

Structural Changes in Thailand's Agriculture

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Lecture 10

The Federal Reserve left the target range for its federal funds rate unchanged at 0.25% to 0.5% for the 6th time during its September meeting.

But Fed Chair Janet Yellen said US growth has strengthen and rate hikes would be necessary to keep the economy from overheating and fueling high inflation.



Thailand's new normal growth path

- GDP growth in 2013 declined to 2.9% from 6.5% in the previous year.
- Investment and exports contracted by 1.9% and 0.2 % respectively.
- What has gone wrong in Thailand?
- In 2014, GDP grew only 0.6 %.

Unstable growth path

THAILAND GDP ANNUAL GROWTH RATE



SOURCE: WWW.TRADINGECONOMICS.COM | NESDB, THAILAND

SWEDEN GDP ANNUAL GROWTH RATE



SOURCE: WWW.TRADINGECONOMICS.COM | STATISTICS SWEDEN

NETHERLANDS GDP ANNUAL GROWTH RATE



SOURCE: WWW.TRADINGECONOMICS.COM | STATISTICS NETHERLANDS

Main themes

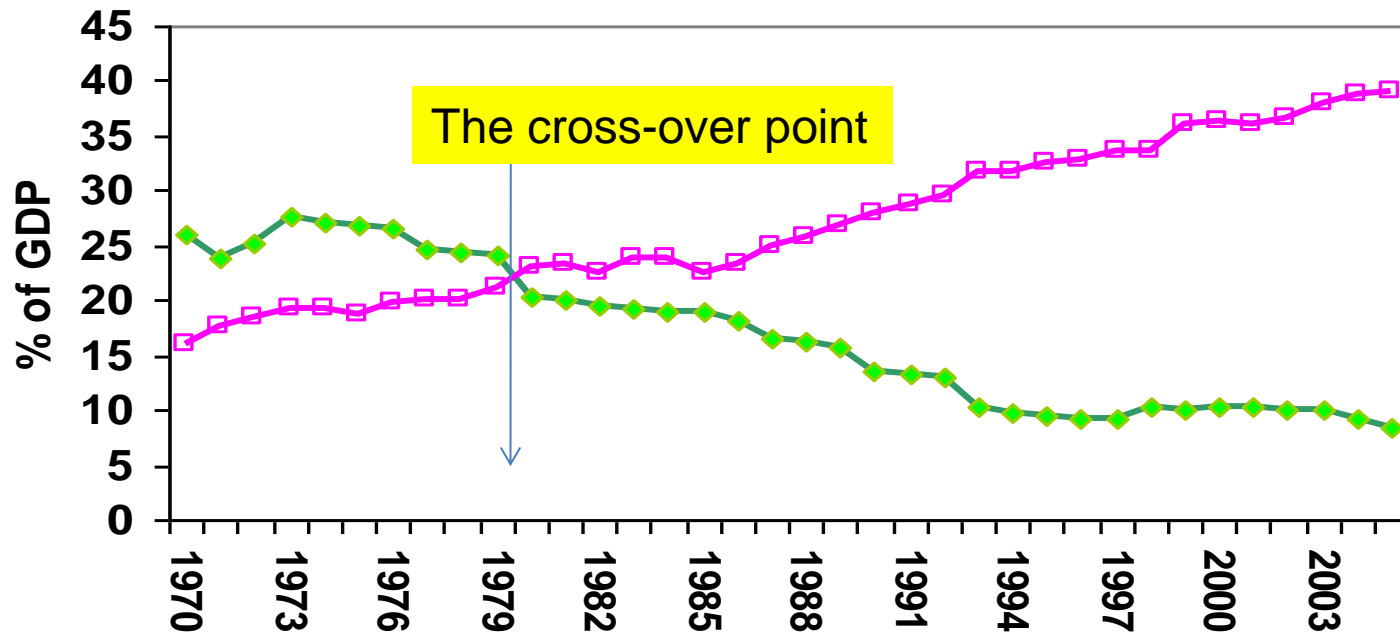
- Changing structure: output, employment, and exports
- A pessimistic view
- Agricultural productivity
- Long-term declining price trends and volatility

Stylized facts of Economic Development

- **Shares of agriculture in GDP and agricultural exports in total exports have been declining continuously over the past four decades.**
- **Agricultural export share declined from the average of 54.3 percent during the period 1979-1981 to 24 percent during the period 1989-91.**
- **By 2002, agricultural exports declined further to 12.2 percent of total exports.**
- **Until recently, the terms of trade of between agriculture and manufacture had been generally unfavorable to farmers.**

