
Commodity Price Cycles, The Agricultural Trap, and Thailand's Incessant Subsidies^{*}

Bhanupong Nidhiprabha

Faculty of Economics
Thammasat University
2 Prachan Road, Bangkok 10200
Thailand
bhanupong@econ.tu.ac.th

Abstract

During Thailand's economic development, the shares of output and employment in agriculture have been consistently higher than in other countries at the same level of income. There are push and pull factors for labor transformation. This paper demonstrates that the slow transformation from rural to urban economy is the result of the agricultural trap, which keeps agrarian labor inside the farm sector. In addition to the lack of public investment in human capital, extremely wasteful farm subsidies have weakened the natural process of structural transformation. Farm subsidies encourage land expansion, which usually lags behind commodity booms, resulting in the excess supply of farm products. In turn, when commodity prices collapse, excess supply perpetuates further subsidies and emboldens the pork barrel activities of incumbent governments.

I. Introduction

Thailand has been a leading world's exporter of rice and rubber since the last century, thanks to her abundant land and labor. Output always exceeds domestic consumption, leaving a substantial surplus for exports. Since the country opened its trade sector in the 1850s, there has been an enormous expansion of cultivated land areas to take advantage of favorable commodity prices. Recently, due to more frequent fluctuations in the world business cycle, commodity prices have become more volatile, causing export instability and unstable farm incomes. The Thai government regularly intervenes to ensure a decent standard living for farmers. During commodity booms, the government sets high prices of agricultural commodities to guarantee stable and high income for farmers. When commodity markets bust, the government is compelled to intervene and resist the downward trend of commodity prices. The government views agricultural subsidies as a moral

^{*} I am thankful for the comments and suggestions made by Shigeyuki Abe, Prema-Chandra Athukorala, Maria Socorro-Gochoco Bautista, Wen-jen Hsieh, Fukunari Kimura, Chalongsob Sussangkarn, Siow Yue Tan, Somkit Tangkitvanich, Wing Thyee Woo, and Yanrui Wu.

mandate to take care of the plight of the poor and ignores the costs and ineffectiveness of market interference. In time, these subsidized agricultural products have become political commodities. This paper explores the hypothesis that chronic agricultural subsidies create a trap for the Thai economy to maintain agricultural output and employment higher than it would have been had the government allowed the market system to function with minimum intervention.

Section 2 illustrates the changing characteristics of Thai agriculture, whose prosperity has been more dependent on exports. Section 3 outlines the nature of commodity booms and busts. Section 4 analyzes Thailand's sluggish farm productivity growth. Section 5 discusses the declining terms of trade of export commodities, which prompted the government to intervene in the commodity markets. Section 6 examines rampant subsidies in agricultural products and explains why giving subsidies has become a vicious cycle of intervention. Concluding remarks are provided in the last section.

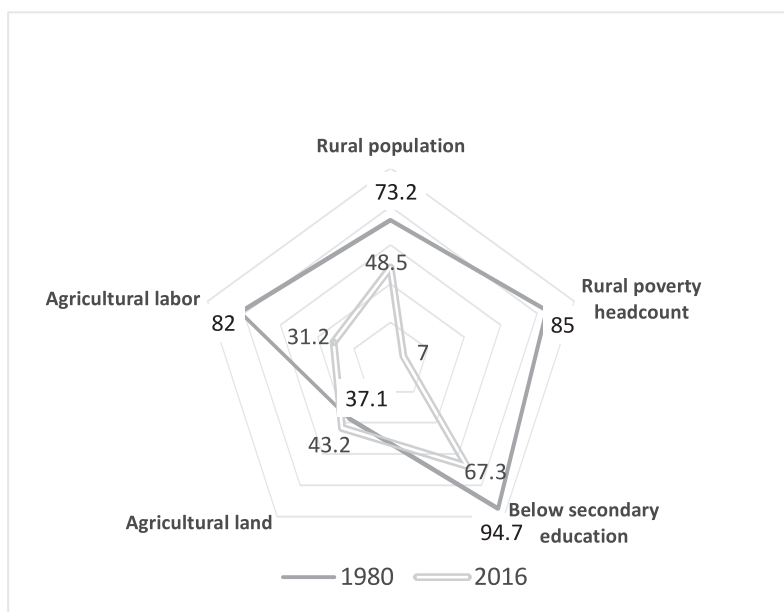
2. Characteristics of Thailand's agriculture

The changing landscape of Thailand's agriculture is captured by comparing vital agricultural statistics in 1980 and 2016 (Figure 1). In 1980, 73 percent of Thais still lived in rural areas. After 36 years, in 2016 the rural population had declined to 48.5 percent of the population. During the same corresponding period, rural poverty dropped from 85.0 to 7.0 percent. Labor employment in agriculture shrank from 82.0 to 31.2 percent, thanks to farm mechanization and urban migration. Nevertheless, the transfer of agricultural labor has been slow compared with other countries at the same level of per capita income. Ideally, the boundary of the 2016 pentagon shown in Figure 1 should have been converging to the center of the figure, where poverty, illiteracy, and rural population gradually decline.

In 2016, the percentage of the Thai who received education below the secondary level was still high at 67.3 percent—a slow speed of reduction from the 94.7 percent level in 1980. Because of the low level of human capital, finding decent jobs for unskilled labor is a daunting task. What is striking in Figure 1 is that all magnitudes, except agricultural land, declined consistently. Agrarian land expanded from 37.1 to 43.2 percent of total land areas during the same corresponding period. The land input in agriculture should have declined. Forest encroachment and deforestation ensued, causing a detrimental impact on the environment.¹

The contribution to GDP from agriculture has slowly declined. Compared with the last four decades, the share of agriculture in total output dropped from 62.5 percent in 1975

¹ In 2015, the forest area in Thailand was only 32.1 percent of total area, compared with 81.3 percent in Lao PDR, 67.6 percent in Malaysia, and 53.6 percent in Cambodia.

