

The US Farm and Food System

AEB 2104

Agricultural Economics

<http://www.geocities.com/dsolisw/AEB2104.html>

Agriculture's role in the US economy

- Agriculture is vital in the economy
- Its goal is to provide quality food and fiber at reasonable prices to all consumers
- US agriculture is not a homogeneous industry
 - Family farms (family constitutes the labor force)
 - Large corporate organizations
 - Credit and input supply firms, etc.
- The importance of an industry can be measure using two measures:
 - Employed labor force
 - National output

TABLE 2-1 Industry Distribution of National Output and Employed Labor Force, United States, 1998 and 1995

| Type of Industry | National Output (%) | Employed Labor Force (%) |
|--|---------------------|--------------------------|
| Farming | 2 | 3 |
| Mining and construction | 5 | 5 |
| Manufacturing | 17 | 14 |
| Transportation, communication, and utilities | 8 | 5 |
| Wholesale and retail trade | 16 | 23 |
| Finance, insurance, real estate | 19 | 6 |
| Services | 20 | 29 |
| Government (state, local, and federal) | 13 | 15 |

SOURCE: "Economic Report of the President," U.S. Government Printing Office, Washington, D.C., 1999; and "Survey of Current Business," U.S. Department of Commerce, March 1999.

US economy

- **Services** include: medical care, legal and accounting services and entertainment
- The definition of services can also be broaden to include wholesale and retail, financial services, and government.
- With this broaden definition services account for 68% of the national output.

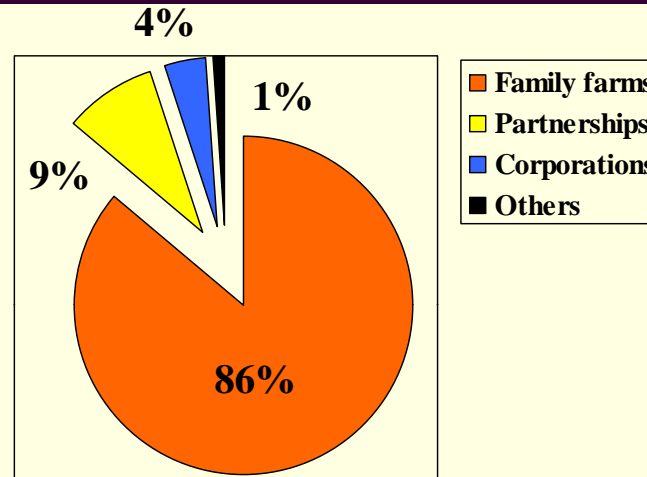
US economy

- **Manufacturing** contributes to 1/5 of the national output.
- Manufactured items can be classified in:
 - Durable goods (“hard goods”): Cars, appliances, etc.
 - Nondurable goods (“soft good”): textile, food, apparel
- **Government** 1/3 of the employment because the large expenditure in education, military and social programs

US economy

- **Farming** is one of the smallest industry 2% National output.
- However, agriculture indirectly accounts for much employment in other industries (wholesale, manufacturing and processing, etc.)
- **Agriculture** employs 3.1M as farm owners and workers, 0.4M in service, 0.4M in agricultural input industries, 3.3M in marketing and processing, etc.
- In total, agriculture provides 21M jobs (15% total US employment)

The Business structure of farms



- However, corporations sold 40% of cattle, 66% of nursery and green house products, and 40% of fruits
- Reasons to be a corporation:
 - Transfer farms to others at lower cost
 - Employee benefits (SS, unemployment, etc.)
 - Reduce liability (manager and owner)
 - Taxes (lower taxes for corporation)

Economic size classes of farms

- According to the value of farm product sold we can classified farms as:
 - > \$100,000 (Expanding)
 - \$20,000 and 99,999 (Declining)
 - < \$20,000 (Non-commercial)
- **Expanding sector**
 - Increase in 100,000 farms in the last decade
 - 17% all farms, 82% of agriculture output, 62% of government support
 - Average farm income is \$191,426

Economic size classes of farms

■ Declining sector

- Decrease in approx. 200,000 farms during the last decade
- 22% of all farms, 26% of government support
- Average farm income is \$63,396

■ Non-commercial

- 61% of all farms, most of the farm income comes from off-farm activities
- Average farm income is \$48,567

Vertical coordination in agriculture

- ***Vertical coordination*** or ***vertical integration***: means that successive production stages and /or marketing stages are coordinated within one firm
- ***Contract production***: involves the use of production agreements between farmers or ranchers and processors, dealers, or others who are at the first stage before or after the farm

