## The Gains and Losses of Producers and Consumers in the Implementation of Rice Tariffication Law: An Integrated Impact Analysis

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### Abstract

This study aims to investigate the effects on consumer and producers in the advent of the implementation of the law. This study had used the triangulation type of mixed method research design. The quantitative research design was used to analyze the secondary data and survey result with the aid of descriptive and inferential statistics. Meanwhile, the qualitative research design was used to validate the existing statistical results generated from secondary data survey results by conducting in-depth interviews and focus group discussions. This study had evaluated the impact of RTL in macro and micro level both in household and producer sector. The Top-Down Microsimulation had used to assess the impact of the RTL on consumer level in terms of consumption expenditures and poverty and distribution of income. The result of the study revealed that the rice prices for consumers does not automatically lower down with the imposition of Rice Tarrification Law. Moreover, the household is anticipated to experience a conservative decrease in the cost of consumption of rice by 0.45% or a household savings amounting to Php10.30 million. Moreover, the Philippine had experienced a decline in the current prices of well milled rice by 4.59% and real prices of well milled rice by 8.12% amid the implementation of RTL.

Keywords: Rice Tarrification Law, Rice Reform, Consumer Prices, Farmers

### Introduction

The food security, under nutrition, poverty, inequality are the biggest development problems among developing countries. The rice farming plays an important role in poverty reduction where about 900 million of the poor household in the world is highly dependent on production and consumption of rice (CGIAR,2020; Bordey, 2010). In the Philippines, rice accounts for around 20% of its agriculture Gross Value Added, and it employs of about 2.5 million households which are composed of 2.1 million farmers, 110,000 workers for post-farm activities and 320,000 workers for ancillary activities (Gonzales, 2013). Also, rice earmarked for 25% of the food expenditures of 30% of the poorest population of the country (Balisacan& Sebastian, 2006).

With the aim of achieving food security in the Philippines and to attain significantly lower market price of rice, the Republic Act (RA) No 11203 titled as An Act Liberalizing the Importation, Exportation and Trading of Rice, Lifting for the Purpose the Quantitative Import Restriction on Rice and for Other Purposes has been enacted last February 14 2019. The RA 11203 mandates the following: (1) replacement of quantitative restriction (QR) on rice imports by the imposition of 35% import tariff for goods coming from Association of South East Asian Nations, 40% import tariff for goods coming from Non-ASEAN trading partners, and 180% tariff rate for Non-World Trade Organization (WTO) trading partners, (2) creation of Rice Competitiveness Enhancement Fund (RCEF) that mandates for an automatic appropriation of rice fund amounting to Php10 billion for the next 6 years regardless of the amount of tax collection which will be distributed and allocated in rice producing areas such as Philmech (50%), Philrice (30%), Landbank and DBP for expanded rice credit assistance (10%), and rice extension services (10%), (3) in the case that the annual tariff revenues exceed Php10 billion in any given year within six years period, the excess will be allocated as rice financial assistance for famer managing two hectares and below regardless whether they continue or not in farming rice, titling of agricultural rice lands, expanded crop insurance program on rice, and crop diversification program.

The implementation of Rice Trade Liberalization Law has brought controversial issues since it has been blamed on the adverse impact on the income and welfare of farmers in the country (Briones, 2019). With this controversial issues on the adverse effect of RTL, this study aims to investigate the effects on consumer and producers in the advent of the implementation of the law. Specifically, this research seeks to answer the following questions:

1. What has been the behavior of rice production, rice trade, prices of rice before and after the implementation of Rice Trade Liberalization Law?

2. What has been the effect of Rice Trade Liberalization Law on macro economy perspective such as prices of goods, employment, rice production, and consumer welfare, and on micro economy such as revenues and profit of farmers, welfare of farmers, occupational choice, regional and household income and expenditure, poverty and distribution of income?

3. Is there a significant difference in the effects of Rice Trade Liberalization Law on revenues and profit of the farmers, rice production, occupational choice, household income, household expenditures when grouped according to regions?

### **Theoretical And Empirical Background**

The Substitutability Between Domestic and Foreign Rice

The consumer theory emphasized that that consumer purchases a combination of goods that maximizes their utility subject to a budget constraint (Gao et al., 2016). The consumers; preference in consuming goods and services can be expressed through a utility function with corresponding budget constraint. The budget constraint depends on the prices of goods, properties of goods and the preferences of the consumer.

With the utility function and budget constraint enable to determine the elasticity of substitution between products as to determine whether the goods are substitutes or complements. The maximizing utility is at time t subject to the budget constraint and import quota is represented Lagrange function:

$$L = U_{t} + \lambda_1 (E_t - P_{dt} X D_t - P_{it} X I_t) + \lambda_2 (I_t - I_t)$$
(1)

Where,

$$U_{t} = \left[\alpha D_{t}^{\theta - 1/\theta} + (1 - \alpha)I_{t}^{\theta - 1/\theta}\right]^{\theta - 1/\theta}$$
(2)

The Ut is the consumption of rice produced domestically and by foreign countries. Meanwhile, Dt is the quantity of rice produced domestically, Dt is the imported SBS general rice volume, It is the total rice quota, Pdt is the price of domestic rice, Pit is the price of imported rice, Et is the expenditure of consuming rice, $\theta$  is the elasticity of substitution,  $\alpha$  is the consumer preference for domestic rice, 1-  $\alpha$  is the consumer preference for imported rice.

The Kuhn-Tucker conditions are as follows:

For imported rice: $L_{lt} = U'_{t+} P_{it}\lambda_1 - \lambda_2$	= 0	I <u>t</u> ≥0	(3)
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For domestic rice: 
$$L_{DT} = U'_{DT} - P_{DT} \lambda_1 = 0$$
  $D_T \ge 0$  (4)

Budget Constraint1:L 
$$\lambda_1 = E_t - P_{dt} x D_t - P_{it} x I_t \lambda_{1 \ge 0}$$
 (5)

Budget Constraint1:L 
$$\lambda_2 = I_t - I_t \ge 0$$
  $\lambda_2 \ge 0$ 

(6)

The consumer preference parameters are obtain using the following

$$\frac{P_{\rm IT}}{P_{\rm DT}\alpha} = \frac{1-\alpha}{P_{\rm DT}\alpha} (D_{\rm t}/I_{\rm t})^{1/\theta}$$
(7)

The degree of substitutability of domestic rice and imported rice the elasticity of substitution is defined as:

$$\varepsilon_{di} \left( \frac{d \ln\left(\frac{cd}{ci}\right)}{d \ln(MRS_{id})} \right) = \left( \frac{d\left(\frac{cd}{ci}\right)}{\frac{d\left(\frac{P_i}{P_D}\right)}{P_i / P_D}} \right)$$
(8)

The cd is the consumption of domestic rice, ci is the consumption of imported rice, Pi is the price of imported rice, and PD is the price of the domestic price.