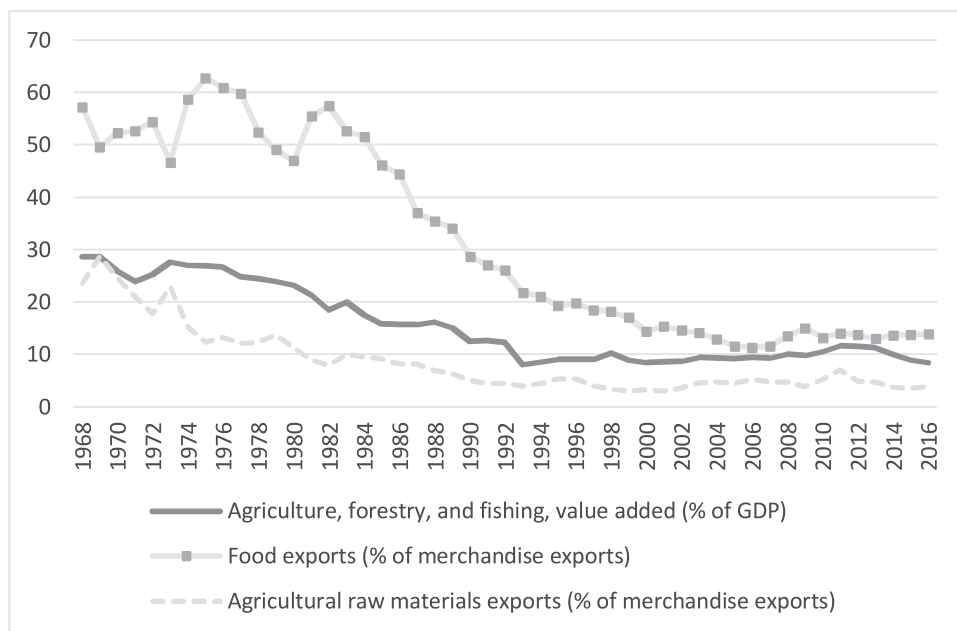
Figure 1. Agriculture and rural transformation

Source: World Bank (<https://databank.worldbank.org/data/>).

to 13.9 percent in 2016 (Figure 2). This is not surprising, considering that exports of agricultural products in total merchandise exports had declined steadily, but it has remained somewhat stable since 1993.

In 2016, food and agricultural raw materials exports, as a percent of merchandise exports, fell from 30 percent in 1969 to 8.5 and 3.8 percent, respectively. Rice had dominated food exports since Thailand was forced to sign the Bowring Treaty with the British in 1855. Since then Thailand has fully participated in the global trade in rice and has become a significant exporter in the world markets. Rice and rubber had been Thailand's top two exports until the early 1970s. Their importance has diminished considerably as the country began earnest industrialization by providing incentives to foreign direct investment in the manufacturing sector. Presently, rubber and cassava are Thailand's principal raw material exports. Cassava emerged as Thailand began exporting cassava to Europe, when the demand for animal feed increased significantly in the early 1970s.

The export demand for agricultural products dictates Thailand's pattern of agricultural production. Why did the declining trends depicted in Figure 2 remain stable between 1993 and 2016? The answer lies in the commodity booms and subsidies, which did not readily

Figure 2. Thailand's dwindling agriculture

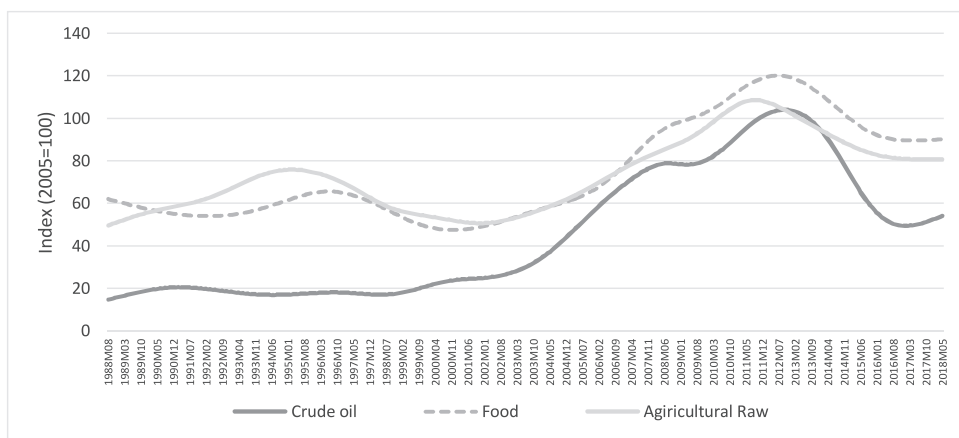
Source: World Bank (<https://databank.worldbank.org/data/>).

permit Thailand to relinquish its role as export champion of rice and rubber, despite its dwindling comparative advantage.

3. Agricultural commodity price cycles

Countries that export primary commodities are seemingly blessed by abundant natural resources, enabling them to enjoy a comparative advantage. From time to time, they experience favorable terms of trade against manufactured goods. If there is a long commodity boom, the primary commodity-exporting countries enjoy high income and wealth generated by the lengthy price increases. Because commodity booms are not permanent, sooner or later the booms end. Figure 3 shows that the duration of the oil boom was longer than the booms in food and agricultural raw materials. Although the booms and busts of these primary commodities are short-lived, they leave a permanent impact on the economy.

There exists a long-run relationship between the price cycles of food and agricultural raw materials. Because land can be used to produce either food crops or agricultural raw materials, farmers can switch the cropping pattern when their relative prices change. Crude

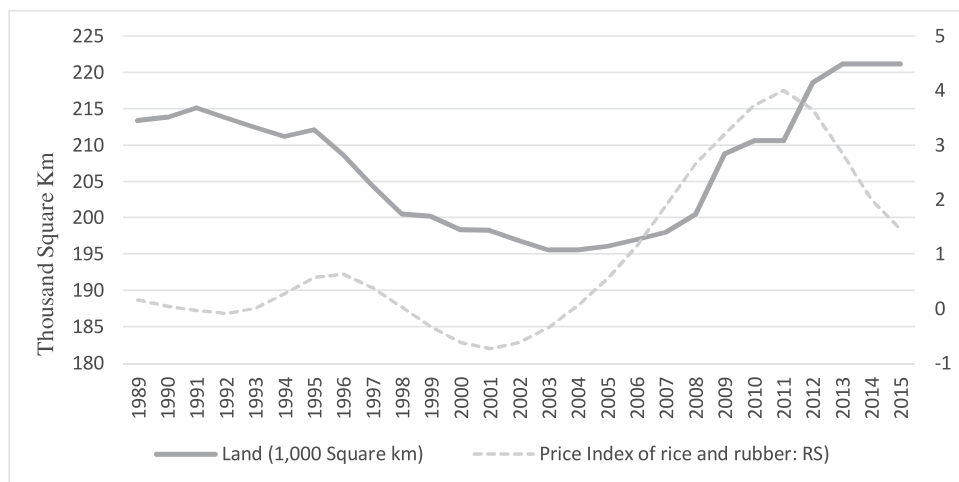
Figure 3. Commodity price cycles

Source: Mundi Index.

oil is different, however, and its price cycle differs from food and agricultural raw materials. Nevertheless, a rise in the demand for food translated into higher crude oil prices as petroleum is used intensively in food production and transportation of agricultural commodities. To analyze the booms and busts in primary products, we must consider the cycle of crude oil. Using principal components of the monthly export prices of rice and rubber from 1989 to 2015, we can visualize the price cycles of Thailand's major agricultural exports (Figure 4). There were two peaks: The first one was in 1996, before the Asian Financial Crisis, and the second one was in 2011, after the Global Food Crisis in 2008.