TABLE 2-5 Production Contracts and Vertical Integration

| Products | Production Contracts | | | | Vertical Integration | | | |
|------------------------------|----------------------|------|------|------|----------------------|------|------|------|
| | 1960 | 1970 | 1980 | 1994 | 1960 | 1970 | 1980 | 1994 |
| | (Percent) | | | | | | | |
| Crops | | | | | | | | |
| Feed grains | 0.1 | 0.1 | 1.2 | 1.2 | 0.4 | 0.5 | 0.5 | 0.5 |
| Hay and forage | 0.3 | 0.3 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Food grains | 1.0 | 2.0 | 1.0 | 0.1 | 0.3 | 0.5 | 0.5 | 0.5 |
| Fresh vegetables | 20.0 | 21.0 | 18.0 | 25.0 | 25.0 | 30.0 | 35.0 | 40.0 |
| Processing vegetables | 67.0 | 85.0 | 88.1 | 87.9 | 8.0 | 10.0 | 10.0 | 6.0 |
| Dry beans and peas | 1.5 | 1.0 | 2.0 | 2.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Potatoes | 40.0 | 45.0 | 60.0 | 55.0 | 30.0 | 25.0 | 35.0 | 40.0 |
| Citrus fruits | 0 | 0 | 0 | 0 | 8.9 | 9.4 | 11.2 | 6.9 |
| Other fruits and nuts | 0 | 0 | 0 | 0 | 15.0 | 20.0 | 25.0 | 25.0 |
| Sugar beets | 99.0 | 99.0 | 99.0 | 99.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Sugarcane | 24.4 | 31.5 | 29.3 | 27.3 | 75.6 | 68.5 | 70.7 | 72.7 |
| Cotton | 5.0 | 5.0 | 1.0 | 0.1 | 3.0 | 1.0 | 1.0 | 1.0 |
| Tobacco | 2.0 | 2.0 | 1.4 | 9.3 | 2.0 | 2.0 | 2.0 | 1.5 |
| Soybeans | 1.0 | 1.0 | 1.0 | 0 | 0.4 | 0.5 | 0.5 | 0.4 |
| Seed crops | 80.0 | 80.0 | 80.0 | 80.0 | 0.3 | 0.5 | 10.0 | 10.0 |
| Livestock | | | | | | | | |
| Fed cattle ^a | NA | NA | NA | NA | 6.7 | 6.7 | 3.6 | 4.5 |
| Sheep and lambs ^a | NA | NA | NA | NA | 5.1 | 11.7 | 9.2 | 29.0 |
| Market hogs | 0.7 | 1.0 | 1.5 | 10.5 | 0.7 | 1.0 | 1.5 | 8.0 |
| Fluid-grade milk | 0.1 | 0.1 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Manufacturing-grade milk | 0 | 0 | 0 | 0 | 2.0 | 1.0 | 1.0 | 1.0 |
| Eggs | 7.0 | 20.0 | 43.0 | 25.0 | 5.5 | 20.0 | 45.0 | 70.0 |
| Broilers | 90.0 | 90.0 | 91.0 | 92.0 | 5.4 | 7.0 | 8.0 | 8.0 |
| Market turkeys | 30.0 | 42.0 | 52.0 | 60.0 | 4.0 | 12.0 | 28.0 | 28.0 |
| Total farm output | 8.3 | 9.3 | 11.5 | 10.7 | 4.4 | 5.3 | 6.2 | 7.6 |

^aNA means not available.

SOURCE: Economic Research Service, USDA.

Farmer cooperatives

- ***Farmer cooperatives*** is defined as a business that is organized, capitalized and managed for its members-patrons, furnishing and/or marketing goods and services to the patrons at cost.
- Net savings or patronage dividends are return to members-patrons.
 - Output cooperatives
 - Input cooperatives
 - Credit cooperatives
 - Etc.

Farm output

- Farm output has increased over the past 40 years based on technical change, improve management, and less labor.
- Reduction in the number of farms and rural population
- Increase in farm size, mechanization and productivity

TABLE 2-6 Number, Population, and Size of Farms in the United States

| Year | Number of Farms ^a | Farm Population (000) | Average Farm Size (Acres) | U.S. Population on Farms (%) |
|------|------------------------------|-----------------------|---------------------------|------------------------------|
| 1920 | 6,518,000 | 31,974 | 147 | 30.1 |
| 1930 | 6,546,000 | 30,529 | 151 | 24.9 |
| 1940 | 6,350,000 | 30,547 | 167 | 23.2 |
| 1950 | 5,648,000 | 23,048 | 213 | 15.3 |
| 1960 | 3,962,000 | 15,365 | 297 | 8.7 |
| 1970 | 2,924,000 | 9,712 | 383 | 4.8 |
| 1975 | 2,521,420 | 8,864 | 420 | 4.2 |
| 1980 | 2,439,510 | 6,051 | 426 | 2.7 |
| 1985 | 2,292,530 | 5,355 | 441 | 2.2 |
| 1990 | 2,145,820 | 4,591 | 460 | 1.9 |
| 1995 | 2,196,400 | 4,623 | 438 | 1.8 |
| 1996 | 2,190,500 | 4,709 | 438 | 1.8 |
| 1997 | 2,190,510 | 4,710 | 436 | 1.8 |
| 1998 | 2,191,510 | 4,712 ^b | 435 | 1.7 ^b |

^aOver time the Bureau of the Census has used varying definitions of a farm. In 1959, 1964, and 1969, places of less than 10 acres were counted as farms if estimated sales of agricultural products for the year amounted to at least \$250, and places of 10 acres or more were counted as farms if their sales amounted to at least \$50 per year. The Census definition of a farm was changed in 1974 to an establishment that had or normally would have had sales of agricultural products of \$1000 or more.

