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REVISITING THE ROLE OF AGRICULTURE IN ECONOMIC GROWTH: CAN LOWER FOOD PRICES EXPLAIN THE ECONOMIC TRANSITION STATUS OF INDONESIA RELATIVE TO SOUTH KOREA?

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ABSTRACT

The main objective of this article is to explain the possible mechanism between food prices and the economic transition status difference between Indonesia and South Korea. Moreover, the article also discusses the possible source of success in lowering food prices in the two economies. The two-goods consumption model for two economies is used to relate the relative economic transition status and food prices. The model and the historical data show a similar pattern: the economic transition is diverging between the two economies while the food prices are relatively getting more expensive in Indonesia. The possible sources of lower food prices are discussed.

Keywords: Economic Development, Food Price, Agricultural Productivity, Trade Reform

JEL: D01; E21; E31; O12; Q17

Introduction

One possible role of agriculture in economic growth is the sector's ability to provide food to all people in the economy. The rise of agricultural productivity allows some labor in the sector to produce other things without decreasing the number of food products available, thus the real price of food decrease over time. A study by Johnston & Mellor (1961) suggests that failure to increase agricultural output will result in higher food prices that lead to weaker economic growth, while Lains & Pinilla (2009) mention that the majority of development economists considered agriculture sector as a "black box" from which food is extracted. Although it is not the same, both argue that food availability can be related to overall economic activities.

The link between agricultural productivity growth, food prices, and economic development may look clear if we look back at some Western countries' experience. During the transition process, they can manage to increase their agricultural output while decreasing the number of labor both in proportion to total labor and the absolute number of the farmers, as presented in Dovring (1965), even the US achieved overcapacity of agricultural products around 1933 (Heady, 1965) that later supported price reduction in Western European countries

through exporting their food surplus. This success then allows more laborers to work in other sectors while the whole society may enjoy an improvement in food and nutrition; Grigg (1995) and Collantes (2019) show this improvement in some Western European countries.

However, the pattern of economic development may look unclear in some Asian countries because some countries like Japan and South Korea can successfully transform into industrialized economies while others, including Indonesia, stopped the transition process in the 21st century. The phenomenon is known as the middle-income trap where the country fails to jump and converge into a higher-income steady-state (Robertson & Ye, 2013; Ito, 2017). One possible explanation that can be derived from the discussion of agriculture's role in economic growth is the failure of increasing agricultural output while moving labor into other sectors so that the real price of food is unable to decrease over time.

Therefore, this study aims to present the possible linkage between agricultural productivity growth, food prices, and economic development in Indonesia compared to South Korea from the end of the 20th century until the early 21st century. This study conjectures food prices can explain the process of economic development by using the consumption model of two countries. Observed data and results from previous studies are used to create suggestive evidence that supports the conjecture. This study fits itself into the discussion of agriculture's role in the economy while it is also linked to the relationship between trade policy and structural transformation in South Korea discussion such as Connolly & Yi (2015) and Teignier (2018). The main point that makes this article stand out among others is the emphasis on the Indonesian economy vis-à-vis the South Korean economy and the focus on food prices.

The rest of this paper is organized as follows: Section 2 introduces the two-goods consumption model of two countries and derived the relative agricultural output equation, Section 3 discusses the historical data of economic development and food prices, Section 4 discusses the possible source of low food prices between two economies, and Section 5 concludes the study. The discussion includes suggestive evidence of the relationship between economic transition status and food prices, then followed by a possible explanation of why food price differs between the two economies.