Agricultural output's response to price changes is well documented (Askari and Cummings 1977; Rao 1989; Key, Sadoulet, and De Janvry 2000).

Farmers optimize the production process by choosing an optimum combination of inputs, given their prices and the expected product prices. Land used in Thai agriculture is positively related to the index of the principal component of agricultural prices (Figure 4). When agrarian prices increase, agrarian land expanded and vice versa when the prices decrease. At the trough of the price cycle in 2001, when global demand growth declined temporarily, agricultural land shrank as a result of the substantial fall in the commodity prices since 1997. During the long commodity boom after 2001, it took a few years before agricultural land continued an expansion path for another decade. Similarly, when the commodity prices weakened after 2011, thanks to China's slowdown, expansion of agricultural land continued and finally plateaued in 2013. It is not surprising that, with global

Figure 4. Cultivated land and price index of rice and rubber

Source: World Bank (<https://databank.worldbank.org/data/>).

recovery in 2018, the strengthening commodity prices would lead to more expansion of land in response to favorable export prices and government subsidies.

Land expansion occurs following favorable world export prices. Indeed, cultivated areas rise two years after the country has experienced higher export prices. There is a strong correlation (0.96) between the previous two years of the price index of principal commodities and the contemporaneous cultivated land areas. Strong and lagged agricultural supply responses to upswings of commodity prices are the root of the problem. Farmers responded to high prices by increasing cultivated land areas, which is subject to the law of diminishing returns, resulting in low productivity growth after the boom years. Moreover, because of lagged supply responses, farmers cannot change their cropping patterns instantaneously during the down-swings. Farm mechanization, which allows exploitation of economies of scale, is suitable to large farms. It is the factor price ratio that determines the optimum input mix. High wage rates and rising input costs preclude utilizing non-land factors of production. Expansion of land areas seems to be more reasonable in growing paddy and other cash crops such as cassava, maize, coconut, rubber, and oil palms.

Because of lagged output responses, farmers suffer from income instability caused by commodity price cycles, and output fluctuations. Excess supply is an inevitable result of land intensity in agricultural production. If responses to rising commodity prices were in the form of biased capital or labor-augmented growth, it would be easier for agricultural supply to adjust quickly during the time of market gluts. The heavy dependency on

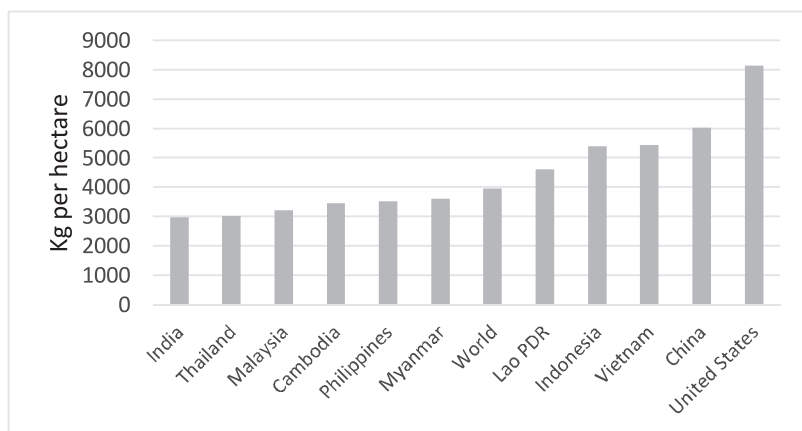
land-augmented output growth makes the supply of agricultural product less elastic to price changes. Also, it requires more government subsidies when the world market prices turn against farmers. More importantly, agricultural subsidies have become so sacrosanct that politicians dare not deal with the long-term issues of efficiency and effectiveness of the grants. The budget for farming subsidies grows considerably when natural disasters strike and when the guaranteed prices are above the world market prices. That is why rice, rubber, and other agricultural products become political commodities.

4. Sluggish farm productivity growth

One of the main reasons why Thailand has lost some of its market shares is diminished competitiveness.² When the cost of production becomes very high, because of wage pressure and rising input costs, it is impossible to compete with more efficient foreign producers, who have higher productivity and better access to advanced countries' markets. The only way to compete successfully with neighboring countries that benefit from General Systems of Preferences is to increase farm productivity at least by the tariff differential, given the same level of the exchange rate.

There are various ways to improve farm productivity, even for a small farm size. There is the "crowding-in" effect of modern inputs and cultivation practice on agricultural productivity. Adoption of new rice varieties can increase flood tolerance and enhance adoption of a more labor-intensive planting method (Emerick et al. 2016). Farm mechanization works best in large areas where farmers can exploit the economies of scale by using heavy machinery. Thailand's farm sizes are relatively small, compared with those in advanced countries. Moreover, they tend to be smaller over time as the population increases, thanks to the practice of sharing the land inheritance among offspring. As shown in the case of Australia, however, agricultural productivity enhancement is done by changing production technology. Small farms can increase productivity through increased ability to access advanced technologies rather than merely expanding scales (Sheng et al. 2015). In Japan's rural communities, where aging farmers are typical, automated drones can solve the problem of a labor shortage as they can apply pesticides and fertilizer to small farms, improve productivity, as well as reduce farming costs. Wickramasinghe (2017) explores agricultural productivity in Asia and the Pacific and attributes the early stage of Thailand's agricultural productivity growth to area expansion. Although input intensification was a contributing factor, it was on and off throughout the early period. After the 2000s, total factor productivity growth was the main contributor to agricultural productivity. However, as observed by Suphannachart and Warr (2011), the government's funding for research and development of plant varieties and technological improvement is relatively low and insufficient to

² On 26 December 2018, the Freight on Board price of white rice 5 percent was quoted at US\$ 403 in Thailand, compared with US\$ 382 and US\$ 372 in Vietnam and India, respectively (Source: *Bangkok Post*).

Figure 5. Crop yields, 2016

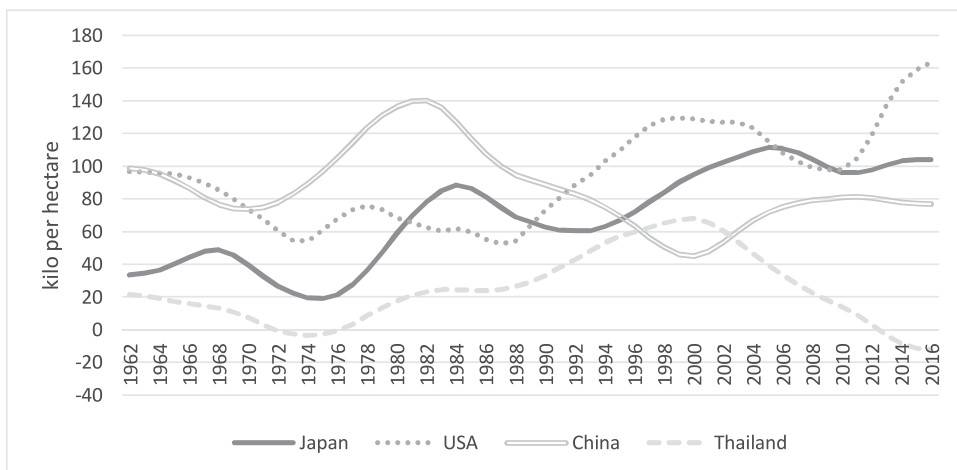
Source: World Bank (<https://databank.worldbank.org/data/>).

compensate for the lack of private investment in agriculture.³ As a result, Thailand's farm productivity has remained stagnant over the last decade.