Welsch (2008) emphasized that the consumer chooses the quantity of composite good home country goods (QD) and foreign country goods (QM) based on minimizing expenditures QD\*PD +QM\* PM or maximizing his/her utility. The consumer utilizes his/ her consumption subject to budget constraint implies that the marginal rate of substitution between domestic and foreign goods should be equal to the corresponding price ratio.

$$\frac{Q_M}{Q_D} = \left[\frac{\beta}{1-\beta}, \frac{P_D}{P_M}\right]^{\sigma}$$
(9)

Where the QD refers to the quantity of domestic goods, QM is the quantity of foreign goods, PD is the domestic price, and PM is the imported price. The is the distribution parameter between domestic and foreign goods, and  $\sigma$  is the Armington Elasticity. The Armington elasticities specify the degrees of substitution in demand between similar product produced. The elasticity of substitution can be represented by the following equations:

$$\log\left(\frac{Q_{M}}{Q_{D}}\right) = \sigma \log\left(\frac{\beta}{1-\beta}\right) + \sigma \log\left(\frac{P_{D}}{P_{M}}\right) + e$$
(10)

Onwuka et al. (2002) found in their comparative study between the foreign and local rice consumption in Umuahia North and Ikwuano that the price elasticity of rice is positive and greater than one, which implies that the demand for rice is elastic, and the price elasticity for rice substitute is inelastic. Moreover, the income elasticity of rice consumption is inelastic. This further means that the rice has become necessity and does not easily affected by changes in the price of

substitution and income. Further, their study revealed that the consumer prefers to buy foreign rice compared to local rice which indicates that the foreign rice importation had overcome the local rice production which would cause a detrimental in the local economy.

### Measuring the Tariff Equivalent of Import Quota

The tariff equivalent of Non-Tariff Barriers (NTB) (Import Quota) can be represented by the equation below:

$$t_e = MP + EC$$
 (11)

$$Pi_t = P'_{it} + MP + EC + CT + \pi$$
(12)

Where,  $t_e$  is the tariff equivalent of import quota, MP is the mark-up imposed on imported rice, EC is the extra cost. Pi<sub>t</sub> refers to consumer prices of imported rice,P'<sub>it</sub> is the Cost, Insurance, and Freight prices of imported general rice,t<sub>c</sub> refers to tariff equivalent of NTBs, MP is the mark-up imposed on imported rice, EC is the extra cost for the imported general rice, CT is the transportation port cost to supermarket, and  $\pi$  is the net profit of selling general rice (Gao et al., 2016).

The tariff equivalent can be further expanded by incorporating the substitution between domestically produce rice and imported rice as shown in equation 3:

$$T_e = MP + EC = P_{dt} \times (1-\alpha)/\alpha \times (D_t / I_t)^{1/\theta} - P'_{it} - CT - \pi.$$

Herander (2013) emphasized that the critical value of the tariff rate ( $t_c$ ) as the tariff rate which is set as Marginal Cost of Tariff (MC<sub>t</sub>) is equal to the Marginal Cost of Quota (MC<sub>q</sub>). This means that the critical tariff rate is inversely proportional to the quota quantity. As the quota quantity decreases the MC<sub>q</sub> decreases and the tariff rate must be higher in order to maintain the MC<sub>t</sub> = MC<sub>q</sub>. Further, the combination of the lower tariff rates and lower quota quantities often results to lower domestic prices under the tariff than the quota.

A buffer stock of rice protects both price limits of rice and withdrawal of rice stock and the rice importation without control reduces domestic prices. Further, the expansion in imports through a subsidy and a reduction in imports through quota restriction would stabilize the prices where the subsidy in imports is more than to offset by quota profits. Moreover, the ad valorem tariff with either singly or concurrently with quota can be used when the price is low (Brown, 2007)

### The Welfare Effects of Altering Rice Import Quota

The Compensated Variation (CV) was used to measure the welfare effect of altering the import quota of rice where it measures the expenditures necessary to compensate consumers for the effects of price changes after reform in trade. The CV is expressed as:

 $CV = E(P_{it}^{*}, U) - E(P_{it}, U)$ 

Where, E ( $P_{it}^*$ , U) is the expenditure function;  $P_{it}$  is the initial consumer prices of imported rice,  $P_{it}^*$  is new consumer prices; U is the initial utility level. A positive CV indicates that consumer decreases welfare, meanwhile, a negative CV means a gain in consumer welfare. Since the quantity of imported rice is equivalent to Hicksian compensated demand at the price  $P_{it}^*$  at the initial U, then

 $CV = E P_{it}^* X I^h (P_{it}^*, U) - P_{it} X I_t$ 

Then let the change in price is  $dP_{it} = P_{it}^* - P_{it}$  and the Hicksian compensated demand is  $dI^h = I^h (P P_{it^*}, U)$  then the CV can be represented as:

 $CV = P_{it}^* X dI^h + I_t x dP_{it}$ 

The price elasticity of demand is :

 $e_{p}^{*} = e_{p} + we_{i}$ 

The compensated price  $e_p$  is based on the slutsky equation where w is the spending share of the general rice in the total expenditure

### **Review of related literatures and studies**

The Liberalization of Trading of Rice in the Philippines

The Republic Act (R.A.) 11203 or otherwise known as An Act Liberalizing the Importation, Exportation and Trading of Rice, Lifting for the Purpose the Quantitative Import Restriction on Rice and for other Purposes has been enacted on July 23 2018. The aim of the R.A. 11203 is to ensure food security and make the country's agricultural sector viable, efficient, and globally competitive by replacing the non-tariff import restrictions in the form of quantitative restrictions by tariffs restrictions, thereby protecting the local producers of agricultural products. Further, the RA 11203 mandates the replacement of rice quantitative restrictions with tariff and initial bound tariff rate of 35% form imported rice originated from ASEAN countries, 180% tariff rates for Non-WTO trading partners, 40% tariff rates for imports falling within the Minimum Access Volume (MAV). The law also gives power to the President of the Philippine to increase, reduce, revise, or adjust the existing rates of import duty upto the bound rate committed by the Philippines under the WTO Agreement on Agriculture and under the ATIGA.

