

POLITICAL ECONOMIC ANALYSIS OF RICE SELF-SUFFICIENCY IN INDONESIA

Analisis Ekonomi Politik Swasembada Beras di Indonesia

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ABSTRACT

Rice self-sufficiency is an important programme in Indonesia. The programme has four major targets, i.e. increasing production, stabilizing prices and reserve stocks, and minimizing import. For that purpose, the government gave a mandate to a parastatal, namely National Logistic Agency (Bulog) in implementing the rice policies. Some studies found that involvement of such a parastatal could lead to government failure in budget allocation. The study aimed to estimate social cost of rice self-sufficiency programme based on the implementation of rice instrument policies by Bulog. The study used the national annual data of 2002–2014 period. The method used was the political preference function model to estimate economic rent and dead-weight loss using rice price elasticity of demand and supply. The result showed that in terms of percentage of food security budget, the average of economic rent reached IDR 6.37 trillion per annum (18.54%), while the average of dead-weight loss amounted at IDR 0.90 trillion per annum (2.34%). It proved that rice self-sufficiency programme along with the involvement of Bulog was economically inefficient. The government should provide better agricultural infrastructure, review governmental procurement prices, and stop rice import policy to remedy market failure.

[**Keywords:** budget, policy, rice, self-sufficiency]

ABSTRAK

Program swasembada beras merupakan program penting di Indonesia. Program tersebut mempunyai empat target utama, yaitu peningkatan produksi, stabilisasi harga dan cadangan beras pemerintah, serta penghentian impor. Guna mencapai tujuan tersebut, pemerintah memberi mandat kepada badan usaha milik negara, yaitu Bulog untuk melaksanakan kebijakan perberasan. Banyak kajian menemukan bahwa keterlibatan badan usaha semacam Bulog dapat memicu kegagalan pemerintah dalam mengalokasikan pendanaan. Pengkajian ini bertujuan untuk mengestimasi biaya sosial dari program swasembada beras berdasarkan pelaksanaan instrumen kebijakan beras oleh Bulog. Data yang digunakan merupakan data tahunan pada tingkat nasional periode 2002–2014. Pengkajian menggunakan model fungsi preferensi politik untuk mengestimasi rente ekonomi dan kesejahteraan sosial yang hilang dengan menggunakan nilai elastisitas harga dari permintaan dan penawaran beras. Hasil kajian menunjukkan bahwa rata-rata rente ekonomi yang timbul mencapai Rp6,37 triliun per tahun atau 18,54% dari dana ketahanan pangan, sedangkan kesejahteraan sosial

yang hilang rata-rata Rp0,90 triliun per tahun atau 2,34% dari dana ketahanan pangan. Hal ini membuktikan bahwa program swasembada beras yang melibatkan Bulog dalam pelaksanaannya secara ekonomi tidak efisien. Pemerintah perlu menyediakan infrastruktur pertanian yang lebih baik, mengkaji ulang harga pembelian pemerintah, dan menghentikan impor beras guna meredam kegagalan pasar.

[**Kata kunci:** beras, dana, kebijakan, swasembada]

INTRODUCTION

Rice self-sufficiency policy is an important part of agricultural development programme in Indonesia (Baharsjah et al. 2014). Therefore, the government implements policy instruments to achieve self-sufficiency targets, i.e. to increase the national production, to stabilize the domestic prices and reserve stocks, and to minimize the import. For that reasons, the government intervenes the domestic rice market by implementing rice policy instruments. In addition, the government involves a parastatal, namely National Logistic Agency or Bulog to execute the rice policy instruments along with the implementation of rice-self sufficiency programme.

From the economic perspectives, self-sufficiency policy is inefficient (Barker and Hayami 1976), and being burden to the economy (Hutagaol 2017). The objective of such policy to increase rice production will imply on budget allocation. Therefore, some criticisms appeared assessing the programme. Involvement of Bulog in implementation of the rice policy instruments lead to the government failure, especially in budget allocation (Wambua et al. 2005; Zvavahera and Ndoda 2014) because operational activities of the parastatal is funded by the government (McCulloch and Timmer 2008). Hence, involvement of Bulog to accomplish the price stabilization and import policy received criticisms.

Bulog conducts buying and selling activities likewise the general rice traders, but Bulog uses the governmental prices. Moreover, Bulog manages the government reserve-stocks that come from domestic procurement and import of medium-quality rice. The general rice traders are not allowed to import medium-quality rice. Therefore, both instrument policies are concerned as privilege for Bulog because those are not given to the others. Such policy may trigger rent-seeking activities of the related one that have an impact on inefficiency of the programme and is concerned as the social cost of the policy. In addition, Bulog distributes rice for the poor (Raskin) as a subsidy to the poor family and this is concerned as the distribution activity. Moreover, during Susilo Bambang Yudhoyono administration, the distribution of Raskin tended to increase. Therefore, it is crucially necessary to investigate the effectiveness of the pro-poor policy.

Because of the reason above, the criticisms come regarding the inefficiency issue and rent-seeking activities in accordance with the implementation of rice self-sufficiency programme and involvement of Bulog in the programme. However, none of the criticisms come with quantitative data to prove their arguments. Many studies related to rice self-sufficiency programme have been conducted, but there was no empirical one that could provide quantitative data to support the criticisms on self-sufficiency programme and involvement of Bulog. A political economic study was then conducted to prove the criticisms. The study aimed to estimate social cost of rice self-sufficiency programme along with the implementation of price instrument policies and import policy by Bulog.