There has been an attempt by the Thai government to solve the problem of land fragmentation by unifying a small parcel of lands so that farming can be made more efficient. Nevertheless, Thailand's farmland productivity is still low compared with the United States, China, Vietnam, and Indonesia (Figure 5). In 2016, the data from the World Bank show that Thailand's crop yields were lower than the world average and were among the lowest in the Asian region. Chemicals are used heavily in Thailand to boost land productivity by applying fertilizers, herbicides, and pesticides, leading to land degradation. High-yielding varieties of cereals result in farm productivity improvement in the United States and China. With fertile soil quality and abundant water resources, crop yields in Vietnam and Indonesia are high without depending so much on the land extension.

By removing cyclical components from the actual values of land productivity time series, we can obtain the long-term trend values of crop yields from 1962 to 2016. When examining changes in these long-term magnitudes, we can trace the dynamism of land productivity improvement over time. Thailand's productivity improvement slowed down in the 1960s, well into the middle half of the 1970s (Figure 6). The massive extension of cultivated areas is the culprit. However, the 1960s' gradual decline pales in comparison to

³ In 2019, the government plans to install high-speed Internet to rural areas and distribute free SIM cards to farmers, hoping they can obtain instantaneous information on input and output prices.

Figure 6. Changes in long-term land productivity

Source: Calculation based on World Bank data (<https://databank.worldbank.org/data/>).

the sharp decline after 2000, which corresponds to the rapid increase in the expansion of agricultural land.

On the contrary, there had been a surge in land productivity improvement in the late 1970s up to the year 2000, when the productivity improvement started to slow down. Likewise, the rise in land productivity improvement corresponds to the period of contraction in farm areas (Figure 4). Area expansion without labor productivity improvement led to a fall in land productivity. Like business cycles, there can be an upturn and a downturn in productivity improvement. These cycles are affected by weather conditions and climate changes. What is important is the country's ability to maintain the long-term growth of agricultural productivity. Despite the up and down cycles, there has been a clear trend of long-term farm productivity in the United States and Japan, which was not the case for China, where a slowdown in productivity improvement took place from 1982 to 2000 (Figure 6). However, China's land productivity improvement rebounded and became stagnant again from 2008 to 2016. Thailand's productivity improvement looks rather gloomy. From 2013 to 2016, there was a significant deterioration of Thailand's farm productivity improvement, aggravating farm debt and rural poverty.

Negligence of public investment in agriculture can lead to poor performance in the farm sector. Not only insufficient investment in infrastructure, which could have enhanced productivity in the rural sector, but the lack of human capital investment can also slow down the migration of rural labor. Baumol (1993) argues that a sector with static labor

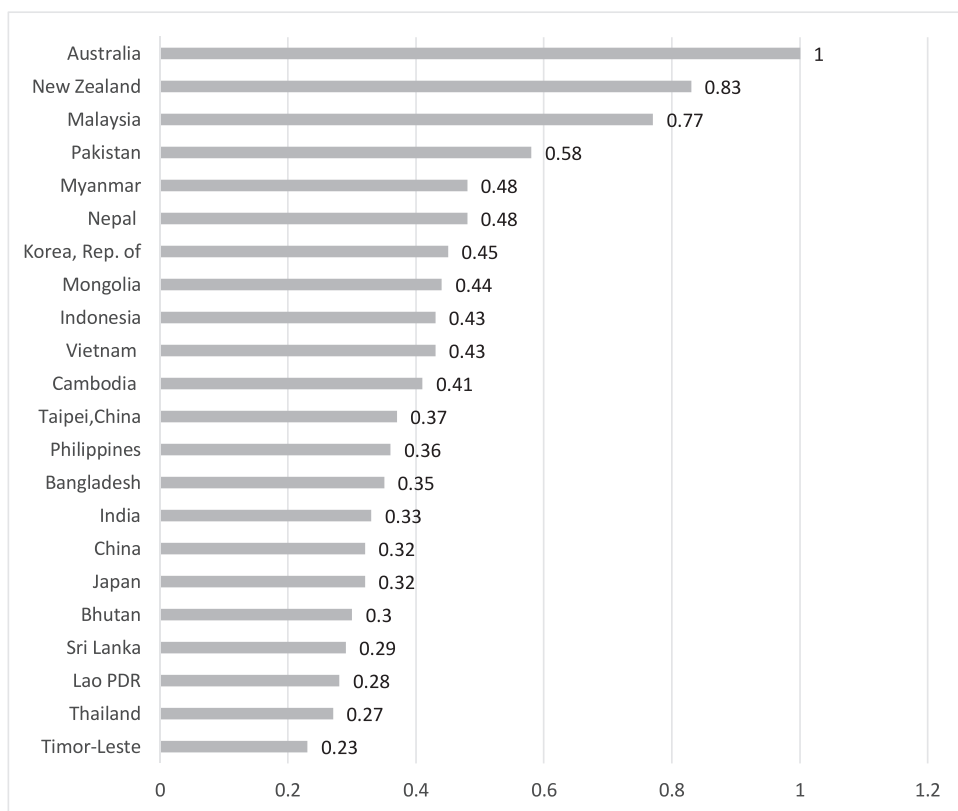
productivity growth would suffer from high cost of production because wages in the low productivity growth industry would be pushed higher by the wage rate in sectors where labor productivity growth is rising.⁴ In the static productivity growth sector, such as the agricultural sector, financial problems are widespread because of high labor costs. That is why farmers remain poor and beset by financial problems, as they have low marginal labor productivity and pressure from high wages. The government is compelled to provide subsidies. Nevertheless, the persistent level of subsidies provided to farmers can bring about the relatively low productivity of labor compared with overall labor productivity. We can approximate the labor productivity gap by calculating the ratio of agriculture share in GDP to agricultural labor share in total employment. Using annual data from 2016, we construct an index of labor productivity gap, shown in Figure 7.

