CHAPTER 2

# National Income and Product Account

# 2.1 The component of Macroeconomy

**Macroeconomics focuses on five groups:**

# 2.2 Circular flow diagram

**Circular flow:** A diagram showing the income received and payments made by each sector of the economy.

Injection

Withdrawal

Foreign Sector

Firms

Financial Institutions

Households

Government

# 2.3 National Income and Product Account

❖ **National income and product accounts:**
Data collected and published by the government describing the various components of national income and output in the economy.

❖ **Office of the National Economics Development Board (NESDB)**

**www.nesdb.go.th**

# Gross Domestic Product

**Gross Domestic Product (GDP):** The total market value of **all final goods and services** produced **within a given period** by **factors of production located within a country**.

# Concept of final goods and services

**Final goods and services:** Goods and services produced for final use.

**Intermediate goods:** Goods that are produced by one firm for use in further processing by another firm.

**Value added:** The difference between the value of goods as they leave a stage of production and the cost of the goods as they entered that stage.

# 2.4 GDP versus GNP

## ❖ Gross Domestic Product (GDP):

Look at output that **use factor of production within the country** to produce goods and services

## ❖ Gross National product (GNP)

The total market value of all final goods and services produced within a given period by **factors of production owned by a country's citizens, regardless of where the output is produced.**

# 2.4 GDP versus GNP

## Example

- Income from factory located in other country

- Maid and labor work in other country
- ***GNP = GDP + Net Factor Income from Abroad***

**Net factor income from abroad** = Income from Thai factor of production used to produce G&S abroad – Income from foreign factor of production used to produce G&S in Thailand

# 2.5 Measurement of GDP

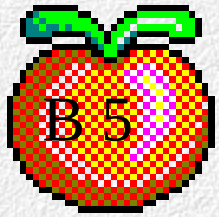
- Production Approach
- Expenditure Approach
- Income Approach

# 2.5.1 Product Approach

- Calculated from value of final goods and services
- Calculated using value added method

# Production Approach: using final G&S values

- Calculate total value of final goods and service: suppose there are 400 apples and 300 oranges in the economy


GDP = (price of apples × amount of apples)
+ (price of oranges × amount of oranges)
=
GDP =

# Production Approach: using value-added values

**Value added** The difference between the value of goods as they leave a stage of production and the cost of the goods as they entered that stage.

# Production Approach: using value-added values

| Value added in production of bottle orange juice | | |
|---|---|---|
| **Stage of production** | **Sales** | **Value Added** |
| (1) Orange | 500 | |
| (2) Orange juice | 650 | |
| (3) Orange juice in bottle (factory level) | 900 | |
| (4) Retail sale (Supermarket level) | 1200 | |
| Total value added | | |

# Some concerns: measuring GDP

## EXCLUSION OF USED GOODS AND PAPER TRANSACTIONS

**GDP is concerned only with new, or current, production**.

GDP ignores all transactions in which money or goods change hands and in which no new goods and services are produced.

**Example:**

- **A house build 3 years ago, should it be counted in GDP this year ?**

- **How about commission fee for the commissioner who sell the house?**

# 2.5.2 Expenditure Approach

**Expenditure approach:** A method of computing GDP that measures the amount spent on all final goods during a given period.

# THE EXPENDITURE APPROACH

**There are four main categories of expenditure:**

**Expenditure Categories:**

- **Personal consumption expenditures** (***C***): household spending on consumer goods
- **Gross private domestic investment** (***I***): spending by firms and households on new capital, i.e., plant, equipment, inventory, and new residential structures
- **Government consumption and investment (*G*)**
- **Net exports (*X* - *M*):** net spending by the rest of the world, or exports (*EX*) minus imports (*IM*)

$$GDP = C + I + G + (X - M)$$

# THE EXPENDITURE APPROACH (C)

## Personal Consumption Expenditures (*C*)

personal consumption expenditures (*C*): expenditures by consumers on goods and services.

There are three main categories of consumer expenditures: durable goods, nondurable goods, and services.

# THE EXPENDITURE APPROACH (C)

**Durable goods:** Goods that last a relatively long time, such as cars and household appliances.

**Nondurable goods:** Goods that are used up fairly quickly, such as food and clothing.

**Services:** The things we buy that do not involve the production of physical things, such as legal and medical services and education.

# THE EXPENDITURE APPROACH (I)

## Gross Private Domestic Investment (*I*)

Gross private domestic investment (*I*): Total investment in capital—that is, the purchase of new housing, plants, equipment, and inventory by the private (or nongovernment) sector.

There are three main categories of investment expenditures: nonresidential investment, residential investment, and changes in inventories

# THE EXPENDITURE APPROACH (I)

**Nonresidential investment:** Expenditures by firms for machines, tools, plants, and so on.

**Residential investment :** Expenditures by households and firms on new houses and apartment buildings.

**Change in business inventories:** The amount by which firms' inventories change during a period. Inventories are the goods that firms produce now but intend to sell later.
**= inventory end of period – inventory beginning of period**

**GDP = final sales + change in business inventories**

**GDP = final sales + inventory end of period**
**- inventory beginning of period**

# THE EXPENDITURE APPROACH (I)

## *Gross Investment versus Net Investment*

**Depreciation:** The amount by which an asset's value falls in a given period.

**Gross investment:** The total value of all newly produced capital goods (plant, equipment, housing, and inventory) produced in a given period.

