# EE460: Thailand's Processed Food Industry

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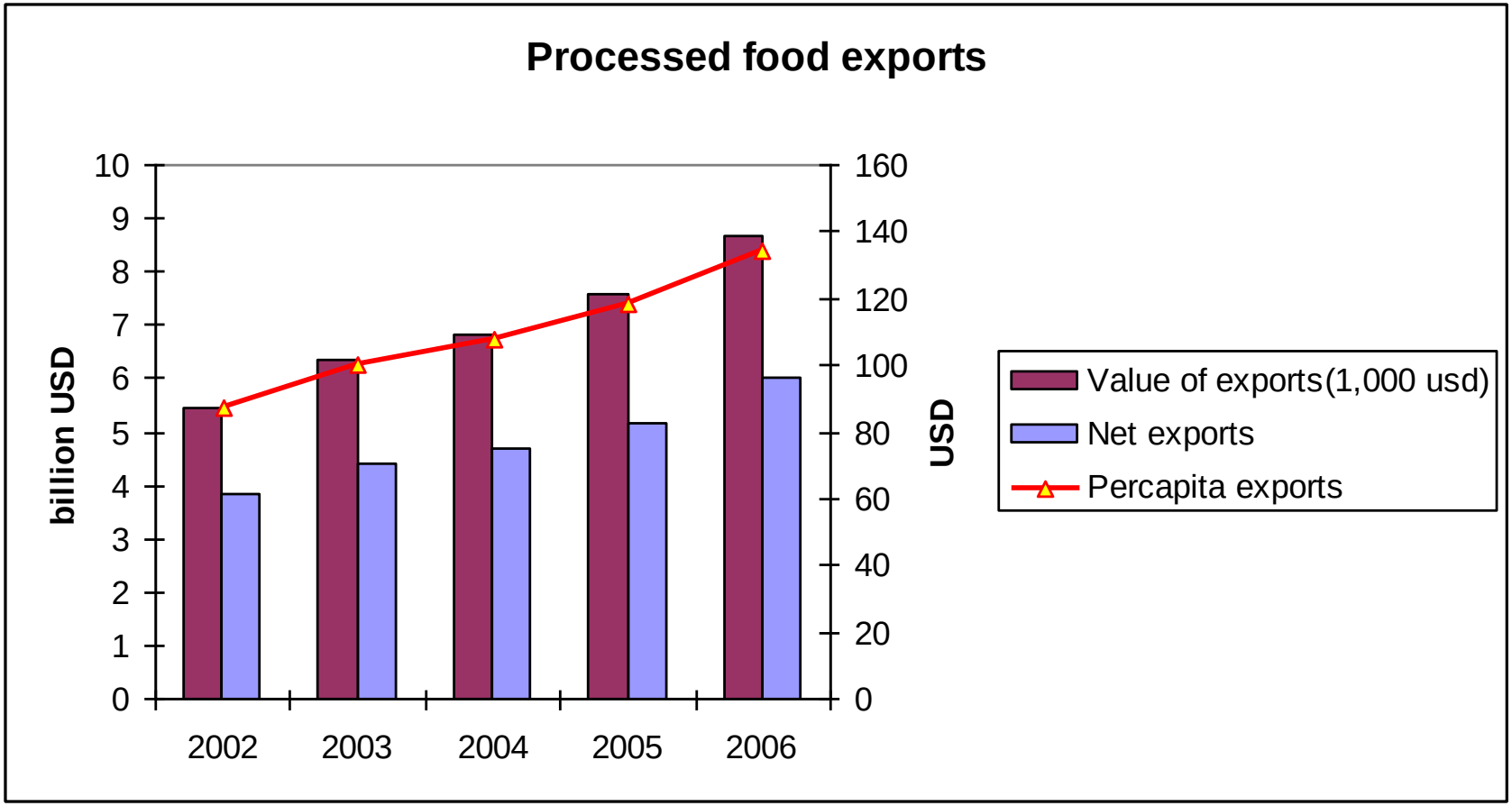
Lecture 17

# Outline

- Importance of the industry
- Trade Performance
- Canned pineapple
- Export competitiveness
- Processed chicken
- Frozen shrimp
- SPS measures and impacts
- Response to NTBs

# Net exports amounted to 70% of gross exports




**Source: UNCTAD/intracen.org**

# Herfindahl-Hirschman Index

$$HHI = \sum_{i}^{N} s_i^2$$

Source: Department of Justice , USA.

- where $s_i$ is the market share of firm *i* in the market, and *N* is the number of firms. Thus, in a market with two firms that each have 50 percent market share, the Herfindahl index equals $0.50^2+0.50^2 = 1/2$.

- The term “HHI” means the Herfindahl–Hirschman Index, a commonly accepted measure of market concentration. The HHI is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers.

# Herfindahl-Hirschman Index

$$HHI = \sum_{i}^{N} s_i^2$$

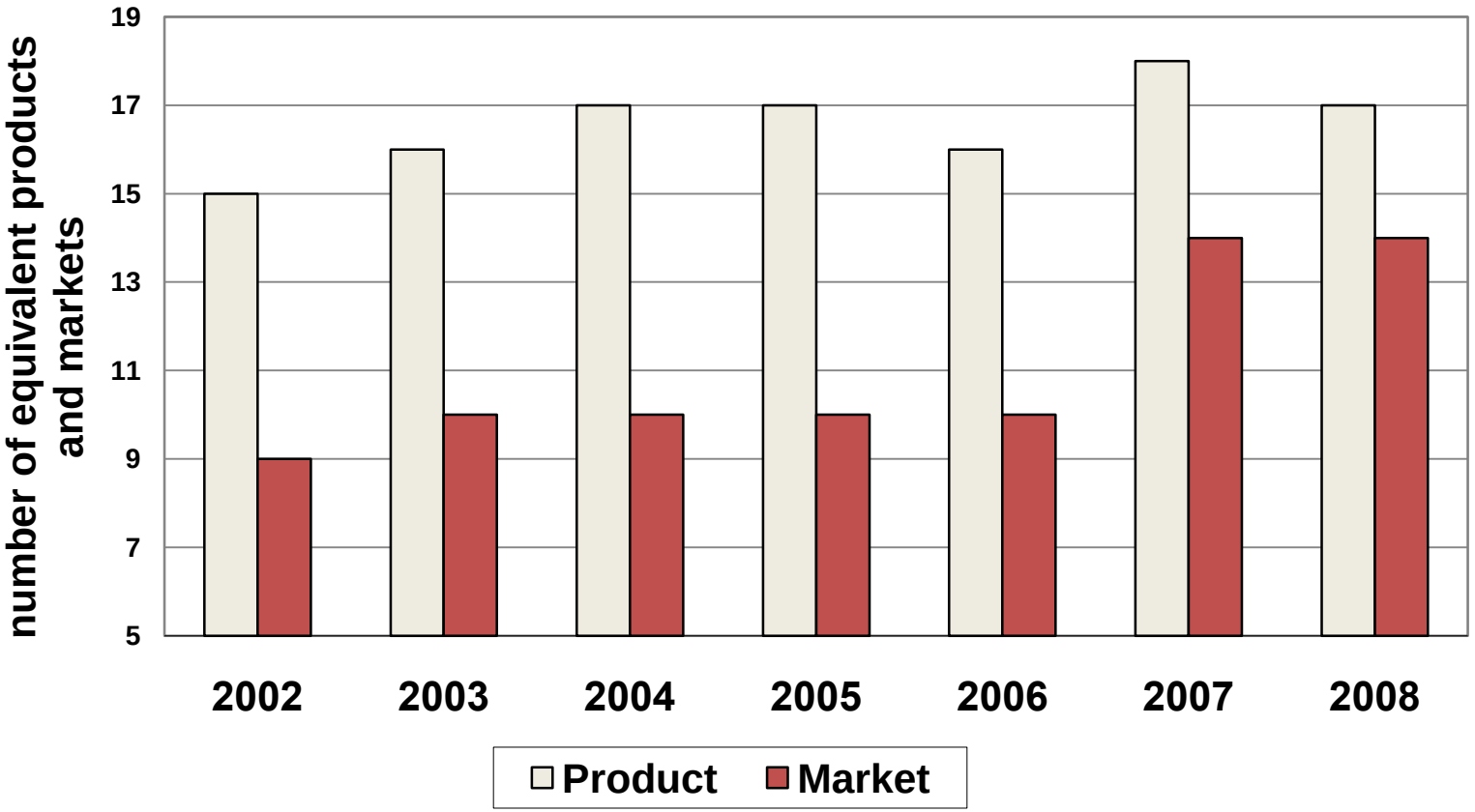
- For example, for a market consisting of four firms with shares of 30, 30, 20, and 20 percent, the HHI is 2,600 ($30^2 + 30^2 + 20^2 + 20^2 = 2{,}600$).

