Japanese National Accounts: Estimation Methodology

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The views and opinions expressed in this paper are the author's only; ESRI does not share them.

0. Introduction

- What Are National Accounts?
  - The most essential and comprehensive economic statistics
    - Overall and detailed description of economic development
    - From flow to stock
    - Both in nominal, real, and price terms
    - Integration of basic source data
  - Established world standards
    - Academic background
    - *System of National Accounts 1993*
    - Time-series, cross-country, and regional comparisons
    - Consistency with other economic statistics

0. Introduction (continued)

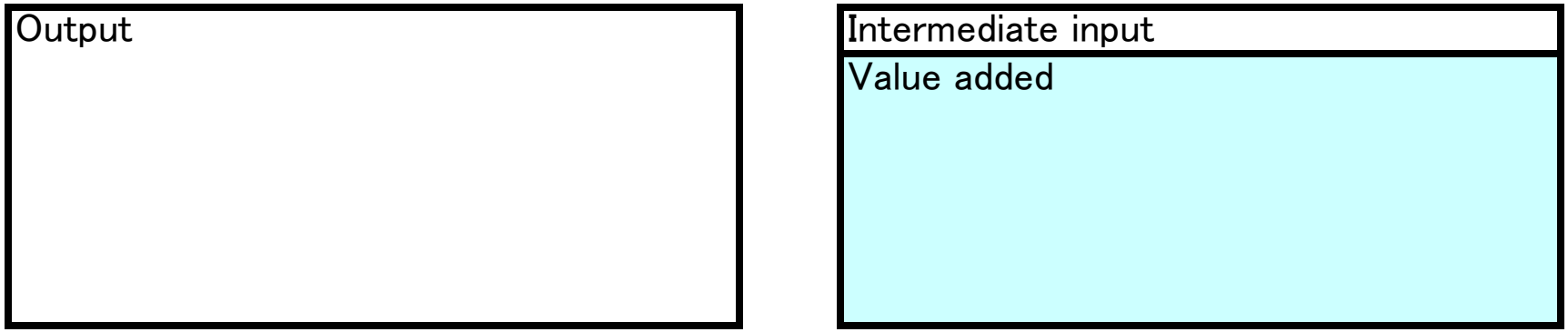
- National Accounts in Japan
  - A long history…started in the Meiji era.
  - High quality, greater detail, and timeliness
  - Widely used: policymaking, economic analyses, and forecasts
  - Missions of Department of National Accounts
    - Publication of annual estimates (contain approximately 70 different kinds of tables, some in both nominal and real terms; and some in both annual and quarterly terms)
    - Publication of flash estimates (approximately six weeks later)
    - Other issues (research on satellite accounts, etc.)

1. National Accounts : Overview and Key Concepts

- Sequence of Accounts
  - Production, income, current and capital expenditure, and stock
- Sector Classification
  - Households, general government, financial/non-financial corporations, NIPSH
- Price and Volume Measurement
- Some Definitions
  - Difference between consumption and investment