The gap index ranges from one to zero. There was no discernable productivity gap between the agriculture and the non-agriculture sectors in Australia. Thailand is almost at the bottom of the scale, indicating a vast difference between agricultural labor productivity and nationwide labor productivity. Thailand's index of 0.27 suggests that agrarian labor average productivity is 73 percent below the national average. Thailand's agricultural productivity gap is lower than that of Timor-Leste. According to Lundahl and Sjöholm (2013), Timorese farmers survive on subsistence farming, because of the lack of land and capital. The way to increase the standard of living of Timorese farmers is to increase earning opportunities outside agriculture. Thailand is different in the sense that land is abundant, but capital is inadequate in the farm sector.

Nevertheless, the way to eradicate poverty is similar in the sense that the non-agricultural sector must be able to provide job opportunities for farmers. The productivity gap index in Figure 7 also shows that there is a substantial productivity gap between rural China and the rest of the country. Ma, Huang, and Oxley (2013) argue that during China's agricultural policy transformation, public and private investment has been responsible for increasing agriculture's total factor productivity. Their empirical evidence shows that public capital formation in the sector induced farmers' capital formation. Productivity gaps remain in China and Japan. Without subsidies, farmers in both countries would have much lower incomes.

Productivity gaps are high in countries with substantial agricultural protection and subsidies. Grain independence is the principal reason why the farm sectors in Japan and China

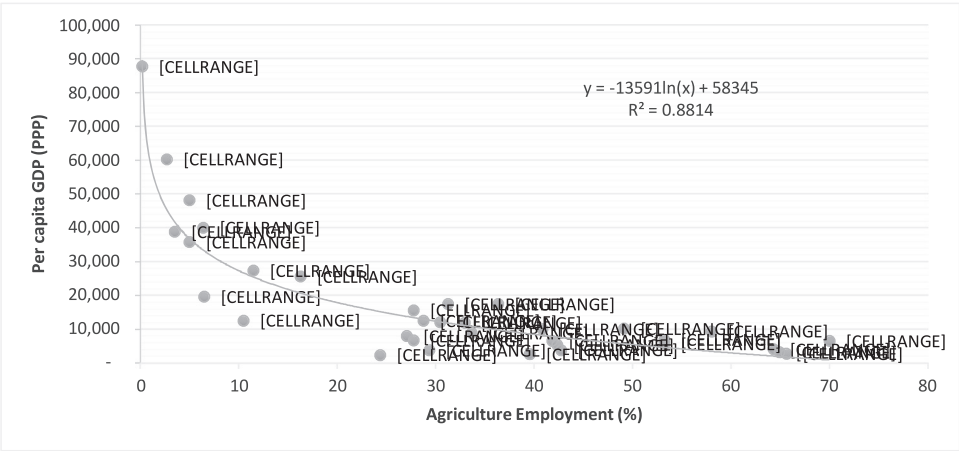
⁴ Baumol (1993) cited the live performing arts industry as the stagnant sector with low productivity improvement. The industry suffers from high wages as it has to offer high wages to maintain labor within the sector because the general wage rate is rising, due to the improvement of labor productivity in other sectors. In Thailand's farm sector, wage rate rises due to the cost disease of low agricultural productivity growth and the sectoral terms of trade which turns against the farm sector.

Figure 7. Agricultural labor productivity gap (Unit: Ratio to each country's average labor productivity)

Source: Calculation based on World Bank data (<https://databank.worldbank.org/data/>).

are relatively less efficient than other sectors in the countries. The farm labor cost is high, though Baumol's cost disease. The OECD has published producer support estimates for developed countries. Producer support estimates are around 20 percent in EU, 40 to 60 percent in Japan and Korea, and 10 percent in the United States and Australia. Japan and Korea have maintained their objective of food security. Their farm productivity is not relatively high compared with the United States and Australia. Political economy in these countries explains the differences in the level of agricultural protection. In countries where farmers are numerous, unified, and well organized, farmers have significant power over incumbent governments' agricultural policy. The voting outcomes depend crucially on populism policy platforms.

Figure 8. Per capita income and agricultural employment



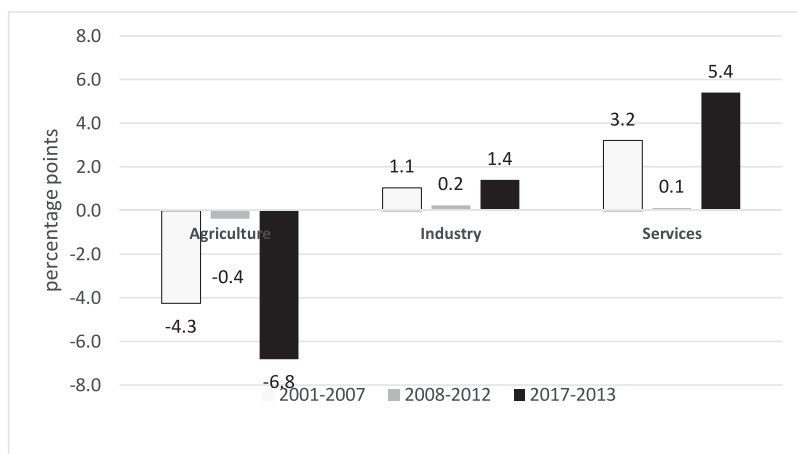
Source: World Bank (<https://databank.worldbank.org/data/>).

Low farm productivity makes the transformation of agricultural labor a formidable task. High-income countries, such as Australia, Japan, Taiwan, New Zealand, and Korea, were able to transfer labor out of agriculture. Raising farm productivity can speed up the labor transformation process. In low-income countries, farmers are living in poor conditions and suffering from massive debt burden.

The structural change in the labor market is slow, because of low-skilled farm laborers. Figure 8 illustrates that, from the 2016 international cross-sectional data, the lower the level of per capita income (measured in PPP), the higher the agricultural employment share. There is a non-linear relationship between the two variables, suggesting that once the agrarian employment share declines below 10 percent, per capita income would rise exponentially. The structural transformation of agricultural labor has been slow and painful in Thailand, and it has a long way to go before farm employment declines below the critical level.

The period 2008–12 exhibits Thailand’s static labor transformation, which occurred during the Global Financial Crisis when agriculture and manufactured exports experienced dismal performance. Thailand’s labor transformation depends on the dynamism of the export sector to sustain economic growth.

The slow speed of agricultural labor migration during 2008–12 was the result of the commodity boom, which kept the farm labor in rural areas. The share of farm labor in total employment reduced by 0.4 percentage point, and employment in the industry and service

Figure 9. Changes in employment share (from beginning to end periods)

Source: Thailand's National Economic and Social Development Board (www.nesdb.go.th/nesdb_en).

sectors increased by less than 0.2 percentage point (Figure 9). On the contrary, during the periods 2001–07 and 2013–17, when agricultural prices were not attractive, there were push factors responsible for a reduction of the agrarian labor share by 4.3 and 6.8 percentage points, respectively. The pull factor from urban areas attracted farm labor into the service sector, including the retail, wholesale, construction, and real estate sectors. The employment share in the service sector increased by 3.2 and 5.4 percentage points during the same corresponding periods.