- The Herfindahl Index (*HII*) ranges from 1/*N* to one, where *N* is the number of firms in the market. Equivalently, if percents are used as whole numbers, as in 75 instead of 0.75, the index can range up to $100^2$, or 10,000.

- A HHI index below 0.01 (or 100) indicates a highly competitive index.
  A HHI index below 0.15 (or 1,500) indicates an unconcentrated index.

# Export diversification of processed food: product and market diversification

A diversity index (an ***inverse*** of Herfindahl-Hirschman Index, which captures degree of market concentration)




**Source: UNCTAD/intracen.org**

| Thailand's Trade Performance Index in 2011<br>Indicator's Description | Processed food<br>(Value) | Processed food<br>(Rank) |
|---|---|---|
| Number of exporting countries for the ranking in the sector | 171 | |
| Value of exports (in thousand US$) 2011 | 19,002,589 | |
| Export growth in value, p.a. (%) | 16% | 37 |
| Share in national exports (%) | 8% | |
| Share in national imports (%) | 2% | |
| Relative trade balance (%) | 53% | |
| Relative unit value (world average = 1) | 1.2 | |

**Source: UNCTAD/intracen.org**

| | Value | Rank (total 171 countries) |
|---|---|---|
| Net exports (in thousand US$) | 13,255,147 | 6 |
| Per capita exports US$/inhabitant) | 296.6 | 43 |
| Share in world market (%) | 2.67% | 14 |
| Product diversification (N° of equivalent products) | 16 | 42 |
| Product concentration (Spread) | | 42 |
| Market diversification (N° of equivalent markets) | 15 | 20 |
| Market concentration (Spread) | | 20 |
| Relative change of world market share p.a (%) | 5.80% | |

**Source: UNCTAD/intracen.org**

# Benefits from processed food industry

- Less reliance on imported raw materials: high value added.
- Low capital intensity: creating more jobs
- Close links with the agricultural sector
- Output and exports reflect changing comparative advantage.
- Wider scope for ***product differentiation*** than traditional agricultural commodities.

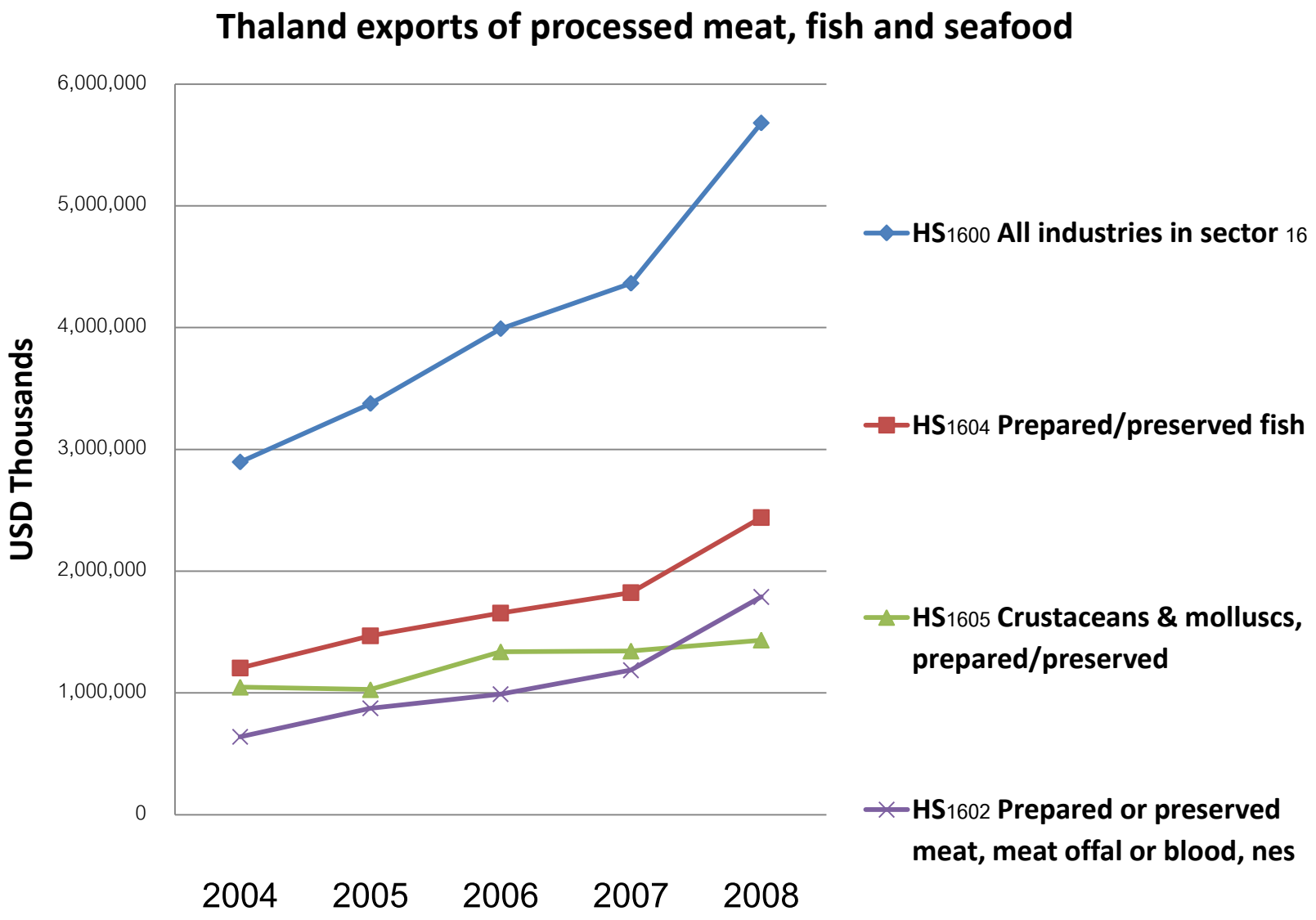
# Trade Performance HS : Exports of meat, fish and seafood food preparations (2011, in USD thousands)

| Rank | Country | Exports as a share of total exports (%) | Exports as a share of world exports (%) | Growth of exports in value (% p.a.) | Growth of exports in volume (% p.a.) | Growth of share in world exports (% p.a.) | Number of exported products | Share of top 3 exported products (%) | Number of export markets | Share of top 3 export markets (%) | Specialisation (Balassa Index / RCA Index ) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | **World** | 100 | 0.24 | 8 | 1 | 1 | 26 | 40.2 | 219 | 34.6 | |
| 1 | **China** | 0.41 | 17.67 | 8 | | 0 | 25 | 53.4 | 150 | 66.4 | 1.7 |
| 2 | **Thailand** | 3.16 | 16.26 | 13 | 5 | 6 | 25 | 84.4 | 171 | 60.6 | 13.2 |
| 3 | **Germany** | 0.22 | 7.37 | 7 | 5 | -1 | 26 | 56.4 | 119 | 39.7 | 0.9 |
| 4 | **USA** | 0.13 | 4.17 | 9 | 6 | 2 | 26 | 54.8 | 124 | 62.7 | 0.5 |
| 5 | **Brazil** | 0.66 | 3.81 | 3 | -3 | -5 | 16 | 85.2 | 139 | 53.9 | 2.8 |

Country rank (6) Netherlands
(7) Denmark, (8) Spain (9) Belgium (10) France (11) Vietnam (12) Poland (13) Italy

# Major processed food exports

- Processed seafood: caned tuna, fresh and frozen shrimp
- Processed meat: chicken, pork
- Processed vegetable and fruit: canned pineapple