**Net investment = Gross investment - Depreciation.**

$$\text{capital}_{\text{end of period}} = \text{capital}_{\text{beginning of period}} + \text{net investment}$$

$$\text{capital}_{\text{end of period}} = \text{capital}_{\text{beginning of period}} + \textbf{Gross investment} - \textbf{Depreciation}$$

# THE EXPENDITURE APPROACH (G)

## Government Consumption and Investment (*G*)

Government consumption (purchases) and investment (*G*): Expenditures by federal, state, and local governments

- For goods and services that government consumes in providing public services
- For investment.

# THE EXPENDITURE APPROACH (X - M)

## Net Exports (*EX - IM*)

Net exports (*EX - IM*): The difference between exports (sales to foreigners of Thai produced goods and services) and imports (Thai purchases of goods and services from abroad).

The figure can be positive or negative.

# THE EXPENDITURE APPROACH (X - M)

## Conclusion

Gross Domestic Product

$$GDP = C + I + G + (X - M)$$

Net Domestic Product

$$NDP =$$

$$NDP =$$

$$NDP =$$

$$NDP =$$

Net National Product

$$NNP =$$

# Expenditure on Gross Domestic Product at Current Market Prices (Original),2019(Millions of Baht)

| | |
|---|---|
| Private Consumption expenditure **(C)** | **8,448,321** |
| + General Consumption Government Expenditure **(G)** | **2,722,780** |
| + Gross Fixed Capital Formation **(I)** | **3,814,370** |
| + Change in Inventory **(I)** | **227,414** |
| + Exports of Goods and Services **(X)** | **10,086,594** |
| - Imports of Goods and Services **(M)** | **8,543,405** |
| **Expenditure on Gross Domestic Product** | **16,756,074** |

| | |
|---|---|
| **Expenditure on GDP** | **16,756,074** |
| + Statistical Discrepancy | **119,817** |
| **Gross Domestic Product** | **16,875,891** |

Consumption = 50.06%
Government = 16.13%
Investment = 23.95%
Exports = 59.77%
Imports = 50.62%
GDP =100.00%

data source: NESDB

# Expenditure on Gross Domestic Product at Current Market Prices (Original), 2011-2019, (Millions of Baht)

| | Private Consumption Expenditure C | General Government Consumption Expenditure G | Gross Fixed Capital Formation I | Change in Inventories I | Exports of Goods and Services X | Imports of Goods and Services M | Expenditure on Gross Domestic Product | Statistical Discrepancy | Gross Domestic Product |
|---|---|---|---|---|---|---|---|---|---|
| 2011 | 5,742,852 | 1,397,530 | 2,769,018 | 37,451 | 8,109,950 | 7,631,792 | 10,425,009 | 115,125 | 10,540,134 |
| | 54.49% | 13.26% | 26.27% | 0.36% | 76.94% | 72.41% | 98.91% | 1.09% | 100.00% |
| 2012 | 6,293,508 | 1,544,330 | 3,245,925 | 137,205 | 8,529,212 | 8,400,223 | 11,349,957 | 25,392 | 11,375,349 |
| | 55.33% | 13.58% | 28.53% | 1.21% | 74.98% | 73.85% | 99.78% | 0.22% | 100.00% |
| 2013 | 6,475,849 | 1,643,464 | 3,180,865 | 298,352 | 8,753,512 | 8,362,555 | 11,989,487 | -90,777 | 11,898,710 |
| | 54.42% | 13.81% | 26.73% | 2.51% | 73.57% | 70.28% | 100.76% | -0.76% | 100.00% |
| 2014 | 6,644,632 | 1,729,869 | 3,146,155 | -37,252 | 9,111,735 | 8,217,427 | 12,377,712 | -236,616 | 12,141,096 |
| | 54.73% | 14.25% | 25.91% | -0.31% | 75.05% | 67.68% | 101.95% | -1.95% | 100.00% |
| 2015 | 6,974,351 | 2,334,149 | 3,375,475 | -108,626 | 9,340,694 | 7,811,706 | 14,104,337 | -566,852 | 13,537,485 |
| | 51.52% | 17.24% | 24.93% | -0.80% | 69% | 57.70% | 104.19% | -4.19% | 100.00% |
| 2016 | 7,260,410 | 2,461,539 | 3,484,345 | -420,724 | 9,950,612 | 7,804,666 | 14,931,516 | -398,041 | 14,533,475 |
| | 49.96% | 16.94% | 23.97% | -2.89% | 68.47% | 53.70% | 102.74% | -1.95% | 100.00% |
| 2017 | 7,537,993 | 2,531,913 | 3,580,036 | -49,559 | 10,534,540 | 8,442,039 | 15,692,884 | -240,002 | 15,452,882 |
| | 48.78% | 16.38% | 23.16% | -0.32% | 68% | 54.63% | 101.55% | -1.55% | 100.00% |
| 2018 | 8,002,725 | 2,643,380 | 3,726,894 | 395,148 | 10,616,164 | 9,169,689 | 16,214,622 | 150,950 | 16,365,572 |
| | 49% | 16% | 23% | 2% | 65% | 56% | 99% | 1% | 100.00% |
| 2019 | 8,448,321 | 2,722,780 | 3,814,370 | 227,414 | 10,086,594 | 8,543,405 | 16,756,074 | 119,817 | 16,875,891 |
| | 50.06% | 16.13% | 22.60% | 1.35% | 59.77% | 50.62% | 99.29% | 0.71% | 100.00% |

