III THEORETICAL BACKGROUND

3.1 Price Volatility and Price Stabilization Policy

Price volatility explains the variance of data compared to their mean. The price volatilities of food commodity are really important, especially for rice which facing inelastic demand in the market. Price volatility will influence economic and welfare of the society (Bustaman 2003). When rice prices increase, the composition of public expenditure on rice will increase. These impacts are the reduction of revenue allocation for the other needs such as education and health. If the rice prices increase continuously and volatile, the more onerous burden for society which can reduce the welfare of society including farmers as the net consumer of rice.

In the Indonesian market, the standard of food volatilities determined by Government Regulation about Food Security No. 68 Year 2002 and Regulation of the Minister of Trade No. 22/M-DAG/PER/10/2005. These explain that high price volatility or unstable price for staple food is when the increases of rice price higher than 25% of normal price in a week.

Price stabilization on food can enhance economic growth and food security (Timmer 1996; Timmer 2004; and Dawe 2011). The advantages of price stabilization are that it can reduce the level of risk faced by producer and stimulates farmers to invest more to produce rice and raise productivity, meanwhile for consumer can get benefit from stable price and can alleviate poverty. These notions assumed that rice price transmitted completely from consumer to producer.

The price stabilization mechanism and its consequences are explained by simple Marshalian theory from Waugh-Oi-Massell in Newbery and Stiglitz (1981) (Istiqomah 2006). This theory assumes that the supply and demand are linear in the market and will response instantaneously when there is change of supply or demand, and additive stochastic disturbances. The changes of price equilibrium in the market due to supply or demand changes in the short-run will cause price volatility. The price stabilization is aimed to dampen the unstable prices and lead
the prices to the mean of its prices. The mechanism of price stabilization from Marshalian Theory is depicted as follow:

![Figure 6](image)

The figure above depicts for the decreased supply in the market. The decreased supply can be caused by bad weather, crop failure, drought, lean season, etc. With assumption of constant demand, when supply into market decreases, equilibrium price will rise (supply shifts from $S_1$ to $S_2$, price follows to shift from $P_1$ to $P_2$). The price stabilization attempts to stabilize price at its mean, $\bar{P}$, without change in average supply. The impact of price stabilization can be explained by the changes of consumer surplus and producer surplus.

The government of Indonesia has imposed price stabilization through i) determine floor price or ceiling price in the market and ii) inject additional supply or demand into market with determined government purchasing price. The first policy is used by the government of Indonesia in the New Order period in 1967-1998, whereas the second policy is imposed in the new regime after reformation period, since 2005 until now (Kusumaningrum 2008). The mechanisms of price stabilization of these methods are depicted bellow:
Figure 7  The enforcement of floor price to stabilize price in the market
Source: Kusumaningrum  2008

Figure 7 explains that when supply increases from $S_1$ to $S_2$, then the price decreases from $P_1$ to $P_2$, the government imposes the floor price as the minimum price which is allowed. The consequence of this policy is that the government has to purchase rice as much as the excess supply/surplus ($Q_S^* - Q_D^*$) with the determined floor price in the market. In this case, government guarantee that the price in the market will not being lower than the floor price.

Figure 8  The enforcement of government purchasing price to stabilize price in the market
Source: Kusumaningrum  2008
Figure 8 explains how the government purchasing price by Bulog works to stabilize price in the market. The government effort to stabilize price through inject additional demand into market with determined price, determined characteristics and depends on the capability of Bulog to purchase for stocks. Government has had a percentage of purchase equal to 8 percent of all the existing supply in the main harvest time. With the proportion of 8 percent, the government easier in budgeting, planning, and budget calculation. There is no guarantee for price in the market for the case of government purchasing price. The rice price equilibrium depends on the supply and demand in the market. The government purchasing price takes a role just as referenced price for market.

3.2 Price Transmission and Market Integration

Price transmission and market integration topic has been growing to be the important issue in agricultural market policy. This issue becomes one of considerations for decision making process in agricultural market policy due to its advantages to give insight about the effect of its implementation for the economic welfare. Price transmission parameter useful to indicate the direction, the magnitude and the distribution of benefit and the cost of trade policy implementation (Rapsomanikis et al. 2006)

There is no formal definition about price transmission. But there are some concepts required to determine the price transmission and market integration. The price transmission reflects the extent of market integration. Fackler and Goodwin (2001) defined two markets are integrated if shock in one market is transmitted to the other market. Specifically for illustration, goods X in market A is integrated with market B if shock in the market A for example the demand changes will influence the goods X price both in market A and market B. This indicates that goods X has long-run cointegration among market A and market B.