On the other hand, the manufacturing sector, which is relatively capital-intensive by nature, cannot absorb farm labor as much as the service sector. The success of labor transformation depends to some extent on the ability of the service sector to pull farm labor as well as the frequency of the occurrence of commodity busts, which would speed up the process of labor transformation. Commodity booms are a curse that slows down the structural transformation of agricultural labor.

On the other hand, commodity busts can be a blessing in disguise. The boom–bust cycles are temporary by nature, but the trouble is that farmers and politicians treat them as if they were permanent. Farmers react to the booms accordingly by increasing land cultivation, while the government comes up with various supporting schemes, making the increase in farm prices seemingly permanent. There is an element of moral hazard that tends to perpetuate the oversupply situation. Farmers are crying for public help whenever they experience a fall in commodity prices. Examples abound for staple products, agricultural

Table 1. Widening wage gap between agriculture and non-agriculture

Sector	2011	2017
Construction	1.35	1.68
Entertainment	1.63	2.02
Manufacturing	1.73	2.15
Wholesale and retail	1.79	2.16
Non-agriculture	1.83	2.23
Real estate	2.72	2.77
Education	2.34	2.96
Health	2.80	3.18
Finance	4.46	4.04
Scientific and technical	3.92	4.17

Source: National Statistical Office (<https://www.nso.go.th/en/stat>).

Note: Unit: Ratio of the agricultural monthly wage.

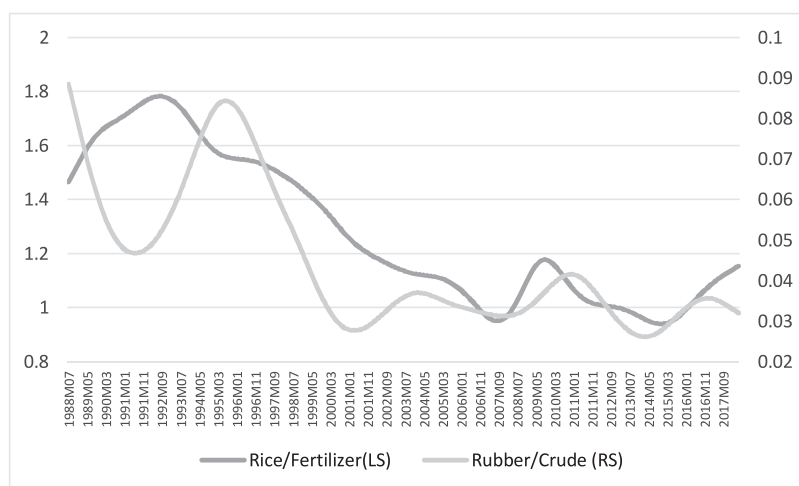
raw materials, and fruit. Farmers begin to face the harsh reality when the terms of trade turn against them.

Because wage rates reflect labor productivity, labor in the highly productive sector commands higher wage rates. In 2011, the non-agricultural monthly wage was 1.8 times higher than agriculture wages (Table 1). By 2017, the gap widened to 2.2 times. The widening trend is evident in most sectors. The narrowest gap was in the construction sector, where it was relatively more comfortable for farm laborers to migrate. The most substantial gap was in the scientific and technical sector. Low productivity of farm labor prevents these individuals from moving out. The hierarchical structure of skilled labor precludes unskilled labor to move upward, thanks to insufficient investment in human capital.

5. Declining agricultural terms of trade

When commodity prices rise, not all farmers benefit from the commodity booms, because the prices of inputs, such as diesel, fertilizers, and herbicides, also go up. Only large farms, which are net sellers, would benefit from commodity booms. Small farmers or landless laborers, who cannot get access to credit markets, are net food buyers. They are worse off from the commodity booms. As shown in Figure 10, the net barter terms of trade between rice and fertilizers declined considerably from 1993 to 2015, when the declining trend reversed into an uptrend. The net barter terms of trade between rubber and crude oil exhibited more volatility than the terms of trade between rice and fertilizer. However, both terms of trade share a similar trend in the long-run. Therefore, even if there are commodity price booms, benefits from favorable prices are overstated because of the rising input costs and the next price decline.

According to Hadass and Williamson (2003), the long-run impact of relative commodity price shocks reinforce the comparative advantage of industries in advanced countries and strengthen the primary product's comparative advantage in developing countries. The

Figure 10. Deteriorating trends of the terms of trade

Source: Mundi Index.

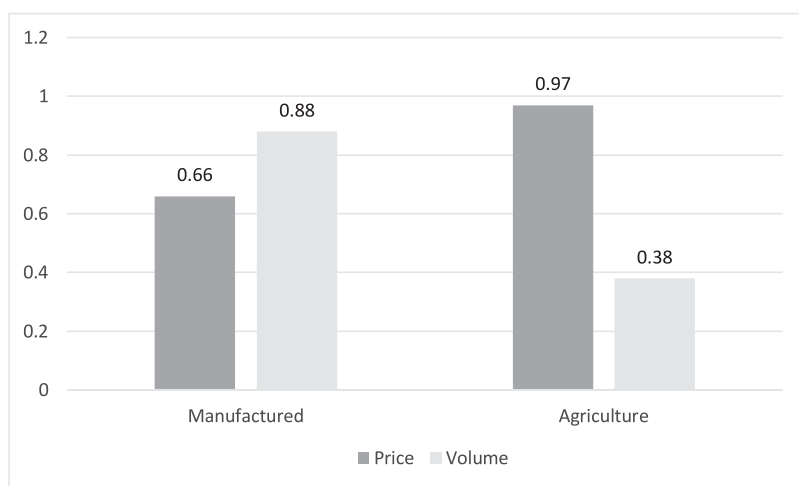
booming sector in the primary commodity exporting countries suffer from the "resource curse," subsequently experience capital flight and rent-seeking activities, thereby reducing their long-run growth potential.

The situation is more complicated in Thailand because the country exports multiple primary commodities and imports crude oil. Rubber and crude oil prices are highly correlated because natural rubber can substitute for synthetic rubber, which is a byproduct from the oil refining process. Thus, an increase in crude prices leads to higher natural rubber prices. During the oil price slump, rubber growers whose livelihood depends on selling rubber latex and sheets suffered tremendously from the perilous fall in the rubber prices.