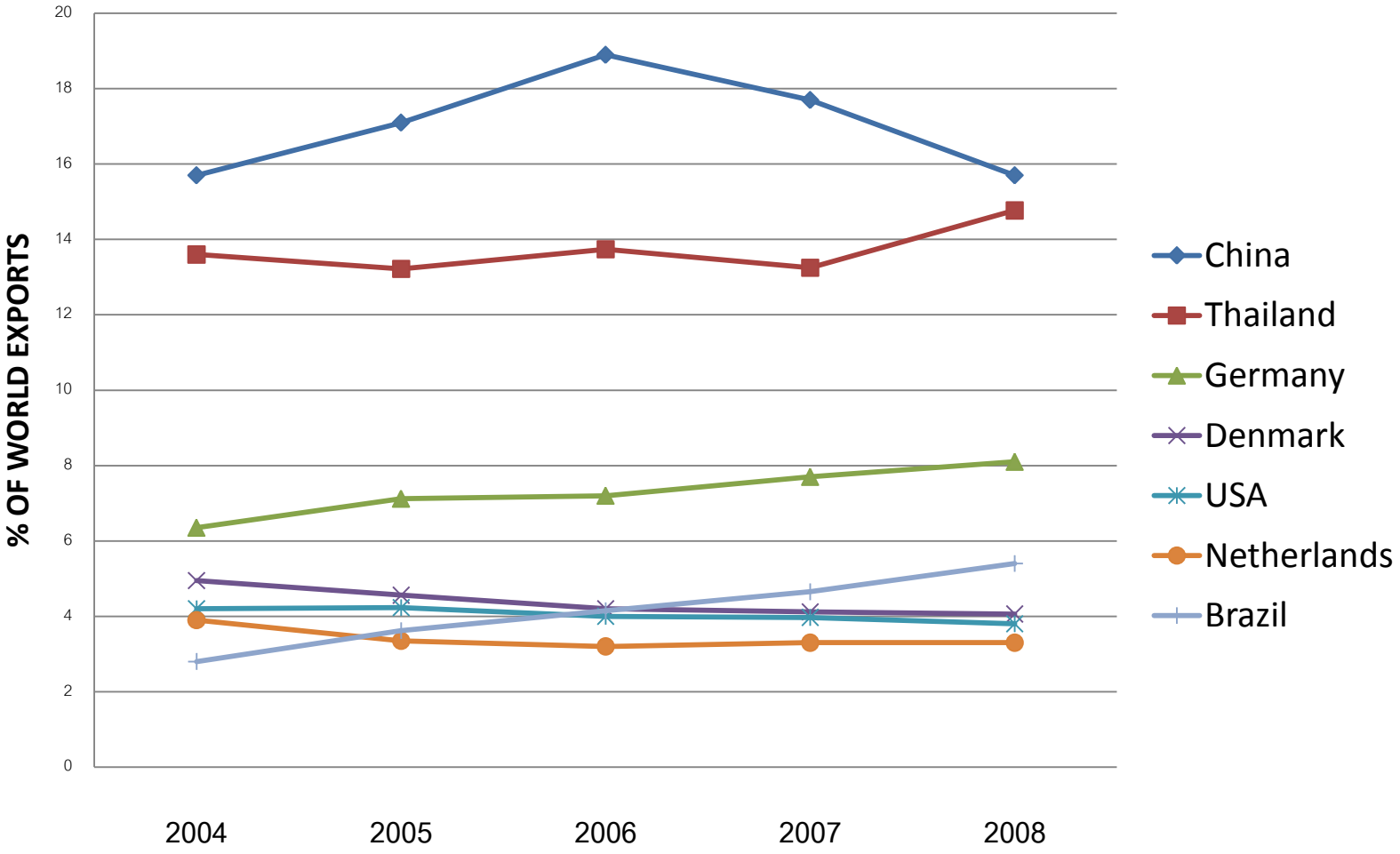



**Source: UNCTAD/intracen.org**

Window of opportunities

**World market share of major food exporters**

meat, fish, and seafood preparations (HS 16)




**Source: UNCTAD/intracen.org**

# The case of canned pineapple

- Output of processed food industry is driven by demand for its exports.
- The decline in the production of canned pineapple industry from 1995 to 1998 can be attributed to unfavorable external demand.
- Because the industry has very low profit margin, changes in the cost of raw materials, exchange rates, GSP, and anti-dumping duties adversely affect the industry.

# Market structure of canned pineapple

- Demand conditions can become unfavorable to the industry because of changes in consumer preference.
- Canned pineapple exports fluctuates widely over the year, more than canned tuna and other canned fruit.
- Thai pineapple has a unique business operation based upon price competition and relatively free entry and exit.

# More challenges

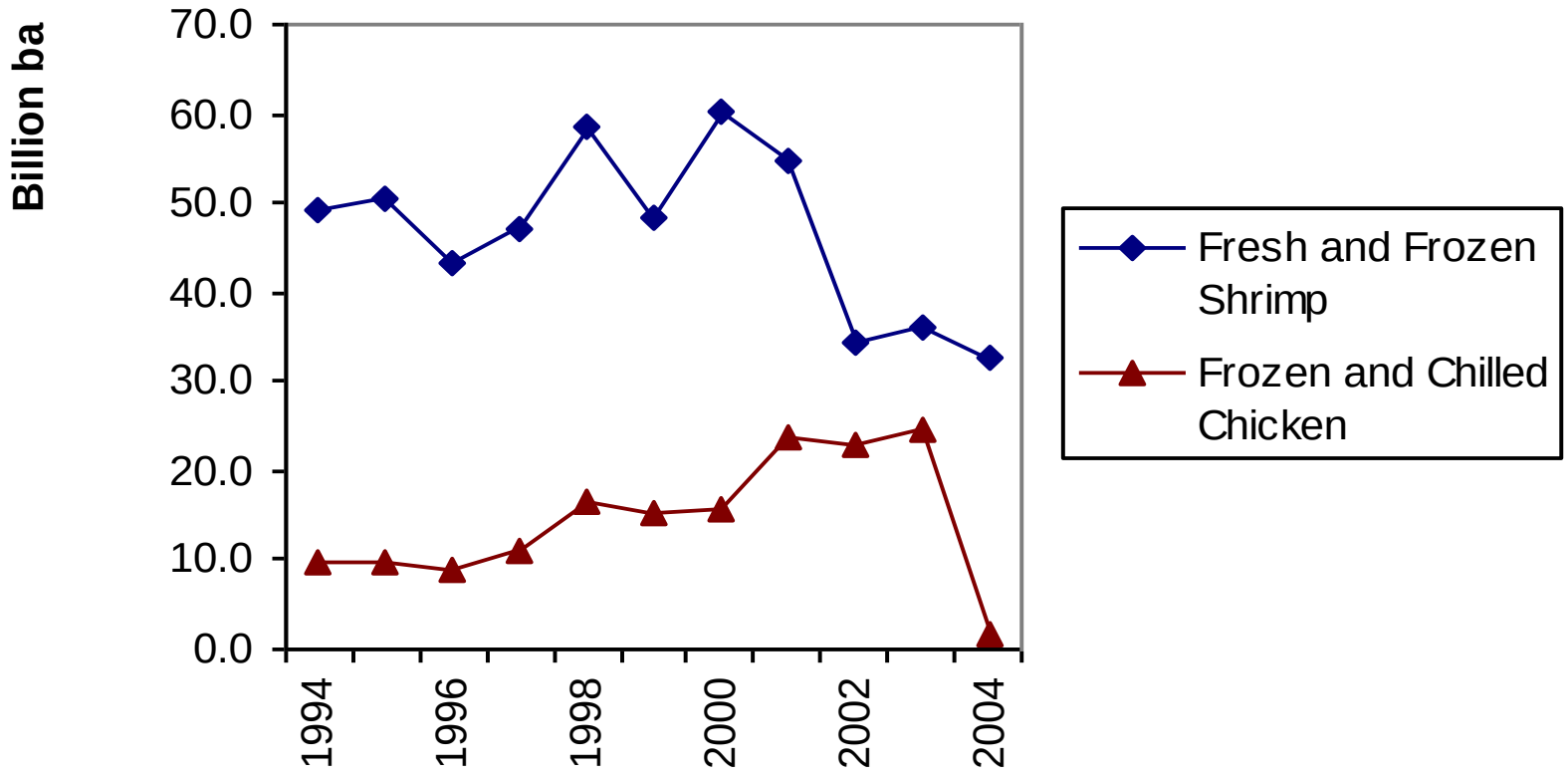
- There are problems with labor shortage as other industries also compete for labor.
- Coping with rising wages, energy prices, and currency appreciation would be a challenge to these mature food processing industries in Thailand.