1. Thailand's output structure

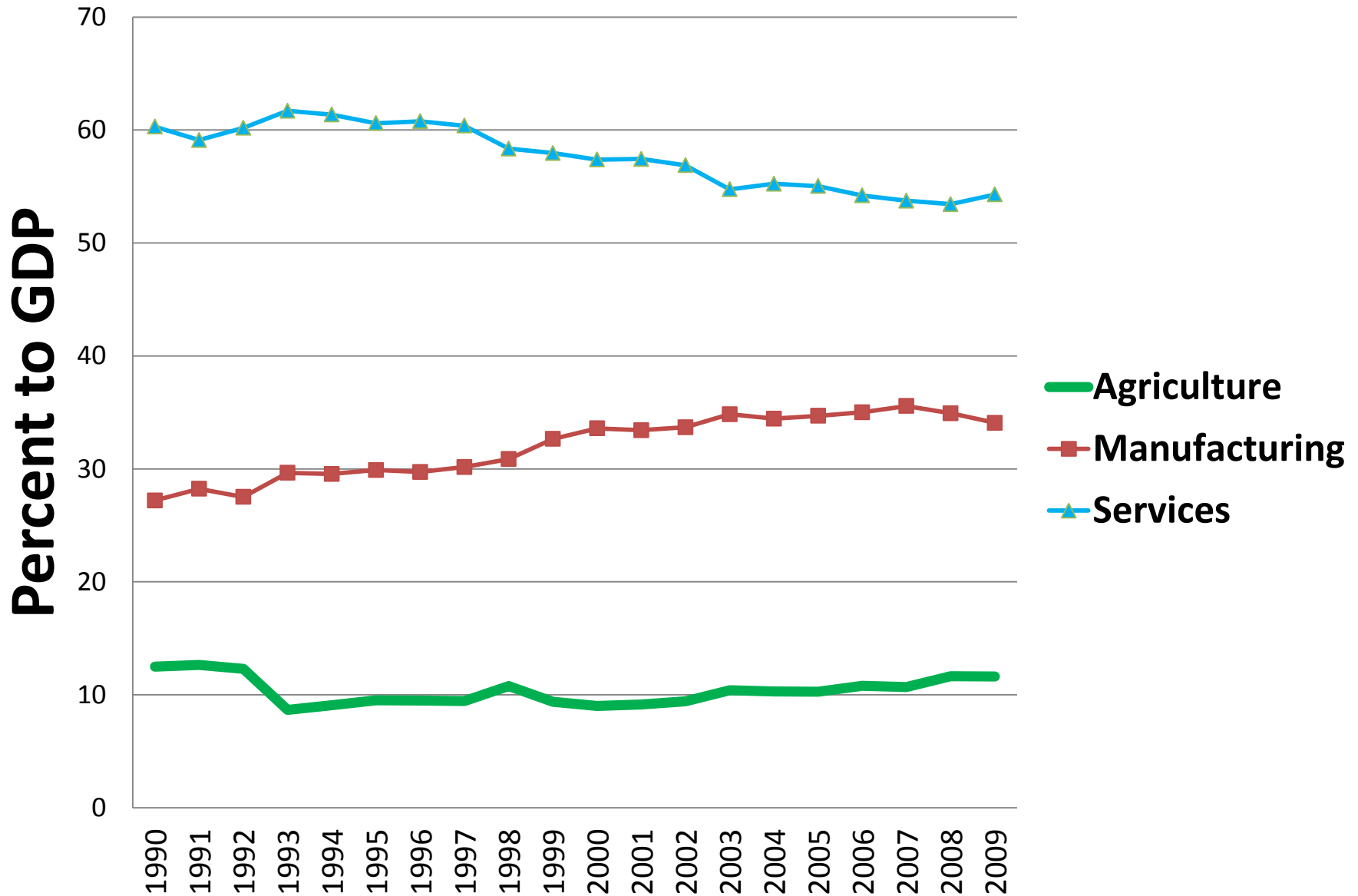
Changing Output Structure



Source: Bank of Thailand, Quaterly Report

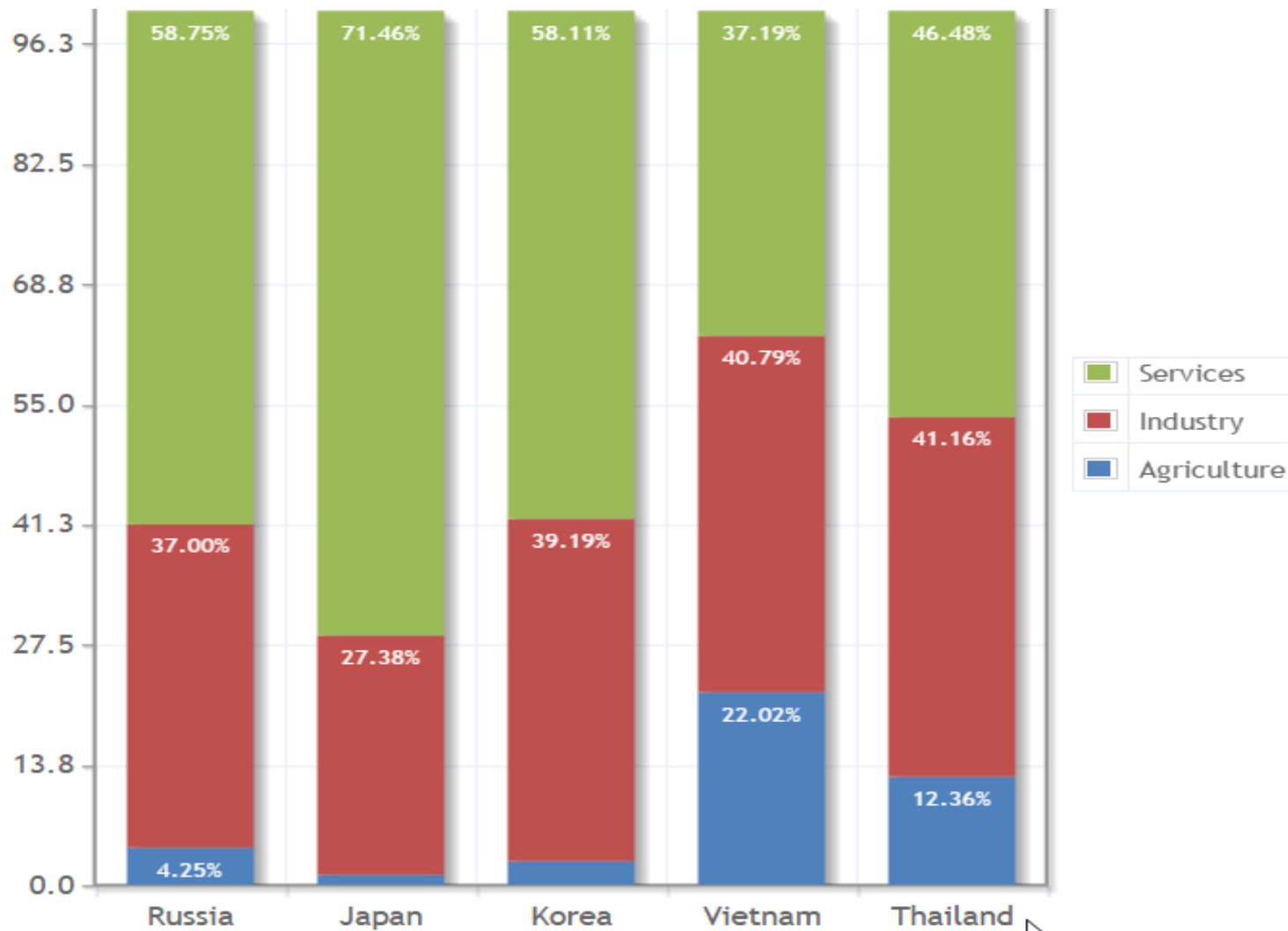
—◆— Agriculture —□— Manufacture

Output structure: 1990-2009

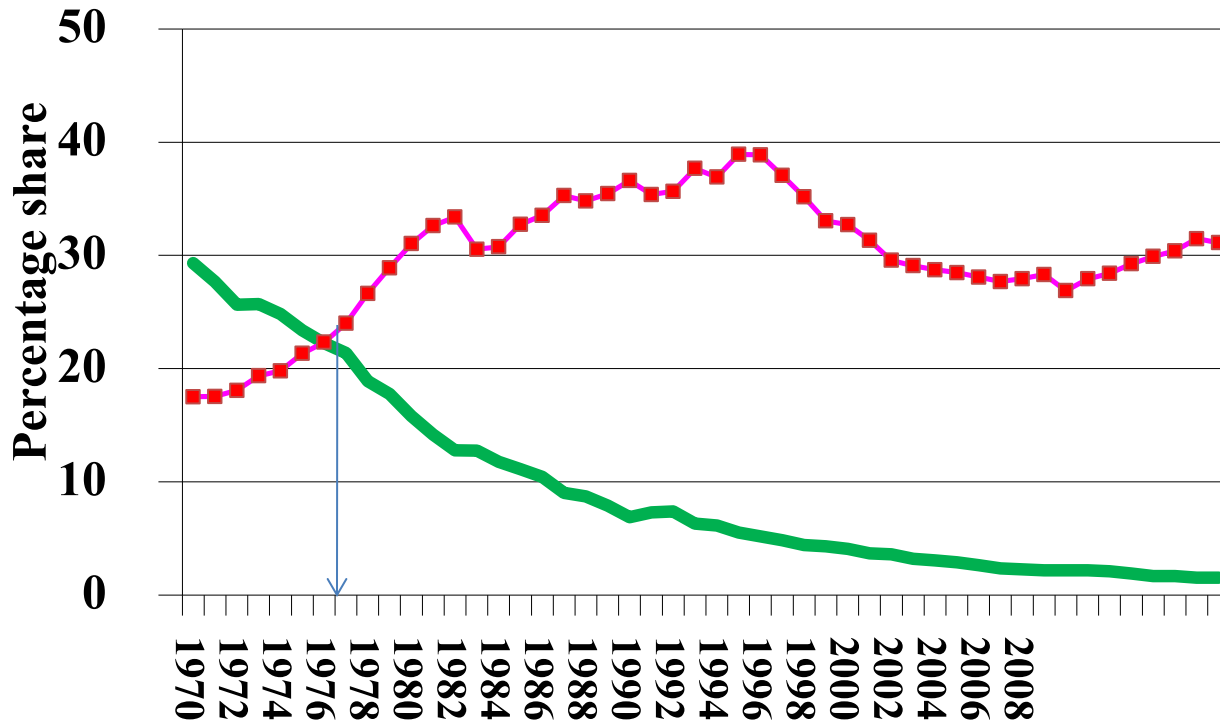


GDP Composition by Sector

in search of creative economy
and looking forward to digital economy



Taiwan

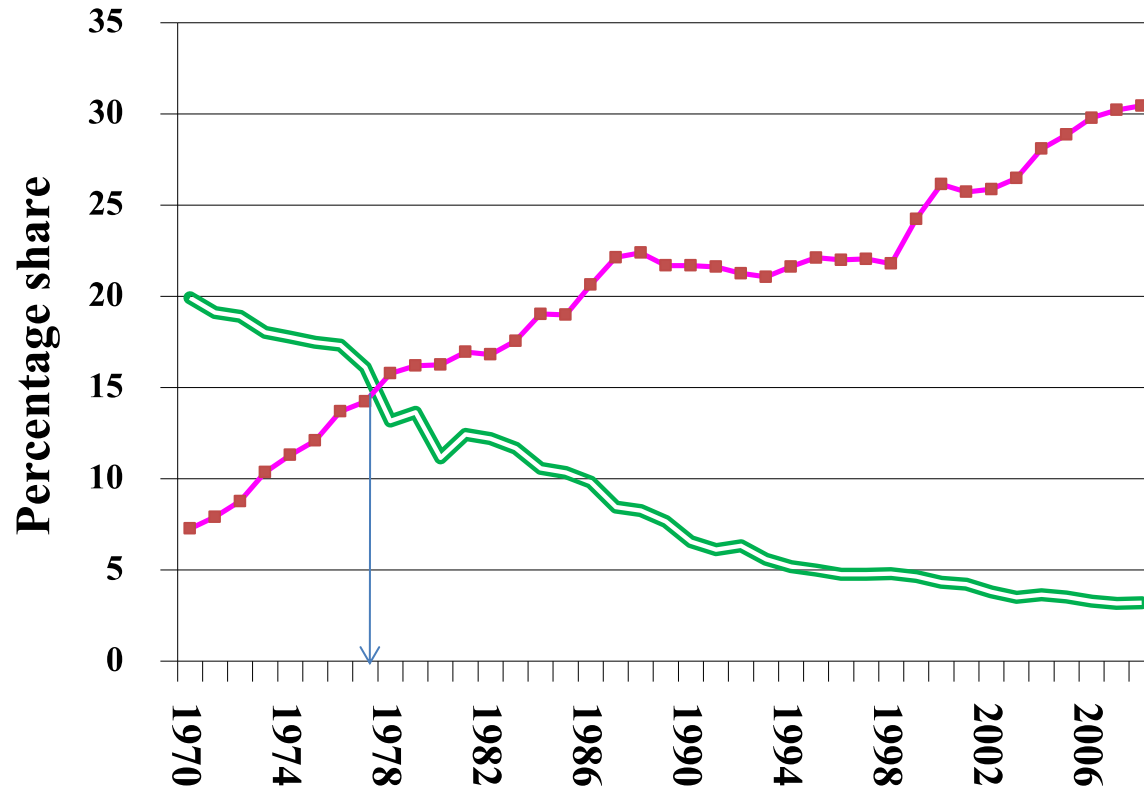


The cross-over point was experienced earlier in the four Asian Tigers

— Share of Agricultural Product (%)

—■— Share of Manufacturing Product (%)