METHODOLOGY

Time, Location and Data Collection

This study was conducted in 2016 using secondary data on the national level of Indonesia. The average of annual data started from 2002 to 2014 consisting of rice market data and macroeconomic indicators. The data comprised of domestic rice production (kg), national rice consumption (kg), nominal consumer rice price, nominal consumer price of rice substitute, i.e. maize (kg), consumer price index, nominal producer rice price (IDR kg⁻¹), producer price index, milling cost of medium rice (IDR kg⁻¹), CIF import price (IDR kg⁻¹), import tariff of rice (IDR/kg), governmental procurement price (IDR kg⁻¹), sale price of rice (IDR kg⁻¹), tonage of Bulog's rice procurement and distribution (kg), and tonage of imported rice (kg).

The macroeconomic indicators comprised of real national income per capita (IDR), exchange rate of rupiah to US dollar (IDR/USD), and import tariff of rice. Besides, the budget of food security (IDR) was used as the approach of the budget of rice self-sufficiency programme. The sources of the data were the BPS-Statistics Indonesia, the Central Bank of Indonesia (BI), the Ministry of Agriculture and the Ministry of Finance, Republic of Indonesia.

Political Weight Estimation

The role of the government in agricultural sector is being the regulator, subsidy provider and tax collector (Ortiz 1999). The government intervenes the commodity market to allocate the resources by implementing policy instruments to achieve the targets of the policy. In which, political preference of the government is very important in formulating the policy (Swinnen and Zee 1993), because in a commodity market there are many vested interest groups involved in the market (Barret 1999). Political preference of the government to the vested interest groups is indicated by the political weight. Furthermore, political weight indicates the lobbying power of vested interest groups. During policy formulating process, the vested interest groups compete each other to influence the policy maker in order to get benefit from the policy (Rausser and Roland 2009).

By hypothesis that the government as the policy maker has a welfare function with subject to a certain political weight of each vested interest group, for example the producer, consumer, and tax payer, comprising a simple political preferential function is as follows (Johnson 1995):

$$W = w_p \cdot G_p + w_c \cdot G_c - w_t \cdot L_t \quad (1)$$

Where w_p , w_c and w_t are political weights of the producer, consumer and tax payer, while G_p , G_c , and L_t are the welfare resulted from the policy. To stabilize the domestic price, the government applies price support policy. This policy will give benefit to the producer and consumer, while the tax payer will get loss (Figure 1). The loss of the tax payer is showed by ABE area and known as dead-weight loss (DWL). The welfare function of the price support policy related to the self-sufficiency programme can be defined as follows:

$$W = (w_p - w_t) G_p + (w_c - w_t) G_c - w_t DWL_t \quad (2)$$

where,

$P_0EAP_s = G_p$ = the change of producer surplus

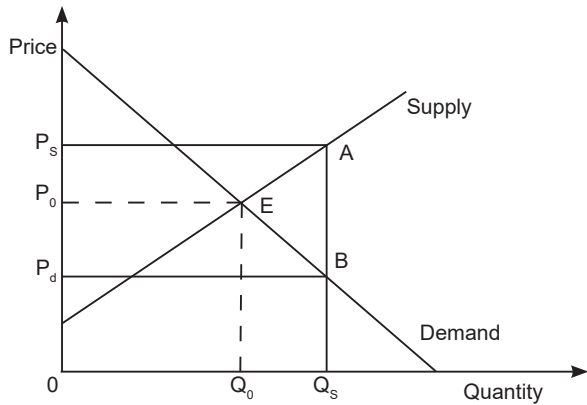


Fig. 1. Impact of price support policy on closed economy model (Johnson 1995).

$P_0EBP_d = G_c$ = the change of consumer surplus
 $P_sABP_d = L_t$ = the loss of tax payer
 $EAB = DWL_t$ = dead-weight loss

The approach above assumes that the policy formulating process can be explained through a mathematical problem, where the government is going to maximize a welfare function that consists of any welfare of the vested interest groups (Bullock 1994).

Price Elasticity Estimation

This study was conducted using a political preferential function model to illustrate the objective of the government of Indonesia to maximize social welfare of the producer, consumer and government in the rice market. The analysis was started by testing the variables integration order. It used the Augmented Dickey-Fuller's unit root test. The only stationary and free ones from unit root were then used in the following step, i.e. estimation of rice demand and supply relation.

Since the analysis focused on the involvement of Bulog in rice procurement and distribution in the domestic market, hence the other traders were assumed as another group as non-Bulog. As a result, the market structure of domestic rice was assumed as an oligopoly market. For that reason, a dynamic-oligopoly model adopted from Bresnahan (1982) and Lau (1982) that had been modified by Steen and Salvanes (1999) was then utilized to estimate the rice demand and supply relation. Since Bulog only conducted procurement and distribution of medium-quality rice, therefore, this study focused on this rice category and excluded the premium rice imported by the registered importers that might come from the general rice traders.

The dynamic-oligopoly model of demand (Equation 3) and supply relation (equation 4) was then used to estimate the elasticity of demand (equation 5 and 6) and supply (equation 8 and 9). Afterwards, the generated economic rent and dead-weight loss based on the implementation of the price policy and import policy were calculated using equation 10 and 11. The value of the economic rent and DWL were then transformed into percentage of the budget and concerned as the social cost of the programme.

$$\Delta Qd_t = \alpha_0 + \alpha_{pd} \Delta Pd_t + \alpha_Y \Delta Y_t + \alpha_Z \Delta Z_t + \alpha_{PY} \Delta PY_t + \alpha_{PZ} \Delta PZ_t + \alpha_{Qd} \Delta Qd_{t-1} + \gamma [Qd_{t-1} - \Theta_{pd} Pd_{t-1} - \Theta_Y Y_{t-1} - \Theta_Z Z_{t-1} - \Theta_{PY} PY_{t-1} - \Theta_{PZ} PZ_{t-1}] + \alpha_D D_t + U_t \quad (3)$$

