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The Sectoral Impact of the Rice Tariffication Law on Filipino Rice Supply: A Time-Series Analysis

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Abstract

The Rice Tariffication Law was implemented in March 2019 to address rice shortage by replacing quantitative restrictions with import tariffs. Prior studies have evaluated its various impacts, but no study has analyzed post-RTL seasonal rice supply data by sector. This study is a quasi-experimental, interrupted time-series analysis using ARIMA models applied to 2011-2020 data. The control group consists of observed values and the experimental group consists of ARIMA-forecasted values post-RTL. Research findings indicate that RTL does not affect rice supply trends in the overall rice supply and household sector. Conversely, in the commercial and NFA sectors, RTL has been observed to significantly influence rice supply trends. This reveals the ways in which RTL altered the dynamics within these sectors, thereby impacting their respective supply trends by influencing local production, buffer stock, and importation. The actualization of RCEF, buffer stock increase, and the development of plans to enhance agricultural sustainability are recommended.

Keywords: agricultural and natural resource economics, rice tariffication law, rice sector, rice supply, interrupted time-series, ARIMA, Philippines

1.0 Introduction

After losing its self-sufficient status in rice, its main staple, the Philippines became a net rice importer and has failed to regain self-sufficiency since. Quantitative restrictions (QRs) were employed to protect local farmers from the negative impacts of importing rice, allowing rice to be imported only under a minimum access volume (MAV), with the National Food Authority (NFA) put solely in charge of importation and price stabilization. With the depletion of NFA rice stocks, the Rice Tariffication Law was enacted in response to the surging inflation of rice price during the final quarter of 2018 (Tobias, 2019). Quantitative restrictions on rice were replaced with tariffs, which allowed for more importation through the Rice Tariffication Law (RTL), which sought to keep rice supplies high and prices low while still protecting local farmers (Department of Agriculture, 2019; Tobias, 2019). RTL's struggle in balancing lower rice prices for consumers and high profits for farmers has consistently raised the question, "Does the RTL generate a net benefit or loss to the Philippine Rice Sector?", and continues to do so as President Marcos Jr. has recently asked for a reassessment of RTL (De Vera, 2022). To address the question, this study will explore the impact of RTL on rice supply on the different sectors of the Philippines. This study has three objectives: (1) to visualize trends in supply before and after RTL within each sector and in total, (2) to forecast supply values assuming RTL was not implemented and compare the predicted values with the observed within each sector and in total, and (3) to analyze the results and

provide recommendations to improve the state of Philippine rice supply. The accomplishment of these objectives will benefit three stakeholders: (i) policymakers in the assessment of an intervention for depleting rice supply's effectiveness in solving the problem, (ii) sector employees in the awareness of where their sector is trending towards in terms of rice supply with recommendations to amend issues, and (iii) other researchers in their synthesizing of this study's results to others relating to agriculture, government interventions, and economics.

The Rice Tariffication Law, was implemented to liberalize the rice industry, can impact the availability and prices of rice, a staple food for many low-income families. Government programs aimed at assisting the less privileged (Geniston et al., 2015) could be influenced by the changes in rice prices and availability resulting from implementing this law. Many studies have since attempted to answer this question on various impacts of the RTL, such as on supply, import, production, price, welfare, and distribution by utilizing surveys, partial equilibrium models, econometric models, linear regression, K-means clustering, and authors' calculations (Balié & Valera, 2020a ; Balié et al., 2021; Briones, 2021; Calicdan et al., 2020; Casinillo, 2020; Casinillo, 2022; Estadilla, 2022; Vertudes et al., 2020). Various angles on the positive and negative impacts of RTL have been explored by prior studies. On the positive side, Balié and Valera (2020a) found higher imports and lower prices of rice post-RTL. Calicdan et al. (2020) determined that the effects of RTL on production, satisfaction, and government budgets on rice were all both directly proportional and low. Balié et al. (2021) discovered that because of lower rice prices, RTL reduced poverty at the expense of farmers. Estadilla (2022) agrees with these results, adding that despite the loss in production, rice supply is improved due to imports and lower prices, and shows that RTL gives a net benefit to society. Other studies, however, show negative results. Casinillo (2020) and Vertudes et al. (2020) both used a cross-sectional research design which exposed the dissatisfaction of farmers on the effects of RTL, and Casinillo (2022) built on his previous result to suggest that the majority of farmers are low-profit and low-happiness post-RTL. Briones (2021) found lower rice prices but proposed that these cause an increase in poverty, contrary to Balié et al. (2021), making it beneficial for consumers but harmful for farmers, consistent with Balié et al. (2021). The literature is strong in that they are all data-based and facilitated by those with expertise, but they need to be more in-depth and lack the timeliness of the data used.