Chart 1: Sequence of Accounts – simplified case of households

1) Production



2) Income generation

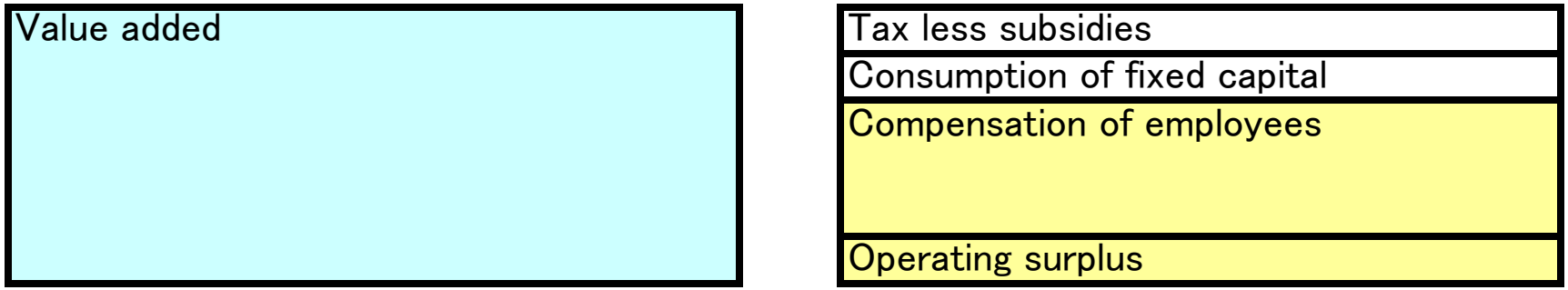


Chart 1 (continued)

3) Income distribution

Compensation of employees	Property income, payable
Operating surplus	Tax on income, wealth, etc.
Property income, receivable	Social contributions
Social benefits	Other current transfer, payable
Other current transfers, receivable	Disposable income

4) Use of income

Disposable income	Expenditure
	Saving, net

Chart 1 (continued)

5) Changes in capital

Saving, net	Gross capital formation
Capital transfers, receivable (less) Capital transfer, payable	(less) consumption of fixed capital
	Net lending (borrowing if negative)

6) Financial account

Changes in financial liabilities	Changes in financial assets
Net lending (borrowing if negative)	

7) Balance sheet (changes)

Changes in financial liabilities	Changes in non-financial assets
Changes in net worth due to saving and capital transfers	Changes in financial assets
Changes in net worth due to nominal holding gains/losses, etc	

Opening balance sheet + 5) + 6) + revaluation, etc = Closing balance sheet

Chart 2: Sectors in National Accounts

Sector	Sub-sector
Non-financial Corporations	Private NFC
	Public NFC
Financial Corporations	Private FC
	Public FC
General Government	Central Government
	Local Governments
	Social Security Funds
Non-profit Institutions Serving Households	
Households	

2. Methodology I : Frameworks for Nominal Figures

- Benchmark Year Estimates
  - Most detailed information available
  - Input-Output tables, Population Census, and other comprehensive surveys (available every five years)
  - Commodity-flow method
- Annual Estimates
  - Using detailed annual data with extrapolation
  - Commodity-flow method
  - Expenditure, production and income accounts