Equation 3 is the dynamic-oligopoly rice demand model, where

- Qd = rice demand (kg),
- Pd = consumer price (IDR kg⁻¹),
- Y = national income per capita (IDR),
- Z = consumer price of rice substitute (IDR kg⁻¹),
- PY = multiplication between Pd and Y , the shifting variable of demand,
- PZ = multiplication between Pd and Z , the rotation variable of demand,
- D = dummy variable of the governmental period, $D = 0$ for 2001-2003; $D = 1$ for 2004-2014,
- α_0 = intercept,
- $\alpha_{pd}, \alpha_Y, \alpha_Z, \alpha_{PY}, \alpha_{PZ}, \alpha_{Qd}, \alpha_D$ = estimated coefficients of the long-run parameters,
- U_t = error term,
- $\Theta_{pd}, \Theta_Y, \Theta_Z, \Theta_{PY}, \Theta_{PZ}$ = estimated coefficients of the short-run parameters,
- γ = adjusted parameter from short-run to long-run, the estimated coefficient of the autoregressive distributed lag (ADL) model.

$$\Delta Ps_t = \beta_0 + \beta_{Qs} \Delta Qs_t + \beta_W \Delta W_t + \lambda \Delta Q_t^* + \beta_{Ps} \Delta Ps_{t-1} + \psi [Ps_{t-1} - \xi_{Qs} Qs_{t-1} - \xi_W W_{t-1} - \Delta Q_t^*] + \beta_D D_t + V_t \quad (4)$$

$$Q_t^* = \frac{Qs_t}{\Theta_{pd} + \Theta_{PY} Y_t + \Theta_{PZ} Z_t} \quad (5)$$

Equation 4 is the dynamic-oligopoly rice supply model, while equation 5 is reflecting the relation between demand and supply response in the oligopolistic market, where:

- Ps = producer price (IDR kg⁻¹),
- Qs = rice supply (kg),
- W = rice milling cost (IDR kg⁻¹),
- D = dummy variable representing the governmental period,

- V_t = error term,
- β_0 = intercept,
- $\beta_{Q_s}, \beta_w, \lambda, \beta_{P_s}, \beta_D$ = estimated coefficients of long-run parameters,
- $\xi_{Q_s}, \xi_w, \Lambda$ = estimated coefficients of short-run parameters,
- ψ = adjusted parameter from short-run to long-run, the estimated coefficient of the autoregressive distributed lag (ADL) model,
- λ = long-run market power,
- Λ = short-run market power.

Following the estimation of rice demand and supply relation, price elasticity of rice demand was calculated using the formula developed by Steen and Salvanes (1999), while price elasticity of supply was computed using the equation developed by Zaini (2011) since Steen and Salvanes' model did not provide it.

$$(\eta_{SR}) = [\alpha_p + \alpha_{PY}\bar{Y} + \alpha_{PZ}\bar{Z}] \cdot \left[\frac{\bar{P}_d}{\bar{Q}_d} \right] \tag{6}$$

$$(\eta_{LR}) = [\Theta_p + \Theta_{PY}\bar{Y} + \Theta_{PZ}\bar{Z}] \cdot \left[\frac{\bar{P}_d}{\bar{Q}_d} \right] \tag{7}$$

$$(\varepsilon_{SR}) = \left[\frac{\alpha_p + \alpha_{PY}\bar{Y} + \alpha_{PZ}\bar{Z}}{\beta_{Q_s}(\alpha_p + \alpha_{PY}\bar{Y} + \alpha_{PZ}\bar{Z}) + \lambda} \right] \cdot \left[\frac{\bar{P}_s}{\bar{Q}_s} \right] \tag{8}$$

$$(\varepsilon_{SR}) = \left[\frac{\Theta_p + \Theta_{PY}\bar{Y} + \Theta_{PZ}\bar{Z}}{\xi_Q(\Theta_p + \Theta_{PY}\bar{Y} + \Theta_{PZ}\bar{Z}) + \Lambda} \right] \cdot \left[\frac{\bar{P}_s}{\bar{Q}_s} \right] \tag{9}$$

Equation (6) is the short-run price elasticity demand of rice and equation (7) is the long-run price elasticity of demand. Meanwhile, equation (8) is the long-run price elasticity of supply and equation (9) is the long-run price elasticity of supply.

Social Cost Estimation

Along with the implementation of price instrument policies, the government conducts import policy to fulfill the reserve stock. When the government does not apply import tariff, the domestic price will be similar to the world price ($P_w = P_d$), the domestic production is ab , the national consumption is ac , and the import volume is df (Figure 2b) or bc (Figure 2a). In terms of rice self-sufficiency policy, the government applies import tariff (t) and import quota to provide price incentive to farmers to cultivate rice. Therefore, the domestic price increases from P_w to P_d .

Since the import tariff (t) and import quota applied, the national demand for imported rice shifts to the left from ED to ED^* , crossing the supply curve (ES) at e (Figure 2b). Hence, the volume of imported rice decreases from df to de and the P_d (Fig. 2a). The increasing domestic price will increase domestic production from ab to gh (Figure 2a), decrease consumption from ac to gj , and decrease import volume from bc to hj . On the other hand, the government receives revenue from the import tariff. It is represented by the $dekl$ area (Figure 2b). Since the import quota is binding, therefore, the import volume is ED^* . Seeing that the import policy is such a privilege for Bulog, thus the government will not receive more revenue from the import quota (Houck 1986). As a result of the two rice policies, the economic rent generates in the rice market, starting from the production side to the import side as follows (Jula and Buneci 2013):