Theoretical Framework and Supporting Data

This study uses two countries and two goods consumption models to explain the linkage between the failure of lowering food prices and economic development. Economic development in this study is defined as the transition status from agriculturally based economy to industry and services; therefore, it is defined as the agriculture output relative to other sectors output,

$$s = \frac{f}{x} \tag{1}$$

where f is the agriculture output and x are the other sector output. The total of each output consumed is then defined by identical consumer utility maximization problem,

$$u(f,x) = \left[\alpha f^{\gamma} + (1-\alpha)x^{\gamma}\right]^{\frac{1}{\gamma}} \tag{2}$$

subject to,

$$M = P_f f + p_x x \tag{3}$$

Solving the first order condition then we have,

$$s = \frac{f}{x} = \left[\frac{(1-a)}{a}\frac{p_f}{p_x}\right]^{\frac{1}{(\gamma-1)}} \tag{4}$$

Thus, the relative transition indicator s between two countries can be defined as,

$$\frac{s_{ID}}{s_{SK}} = \left[\frac{p_f^{ID}}{p_x^{ID}} \frac{p_x^{SK}}{p_f^{SK}} \right]^{\frac{1}{(\gamma-1)}} \tag{5}$$

Assuming both countries are identical in their preference for the two goods and have the same liberalization of other goods but differ in agricultural goods, then

$$\frac{s_{ID}}{s_{SK}} = \left[\frac{p_f^{ID}}{p_f^{SK}} \right]^{\frac{1}{(\gamma-1)}} \tag{6}$$

Therefore, the difference in transition can be explained by the difference in the price of agricultural or food products.

Supporting data used in this study are gathered from UNCTAD, FAO, USDA, and ITC Trade Map. Some of the data are transformed into variables explained in theoretical section. The description of the data and transformed data are provided in Table 1 below.

Table 1: Data and Transformation Description

Name	Symbol	Source	Description/Formula
Indonesia Agricultural Output	Y_{ID}^{ag}	UNCTAD (2022)	Agricultural output calculated using constant price
South Korea Agricultural Output	Y_{SK}^{ag}	UNCTAD (2022)	Agricultural output calculated using constant price
Indonesia Other Sector Output	Y_{ID}^{nag}	UNCTAD (2022)	Non-agricultural output calculated using constant price
South Korea Other Sector Output	Y_{SK}^{nag}	UNCTAD (2022)	Non-agricultural output calculated using constant price
Indonesia Agricultural Output to Non-Agricultural Output Ratio	s_{ID}	Calculated	$\frac{Y_{ID}^{ag}}{Y_{ID}^{nag}}$
South Korea Agricultural Output to Non-Agricultural Output Ratio	s_{SK}	Calculated	$\frac{Y_{SK}^{ag}}{Y_{SK}^{nag}}$
Relative Economic Transition Ratio	s_r	Calculated	$\frac{s_{ID}}{s_{SK}}$
Indonesia Food Price Indices	p_f^{ID}	FAO (2020)	Consumer food price indices
South Korea Food Price Indices	p_f^{SK}	FAO (2020)	Consumer food price indices
Relative Food Price Ratio	p_f^r	Calculated	$\frac{p_f^{ID}}{p_f^{SK}}$
Indonesia Agricultural Productivity	$Agprod_{ID}$	USDA (2021)	Agriculture total factor productivity indices
South Korea Agricultural Productivity	$Agprod_{SK}$	USDA (2021)	Agriculture total factor productivity indices
Relative Agricultural Productivity Ratio	$Agprod_r$	Calculated	$\frac{Agprod_{ID}}{Agprod_{SK}}$

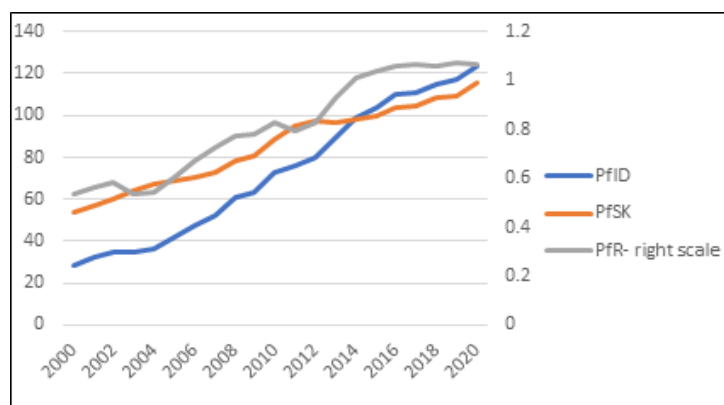**Economic Development and Food Prices**

The economic transition in Indonesia and South Korea from 1970 is moving in the same direction. Indonesia in the early 1970s experienced a faster transition and tried to close the gap only until 1978, after that the divergence between two economies continued to rise. There is another attempt for Indonesia to close the gap during 1990 but then the Asian financial crisis in 1997/1998 hits and expands the gap even more from 5 to 8 in just five years.