# A leading indicator

- The year 2001 witnessed the gain in Thailand's market share of chicken exports to the EU, reaching above **35** percent in the total imports in the EU, at the expense of the US.
- The ***rising market share*** is an early warning that the chicken industry will be subject to new barriers.
- Nitrofuran detection was responsible for the decline of the Thai market share in **2002.**
- The Avian Influenza that triggered the ban on Thai chicken further depressed the share of Thai chicken in **2004.**

# Chilled and frozen products

**Figure 15: Impacts of GSP Withdrawls (1999) Nitrofurans (2002) and Avian Infulenza (2004)**




Source: Office of Agricultural Economics
Department of Fisheries

# *Further* processed chicken

- There was a sharp fall in exports of chilled and frozen chicken because of the ban on Thai chicken after the outbreak of Avian Influenza in 2004
- Since it is safe to consume cooked chicken, Thai exporters began exporting boiled chicken and further processed chicken meat to compensate the fall in exports of frozen chicken.
- In 2004, Thailand exported heat-treated chicken worth 20 billion baht, half of which went to Japan, followed by the EU.

# Responses to non-tariff barriers

- **Thai food processing firms have to adjust in the new technical trade barriers:**
- **Move from chilled and frozen to cooked chicken and further chicken**
- **Adopt a closed farming system**
- **Invest directly in importing countries (CP Chilled chicken plants in UK)**
- **Kaew Kung (59 baht per cup) produced in a billion-baht factory close to shrimp farms near Trad**

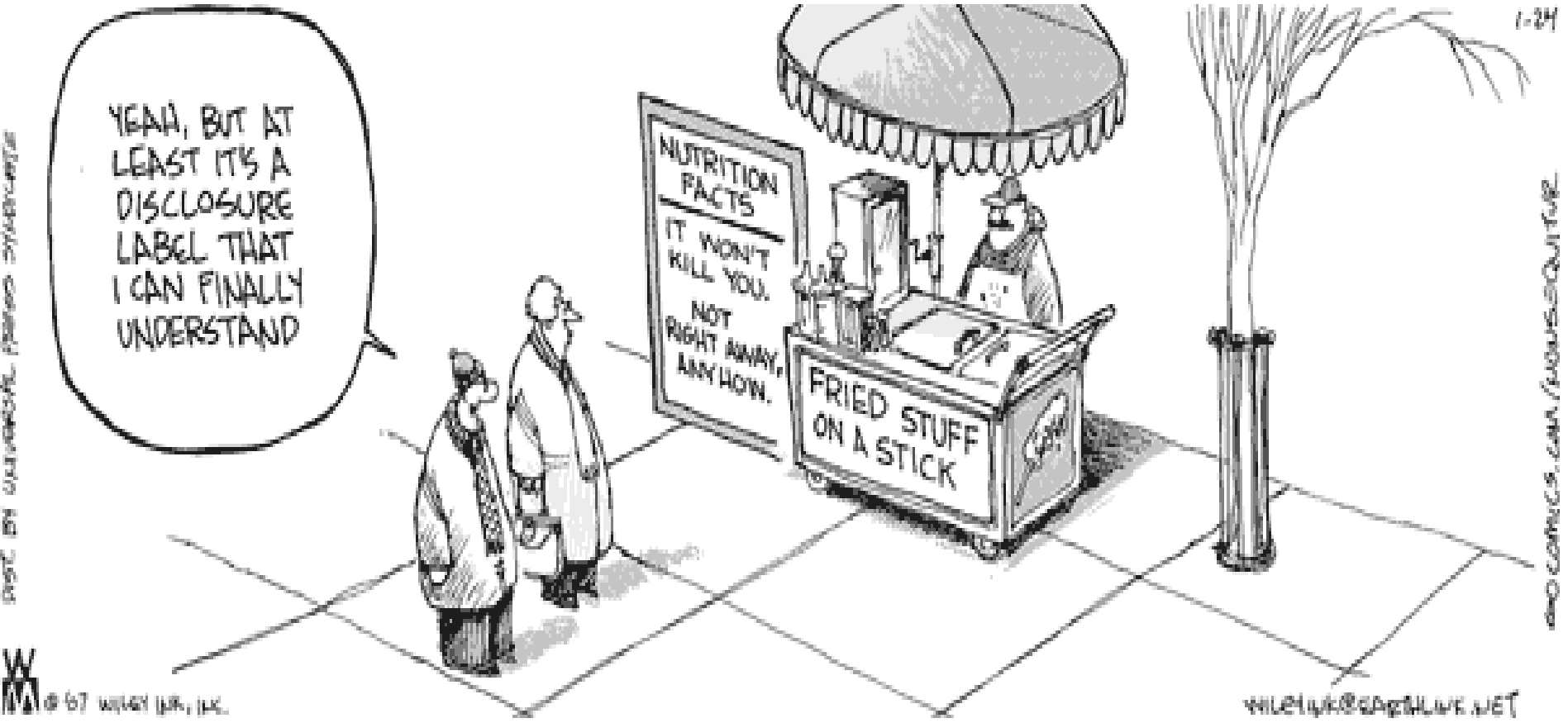
# Sanitary and Phytosanitary Standard (SPS)

SPS can be used as powerful tools to impede international trade and *protect* domestic producers through unjustified different requirements in different markets, unnecessary costly or time consuming tests, or duplicative conformity assessment procedures.

# The case of the EU

- The European Commission has set clear guidelines for producers and exporters to improve the healthiness of food for EU consumers.
- Among the measures is voluntary "traffic labeling", which deems products either green, yellow or red, depending on the risk of causing obesity.