There are four main gaps in the existing literature, namely, (a) the absence of analysis on supply trends as a result of RTL, (b) the neglect to consider the sectors within the Philippine Rice Sector, (c) the lack of studies utilizing time-series data post-RTL, and (d) the failure to account for autocorrelation, possible non-stationarity, and seasonality in data. Most studies did not use data after the implementation of RTL after 2019, which disabled them from analyzing trends post-RTL. Some also chose a small locale, such as certain provinces and the rice sector as a whole rather than the whole country and each sector, which limited the potential for the results to be holistically analyzed. No study has used ARIMA models, which is unusual given the autocorrelation and seasonality in rice data. These weaknesses likely led to the results being equivocal. This study, then, is necessary to close all unanswered questions from previous studies particularly on the supply trend effects of RTL.

The null hypothesis is that the supply trend has not changed due to the failure of RTL to impact the factors of rice supply, which will be discussed in the conceptual framework, and the alternative hypothesis is that the supply trend has changed either due to the effectiveness of RTL to influence the factors. Recommendations will then be made to improve the explored situation on rice supply

trends. In summary, this paper seeks to evaluate the effectiveness of RTL in terms of Philippine rice supply trends for the benefit of policymakers, sector employees, and other researchers. Related literature will be reviewed before the methods used will be enumerated, the results shown and discussed, recommendations will be made and the paper concluded. The thesis statement is as follows: "The Rice Tariffication Law has impacted Philippine rice supply among its different sectors."

Conceptual Framework

This study's conceptual framework is drawn from Cororaton (2004) which shows three major components that affect the Philippine rice supply, namely, local production from farmers, buffer stock kept by the NFA, and imports especially from Thailand and Vietnam. These factors are integral to the research question because the RTL affects all three factors, which in turn impacts the trend of rice supply among the different sectors.

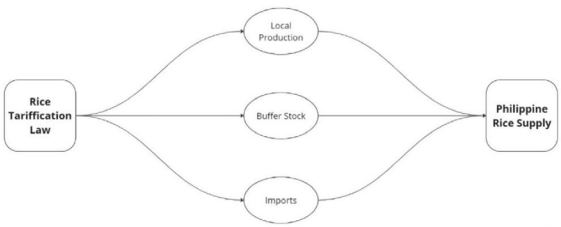

Figure 1. *Conceptual Framework*

Literature Review

Rice Tariffication Law. Signed into law by President Duterte on February 14, 2019, the Rice Tariffication Law amends the Agricultural Tariffication Act of 1996 by replacing its quantitative restrictions on rice with tariffs (Philippine Rice Research Institute, 2019). A greater rice supply is the expected outcome due to increased importation without the limitations set by QRs, which would then lead to lower rice prices. Some other key provisions of the law include the creation of the Rice Competitiveness Enhancement Fund (RCEF), the transfer of the regulatory function of the NFA to the Bureau of Plant Industry (BPI), and the provision of a Special Rice Safeguard (Tobias, 2019). RTL was created as an intervention to the surging inflation of rice price on 2018, rising by 13% from the past year, after the shortage of NFA rice. Even though the NFA commissioned the import of 500 thousand metric tons in early 2018, this was reduced to two days' worth which indicated a rice crisis in the country (Neo, 2018). As the NFA is required to maintain a 15-day stock at any given time, the rice crisis, along with soaring prices and weevil infestations, required an intervention in the form of RTL (Evangelista, 2018). However, a side effect of RTL would be that local farmers would have to compete with the low prices of imported rice. Hence, RTL mandates the RCEF as a fund to support farmers in machineries, development, credit, and education using tariff revenues. With its own pros and cons, the RTL has always been controversial, with some groups expressing support and others, such as the Federation of Free Farmers (FFF), calling for amendments on the law (Briones, 2021).