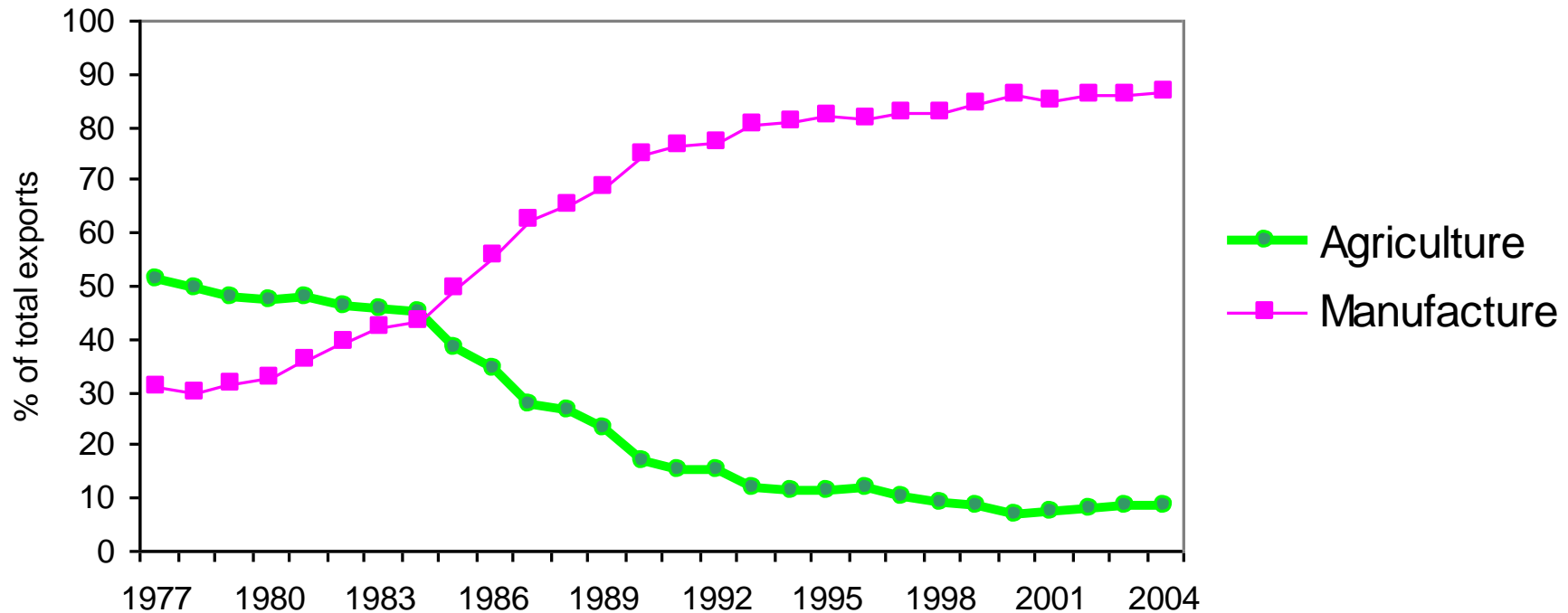
South Korea



— Share of Agricultural Product (%) — Share of Manufacturing Product (%)

2. Structure of Thailand's exports

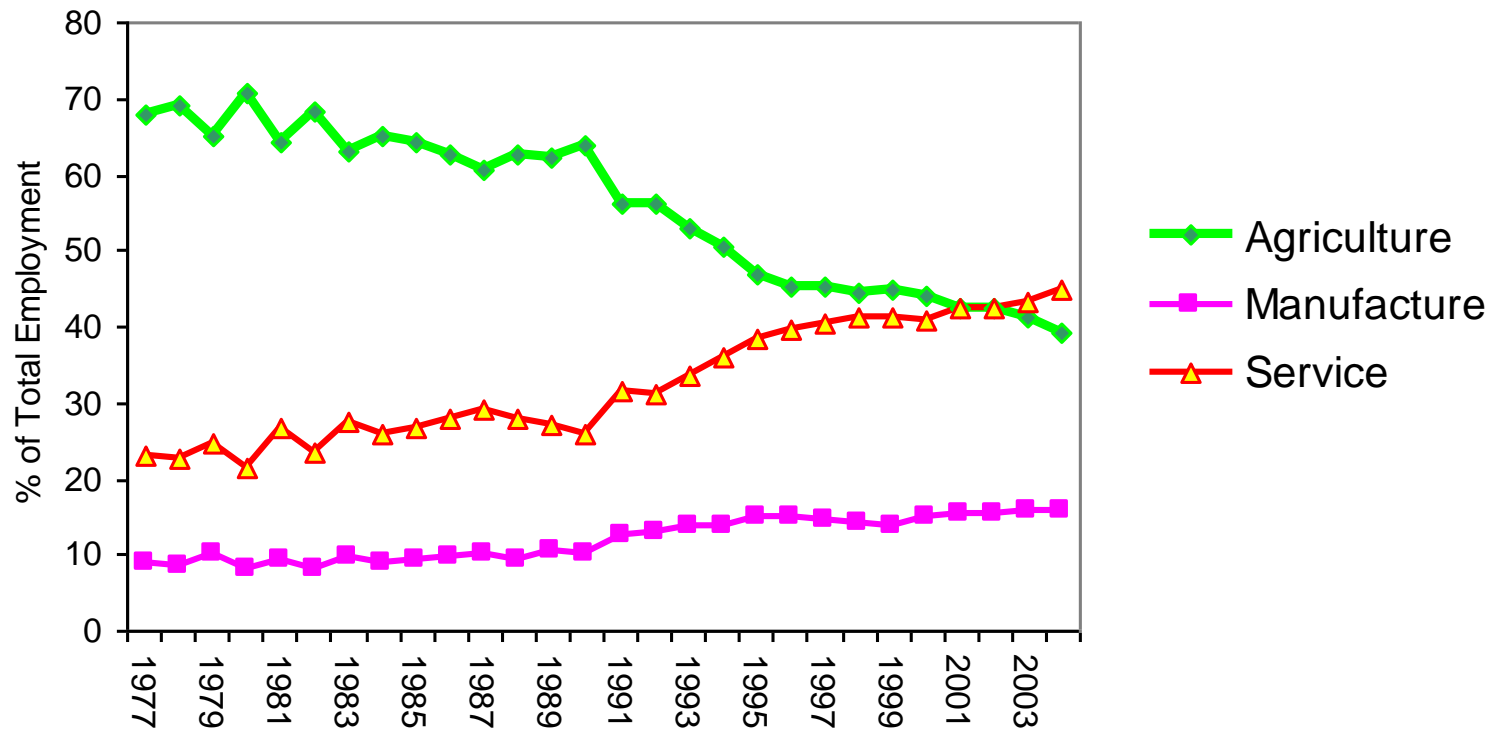
Declining importance of agricultural exports



