 7925, Section 11
[33] TPP Final Text (2016), Article 13.13 (1)
[34] TPP Final Text (2016), Article 13.13 (2)

and conditions, and at rates, that are reasonable, nondiscriminatory, and transparent, subject to technical feasibility.[35]

One of the major limitations to market entry in PTNS is the cost of network deployment. Extensive infrastructure is needed to build telecommunications networks. In addition, the acquisition of rights-of-way and other permits required to install ducts, conduits, and poles can be time consuming.

Infrastructure sharing and colocation can significantly reduce barriers to competitive entry. They allow operators to provide services at a lower cost than if they built their infrastructure. Sharing also helps to reduce the control of essential facilities by dominant operators. Another benefit is reduced environmental impact and inconvenience to the public. Similar to the obligations for interconnection, prices for access to and use of facilities should be as transparent as possible to ensure fair trading.

However, agreements in the Philippines on colocation and access to poles are internal to the parties and are not provided to the public.

Submarine cable systems

The TPPA requires that where a supplier of telecommunications services in the territory of a party operates a submarine cable system to provide public telecommunications services, that party shall ensure that the supplier accords suppliers of public telecommunications services of the other party reasonable and nondiscriminatory treatment with respect to access to that submarine cable system, including landing facilities.[36] This is currently not governed by existing regulations in the Philippines, and is subject to the bilateral negotiations of the submarine cable system owner/operator and the access seeker.

INTERNATIONAL MOBILE ROAMING

State parties to the TPPA are obligated to endeavor to cooperate on promoting transparent and reasonable rates for international mobile roaming services.[37] Should a party choose to regulate rates or conditions for wholesale international roaming services, it shall ensure that a supplier of public telecommunications services of another party has access to the regulated rates or conditions for its customers roaming in the territory of the first party.[38]

Also, each party shall provide to the other parties information on rates for retail international mobile roaming services for voice, data, and text messages offered to consumers of the party when visiting the territories of the other parties.[39]

Currently, the Philippines has no regulations on international mobile roaming services, leaving it to its PTNS to negotiate with its foreign counterparts. There is then a lack of transparent and reasonable rates for such services. The information on retail rates will depend on different providers, and can be accessed by the customers through its service provider and not the NTC.

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[35] TPP Final Text (2016), Article 13.14
[36] TPP Final Text (2016), Article 13.15
[37] TPP Final Text (2016), Article 13.6 (1)
[38] TPP Final Text (2016), Article 13.6 (4)
[39] TPP Final Text (2016), Article 13.5 (6)

COMPETITIVE SAFEGUARDS

Under the TPPA, state parties are obliged to maintain appropriate measures for the purpose of preventing suppliers of public telecommunications services that, alone or together, are a major supplier in its territory from engaging in or continuing anticompetitive practices,[40] which include:

1. Engaging in anticompetitive cross-subsidization;
2. Using information obtained from competitors with anticompetitive results; and
3. Not making available, on a timely basis, to suppliers of public telecommunications services, technical information about essential facilities and commercially relevant information that are necessary for them to provide services.

The Philippine Constitution already explicitly provides that 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.[41] Jurisprudence affirms the foregoing provision in the following manner:

"Section 19, Article XII of our Constitution is antitrust in history and in spirit. It espouses competition. The desirability of competition is the reason for the prohibition against restraint of trade, the reason for the interdiction of unfair competition, and the reason for regulation of unmitigated monopolies. Competition is thus the underlying principle of Section 19, Article XII of our Constitution which cannot be violated by RA 8180. We subscribe to the observation of Prof. Gellhorn (1986, p. 45) that the objective of the antitrust law is 'to assure a competitive economy, based upon the belief that through competition, producers will strive to satisfy consumer wants at the lowest price with the sacrifice of the fewest resources. Competition among producers allows consumers to bid for goods and services, and thus matches their desires with society's opportunity costs.'