data source: NESDB

# THE INCOME APPROACH

Income approach for GDP or GNP

**Factor Incomes**: the total income earned by factors of production owned by a country's citizens → **GNP**

**Factor Incomes**: the total income earned by factors of production within a country → **GDP**

**Factor Incomes**

**= compensation of employees**

**+ proprietors' income**

**+ corporate profits**

**+ net interest**

**+ rental income**

# THE INCOME APPROACH

## Composition of Factor Incomes

**Compensation of employees:** Includes wages, salaries, and various supplements—employer contributions to social insurance and pension funds, for example—paid to households by firms and by the government.

**Proprietors' income:** The income of unincorporated businesses

**Corporate profits:** The income of corporate businesses.

**Net interest:** The interest paid by business

**Rental income:** The income received by property owners in the form of rent

# THE INCOME APPROACH

GDP or GNP (depends on factor income that we consider)

= factor incomes

+ depreciation

+ (indirect taxes – subsidies)

+ others

**Depreciation:** The amount by which an asset's value falls in a given period.

**Indirect taxes:** eg. sales taxes, custom duties, and license fees

**Subsidies:** government payments to firms or households for which it receives nothing in return.

# THE INCOME APPROACH

GDP or GNP (depends on factor income that we consider)

= factor incomes

+ depreciation

+ (indirect taxes – subsidies)

+ others

**Others:** such as **net business transfer payments**, **surplus of government enterprises** and **statistical discrepancy**

**Net business transfer payments:** Net transfer payments by businesses to others.

**Surplus of government enterprises:** Net income of government enterprises

**Statistical discrepancy:** Data measurement error

# THE INCOME APPROACH

Relationship between GDP, GNP, NNP, and NI

***GNP = GDP + Net Factor Income from Abroad***

**Net factor income from abroad** = Income from Thai factor of production used to produce G&S abroad – Income from foreign factor of production used to produce G&S in Thailand

***NNP = GNP – Depreciation***

***National Income = NNP – Statistical Discrepancy***

# THE INCOME APPROACH

Relationship between National Income (NI), personal income (PI), and Disposable Income (DI)

***Personal Income = NI – Amount of national income not going to households***

*Example of Amount of national income not going to households is* ***Retained earnings of corporation***

***Retained earnings of corporation =***

***Corporate profits - Dividends***

***Personal Income = NI***

***– (Corporate profits – Dividends)***

***– Other parts of NI not going to households***

# THE INCOME APPROACH

Relationship between National Income (NI), personal income (PI), and Disposable Personal Income (DI)

***Disposable personal Income (DI) = Personal Income (PI) – Personal income taxes***

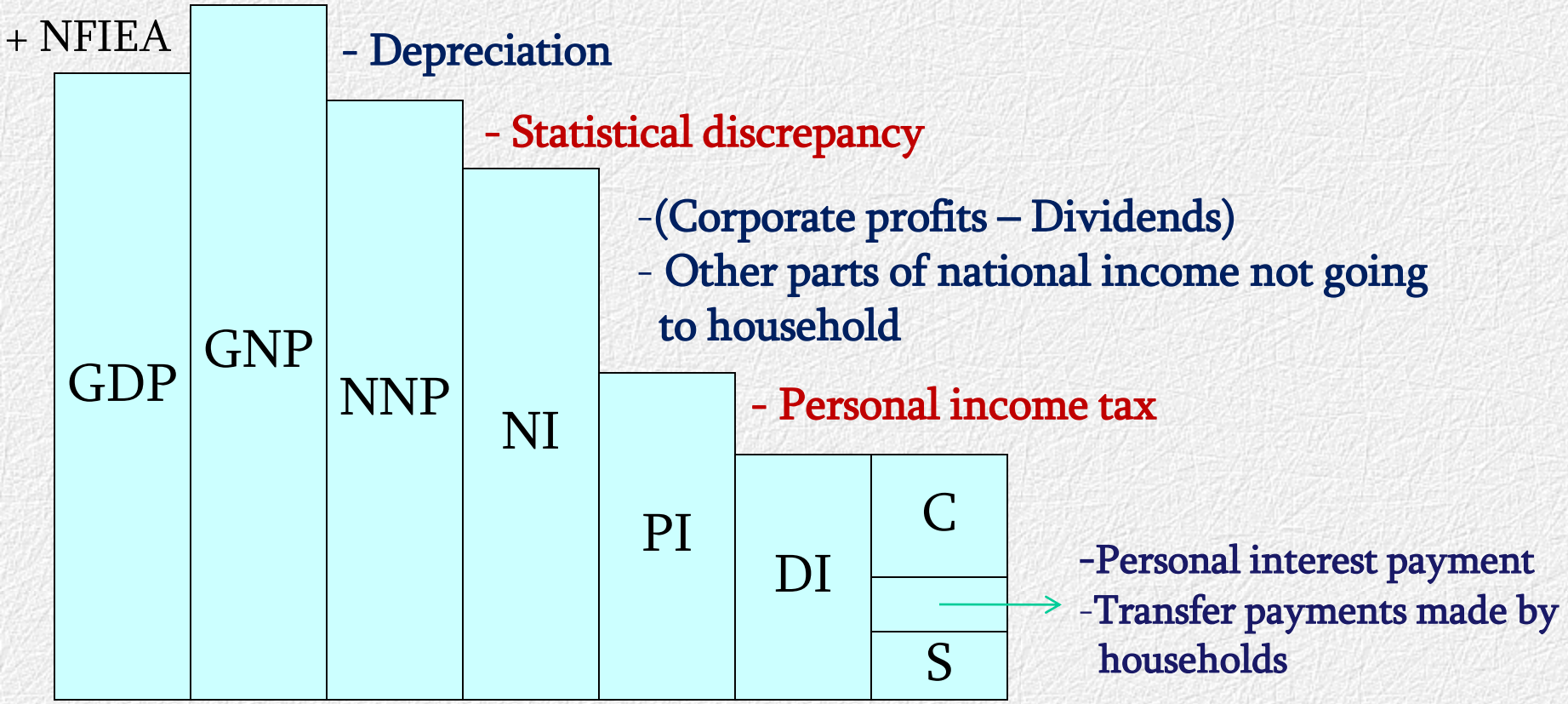
***People spends Disposable Personal Income (DI) for***