$$TER = \{(P_s - P_w) Q_s\} + \{(P_s - P_w)M\} + DWL \tag{10}$$

$$DWL = \frac{\eta_{SR}(P_s - P_w)^2}{2 P_s} \bar{Q}_d \tag{11}$$

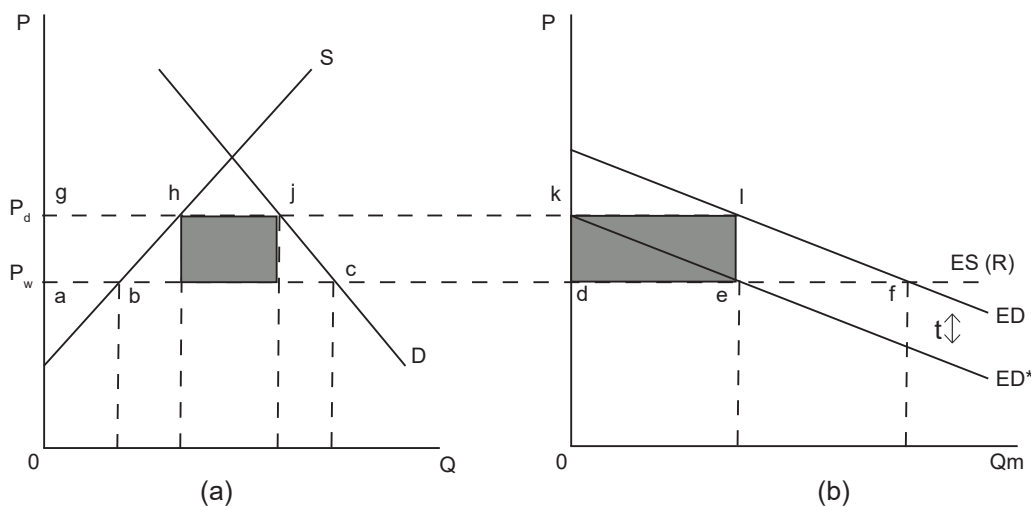


Fig 2. Impact of import tariff and import quota on production (Houck 1986).

Where TER is the total economic-rent or the value of social cost, P_s is the producer price, P_w is the import price, Q_s is the rice supply, M is the volume of imported rice, DWL is the welfare loss represented by the value of dead-weight loss, η_{SR} is the elasticity of demand in the short-run, and Q_d is the rice demand.

RESULTS AND DISCUSSION

Political Weight

The political weight of the vested-interest group in Indonesia rice market was calculated using Johnson (1995). The result showed that the government received the highest political weight, followed by the rice producer, then the rice consumer (Table 1). This result indicates that the implemented rice policy instruments are biased to the government rather than to the rice producer and consumer. It means that political preference of the government to Bulog is high. It proves that Bulog as the representative of the government received the highest political preference.

Price Elasticity

Based on the stationary test, the variable data were stationary in the first different. These data were then tested in the integration order. Afterward, estimation of rice demand and supply relation was conducted to compute price elasticity of rice demand and supply using a dynamic-oligopoly model. Estimation of dynamic-oligopoly model of demand showed that the rice demand was inelastic (Table 2) indicated by the price elasticity of demand ($\eta_{SR} = -0.1122$; $\eta_{LR} = -0.1415$). It emphasized that rice is the main staple food in Indonesia and could not be substituted by maize ($\alpha Z = -9.46E+08$). Maize was being complement to rice. When the maize price increased, the rice demand decreased. This finding implied that food diversification programme from rice to non-rice did not work well in the implementation.

Estimation of dynamic-oligopoly model of supply relation revealed that rice price was the only factor affecting farmers to cultivate rice. It was indicated by the short-run price supply elasticity, i.e. $\varepsilon_{SR} = 1.4310$ (Table 3). Hence, rice production could increase and rice price might be profitable for the producer and payable for the consumer. The implemented rice policies in the rice market could be a mechanism of income transfer from the producers to the consumers through the price mechanism.

Social Cost Estimation

In accordance with the implementation of rice self-sufficiency programme, the Government of Indonesia allocated budget for food security programme. In the budget data, there was no specific closure mentioning rice self-sufficiency programme. However, most of expenditure was provided to support the achievement of rice self-sufficiency. Therefore, the budget of food security was then used for the approximation of budget of rice self-sufficiency programme.

The government distributed the budget through two ministries, i.e. the Ministry of Public Work and Public Residence and the Ministry of Agriculture. The budget was grouped into three types, i.e. subsidy, government expenditure and transfer to the regional governments. The subsidy was provided in terms of food subsidies, fertilizer, seeds and credit interest. The government expenditure was provided in kind of government rice-reserve stock, food stabilization reserve, national seed reserve and food security reserve. On the regional level, the budget was allocated for irrigation and other agricultural activities through the transfer mechanism.

During the analysis period, the budget tended to increase from IDR 10.26 trillion in 2002 to more than IDR 67.78 trillion in 2014 (Appendix 1). It showed a positive growth rate of 18.36% per annum. On the other hand, the level of rice self-sufficiency ratio achieved 0.99 (99%) on average and tended to decrease by 0.02% per annum (Table 4). This findings showed that Indonesia faced an on-trend self-sufficiency. It indicated that import was taken place to fulfill the reserve stock and to meet the domestic demand.