Further, the law also mandates the allocation of Rice Competitive Enhancement Fund (RCEF) which shall be consist of an annual appropriation of Ten billion pesos (Php10,000,000) for the next six years upon the implementation of the law. Under the law, the RCEF should be allocated and disbursed to rice producing areas which will be earmarked in the following: (a) fifty percent of the RCEF will be allocated to rice farm machineries and equipment; (b) thirty percent of the RCEF will be

allocated to rice see development, propagation and promotion, (c) ten percent of RCEF should be earmarked for expanded rice credit assistance; and (d) ten percent of the RCEF shall be made available for the extension services provided by PHILMech, PhilRice, Agricultural Training Institute (ATI) and Technical Education and Skills Development Authority for teaching skills on tice crop production, farm mechanization, and knowledge/technology transfer.

Moreover, the RA 11203 also mandates that in any case that the rice importation tariff revenue exceeds P10 billion in any given year within the six years following the effectivity of the law, the excess revenues should be allocated by congress and it should be included in General Appropriation Act for the following specific purposes: (a) rice farmer financial assistance, (b) titling of agricultural rice lands, (c) expanded crop insurance program on rice, and (d) crop diversification program.

Balie et al. (2020) had used the IRRI Global Rice model to study the impact of Rice Tariffication Law on household welfare and poverty using the 2015 Family Income and Expenditure Survey. The result of the study revealed that the RTL decreases 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. This reflects that the households are being affected by the law both as producers and consumers. As consumer, the households benefit from the lower prices that result from the rice trade reform where the poorest of quintiles are better off while the richest quintiles are unaffected or slightly worse-off. Moreover, those households living in the poorest regions befitted in the RTL which had qualified it as pro-poor and redistributive. On the contrary, the household as producer are negatively affected by the RTL with a decline in welfare by 7.7% since the producer prices is anticipated to decrease by between 13.6% and 22.57%.

Briones (2019) found out the RTL would result to projected increase in the production of palay by 2.8% per year without the implementation of the new tariff. Further, the RTL is also expected to decrease the production of palay by 5.7% from the year of implementation up to 2024, and it is expected to a positive growth from 2025 onwards. Moreover, the RTL is expected to increase the farm gate price by 0.20% per annum. The price farm gate price is expected to further accelerates at 1.3% from 2030 onwards. On contrary to farm gate price, the retail price is expected to decrease by 3.5% per year from 2019 to 2024. In terms of welfare effect, the RTL is expected to result to an increase in the projected income of farmers by 2.5% per year to 2024 and accelerating to 1.8 % per year to 2030. Further, the RTL is also expecting to have a negative impact on the welfare of producer where rice farmer are expected to incur loss up to Php7.6 billion per year from the year of implementation until 2024, and the farmer's loss is expected is expected to increase up to Php12.60 billion per year from 2025 to 2030.

### Methodology

This study had used the triangulation type of mixed method research design. The quantitative research design was used to analyze the secondary data and survey result with the aid of descriptive and inferential statistics. Meanwhile, the qualitative research design was used to validate the existing statistical results generated from secondary data survey results by conducting in-depth interviews and focus group discussions. This study had evaluated the impact of RTL in macro and micro level both in household and producer sector.

The Micro and Macro Effect of RTL on Producer Side

The descriptive statistics was used to study the impact of RTL on producer side by using the secondary data generated from Philippine Statistical Authority and survey results conducted to farmers across regions. Also, this study also utilized the Focused Group Discussion and in-depth interview to triangulate the statistical result of the descriptive statistics. The research also interviewed industry players among others.

The study has been conducted in the mid of COVID travel restrictions so it was difficult to do onsite validation and interviews. Much of the data gathering was done virtually and at the same time relied heavily on contacts at the ground level, particularly for the survey component of this research.

### The Micro and Macro Effect of RTL on Consumer Side

The Top-Down Microsimulation had used to assess the impact of the RTL on consumer level in terms of consumption expenditures and poverty and distribution of income. Top-Down Behavioral Microsimulation has the capability to determine the changes in Household Consumption expenditure, poverty incidence and distribution of income due to RTL. The implementation of the Top-Down Behavioral Microsimulation to determine the changes in rice consumption expenditure, poverty and income distribution due to RTL Law was shown in Figure 1. The Top-Down Behavioral Microsimulation is a three steps procedures in studying the effects on distribution of income and poverty. It involves the following steps: (1) The estimation of household consumption expenditure before the implementation of RTL and determining the estimated rice consumption expenditure, distribution of income and poverty incidence, (2) the integration of macro changes in prices of rice to the estimated household consumption expenditure; and (3) The estimation of household consumption expenditure that determine the poverty incidence and distribution of income after the RTL.



Figure 1. Process of Determining the Effect of the RTL Law on Household Level

### Results and Discussions

The Production, Value, Retail Price, Wholesale Price, and Farm Gate Price of Rice in the Philippine Before and After the RTL

The Republic Act No. 11203, otherwise known as Rice Tariffication Law (RTL) has been signed by President Rodrigo Roa Duterte last February 14, 2019. Before the implementation of the Law covering the period March 2017 to February 2019, the average monthly rice production of the Philippines is at 5.36 billion metric tons. However, the implementation of the law resulted to plunge the production of rice at 1.56 million metric tons, a decrease by 99% from previous year's average monthly production, as reflected in Table 1. Moreover, the RTL also resulted to a decline in the value of production by 21% from average monthly production of Php31.29 covering the period March 2019 to February 2019 to Php24.61 billion covering the period March 2019 to February 2020. Meanwhile, the wholesale and farmgate price of rice had decreased by 12% and 17%, respectively from average monthly wholesale price of Php38.99 to Php34.00 and from average farm gate price of Php19.36 to Php16.01.