Source: Bank of Thailand

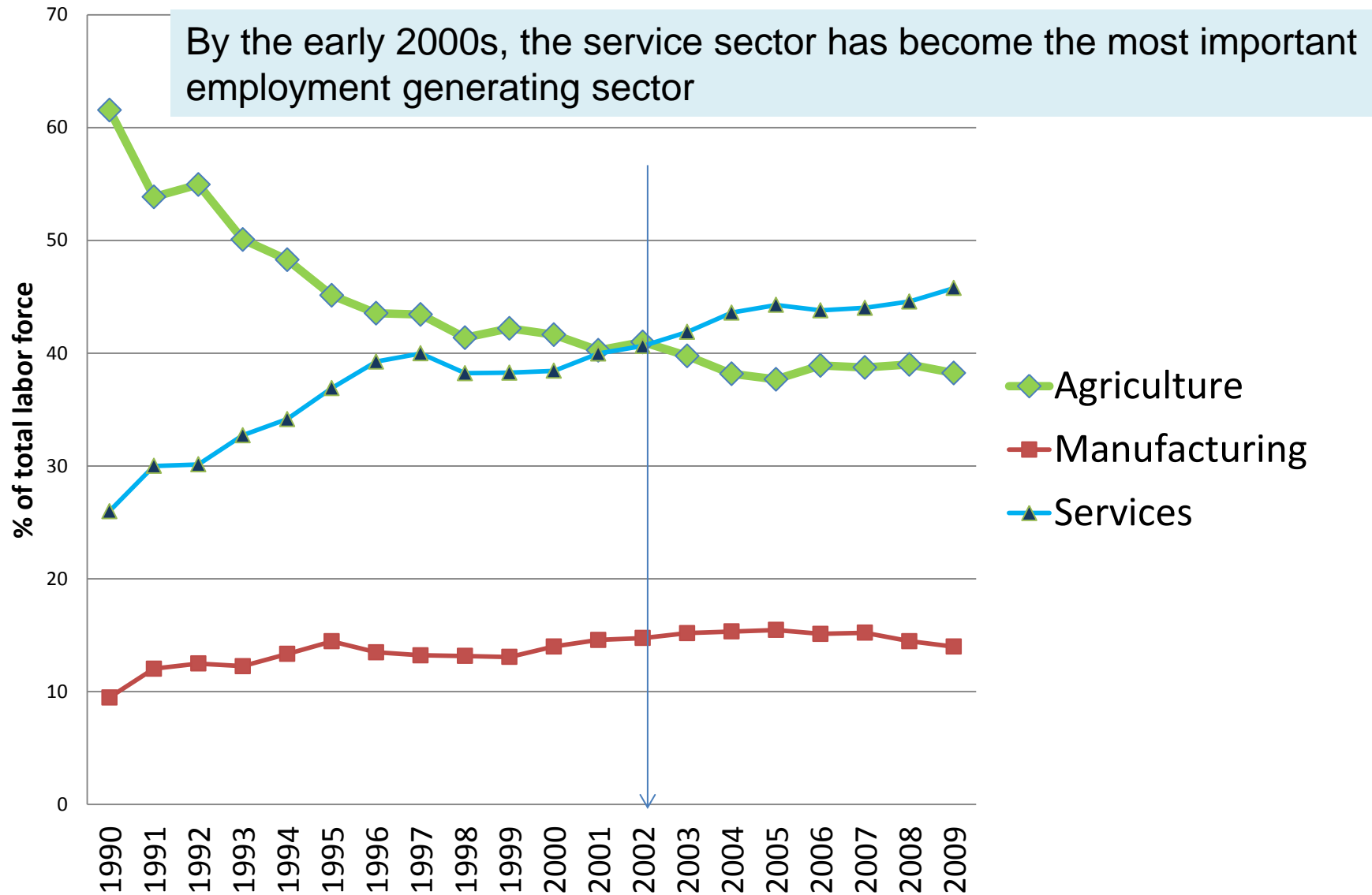
3. Employment Structure

Changing Employment Structure



Source: Bank of Thailand

Thailand's Employment structure: 1990-2009



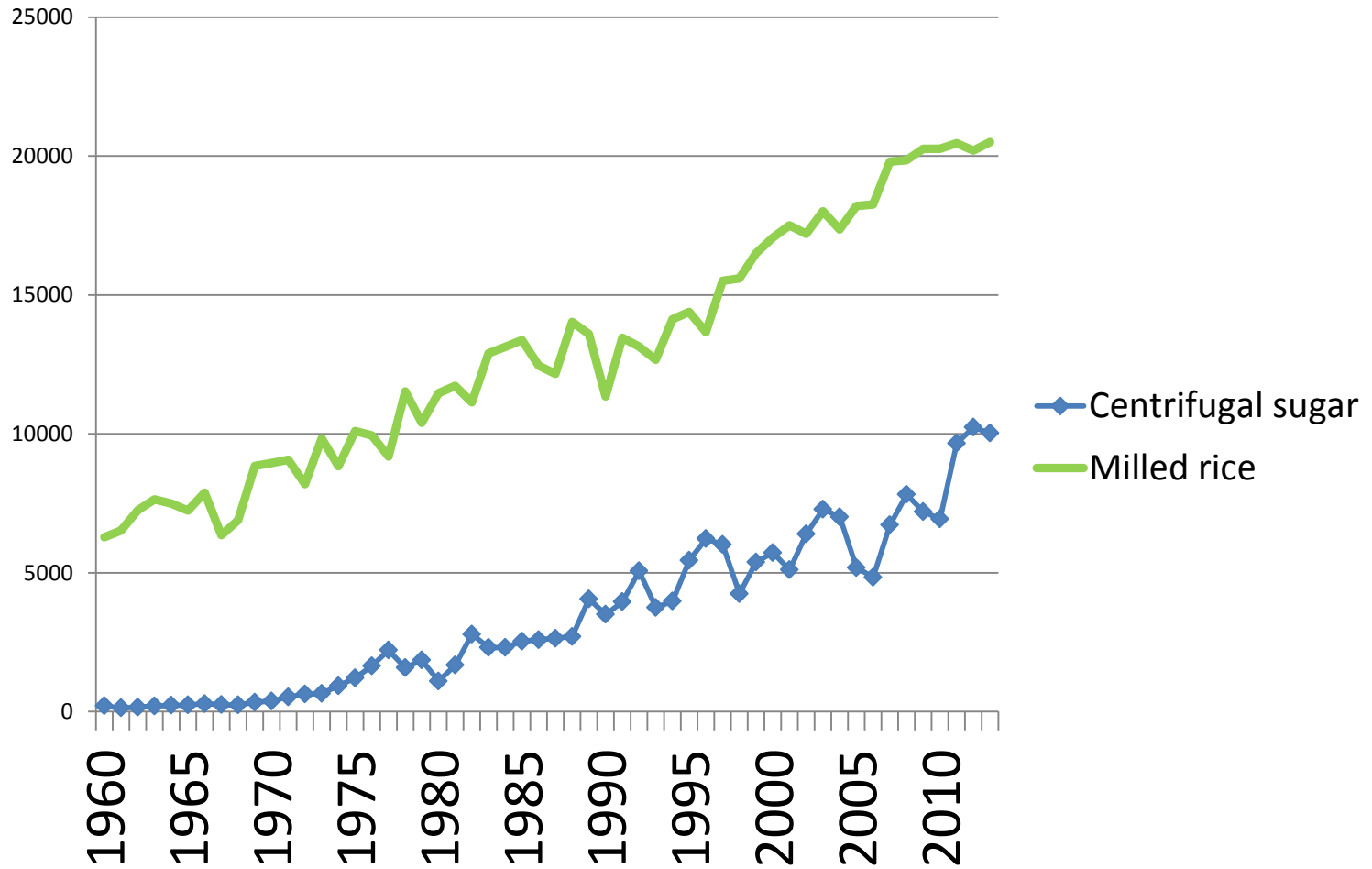
A dismal view

- **“Thailand would lose comparative advantage in agriculture as manufacturing has increasingly become more important than agriculture”.**
- **“Due to the shortage of labor and water during the dry season, with the disappearance of land in the 1980s, the future of Thai agriculture would look bleak”.**
- **Ammar Siamwalla (1996) “Thai Agriculture: From engine of growth to sunset status”**
- **Source: TDRI Quarterly Review Vol. 11, no.4**

Blame the Dutch disease

- The boom in the non-agricultural sector led to higher wage rates in urban areas.
- As a result of migration, the lack of labor ***intensified farm mechanization***, which in turn diminished employment opportunities in agriculture.
- Wage pressure and declining agricultural prices squeezed farm profits, discouraging investment and further reducing agricultural growth.

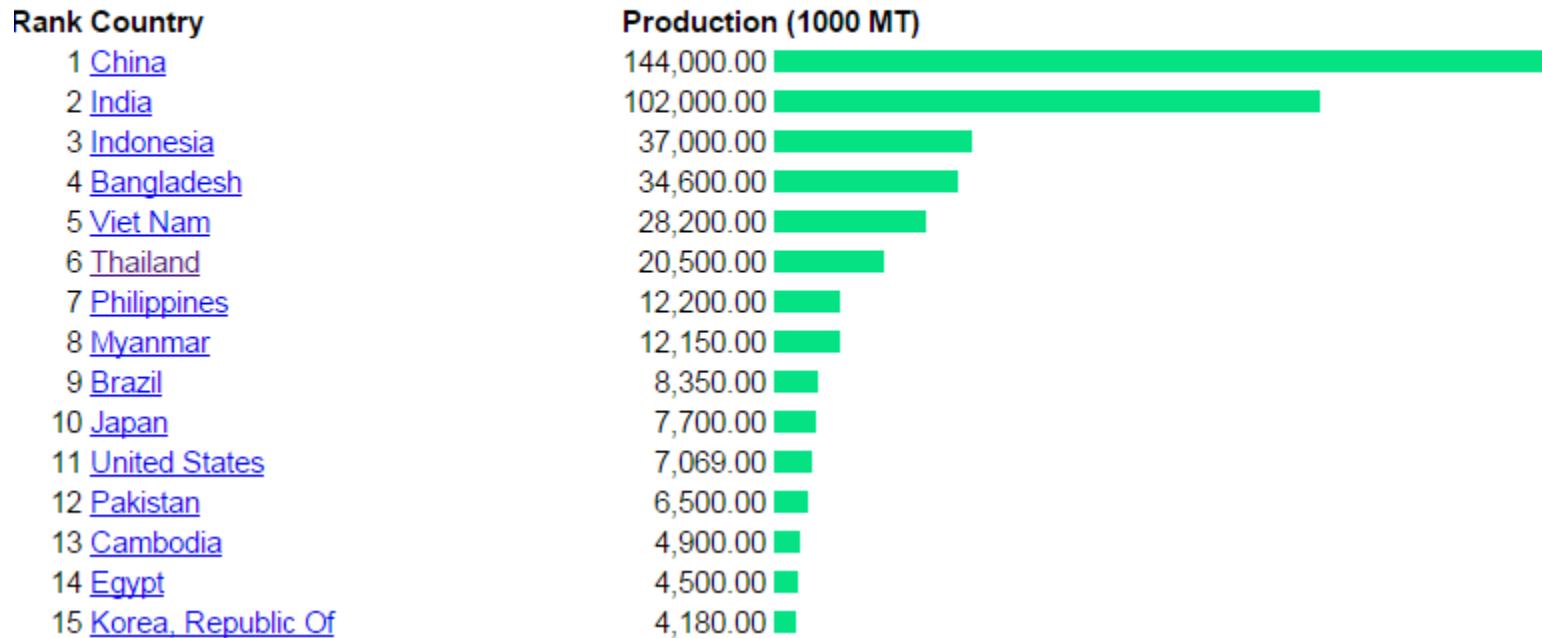
Thailand's rice and sugar production (1000 MT)



Top 15 rice growers

Milled Rice Production by Country in 1000 MT

Switch to: [Growth Rate](#) [Map](#)