In the mean time, estimation of political economic function model showed that during the implementation of the price instrument policies and import policy, the economic rent and DWL generated considerably. The economic rent fluctuated between IDR 1.89 trillion and IDR 14.49 trillion, reached IDR 6.37 trillion on average, and tended to increase by 12.94% per annum during 2002–2014 (Table 1). The economic rent reached 18.54% of the budget, but the proportion tended to decrease by 5.41% per annum during 2002–2014. In addition, the DWL fluctuated between IDR 0.09 trillion

Table 1. The average political weight of vested interest groups in Indonesia rice market

| Vested interest group | Political weight |
|-----------------------|------------------|
| Producer (W_p) | 0.5375 (17.67%) |
| Consumer (W_c) | 0.2324 (7.67%) |
| Government (W_g) | 2.2401 (74.67%) |

Table 2. Estimation result of dynamic-oligopoly demand function.

| Variable | Parameter | Coefficient | St. Dev. | t-Statistic | Prob. |
|--------------------|---------------|-------------|----------|-------------|--------|
| C | α_0 | 1.36E+10 | 2.78E+09 | 4.8957* | 0.0163 |
| ΔPd_t | α_{Pd} | -6.10E+08 | 85245803 | -7.1530** | 0.0056 |
| ΔY_t | α_Y | 722.0440 | 151.5221 | 4.7653* | 0.0176 |
| ΔZ_t | α_Z | -9.46E+08 | 1.96E+08 | -4.8225* | 0.0170 |
| ΔPY_t | α_{PY} | -20.7517 | 3.218325 | -6.4480** | 0.0076 |
| ΔPZ_t | α_{PZ} | 26162996 | 5172820. | 5.0578* | 0.0149 |
| ΔQd_{t-1} | α_{Qd} | -1.7735 | 0.300563 | -5.9006** | 0.0097 |
| D | α_D | -2.30E+09 | 4.32E+08 | -5.3178* | 0.0130 |
| U_{t-1} | γ | -0.322197 | 0.094080 | -3.4247* | 0.0417 |
| <i>R-squared</i> | | 0.9569 | | | |
| Long-run parameter | | | | | |
| Pd_{t-1} | Θ_{Pd} | 7.14E+08 | | | |
| Y_{t-1} | Θ_Y | 246.1786 | | | |
| Z_{t-1} | Θ_Z | 8.18E+08 | | | |
| PY_{t-1} | Θ_{PY} | -1.7776 | | | |
| PZ_{t-1} | Θ_{PZ} | -20584571 | | | |
| Elasticity | | | | | |
| Short-run | η_{SR} | -0.1122 | | | |
| Long-run | η_{LR} | -0.1415 | | | |

*) Prob. < 0.90%; **) Prob. < 0.95%.

Table 3. Estimation result of dynamic-oligopoly supply function.

| Variable | Parameter | Coefficient | St. Dev. | t-Statistic | Prob. |
|--------------------|--------------------|-------------|----------|-------------|--------|
| ΔQs_t | β_{Qs} | 9.42E-10 | 1.39E-09 | 0.6753 | 0.5247 |
| ΔW_t | β_W | -0.9351 | 0.9033 | -1.0352 | 0.3405 |
| ΔQ^*_t | λ | -0.0003 | 0.0003 | -0.9855 | 0.3624 |
| ΔPs_{t-1} | $\beta_{Ps t-1}$ | 0.0657 | 0.3800 | 0.1729 | 0.8684 |
| D | β_D | 17.4824 | 10.9106 | 1.6023* | 0.1602 |
| V_{t-1} | Ψ | -0.3040 | 0.1816 | -1.6742* | 0.1451 |
| <i>R-squared</i> | | 0.4245 | | | |
| Long-run parameter | | | | | |
| Qs_{t-1} | ξ_Q | 1.82E-09 | | | |
| W_{t-1} | ξ_W | -0.5341 | | | |
| Q^*_{t-1} | Λ | -0.0003 | | | |
| Elasticity | | | | | |
| Short-run | ε_{SR} | 1.4310 | | | |
| Long-run | ε_{LR} | 0.7406 | | | |

*) Prob. < 90%.

and IDR 2.72 trillion, reached IDR 0.90 trillion on average, and tended to increase by 16.94% per annum during 2002–2014 (Table 1). The DWL achieved 2.34% of the budget, though the proportion tended to decrease by 1.42% per annum during the analysis period.

Based on the summing up between the economic rent and the DWL, from 2002 to 2014, on average

20.88% of the budget was lost and being the welfare lost and could not benefit neither the producers, the consumers, nor the tax payers in the rice market. It became the social cost of the rice-sufficiency programme. Nonetheless, throughout the analysis period the magnitude of the social cost tended to decrease by 4.84% per annum (Table 4).

Table 4. The budget of food security, rice self-sufficiency ratio, economic rent and dead-weight loss, 2002–2014.

| Year | Food security budget (IDR trillion) | Rice self-sufficiency ratio | Economic rent | | Dead weight loss | |
|-------------|--|-----------------------------|----------------|---------------|------------------|---------------|
| | | | (IDR trillion) | (% of budget) | (IDR trillion) | (% of budget) |
| 2002 | 10.26 | 0.97 | 3.69 | 35.95 | 0.29 | 2.87 |
| 2003 | 13.47 | 0.98 | 3.71 | 27.55 | 0.51 | 3.78 |
| 2004 | 12.32 | 1.00 | 3.46 | 28.05 | 0.48 | 3.87 |
| 2005 | 13.17 | 1.00 | 1.89 | 14.33 | 0.09 | 0.72 |
| 2006 | 20.19 | 0.99 | 2.81 | 13.94 | 0.34 | 1.68 |
| 2007 | 27.75 | 0.97 | 6.22 | 22.42 | 0.70 | 2.52 |
| 2008 | 45.54 | 1.00 | 4.48 | 9.84 | 0.42 | 0.92 |
| 2009 | 52.74 | 1.00 | 4.29 | 8.13 | 1.79 | 3.40 |
| 2010 | 52.83 | 0.99 | 5.38 | 10.19 | 0.41 | 0.78 |
| 2011 | 60.76 | 0.95 | 9.82 | 16.16 | 0.62 | 1.02 |
| 2012 | 67.36 | 0.97 | 14.49 | 21.52 | 1.20 | 1.79 |
| 2013 | 68.62 | 1.00 | 12.97 | 18.90 | 2.72 | 3.97 |
| 2014 | 67.79 | 1.00 | 9.54 | 14.07 | 2.09 | 3.09 |
| Average | 39.44 | 0.99 | 6.37 | 18.54 | 0.90 | 2.34 |
| % per annum | 18.36 | 0.02 | 12.94 | -5.41 | 16.94 | -1.42 |