"Again, we underline in scarlet that the fundamental principle espoused by Section 19, Article XII of the Constitution is competition for it alone can release the creative forces of the market. But the competition that can unleash these creative forces is competition that is fighting yet is fair. Ideally, this kind of competition requires the presence of not one, not just a few, but several players. A market controlled by one player (monopoly) or dominated by a handful of players (oligopoly) is hardly the market where honest-to-goodness competition will prevail. Monopolistic or oligopolistic markets deserve our careful scrutiny and laws which barricade the entry points of new players in the market should be viewed with suspicion" (Tatad v. Sec. of Energy 1997).

Such emphasis on competition found its way into RA 7925, Section 4 (f), where it was declared as a national policy that "(a) healthy competitive environment shall be fostered, one in which telecommunications carriers are free to make business decisions and to interact with one another in providing telecommunications services, with the end in view of encouraging their financial viability while maintaining affordable rates." Again, in NTC MC 14-7-2000, the commission stipulates that it can disapprove an interconnection agreement if it is anticompetitive.[42]

It may be noted, however, that RA 7925 expressly mandates cross-subsidization to unprofitable local exchange areas in order to promote telephone density and provide extensive access to basic telecommunications services.[43] While this cross-subsidization policy used to be common in other countries, it has been phased out due to the distortions it creates in markets. Today, the mechanism

[40] TPP Final Text (2016), Article 13.8
[41] 1987 Constitution, Article XII, Section 19
[42] NTC MC No. 14-7-2000, Article V, Section 14 (d)
[43] RA 7925, 5(c)

most used around the world is a Universal Service Fund (USF), which collects a percentage of revenues from PTEs.

To give teeth to the Philippines' increasingly difficult battle against anticompetitive acts and practices in various industries and markets, Congress has passed RA 10667, or otherwise called the Philippine Competition Act (PCA). The PCA prohibits acts that restrict, prevent, or lessen competition, such as bid manipulation, controlling production, markets or technical development, as well as the abuse of dominant position by a major player that includes imposing barriers to entry, or selling goods or services below cost to drive out competition, discriminatory prices, and the like.[44] In addition, mergers and acquisitions that substantially prevent, restrict, or lessen competition in the relevant market or in the market for goods or services are likewise prohibited.[45]

This law will now cover the telecommunications industry, prohibiting major suppliers from performing any act that will substantially restrict or lessen competition in the telecommunications market.

In this context, it is expected that the Philippine Competition Commission (PCC), which has been created by the PCA, will also work with the NTC to address some of the challenges previously discussed—such as those on number portability, as well as on requiring more transparent reportorial submissions from industry players, among others—to the extent that these unreasonably restrict competition in the sector. One positive step done by the PCC toward promoting competition was when it sought to review a recent acquisition of the incumbent players of a potential entrant's telecommunication assets, including radio spectra. However, as of date, the review was put on a standstill due to an injunction filed by the incumbents against PCC to prevent the former from proceeding with its review (Camus 2017). Notably, according to the PCC, its initial study has yielded concerns that the transaction is likely to lead to substantial lessening of competition in the relevant markets, translating into consumer harm.

Developments on the PCC's discharge of its mandate to promote competition in the telecommunications sector, and the role NTC, alongside with the newly created Department of Information and Communications Technology, will take in supporting PCC's efforts, will demonstrate the country's resolve to promote competition in this vital sector.

As is apparent from the PCA, the PCC comes well equipped with its massive task, having primary and original jurisdiction over all competition-related issues, with the power to penalize potentially anticompetitive practices, such as foreclosure of competitors, exploitation of market power, and collusion. It can also prohibit mergers and acquisitions, and impose structural and behavioral remedies to address market failures.

LICENSING AND ENFORCEMENT

The TPPA requires a state party to have a telecommunications regulatory body that is separate from, and not accountable to, any supplier of public telecommunications services and is able to render impartial decisions.[46] Such body should not hold a financial interest or maintain any operating or management role in such a supplier.[47] As previously stated, the NTC fulfills this function. It

[44] RA 10667, Section 14–15
[45] RA 10667, Section 20
[46] TPP Final Text (2016), Article 13.16
[47] TPP Final Text (2016), Article 13.16

has jurisdiction over licensing, pricing, adoption of standards of reliability and interoperability, frequency allocation and assessment, dispute resolution, and consumer protection (Patalinghug and Llanto 2004).