There is also a certain degree of correlation between the prices of rice and rubber, due to other common factors such as energy prices, which drive commodity prices to move together. The co-movements of Thailand's major export commodity preclude the reduction of risk from exporting primary products, whose prices always move in tandem.⁵

In their attempt to explain the causes of agricultural price cycles, Baffes and Haniotis (2016) point out that there are many contributing factors. Increases in real income reduce demand for farm products, which is consistent with the Prebisch-Singer hypothesis and its

⁵ From 1988 to 2018, the correlation coefficient of crude oil and rice prices was 0.6, and 0.78 for crude oil and rubber prices. The rice price itself correlates with rubber and maize prices at the values of 0.55 and 0.83, respectively.

Figure 11. Correlates of export values (January 2000 to May 2018)

Source: Calculation based on Bank of Thailand data (<https://www.bot.or.th/English/Statistics>).

predecessor—Engel's Law. However, energy prices matter most in determining the agricultural price cycles, because of the energy-intensive nature of agriculture. The other important factor determining the commodity price cycles is conditions in the world supply and demand, which can be captured by the stock-to-use ratio.

As a price taker in the world markets, Thailand's values of manufactured exports are determined more by export volume than their prices.⁶ The world market prices dictate Thailand's manufactured export prices because the share of Thailand's manufactured exports is less than 2 percent of total world trade. Domestic supply factors, more important than the price factor, determine international sales of manufactured products.

Unlike manufactured goods, values of Thailand's agricultural exports are mainly influenced by the price factor. The correlation coefficient of the two variables is close to unity (Figure 11). On the other hand, the volume of agricultural exports is not highly correlated with their export values. The world agricultural prices determine the fate of Thai farmers—more than local weather conditions, which cause fluctuations in farm output. When agriculture export prices rise, farm income increases accordingly. Evidence from the correlates in Figure 11 supports the view that Thai farmers' well-being is mainly dictated by world market prices, more than mother nature. The importance of agricultural prices explains

⁶ The correlation coefficient between the export value and the quantity was 0.88, and its corresponding coefficient with the manufactured export price was 0.66.

the government's motivation in regulating farm prices through various schemes of price support and subsidies.

During the period when oil price shocks adversely impacted the Thai economy, the Thai government subsidized gasoline and diesel prices. Interventions in energy and foreign exchange markets by maintaining unrealistic prices were inevitably costly and ineffective (Nidhiprabha 2006). As we shall see, the implication of agricultural market intervention is the same.

6. Incessant subsidies

Agricultural subsidies have been a global norm. Before 2014, the U.S. government spent about US\$ 20 billion annually to support corn and soybeans production through direct payments based on farm ownership. Also, UK farmers received direct payments by the EU through Common Agricultural Policy. The Japanese government used the *gentan* program, under which the government had paid farmers to reduce rice crops since 1971. The Chinese government provides "land bank" to enlarge farm sizes by handing out cash to small farmers to abstain from growing rice so that large-scale farmers can use the land bank for cultivation.

Rice has long been a political commodity in Thailand—from Abhisit's democratic administration (2009–11), through Yingluck (2011–14), to General Prayut's military regime (2014–19). High rice prices hurt consumers; low prices hurt farmers. The balancing act requires a delicate policy to get the price right by satisfying farmers, pacifying consumers, and achieving high exports. The Abhisit government utilized a price-guarantee program to manipulate paddy prices. His government spent US\$ 6 billion in 2010 on direct payments to rice growers. In addition to rice, the Abhisit government spent almost US\$ 10 billion on price supports and provided low-interest loans for sugar producers, and US\$ 500 million to support maize growers.

Not to be outdone, the Yingluck government crafted a mortgage rice program that raised the domestic price above the world market prices. Farmers received income in advance from mortgaging rice to the Bank of Agriculture and Agricultural Cooperatives. They had the right to sell their rice and pay the money back to the Bank if the market prices were above the mortgaged prices. Unfortunately, the world market rice prices were below the mortgaged prices. The costly US\$ 15 billion mortgage scheme led to Prime Minister Yingluck's downfall. The Supreme Court handed down a verdict of negligence and found her guilty of corrupt practices in relation to the mortgage program.

Ironically, General Prayut, who overthrew the Yingluck administration by a military coup, also resorts to the rice mortgage scheme, except that the General has instructed scrutiny of

the program to prevent corruption. The US\$ 3 billion rice subsidies cover the mortgage of the 9 million tons of the 2018–19 paddy production, including credits to farmers and rice traders.⁷ The mortgaged paddy prices under the military-led government were based on 90 percent of the average domestic paddy price in the last three years. If the world price of rice falls precipitously in 2019, the government might end up losing more than the Yingluck government's program, which incurred a "loss" of 500 billion baht.

The military-led government spent 1.4 billion baht in state emergency funds to incentivize rice farmers to abstain from growing the second crop by switching to maize. In the long run, when the increased supply of maize outpaces the demand, prices will drop. Switching from rice to maize may turn out to be a policy faux pas because the prices of rice and maize move together firmly.⁸ They are the cause and effect of each other. Animals can be fed with either low-quality milled rice or maize. Thus, maize and poor-quality rice are close substitutes. Encouraging farmers to grow maize and reduce rice production will not help to shore up the rice price as long as world market prices dictate domestic prices.

Promoting domestic production of maize would help the local animal feed industry indirectly. Nevertheless, maize farmers would be hard-pressed to sell their produce to local animal feed producers, who have monopsony power. More effectively, the government could have allowed importation of cheaper wheat to produce animal feeds.

Populism policy via agricultural subsidies will create another vicious circle of subsidies, like the case of other commodities such as oil palms, which have been promoted by the government in the past few years. Due to the oversupply of natural rubber and the rising demand for synthetic petroleum-based rubbers, many rubber farmers have expanded into the more profitable palm tree business to produce palm oil. Consequently, the rapid expansion of oil palm plantations has already led to a fall in domestic prices of palm oil.

There is a firm belief among agricultural policy makers that if farmers hold on to their products from the beginning of the harvest season, farmers can fetch a higher price when the harvesting season is almost over. The government, therefore, provides cheap credits for crop growers to delay sales, providing cash handouts to rice farmers who delay selling their crops by six months. In September 2016, the National Rice Policy Committee spent 1.24 billion baht on cash handouts to rice farmers who postponed the sales and provided

7 The key difference between Yingluck and General Prayuth programs is that the latter capped the quantity of the rice mortgage.

8 The correlation coefficient between rice and maize prices was 0.83, as calculated from monthly data between January 2000 and May 2018.

low-interest subsidies to millers and agricultural cooperatives that agreed to hold rice in their warehouses for six months.

The government intervenes from both supply and demand sides. Distorted trade policy instruments are used frequently. Coconut is another example of market intervention; the government banned imports of coconuts in 2018 after coconuts growers had complained about the 40 percent drop in coconut prices due to excess domestic supply and cheap coconut imports.