Palm Oil Production

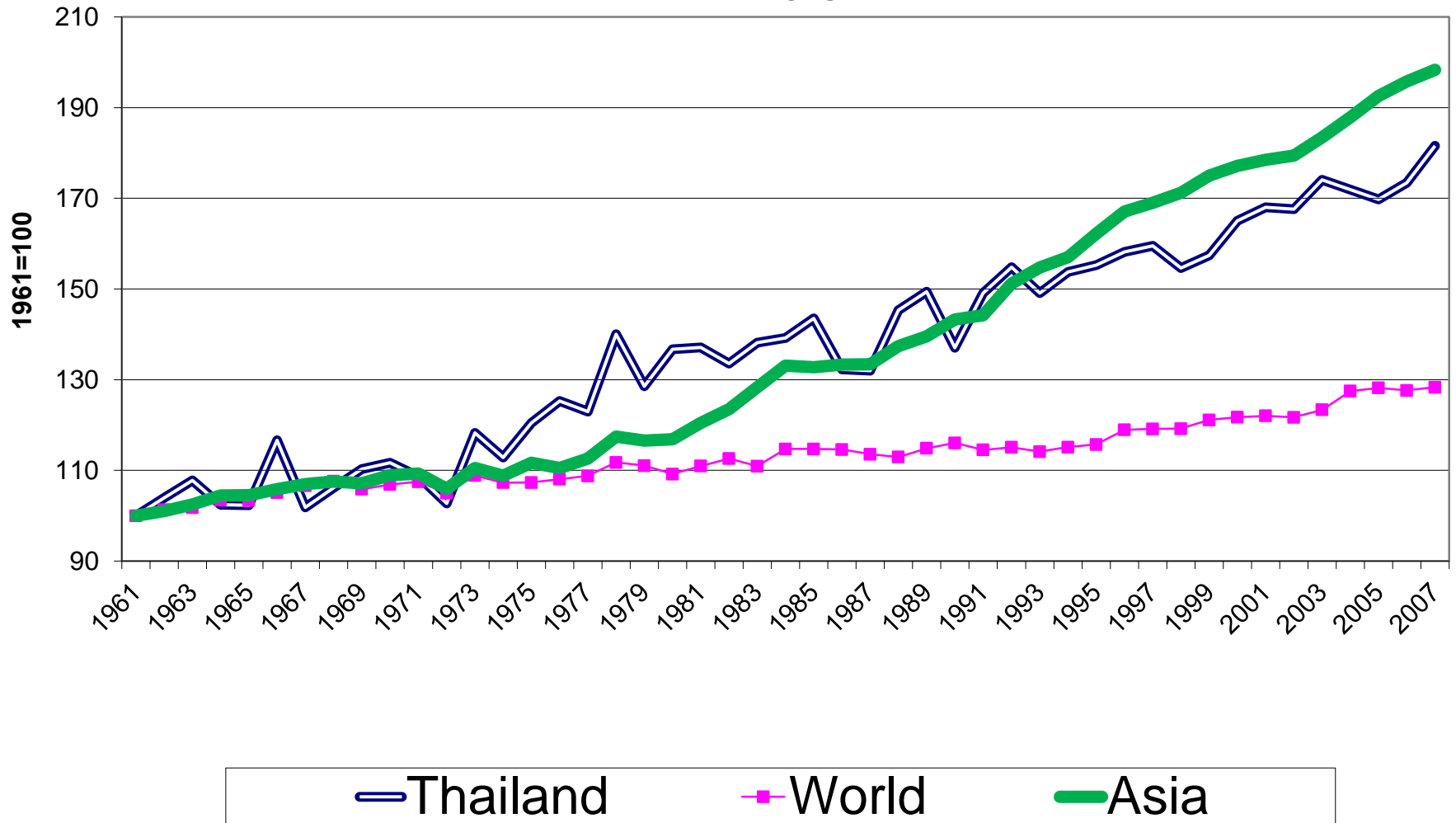
Rank Country

- 1 [Indonesia](#)
- 2 [Malaysia](#)
- 3 [Thailand](#)
- 4 [Colombia](#)
- 5 [Nigeria](#)
- 6 [Papua New Guinea](#)
- 7 [Ecuador](#)
- 8 [Honduras](#)
- 9 [Côte D'ivoire](#)
- 10 [Guatemala](#)
- 11 [Brazil](#)
- 12 [Costa Rica](#)
- 13 [Cameroon](#)

Production (1000 MT)



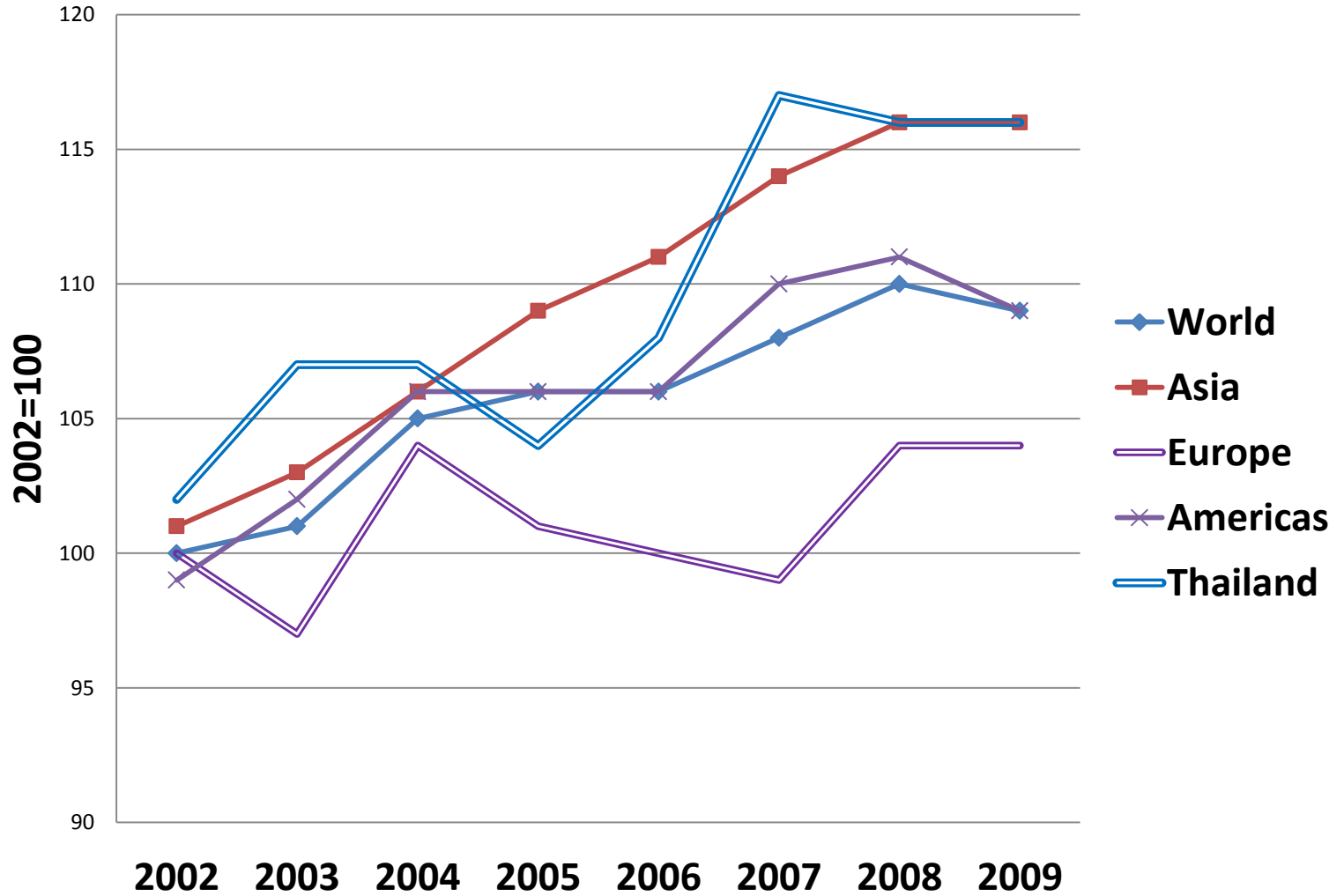
Agricultural Production per Capita Index



Thai agriculture over the last 50 years

- Per capita agricultural output in Thailand increased **faster** than the world average and industrialized countries.
- *The rapid improvement has become more pronounced since 1990s.*
- But Thailand still lags behind other countries in Asia, possibly due to the explosive growth of Chinese agriculture since 1970.
- There are still very large productivity gaps, though declining, between Thailand and developed countries.

Per capita agricultural output



Yields of major crops

- A remarkable productivity surge in rubber production after 1985.
- There were some productivity gain in maize and rice, but those increased yields were relatively small.
- For cassava, yields remained relatively low and did not show any sign of improvement from the level in 1960s.



