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Distributional Impact of the Rice Tariffication Policy in the Philippines

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Abstract

In March 2019, the government of the Philippines promulgated a bill called the Rice Tariffication Law (RTL). It has dramatically changed the policy landscape in the rice sector and generated heated debates on how it would affect food security and poverty. This study explores the welfare effects of this reform across different types of households. We rely on the IRRI Global Rice Model to simulate the domestic price effects of the reform (Balié and Valera, 2020) and the Family Income and Expenditure Survey (FIES) to study the welfare impact of these price changes. Our results show that the RTL reduces consumer and producer rice prices, which affects households on the production and the consumption sides. Because a large majority of households are net buyers of rice and the policy reform reduces rice prices, most households benefit from the reform. Overall, the effects of the reform on poverty are beneficial. The poorest quintiles are positively affected, while the richest quintiles are unaffected or slightly worse-off. Spatially, the poorest regions also benefit the most. However, the rice growers who are net sellers are negatively impacted. The government should seek to mitigate the negative effects on non-competitive rice growers. Investments in public goods and services are a promising option to ease the emergence of on-farm and off-farm businesses as more profitable alternatives to rice production.

Keywords: Welfare effects, regional analysis, price change, rice policy, Philippines.
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1. Introduction

The Philippines has a decades-long policy of protecting the rice sector and intervening in the rice market. Since the early 1980s, the country has maintained domestic rice prices above international prices. In March 2019, the government of the Philippines promulgated a bill called the Rice Tariffication Law (Republic Act No. 11203). The policy reform abandoned the quantitative restrictions on imports that have been in place for more than thirty years, replacing them with ad valorem tariffs to finally comply with the principles and rules of the World Trade Organization (WTO). Another important aspect of the reform was the elimination of the role of the National Food Authority (NFA) in rice imports. For many years, the NFA had a monopoly on the importation of rice, and more recently, it issued a limited number of import licenses to private traders. The NFA has long been considered a source of huge inefficiencies and inappropriate interventions in markets (Clarete, 2019; Galvez, 2019; Ramos, 2019). The RTL opened up the market to private sector traders, eliminating the de facto market power exercised by the NFA for decades. The role of the NFA is now limited to maintaining food security rice stocks procured from Philippine farmers.

The quantitative restrictions are replaced by a 35% applied tariff on rice imported from members of the Association of Southeast Asian Nations (ASEAN). Imports from ASEAN countries are subject to in-quota applied tariff of 40% for volumes below 350 thousand tons and out-of-quota applied tariff of 50% for non-ASEAN countries for volumes above that amount (Briones, 2019; USDA, 2019). The bound tariff rate is 180% for imports from non-ASEAN countries above 350 thousand tons (NEDA, 2019).

The new policy has not only eased restrictions on rice imports, it has also increased the government revenue arising from tariffs. The government adopted the Rice Competitiveness

Enhancement Fund (RCEF) to modernize rice farms and support the government's goal of increasing the sector's productivity. The RCEF is endowed with roughly USD 200 million (PhP 10 billion) annually for six years beginning 2019. By law, half of the RCEF (PhP 5 billion) will be used to annually procure rice farm equipment through the Philippine Center for Postharvest Development and Mechanization (PHilMech). The Philippine Rice Research Institute (PhilRice) will receive 30 percent of the RCEF to develop, propagate and promote improved rice seeds to rice farmers and organizations of rice farmers. Meanwhile, the Land Bank of the Philippines and the Development Bank of the Philippines will be entrusted with 10 percent of the fund for the creation of a credit facility with minimal interest rates and collateral requirements. The remaining 10 percent of the RCEF will be dedicated to capacity development in rice crop production, modern rice farming techniques, seed production, farm mechanization, and knowledge and technology transfer through farm schools nationwide.

This policy reform has generated important debate, often spilling over into the popular media. The Law has been criticized by some policymakers, notably members of congress, prominent farmers' groups, and a few members of academia. The main argument is that by reducing paddy price, it would impoverish small rice growers who are already close to the poverty line and vulnerable to market and other shocks. Other stakeholders have pointed out the risk for the national food security of increasing the import dependence, becoming more exposed and vulnerable to shocks in the international rice market. Some farmers groups and cooperatives are particularly vocal regarding the reduced role of the NFA due to the RTL (ABS-CBN News, 2019; Simeon, 2020).

Proponents of the RTL argue that the losses to rice farmers are small compared to the gains to consumers and the country as a whole. They point out that poor urban households would gain from lower rice prices. Furthermore, they note that the tariff revenue can be used to support

farmers with rural investments (Habito, 2019a and 2019b; Briones, 2019). Javier (2019) defends the RTL but advocates for using the tariff revenue to provide cash assistance to rice farmers.

However, both sides agree that agriculture should remain a priority. Most of the tenets of this pro-agriculture stance argue that priority should be placed in infrastructure development and modernization including irrigation maintenance, flood retardation infrastructure, farm-to-market roads, and food terminals that would increase farmer productivity and income. These priorities denote a preference for investments in public goods. As such, they only partially align with those of the RCEF which primarily emphasize production.

While it has been heavily debated, the potential effects of the reform had not been extensively studied to date. To our knowledge, there are no studies exploring the potential distributional effects of the reform across types of households of the country. In this study, we propose to fill this gap in the literature. We look at the possible effects of the reform at household level and across regions. We rely on the family income and expenditure survey (FIES) for 2015. To get a sense of the magnitude of the price effect, we build on the study by Balié and Valera (2020) which used the IRRI Global Rice Model (IGRM) with useful regional disaggregation to capture the differentiated outcomes across regions.

This paper aims to provide greater insights for policymakers in the Philippines as well as development partners on the actual effects of this controversial reform. The findings are relevant beyond the Philippines as other countries in the region are currently contemplating a reform of their rice price policy. This research also adds to the literature both from a methodological and an empirical standpoint. Methodologically we show how useful it is to combine the result of a partial equilibrium model with an analysis of the distributional impact of a change in the households' demand system. Specifically, we estimate the proportional change in income associated with a rice price change, where the household may be a consumer and/or producer of

rice. In doing so, we build on the Deaton's (1989) approach to approximating the compensating variation (CV) of price changes, extending it to take into account second-order effects (that is, the effect of producer and consumer response to the price change) and the fact that producer and consumer prices may not change in the same proportion.

We find that the RTL reduces consumer and producer rice prices, which affects households on the production and the consumption sides. Because a large majority of the households are net buyers of rice and the policy reform reduces rice prices, most households benefit from the reforms. Overall, the effects of the reform on poverty are positive. The poorest quintiles are positively affected. The richest quintiles are unaffected or slightly worse-off. Spatially, the poorest regions also benefit the most. As a result, this policy reform can be qualified as pro-poor and also somewhat redistributive. However, the rice growers who are net sellers are negatively impacted. The role of the government would be to adopt accompanying measures to help these farmers to adapt and develop profitable business in or outside agriculture. In that sense, the RCEF is a move in the right direction. It is hoped that the RCEF will also allow for investments in infrastructure and other public goods that would enable the business in agriculture as well as outside agriculture. Investments and policy support measures are needed in rural areas of the Philippines to create more opportunities for on-farm diversification towards higher value crops than rice and off-farm income-generating activities to supply the goods and services demanded by the agricultural sector.

The paper is structured as follows. The second section provides an overview of the literature on policy reforms with a focus on the rice sector and the welfare analysis of changes in food prices. Section 3 describes the data used and their sources, while Section 4 describes the methods used in the analysis. Section 5 presents the main results and offers a discussion of these results. The last section concludes and proposes a few policy recommendations.

2. Literature review

Previous studies on the price effect of rice trade policy reform specifically distinguish its impact on the world and domestic prices of rice. However, only a few of these studies consider the impact of changes in the domestic price of rice on the welfare and poverty of different groups of households. In this section, we present and discuss related literature in two strands: the impact of rice policy trade reforms on the domestic prices of rice and the impact of price changes in rice and other food commodities on poverty.