Barrett (2001) said that price transmission or market integration as the satisfaction of the Law of One Price (LOP). The LOP states that if trade occurs between two markets and all profitable arbitrage opportunities are eliminated, the prices of two markets are equalized up to the cost of commerce (Barrett 2001).
The LOP is supposed to regulate for spatial market integration, whereas for vertical market integration depends on production costs (Conforti 2004).

In addition, a basic concept, which is always used in spatial market integration analysis, is the Enke-Samuelson-Takayama-Judge model. This model postulates that price transmission is occurred when changes of price of one commodity in one market \( P_{1t} \) transmitted to the price in other market \( P_{2t} \) with reflected price plus transfer cost \( C \). Transfer cost in the spatial market context for example is transport cost, whereas in the vertical market is marketing margin (Brümmer et al. 2009). This postulate follows the Law of One Price postulate (LOP). The relationship between the prices is as follows:

\[
P_{1t} = P_{2t} + C
\]

There are three notions of price transmission concept, they are co-movement and completeness of adjustment, dynamic and speed of adjustment, and symmetry or asymmetry response adjustment (Rapsomanikis et al. 2006). Price transmission analysis can be used to check the degree of market efficiency, in terms both of them close to the competitive model (Barrett & Li 2002).

The degree of price transmission depends on some factors, these factors can disrupt or even omit the price transmission. They are transaction costs, transportation cost, market power, increasing return to scale in production, product homogeneity and differentiation, exchanges rates, border and domestic policies, market imperfection (Conforti 2004; Keats et al. 2010), market structure (Braun 2008), trade policies, marketing margin, and communication infrastructure (Rapsomanikis et al. 2006). The government policies can impede the price transmission through agricultural policy instrument such as import tariffs, tariff rate quota, export subsidies or taxes, and interventions mechanism. But government policies not always hinder price transmission and market integration, it depends on the nature of the policy instruments employed (Rapsomanikis et al. 2006).

Price transmission in the market chain is included into vertical price transmission. Vavra and Goodwin (2005) define vertical price transmission as
“the adjustment to price shocks along the chain from producer to wholesaler and to retail levels, and vice versa.” Price transmission analysis which involved the intermediate in the market chain can show how the successive price transmission of shock from the point of origin until the end of market chain. Imperfect pass-through among intermediate can impede the price transmission and the transferred benefit from consumer to producer, and vice versa. Vertical price transmission has important role to determine the effects of trade policy in the size and the distribution of welfare (Vavra & Goodwin 2005).

There is one characteristic of vertical price transmission which is often found in the market chain of food commodity, this is asymmetric price transmission. It emphasizes the different pace responses from price reduction and price increase (Vavra & Goodwin 2005). The price reduction of food commodity in farm is transferred through the market chain slowly and possibly not fully until consumer. Whilst, the price increase at farm level is transmitted quickly through market chain until consumer. The possibility causes of asymmetry price transmission are the present of many small intermediaries (Peltzman 2000), market concentration and market power (McCorriston & Sheldon 1996).

3.3 Operational Framework

The background of this study is the resilience of the Indonesian rice market faced the world rice price crisis in 2007/2008 and in 2010/2011. Beside the effect of good harvest in 2007, the stable price also comes from the enforcement of comprehensive policies by the government of Indonesia to maintain stable price in the consumer market. The phenomena raise a question how about the rice market chain performance in this period? The good condition in the consumer market should be transferred to the production market, so producers in the production point get the same benefit like consumers (the transferred benefit).

This study analyzes the relationships between producer price-rice miller price, producer price-wholesaler price, producer price-retailer price, rice miller price-wholesaler price, rice miller price-retailer price, and wholesaler price-retailers price. We analyze the market chain performance through price volatility analysis and price transmission analysis. Price volatility analysis uses standard
deviation of return and price transmission analysis uses Error Correction Model. From this study we supposed to get the insight about the market integration along Indonesian rice market chain, whether this is integrated or not. Then we analyze the possible related causes and analyze the effects of the government interventions into the price transmission performance. We can recommend the policy implication from this study relate to the rice policy and the price transmission in Indonesian rice market chain.
Figure 9  Operational framework of this study

- **Stable rice prices in Indonesian market**
- **Good harvest in 2007**
- **Market interventions**
- **Good harvest in 2007**
- **Indonesian rice market chain performance? (vertical market)**
- **Stable rice prices in Indonesian market 2010/11**
- **Price transmission analysis**
- **Price volatility analysis**
- **Policy implication**
- **Error Correction Model**
- **Standard deviation of return**

- **Rice miller**
- **Wholesaler**
- **Retailer**

- **Policy implication**
  - **rice prices crisis in the world market 2007/08 and 2010/11**