^bEstimated.

SOURCE: Economic Research Service, USDA.

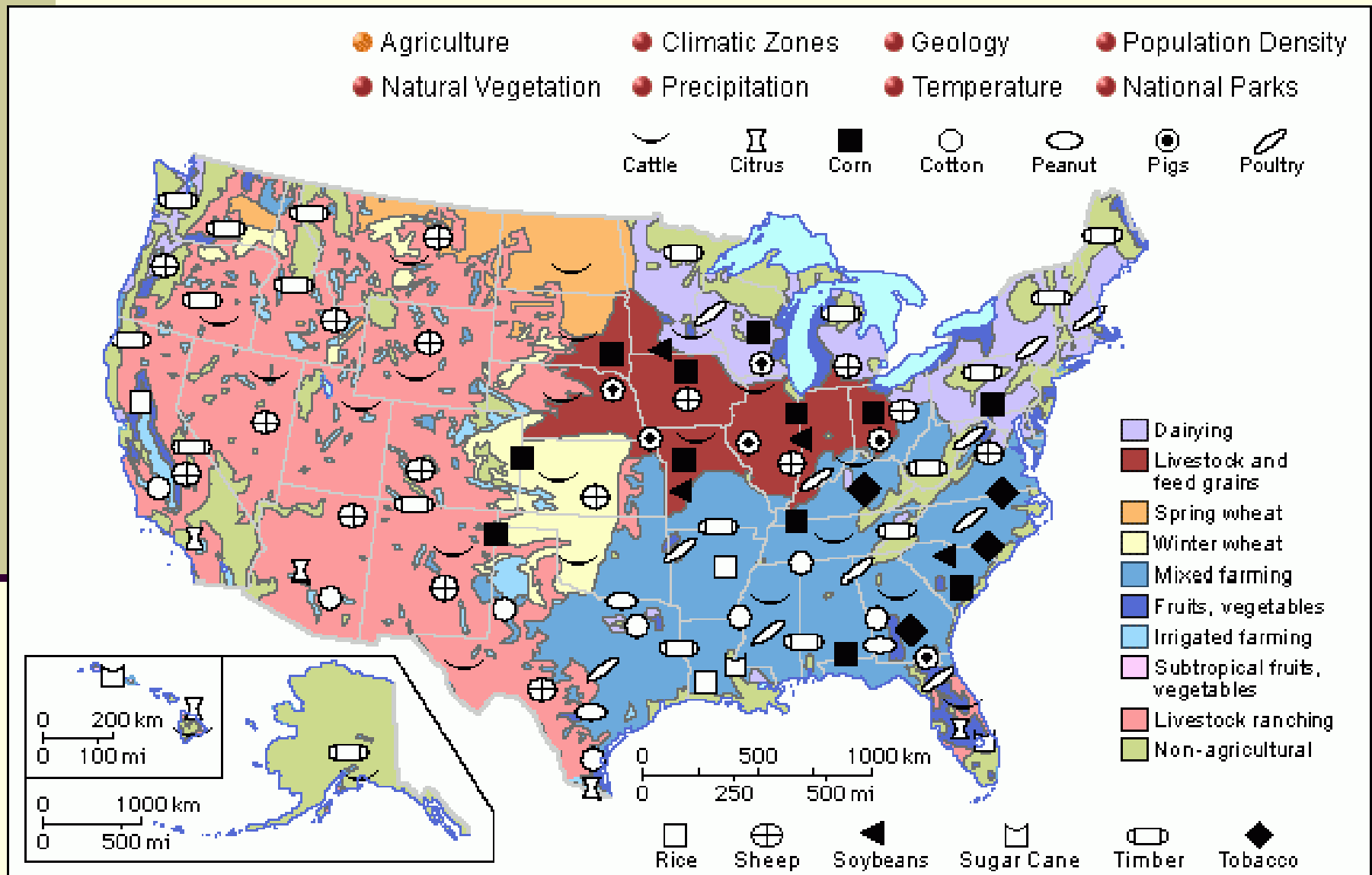
TABLE 2-7 Types of Farms in the United States with Annual Sales of \$5000 or More