2.1. Trade policy reforms in the rice sector

Trade policy reforms undertaken in major rice trading countries, including export liberalization and import liberalization, can result in either higher or lower rice prices. The price of rice is a major determinant of the well-being of poor families in many developing countries where rice is a major food commodity. Any significant swing in rice prices associated with trade policy reforms is a matter of serious concern for policymakers in developing countries. Higher rice prices reduce the purchasing power of the urban poor who spend a relatively large share of their budgets on rice. Conversely, lower farm prices reduce income for rice farmers, particularly those who are large net sellers of rice.

Few studies have estimated the distributional domestic price effect of rice trade policy reforms. Deaton (1989) studied the impact of higher rice prices resulting from Thailand's export liberalization program. He found that middle-income farmers gained the most from such a price shock because their net sales were large relative to their income. Simulating the effect of export liberalization on rice prices in Vietnam using a spatial-equilibrium model, Minot and Goletti (1998) showed that eliminating the rice export quota would increase the average retail price of rice by 19-26% depending on the region. They used household survey data to show that these

price changes would have a slightly beneficial impact in terms of poverty reduction. Bakhshoodeh (2010) examined the impact of the change in price of imported rice due to exchange-rate unification on the domestic rice prices among the households in Iran. The author reported that the percentage increase in the domestic rice prices between 2002 and 2003 was higher for the poorest households (39%) than for the richest households (20%) in the rural areas. Ha et al. (2015) studied the impact of quota policy and free trade scenarios on Vietnam's domestic rice prices. They showed that rice prices would fall by 17% in the Mekong River Delta and 18% in the South East region with an export quota, while prices would rise by more than 30% in those two regions under a free-trade scenario. Ali et al. (2019) estimated that the domestic rice price in Malaysia would drop by 15.8% under a free-trade scenario and 16.5% under a scenario combining free trade and achieving self-sufficiency through a positive productivity shock.

There are existing empirical studies of the rice trade policy reforms in the Philippines. Acosta and Kagatsume (2003) used a spatial-equilibrium model to show that the domestic prices of rice would decrease by 20% when the AFTA tariff is eliminated in combination with an overall reduction of tariffs and domestic support to comply with WTO rules. Likewise, Briones (2012) simulated a tariff reduction to 35% from its baseline tariff rate of 50% and showed that farm and retail prices in the Philippines would decline by 8.0% and 8.7%, respectively.

Using the IRRI Global Rice Model (IGRM), Hoang and Meyers (2013) investigated the impact of trade liberalization in five major rice trading countries of Southeast Asia. The results of their simulation for the Philippines showed that the retail price of rice would decline by 19% in 2020 when state trading enterprises (STE) implicit tariffs are eliminated. Moreover, they showed that retail prices of rice in the Philippines would decline more by 33% in 2020 when both the ASEAN Free Trade Agreement (AFTA) and STE tariffs are removed. Also for the

Philippines, Perez and Pradesha (2019) used the International Food Policy Research Institute (IFPRI) International Model for the Policy Analysis of Agricultural Commodities and Trade (IMPACT) and estimated that both farm and retail prices of rice would decrease by 26% when quantitative restrictions (QR) are removed and a 35% import tariff is imposed. More recently, Balié and Valera (2020) used the IGRM and examined the impact of the QR removal in 2019 and the imposition of different import tariff scenarios on the domestic rice prices. Their study revealed that farm and retail prices at the national level would decrease by 30% and 17% in 2019, respectively. At the regional level, they found a heterogeneous production response to the policy reform, with rice farm prices falling between 14% in the ARMM region and 23% in SOCCSKSARGEN region (the acronyms are spelled out in Table 1).

There are also empirical studies on the impact of rice trade policy reform in the Philippines based on computable general equilibrium models. Cockburn et al. (2008) estimated that the domestic price in the Philippines would decrease by 2.7% for irrigated paddy rice and 3.3% for non-irrigated paddy rice when the tariffs for all agricultural and industrial sectors are fully eliminated. Also, Cororaton and Yu (2019) showed that the elimination of the QR and imposition of 35% tariff in the Philippines would lower farm and retail prices by 3.7% and 10.9%, respectively.

As the above discussion suggests, the existing literature focuses only on the impact of rice trade policy reforms on the domestic rice prices. In this study, we contribute to the literature by investigating the distributional effects of lower domestic rice prices associated with import liberalization in the Philippines on the welfare of different households and across regions. In doing so, we build on Balié and Valera (2020) who estimated the percentage fall in farm prices by region, average percentage decrease in retail price, and supply elasticity of rice by region.

In this study, we combine household survey data with information on the supply and demand elasticities for rice and region-specific poverty lines. This enables us to offer new perspectives on the impact of the Philippine Rice Tariffication Law in a number of ways. First, this study allows us to take into account second-order effects (e.g. the welfare impact of producer and consumer response to the rice price change), and the fact that producer and consumer prices of rice may not change in the same proportion. Second, this study offers an explicit analysis of how the effect of rice tariffication on total consumption expenditure as a measure of household welfare, and poverty varies across household groups, regions, rural and urban locations, farmer groups, and sex of household heads. Third, the use of household data allows us to examine the types of rice consumed by different households and analyze the importance of rice in household budgets. Fourth, this study quantifies the number of households who are net buyers and net sellers of rice.

2.2. Past studies on welfare effects of food price changes

The issue of whether poor households gain or lose from higher food prices has motivated a large body of literature. However, empirical evidence on the impact of rice price changes on poverty remains equivocal. Ravallion (1990), who analyzed first-order effect of rice price in Bangladesh, showed that poor rural households suffer from higher rice prices and induced changes in wages while rich rural households gain. Applying Deaton's approach based on the first-order effect of prices, Ivanic and Martin (2008) found that higher rice prices reduce rural and national poverty rates in Pakistan and Vietnam, while raising the urban poverty rate. They also showed that higher rice prices increase rural, urban and national poverty rates in Bolivia, Cambodia, Madagascar, Nicaragua, and Zambia. Analysis of first-order effect of price changes also showed that higher rice prices increase poverty rates in Burkina Faso (Badolo and Traore, 2015), and Latin American countries (Robles and Torero, 2010). In addition, Dimova and Bakou

(2013) found that poor rural households gain from the increase in rice prices in Cote d'Ivoire, while middle income urban households lose.

A few studies analyzed the distributional impact of rice trade policy reforms using the first-order effect of rice prices. For the Philippines, Lasco et al. (2008) combined first-order impact and induced wage effect of lower rice prices associated with import liberalization. Their research showed that decreasing rice prices adversely affect households that are highly reliant on agricultural wages for income, while other households benefit from it.

Meanwhile, most studies also employ first-order approximation of the welfare impact of higher prices of other food commodities. Some examples of these studies include Arndt et al. (2008), Ivanic and Martin (2008), Wodon and Zaman (2008), Simler (2010), Dimova and Bakou (2013), Badolo and Traore (2015), Jacoby (2013), Ivanic and Martin (2014), Caracciolo et al. (2014), Levin and Vimefall (2015), and Martuscelli (2017). Overall, a very mixed picture is obtained as to whether higher food prices raise or reduce poverty in developing countries.

First-order approximations of the welfare impact of price changes do not capture the response of consumers or producers to the price changes (Minot and Dewina, 2015). As a result, the aforementioned studies at most can only evaluate the short-run effects of price changes that occur before households have time to adjust production and demand (Martuscelli, 2017). In this case, as pointed out by Mghenyi et al. (2011), the first-order approximation lacks the ability to further evaluate the welfare effect of a large discrete price change since supply and demand responses to such a major price change may be substantial.