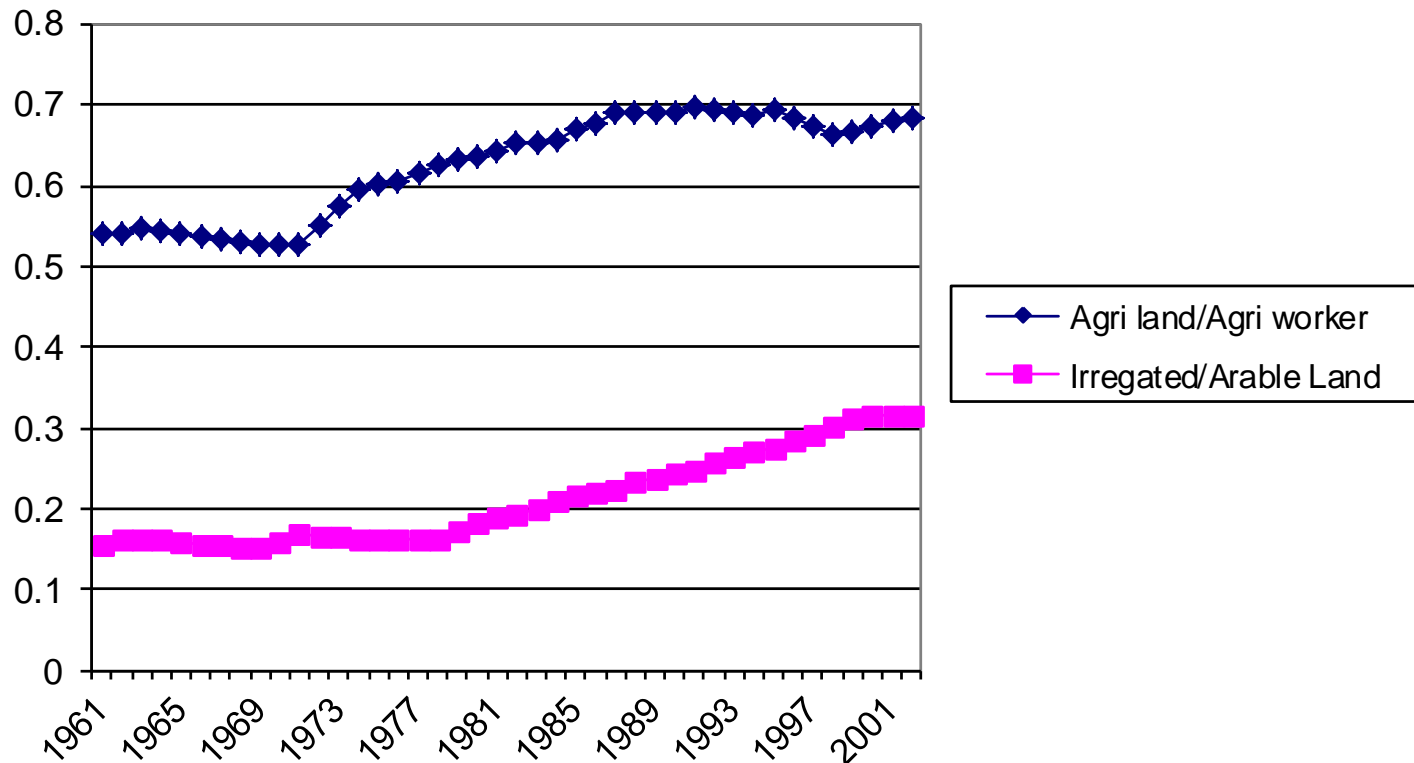
Why did rice farm productivity increase?

- Farm mechanization, fertilizer, and irrigation are responsible for such improvement.
- Large declines in imports of agricultural machinery can be attributed to large currency depreciations and expansion of domestic production of farm machinery.
- *How would the strong baht exchange rate help or hurt Thai farmers?*

Land-labor ratio

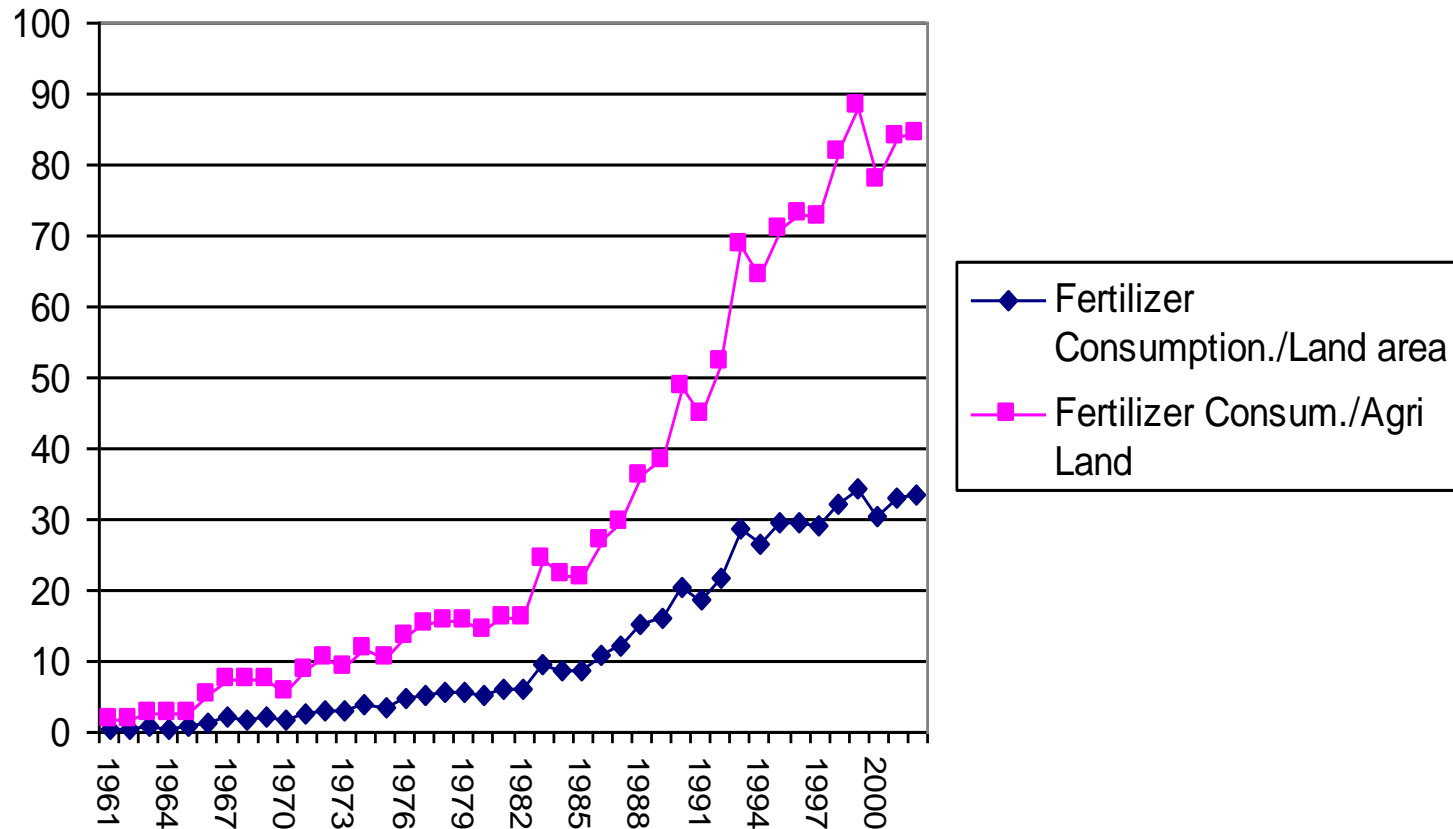
Rain-fed vs. irrigated land

Factor intensity in agriculture



High time for organic farming

Fertilizer Consumption per land
(Mt/1000 Ha)



Factor Intensities

- Continued increases in factor intensities of farm input factors, which are complement to improvement in irrigation (e.g., water pumps, threshing machine, two-wheeled and four-wheeled tractors).
- The irrigated area as a percentage of arable land increased from 15 percent in 1960 to more than 30 percent in 2000.
- Improved High-Yielding Varieties (HYV) of rice also resulted in yield improvement.
- **Irrigation** made it possible for these input factors become complement to each other.

Table 1: Factor Intensity in Agriculture: 1961- 2002

(percentage change)

Arable Land/labor	0.8
Fertilizer/Land	62.3
Irrigated/Arable Land	2.0
Imported machine/labor	16.3

Martin and Mitra (2001)

Agriculture vs. manufacturing productivity growth

- Employing panel data from **50 countries** over the period 1967-92, Martin and Mitra found that productivity growth has been ***higher for agriculture*** than manufacturing sector in both industrial and developing countries.
- The shift away from agriculture in developing countries has been driven by **higher productivity growth in agriculture.**

Martin and Mitra (2001)

Agriculture vs. manufacturing productivity growth

- “Rapid accumulation of **human capital** contributed to a strong shift out of agricultural activities and into export-oriented manufacturing industry in East Asian economies.”

FDI and Productivity

- **Although human capital accumulation in Thailand has increased rapidly in the last decade, physical capital accumulation increased at a much faster pace.**
- **Foreign direct investment and capital inflows concentrated in the manufacturing and services sectors; thereby substantially raising capital-labor ratios in both sectors.**
- **FDI in agricultural sector has been insignificant, if any.**

Thus productivity increase in manufacture was *higher* than the increase in the agricultural sector--in particular prior to the financial crisis.