- ***Personal consumption expenditures (C)***
- ***Personal interest payment***
- ***Transfer payments made by households***
- ***Personal saving (S)***

***If there is no "Personal interest payment" and "Transfer payments made by households" DI = C+S***

# GDP, GNP, NNP, NI, PI and DI

**Net factor income from abroad (NFIEA)**= Income from Thai factor of production used to produce G&S abroad – Income from foreign factor of production used to produce G&S in Thailand



# Measurement of GDP by Income Approach, 2009-2017, (Millions of Baht)

| | GDP | GNP | NNP | NI | PI | DI |
|---|---|---|---|---|---|---|
| 2009 | 9,654,016 | 9,322,692 | 7,835,953 | 6,925,342 | | 5,612,949 |
| 2010 | 10,802,402 | 10,326,084 | 8,735,308 | 7,623,833 | | 6,130,171 |
| 2011 | 11,300,485 | 11,052,339 | 9,313,813 | 8,206,172 | | 6,497,536 |
| 2012 | 12,349,026 | 11,819,474 | 9,861,316 | 8,576,808 | | 7,025,459 |
| 2013 | 12,901,498 | 12,102,248 | 10,016,723 | 8,675,600 | | 7,200,719 |
| 2014 | 13,132,234 | 12,481,046 | 10,246,647 | 8,970,142 | | 7,434,419 |
| 2015 | 13,932,741 | 13,006,001 | 10,598,102 | 9,204,856 | | 7,786,011 |
| 2016 | 14,537,512 | 13,462,890 | 10,893,493 | 9,443,926 | | 8,084,601 |
| 2017 | 15,142,284 | 13,919,780 | 11,188,884 | 9,682,996 | | 8,383,192 |

data source: NESDB, NSO

# 2.6 NOMINAL GDP vs. REAL GDP and GDP Deflator

**Nominal GDP:** Gross domestic product measured in current prices

$$= (P_{1\ \text{current}} \times Q_1) + (P_{2\ \text{current}} \times Q_2) + \ldots\ldots\ldots + (P_{n\ \text{current}} \times Q_n)$$

**Real GDP:** Gross domestic product measured in constant prices

$$= (P_{1\ \text{base year}} \times Q_1) + (P_{2\ \text{base year}} \times Q_2) + \ldots\ldots\ldots + (P_{n\ \text{base year}} \times Q_n)$$

# 2.6 NOMINAL GDP vs. REAL GDP and GDP Deflator

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} = \frac{\Sigma\,(P_{current} \times Q_{current})}{\Sigma\,(P_{base\ year} \times Q_{current})}$$

The GDP deflator is one measure of the overall price level.

Overall price increases can be sensitive to the choice of the base year.

# **Example:** NOMINAL GDP vs. REAL GDP calculation

Three Goods Economy: Books (B), Rulers (R), Erasers (E)

| ปี | $P_B$ | $Q_B$ | $P_R$ | $Q_R$ | $P_E$ | $Q_E$ |
|---|---|---|---|---|---|---|
| Year 1 | 100 | 80 | 20 | 300 | 5 | 250 |
| Year 2 | 120 | 60 | 30 | 250 | 6 | 150 |
| Year 3 | 130 | 90 | 35 | 400 | 7 | 450 |