To address this problem, the second-order impact of price changes on welfare and poverty are calculated in several studies. This approach allows for the welfare-enhancing responses of producers and consumers to price changes (Minot and Dewina, 2015). Among the few studies that employed this approach within the rice trade reforms setting, Minot and Goletti

(1998) used a spatial-equilibrium model to simulate the effects of export liberalization on rice prices in Vietnam. Using household survey data, they estimated second-order impact of price changes on household welfare and poverty. They found that higher rice prices slightly reduced the incidence and depth of poverty in Vietnam. Looking at the lower rice price due to liberalization of trade in irrigation equipment and fertilizer markets in the early 1990s in Bangladesh, Klytchikova and Diop (2006) found that the poorest households benefit from this reform while large rice net sellers are the main losers. Moreover, in Bangladesh, Hasan (2016) found that a sharp rise in rice price worsens the country's poverty situation on the basis of the rice per capita consumption gap.

Several studies have also estimated the second-order welfare effect of higher food prices. Some examples of these studies include Minot and Daniels (2005), Robles and Torero (2010), Mghenyi et al. (2011), Vu and Glewwe (2011), Ferreira et al. (2013), Minot and Dewina (2015), Tiberti and Tiberti (2018), and Van Campenhout et al. (2018).

As shown above, only a few studies analyzed the distributional impact on welfare and poverty of lower rice prices associated with rice trade liberalization. To our knowledge, there are no studies investigating the welfare effect of rice tariffication or the distributional consequences across regions of the Philippines. Thus, our study fills a potential gap in the existing literature by capturing producer and consumer responses to rice price changes due to the 2019 RTL in the Philippines, and estimating second-order welfare effects within a partial-equilibrium approach.

3. Data and sources

The effects of rice tariffication on household welfare occur through prices. The reform leads to lower domestic rice prices, resulting in reduced income for rice farmers but increased purchasing power for rice consumers. Our analysis employs data based on three sources in order to simulate the impact of lower prices of rice on different types of households.

First, we use the simulated decline in farm and retail prices due to the rice trade policy reform from Balié and Valera (2020). The authors used the IRRI Global Rice Model (IGRM), a partial equilibrium model comprising 25 countries and four regional aggregates. The model incorporates net imports by origin, linkage between national retail price and regional farm prices, and a regional supply response of rice. In their simulation, they removed the QR on rice imports and imposed a 35% tariff on imports from ASEAN countries and a 40% tariff on non-ASEAN WTO member countries within the minimum access volume. The model simulates the impact of the rice tariffication on farm-gate and retail prices in each region of the Philippines.

Second, we obtained estimates of the compensated and uncompensated demand elasticities for rice from Lantican et al. (2013), supply elasticities from Balié and Valera (2020), and regional poverty lines from the Philippine Statistics Authority (PSA) (see Table 1). Lantican et al. (2013) estimated demand elasticities using data from the Survey of Food Demand for Agriculture Statistics, quarterly retail prices between August 2008 to May 2009, and the Linear Approximate Almost Ideal Demand System (LA/AIDS). Balié and Valera (2020) estimated supply elasticities using time-series analysis of rice harvested area and producer prices over the period 1990-2015.

Third, we use household survey data on income, expenditure and several other variables from the 2015 Family and Income Expenditure Survey (FIES), a nationally-representative survey of about 41,000 households collected by the PSA. This survey provides information on the income and expenditure patterns of different types of households before the rice tariffication in March 2019. We use this information to simulate the impact of lower domestic prices on the welfare of each household in the sample. We assume that rice consumption patterns and income sources did not change significantly between 2015, when the survey took place, and 2019, when domestic rice prices decreased following the reform. We also assume that the estimated demand

and supply elasticities are still valid.

In this study, we choose to adopt the definition of the 17 regions covered in the 2015 FIES data. Table 1 shows the demand and supply elasticities for rice and the poverty line for each of the 17 regions of the Philippines. For the purpose of this study, households were classified along five dimensions: urban and rural households, male- and female-headed households, the 17 regions, rice farmers and other households, and five quintiles of per capita consumption expenditure. All the analyses used sampling weights estimated by the PSA for the 2015 FIES data to compensate for over- and under-sampling in the FIES sample design.

Table 1. Demand and supply elasticities of rice and poverty lines by region

	Demand elasticity for rice		Supply	Poverty line
Region	Uncompensated	Compensated	elasticity of rice	(pesos/person/yr)
NCR	-0.65	-0.51	0.12	25,007
CAR	-0.58	-0.41	0.10	21,770
Ilocos Region	-0.65	-0.47	0.11	20,488
Cagayan Valley	-0.76	-0.55	0.10	21,860
Central Luzon	-0.73	-0.55	0.12	23,200
CALABARZON	-0.89	-0.69	0.15	22,121
MIMAROPA	-0.56	-0.27	0.12	20,224
Bicol Region	-0.51	-0.26	0.13	21,476
Western Visayas	-0.5	-0.24	0.12	21,070
Central Visayas	-0.53	-0.25	0.12	21,914
Eastern Visayas	-0.49	-0.18	0.11	21,304
Zamboanga Penn.	-0.75	-0.34	0.12	20,925
N. Mindanao	-0.59	-0.28	0.06	22,345
Davao Region	-0.58	-0.3	0.16	22,754
SOCCSKSARGEN	-0.48	-0.19	0.11	21,025
Caraga	-0.51	-0.09	0.11	22,570
ARMM	-0.53	-0.22	0.11	21,563

Sources: Lantican et al. (2013) for demand elasticities, Balié and Valera (2020) for supply elasticities, and PSA (2015) for poverty line. Note that Balié and Valera (2020) did not estimate a supply elasticity for the NCR because rice production there is minor, so we used the elasticity from the adjacent Central Luzon region.
Note: NCR is the National Capital Region. CAR is the Cordillera Administrative Region. CALABARZON is an acronym for the region comprising five provinces: Cavite, Laguna, Batangas, Rizal, and Quezon. MIMAROPA is an acronym for the region comprising Mindoro, Marinduque, Romblon and Palawan. ARMM refers to the Autonomous Region of Muslim Mindanao. SOCCSKSARGEN is an acronym for the region comprising four provinces (South Cotabato, Cotabato, Sultan Kudarat, and Sarangani) and one city (General Santos)

4. Methods

The methods used in this study can be divided into two parts. First, we use the IGRM to simulate the impact of the rice tariffication reform in the Philippines on producer and consumer rice prices in different regions of the country. Second, we use the 2015 FIES to estimate the impact of these rice price changes on welfare and poverty among different types of households in the Philippines.

In the IGRM, each country model has four major components that include supply, demand, trade, and price relationships. Supply is composed of production, beginning stocks and imports. Demand comprises domestic consumption, ending stock and exports. The Thai FOB 5% broken price, which is the world reference price for the IGRM, is solved to close the model such that the net exports of Thailand equal the sum of the net trade of the remaining countries.

We build on Balié and Valera (2020) in simulating the price effect of the QR removal and the imposition of applied tariffs for imports from ASEAN and non-ASEAN WTO member countries. The procedure by which this simulation was facilitated is twofold. First, the QR is captured first into net import imports coming from Vietnam and Thailand, other ASEAN countries, and non-ASEAN countries. Accordingly, the QR and net imports by origin are taken into account in solving for market clearing farm price. The market clearing farm price is determined by the sum of net imports, total milled production, beginning stocks equal to the sum of total consumption and ending stocks. Second, the market clearing farm price is linked to national retail price, which is also a function of the world price of rice. The national retail price is then linked to the regional farm prices. This allows us to estimate changes in regional farm prices and national retail price when QR is eliminated and applied tariffs are imposed.

The second part of the analysis uses these rice price changes and household survey data to simulate the distributional impact of rice tariffication. Deaton (1989) was one of the first

studies to use nationally representative household survey data from a low-income country to estimate the impact of price changes on welfare of each household, a method sometimes called microsimulation. To measure the welfare impact on a household of a price change of a commodity that the households buys and/or sells (such as rice), Deaton (1989) proposed the following formulation:

$$\frac{CV}{Y} = (q - s)\hat{p} \tag{1}$$

where CV is the compensating variation measure of welfare, Y is household income or expenditure, q is the value of production of the commodity as a share of expenditure, s is the share of total expenditure spent on the commodity, and $\hat{p}$ is the proportional change in the commodity price. This expression is a first-order Taylor-series approximation of the proportional compensating variation associated with a price change.