The licensing process of the Philippines is in accordance with the TPPA which requires the same to be made publicly available.[48] The NTC publishes its Rules of Practice and Procedure ("Rules") for public information. Existing permits and/or licenses are likewise publicly available in its offices and website, while the terms and conditions of the licenses can be found in the document issued itself. In the event of denial, the NTC provides the reasons for the same, and any revocation or refusal for renewal undergoes the proper proceedings pursuant to its rules.[49]

NTC's powers to enforce its mandate can be found in RA 7925 and the Public Service Act or Commonwealth Act No. 146. The sanctions, however, are not up to par with the TPPA's requirement that the "authority shall include the ability to impose effective sanctions, which may include financial penalties, injunctive relief (on an interim or final basis), corrective orders, or the modification, suspension, or revocation of licenses."[50] The fine imposable by the NTC is only PHP 200 per day for the period during which default or violation continues.[51] There are no penalties or sanctions provided under RA 7925.

The maximum fine of PHP 200 per day, which was established 80 years ago in the Public Service Act of 1936, is clearly insufficient to deter anticompetitive behavior. Without effective sanctions for violations, inducing compliance is difficult. If penalties are too low and enforcement is unlikely, operators will tend to choose to violate the law and face the possible consequences.

For instance, in 2011, the NTC issued a memorandum circular requiring operators to reduce short message service (SMS) interconnection fees by PHP 0.20 and to drop prices from PHP 1.0 to PHP 0.80 per text. While operators complied with the former, they did not reduce the SMS rates they charged their customers. Thus, in 2012, the NTC instructed these firms to reimburse their subscribers for the difference in the rates they charged from when the circular was supposed to have been effective. The NTC also ordered the companies to pay PHP 200 per day until they are able to comply with the circular. This penalty for failing to implement the order is equivalent to only PHP 72,800 annually, a drop in the bucket compared to the billions these companies earn every year. Unsurprisingly, the operators chose to pay the fee instead of reducing rates and reimbursing customers.

The noncompliance by the operators highlights the NTC's weakness as a regulator. For any law to have a deterrent effect, sanctions must be significant. One possible alternative may be to make the penalty a multiple of the profits earned as a result of the unlawful activity. For instance, in some countries, a fine of up to twice the gain or loss caused by the crime may be imposed. The amount of the losses to customers and other firms are included as they are often greater than the gains of the violating operator, thus highly discouraging unlawful behavior.

The passage of the PCA created an opportunity to indirectly give some teeth to NTC's regulatory powers. The PCA empowers the PCC to impose far more significant and nontrivial fines and penalties. The NTC and the PCC could therefore work together to set up a system that can now deter players from engaging in anticompetitive behavior.

For resolution of telecommunications disputes, the TPPA requires that a telecommunications regulatory body should undertake this function. This includes interconnection-related disputes.[52]

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[48] TPP Final Text (2016), Article 13.18 (1)
[49] TPP Final Text (2016), Article 13.18 (2)
[50] TPP Final Text (2016), Article 13.20
[51] Commonwealth Act No. 146, Section 21
[52] TPP Final Text (2016), Article 13.21 (1)

If the regulatory body declines to do so, it shall, upon request, provide a written explanation.[53] A system for petitioning for reconsideration a determination or decision of the telecommunications regulatory body must be in place. Nonetheless, these modes of redress will not stay compliance from the determination or decision of the regulatory body.[54]

The designated function of the NTC to preside over a dispute on interconnection charges can be found under RA 7925. The law stipulates that should the parties fail to agree thereon within a reasonable period of time, the dispute shall be submitted to the commission for resolution.[55] Any other issues within NTC jurisdiction may be submitted for its consideration.[56] The steps for the proceedings before the NTC are set forth in the Rules of Practice and Procedure of the Commission, and is appealable to the Court of Appeals (NTC 2006).