Month & Year	Production (In Metric Tons)	Value (In Thousand Pesos)	Retail Prices of Rice	Wholesale Price of Palay	Farm Gate Price of Palay
March	678,722,649	26,456,933	41.89	36.56	17.97
April 2017	1,966,072,675	23,538,937	41.88	37.09	18.33
May 2017	1,606,503,538	23,320,627	41.8	37.47	18.16
June 2017	2,274,274,792	23,500,411	41.97	38.08	18.3
July 2017	1,648,811,589	19,264,955	42.1	38.43	18.94
August	2,604,939,222	19,081,866	42.17	38.06	18.76
September	3,439,008,009	18,441,057	42.43	36.91	18.13
October	7,821,216,542	43,789,820	42.07	38.14	17.53
November	8,770,453,938	45,188,696	42.02	38.19	18.09
December	8,021,055,994	46,287,813	42.32	38.16	18.53
January	4,305,477,608	26,832,884	42.58	38.11	18.89
February	5,484,476,755	28,281,775	42.97	38.43	19.91
March	4,403,599,659	30,181,810	43.39	38.88	20.5
April 2018	4,316,113,821	25,888,978	43.63	38.62	20.16
May 2018	4,149,171,008	25,863,294	43.71	38.97	20.14
June 2018	4,996,726,831	26,222,864	44.19	39.47	20.42
July 2018	3,764,498,267	21,380,641	44.80	40.43	21.02
August	6,612,538,025	23,089,465	46.66	41.92	22.7
September	7,416,092,100	22,418,142	48.97	44.17	22.04
October	13,941,299,751	49,909,903	48.43	41.95	19.98
November	12,042,824,960	48,461,067	46.17	40.99	19.4
December	10,793,828,387	49,060,585	44.94	40.76	19.64
January	4,333,887,226	26,861,294	44.59	37.42	18.91
February	3,339,550,596	26,136,849	44.37	38.6	18.4
Average	5,363,797,664.3	29,977,527.80	43.80	39.00	19.40
March	1,472,283	25,779,682	43.77	38.6	17.51
April 2019	1,284,175	21,574,148	43.48	34.76	16.8
May 2019	1,284,175	21,715,408	42.96	33.84	16.91
June 2019	1,284,175	21,227,421	42.78	34.01	16.53
July 2019	1,017,157	17,617,160	42.43	33.23	17.32
August	1,017,157	16,477,944	42.30	34.51	16.2
September	1,017,157	15,003,067	42.02	33.86	14.75
October	2,497,993	35,971,101	41.52	33.4	14.4
November	2,497,993	36,420,740	41.52	33.01	14.58
December	2,497,993	38,269,255	41.42	32.8	15.32
January	1,420,481	22,528,827	41.27	33.01	15.86
February	1,420,481	22,798,718	41.08	33.07	16.05
Monthly	1,559,268	24,615,289	42.21	34.01	16.02

Table 1: The Production, Value, Retail Price, Wholesale Price, and FarmGate Price of Rice in the Philippine Before and After the RTL

Since the implementation of the RTL had just started on the second quarter of 2019, this research had compare the regional production from second quarter to fourth quarter each year to make the production comparable before and after the RTL. Based on comparative analysis, the production of palay in regions IV-A, VII, XII have been greatly affected by the implementation of RTL.

The region IV-A recorded an 8% decrease in the rice production from 322,857 metric tons in 2018 to 296.840 thousand metric tons in 2019, and a decrease of 25% compared to the 2016-2018 average palay production. Meanwhile, the production in 2020 had declined by 5% compared to the 2018 production amid the implementation of RTL. The decrease in the production of Region IV-A is associated with the decrease in the production in the provinces of Rizal, Cavite and Quezon with recorded decrease of 33.11%, 16.31%, and 11.26%, respectively.

The region VII recorded a 30.63% decrease in the rice production from 209.15 thousand metric tons in 2018 to 145.07 thousand metric tons in 2019, and a decrease of 54.06% compared to the 2016- 2018 average palay production. Meanwhile, the production in 2020 had declined by 6.45% compared to the 2018 production amid the implementation of RTL. The decrease in the production of Region VIIIs associated with the decrease in the production in various provinces of Bohol (-30.40%), Cebu (15.99%), Negros Oriental (17.73%), and Siquijor (28.49%). Moreover, the 2019 three-quarters productions of region VII is smaller by 27.15 compared to the average three-quarters production from 2016 to 2018.

Also, the Region XII recorded a decrease in three-quarters production by 12.335 in 2019, and 6.98% in 2020 compared to 2018 three-quarters production. The decrease in three-quarters productions of provinces of North Cotabato (-5.75), South Cotabato (-14.15), and Sultan Kudarat (-15.15) had contributed to the decrease in the production of Region XII.

Table 2 shows the comparative analysis of wholesale selling prices of well mill rice of various provinces before and after the implementation of RTL. The table depicts that due to the implementation of the RTL the average monthly selling prices of well mill rice had dropped down across Luzon, Visayas, and Mindanao with a decrease in selling price of 4.04%, 13.12%, and 4.67%, respectively. Among the well milled rice producing provinces in the Philippines, the Davao Del Sur had recorded the highest decrease in the prices with a dropped down by 22.58%. This was then followed by provinces of City of Davao (15.30%), Sultan Kudarat (14.69), and Davao Del Norte (14.58%). To disregard the effect of fluctuations in the prices that could affect the prices of the well milled rice, this study had converted the nominal average monthly prices of rice into real value using the 2012 as base prices. The statistical results show that the Visayas had recorded a huge decline in the real prices of well milled rice with a decrease of 13.12%.