Deaton calls $(q - s)$ the net benefit ratio (NBR) and notes that it can also be interpreted as the short-term elasticity of household welfare with respect to the price of the commodity. If the household is a net seller, the NBR will be positive, implying that an increase in the commodity price will raise household welfare. If it is a net buyer, the NBR will be negative and higher prices will reduce welfare (ignoring second-order effects).

This expression is quite useful in applied policy analysis because it does not require any information on household responses to price changes. However, the equation relies on several simplifying assumptions:

- that the proportional change in consumer prices is equal to the proportional change in producer prices,
- that consumers do not respond to the change in consumer prices or that the time frame is too short to reflect a demand response,

- that farmers do not respond to the change in producer prices or that the time frame is too short to reflect a supply response,
- that there is no change in input or factor prices or that these changes have a negligible effect on household income.

In this study, we use an extended version of Deaton's equation that relaxes the first three of the four assumptions:

$$\frac{CV}{Y} = q\hat{p}_P + \frac{1}{2}\varepsilon_S(\hat{p}_P)^2 - s\hat{p}_C + \frac{1}{2}\varepsilon_D(\hat{p}_C)^2 \quad (2)$$

where $\hat{p}_P$ is the proportional change in producer prices, ε_S is the elasticity of supply of the commodity, $\hat{p}_C$ is the proportional change in consumer prices, and ε_D is the Hicksian elasticity of demand. By distinguishing between the proportional change in producer prices and consumer prices, we relax the first assumptions that they are identical. By adding the second and fourth terms on the right side, we take into account the producer and consumer response to the new prices in calculating the welfare impact, thus relaxing the second and third assumptions. In graphic terms, these are the "triangles" in the diagrams of consumer and producer surplus. Because these second-order effects are positive, the welfare impact obtained from equation (2) will be somewhat more positive than that obtained from equation (1). It can be shown that equation (2) is the second-order Taylor-series expansion of the proportional compensating variation associated with a price change (see Minot and Dewina, 2015).

Equation (2) can be used to estimate the change in income due to the commodity price change for each household in a household survey. This information allows us to determine whether a household is below the poverty line before and after the price change. If the household survey is nationally representative, we can use sampling weights and household size to aggregate these results to calculate the incidence of poverty (also called headcount poverty) at subnational

or national levels before and after the price change. For example, we can estimate the impact of the price change on the incidence of poverty for different categories of households such as rice farmers, urban households, and those living in each region.

5. Results and discussion

As mentioned in Section 3, we use a partial equilibrium model to simulate the effect of the rice tariffication law on producer and retail rice prices and household income and expenditure survey data to simulate the impact of rice price decreases on the real income (or purchasing power) of each household in the 2015 FIES. The results are then aggregated to different types of households, defined by location, gender of households, region, farmers group, and expenditure quintile.

This section begins with a description of household characteristics based on the 2015 FIES, particularly the patterns of rice production and consumption. Next, we review the results of a prior study on the impact of the rice tariffication reform on rice prices. With this information, we examine the impact of these rice price changes on the welfare of different types of households. Finally, we explore the effect of rice tariffication on two measures of poverty, the incidence of poverty and the poverty gap.

5.1. Characteristics of households in the Philippines

It is useful to describe first the characteristics of households prior to estimating the impact of rice price changes on the welfare of different households. Table 2 shows the number and share of households in different categories. According to the 2015 FIES, slightly more than half (56%) of Philippine households live in rural areas, with the other 44% in urban areas. Nearly 80% of the households are male headed. Collectively, households in CALABARZON, Central Luzon and NCR (National Capital Region) account for 38% of the population. NCR, which comprises areas of Metro Manila, produces only very small quantities of rice. Central Luzon and

CALABARZON are rice-producing regions where some provinces are at the doorstep of the NCR. Rice growers represent 11% of all households. Non-rice farmers jointly represent 89% of all households. There are many more of these non-rice farmers than there are rice growers even though rice is the single most important staple crop in the Philippines.

Table 3 presents characteristics of rice growers and other households. Household size is similar, with both groups having slightly fewer than 5 members on average. Rice farming households are more likely to be male headed than other households. Average income and expenditure per capita are both lower for rice growers than other households. The share of food expenditure is slightly higher for rice growers (52%) than for other farmers (49%), reflecting their lower income. The incidence of poverty rate is noticeably higher among rice farmers (35%) than other households (27%), and a similar pattern holds for the poverty gap.

Table 2. Share of households in each category

Location	Frequency	Percent
Urban	18,202	44
Rural	23,342	56
Male	31,994	77
Female	9,550	23
Total	41,544	100
NCR	5,517	13
CAR	735	2
Ilocos Region	2,138	5
Cagayan Valley	1,492	4
Central Luzon	4,582	11
CALABARZON	5,941	14
MIMAROPA	1,274	3
Bicol Region	2,306	6
Western Visayas	3,106	7
Central Visayas	3,056	7
Eastern Visayas	1,783	4
Zamboanga Penn.	1,507	4
N. Mindanao	1,881	5
Davao Region	2,113	5
SOCCSKSARGEN	1,927	5
Caraga	1,059	3
ARMM	1,126	3
Total	41,544	100
Rice grower	4,552	11
Other	36,992	89
Total	41,544	100
Poorest	8,309	20
2nd	8,309	20
3rd	8,310	20
4th	8,308	20
Richest	8,307	20
Total	41,544	100

Source: Analysis of data from 2015 FIES

Table 3. Characteristics of rice farmers and other households

	Rice growers	Other households
Household size	4.8	4.6
Share of male headed household (%)	87	76
Share of female headed household (%)	13	24
Income per capita (pesos/year)	53,724	69,333
Expenditure per capita (pesos/year)	40,792	55,840
Share of food in expenditure (%)	52	49
Incidence of poverty (%)	35.0	26.5
Poverty gap (%)	8.8	6.9

Source: Analysis of data from 2015 FIES

As expected, the per capita consumption of high-quality (well-milled) rice increases with income (see Figure 1). For example, consumption of high-quality rice by the richest quintile is fourfold that of the poorest quintile. Conversely, the poorest quintile consumes nearly twice as much ordinary rice and 20 times more NFA rice compared to the richest quintile. Unsurprisingly given the gap in income, urban households consume twice as much high-quality rice than rural households, who tend to consume more of the ordinary and low-quality NFA rice (see Figure 2).

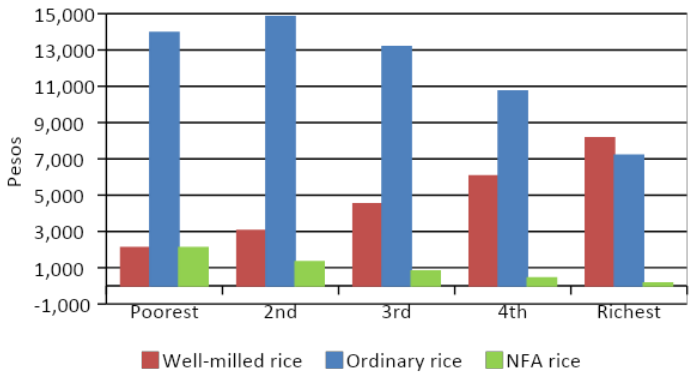

Figure 1. Composition of rice consumed by expenditure quintile

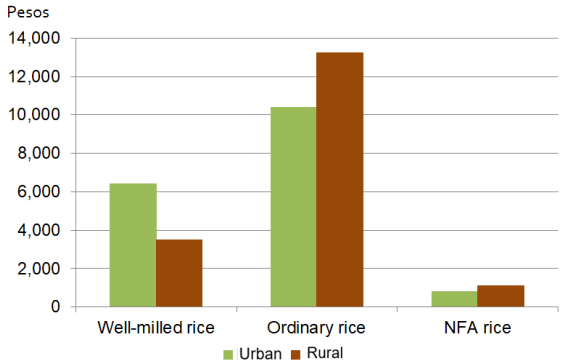

Figure 2. Average consumption of rice by location

Table 4 shows the importance of rice consumption in total expenditure and the value of rice production as a proportion of total expenditure for different types of households. The difference between these two ratios is the value of net sales as a share of expenditure, also called the net benefit ratio (NBR). As discussed earlier, a negative NBR in rice means the household (or group of households) is a net buyer (in value terms) and will gain from lower rice prices. Conversely, a positive NBR implies net sales of rice, so the household will lose from lower rice prices. Overall, the value of rice production represents about 5.3% of household expenditure, while the value of rice consumption is 11.7% of expenditure, implying a net benefit ratio of -6.4%. The negative NBR reflects the fact that the Philippines is a rice-importing country (implying that consumption exceeds production) as well as the fact that rice consumption is valued at the higher retail price while production is valued at producer prices.