ALLOCATION AND USE OF SCARCE RESOURCES

Each party is obligated under the TPPA to administer its procedures for the allocation and use of scarce telecommunications resources, including frequencies, numbers, and rights-of-way, in an objective, timely, transparent, and nondiscriminatory manner.[57] Moreover, it shall make publicly available the current state of allocated frequency bands, but retain the right not to provide detailed identification of frequencies allocated or assigned for specific government uses.[58] However, when making a spectrum allocation, each party shall rely on an open and transparent process, and market-based approaches in assigning spectrum.[59]

Pursuant to NTC MC No. 8-9-95, the radio spectrum allocation and assignment shall be subject to review in the interest of public service and in order to keep pace with developments in wireless technology to ensure wider access to the limited radio spectrum and the use of cost-effective technology (NTC 1995). The NTC issues circulars providing for frequency allocations for wireless systems. Assignments of frequency allocated are not available to the general public information due to security reasons.

UNIVERSAL SERVICE

The TPPA requires each state party to administer any universal service obligation that it maintains in a transparent, nondiscriminatory, and competitively neutral manner, and shall ensure that its universal service obligation is not more burdensome than necessary for the kind of universal service that it has defined.[60] The full universal service goal of RA 7925 is met by the state requirement for carriers to cross-subsidize underserved areas.

The underlying concept of universal service is to ensure that all citizens have access to basic telecommunications services at reasonable charges. Since PTNS are more costly to provide in some

[53] TPP Final Text (2016), Article 13.21 (1)
[54] TPP Final Text (2016), Article 13.21 (1)
[55] RA 7925, Article 18
[56] RA 7925, Article 3, Section 5
[57] TPPA, supra note 1, Article 13.19 (1)
[58] TPPA, supra note 1, Article 13.19 (2)
[59] TPPA, supra note 1, Article 13.19 (4)
[60] TPP Final Text (2016), Article 14.15

areas than others, PTEs will tend to focus on more lucrative services and coverage, and neglect less profitable locations.

Mechanisms to implement universal service should avoid distortion of natural market competition and undue burden on the sector. Unfortunately, with the introduction of competition and liberalization in telecommunications, the traditional approach of cross-subsidization is no longer effective. Cross-subsidies have been shown to create strong distortions that impede effective competition.

Over the last two decades, many countries have turned to USFs to address universal service requirements. USFs operate by having the industry itself finance projects to extend the reach of PTNS, with PTEs typically contributing between 0.5 and 5 percent of their revenues. By applying fees horizontally to the whole sector, relative prices remain steady, and distortions in the economy are minimized. To align with recognized best practices, the Philippines would need to amend or replace RA 7925 to remove provisions on cross-subsidization and create a more competitively neutral mechanism, such as a USF, to achieve its universal service objectives.

CONCLUSION

There remain a number of issues in the telecommunications industry that must be resolved before the Philippines can be considered fully compliant with anticipated requirements in new generation FTAs that it might want to join in the future. Comprehensive amendments to RA 7925 are in order, especially with respect to interconnection, unbundling of network elements, cross-subsidization, number portability, and the powers of the NTC to police the market players, as was illustrated in this paper. Alternatively, given the broad mandate and powers given to the newly formed PCC, and the positive impact that addressing these issues may have on the environment for competition in the telecommunications sector, it may now be possible for the PCC and the NTC, working together, to bridge these gaps through a series of administrative issuances.

In any case, significant changes are still warranted in the Philippines' regulatory framework for the telecommunications sector. These are essential to be compliant with the requirements of emerging new trade agreements. More importantly, there is a need to ensure adequate competition in the sector that upholds the public welfare and promotes international competitiveness of Philippine enterprises, for which ICT services represent significant costs of doing business.

Finally, whether or not such legislative solutions would be enough to achieve compliance with the requirements of new trade agreements such as the TPPA, given the constitutional restrictions on foreign participation in public utilities, is arguable and deserves further study.

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