In the case of cassava, the government wanted to raise the price by increasing domestic demand from exporters by implementing the stock-to-export ratio, requiring cassava exporters to increase their holding stocks from 50 to 150 percent of the quantity exported. On the supply side, in January 2015, the cabinet approved 2,760 million baht to subsidize a 3 percent interest rate loan for each farmer who postponed harvesting to push up the price at the beginning harvest season. The interest subsidy also went to processing factories, exporters, and ethanol producers to purchase tapioca during the high supply season to shore up the cassava price.

In 2018, the government provided a grant of 17.5 billion baht to one million rubber farm owners and 300,000 tappers to alleviate the burden from plunging rubber prices. Another 92 billion baht, 38 billion baht of which are earmarked for project management cost, would be given to the construction of roads using asphalt mixed with rubber latex to increase domestic demand for rubber. Another fictitious policy to raise the price of rubber is providing a 15,000-baht income tax reduction on purchases of tires that use local rubber. It turns out that the brand-name tires sold in Thailand do not fit that category. The novel idea of creating artificial demand might work temporarily in the short run, but it is hardly a sustainable and efficient solution to oversupply and overstock problems. One must think about the cost-benefit of this type of program, which is unavoidably inefficient and prone to corruption.

Commodity prices move in tandem because they are affected by changes in similar factors driving the demand and supply: weather conditions, world business cycles, substitutability and complementarity in production network, and consumer demand systems. Any attempt to intervene in one commodity would result in disequilibrium in another. Subsidies and distorted commercial policy would in time make farmers addicted to subsidies at the expense of long-term improvement in productivity. Agricultural subsidies would prolong the captivity of Thai farmers in the agricultural trap unless there is a substantial improvement in farm productivity.

The agricultural sector can become more dynamic with the rise of the processed food industry, which provides a linkage between industry and agriculture (Nidhiprabha 2005).

The essential strategy to escape from the agricultural trap is to provide a linkage between the agricultural and non-agricultural sectors. Agroindustry, which is more labor intensive than other manufacturing industry, can provide the solution for labor migration.⁹

7. Concluding remarks

Rice and rubber are political commodities. Politicians use them to gain popularity by giving subsidies. Farmers use them as bargaining chips for their livelihood via street protests. Agricultural subsidies are a global norm, but they are egregiously expensive and ineffective in the long run. There is a more effective and efficient way to help farmers escape the poverty trap. Public investment in agriculture-related infrastructure, research, and development of farming techniques are a necessary condition for raising farm productivity. Strengthening the processed food industry provides a close linkage between farm and manufacturing sectors. Furthermore, human capital investment in the rural sector will have a long-term impact on increasing farm labor productivity, which permits the migration of farm laborers to urban areas. The aim must be on reducing the labor productivity gap between the agricultural and non-agricultural sectors.

Because of their linkages, a boom in the manufacturing sector can lead to high economic activity in the service sector, and vice versa. The challenge is that the agricultural sector, like an island in the nation, has loose connectivity with other sectors. The agricultural sector can become more productive and efficient by reducing the distortion in the farming sector. Cutting agrarian subsidies is the first step to improve agricultural efficiency.

Changing weather patterns disrupt the regular supply of grains. Cyclical movements in world business cycles affect demand for agricultural raw materials. Imbalances in supply and demand for agricultural commodities lead to booms and busts of primary products. Because of the lag responses of agricultural production, the resulted excess supply and demand necessitate governments to regularly intervene to stabilize farm incomes through various commercial policies and farming subsidies. Rural poverty and rising farm debts provide incumbent governments an excuse to intervene, enhancing the opportunity to please voters and appease the less well-off. Enormous budgets are allocated to agricultural subsidies, at the expense of other long-term agrarian investment, which turns out to be unproductive and inefficient. The incessant subsidies created an agricultural trap, keeping the agrarian laborers inside the farm sector, and delaying the structural transformation.

⁹ Nidhiprabha (2017) provides evidence showing that the rise in Thailand's manufactured exports is related to the level of foreign direct investment, although the success of the processed food industry is less dependent on foreign direct investment.

References

- Askari, Hossein, and John Thomas Cummings. 1977. *Agricultural Supply Response. A Survey of the Econometric Evidence*. Westport, CT: Praeger Publishers.
- Baffes, John, and Tassos Haniotis. 2016. What Explains Agricultural Price Movements? *Journal of Agricultural Economics* 67(3):706–721.
- Baumol, William J. 1993. Health Care, Education, and the Cost Disease: A Looming Crisis for Public Choice. *Public Choice* 77(1):17–28.
- Emerick, Kyle, Alain de Janvry, Elisabeth Sadoulet, and Manzoor H. Dar. 2016. Technological Innovations, Downside Risk, and the Modernization of Agriculture. *American Economic Review* 106(1):1537–1561.
- Hadass, Yael S., and Jeffrey G. Williamson. 2003. Terms-of-trade Shocks and Economic Performance, 1870–1940: Prebisch and Singer Revisited. *Economic Development and Cultural Change* 51(3):629–656.
- Key, Nigel, Elisabeth Sadoulet, and Alain De Janvry. 2000. Transactions Costs and Agricultural Household Supply Response. *American Journal of Agricultural Economics* 82(2):245–259.
- Lundahl, Mats, and Fredrik Sjöholm. 2013. Improving the Lot of the Farmer: Development Challenges in Timor-Leste during the Second Decade of Independence. *Asian Economic Papers* 12(2):71–96.
- Ma, Hengyun Ma, Jikun Huang, and Les Oxley. 2013. Capital Formation and Agricultural Growth in China. *Asian Economic Papers* 12(1):166–190.
- Nidhiprabha, Bhanupong. 2005. Dynamism of the Thai Agriculture. *East Asia Economic Perspectives* 12(2):22–45.
- Nidhiprabha, Bhanupong. 2006. The Buffeting of Thailand by the Unholy Trinity of Avian Influenza, Tsunami, and the Oil Price Shock. *Asian Economic Papers* 5(2):118–129.
- Nidhiprabha, Bhanupong. 2017. The Rise and Fall of Thailand's Export-Oriented Industries. *Asian Economic Papers* 16(3):128–150.
- Rao, J. Mohan. 1989. Agricultural Supply Response: A Survey. *Agricultural Economics* 3(1):1–22.
- Sheng, Yu, Shiji Zhao, Katarina Nossal, and Dandan Zhang. 2015. Productivity and Farm Size in Australian Agriculture: Reinvestigating the Returns to Scale. *Australian Journal of Agricultural and Resource Economics* 59(1):16–38.
- Suphannachart, Walerat, and Peter Warr. 2011. Research and Productivity in the Thai Agriculture. *Journal of Agriculture and Resource Economics* 55(1):35–52.
- Wickramasinghe, Upali G. A. 2017. Fostering Productivity in the Rural an Agricultural Sector for Inclusive Growth in Asia and the Pacific. *Asia-Pacific Development Journal* 24(2):1–22.