| | Number | | | | |
|----------------------------|-----------|-----------|-----------|-----------|-----------|
| | 1978 | 1982 | 1987 | 1992 | 1997 |
| Total U.S. | 1,532,813 | 1,426,441 | 1,334,545 | 1,262,875 | 1,186,868 |
| Cash grain | 467,998 | 478,992 | 377,640 | 352,245 | 353,120 |
| Tobacco | 78,362 | 81,699 | 46,451 | 63,572 | 49,393 |
| Cotton | 28,559 | 19,258 | 25,988 | 19,331 | 18,448 |
| Other field crops | 61,715 | 51,857 | 62,129 | 67,312 | 94,406 |
| Vegetables | 20,284 | 19,549 | 20,828 | 21,486 | 24,092 |
| Fruit and nuts | 48,341 | 46,251 | 50,613 | 48,210 | 47,983 |
| Poultry | 40,379 | 34,236 | 32,666 | 29,855 | 30,395 |
| Dairy | 164,260 | 162,143 | 136,892 | 112,647 | 85,576 |
| Livestock | 525,273 | 447,321 | 500,221 | 473,276 | 411,513 |
| Miscellaneous ^a | 97,642 | 85,135 | 81,117 | 74,941 | 71,942 |

^aIncludes nursery, greenhouse products, and such things as mink production.

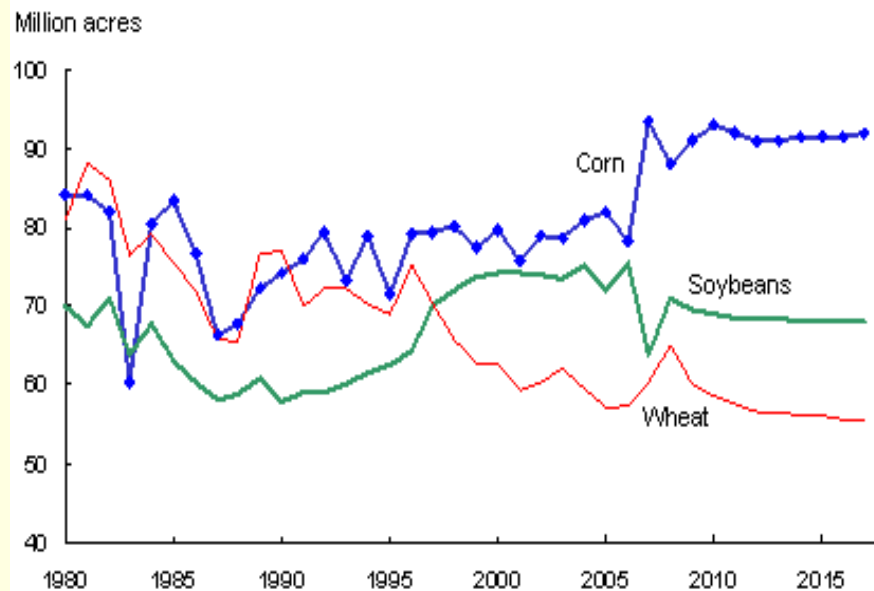
SOURCE: U.S. Department of Commerce. *Census of Agriculture*, Bureau of the Census, Washington, D.C.

Major types of agricultural enterprises by state



Basic grains

U.S. planted area: Corn, wheat, and soybeans

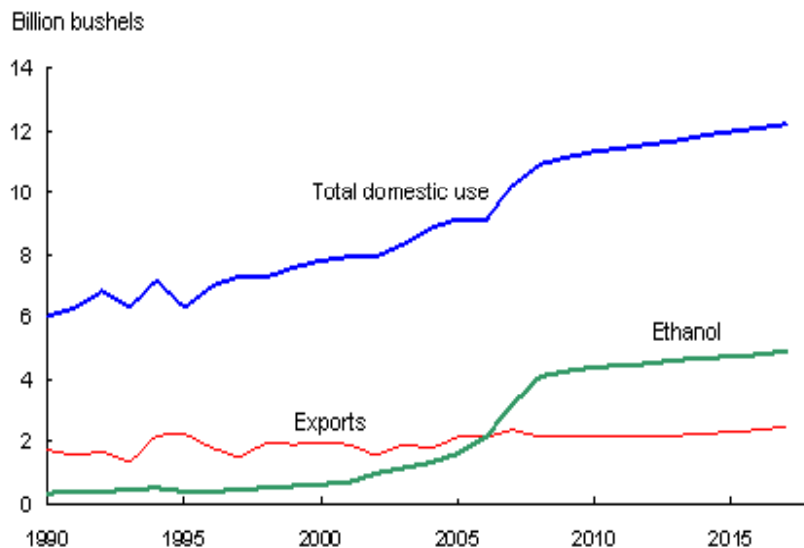


Source: *USDA Agricultural Projections to 2017*, February 2008.
USDA, Economic Research Service.

- Corn, wheat, and soybeans account for about 88 percent of acreage for the eight major field crops.
- In 2008, there is some shift in the cropping mix toward wheat and soybeans and away from corn due to short-term global supply reductions for those crops.
- However, longer term shifts move acreage back to corn, reflecting the growth in domestic corn-based ethanol production that raises corn prices and producer returns.