This findings gave the proof of the aforementioned criticisms that Bulog involvement in the implementation of rice policies has distorted the rice market. The evidence of both economic rent and DWL proved the existing rent-seeking activities in the domestic rice market. Intervention of the government by involving Bulog to stabilize rice price and reserve stock, and to import rice resulted in market failure. It was indicated by the generation of economic rent and DWL. It proved that rice self-sufficiency programme is obviously a high-cost policy.

In view of the fact, the privilege of Bulog has transformed economic structure of rice market. It changed rice market structure systematically from a perfect competition to an oligopoly competition. The actual market structure of rice market in Indonesia seemed like a competitive market. It was indicated by the free-entry to and the free-exit from the market, many market players and homogenous products. Nonetheless, intervention of the government through the implementation of price policy and import policy distorted the domestic market. The market distortion might relate to the protection level, intensity of political activity of the vested interest groups in the market, and influencing capability of those groups to the government (Masters and Garcia 2009; Swinnen and Zee 1993).

From the national point of view, rice market was being the mean to achieve the government objectives. The government implemented such policies to protect either the producers or the consumers. The government

established the market intervention to maintain the affordable price in the domestic market (Timmer 1986). Nonetheless, import was carried out to remedy the increasing price because of the decreasing supply in the domestic market. On the other hand, execution of the price instrument policy and import policy produced a zero sum outcome. The increasing income of the producers would be lost because the consumer had to pay the higher price (Timmer 2004). It showed that the price stabilization policy had an impact on the income distribution among the vested interest groups in the rice market. Rashid et al. (2007) revealed that involvement of parastatal in food grain market intervention was no longer convincing. The cost of parastatal-led price stabilization was staggering and the price policies were being dictated by special interests. Reduction of the intervention could promote competition, reduce subsidies and release funds for development and anti-poverty programs - all without jeopardizing price stability.

From the governmental point of view, price stabilization is crucially important. The hiking price might lead to high inflation and triggered the occurrence of social, economic and political issues. For that reason, the government countered the hiking price by conducting an ad hoc import policy to remedy the inflation. The quantification of price instrument policy and import policy in the political preferential function model could describe the result of the market intervention. Generation of social cost occurred at the equilibrium of political economy that involved relevant vested interest groups in the market.

Rice producer, the government and Bulog received the generated economic rent. Rice producers received economic rent in terms of financial profit of trading activity. The government received revenue from the import tariff. While Bulog received economic rent from the existing price gaps between producer price and governmental procurement price and between consumer price and import price. Nonetheless, most of the rice producers were smallholders (Masyhuri and Novia 2014), which their number was equivalent to around 15 million households (Anggoro 2014). They worked on a hectare or less of holding size (Masyhuri and Novia 2014; Suryana et al. 2001). Makbul et al. (2015) found that the market for small farmers was not a free and competitive market, but a monopsony, in which increases in rice prices would not increase their income. Moreover, around 70% of farmers were landless (Suryana et al. 2001) and being the net consumer of rice that counted for 60% of total population of Indonesia (Hariyadi and Yamin 2014).

From the discussion above, it showed that the rice market failure was obviously caused by the nature of the market and the atomistic decision making, i.e. top-down rice policy from the central government to the regional governments. Hai and Talbot (2013) showed that food price policies also distorted market prices in any countries. In some cases, distortionary policies were defensible on the grounds of equity or food security; in others, those created opportunities for rent extraction. The rice price stabilization was good when the price movements could motivate the producers to cultivate rice and improve purchasing power of the consumers. One way to increase producers' incomes was to increase rice price. This was based on the assumption that increase in rice price would subsequently increase paddy price, which, in turn, improve farmers' income (Makbul et al. 2015). The more available rice in the market would provide more affordable price to the consumer.

The import policy could increase producers' distress, especially among the marginal and smallholders. Along with the economic liberalization, farm mechanization, increased share of purchased inputs, price fluctuation and higher wage rate would increase vulnerability of the smallholders than the large farmers (Reddy and Amarendar 2015). Therefore, in case of regionality, the government should consider disparities in profitability of rice production. On the other hand, the role of rice as the staple food of most of the population of Indonesia urged the government to determine the affordable rice price for the consumer. The expensive price was seemingly associated with the more important off-farm food sector in particular, milling, retailing and branding (Minten et al. 2013). Those implied that improvement of income

distribution between rice producers and consumer should be conducted from on-farm to off-farm.

CONCLUSION

Implementation of price instrument policy and import policy by Bulog had an impact on the market failure, evidenced by the generation of economic rent and dead-weight loss. Bulog involvement in rice self-sufficiency programme obviously distorted rice market and caused welfare lost. This evidence proved the criticisms that rice self-sufficiency is economically inefficient related to the social cost generation.

The government should review the price and import policies to remedy market failure. It is crucially necessary to reduce social cost due to the implementation of price policy and import policy by Bulog. The government is suggested to orientate income distribution rather than price stabilization. It is urgently required to provide and improve irrigation facilities, agricultural roads, postharvest technologies and marketing infrastructure. Those operational policies may not only reduce income risk of the producers, but also improve purchasing power of the consumers. Since import was the one of economic-rent sources, hence, it is suggested to be stopped.