# **Example:** NOMINAL GDP vs. REAL GDP calculation

Using year 1 as a base year, Find

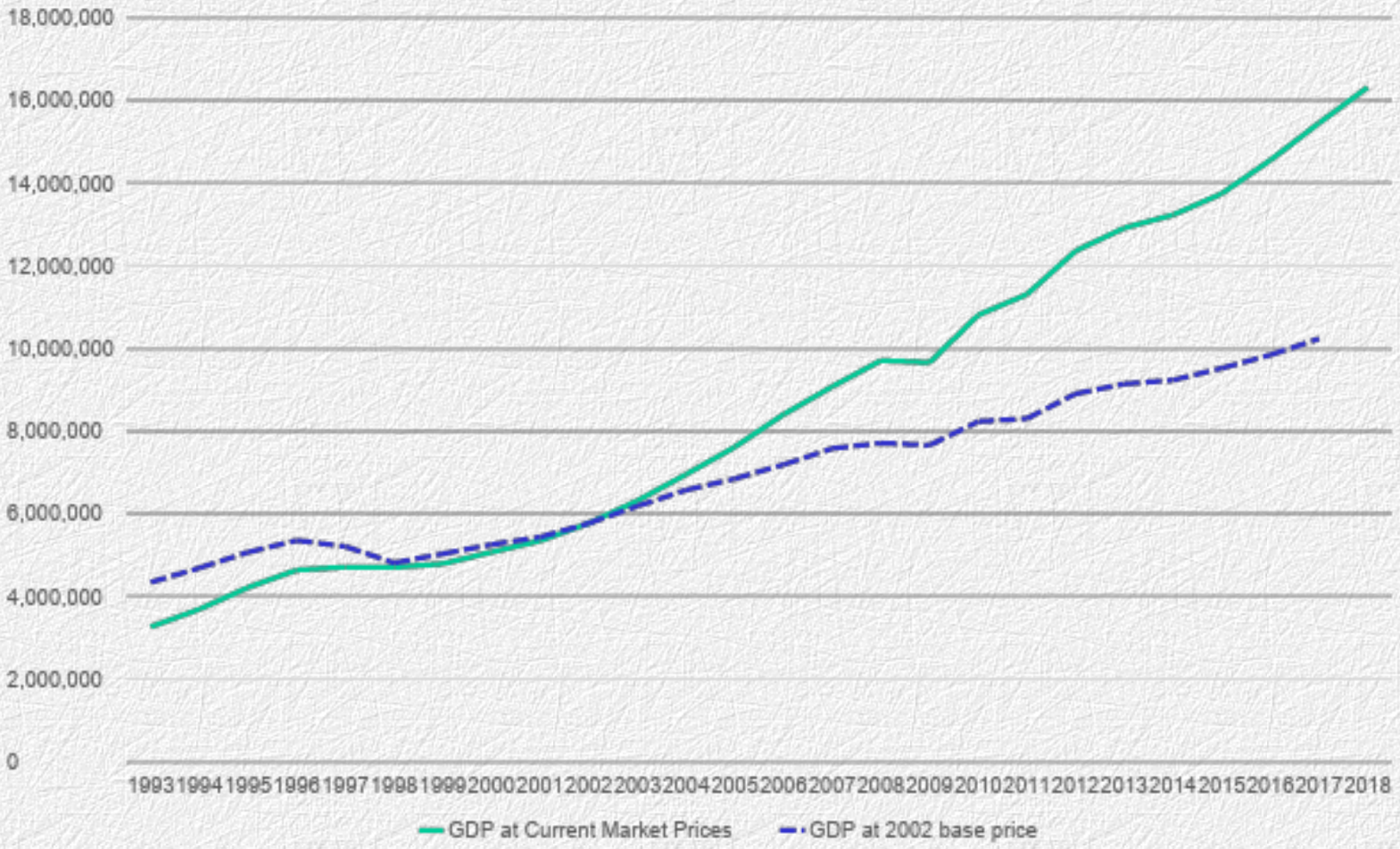
- Nominal GDP for year 1 =
- Nominal GDP for year 2 =
- Nominal GDP for year 3 =
- Real GDP for year 1 =
- Real GDP for year 2 =
- Real GDP for year 3 =

