Extended Abstract
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Paper/Poster Title	An analysis of the price margin of the rice market in Indonesia

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Abstract	*200 words max*

The Indonesian rice market has the characteristics of imperfect competition since we are considering a differentiated commodity and an oligopolistic market structure along the supply chain from farm to retail, as well as intervention by the state run *Bulogs*. We propose an empirical framework to examine the dynamics of the wedge created between retail and farm prices, known as the price margin. Following past studies, if retail prices respond more rapidly and fully to a farm price increase than to a farm price decrease then the asymmetry is 'positive', whereas if retail prices respond more rapidly and fully to a farm price decrease than to a farm price increase then the asymmetry is 'negative'. This paper contributes in two ways. First, we determine whether this price margin within and across different rice qualities (e,g, superior, medium and low quality), is stable or not. Secondly, if the margins are stable in the long run, we proceed to examine whether positive and negative asymmetry exists due to market imperfections. Our results show that the price margin is stable, and asymmetry does exist. The empirics lend support that intervention by *Bulogs* and market power are present in the vertical price chain.

Keywords	Price Margin, Momentum Threshold Autoregressive Model, Price Adjustment, Rice Quality, Imperfect Competition
JEL Code	C22; Q02; Q13 see: www.aeaweb.org/jel/guide/jel.php?class=Q)

Introduction	*100 – 250 words*

In this paper, we analyse the marketing margin (the difference between retail and farm prices) which can contract or expand, as prices change along the vertical supply chain. Farm and retail prices do not increase by the same percentage as marketing costs are unlikely to increase proportionally as there are a vast array of costs included within this marketing margin. When food prices increase, marketing costs are likely to increase by smaller amounts and so marketing margins are unlikely to increase proportionately. Changes in farm prices can lead to a less or more than proportionate change in retail prices along the supply chain causing the marketing margin to expand or contract. Researchers define asymmetry being positive or negative. If retail prices respond more rapidly and fully to a farm price increase than to a farm price decrease then the asymmetry is 'positive', whereas if retail prices respond more rapidly and fully to a farm price decrease than to a farm price increase then the asymmetry is 'negative'. We determine whether this price margin formed by the wedge created between retail and farm prices within the same rice quality as well as different rice qualities, is stable or not. Secondly, if the margins are stable in the long run, we proceed to examine whether

positive and negative asymmetry exists due to market imperfections based on oligopolistic market structures.

Methodology — *100 – 250 words*

To answer the two empirical questions, we adopt a procedure to estimate the dynamics of the price margin by employing the momentum threshold autoregressive (M-TAR) model. The model can be written as:

$$\Delta Z_t = I_t \gamma_1 Z_{t-1} + (1 - I_t)\gamma_2 Z_{t-1} + \sum_{i=1}^{p} \phi_i \Delta Z_{t-i} + \omega_t \tag{1}$$

$$I_t = \begin{cases} 1 \text{ if } \Delta Z_{t-1} \geq \tau \\ 0 \text{ if } \Delta Z_{t-1} < \tau \end{cases} \tag{2}$$

where Z_t is the de-meaned margin $(P_t^R - P_t^F)$ and τ is the threshold. If we find $|\gamma_1| > |\gamma_2|$, that implies we find little adjustment for $\Delta Z_{t-1} < \tau$ but substantial decay for $\Delta Z_{t-1} \geq \tau$. During the phase where $\Delta Z_{t-1} < 0$, or when $\Delta P_t^R < \Delta P_t^F$, then a deviation in the margin is created, and this deviation tends to be corrected relatively slowly, in comparison to the phase where a deviation arising from $\Delta P_t^R > \Delta P_t^F$ which is corrected at a relatively faster rate. Alternatively, if $|\gamma_1| < |\gamma_2|$; then the change in margin due to $\Delta P_t^R < \Delta P_t^F$ tends to dissipate at a faster rate compared to the phase where $\Delta P_t^R > \Delta P_t^F$. The null of a permanent deviation in the rice price margin is given by the following testable hypothesis, that is, $H_0: (\gamma_1 = \gamma_2 = 0)$, against the alternative H_A: $\gamma_1 < 0$ and/or $\gamma_2 < 0$. Under the alternative hypothesis there is a stable margin in at least one regime. Rejection of the null implies that the margin is stable, which addresses the first question that we raise. If the margin is stationary in either or both regimes, then we can test for both forms of positive and negative asymmetry, which addresses the second question. To this end we set up the null, $H_0: (\gamma_1 = \gamma_2)$, using the F statistic. Rejecting the null implies that the adjustment to any deviation is asymmetric.

Results — *100 – 250 words*

In the case of the retail–farm price margin we find that there is overall evidence of positive asymmetry. In each of the rice qualities (whether it be low, medium or superior), we find that when an increase (decrease) in retail prices is greater (less) than an increase (decrease) in farm prices, or in other words, $\Delta P_t^R > \Delta P_t^F$, causing the margin to increase, then this increased margin is gradually corrected over time. In contrast if there is negative asymmetry, then both the superior and medium quality rice prices do not adjust to correct the deviation in the margin (that is, the deviation is allowed to persist). This implies that under negative asymmetry, when a decrease (increase) in retail prices is less (greater) than a decrease (increase) in farm prices, or when $\Delta P_t^R < \Delta P_t^F$, so that the margin is decreasing, then this is not corrected (for medium and superior quality rice) or corrected at a slower rate (for low quality rice). The impulse response analysis shows that if an exogenous shock leads to a positive shock in the margin, so that retail prices change by a significantly larger proportion in comparison to farm prices, then the margin will adjust relatively quickly in comparison to a negative shock, which leads to retail prices falling by much less in comparison to farm prices. In this latter case, we find that the shock is permanent for medium quality rice.

Discussion and Conclusion	*100 – 250 words*

Our results reveal that the price margin is stable which delivers a more powerful test and slightly different conclusion if we allowed erroneously for only symmetric adjustment. If the margin, which comprises the cost of storage and transportation costs from farm to retail outlets, is compressed or stretched, equilibrating forces come in to play that restore the margin to its equilibrium level. If retail prices increase faster than farm prices, where a threshold is exceeded, then the *Bulogs* intervene by releasing rice stocks, thereby applying brakes on any further deviation of the price margin. If the farm prices fall by more than the retail prices, where a threshold is exceeded, the *Bulogs* intervene by purchasing rice from farmers and therefore prevent any further deviation in the margin. We show that the intervention by *Bulogs* has been effective by causing the margin to be stable. If the margin is squeezed as a result of farm prices increasing where farmers are better off selling their rice to private traders that may be higher than the intervention price, the costs of storage and transportation will cause retail prices to increase thereby bringing the margin back to its long run equilibrium level. We conclude that farmers have been able to exploit the opportunity to sell their rice to private sellers if they can obtain a higher price than *Bulogs*. We note that this adjustment takes place irrespective of whether we consider the margin within each quality of rice or across different qualities of rice.