The case of corn

U.S. corn: Domestic use, ethanol, and exports



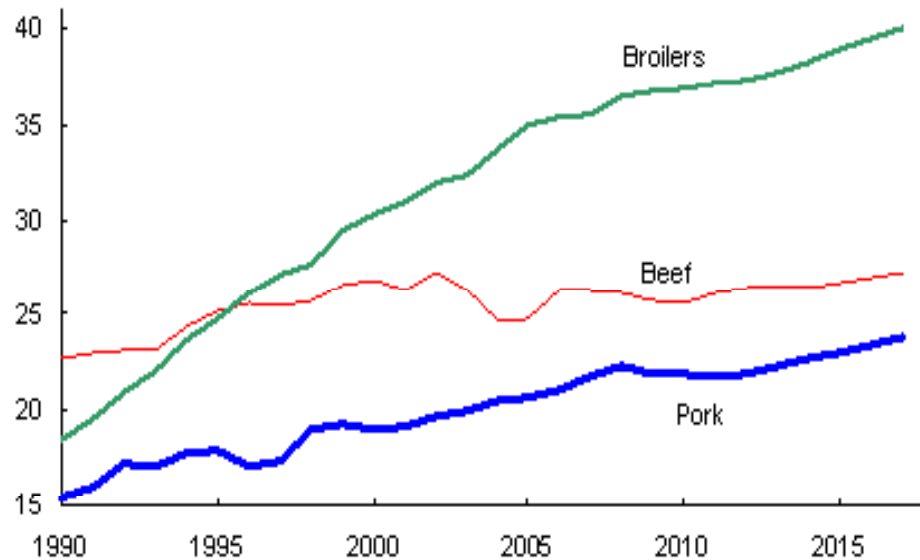
Source: *USDA Agricultural Projections to 2017*, February 2008.
USDA, Economic Research Service.

- Large increases are projected in corn used for ethanol production over the next several years. Relatively high prices for crude oil contribute to favorable returns for ethanol production, which combine with government programs to provide economic incentives for a continuation of the ongoing expansion in ethanol production capacity.
- U.S. corn exports rise in response to stronger global demand for feed grains to support growth in meat production. Additionally, U.S. corn exports to Mexico are boosted because of the elimination of tariffs on corn imports from the United States.

Livestock production

U.S. red meat and poultry production

Billion pounds

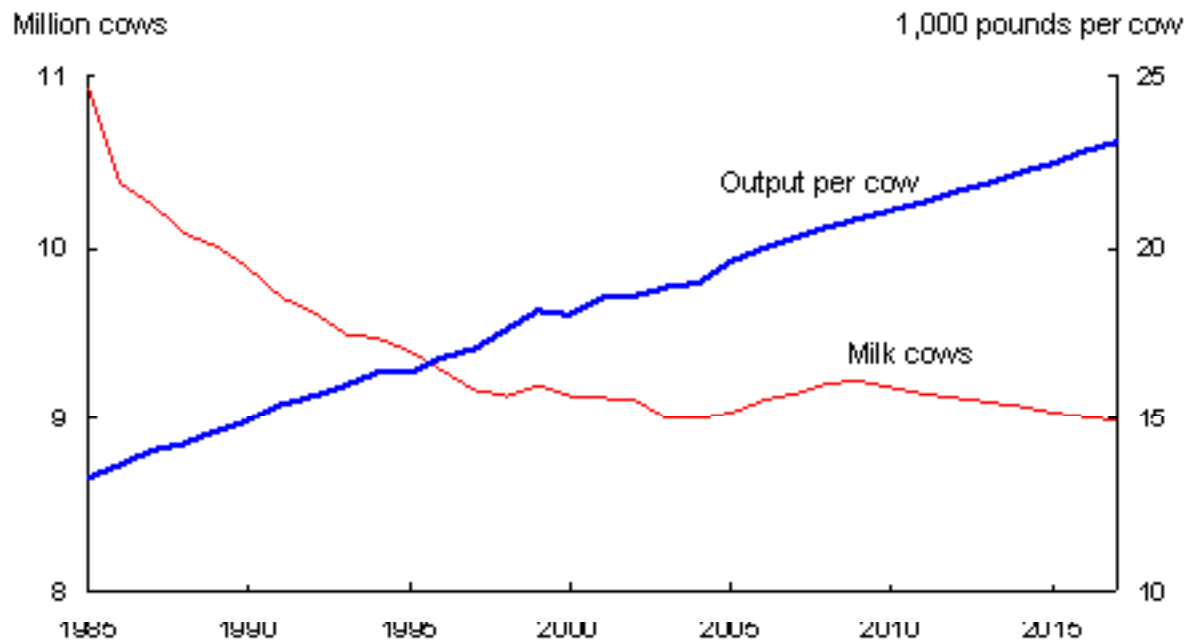


Source: *USDA Agricultural Projections to 2017*, February 2008.
USDA, Economic Research Service.