# **Example:** NOMINAL GDP vs. REAL GDP calculation

Using year 1 as a base year, Find

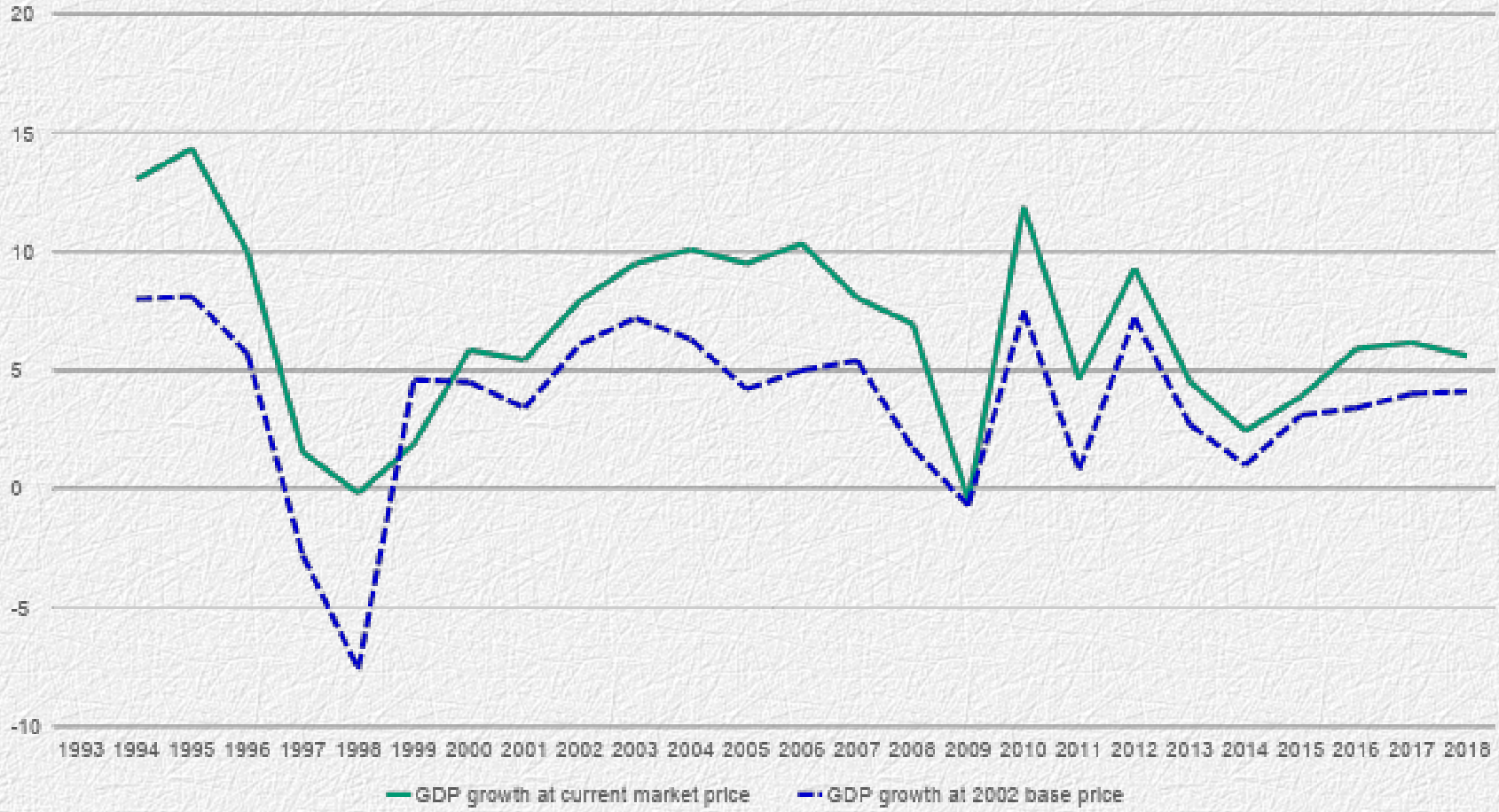
- GDP deflator for year 1 =
- GDP deflator for year 2 =
- GDP deflator for year 3 =
- Inflation rate for year 2 (from year 1) =
- Inflation rate for year 3 (from year 2) =