### The Production of Palay during the COVID Pandemic Disease

Amid the community quarantine which has been implementing by the government to prevent the exponential spread of COVID-19 pandemic in the Philippines covering the period March 2020 to December 2020, the three-quarters production of Palay had grown by 4.41% in the last three quarters of 2020. However, the Cordillera Administrative Region had experience a large decrease in the three-quarters production of palay plunging by 4.16% compared to the previous three- quarters figure. Further, regions III and IX had experienced a conservative decrease in the three-quarters production with a decrease of 0.95 and 0.01, respectively

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Comparative Analysis of the Regional Wholesale Selling Price of Rice During and Before RTL and COVID

Table 3 depicts the comparative analysis of the wholesale price well milled rice during and after the implementation of RTL and COVID. Based on the results, the Philippine had experienced a decline in the current prices of well milled rice by 4.59% and real prices of well milled rice by 8.12% amid the implementation of RTL. Among administrative regions, Visayas regions is greatly by the implementation of RTL plunging the real prices of well milled rice by 16.54% which is associated with a decrease in the prices of rice producing provinces ranging from a decline from 7.23% to 23.74%. Further, Mindanao administrative regions also had registered a decline in the real prices of well milled rice by 8.00%, while the Luzon regions had registered a decline by 1.25%.

Meanwhile, the community quarantine that is being imposed by the Philippine to prevent the spread of COVID-19 had resulted to conservative decrease in the real prices of well milled rice by 0.17%. Luzon regions had registered 6.35% decline in the real prices of well milled rice due to community quarantine, while Visayas and Mindanao regions had registered an increase in the prices by 6.68% and 1.30%, respectively. Among provinces in Luzon region, the province of Nueva Ecija had registered the highest decrease in the prices of real milled rice posting a decline of 15.13%. On the contrary, the province of Negros Oriental had

the highest posted increase in the real prices of well milled rice with 14.83%

Regions	2016	2017	2018	Average Production Before RTL	Post RTL (2019)	Post COVID (2020)	2019 vs 2018	2020 vs 2018	RTL Effect	COVID Effect
CAR	328.85	385.17	331.69	348.57	360.58	345.58	8.711	4.188	3.45	-4.16
REGION I	1,487.63	1,539.26	1,390.81	1,472.57	1,521.22	1,571.24	9.376	12.973	3.3	3.29
REGION II	1,752.58	2,062.25	1,654.55	1,823.12	2,024.08	2,051.13	22.334	23.969	11.02	1.34
REGION III	2,701.67	2,960.59	2,935.56	2,865.94	3,000.31	2,971.79	2.206	1.234	4.69	-0.95
<b>REGION IV-A</b>	317.15	326.84	322.86	322.28	296.84	305.31	-8.059	-5.435	-7.89	2.85
MIMAROPA	850.72	870.8	916.96	879.5	884.19	912.97	-3.574	-0.436	0.53	3.25
REGION V	985.95	1,049.71	1,059.74	1,031.80	947.02	1,040.13	-10.637	-1.85	-8.22	9.83
<b>REGION VI</b>	1,449.69	1,598.72	1,629.43	1,559.28	1,489.78	1,662.94	-8.571	2.057	-4.46	11.62
REGION VII	156.52	231.73	209.15	199.13	145.07	195.65	-30.636	-6.453	-27.15	34.87
REGION VIII	669.33	659.95	667.15	665.47	605.84	674.23	-9.189	1.061	-8.96	11.29
REGION IX	435.22	485.96	510.97	477.38	482.52	482.47	-5.567	-5.577	1.08	-0.01
REGION X	541.1	560.05	575.42	558.86	577.64	608.76	0.385	5.794	3.36	5.39
REGION XI	296.57	311.21	341.64	316.47	316.13	337.61	-7.467	-1.178	-0.11	6.79
REGION XII	855.19	941.35	934.02	910.18	818.81	868.83	-12.335	-6.979	-10.04	6.11
REGION XIII	444.25	462.76	488.41	465.14	423.59	476.66	-13.271	-2.406	-8.93	12.53
BARMM	422.54	410.75	474.77	436.02	504.37	528.11	6.236	11.235	15.68	4.71
PHILIPPINES	13,694.95	14,857.08	14,443.12	14,331.72	14,397.98	15,033.41	-0.313	4.087	0.46	4.41

Table 2: Comparative Analysis of Three-Quarters Rice production Pre and Post RTL, and Pre and Post COVID-19.

Based on the result of the study, the Visayas regions had registered the highest decrease in the real prices of regular milled rice with a decline of 13.67%. Meanwhile, Mindanao regions and Luzon regions also posted a decline in the real prices f regular milled rice with a decrease of 8.62% and 6.31%, respectively.

Among regular milled rice producing provinces, the Compostela Valley had the highest recorded decrease in the prices with a decline of 27.15%. This was then followed by the decrease in the prices in the provinces of Davao Del Sur (20.55%), Cavite (20.29%), and Albay (19.90%).

The Philippine prices of regular milled rice has remained stable amid the implementation of community quarantine with a slight increase in the prices by 0.02%. The 3.32% decrease in the prices of regular milled rice in the Visayas regions has been offsetted by the 3.58 increase in the real rice

prices in Visayas regions and 0.55% increase in the real rice prices in Mindanao regions

The implementation of RTL had resulted to a decline in the nominal gross return amounting to Php23,936 per hectar though the imputed and cash cost had decreased by Php423.00/hectare and Php363/hectare, respectively. This had resulted to a decline in the net return amounting to Php29,492/hectare. This has resulted to loss in net return amounting to Php29492 per hectare. The interpolated amount of Philippine aggregated loss of farmers is amounting to Php13.71 billion. The aggregated loss of farmers due to RTL is 37% greater than the allocated yearly Rice Competitive Enhance Funds (RCEF) amounting to Php10.00 billion to augment any loss that will be incurred by the farmer due to RTL.

In terms of real value, the RTL had resulted to a loss in the gross return of farmers by Php120.00 per hectare with an increase in cash cost and imputed cost by Php16.00 and Php14.00 per hectare. This had resulted to a loss in the net return of Php 24.00 per hectare. Meanwhile, the interpolated aggregate national loss of farmer due to RTL is Php113.451 million.

As a result of the implementation of RTL, the volume of rice increases by 253% from 3.53 million metric tons in 2018 to 12.48 million metric tons in 2019. Moreover, the value of rice significantly increases from Php1.47 billion to Php4.58 billion posting an increase of 210.78%.