- Higher grain prices as well as effects of drought in recent years hold down cattle inventories, pushing U.S. beef production down.
- Pork and poultry production becomes substitutes for beef production.

Milk production

U.S. dairy herd and milk production per cow



Source: *USDA Agricultural Projections to 2017*, February 2008.
USDA, Economic Research Service.

Developments of large, specialized operations in most regions contribute to a continuation of gains in output per cow.

The agribusiness complex

Farming is closely related to the marketing and farm supply industry

Farms buy most of their inputs

Farm Supply

Feed, fertilizers, petroleum products, farm machinery, chemicals, other farm supply and services

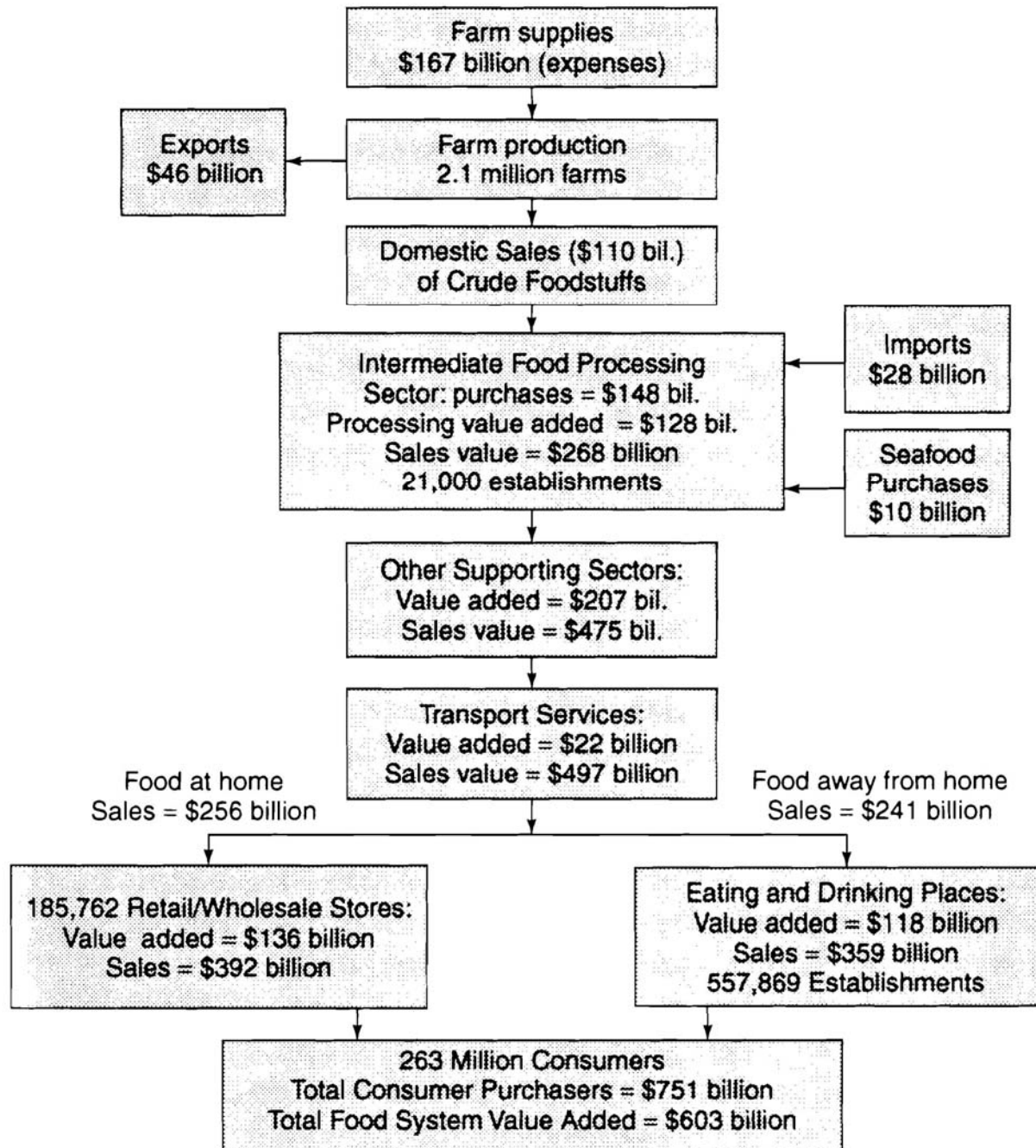


Farm



Marketing

Transform, Transport, and Transfer food and fiber to consumers



The role of marketing

- The job of marketing is very important because farm products are *raw* and the marketing system adds time, form, and place.
- Marketing accounts for approximately $\frac{3}{4}$ of the final value.
- Marketing gives US consumers a wide selection of food products at a relative low % of their disposable income (11% one of the lowest in the world)
- Marketing also needs to adapt to changes in consumers demand
 - Past: butter, whole milk, red meat, eggs, tea
 - Now: Skim milk, fruit, vegetables, rice, etc.