In general for both LDCs and developed countries

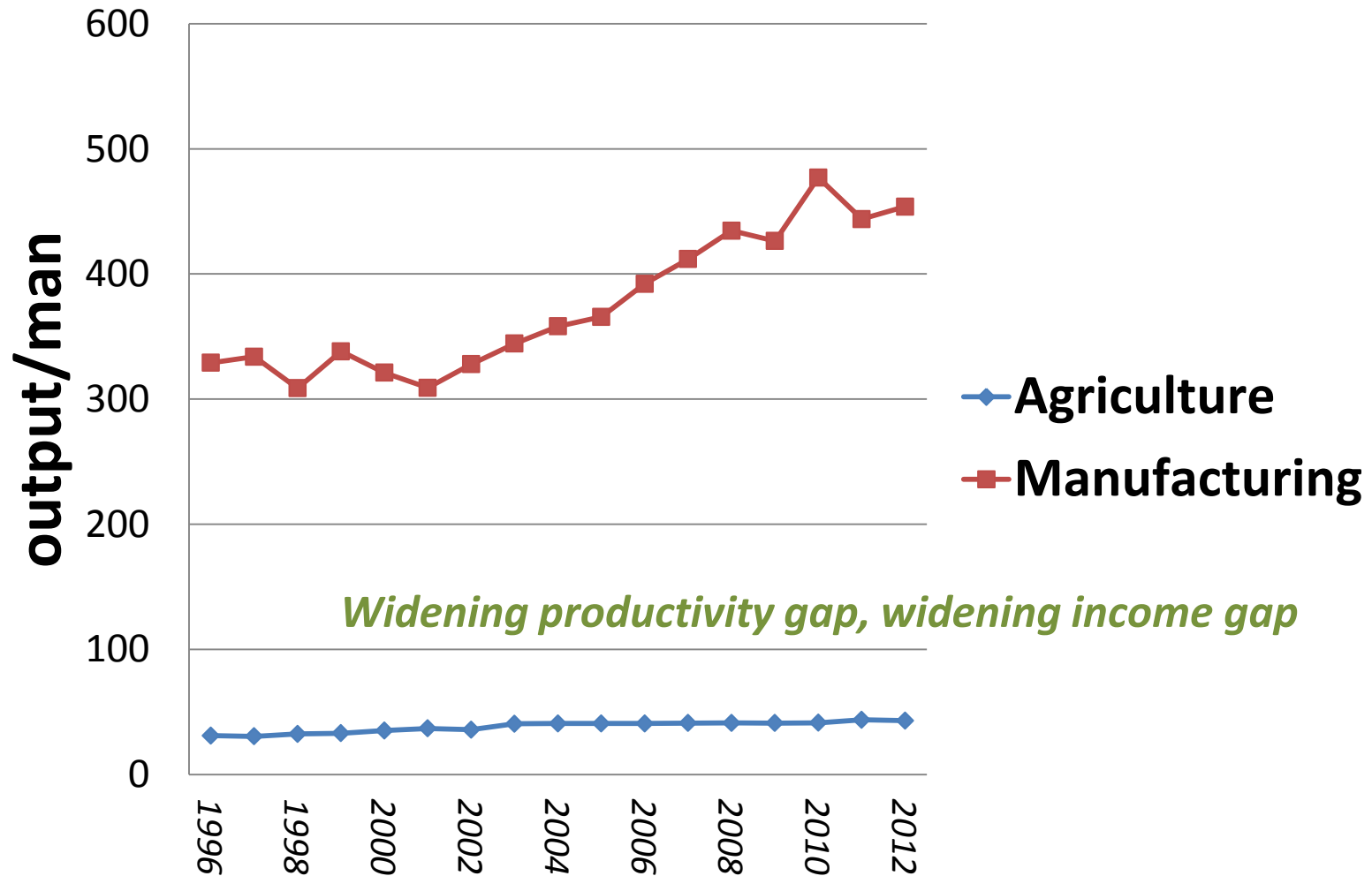
$$(MP_L)^a > (MP_L)^m$$

But in the case of Thailand

$$(MP_L)^a < (MP_L)^m$$

Average Product of Thai Labor

$AP_L = \text{Output/Labor}$



Median Ages in Various Countries

- Philippines 23
- India 25
- China 35
- Japan 45
- Thailand 34
- **Average age of farmers**
- USA 58
- Japan 66

Declining demand for farm labors in the US

- In 1935, the number of farms in the United States peaked at 6.8 million as the population edged over 127 million citizens. As the number of farmers has declined, the demand for agricultural products has increased.
- This increased demand has been met (and exceeded) with the aid of large-scale mechanization (the use of large, productive pieces of farm equipment), improved crop varieties, commercial fertilizers, and pesticides.
- The need for human labor has also declined as evidenced by the increase in agricultural labor efficiency over the past century – from 27.5 acres/worker in 1890 to 740 acres/worker in 1990 (or 26.9 % every year)
- *From 1961 to 2002, land/worker increased by just 0.8%*

The graying of American farm population

- As the U.S. farm population has dwindled, the average age of farmers continues to rise.
- In fact, about sixty percent of the farmers in this country are 55 years old or older (Bureau of Labor Statistics).
- The average age of a principal operator of a farm has increased from 54 years old in 1997 to **57** years old in 2007.
- The percentage of principle farm operators 65 years or older has increased almost 10 percent since 1969.
- The graying of the farm population has led to concerns about the long-term health of family farms as an American institution.
- This graying farm labors also experienced in Japan and Thailand.

Why has the majority of Thailand's labor force remained in agriculture?

- From 1985 to 2003, the ratio of output per worker in manufacturing sector increased by **eightfold**, while the same ratio in the agricultural sector increased less than twofold.
- **Productivity gap** between the two sectors remains as large as before if not widening.
- High capital-labor ratio in the manufacturing sector implies **limited capacity** to generate employment.
- The shift out of the agricultural sector has been ***painfully slow***.

In the case of Thailand

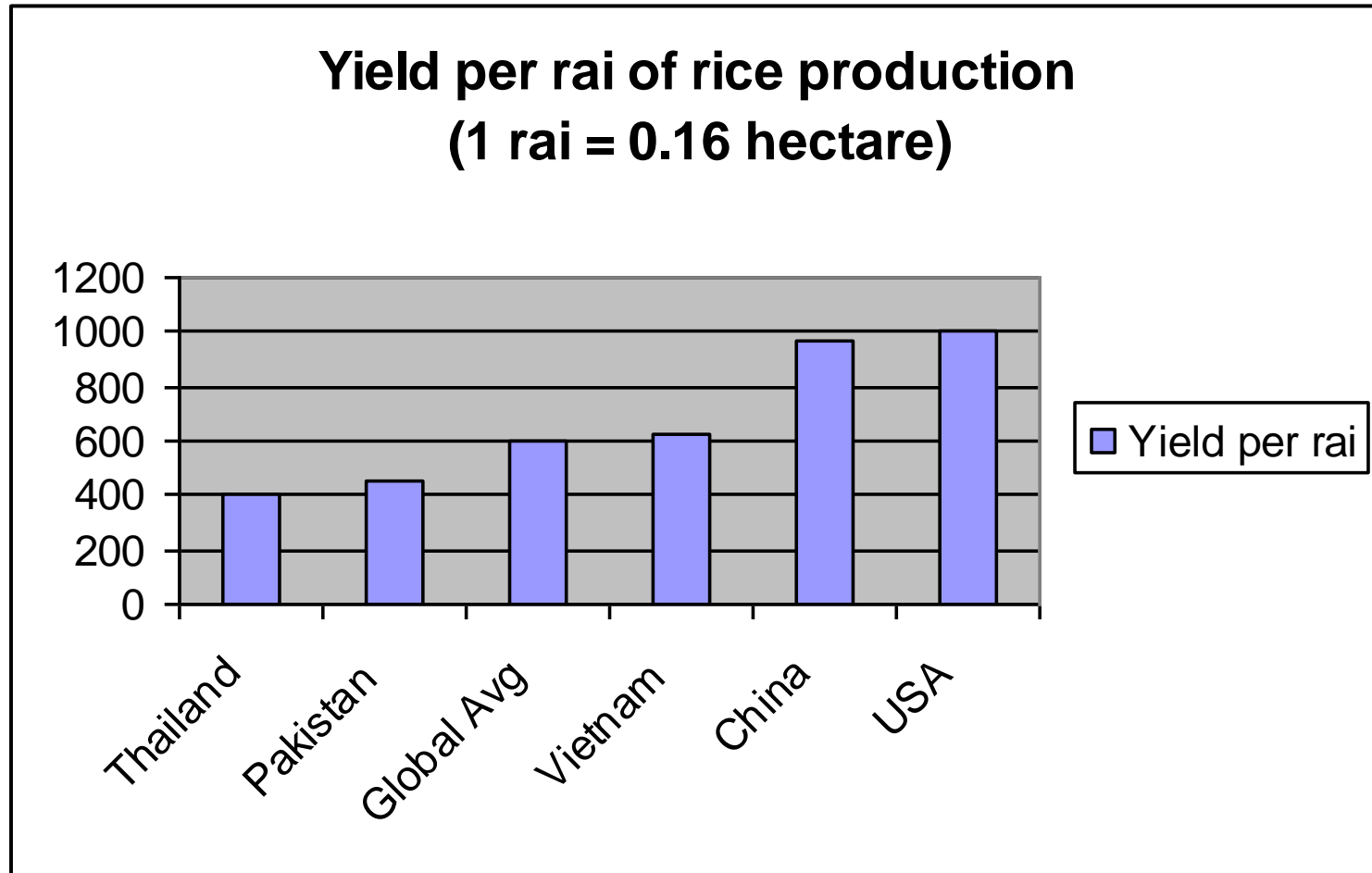
$$\left(\frac{K}{L}\right)^a < \left(\frac{K}{L}\right)^m$$



Heterogeneous production function

- According to Johnson (1991), American agriculture has a capital-labor ratio that is **six** times the ratio in manufacturing.
- Agriculture in developed countries are **more** capital intensive than developing countries.
- What happens when Thai agricultural labors are deprived of vital inputs: water, fertilizer, machinery, and irrigated land?
- Output per land (yield per rai), and output per farmer is very low.