	Nominal	Value						Real Value	е				
Year	Seasons	Gross Returns	Cash Costs	Non- Cash Costs	Impute d Costs	Total Costs	Net Return	Gross Returns	Cash Costs	Non- Cash Costs	Imput ed Costs	Total Costs	Net Return
	Dry	70,307	21,172	15,065	10,691	46,928	23,379	445.26	47.55	316.83	33.74	1390.71	16.81
	Wet	65,322	21,164	15,093	11,628	47,885	17,437	413.69	51.16	295.02	39.41	1214.93	14.35
2015	Average	67,552	21,167	15,101	11,202	47,470	20,082	427.82	49.48	305.21	36.70	1293.38	15.53
	Dry	68,100	21,096	14,796	10,793	46 <i>,</i> 685	21,415	432.11	48.82	303.06	35.61	1310.90	16.34
	Wet	67,171	20,935	15,549	11,854	48,338	18,833	426.21	49.12	316.56	37.45	1290.86	14.59
2016	Average	67 <i>,</i> 436	21,059	15,196	11,370	47,625	19,811	427.89	49.22	308.76	36.82	1293.31	15.32
	Dry	73,974	21,061	16,412	11,307	48,781	25 <i>,</i> 193	452.16	46.58	352.35	32.09	1520.13	16.57
	Wet	72,254	21,050	17,103	12,357	50,511	21,743	441.65	47.66	358.84	34.44	1466.80	14.82
2017	Average	72 <i>,</i> 950	21,081	16,786	11,877	49,744	23,206	445.90	47.28	355.06	33.45	1487.07	15.61
	Dry	81,918	21,322	13,452	11,220	45,994	35 <i>,</i> 924	442.80	48.15	279.36	40.16	1145.18	31.37
	Wet	80 <i>,</i> 556	21,774	14,877	12,565	49,216	31,340	435.44	50.00	297.51	42.23	1165.33	26.89
2018	Average	81,024	21,572	14,189	11,913	47,675	33,349	437.97	49.25	288.07	41.35	1152.85	28.93
	Dry	91,191	21,587	11,098	11,132	43,381	53 <i>,</i> 870	458.94	47.04	235.94	47.18	919.44	58.59
	Wet	90,487	22,530	12,941	12,782	47,942	48,290	455.40	49.47	261.57	48.87	981.07	49.22

Table 6: Comparative Analysis of Gross Returns, Costs, and Net Return on Rice Trading Before and After RTL

				1			1						
Projected													
without RTL	Average	90,562	22,078	12,026	11,950	45 <i>,</i> 688	50,816	455.77	48.44	248.26	48.13	949.18	53.54
	Dry	70,001	22,247	12,062	11,532	45,842	24,159	352.29	63.15	191.01	60.37	759.30	31.82
Actual	Wet	630,098	22,168	12,122	12,173	46,463	16,547	3171.10	6.99	1734.04	7.02	6618.62	2.50
2019 with RTL	Average	66,626	21,715	12,059	11,527	45,302	21,324	335.31	64.76	186.21	61.90	731.81	29.14
	Dry	-21,190	660	964	400	2,461	-29,711	-107	16	-45	13	-160	-27
Foregone	Wet	539,611	-362	-819	-609	-1,479	-31,743	2,716	-42	1,472	-42	5,638	-47
Value (Peso Per Hectare)	Average	-23,936	-363	33	-423	-386	-29,492	-120	16	-62	14	-217	-24
Total Hectare in the Philippines 4,650,000							4,650,0	00	1	I	I	I	<u> </u>
Aggregated 13,7138,4	Aggregated Farmers Loss (Current) 13,7138,443,639.513						Aggregated Farmers (Real Value) 113,451,854.38						

# Table 7: Comparative Analysis of Volume of Rice Import Before and After RTL

	Volume of	Rice Import (	in metric ton	s)	Percent Change				
Months	2016	2017	2018	2019	2020	2017	2018	2019	2020
March	123,714	281,693	49,445	488,826	177,577	127.70	- 82.45	888.63	-63.67
April	62,638	29,474	2,434	507,984	702,708	- 52.95	- 91.74	20,767.63	38.33
May	1,837	9,350	2,002	589,997	599,140	409.08	- 78.58	29,364.24	1.55
June	1,110	57,596	335,303	445,425	197,789	5,087.36	482.16	32.84	-55.60
July	505	28,962	320,215	561,108	374,081	5,636.92	1,005.64	75.23	-33.33
August	1,724	52,826	418,452	518,111		2,964.69	692.13	23.82	
September	76,474	105,128	946,622	123,088		37.47	800.45	- 87.00	
October	174,965	80,871	185,740	65,763		- 53.78	129.67	- 64.59	
November	17,265	33,872	120,569	176,553		96.19	255.95	46.43	
December	56,026	13,824	358,775	413,676		- 75.33	2,495.28	15.30	
January	277,657	347,273	1,039,909	268,160		25.07	199.45	- 74.21	
February	360,643	450,562	597,193	455,268		24.93	32.54	- 23.77	
Total	1,154,557	1,491,433	4,376,660	4,613,960	2,051,295	29.18	193.45	5.42	-

# Table 8: Comparative Analysis of Value of Rice Import Before and After RTL

Months	Value of Ri	Percent Change							
	2016	2017	2018	2019	2020	2017	2018	2019	2020
March							- 78.64		-62.85
April						- 62.24	- 62.90		59.94
May							- 39.10		19.50
June								- 7.27	-43.87
July									-18.04

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August							
September				-	84.80		
October			- 48.79	-	74.70		
November							
December			- 74.33	-	1.90		
January				-	78.08		
February				-	27.05		
Total				-	10.46	-	7.51

Table 7 and Table 8 shows the comparative analysis of the volume and value of imported rice before and after RTL. Based on the statistics, the RTL had resulted to an increase in the value of imported rice by 5.42 % covering the period from March 2019 to February 2020. On contrary the value of imported rice decreases by 10.46% due to RTL.