Philippine Rice Sector. The sector is divided into three sectors whose rice stocks the Philippine Statistics Authority (PSA) keeps inventory of, namely, household, commercial, and the NFA. The household sector includes farming and non-farming households, while the commercial sector includes registered grains businessmen monitored by the NFA (Philippine Statistics Authority, 2016). The NFA sector has a special role to stabilize rice prices by buying high from small farmers, selling low, and exercising its monopolistic right, pre-RTL, to import rice to fill supply gaps (Department of Agriculture, 2019). This distinction means that the NFA sector keeps cheaper rice compared to the commercial sector.

Supply Effects. Estadilla (2022) used partial equilibrium analysis to study how the RTL affects domestic rice supply. It found that the total domestic rice supply will substantially increase

post-RTL due to importation, despite a reduction in production.

Import Effects: Balié and Valera (2020a) used partial equilibrium models to test the impacts of RTL on imports, and its simulation results suggested that the RTL would increase imports by 20.7% in 2019.

Production Effects. Estadilla (2022) found a huge reduction in domestic rice production in the short and long-term due to lack of producer protection. Calicdan et al. (2020) in their time series analysis on RTL from 1992-2019 production, price, and budget data discovered that government budget has a positive effect on rice production.

Price Effects. Estadilla (2022), Balié et al. (2021), Briones (2021), and Balié and Valera (2020a) all found a reduction in rice prices as a result of RRL, though the latter also found a slight increase in world and Southeast Asian rice markets.

Welfare Effects. Estadilla (2022) and Balié et al. (2021) concluded that net societal welfare is improved overall due to lower rice prices at the expense of producers. Calicdan et al. (2020) found that there is a positive relationship between farmers' profit and happiness and both were relatively low due to RTL, while Casinillo (2020), Vertudes et al. (2020), and Casinillo (2022) found low satisfaction rates among farmers from RTL, with the former two using surveys and the latter using regression modelling and K-means clustering.

Distribution Effects. Balié and Valera (2020a) discovered a fall in total inflation and poverty, but contrary to this, Briones (2021) found that the lower price of rice slightly increases poverty. Balié et al. (2021) concluded that RTL is beneficial for consumers but harmful for farmers.

Gaps. There are four main gaps in the existing literature. First, there is no analysis of how RTL affects the trend of the Philippine rice supply, which is the immediate problem for which the policy was made. Second, no study has considered the supply in the three sectors composing the Philippine Rice Sector, which renders current studies on rice supply incomplete. Third, no study has used the time series data on Philippine rice supply after 2019, which would've given a more holistic evaluation of RTL after it was implemented. Fourth, no study has utilized an ARIMA model for RTL, which means that previous studies failed to account for the autocorrelation, possible non-stationarity, and seasonality present in time-series data on rice supply, if used at all. The study will explore the impact of RTL on rice supply in the different sectors of the Philippines in an interrupted time-series analysis approach, using time-series data from 2011 to 2020 and fitting them to ARIMA models for forecasting to address these gaps.

2.0 Methods

Research Design

This study will utilize a quasi-experimental, interrupted time-series research design as it seeks to evaluate an intervention and demonstrate causality without randomization. Monthly rice supply data on the household, commercial, and NFA sectors and total rice supply from 2011-2020 will be used so as to identify trends pre-RTL and post-RTL. The dataset used is titled "Rice and Corn: Monthly Total Stocks Inventory by Sector," retrieved from OpenStat PSA. The training data will comprise the pre-RTL data, which will be fed to the Autoregressive Integrated Moving Average (ARIMA) models that will create forecasts for the post-RTL months. The control group, which is the forecasted data assuming the absence of intervention, and the experimental group, which is the observed data with the presence of RTL, will be compared to discover the impacts of RTL on their moving averages or trends, according to the presented hypotheses, for each category. The results will then be analyzed using the hypothesis analysis technique. Monthly data from 2011-2020 is used as the intervention was implemented in March 2019, which allows about a 5:1 split of data points between the pre-RTL period (Jan 2011-Mar

2019) and post-RTL period (Mar 2019-Dec 2020). Though lockdowns due to the COVID-19 pandemic started in the Philippines in March 2020, these had little to no impact on the total rice supply, at least in the short term (Balié & Valera, 2020b). Any possible effects caused by lockdowns on sectors will be explicitly mentioned in the discussion of results, which stand as sufficient post-RTL; pre-lockdown data is forecasted. Hence, there will be a total of 480 samples, evenly distributed, with 120 samples for each of the four categories: household sector, commercial sector, NFA sector, and total rice supply. The data for the first three categories is stored in individual XLSX files, while the latter is calculated by the sum of each value in the former categories to avoid errors.