Chart 3: Input-Output and National Accounts

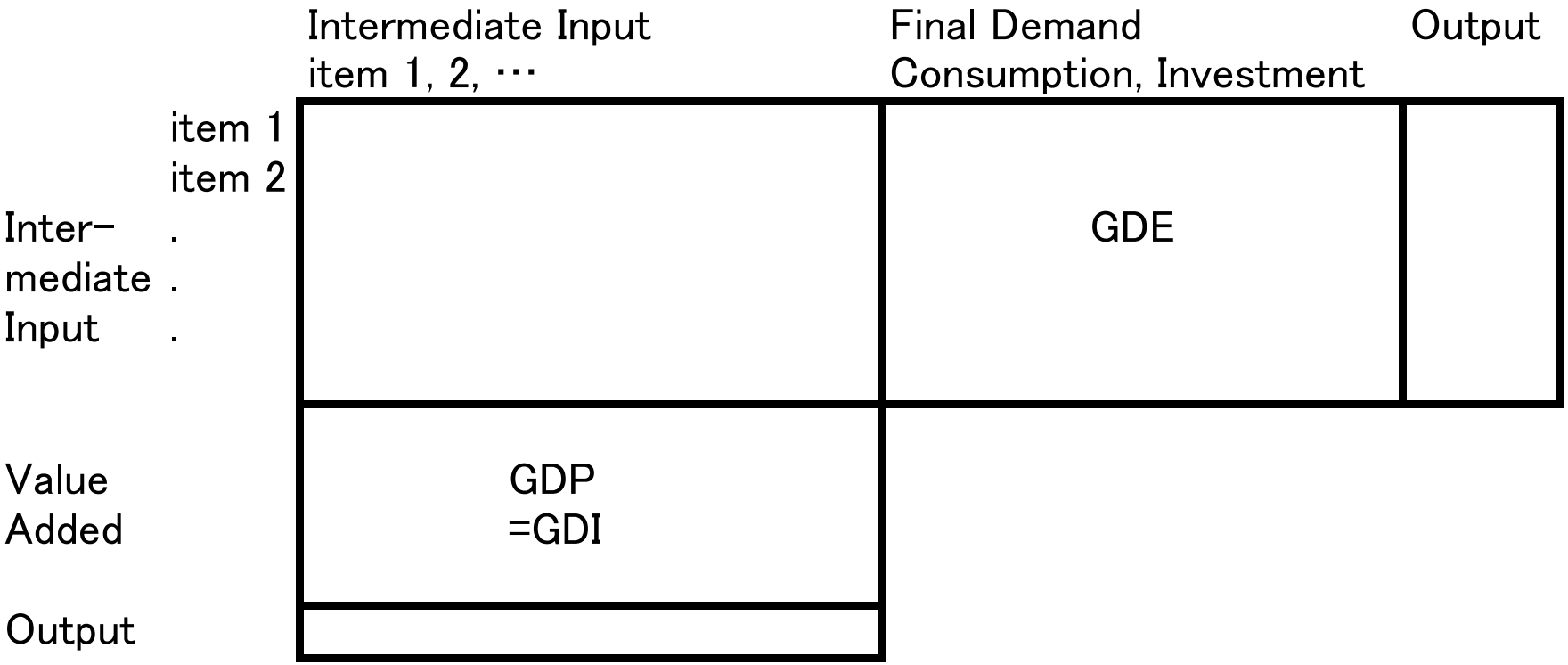


Chart 4: Components of GDE and GDI(GDP)

GDE

- Private consumption expenditure
  - Household consumption expenditure
  - NPISH consumption expenditure
- Government consumption expenditure
- Gross capital formation
  - Gross fixed capital formation
    - Private investment
    - Public investment
  - Changes inventories
- Net exports of goods and services
  - Exports
  - Imports

GDI

- Compensation of employees
  - Wages and salaries
  - Social contributions by employer
- Tax on production and imports
- (less) Subsidies
- Operating surplus and mixed income
- Consumption of fixed capital