Until the next financial crisis in 2007/2008, the transition gap between two economies came closer as Indonesia was less affected from the crisis, but afterwards it continues to rise until 2020. There are many things that may explain this development, but one thing that this study tried to discuss is the relative food price between two economies during this period.
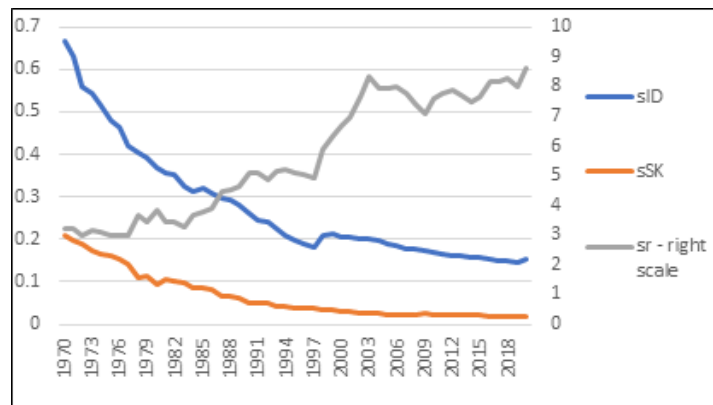
Figure 1: Economic Transition Status and Comparison between Indonesia and South Korea during 1970 – 2018

The consumer food price indices in Indonesia rise faster than South Korea during 2000 – 2020 based on FAOSTAT. The relative food price indices between the two economies then continue to rise during this period. This rise is expected if there is a relationship between food prices and relative share since the relative economic transition status between two economies diverges during this period. Therefore, this may   linkages between food prices and economic development but then we may look at the agricultural productivity data between two economies to see if this pattern can be explained by the success of South Korea agricultural development compared to Indonesia. Jeon (2011) suggests that the different path that the two economies experience is due to the relatively successful agricultural development in South Korea; however, there is no large difference in agricultural productivity between the two economies.

Figure 2: The Consumer Food Price Indices Development and Comparison between Indonesia and South Korea during 2000 – 2020

The agricultural productivity between two economies is found to be superior in Indonesia at the start and the end of the 1960 – 2019 periods [Figure 3]. The data suggest that agricultural development is not relatively better in South Korea, so that it is unable to explain the relatively lower food prices in the country. Oshima (1986) suggests that Korea developed its agriculture until 1970 but then there was no potential agricultural development after that; therefore, Korea started to import large amounts of food. It suggests the lower food prices in

Korea are allowed not due to better agricultural development but through accessing the world food market, which allowed them to take benefit of other countries with higher agricultural productivity. This phenomenon might be explained by comparing the food imports between the two economies.
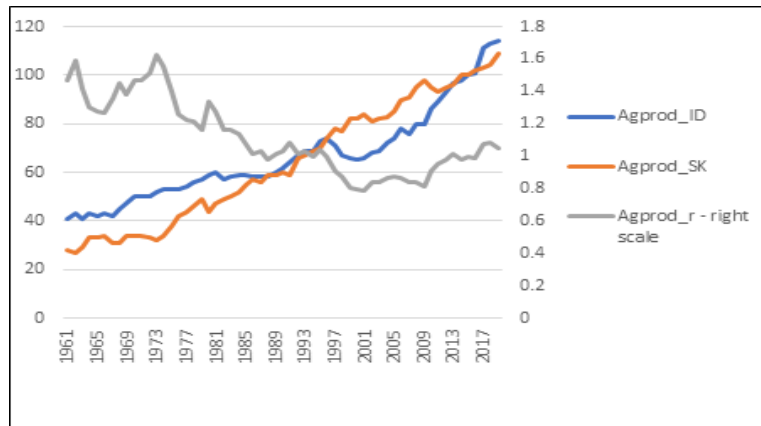
Figure 3: Agriculture Total Factor Productivity Level and Comparison of Indonesia and South Korea during 1960 – 2019