Data Analysis and Arima Model

In Google Colaboratory, a Web Integrated Development Environment (Web IDE) for Python, the data is loaded using Pandas and visualized using Matplotlib. The moving averages with a window of 12 are also calculated using Pandas to visualize trends. ARIMA models are used for forecasting values in each category as they consider autocorrelation, non-stationarity, and seasonality common in rice supply data which improve the accuracy of forecasts and reduce bias, unlike other models that fail to consider the short and long-term trends (Schaffer et al., 2021).

The seasonal ARIMA takes on the form $((p, d, q) \times (P, D, Q)S)$. The lowercase letters represents non-seasonal data, as p is the autocorrelation order, d is the differencing order for stationarity, and q is the moving average order, while the uppercase letters represent their seasonal counterparts. S is the time span of seasonal trend, which is set to 12 in this study as the model is fitted with monthly.

- p: The number of lag observations included in the model (lag order of autoregressive part) for the non-seasonal component.
- d: The number of times that the raw observations are differenced (degree of differencing) for the non-seasonal component.
- q: The size of the moving average window (order of moving average part) for the non-seasonal component.

And for the seasonal component:

- P: The number of lag observations included in the model (lag order of autoregressive part) for the seasonal component.
- D: The number of times that the raw observations are differenced (degree of differencing) for the seasonal component.
- Q: The size of the moving average window (order of moving average part) for the seasonal component.
- S: The number of time steps in each season.

The differencing order is 0 if the data is stationary and 1 if it is not, which is determined by submitting the data to an Augmented Dickey-Fuller Test (ADF Test) from Pmdarima. Pmdarima's auto_arima method is fitted with the training data and utilizes hyperparameter tuning techniques to find the optimal values for the other parameters. The identified parameters are then used for the tuned model, which predicts the values for dates not covered by the training data. The predicted data and their moving averages are also determined and compared with the observed data to assess the effects of RTL on rice supply. P-value hypothesis testing is used with a set confidence level of 95% to discuss the results.

3.0 Results and Discussion

Table 1 shows the values calculated for ARIMA Model Fitting and the mean difference from forecasting. The Boolean values on the second column describe the stationarity of data. Since the household data is non-stationary, its d-value in the fit model is 1. The other parameters in the fit model column other than seasonal trend time span were determined by Pmdarima's Auto ARIMA. The values on the mean difference column were

calculated by subtracting all forecasted data from all corresponding observed data and taking the mean, thus defining either the average increase (for positive values) or the average decrease (for negative values) of rice stock because of RTL. The *p*-value between the observed and forecasted samples determines the statistical significance of the results and will be used in hypothesis testing.

Table 2 includes selected *p*-values from the summary of each model for evaluation. Each test a different assumption of the model, and the *p*-value would need to be less than or equal to 0.05 to reject the null hypothesis of the test. For all models, the L1 *p*-value is less than 0.05, which means that all terms are statistically significant, which meets an assumption. The Ljung-Box test determines whether the residuals are independent and that the errors are white noise. Since all models have a LB p-value of above 0.05, the null is accepted and the residuals are independent for all models, meeting an assumption. Heteroscedasticity checks whether the error residuals have the same variance using White's test. For the model on the household sector, the null is accepted and this fulfills an assumption. However, for the other two models, the null is rejected which means that the residuals show variance and signifies irregularities in forecasting. The Jarque-Bera test examines whether the errors are normally distributed. The model for the household sector fulfills the assumption, but the other models do not as their errors are not normally distributed. Overall, since all terms in all models are statistically significant and the errors are white noise, the ARIMA models generally fit the assumptions needed for sound forecasting.