Chart 5: Commodity-flow Method

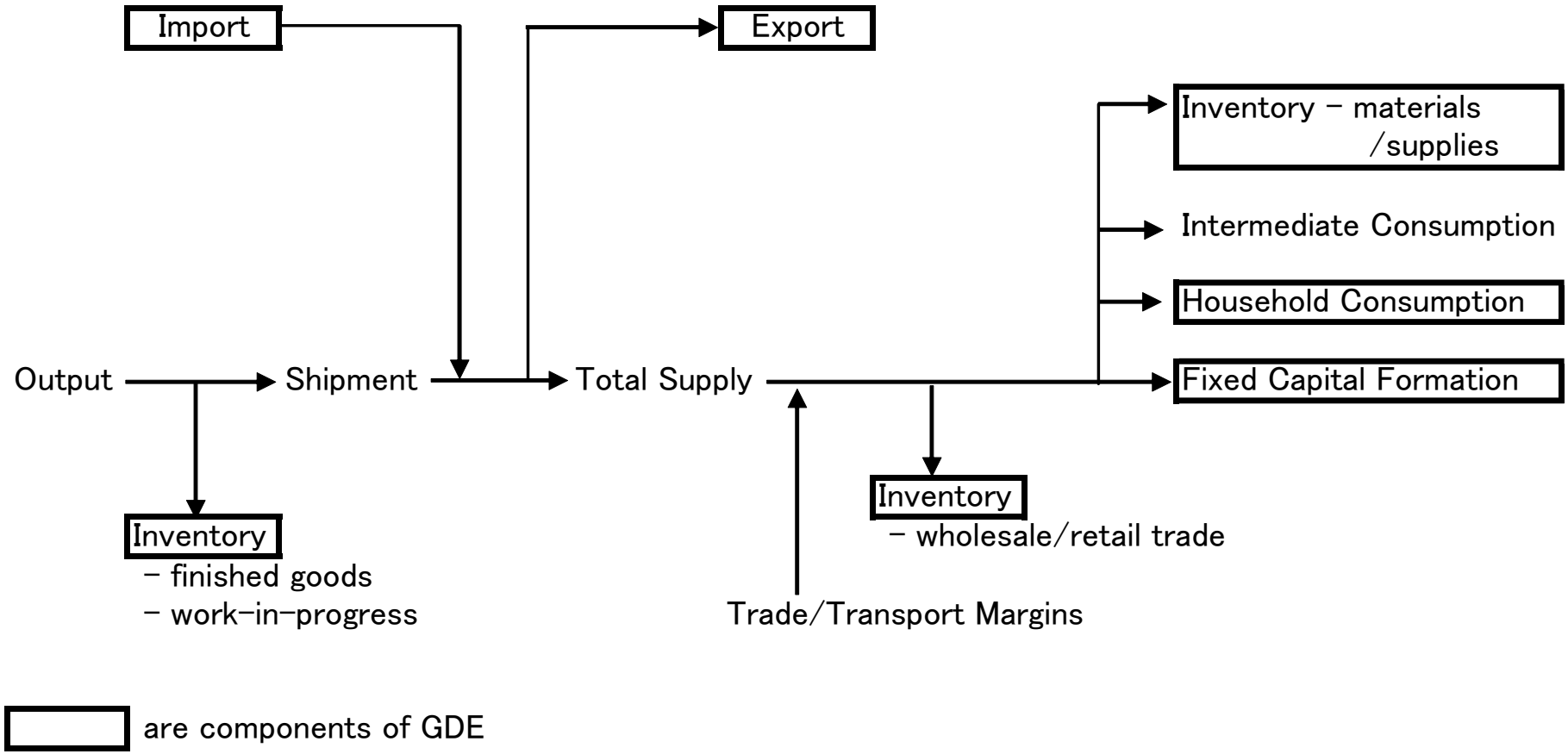
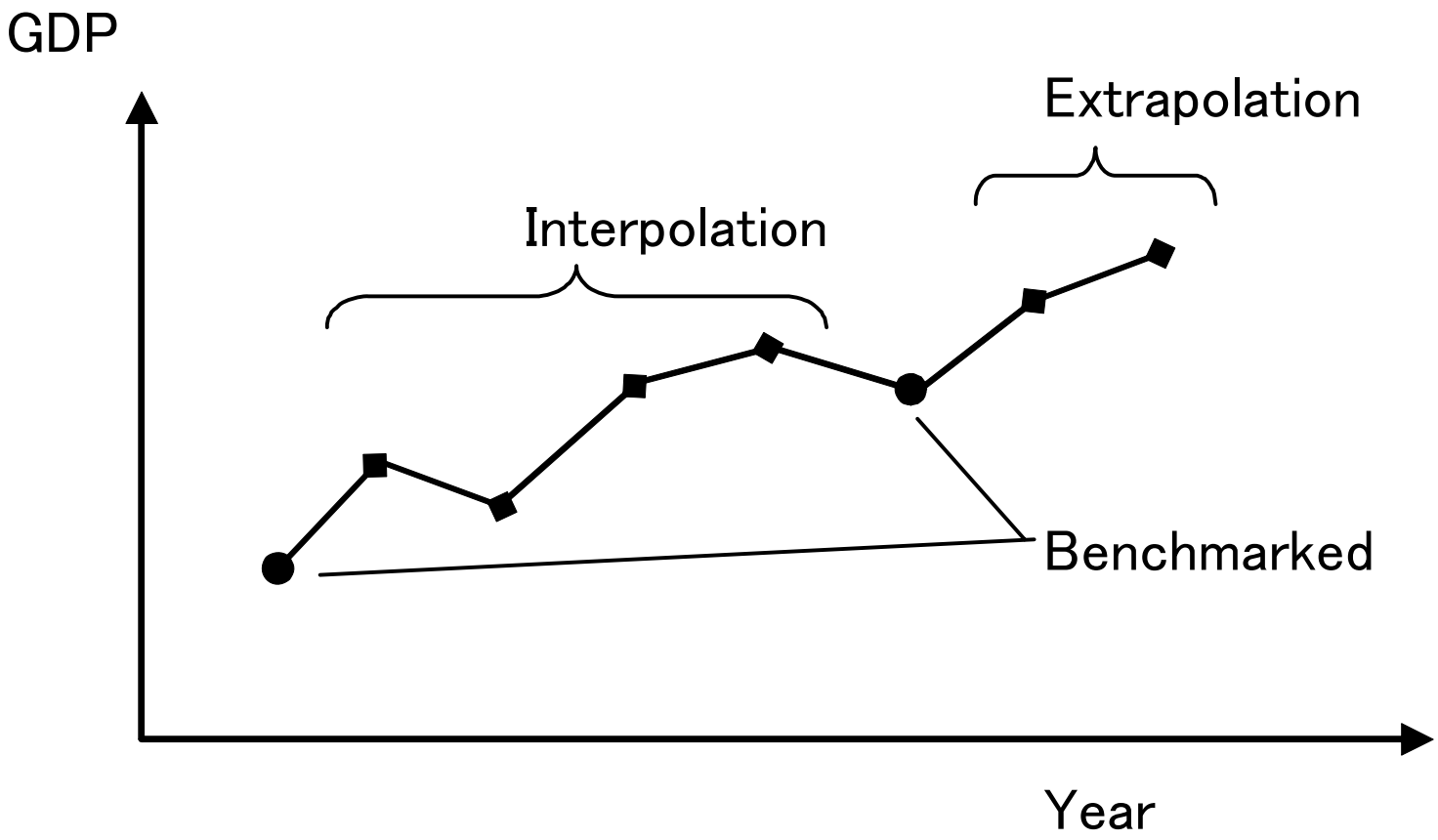