# Level of GDP 1993 – 2018 (Unit: Millions of Baht)




Source: Draw using data from www.nesdb.go.th

# Level of growth GDP 1993 – 2018 (Unit: Percent)



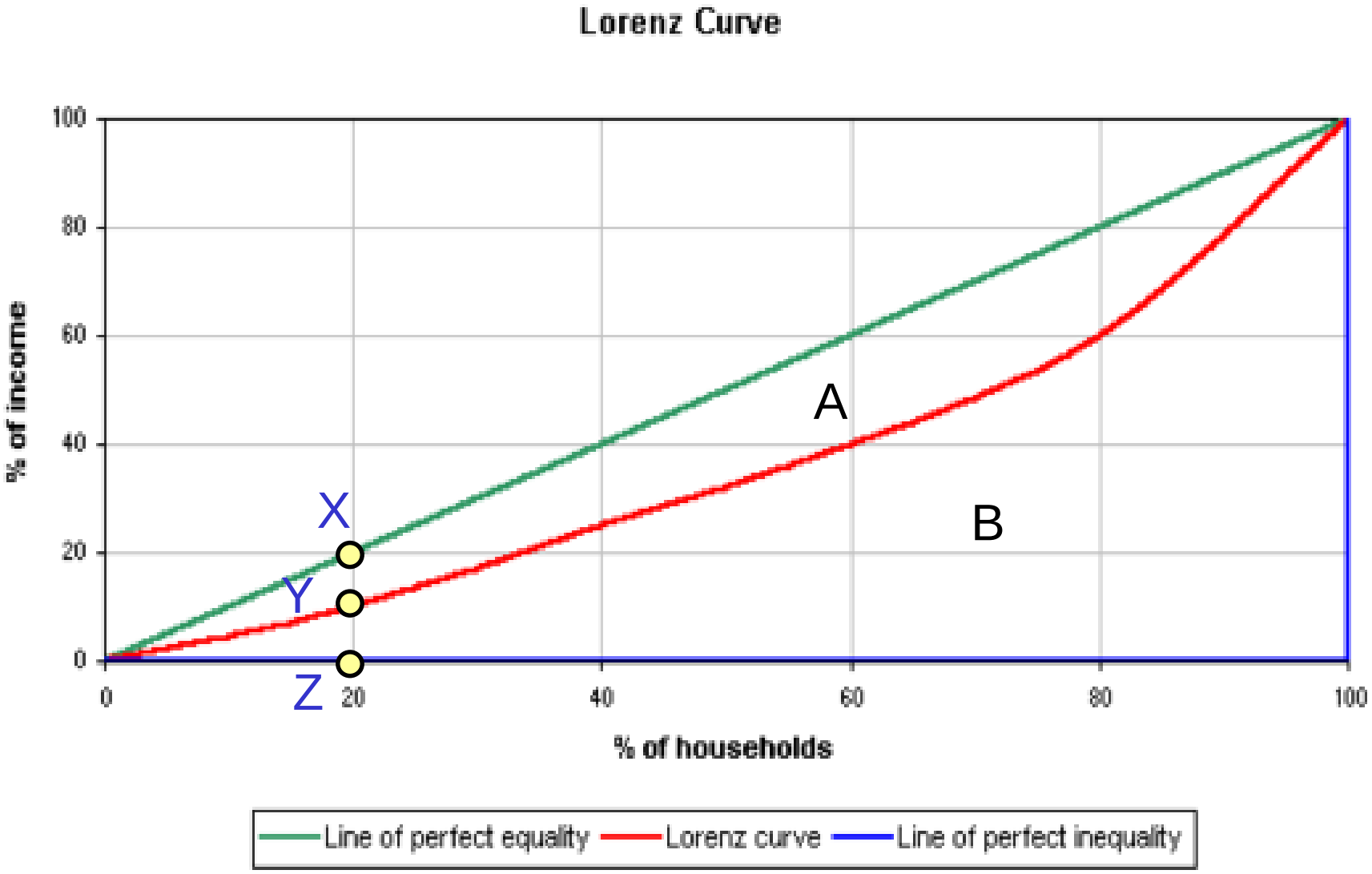

Source: Draw using data from www.nesdb.go.th

# 2.7 LIMITATIONS OF THE GDP CONCEPT

## GDP and SOCIAL WELFARE

## GDP and MEASUREMENT

# 1.5.6 Income distribution (Lorenz Curve and Gini-coefficient)



## 1.5.6 Income distribution (Lorenz Curve and Gini-coefficient)

At point X ⇨ 20% of household receives _____

At point Y ⇨ 20% of household receives _____

At point Z ⇨ 20% of household receives _____