# Read the label first



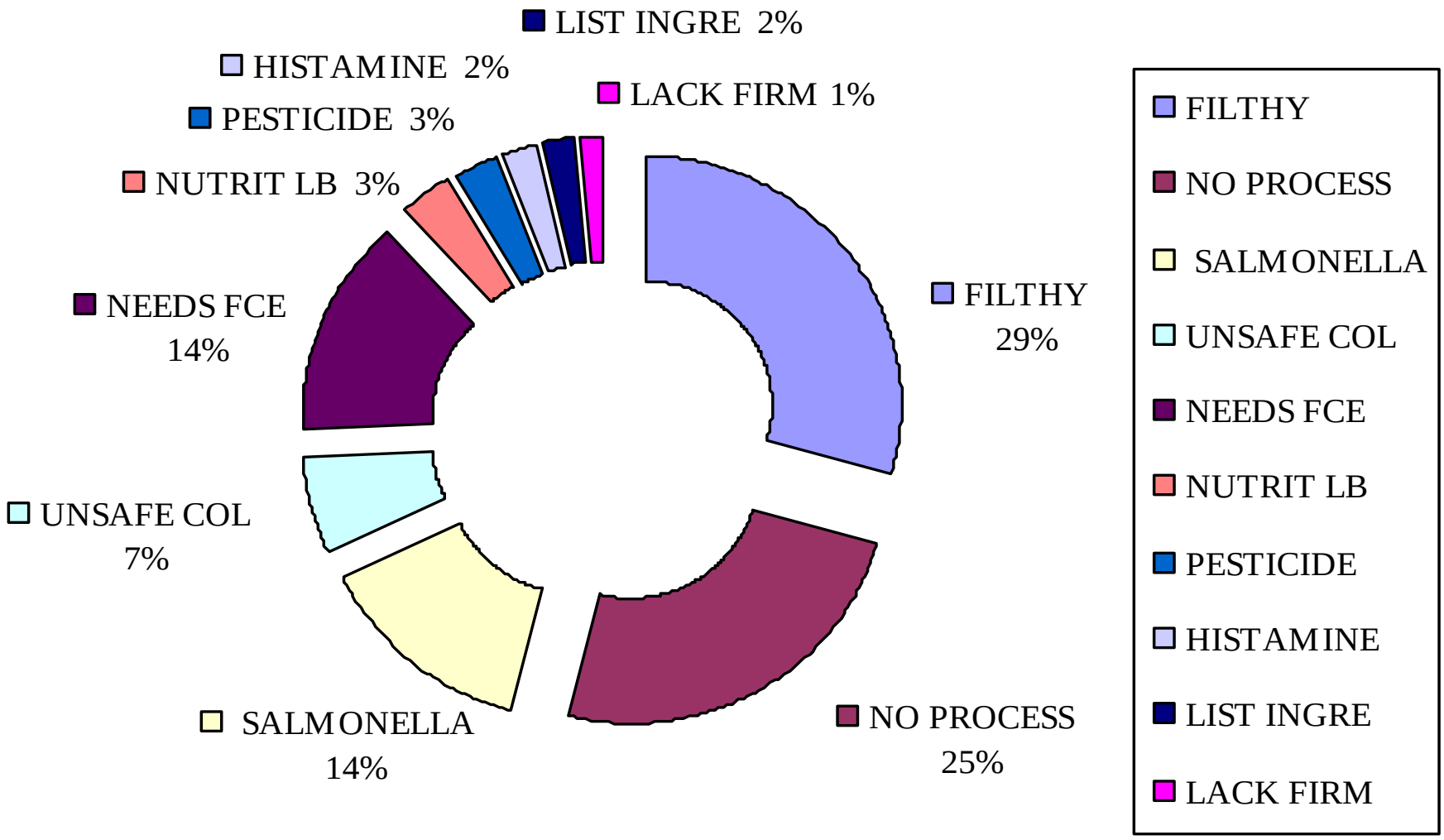
# Pathogenic substance

- The EU also has strengthened its food-safety measures dealing with pathogenic micro-organisms that could harm consumers.
- The list of chemical residues from **pesticides** would be revised with tougher inspections to head off diseases.
- Stringent checks on imported meat, fruit and vegetables are carried as a part of risk assessment procedure.
- Is it safe to eat horse meat?

# Traceability

- Most Thai exporters had co-operated well with previous EU requirements, including a 2005 traceability system for feed and food.
- “The EU have found the Thai  record was not too bad but not perfect,“
- Based on 2006's statistics, there were 86 cases of Thai food imports with problems including nitrofurans in freshwater shrimp and pesticides in fresh vegetables.

# USFDA Detention of Thai food products in 2004



# On pesticides

- The sharp increase in pesticide use by Thai farmers has alarmed international markets.
- Department of Agriculture: We needed to impose a complete ban on four hazardous chemicals still used in Thailand but not in any developed country.
- The country's record of pesticide use was worrying.
- Thailand imported 42,089 tonnes of pesticides in 1997 but that figure had risen to 137,594 tonnes in 2009.

# Thais love chemicals

- Food and Agriculture Organization figures for 2007 show Thailand had 27,126 agricultural chemical brands registered for use - more than China (20,000), Vietnam (1,743), Indonesia (1,158), Malaysia (917), Burma (818) and Laos (100) combined.
- Thailand  is consuming a massive amount of chemicals,
- Thai farmers still use agricultural chemicals that have been banned in many countries: carbofuran, dicrotophos, methyl and EPN

# Imported veggies from Thailand

- The EU recently found prohibited chemicals in imported vegetables including basil, chili, Chinese bitter cucumber and bean. Fears of a possible EU ban on Thai vegetables has prompted the government to order a temporary suspension of shipments.
- We were warned about chemical-contaminated vegetables 26 times in 2009 and up to 55 times in 2010.
- The Agriculture Ministry planed to suspend the export of 16 vegetables to the EU, including basil, aubergines and chilies

# Food-borne diseases

- Two food-borne zoonoses, salmonella and campylobacter, which are a major concern in the UK and worldwide.
- Zoonosis is defined as a disease that we get from animals.
- About 60% of all infections are zoonoses - Sars, avian flu, campylobacter, salmonella; we catch them all from animals, either directly or indirectly from food.

# Beware of Salmonella

- People infected with salmonella and campylobacter may suffer from abdominal pain and diarrhea.
- Salmonella is found in both chicken meat and eggs while campylobacter is found in chickens.

# Food safety

- In Thailand, there are no complete statistics on the epidemiology of the diseases, but studies between 1990 and 1993 found a continuing increase in the number of patients infected with salmonella, rising from 1.33% to 16.98% within a four-year period.
- During the same period, the presence of salmonella bacteria in raw chicken meat was found to have increased dramatically from 1.4% in 1990 to 16.75% in 1993.

# Need quality improvement

- Major causes of the detention are related to quality and safety of the products: unsafe coloring, salmonella.
- Some are not difficult to deal with: nutrition labeling, specification of production process, listing of ingredients, factory certificates.

# A wake-up call: Rising Awareness of Food Safety Standards

2002: Falling chicken and shrimp exports to the EU

2004: (1) Outbreak of Avian Influenza

(2) Massive culling of chickens in 2004

(3) Reduction in domestic consumption of chicken

# Thailand's responses

- National Bureau of Agricultural Commodity and Food Standards (ACFS) was established in 2002 to supervise and control food chain from farms to consumers.
- ACFS established **national standards** for swine, poultry and daily farms.
- ACFS inspection activity is conducted from hatchery to final markets at home and aboard.
- Good agricultural Practice (GAP) involves the upstream activities at hatchery and farm levels.
- The Good Manufacturing Practice (GMP) and HACCP (Hazard Analysis at Critical Control Points) are issued to qualified firms at the harvesting and processing plants.

# Technical trade barriers

- The Australian food safety regulations exemplify in trade-impeding effects of technical barriers.
- Chicken meat imported into Australia must be heated at **70 Celsius for 143** minutes to assure disease-free meat.
- Neither Thailand nor any other country has ever penetrated the Australian chicken market.