 Table 9: Comparative Analysis of Farmers Production Loss, RCEF Funds,

 Rice Tariff Collection (In Billion Pesos

Farmers Production Loss	RCEF Funds	Rice Tariff Collection	Variance between Farmer Loss and RCEF Funds	Variance between Farmer Loss and Rice Importation Collection
Php13.71	Php10.00	Php12.30	Php3.71	Php1.41

Table 9 shows the comparative analysis of farmer's production loss versus RCEF Funds, and imported rice tariff revenue collection. Based on the table the yearly RCEF funds allocation by the government is below the actual amount of farmer's net return by 37% or amounting to Php3.71 billion. Moreover, the rice tariff collection that supposed to augment the RCEF is also below the farmer's production loss by 10.28%.

### Table 10: Supply and Demand Analysis of Rice

Year	Rice Consumption	Domestic Production	Foreign Imported Rice	Total Rice Production	Surplus	Variation
2016	12900	13,539.87	639.02	14,178.89	1,278.89	9.914
2017	13250	14,557.32	557.42	15,114.74	1,864.74	14.074
2018	14100	14,347.99	1,473.30	15,821.29	1,721.29	12.208
2019	14300	14,468.94	2,032.68	16,501.62	2,201.62	15.396
2020	14400	14,571.77	1,564.53	16,136.30	1,736.30	12.058

Table 10 depicts the supply and demand analysis of rice consumption, domestic production and import. Based on the table, the total domestic

rice production of the Philippines is sufficient enough for the domestic rice consumption before the implementation of RTL. Before the implementation of RTL, the average surplus in the supply of rice is at 1.71 million metric tons, and a year of implementation of RTL had resulted to an increase in rice surplus by 27.91%.

Effect on Household Consumption of Rice

Based on the simulation results, the household is anticipated to post a conservative decrease in the cost of consumption of rice by 0.45% or a household savings amounting to Php10.30 million. The greatest beneficiary of the RTL is those household in Region 12 with anticipated savings amounting to Php1.14 million or a decrease in rice consumption expenditure of 1.22%. This was then followed by Region 8 with a decrease in the consumption expenditure by 0.79% or translated to savings of Php785 thousand.

			Household	
Region	Before RTL	After RTL	Savings	Changes
Region 1	116,900,179.80	116,610,726.20	289,453.59	(0.25)
Region 2	103,293,072.05	102,541,311.94	751,760.11	(0.73)
Region 3	204,559,000.23	203,585,091.72	973,908.51	(0.48)
Region 5	106,399,488.17	105,893,237.01	506,251.16	(0.48)
Region 6	136,626,873.56	135,645,060.77	981,812.79	(0.72)
Region 7	132,331,636.60	131,820,434.21	511,202.39	(0.39)
Region 8	99,967,420.89	99,181,764.11	785,656.79	(0.79)
Region 9	70,388,637.40	70,068,331.70	320,305.69	(0.46)
Region 10	82,607,503.32	82,297,946.67	309,556.65	(0.37)
Region 11	130,419,467.37	129,441,710.34	977,757.03	(0.75)
Region 12	94,505,045.77	93,356,008.32	1,149,037.45	(1.22)
NCR	411,484,670.47	410,753,021.41	731,649.06	(0.18)
CAR	98,201,564.54	97,757,888.66	443,675.88	(0.45)
CARAGA	51,400,971.14	51,342,797.95	58,173.20	(0.11)
ARMM	75,737,742.18	75,701,188.94	36,553.24	(0.05)
Region 4-A	309,550,964.67	308,341,909.50	1,209,055.17	(0.39)
Region 4-B	60,323,635.72	60,056,834.06	266,801.67	(0.44)
Philippines	2,284,697,873.91	2,274,395,263.53	10,302,610.38	(0.45)

Table 11: Household Consumption Expenditure Before and After RTL

The Foster, Greer, and Thorbecke Measures of Poverty

The Foster, Greer and Thorbecke measure aims to provide a measurement of poverty, which can be disaggregated, for population sub-groups and the contribution of sub-groups to national poverty. The formula used in this dissertation is as follows:

$$P_1 = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{G_i}{z} \right)^{\alpha}$$

where,  $\alpha > 0$  and is a measure of the sensitivity of the index to poverty

and the poverty line. When the parameter  $\alpha=0$ , the  $P_0$  is simply the head-count index; if  $\alpha=1$  the index is the poverty gap index; and if  $\alpha=2$  indicates the poverty severity index. The poverty head count ratio measures the incidence of poverty as a proportion of population that lives in poverty. It measures the percentage of population that has a disposable income below the poverty line. If the poverty headcount is higher after the policy is allocated, then the policy has disadvantage to some individuals. The implementation of RTL had resulted to a conservative decrease in the Poverty head Count by 1.77%. Meanwhile, the Poverty Gap decreases by 2.45% due to implementation of RTL, and the poverty severity decreases by 2.90%.



The Region 6 is greatest beneficiary of RTL in terms of reduction in the number of individuals who are considered as poor posting a decline of 4.214% in the poverty head count. This was then followed by the Region

12 and Region 4-A with posted improvement in the poverty headcount of 3.599% and 3.462%, respectively. Among regions, the CARAGA region had posted no benefit that will be derived in RTL in terms of reducing the poverty headcount.



FGT Poverty Headcount By Region

The Region 12 is greatest beneficiary of RTL in terms of reduction in the poverty gap posting a decline of 5.70% in the improvement in the gap between then income between rich and poor family. This was then followed by the Region 2 and Region 3 with posted improvement in the poverty headcount of 5.176% and 5.010%, respectively.

Among regions, the ARMM region had posted a conservative decrease in the poverty gap posting an improvement of 0.073%. The Region 12 is greatest beneficiary of RTL in terms of reduction in the poverty severity posting a decline of 6.876% which indicates that the degree of poverty improves due to the policy. This was then followed by the Region 2 and Region 4-A with posted improvement in the poverty headcount of 6.643% and 6.076%, respectively. Among regions, the ARMM region had posted a conservative decrease in the poverty severity index posting an improvement of 0.096%.



FGT Poverty Severity By Region

### Percentage Point Improvement in FGT Poverty Severity Index



### The Gini Index

The Gini Index was used in this paper to measure the extent of movement in the distribution of income (or, in some cases, consumption expenditure) among households within the Philippines due to the implementation of the RTL. A Gini index of zero represents perfect equality and of 100, perfect inequality. The implementation of RTL has

## resulted to decrease in inequality in the Philippines by 0.34% from gini of 0.426448 before RTL to 0.424982 after RTL.