**Point X is on the "Perfect Equality Line"**

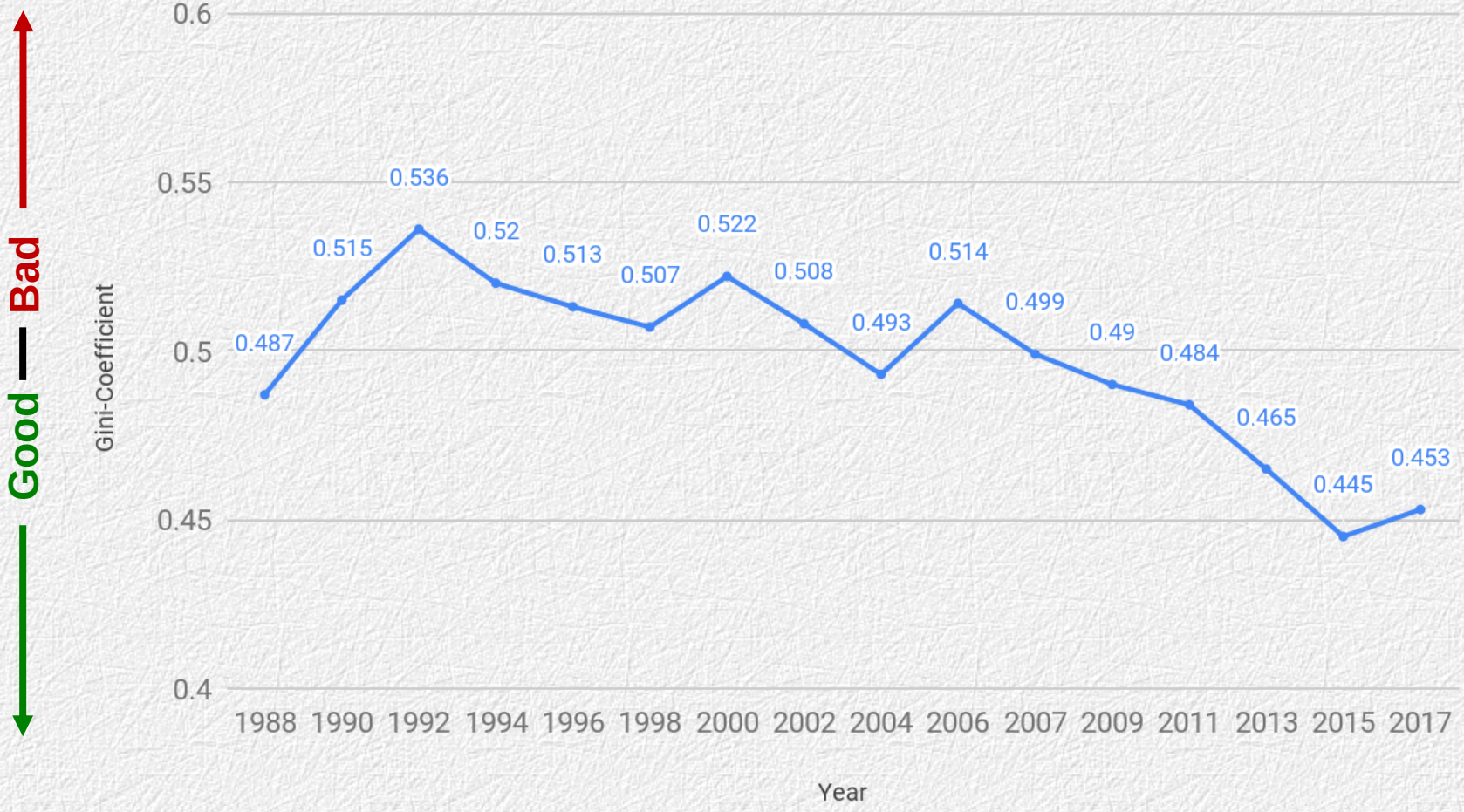
**Point Y is on the "Lorenz Curve"**

**Point Z is on the "Perfect Inequality Line"**

$$\text{Gini-coefficient} = \frac{\text{area A}}{\text{area A + area B}}$$

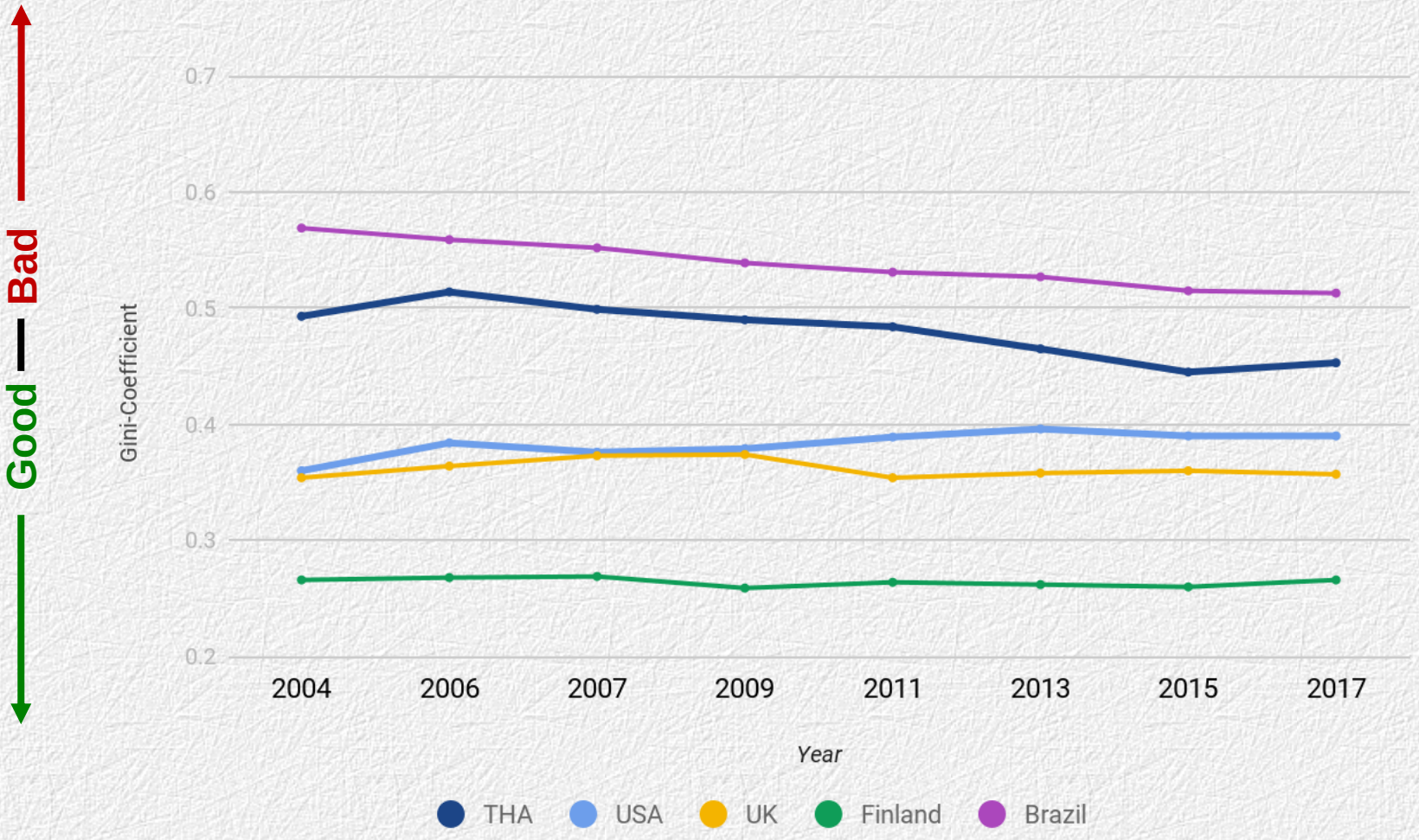
**Gini-coefficient** ⇨ **Unequal income distribution**

# Gini-Coefficient of Income, Thailand, 1988-2017




Data Source: NESDB

# Gini-Coefficient of Income, Thailand and other countries, 2004-2017




Data Source(s): NESDB, OECD, Trading Economics

# Poverty Headcount Ratio at National Poverty Line, Thailand, 2000-2018, (% of population)


Data source: NESDB