Trade Reform and Food Import

The two economies have experienced trade reforms during 1990s following Uruguay Round and Asia-Pacific Economic Cooperation (APEC). Some literature suggest that trade liberalization brings a positive effect to both countries, for example Feridhanusetyawan & Pangestu (2003) show positive welfare gains for both countries, also Rada et al. (2011) and Yoo et al. (2012) respectively discuss the role of trade liberalization for agricultural productivity improvement in Indonesia and South Korea. The path of reform difference during the period between the two economies may came from the fact that South Korea also joined the Organization for Economic Cooperation and Development (OECD), so that the reform expected from Uruguay Round Agreement on Agriculture was closely monitored by the organization, for example in OECD (2001). Thus, it makes South Korean imports in agricultural product double from $5.7 billion in 1995 to $11 billion in 2009 and become a net importer of agricultural products (Yoo et al., 2012). Indonesia on the other side was not taking the same drastic reform as South Korea, especially in agricultural products, because there were many domestic related problems such as local monopolies, monopsonies, interisland trade, and other barriers, as identified in Montgomery et al. (2002), that may need to be reformed first, and also popular political opinion that supports self-sufficiency in food production.

Table 2: Meat and Cereals Import Value for Indonesia and South Korea

Commodity (HS)	Indonesia		South Korea		South Korea/Indonesia	
	2001	**2020**	**2001**	**2020**	**2001**	**2020**
Meat (02)	43	710	835	6,056	19.39	6.9
Cereals (10)	664	3,021	1,509	5,023	2.27	1.2

The difference between two economies trade reform in agricultural products can be the best explanation for the relatively lower food prices in South Korea. The import data taken from Trade Map support this because South Korea was importing a lot more food in 2001 even though the population size is only around 1/5 of Indonesian population [Table 2]. The size of South Korean meat and cereals imports in 2001, respectively, are 835 and 1,509

million USD, while Indonesia respectively only 43 and 664 million USD. Until 2020, the South Korean import size of meat and cereals is still larger than Indonesia. This difference exists even though some protective measures to farmers were also implemented in South Korea, as Jeon (2011) shows that they were struggling with food security and decreasing agricultural land. Moreover, the difference between two economies is also supported from the fact that South Korea had to make many trade agreements to export their industrial products during their transition process, as explained in Connolly & Yi (2015).

Conclusion

This study provides suggestive evidence on the linkages between agricultural productivity, food prices, and economic development through the comparison between the Indonesian and South Korean economy. It is found that the difference in relative agricultural output between two economies is diverging, while the difference in food price indices is found to move in the same direction. It then suggests that failure in lowering food prices might be the reason for slow economic transition. Further, this study discusses the source of this difference is not because of relatively more successful agricultural development in South Korea but from the difference in the trade reform path that allows South Korea to access more food from world markets to support their rapid industrialization, a development feature that differs from the US and Western European countries.

The result from this study is only limited to suggestive evidence rather than causal inference and unable to derive direct policy implication. However, there are some policy insights from this study: 1) agricultural productivity has direct implication to the economic development as it supports more affordable food to support industrialization, 2) increasing own country agricultural productivity is not only a condition to support economic development as world food markets may be accessed by any country, and 3) the implication of importing food to support a country's rapid industrialization is lower food security. Moreover, some questions arise from this study for further research: 1) can Indonesian agricultural productivity increase gradually to support relatively lower food prices without accessing the world food market and eventually export food surplus like the US or Western European development model? 2) can importing food from other countries boost the economic transition process and help excess farmers to move into another sector? and 3) is it better to achieve self-sufficiency in food or promote food trade liberalization both economically and environmentally?

Declaration

The article is based on the author's view supported by available data.

Conflict of Interest

There is no conflict of interest.

Availability of Data and Materials

All data are publicly available from the original source and the calculated data are available upon request.

Authors' Contribution

The author contributes to the whole process of article development.

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