Table 1. *ARIMA Model Fitting and Results*

Sector	ADF Test	Fit Model	Mean Diff.	*p*-value
Household	0.01, False	(0,1,2)(0,1,1)12	26.0778	0.4255
Commercial	0.24, True	(1,0,0)(0,1,1)12	-111.5917	0.0079
NFA	0.33, True	(2,0,0)(4,1,0)12	78.9756	0.0069
Total	N/A	N/A	-6.5383	0.9941

Note: Mean Difference is in thousand metric tons

Table 2. *Summary of ARIMA Model per sector*

Sector*p*-value	L1	Ljung-Box test	Heteroskedasticity	Jarque-Bera test
Household	0.00	0.79	0.93	0.40
Commercial	0.00	0.97	0.00	0.00
NFA	0.00	0.51	0.01	0.00

Figure 2 visualizes the time-series data of rice supply, forecasted rice supply, and their respective moving 12-month averages. Considered by ARIMA in forecasting, seasonality patterns can be observed in the data for all sectors except the NFA, which maintains the rice buffer stock (Carpio, 2020). Rice supply peaks at May and November and dips at March and September, both coinciding with rice harvest during the respective dry and wet seasons (Gutierrez et al., 2019). A visual inspection of the figure also shows that rice stock trends post-RTL remains more or less unchanged for the household sector and the Philippine rice sector as a whole. However, commercial rice stock clearly appears to be trending downward post-RTL, while NFA rice stock also clearly appears to be trending upward.

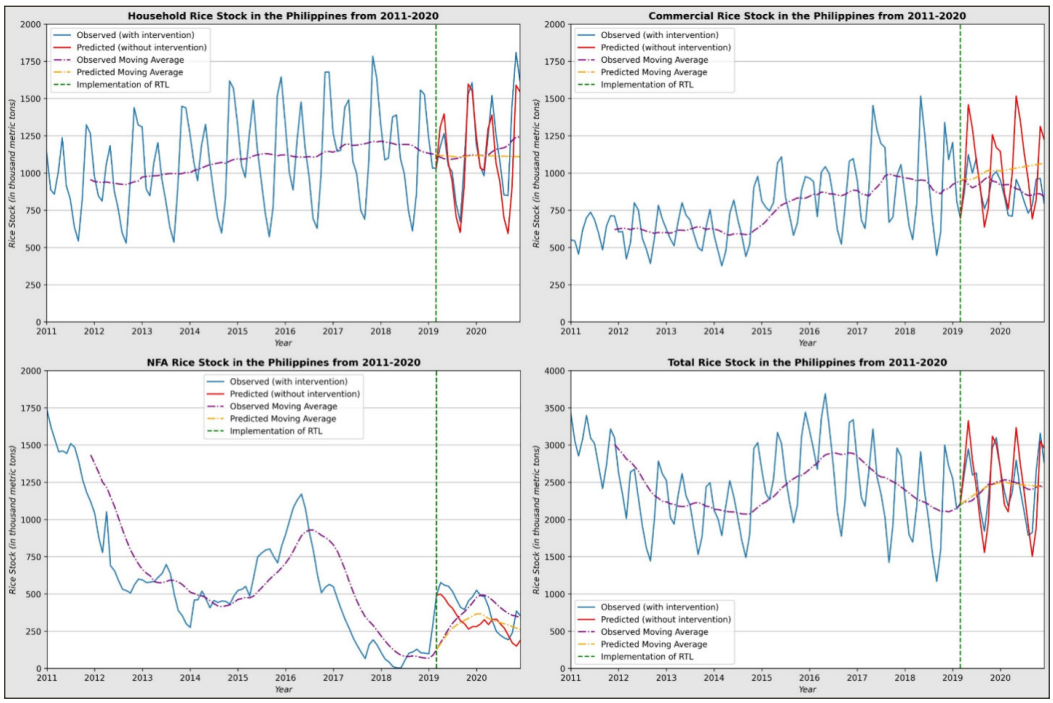

Figure 2. *Monthly Time Series of Rice Supply Data and Forecasts for the Household, Commercial, and NFA Sectors and Total Rice Stock*

Household Sector. The mean difference of 26 thousand metric tons may suggest that RTL has caused an upward trend on household rice stock, but this is amended by a visual inspection of the figure. The difference in rice stock is generally negligible, only beginning to increase gradually in March 2020, when lockdowns begun due to the COVID-19 pandemic. From that point, both rice panic buying and rice subsidies have impacted household supply (Balié & Valera, 2020b; Gudmalin et al., 2021), meaning the subsequent increase is likely not because of RTL. This is verified by taking the mean difference of household rice supply post-RTL and pre-lockdowns, equating to only -6.327635583333335 thousand metric tons. This result is not unusual because households will always demand rice regardless of economic policies, and it is in fact the other sectors that adjust their rice supply for the households' needs. The RTL, which impacts local production, buffer stock, and imports, according to the conceptual framework, does not change the needs of Filipino households. Having a p-value of 0.4255, the forecast for the household sector exceeds the 0.05 alpha and is not statistically significant.