International trade

- During the last decade the value of exports have decrease in \$4 B.
 - Crop surpluses, lower prices, competition
- The US ***Agricultural Trade Balance*** (exports minus imports) is about 14.7 B.
- Agr. exports represent the 11% GDP
- 23% of farm income is derived from exports
- Basic grain are the mayor exports
 - 41% wheat and 18% corn

U.S. Agricultural Exports as a Share of Production.

| Commodity | Percentage of Production Exported |
|-----------|-----------------------------------|
| Wheat | 54 |
| Soybeans | 35 |
| Rice | 48 |
| Cotton | 42 |
| Tobacco | 14 |
| Corn | 24 |
| Poultry | 17 |
| Beef | 5 |
| Pork | 4 |

Source: "Foreign Agricultural Trade of the United States," U.S. Department of Agriculture, Foreign Agricultural Service,

Top 15 U.S. Agricultural Export Destinations, for 2007, value \$U.S.

| Ranking | Country | US \$ |
|---------|--------------------|----------------|
| | World Total | 89,907,538,204 |
| 1 | Canada | 14,003,843,443 |
| 2 | Mexico | 12,703,911,353 |
| 3 | Japan | 10,104,053,574 |
| 4 | European Union-27 | 8,770,156,617 |
| 5 | China | 8,313,857,408 |
| 6 | South Korea | 3,517,712,913 |
| 7 | Taiwan | 3,112,112,657 |
| 8 | Egypt | 1,801,450,233 |
| 9 | Indonesia | 1,541,886,706 |
| 10 | Turkey | 1,488,891,146 |
| 11 | Russian Federation | 1,328,541,016 |
| 12 | Colombia | 1,221,724,921 |
| 13 | Hong Kong | 1,167,847,169 |
| 14 | Philippines | 1,112,163,369 |
| 15 | Thailand | 869,590,833 |

U.S. Imports as a Share of Domestic Consumption

| Commodity | Percentage of Consumption Imported |
|-------------------------|---|
| Coffee | 100 |
| Tea | 100 |
| Cocoa | 100 |
| Bananas | 100 |
| Spices and Herbs | 93 |
| Broccoli for Processing | 69 |
| Fish and Shellfish | 55 |
| Grapes | 41 |
| Frozen Orange Juice | 24 |
| Beef | 10 |
| Pork | 4 |

Source: "Foreign Agricultural Trade of the United States," U.S. Department of Agriculture, Foreign Agricultural Service,

Top 15 U.S. Import Sources, for 2007, \$U.S. value

| Ranking | Country | US \$ |
|---------|-------------------|----------------|
| | World Total | 71,937,138,457 |
| 1 | European Union-27 | 15,286,663,223 |
| 2 | Canada | 15,245,332,053 |
| 3 | Mexico | 10,169,163,716 |
| 4 | China | 2,918,300,651 |
| 5 | Brazil | 2,644,483,468 |
| 6 | Australia | 2,632,170,929 |
| 7 | Indonesia | 2,081,444,508 |
| 8 | Chile | 1,840,529,925 |
| 9 | New Zealand | 1,733,510,344 |
| 10 | Colombia | 1,539,519,402 |
| 11 | Thailand | 1,507,091,633 |
| 12 | Costa Rica | 1,236,637,065 |
| 13 | India | 1,163,598,326 |
| 14 | Malaysia | 1,138,769,780 |
| 15 | Argentina | 1,083,909,278 |