Chart 6: Production and Income

- GDP for (i)th industry: Y (i)
  - Y (i) = output (i) – intermediate input (i)
- Decomposition of GDI by industry
  - Operating surplus estimated as residual, alternatively directly estimated from basic source data
  - Operating surplus (i) = Y (i) – CE (i) – TS (i) – CFC (i)
  - CE (i): Compensation of employees
  - TS (i): Tax less subsidies
  - CFC (i): Consumption of fixed capital

Chart 7: Annual Estimates and Benchmark Revision



3. Methodology II : Estimation of Real Figures

- What Is Real Figure?
  - Nominal = real x deflator (price)
  - Volume and quantity
  - How are quality changes captured?
- Index Number Theory
  - 3 major index formula; issues of aggregation
  - The “substitution bias” problem in ICT-led economy
  - Chain-linking method
- Practical Application
  - Data used, level of detail, and introduced countries.

Chart 8: Index Number Formula

Type \ Volume/Price	Volume Index	Price Index
Paasche Index	$PV_t = \frac{\sum P_t Q_t}{\sum P_t Q_0}$	$PP_t = \frac{\sum P_t Q_t}{\sum P_0 Q_t}$
Laspeyres Index	$LV_t = \frac{\sum P_0 Q_t}{\sum P_0 Q_0}$	$LP_t = \frac{\sum P_t Q_0}{\sum P_0 Q_0}$
Fisher Index	$FV_t = \sqrt{LV_t \times PV_t}$	$FP_t = \sqrt{LP_t \times PP_t}$