Commercial Sector. With a mean difference of -112 thousand metric tons and verified by visual inspection, the RTL's negative impact on rice supply is most salient in the commercial sector. Without RTL, the forecasted data showed an upward trend, which is contrary to the downward trend shown by the observed data. Since the downward trend of observed data has been consisted before and during COVID-19 lockdowns, the latter does not affect these results. A possible explanation for this downward trend is that, even though the commercial sector can exclusively import rice under RTL, this also means that a percentage of their stocks depend more on imports, which are negatively affected when suppliers do not or cannot

export which is likely because the international rice market only has five significant rice-exporting countries (Carpio, 2020; Clarete, 2018). Another explanation would be the reduction in local production (Estadilla, 2022). Both explanations are consistent with the conceptual framework as local production and imports are impacted by RTL, leading to the change in commercial rice supply trends. Having a p-value of 0.0069, the forecast for the commercial sector falls below the 0.05 alpha and is statistically significant. Thus, in the case of the commercial sector, the alternative hypothesis is proven.

NFA Sector. With a mean difference of 79 thousand metric tons, which was also verified by visual inspection, the RTL's positive impact on rice supply is clear in the NFA sector. A downward trend in NFA rice supply was forecasted assuming the absence of RTL, which would've repeated the 2018 rice shortage and inflation. Since the observed upward trend is consistent before and during COVID-19 lockdowns, the latter also does not affect the results. This change to an upward trend can be explained due to RTL's provision in maintaining only the NFA's emergency buffer-stocking mandate which can only be sourced from local farmers (Carpio, 2020; De Vera, 2022), which makes it less prone to supply shocks pre-RTL even if there is a decrease in local production and an increase in imports (Balié & Valera, 2020a). With a p-value of 0.0079, the forecast for the NFA sector falls below the 0.05 alpha and is statistically significant. Thus, in the case of the NFA sector, the alternative hypothesis is proven.

Total Rice Stock. The mean difference of -7 thousand metric tons suggests that the RTL has not caused a significant change in total rice supply trends. Referring to the previous discussions and the conceptual framework, this lack of trend change is caused by the definite decrease in production being balanced out by the increase in buffer stock and stabilized by an indefinite increase of imports. The stabilization effect caused by an interplay between the three sectors can also be observed in the figure, as the post-RTL data oscillate on closer moving averages compared to the pre-RTL data whose moving averages shift up or down over time. However, in the perspective of the total rice stock, the null hypothesis is proven due to having a p-value of 0.9941, which exceeds the 0.05 alpha and proves that the forecast is not statistically significant.

In general, this study has three key findings: (1) that the Rice Tariffication Law has no significant impact to Philippine household rice supply and total rice supply, (2) that the Rice Tariffication Law has negatively impacted Philippine commercial rice supply, and (3) that the Rice Tariffication Law has positively impacted Philippine NFA rice supply.

The Rice Tariffication Law has no significant impact on the Philippine household rice supply and total rice supply. The null hypothesis is proven for both sectors, which is likely due to the constant demand within Filipino households for rice that is unaffected by the law or its effects, as well as an interplay within the different factors which balance out the total rice supply. This finding disproves the projection from Estadilla (2022) that total rice supply and domestic consumption would substantially increase post-RTL but supports the finding that there is an increase in imports and a decrease in production, both of which subsequently result in the RTL having little to no impact on total rice supply. With regards to the conceptual framework, it has shown that the RTL has not influenced the factors of supply and so it has not influenced supply. Furthermore, the study also exposes the apparent seasonality in rice supply data for both sectors.