Table 4 also provides information about different types of households. For rice farmers, about half (49%) of income (including in-kind income) comes from rice production, while rice consumption represents 16% of their budgets. For households that do not grow rice, rice consumption represents 11% of the budget.

As expected, rural households get a larger share of their income from rice than urban households. However, rural households are also spending a larger share of their budget on rice (14%) compared to urban households (8.6%). The rice NBR is negative in both urban and rural areas, but it is slightly more negative (-0.08) in urban areas than in rural areas (-0.06), indicating that the former would benefit more from the policy reform in terms of the proportional change in real income.

In value terms, Cagayan Valley is the only self-sufficient or surplus region, in that rice production accounts for 22% of household income, while rice consumption represents 13% of the total. Thus, the NBR is positive (0.096), suggesting that the region would be harmed by a

reduction in rice prices (if we ignore second-order effects). Meanwhile, all other regions have negative NBRs, meaning they would gain from lower rice prices. This is notably true in Eastern Visayas, where the NRB is -0.148.

Table 4. Average production and consumption ratio and net benefit ratio for rice

Location	Mean rice production share	Mean rice consumption share	Mean net benefit ratio
Urban	0.011	0.086	-0.075
Rural	0.086	0.141	-0.055
Male	0.061	0.123	-0.061
Female	0.026	0.098	-0.071
NCR	0.001	0.060	-0.060
CAR	0.097	0.142	-0.044
Ilocos Region	0.092	0.121	-0.029
Cagayan Valley	0.223	0.126	0.096
Central Luzon	0.066	0.094	-0.028
CALABARZON	0.007	0.086	-0.079
MIMAROPA	0.164	0.172	-0.007
Bicol Region	0.062	0.153	-0.091
Western Visayas	0.065	0.151	-0.086
Central Visayas	0.023	0.098	-0.075
Eastern Visayas	0.041	0.189	-0.148
Zamboanga Penn.	0.066	0.118	-0.052
N. Mindanao	0.027	0.126	-0.098
Davao Region	0.026	0.115	-0.089
SOCCSKSARGEN	0.062	0.158	-0.096
Caraga	0.079	0.164	-0.085
ARMM	0.142	0.191	-0.049
Rice grower	0.486	0.164	0.322
Other	0.000	0.111	-0.111
Poorest	0.063	0.195	-0.133
2nd	0.065	0.155	-0.091
3rd	0.061	0.114	-0.053
4th	0.048	0.078	-0.030
Richest	0.030	0.042	-0.012
Total	0.053	0.117	-0.064

Source: Analysis of data from 2015 FIES

The results show that the importance of rice consumption as well as rice production in the budget is much greater for the poorest quintiles (Figure 3). These shares decline consistently as we move toward richer quintiles. The NBR is negative for all five expenditure quintiles, but it is more negative for the poorest quintile (Figure 4). This means that every quintile gains from lower rice prices, but the poorest quintile gains the most.

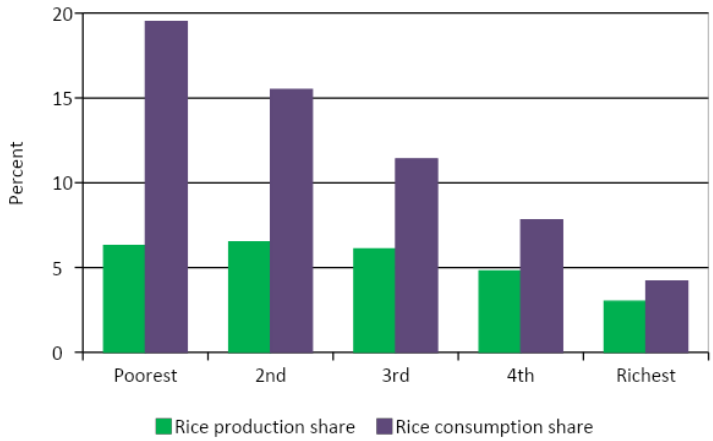

Figure 3. Production share and consumption share by expenditure quintile

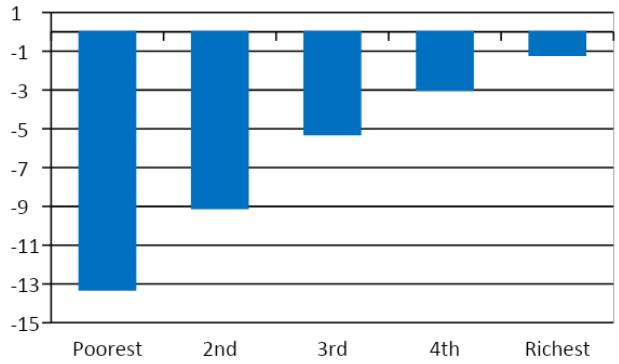

Figure 4. Net benefit ratio by expenditure quintile

Figure 5 shows the relationship between the net benefit ratio and per capita expenditure in more detail. Expenditure is expressed in logarithmic form, and the line is a non-parametric regression using local polynomial function of degree 0 (mean smoothing). The shaded area indicates the 95% confidence interval around the mean value, which is narrow in the center because of the large sample in the FIES. The four red lines indicate the breakpoints between the five expenditure quintiles, meaning that 20% of the population lies between each pair of lines. The graph confirms that the net benefit ratio rises from below -10% in the first quintile to close to zero in the fifth quintile. This means that, on average, poor households gain significantly from lower rice prices, while households in the highest quintile are affected very little.

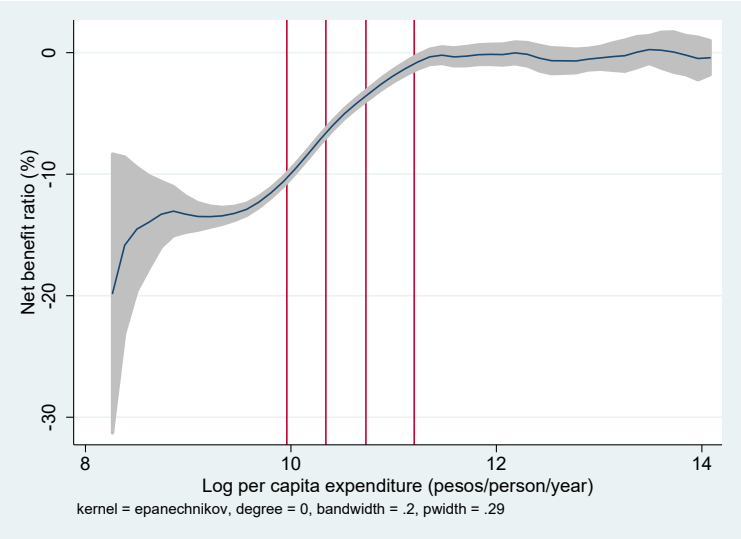

Figure 5. **Net benefit ratio as a function of per capita expenditure**

5.2. Net sellers and net buyers

Given that net buyers gain from lower prices while net sellers generally lose, it is useful to consider the proportion of each among different types of households. As expected, the proportion of households that are net buyers of rice (in value terms) is higher in urban areas (97%) than in rural areas (84%) (see Table 5). However, the large share of rural households that are net buyers is somewhat surprising. This reflects the large number of rural households that own no land themselves, cultivate plots that are too small to produce a surplus, or perhaps grow other crops. These households must purchase rice at markets to meet their consumption needs.