Philippine Gini Coefficient Before and After RTL

Figure below shows the regional analysis of the Gini Coefficient of the Philippines before and after the RTL. Based on the simulation, Region 12 is the greatest beneficiary of RTL in terms of the improvement in gini coefficient with recorded 0.93% decrease in gini coefficient. On contrary, the ARMM incurred adverse effect on the implementation of RTL with an increase in gini coefficient of 0.00058%.



Regional Analysis of Philippine Gini Coefficient Before and After RTL

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The Sen-Shorrocks-Thon Index

The Sen-Shorrocks-Thon (SST) Index is an index of poverty intensity which indicates the incidence, depth, and inequality jointly and is considered as a comprehensive measure of inequality. It is defined as:

$$P_{SST} = P_0 P_1^P (1 + G^P) P_{SST} = P_0 P_1^P (1 + G^P)$$

The SST index is composed of three measures which are average poverty headcount index, average poverty gap, and Gini coefficient. The SST allows to answer the following questions: Are there more poor? Are the poor poorer? Is there higher inequality among the poor?

The SST gives more weights to the poverty gap of the poorer individual. It is usually between zero and one. The zero SST indicates that all incomes are above the poverty line and further indicates that there are no poor people. Meanwhile, an SST of one (1) indicates that all individuals are poor, and they have zero income (Aguirregabiria, 2006). The statistical results of this paper shows that the SST index is 0.146793 after the implementation of the RTL from 0.1501 which translated into an improvement of 2.21%. The improvement in SST index reflected that less people are becoming poor, or an increase in the number of people with an average income above the poverty line. This further indicates that a slight improvement in terms of the joint improvement in the average poverty headcount index, average poverty gap, and Gini coefficient. The greatest beneficiary of the RTL in terms in the improvement of SST index with a decrease of 5.38%, and this was then followed by Region 3 with posted improvement on SST index of 5.058%. Meanwhile, the ARMM had registered the smallest improvement in the SST index due to RTL with a decrease of 0.072%.



#### Regional Analysis of SST Index

### **Conclusion and Recommendations**

Based on the results of the study, the following conclusions had been derived:

- 1. The results of the study revealed that prices of rice decreased but not to the level initially projected.
- 2. In terms of consumer welfare, the implementation of RTL has brought a minimal savings of 0.45% to household expenditures and a conservative decrease in poverty and inequality. The poverty head count also declined by a mere 1.77%. Meanwhile, the poverty gap decreased by 2.45% due to implementation of RTL, while the poverty severity declined by 2.90%.
- 3. However, RTL has serious adverse effects on the producer side with estimated farmers' losses amounting to P279 billion per year. The combined Php 10 billion RCEF funds and excess tariff collections are clearly not enough to compensate farmers for their losses. Most of the funds will be used for investments in machines and seeds, and it will take some time before the full benefit of these interventions can be felt by farmers.
- 4. Additionally, farm yields and costs of production have not improved significantly, thus putting in question the premise that RCEF funds will allow farmers to compete with cheaper imports and still profit despite a fall in local palay prices. The seed support program has not been able to raise productivity to a significant degree; yield in 2020 averaged only 4.09 tons per hectare, or only 3% higher than the performance in 2017, and still a long way from the target of 6 tons per hectare deemed necessary for local farmers to be at par with their Vietnamese counterparts. Meantime, fertilizer, labor and other costs appear to have increased, partly due to the pandemic, and total farming costs of production may have actually increased, instead of decreased, during the first two years of RTL implementation.
- 5. The lifting of the quantitative restriction on rice imports should not have been done in an abrupt manner. In the light of the insignificant impacts on consumers welfare and the huge losses incurred by farmers, there needs to be an immediate review of the law to address the vulnerabilities of both consumers and producers. There may be a need to re-impose measures to protect the local farmers and manage the inflow of imports until such time that farmers are able to reasonably compete, and the local market has already adjusted to the new arrangement. This will provide an opportunity to upgrade local production and empower local farmers before the market is fully opened up to imports.
- 6. The problems hounding RTL should also be addressed in tandem with the ill-effects of COVID-19, ASF, and natural calamities that

consistently affected the lives and livelihoods of rice farmers. These factors have heightened the vulnerability of farmers and farming households.

With the foregoing finds and observations, this research study recommends the following :

- The government needs to craft a clear and effective strategy to balance imports with local supply to prevent acute shortages and price instability on the one hand, but avoid excessive supply gluts on the other, while farmers are finding ways to become more competitive;
- The Bureau of Customs must improve its system for handling rice imports and collecting proper tariffs and plug loopholes that allow for the continued undervaluation, misdeclaration and technical smuggling of rice imports.
- 3. The government must utilize the trade remedies allowed by local laws and WTO rules to address problems arising from excessive imports. In particular, the special and general safeguard mechanisms should be invoked promptly when necessary.
- 4. There is a need to recast the allocation of RCEF to farmers to allow it to anticipate instead of just react to emerging problems. There is also need to ensure that funds are spent wisely and effectively. It is advisable that the cash transfer component of RCEF be increased in the initial years so that it can directly and immediately address the fall in farmers' incomes; the share of non-cash interventions can be gradually increased once farmers and local markets have been able to adjust to the effects of RTL.
- 5. While machines are warranted, there is also need to distribute machines that can be used by individuals (including women) or clustered families.
- 6. Community-based seed production and distribution should be promoted to respond to the increasing cost of production of farmers brought about by the RTL.
- 7. Farmers must be encouraged to go into niche rice production and supply markets for heirloom rice, organic rice and other specialty markets.
- 8. Support for income diversification must be augmented and sustained so that rice farmers have recourse to other sources of income in the event that palay prices fall. Support needs to be provided particularly for women farmers in their role in rice-based farming systems, such as in livestock raising and restocking of hogs and vegetable farming.

A policy and program need to be crafted to attract more women to engage in rice production and capitalize on their capacity to enhance farm productivity by as much as 20%. Steps should also be taken to enhance their technological capacities so that they can participate actively in decision making and the introduction of innovative farming practices.

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