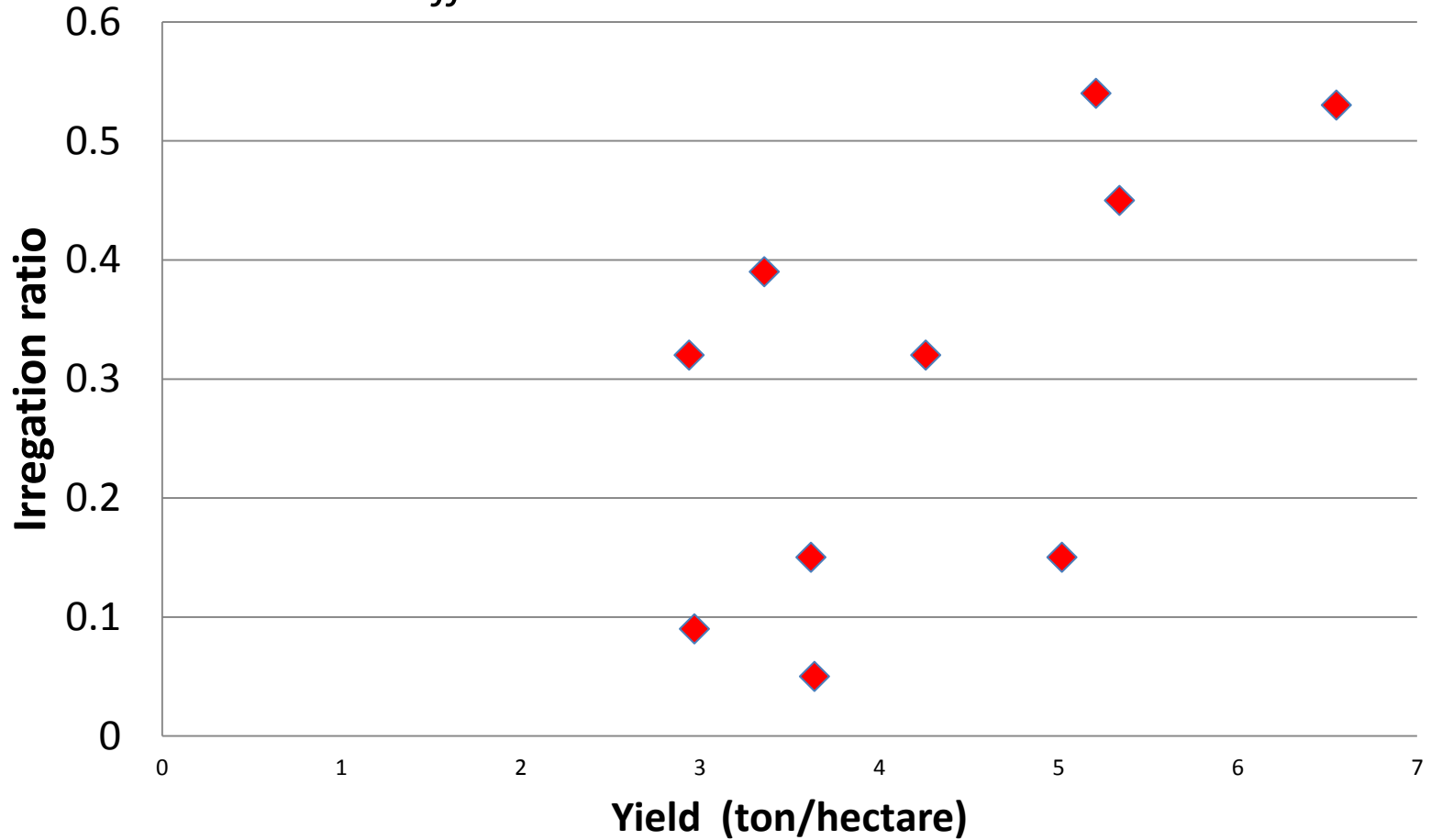
Explain why Thailand has the lowest yield in rice production but managed to be number one rice exporter in the world.



	Yield(ton/hectare)	Irrigation ratio
Myanmar	3.64	0.05
Cambodia	2.97	0.09
Indonesia	5.02	0.15
Philippines	3.62	0.15
South Korea	4.26	0.32
Thailand	2.94	0.32
India	3.36	0.39
Vietnam	5.34	0.45
China	6.55	0.53
Japan	5.21	0.54

Rice yeild and irregation: International Comparision

correlation coefficient = 0.63

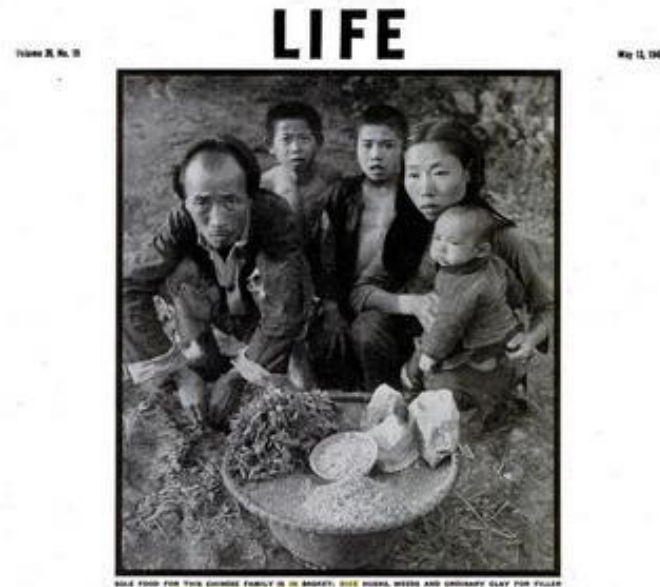


China's super rice

- The new Chinese rice breed yields 1,000 kg per rai (0.16 hectare).
- China's *super rice* breed yields 2,000 kg per rai.
- Thai farmers harvest only 400kg per rai.
- "*Pathum Thani 1*" one of the best cross-breeds yields only 500kg per rai.
- Since investment in new breeds leads to falling price, which might spark protests, the government was reluctant to invest in rice growing.

China Famine: 1956-1961

Presently, Chia is still a net importer of rice
China's objective is to reduce grain dependency



SOLE FOOD FOR THIS CHINESE FAMILY IS IN BASKET; RICE HURDS, WHEAT AND ORDINARY CLAY FOR FUEL

CHINA FAMINE

MILLIONS ARE STARVING IN THE ONCE-RICH "RICE-BOWL"

Famine. Like a three-headed bear, today stalks China. The affliction of drought, overuse and war's aftermath scars even her richest lands. Her poorest people, long trained to suffer, are starving by the million because there is not enough food. Hunan province, once so rich with green fields of growing rice that it was called "China's rice bowl," is now her most devastated area. Hunan's fields are wasted dead by drought. All but a few of her railroad bridges are rubble, having been blown up to resist the Japanese. An estimated 10,000,000 of Hunan's 27,000,000 people rely for sustenance on a diet (about) of green weeds, rice husks, grasses and ordinary clay which they call "Godskin of

Heaven." The poorest leader of the small Hunan village of Chi Ho told LIFE Correspondent William Greer. "The clay adds bulk to the weeds and rice husks and makes their meal more heavy." But no matter what the Chinese add to their poor food they do not magically change it into rice. And that is China's greatest trial, for normally rice farms up to 70% of her people's daily diet.

From the Great Wall to French Indo-China, wherever Chinese lands were gripped by occupying Japanese, the story is virtually the same as in Chi Ho, which had a population of 149 people two months ago and now has only 80 left. Of the remainder, 30 died from starvation and 19 went to

the neighboring city of Hangchow, 17 miles distant, to beg in the streets.

The grim facts of China's famine are like an actor's tale that has suddenly taken on a terrible meaning. Because the land is ruined there is not enough rice in China; and because the Japanese killed the water buffets that pulled the plow, the farmers themselves must now pull the plow or turn the land by hand; and because half-starved men cannot do such heavy work, two thirds of China's rice fields lie idle; and because the land is untilled there is not enough rice. What happens to China where there is not enough rice is shown on the following pages.

NOTICE TO READERS

This issue of LIFE is smaller than normal in number of pages and of regular price. It was cut from usual size when the Chicago power emergency, caused by coal strikes, made it impossible to run LIFE's presses at more than a fraction of capacity. Closing of Chicago subscription offices will delay handling LIFE subscription mail.

Conclusion

- Public investment in irrigation is required to reduce the number of rain-fed farming.
- Productivity of irrigated farm is higher by water supply which is required by new high yielding varieties.
- Different rice farming technology implies different production function and capital-labor ratio, which is rising as farmers are ageing.

Midterm Questions

October 8, 2015

- 1. “Hyperinflation leads to dollarization.” State whether you agree or disagree with the statement and provide reasons.
- 2. Discuss the resilience of the Thai economy after experiencing internal and external shocks.
- 3. Compare and contrast the root causes of the Asian Financial Crisis and the Global Financial Crisis. Also discuss how Thailand coped with the crises.

Midterm Questions

October 8, 2015

- 4. How inclusive are political institutions in Thailand? How has the quality of institutions affected Thailand's economic development?
- 5. In 2011, the daily minimum wage was raised from 250 baht to 300 baht. Examine whether the wage hike has led to inflation, poverty reduction, and exodus of Thailand's direct investment to neighboring countries.