Table 5. Share of net rice sellers and net rice buyers in each category

	Net sellers	Self-sufficient (% of households)	Net buyers
Urban	1.9	0.9	97.2
Rural	13.2	2.2	84.5
Male	9.4	1.6	89.0
Female	4.5	1.6	93.9
Rice grower	75.5	0.0	24.5
Other	0.0	1.8	98.2
Poorest	8.7	4.8	86.5
2nd	10.1	1.3	88.6
3rd	9.8	0.5	89.7
4th	7.5	0.4	92.1
Richest	5.2	1.2	93.6
Total	8.3	1.6	90.1

Source: Analysis of data from 2015 FIES.
Note: Net sellers and net buyers are defined in value terms at producer and consumer prices, respectively.

Even among the rice growers, we still find nearly 25% are net buyers. Although we do not have farm-size data to confirm this, it is likely that these net buyers are small rice farmers who are not able to produce enough to meet their rice consumption requirements. The smallest share of net buyers is observed in the Cagayan Valley (73%) while in all the other regions more than 80% are net buyers (Figure 6). The proportion of net buyers of rice is highest in NCR, a highly urbanized region with many high-income households. Likewise, the proportion of net buyers of rice is high in CALABARZON where extensive land conversion for housing subdivisions or industrial parks has taken place in the past three decades.

In terms of gender difference, female-headed households are more likely to be net buyers than male-headed households. Both rice production share in income and consumption share in the budget are higher for male-headed households than for women-headed households (Table 4). Because the households in the poorest quintiles are primarily net buyers, these households are likely to benefit from a decrease in rice prices. The largest farmers, who are typically net sellers, are more likely to be hurt by lower prices, but they also have more ability to adjust and adapt.

Figure 6. Proportion of net rice sellers and net rice buyers by region

5.3. Impact of rice tariffication on rice prices

The 2019 RTL reformed the policies regulating rice imports in the Philippines. Before the RTL, the NFA imported rice subject to quantitative restrictions, which limited rice imports. The RTL allows private-sector rice imports and uses import tariffs rather than quantitative restrictions to maintain some level of protection for Philippine rice farmers. Based on an analysis using the IGRM (Balié and Valera, 2020), the RTL will allow an increase in rice imports and reduce producer and consumer rice prices. This study estimated that the RTL will reduce consumer prices by 17.4%, and decrease producer prices between 13.6% and 22.6% depending on the region (see Table 6).

5.4. Effects of the reform on household welfare

In this section, we simulate the effect of rice price changes associated with tariffication on per capita real expenditure as a measure household welfare. We calculate the welfare effect of these price changes for each household in the FIES 2015, taking into account the importance of

rice in their consumption basket as well as the importance of rice as a source of income.

Table 6. IGRM results for changes in retail and farm prices of rice

Region	Change in retail prices (%)	Changes in farm prices (%)
CAR	-17.38	-22.17
Ilocos Region	-17.38	-20.63
Cagayan Valley	-17.38	-20.79
Central Luzon	-17.38	-22.04
CALABARZON	-17.38	-17.35
MIMAROPA	-17.38	-22.00
Bicol Region	-17.38	-20.15
Western Visayas	-17.38	-19.25
Central Visayas	-17.38	-12.41
Eastern Visayas	-17.38	-15.42
Zamboanga Penn.	-17.38	-16.65
N. Mindanao	-17.38	-17.98
Davao Region	-17.38	-18.65
SOCCSKSARGEN	-17.38	-22.57
Caraga	-17.38	-18.34
ARMM	-17.38	-13.61

Sources: Balié and Valera (2020).

Table 7 shows the level of per capita consumption before and after the price changes associated with rice tariffication. The original level is based on the 2015 FIES data, while the "after" column refers to the simulated level of per capita expenditure taking into account the effect of rice price changes using equation (2). Overall, the lower rice prices increase real per capita expenditure by 0.5%. On average, both urban and rural households benefit from the reduction in rice prices but the effect is larger for urban households who are nearly all net buyers.

Table 7. Simulated per capita expenditure before and after rice tariffication reform

Location	Mean expenditure before (PHP/person/year)	Mean expenditure after (PHP/person/year)	Percentage change (%)
Urban	72,025	72,634	0.8
Rural	40,284	40,336	0.1
Male	50,187	50,431	0.5
Female	67,606	68,074	0.7
NCR	90,390	91,049	0.7
CAR	51,539	51,717	0.3
Ilocos Region	45,267	45,284	0.0
Cagayan Valley	41,728	40,132	-3.8
Central Luzon	58,567	58,505	-0.1
CALABARZON	69,820	70,501	1.0
MIMAROPA	43,679	43,065	-1.4
Bicol Region	38,865	39,155	0.7
Western Visayas	43,837	44,175	0.8
Central Visayas	47,774	48,301	1.1
Eastern Visayas	39,362	39,997	1.6
Zamboanga Penn.	35,009	35,276	0.8
N. Mindanao	39,611	40,099	1.2
Davao Region	49,107	49,605	1.0
SOCCSKSARGEN	40,558	40,797	0.6
Caraga	39,666	39,934	0.7
ARMM	21,038	21,324	1.4
Rice grower	40,805	37,660	-7.7
Other	55,838	56,558	1.3
Poorest	16,045	16,418	2.3
2nd	25,942	26,333	1.5
3rd	38,011	38,327	0.8
4th	57,720	57,952	0.4
Richest	133,257	133,424	0.1
Total	54,191	54,487	0.5

Source: Simulation of effect of tariffication reform on rice prices and analysis of data from 2015 FIES.

The decline in price due to rice tariffication has a more positive impact on female-headed households. Although the share of rice consumption in the budget is somewhat higher for male-headed households than female-headed households, male-headed households are much more dependent on rice production as a source of income. The latter effect dominates, so male-headed households gain less from price reductions associated with rice tariffication.

Most of the regions would have higher welfare after the reform (Figure 7). Just three of the 17 regions exhibit a decline in welfare, namely Cagayan Valley, MIMAROPA and Central Luzon.

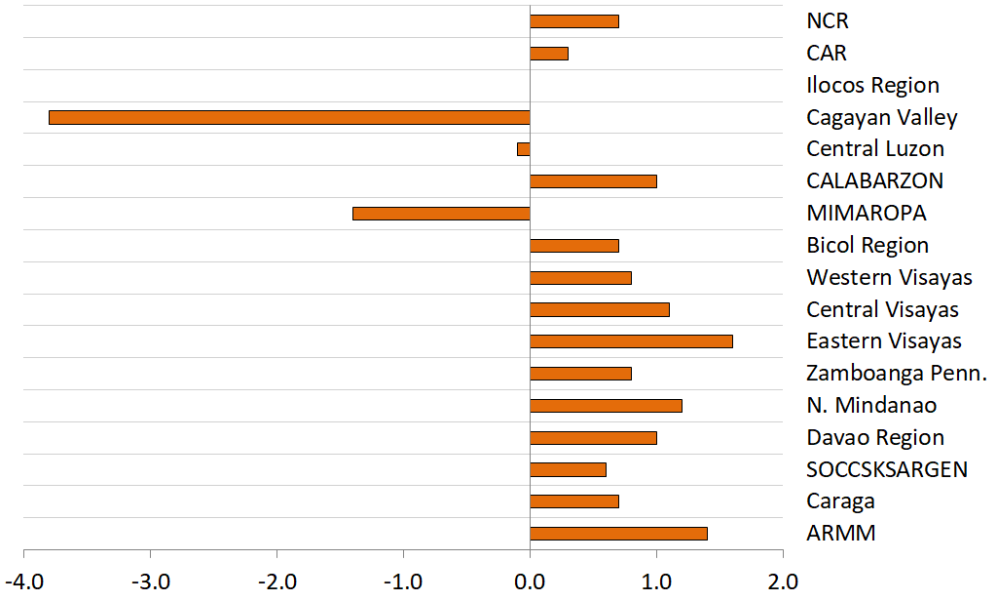

Figure 7. Effect of rice tariffication on per capita expenditure by region

It should be noted that rice growers are the main losers with a decline in welfare of 7.7%. Meanwhile, non-rice farmers (including other farmers and urban households) benefit from the drop in rice price as they are net buyers. The increased purchasing power allows them to increase their consumption of rice and other goods.