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REFERENCES

- Anggoro, U.K. (2014) Jihad Kedaulatan Pangan dalam Bingkai Penciptaan Keunggulan Komparatif dan Keunggulan Kompetitif. In: Agus, A. et al. (eds.) *Jihad Menegakkan Kedaulatan Pangan Suara dari Bulaksumur*. Yogyakarta, Gadjah Mada University Press.
- Baharsjah, S., Kasryno, F. & Pasandaran, E. (2014) *Reposisi politik pertanian meretas arah baru pembangunan pertanian*. Jakarta, Yayasan Pertanian Mandiri.
- Barker, R. & Hayami, F. (1976) Price support versus input subsidy for food Self-sufficiency in developing countries. *American Journal of Agricultural Economics*. [Online] 58 (4), 617–628. Available from: doi:<https://doi.org/10.2307/1238804>.

- Barret, C.B. (1999) Microeconomics of the developmental paradox: On the political economy of food price policy. *Agricultural Economics*. [Online] 20 (2), 159–172. Available from: doi:[https://doi.org/10.1016/S0169-5150\(98\)00085-1](https://doi.org/10.1016/S0169-5150(98)00085-1).
- Bresnahan, T.F. (1982) The oligopoly solution concept is identified. *Economics Letters*. [Online] 10 (1–2), 87–92. Available from: doi:[doi:10.1016/0165-1765\(82\)90121-5](https://doi.org/10.1016/0165-1765(82)90121-5).
- Bullock, D.S. (1994) In search of rational government: What political preference function studies measure and assume. *American Journal of Agricultural Economics*. [Online] 76 (3), 347. Available from: doi:[doi:10.2307/1243648](https://doi.org/10.2307/1243648).
- Hai, N.M. & Talbot, T. (2013) The political economy of food price policy : The case of rice prices in Vietnam. 1–19.
- Hariyadi, S.S. & Yamin (2014) Kebijakan perberasan dan nasib petani kecil. In: Krisnamurthi, B. (ed.) *Ekonomi perberasan indonesia*. Bogor, Perhepi.
- Houck, J.P. (1986) *Elements of agricultural trade policies*. New York, MacMillan Pub.Co.
- Hutagaol, M. (2017) *Dari ketergantungan pada beras menuju diversifikasi pangan: Menjadikan produksi pangan tidak lagi beban ekonomi, tapi modal pembangunan nasional. Orasi Ilmiah Guru Besar IPB pada tanggal 25 Februari 2017*. Bogor, Institut Pertanian Bogor.
- Johnson, R.W.M. (1995) Modelling government processes and policies in agriculture: A review. *Review of Marketing and Agricultural Economics*. 63 (3), Australian Agricultural and Resource Economics Society.
- Jula, N.M. & Buneci, B. (2013) *Critical loss of social welfare under monopoly*. [Online] Available from: <ftp://ftp.repec.org/opt/ReDIF/RePEc/eub/wpaper/eub-2013/2013-06.pdf>.
- Lau, J.L. (1982) Economics letters. *Economics Letters*. 10 (1–2) 93–99.
- Makbul, Y., Pradono, Ratnaningtyas, S. & Dwiyantoro, P. (2015) The effect of market structure on the integration of rice prices with paddy prices and its impact on farmers family income in the Kroya district, indramayu regency, Indonesia. *The Journal of Developing Areas*. [Online] 49 (3) 217–228. Available from: doi:[doi:10.1353/jda.2015.0156](https://doi.org/10.1353/jda.2015.0156).
- Masters, W.A. & Garcia, A.F. (2009) *Agricultural price distortion and stabilization*. World Bank, Washington, DC.
- Masyhuri & Novia, R.A. (2014) Marketable surplus beras. In: Krisnamurthi, B. (ed.) *Ekonomi Perberasan Indonesia*. Bogor, Perhepi.
- McCulloch, N. & Timmer, P. C. (2008) Rice policy in Indonesia: A special issue. *Bulletin of Indonesian Economic Studies*. [Online] 44 (1), 33–44. Available from: doi:[doi:10.1080/00074910802001561](https://doi.org/10.1080/00074910802001561).
- Minten, B., Murshid, K.A.S. & Reardon, T. (2013) Food Quality Changes and Implications: Evidence from the Rice Value Chain of Bangladesh. *World Development*. [Online] 42 (1), 100–113. Available from: doi:[doi:10.1016/j.worlddev.2012.06.015](https://doi.org/10.1016/j.worlddev.2012.06.015).
- Ortiz, J. (1999) The role of interest groups in agricultural policy design: Chile 1960–1988. *Journal of International Development*. [Online] 11 (2), 241–258. Available from: doi:[doi:10.1002/\(SICI\)1099-1328\(199903/04\)11:2<241::AID-JID569>3.0.CO;2-V](https://doi.org/10.1002/(SICI)1099-1328(199903/04)11:2<241::AID-JID569>3.0.CO;2-V).
- Rashid, S., Cummings, R.J. & Gulati, A. (2007) Grain marketing parastatals in Asia: Results from six case studies. *World Development*. [Online] 35 (11), 1872–1888. Available from: doi:[doi:10.1016/J.WORLDDEV.2006.12.006](https://doi.org/10.1016/J.WORLDDEV.2006.12.006).
- Rausser, G.C. & Roland, G. (2009) *Special interests versus the public interest in policy determination*. [Online] Available from: <http://www.worldbank.org/agdistortions>.
- Reddy & Amarendra, A. (2015) Regional disparities in profitability of rice production: Where small farmers stand? *Indian Journal of Agricultural Economics*. 70 (3), 259–271
- Steen, F. & Salvanes, K.G. (1999) Testing for market power using a dynamic oligopoly model. *International Journal of Industrial Organization*. 17 (2) 147–177.
- Suryana, A., Mardianto, S. & Tim Pengkajian Kebijakan Perberasan Nasional (Indonesia) (2001) *Bunga rampai ekonomi beras*. Jakarta, Lembaga Penyelidikan Ekonomi dan Masyarakat, Fakultas Ekonomi, Universitas Indonesia (LPEM-UI) bekerjasama dengan Badan Bimas Ketahanan Pangan, Departemen Pertanian dan Badan Perencanaan Pembangunan Nasional (Bappenas).
- Swinnen, J. & Zee, F.A. Van Der (1993) The political economy of agricultural policies: A survey. *European Review of Agricultural Economics*. [Online] 20 (3), 261–290. Available from: doi:[doi:10.1093/erae/20.3.261](https://doi.org/10.1093/erae/20.3.261).
- Timmer, P.C. (1986) *Getting prices right – The scope and limits of agricultural price policy*. Itacha, New York, Cornell University Press.
- Timmer, P. C. (2004) *Working paper number 48 November 2004 food security in Indonesia: Current challenges and the long-run outlook*. [Online] Available from: https://www.cgdev.org/sites/default/files/2740_file_WP_48_Food_security_in_Indonesia.pdf.
- Wambua, J., Rose, N., Maina, M., Ann, W. & Mumbi, N. (2005) *A decade of parastatal waste : a study of the audited accounts of state corporations over the period from 1993 to 2002*. Nairobi , Centre for Governance and Development.
- Zaini, A. (2011) *Analisis ekonomi politik swasembada gula Indonesia: Kombinasi model oligopolistik dinamika dan fungsi preferensi politik*. [Online] Available from: <http://repository.ipb.ac.id/bitstream/e/123456789/52873/2011aza.fjsessionid=AD6E5D693358D2C74A1DCB0F04347B75?sequence=1>.
- Zvavahera, P. & Ndoda, G.R. (2014) Corporate governance and ethical behaviour: The case of the Zimbabwe Broadcasting Corporation. *Journal of Academic and Business Ethics*. 9, (1–8).