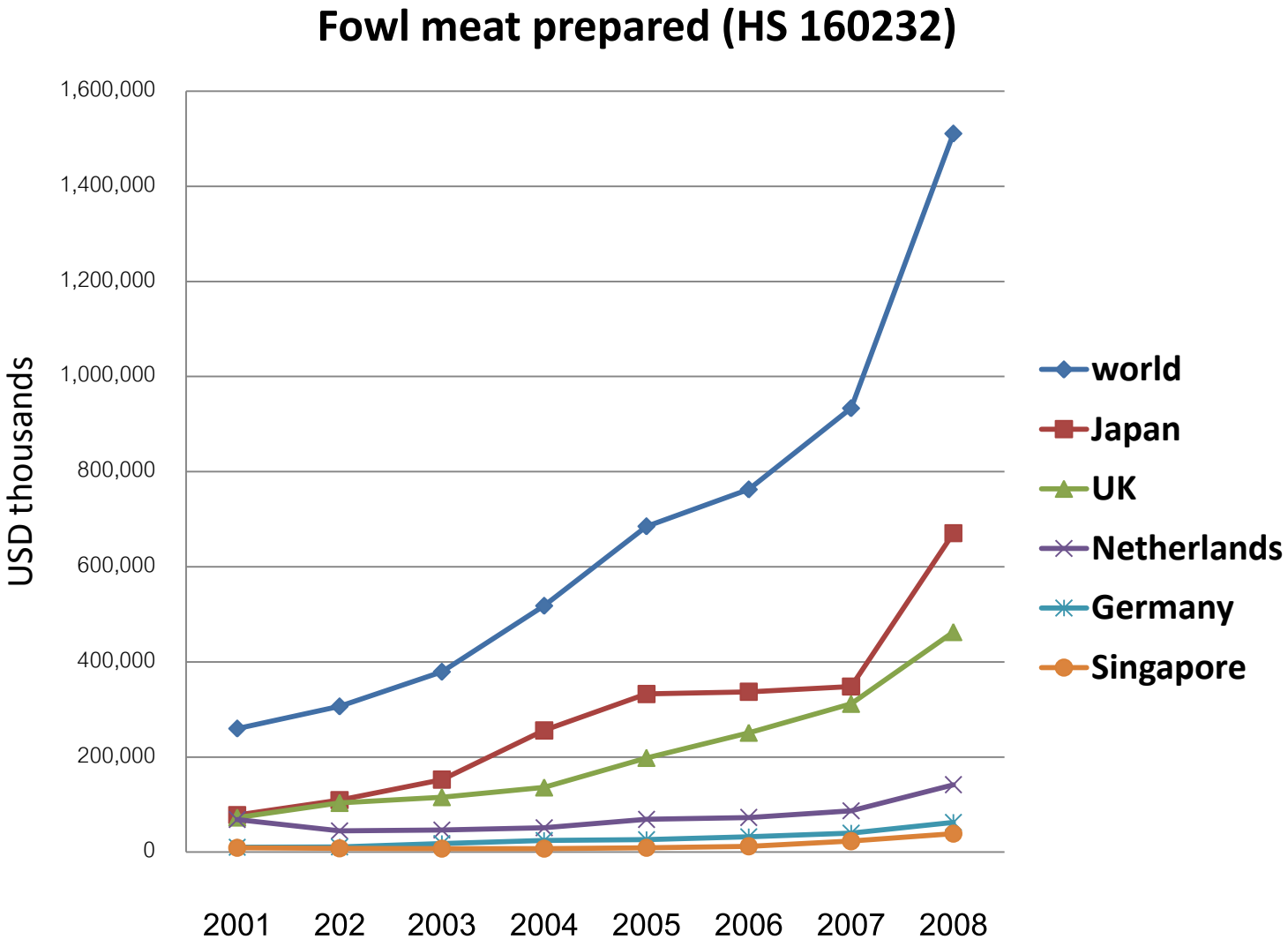
# At the Downunder

- Some Thai companies jokingly suggested the Thai government retaliate by requiring the same kind of heat treatment (**70 Celsius)** on imported wine and chocolates from Australia.
- The basic argument is that food products that are subjected to heat treatment would change their nature and appearance after meeting the most stringent food safety regulations.
- Thus unnecessarily high food safety standards can lead to no trade at all.

# Technical trade barriers

- Food safety standard became a thorny issue during the negotiation of free trade agreement between Thailand and Australia.
- The Thai firms argued that they had a lot to lose because the aberration of food safety standards was still maintained after the removal of tariff barriers.

# Resilient Thai exporters



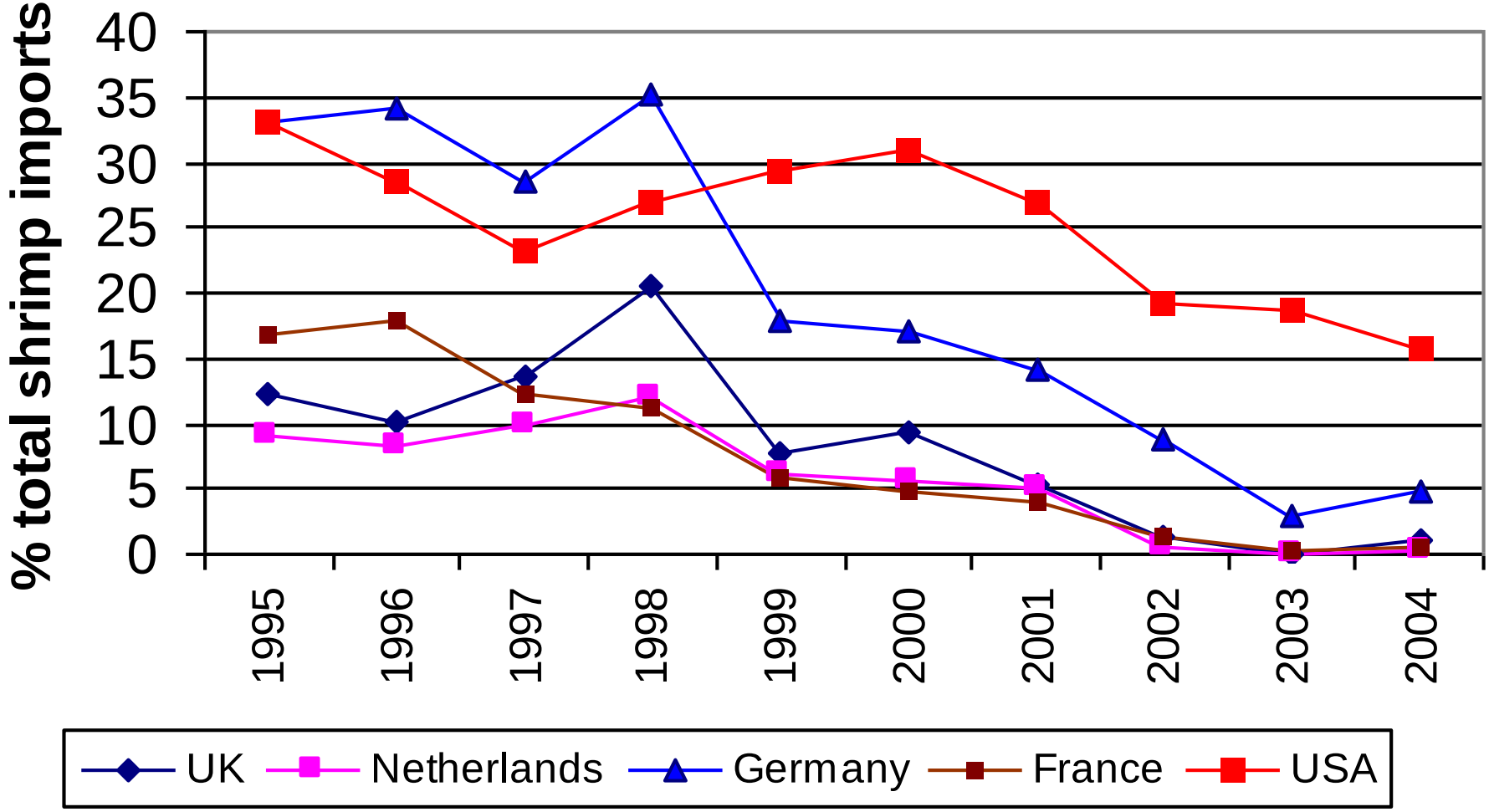
# Thai shrimp exports

- Nitrofuran is a veterinary drug used in food-producing industries, but it is banned in many countries because of a link to cancer in humans.
- The EU first employed costly new laboratory equipment--LCMS/MS--in March 2002.
- The machine found nitrofuran residues in both Brazilian and Thai chickens and shrimps.
- Black tiger shrimp