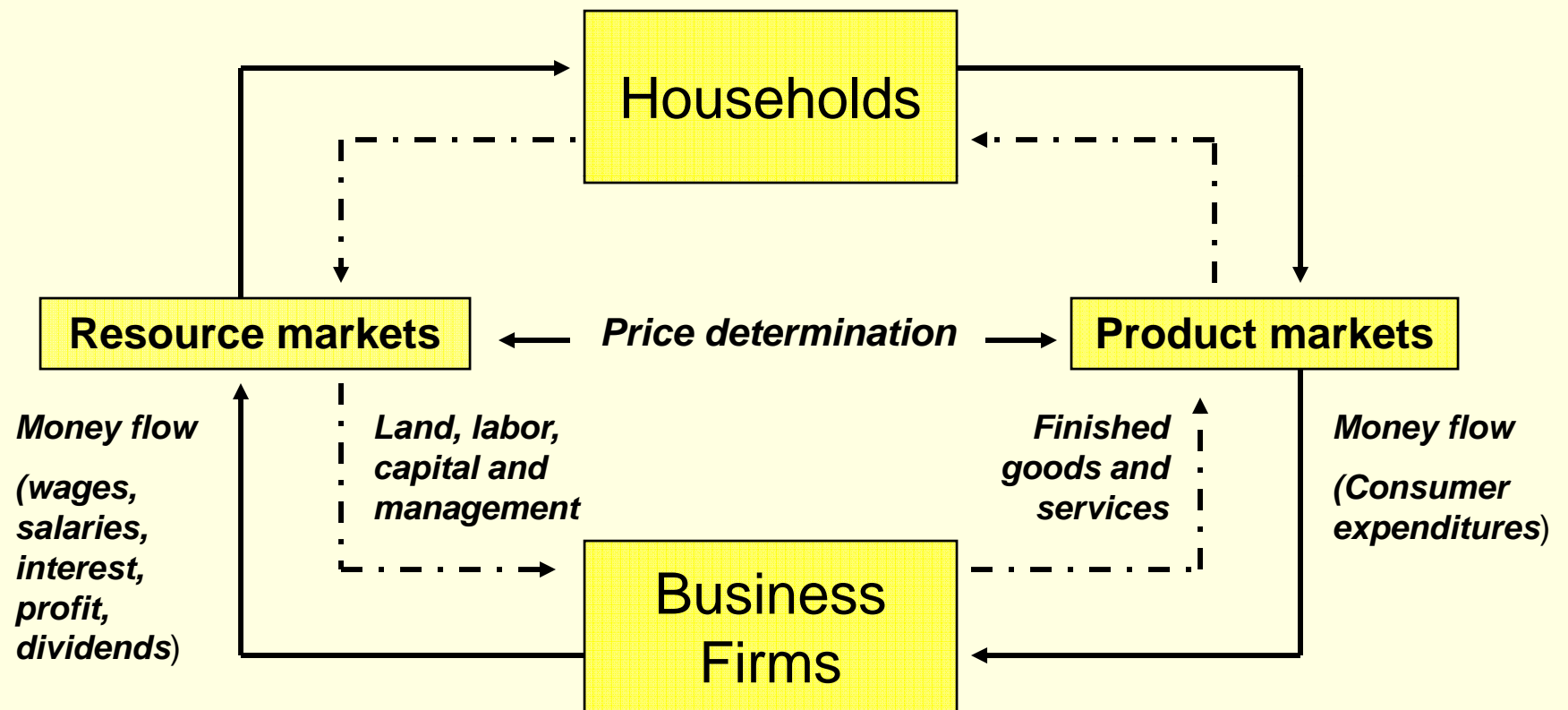
US economic system

- 2 components of the economic system:

Households & Business Firms

- ***Households*** are our dwelling places made up of families or individuals. They consume goods and services. They own the economic resources.
- ***Business firms*** are the economic actors that produce goods and services. To do so, they must purchase or hire economic resources

US economic system



US economic system

- Transaction between households and business firms are limited by scarcity
- Consumers have limited income, but unlimited wants
- Business firms are constrained in production by limited resources
- By aggregating all households and business firms we could have a Macroeconomic view of the economy
- The flow of money and goods among households, business and government we use a system called “National accounts”

Measures of national income and output

- **Gross National Product (GNP)** is defined as the "value of all (final) goods and services produced in a country in one year, plus income earned by its citizens abroad, minus income earned by foreigners in the country (keeping this kind of records is difficult)
- **Gross domestic product (GDP)** is defined as the total market value of all final goods and services produced within the country in a given period of time (usually a calendar year)
 - **Product market method:** adding up the values of purchases made by final consumers. By doing so we avoid double counting by excluding sales from intermediaries

$$GDP = \text{consumption} + \text{gross investment} + \text{government spending} + (\text{exports} - \text{imports}), \text{ or, } GDP = C + I + G + (X-M).$$

Example of double counting

| Stages of Production | Product Value at Point of Sale | Value Added |
|----------------------|--------------------------------|-------------|
| Cotton farmer | \$2 | \$2 |
| Cotton mill | 4 | 2 |
| Textile mill | 9 | 5 |
| Shirt manufacturer | 14 | 5 |
| Wholesaler | 16 | 2 |
| Retail outlet | 20 | 4 |
| Totals | <u>\$65</u> | <u>\$20</u> |

Market equilibrium

- An economy is in ***equilibrium*** when opposing forces within the system just offset one another and there is no incentive or pressure to change.
- I.E., expenditures by consumers and investors are just equal to the payments to the factors of production
- If expenditures by consumers $<$ value of goods and services produce:
 - Business firms cannot sell all their output, inventories will rise and Future output and employment will decrease
- If expenditures by consumers $<$ value of goods and services produce: What happened?????

Government tools

- **Monetary policy** is the process by which the central bank controls (i) the supply of money, (ii) availability of money, and (iii) cost of money or rate of interest, in order to attain a set of objectives oriented towards the growth and stability of the economy
- **Fiscal policy** refers to government policy that attempts to influence the direction of the economy through changes in government taxes, or through some spending (fiscal allowances)
- **Administrative regulation** are legal restrictions promulgated by government authority which attempt to produce outcomes which might not otherwise occur.