The results also show that the welfare of the poorest households increases much more than that of the wealthiest ones with 2.3% increase in expenditure for the poorest as opposed to

0.1% for the richest (see Table 7 and Figure 8). This is explained by the fact that the poorest quintiles spend a larger share of their budget on rice, so they benefit from the decline in rice prices and consequent improvement in purchasing power.

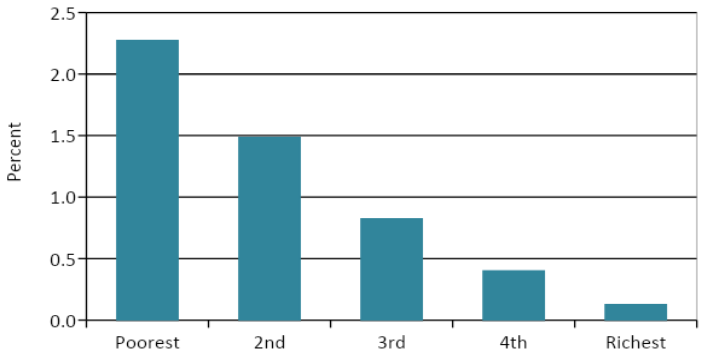

Figure 8. Effect of rice tariffication on per capita expenditure by quintile

Figure 9 provides more detail on the relationship between the proportional impact of rice tariffication on per capita expenditure and the level of per capita expenditure. As in Figure 5, the line is generated by a local polynomial regression of degree 0 (mean smoothing), the shaded area represents the 95% confidence interval, and the red lines indicate the breakpoints between the quintiles of per capita expenditure. The graph confirms that the proportional impact of rice tariffication is, on average, positive for the bottom four quintiles and close to zero for the fifth quintile. Furthermore, the impact is most positive for the poorest quintile (above 2 percentage points) and declines steadily as income rises before stabilizing in among the households in the richest quintile.

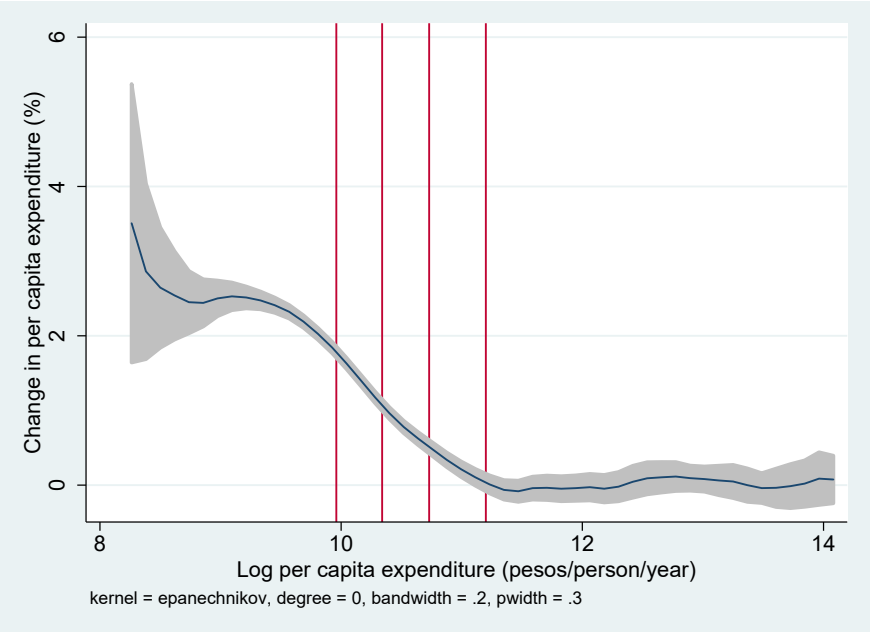

Figure 9. Effect of tariffication on welfare by level of per capita expenditure

5.5. Effects of the reform on the poverty incidence and poverty gap

The previous section shows that reducing rice prices through rice tariffication increases household welfare on average. However, policymakers are also interested in the effect of the policy reform on the poor. This section examines the effect of rice tariffication on two measures of poverty, the incidence of poverty and the poverty gap. Table 8 examines the impact on the incidence of poverty, defined as the proportion of the population living in households below the poverty line. Overall, we observe a 1.2 percentage point decline in the incidence of poverty as a result of rice tariffication, with the effect being slightly larger in rural areas and smaller in urban areas.

Interestingly the poorest regions of Eastern and Western Visayas or Bicol Region are the ones that exhibit the most pronounced reduction in the incidence of poverty (at or above 2 percentage points) as shown in Figure 9. However, rice growers are again the main losers with an increase in poverty of 3.6 percentage points.

Table 8. Incidence of poverty before and after rice tarrification reform

Location	Incidence of poverty before (%)	Incidence of poverty after (%)	Change in poverty rate (percentage point change)
Urban	12.6	11.6	-1.1
Rural	39.0	37.7	-1.3
Male	29.6	28.5	-1.1
Female	18.9	17.5	-1.4
NCR	4.9	4.0	-0.9
CAR	26.5	26.5	0.0
Ilocos Region	22.6	21.1	-1.5
Cagayan Valley	30.5	30.3	-0.2
Central Luzon	13.4	12.8	-0.6
CALABARZON	10.6	9.3	-1.3
MIMAROPA	35.1	36.2	1.1
Bicol Region	40.6	38.5	-2.1
Western Visayas	27.5	25.4	-2.1
Central Visayas	34.2	32.6	-1.5
Eastern Visayas	48.8	46.8	-2.0
Zamboanga Penn.	48.9	47.8	-1.1
N. Mindanao	50.8	49.8	-1.1
Davao Region	30.8	29.8	-1.0
SOCCSKSARGEN	37.5	36.1	-1.4
Caraga	47.0	45.5	-1.5
ARMM	76.2	74.4	-1.8
Rice grower	35.0	38.6	3.6
Other	26.5	24.7	-1.8
Total	27.5	26.3	-1.2

Source: Simulation of effect of tarrification reform on rice prices and analysis of data from 2015 FIES

The incidence of poverty may be misleading as a poverty indicator because it provides no information on income differences among the poor. The poverty gap gives us information about the proportion of the population that is poor and the average gap between their income and the poverty line. By this measure as well, the reform is clearly poverty reducing with a net reduction in the poverty gap of 1.7 percentage points for the poorest household quintile (see Table 9). The second poorest quintile shows a smaller reduction since most of these households are already above the poverty line. The other quintiles do not have any poor households, so they do not show any improvement.