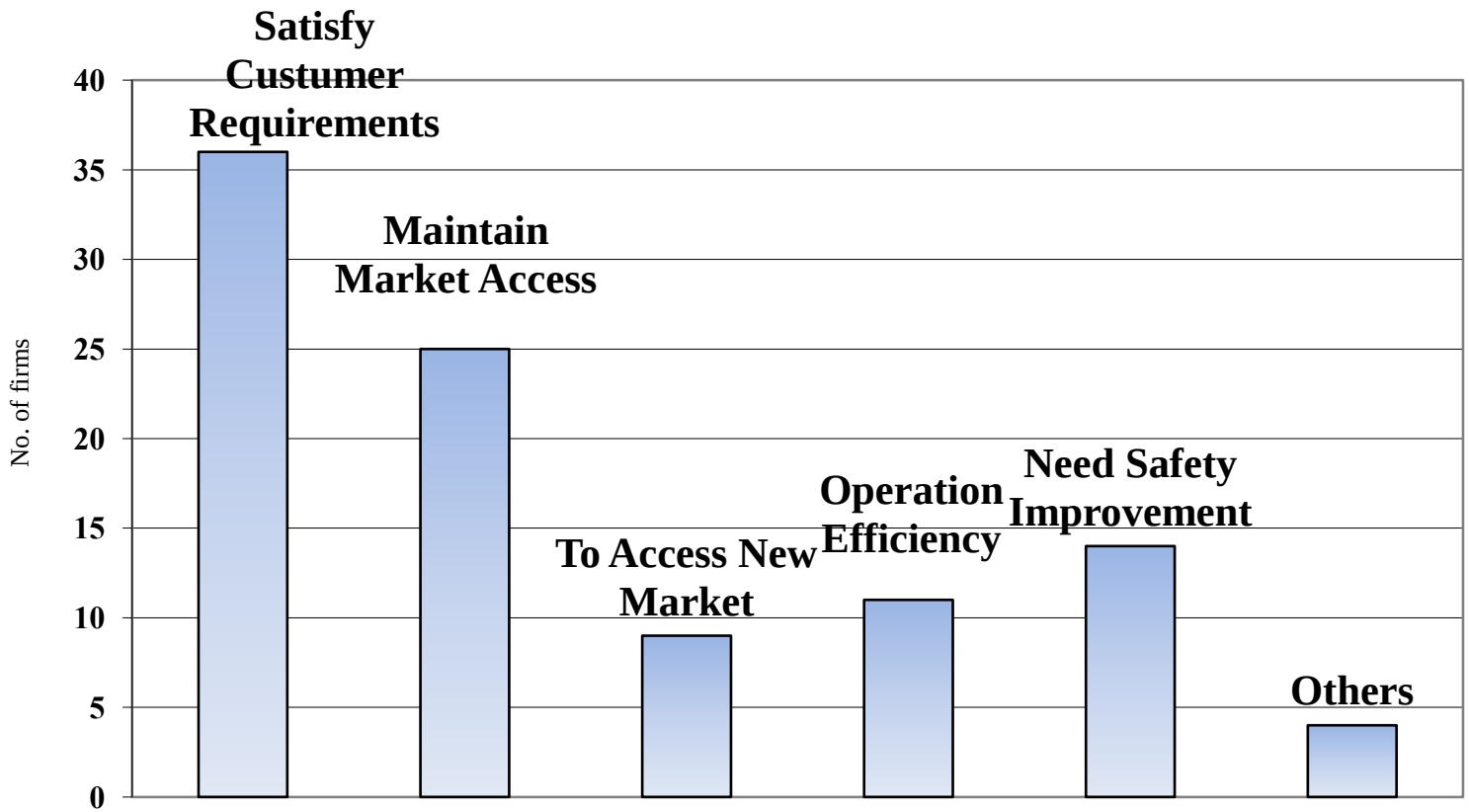
# Thai shrimp exports

- The new LCSMS/MS instrument is so accurate that it can detect drug residues at ***parts per trillion***.
- While Brazilian exports were subject to only random check, Thai products were subject to a 100 percent testing.
- The cost of the new testing equipment is 15 million baht ($350,000).
- Small firms would not be able to afford this costly imported equipment.

## Figure 3.7: Thai shrimp's import penetration



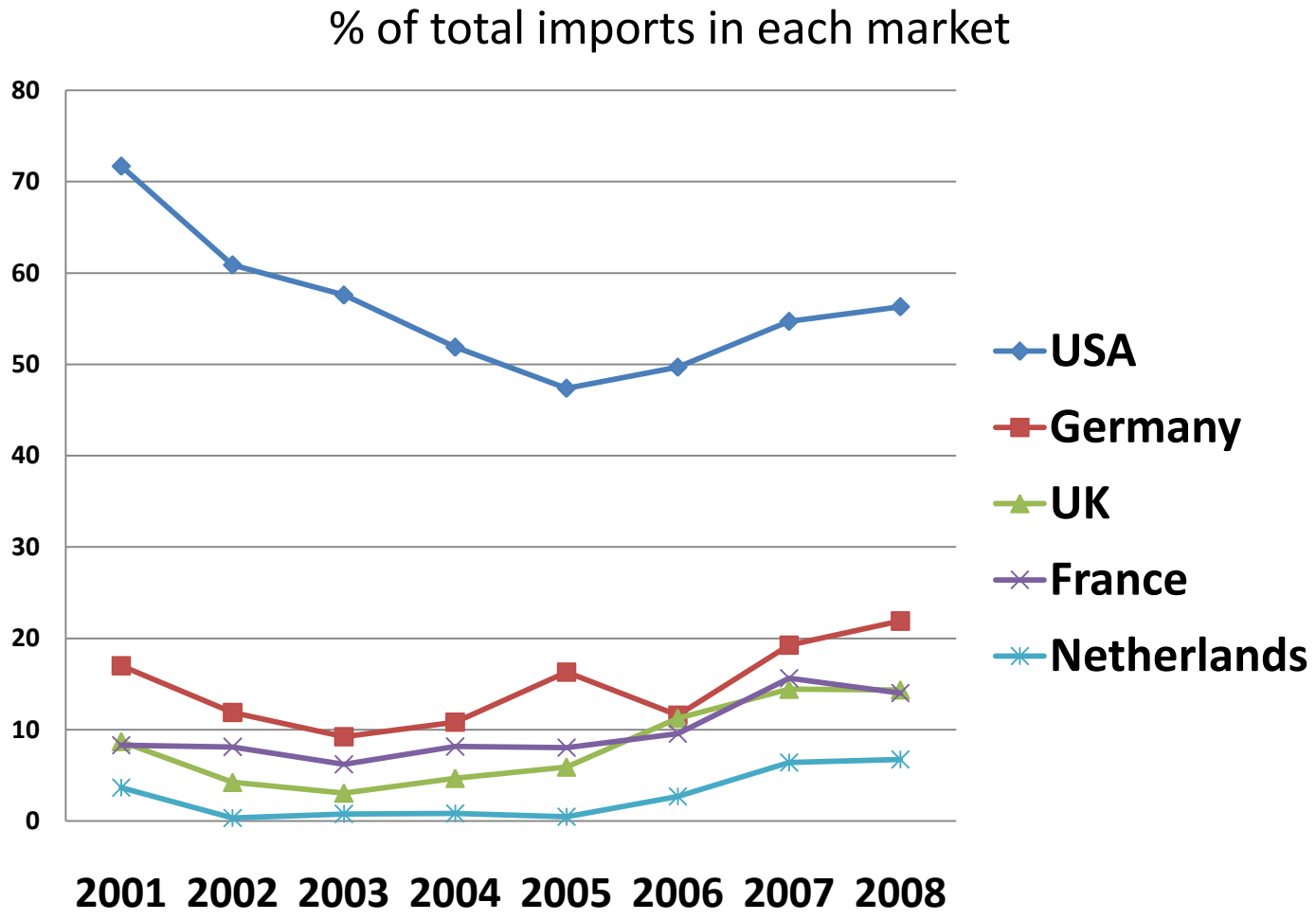
# Reasons for complying with Food Safety Standards



# Friendly shrimp farming

- **Switched from black tigers to white shrimp**
- **Employed pro-biotic farming to create friendly environment for shrimp**
- **Applied no anti-biotic to improve shrimps' digestion system,**
- **Reduced stress and increased virus resistance of baby shrimps**
- **These measures incur higher cost**
- **But it is proactive investment, anticipating more stringent food safety standard.**