The Rice Tariffication Law has negatively impacted the commercial rice supply in the Philippines. The alternative hypothesis is proven for

the commercial rice supply, with a negative mean difference signifying that rice supply has generally and significantly decreased. This finding does not contradict Balié and Valera (2020a) which suggested that the RTL would increase imports, but rather suggests that the reduction in rice production (Estadilla, 2022) and price (Balié & Valera, 2020a; Balié et. al, 2021; Briones, 2021; Estadilla, 2022) outweigh the impact of imports in influencing rice supply in the commercial sector. If such is the effect observed, it would further support the findings of related literature on welfare and distribution, specifically on how lower rice prices improve net social welfare and decrease poverty at the expense of producers (Balié & Valera, 2020a; Balié et. al, 2021; Estadilla, 2022), due to the masses having better access to more, imported rice. However, this neither proves nor disproves the finding that profit, happiness, and satisfaction of farmers were negatively affected by RTL (Calicdan et al., 2020; Casinillo, 2020; Vertudes et. al, 2020) as this would depend on how much rice in the commercial sector is bought from local farmers, which is information that goes beyond the scope of this study. With regards to the conceptual framework, it has shown that the RTL has influenced imports and local production which then influences supply.

The Rice Tariffication Law has positively impacted Philippine NFA rice supply. The alternative hypothesis is proven for the NFA rice supply, with a positive mean difference signifying that rice supply has generally and significantly increased. Aside from the reduction of prices as stated by the related literature, this finding introduces a new positive impact on price, which is the stabilization of NFA rice supply. Since NFA rice has become less prone to supply shocks, prices have also become unlikely to spike, supporting the related literature on the RTL's positive impacts on welfare and distribution. On their negative impacts, this finding slightly contradicts them because it suggests that local farmers have been receiving more patronage due to RTL, at least in the NFA sector, due to an increase in NFA rice supply that may be sourced only from them. With regards to the conceptual framework, it has shown that the RTL has influenced buffer stock, which then influences supply.

4.0 Conclusion

Since its implementation in March 2019, the Rice Tariffication Law has been a contentious issue with policymakers, consumers, farmers, and other stakeholders discussing its various impacts. Years have been spent in quantitative and qualitative researches that help evaluate the policy, with equivocal results. In an effort to give a more definitive answer and a holistic discussion to the issue of rice supply, this study analyzes Philippine sector rice supply trends using ARIMA models in a quasi-experimental interrupted time-series research design with monthly rice supply data from 2011-2020. The control group is the observed data while the experimental group is the forecasted data. The null hypothesis is that RTL has not impacted the supply trend while the alternative hypothesis is that the RTL has impacted the supply trend. The results show that the null hypothesis is proven for the household sector and the total rice supply, while the alternative hypothesis is proven for the commercial and NFA sectors, whose trends have shifted downward and upward, respectively. The thesis statement, "The Rice Tariffication Law has impacted Philippine rice supply among its different sectors," is proven, that even when the household and total rice supply trends appear to be unaffected, there is a noticeable change in trends among the commercial and NFA sectors and an apparent stabilization in the total rice supply data. The study, then, uncovers the intricacies of the RTL's effect on rice supply, which is that it has changed the dynamics of supply among the sectors rather than the rice sector as a whole to fix

the problems it has encountered pre-RTL. Because it has removed the commercial and regulatory functions of the NFA in favor of its buffer-stocking function (De Vera, 2022), it has since avoided running out of rice supply and is able to balance out losses in production and/or imports. Because of its rice importation, the commercial sector has seen a downward trend of supply post-RTL, though it has also seen lower prices of rice (Balié & Valera, 2020a; Balié et al., 2021; Briones, 2021; Estadilla, 2022). Given these results, the paper concludes that the RTL produces a net benefit to the Philippine rice supply trends.

Recommendation

More can still be done to improve the state of Philippine rice supply now and in the long run. First, the RCEF provision of the RTL, which consists of rice farm mechanization, rice seed development and propagation, rice credit assistance, and opportunities for on-farm diversification (Balié et al., 2021), should be actualized for farmers all over the country to greatly improve production. Second, buffer stock should still be increased beyond 30 days' worth as in March 2020, the buffer stock still went low to 14 days' worth even after RTL (Carpio, 2020). Third, the country's dependence on rice imports needs to be decreased over time to reduce shocks in the commercial sector. The Rice Industry Road Map of the RTL, which currently only includes assistance for small farmers (Tobias, 2019), should be amended to include a road map to gradual self-sufficiency. Moreover, further research can be done on time-series data from other impacts of RTL and qualitative research can also be made from the results of this study. The study's discoveries on the rice supply trend changes for the commercial and NFA sectors may have a variety of reasons, but one thing is certain – that the Rice Tariffication Law has indeed impacted the supply trends and in turn, has reduced the Philippines' propensity to experience rice shortages.

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