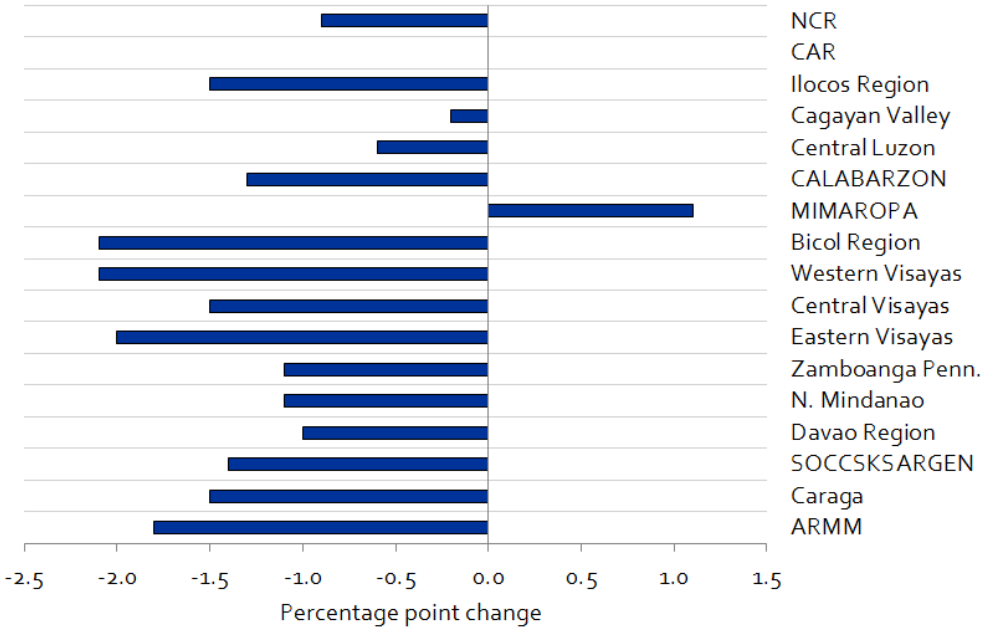

Figure 9. Effect of rice tariffication on poverty incidence by region

We also find that the poorest region of Eastern Visayas and ARMM witness the most pronounced reduction in the poverty gap among all the regions (Figure 10). The urban dominated regions are only very marginally affected. Rice tariffication increases the poverty gap in just two regions, MIMAROPA and Cagayan Valley. In the other 15 regions, poverty gap decreases. Rice farmers are also losing out as can be seen from the rise in poverty gap of 1.5 percentage points. The reform is welfare increasing nationwide. As in any policy reform, there are losers, and in this case, they are the surplus rice farmers.

Table 9. Poverty gap before and after rice tarrification reform

Location	Poverty gap before (%)	Poverty gap after (%)	Change in poverty gap (percentage point change)
Urban	2.7	2.5	-0.2
Rural	10.4	9.9	-0.5
Male	7.7	7.3	-0.4
Female	4.4	4.0	-0.3
NCR	0.7	0.7	-0.1
CAR	6.0	5.9	-0.1
Ilocos Region	4.4	4.2	-0.2
Cagayan Valley	6.3	6.4	0.1
Central Luzon	2.3	2.2	-0.1
CALABARZON	2.0	1.7	-0.2
MIMAROPA	9.5	9.9	0.3
Bicol Region	9.6	8.8	-0.8
Western Visayas	6.4	5.8	-0.6
Central Visayas	9.4	9.0	-0.4
Eastern Visayas	14.0	12.7	-1.3
Zamboanga Penn.	14.5	14.2	-0.4
N. Mindanao	16.5	15.7	-0.7
Davao Region	8.4	7.9	-0.5
SOCCSKSARGEN	11.0	10.4	-0.6
Caraga	13.5	12.9	-0.6
ARMM	21.5	20.5	-0.9
Rice grower	8.8	10.2	1.5
Other	6.9	6.2	-0.6
Poorest	27.3	25.6	-1.7
2nd	0.3	0.4	0.1
3rd	0.0	0.0	0.0
4th	0.0	0.0	0.0
Richest	0.0	0.1	0.1
Total	7.1	6.7	-0.4

Source: Simulation of effect of tarrification reform on rice prices and analysis of data from 2015 FIES

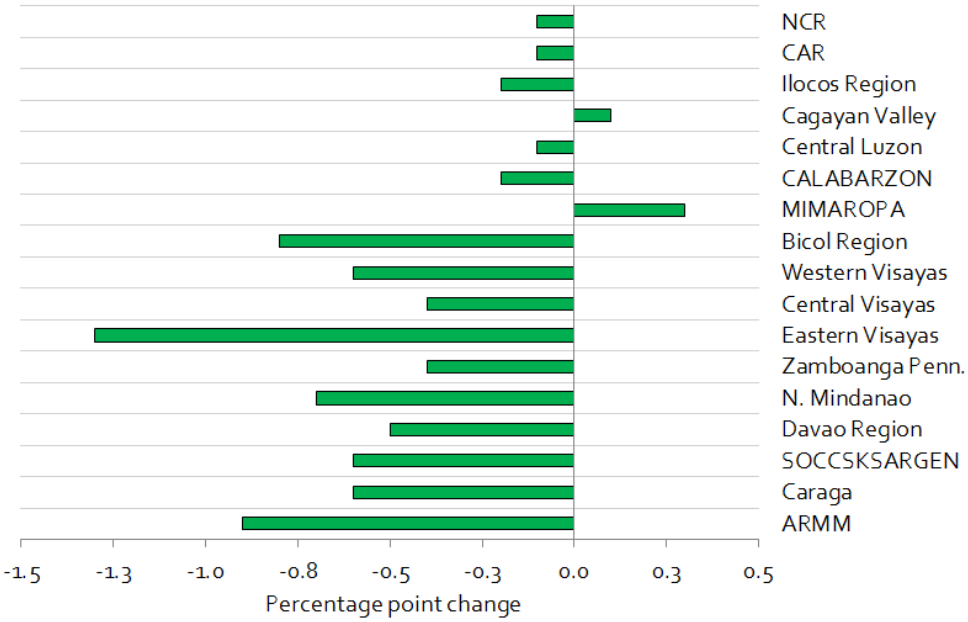

Figure 10. Effect of rice tariffication on poverty gap by region

6. Conclusions

Because of the importance of rice in the Philippine economy and diet, rice prices are a politically sensitive topic. Thus, it is not surprising that the Rice Tariffication Law, passed in March 2019, has been controversial. The RTL converts a series of quantitative restrictions on rice imports into ad valorem import taxes of 35% for imports from ASEAN countries and 40-50% on imports from other countries. This change represents a reduction of the role of the government in managing rice imports as well as a reduction in the level of protection provided to local rice farmers. Opponents of the RTL argue that it will hurt rice farmers and increase rural poverty, while proponents note that urban consumers will benefit from lower rice prices.

In order to address this issue, our study uses the IRRI Global Rice Model to simulate the impact of the RTL on producer and consumer rice prices in different regions of the Philippines and then uses the 2015 Family Income and Expenditure Survey to estimate the effect of these price changes on household welfare and poverty. We find that rice the tariffication reform

reduces the consumer prices of rice by 17.4%, and decreases the producer prices of rice between 13.6% and 22.6% depending on the region. Thus, households are affected both as producers and consumers of rice.

The 2015 Family Income and Expenditure Survey suggests that, since a large majority of households are net buyers of rice, most households benefit from the lower rice prices that result from the rice trade reform. Overall, the effects of the reform on poverty are positive. The poorest quintiles are better off. The richest quintiles are unaffected or slightly worse-off. Spatially, the poorest regions also benefit the most. As a result, this policy reform can be qualified as pro-poor and also somewhat redistributive.

However, the rice growers who are net sellers are negatively impacted. The government can adopt accompanying measures to help these farmers to adapt and develop profitable business in agriculture or outside. In that sense, the Rice Competitiveness Enhancement Fund is a move in the right direction. It is expected that the RCEF will increase investment in infrastructure and other public goods that would stimulate agricultural and non-agricultural activities. The RCEF establishes a program with four components, namely: 1) rice farm mechanization, 2) improved rice seed development, propagation, and promotion, 3) expanded rice credit assistance, and 4) rice extension services. Investments and policy support measures are needed in rural areas of the Philippines to create more opportunities for on-farm diversification towards higher value crops than rice and off-farm income-generating activities to supply the goods and services demanded by the agricultural sector.

With respect to methods, we show the value of using a spatially-disaggregated partial-equilibrium model to simulate the impact of policy on prices and nationally-representative household survey data to examine the impact of the price changes on welfare and poverty. In using a partial-equilibrium model, we assume that the impact of policy on other sectors and

factor prices, particularly wages, is negligible or that these changes would not significantly alter the distributional impact.

The micro-simulation approach has an advantage over the use of a small number of representative household types in providing a richer picture of the poverty and welfare impact. Although it requires nationally representative household survey data, this is becoming less of a constraint with the wider availability of these datasets.

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