# Market penetration of Thai shrimp exports



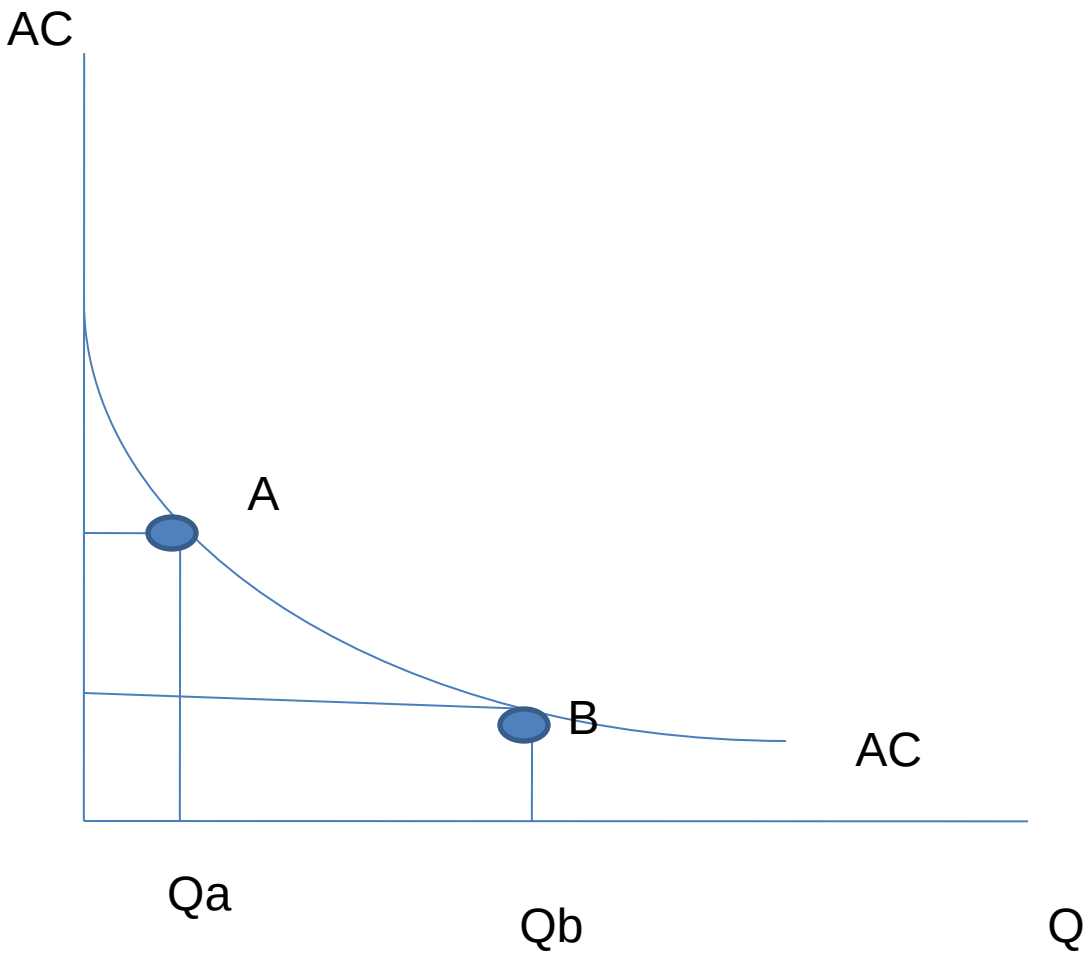
# Anti-Dumping Duty

- Rising market shares can be thought of as an early warning of incoming trade barriers, either in the form of anti-dumping duties (USA, 2004) or non-tariff barriers (the case of EU).
- There were other countries that are subjected to these anti-dumping duties: Vietnam, India, Indonesia, and China

# Size matters

- **Large firms take advantage over smaller firms in the ability to comply with international food safety standards, because of lower average compliance cost.**
- **Large firms have their own brands.**
- **More likely to form strategic partners.**
- **More chances to be a member of exporters' associations**

# Size matters in SPS compliance



# Disadvantages of small firms

- **Incur higher adjustment cost.**
- **Require government assistance in providing information of food safety standards**
- **Need subsidies on lab tests.**
- **Difficult to establish strategic partners.**

  A joint venture with importers is crucial if exporting firms want to gain access to developed countries, whose governments require plant inspection as a necessary condition for market access.

# Structural changes

- Large firms integrate vertically from feed to processed products: pork and chicken
- Some industry such as canned pineapple and shrimp depend on outsourcing of raw materials.
- Shrimp industry faces higher cost of screening input.

# Don’t delay the adjustment

- The sooner firms achieve stringent food safety standards, the greater their ability to compete in the world market.
- Abuses of SPS standards are more frequent in those markets where there are substantial domestic subsidies.
- SPS standards imposed by importing countries would reduce domestic price level of the affected products.
- Export market shares depend partly on firms’ accumulated investment to comply with food safety standard norms.

# Compliance cost as investment expenditure

- Firm's initial investment to comply with SPS measures would pay off in the long run.
- Investment in upgrading food safety standard is related to **export performance** of the firms, specific industry, and the country that is aware of food safety standards.
- **Indirect subsidies** through public spending on raising food safety concerns by government can reduce short-term adjustment costs.

# Examples of industry responses to SPS measures

- Substituted soybean (GMO) by sunflower oil in canned tuna production
- Established strategic partnerships in importing countries (CP and Queensland in case of fruit).
- Integrated vertically (pig meat industry) and SPF (specific pathogen-free) pork.

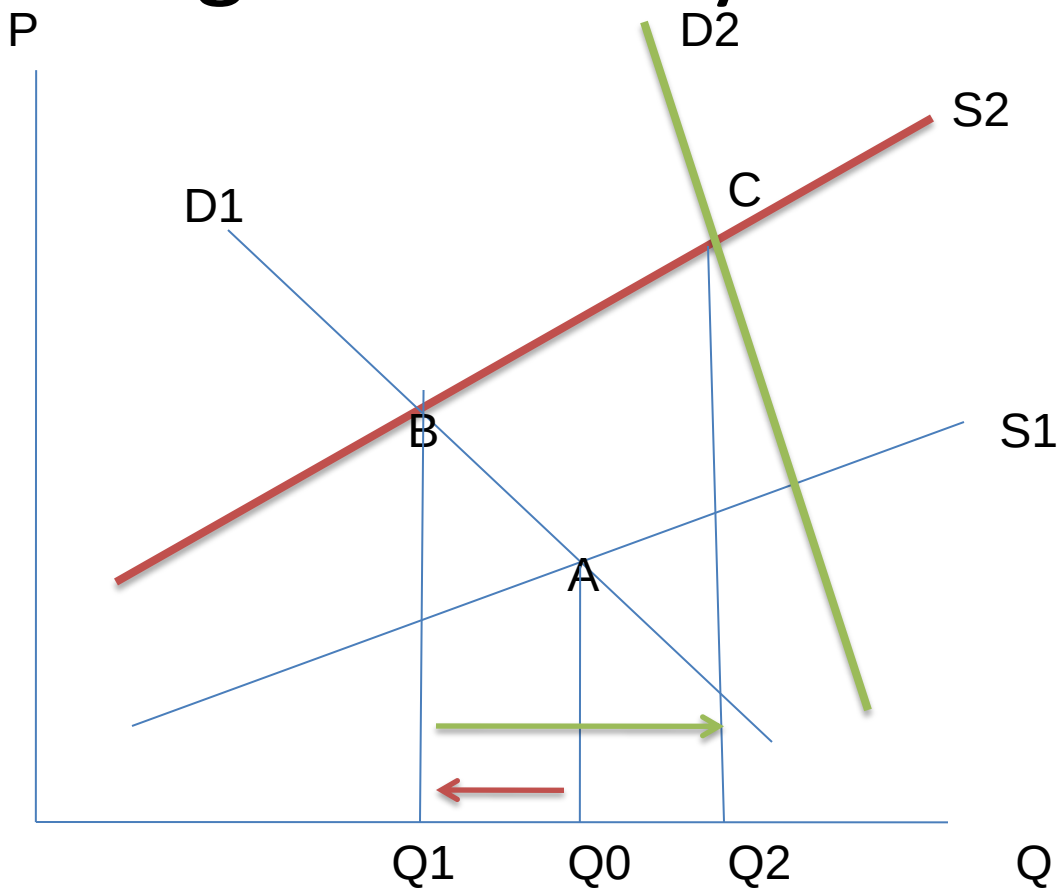
# Roles of Exporters Associations

- **To prevent negative externality, export firms must be a member of an exporter association.**
- **Providing vital information to government and exporters to reduce information cost.**
- **Screening and monitoring moral hazard among members.**
- **Resource pooling and cost sharing in dealing with food safety standard issues to reduce compliance cost.**

# The way forward

- The processed food industry is subject to a constant shock syndrome.
- Tariff and non-tariff barriers are substituted by importing countries.
- Structural change: more concentration of the industry, because size matters for market access and competitiveness.

# Impact of long-term investment in upgrading food safety standard



# Conclusion

- The concern for food safety increases with rising per capita income.
- *The higher the level of market penetration in importing countries, the higher the technical barriers*.

# Conclusion

- Dynamism of the processed food industry is required to maintain the market share.
- The sector must  continuously invest in upgrading both safety and quality standards.