Appendix 1. The budget of food security, 2002–2014.

| Year | Ministry budget (IDR billion) | | Non-Ministry budget (IDR billion) | | | | | | | | | | Total (IDR billion) | | |
|------|-------------------------------|-------------------|-----------------------------------|------------|----------|--------------------|---------------|---------------|------|---------------|------------|----------|---------------------|--------|-----------|
| | MPWPR ¹⁾ | MOA ²⁾ | Subsidy | | | Other expenditures | | | | Transfer | | | | | |
| | | | Food | Fertilizer | Seed | Interest rate | Reserve stock | Stabilization | Seed | Food security | Irrigation | Other | | | |
| 2002 | 2,703.90 | 2,815.50 | 4,696.90 | - | 45.00 | - | - | - | - | - | - | - | - | - | 10,261.30 |
| 2003 | 2,601.71 | 4,595.23 | 4,830.80 | 1,050.00 | 52.00 | - | - | - | - | - | - | 338.50 | - | - | 13,468.25 |
| 2004 | 2,534.16 | 2,923.91 | 4,830.80 | 1,171.40 | 76.20 | - | - | - | - | - | - | 357.20 | 116.24 | - | 12,324.60 |
| 2005 | 2,659.93 | 1,775.10 | 4,965.88 | 2,527.30 | 147.80 | - | - | - | - | - | - | 380.93 | 305.50 | - | 13,174.70 |
| 2006 | 5,551.15 | 2,574.10 | 5,320.24 | 3,165.70 | 131.13 | - | - | - | - | - | - | 627.50 | 1,094.55 | - | 20,186.41 |
| 2007 | 6,532.29 | 2,541.60 | 6,284.33 | 6,260.54 | 478.99 | - | - | - | - | 1,181.30 | - | 815.87 | 1,417.45 | - | 27,745.69 |
| 2008 | 7,203.91 | 3,509.60 | 11,795.90 | 15,181.46 | 985.25 | - | - | - | - | 1,000.00 | - | 1,467.91 | 1,463.01 | - | 45,537.95 |
| 2009 | 7,676.47 | 5,094.40 | 12,987.00 | 18,329.03 | 1,597.20 | - | - | - | - | 1,000.00 | - | 1,542.01 | 1,485.47 | - | 52,739.05 |
| 2010 | 8,016.09 | 3,094.20 | 15,153.81 | 18,410.89 | 2,177.49 | 0.00 | - | - | - | 1,000.00 | - | 960.06 | 1,530.30 | - | 52,833.19 |
| 2011 | 15,963.50 | 4,164.20 | 16,539.30 | 16,344.60 | 96.90 | 0.13 | - | - | - | 1,000.00 | 518.30 | 1,289.48 | 1,775.37 | - | 60,756.64 |
| 2012 | 18,246.62 | 5,082.62 | 19,117.00 | 13,958.50 | 60.30 | 0.40 | - | - | - | 2,000.00 | 342.80 | 1,400.00 | 1,867.05 | 734.50 | 67,355.83 |
| 2013 | 15,931.27 | 6,276.71 | 20,310.11 | 17,617.85 | 414.37 | 0.56 | - | - | - | - | - | 1,565.96 | 2,466.55 | - | 68,615.91 |
| 2014 | 13,202.50 | 5,650.60 | 18,164.70 | 21,047.30 | 308.60 | 0.80 | - | - | - | - | - | 2,212.30 | 2,493.10 | - | 67,785.30 |

¹⁾ Ministry of Public Work and Public Residence.

²⁾ Ministry of Agriculture.

Source: Ministry of Finance (2016).