Chart 9: Fixed-based and Chain-linking

- Example: Laspeyres Volume Index

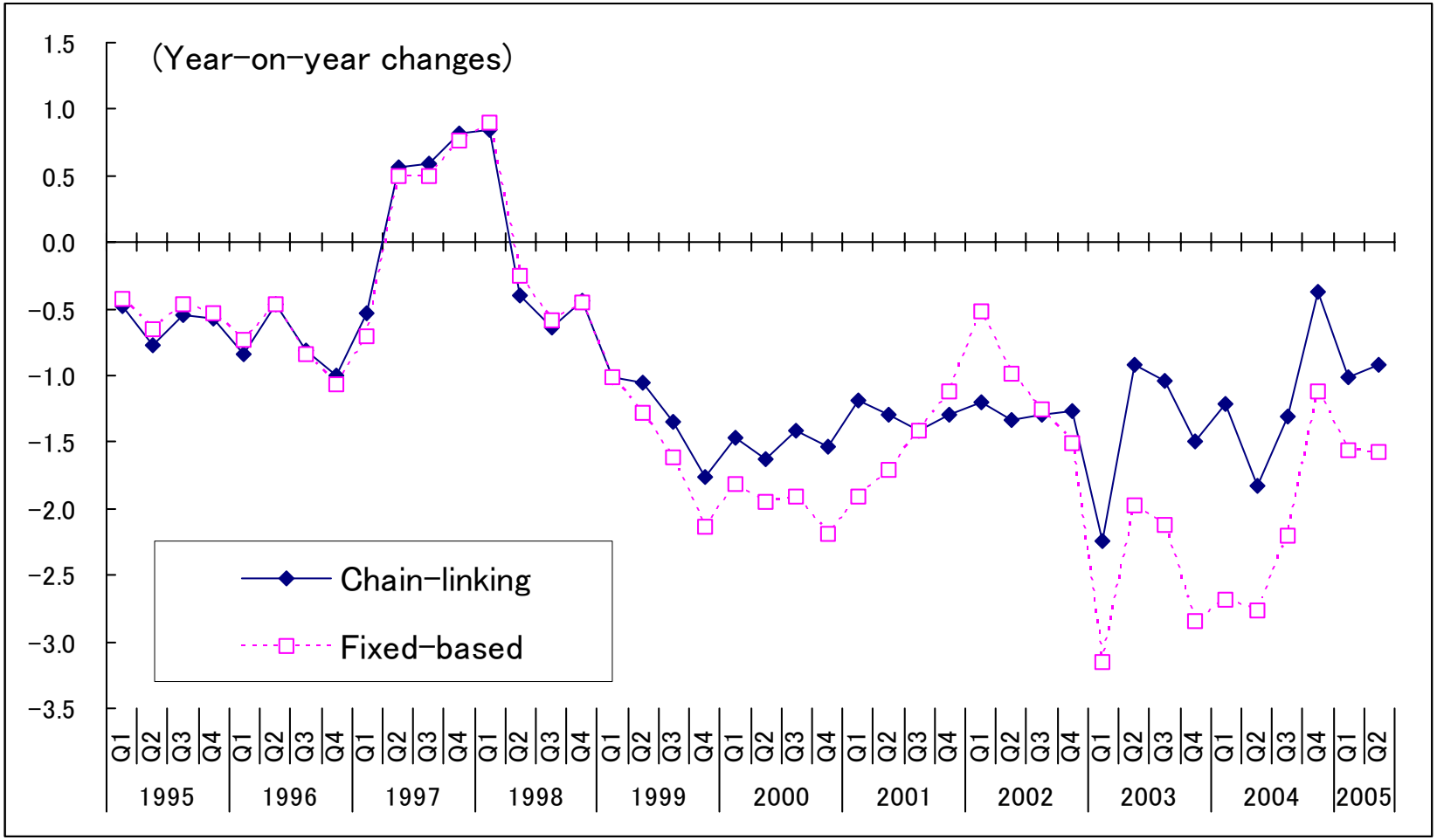
Fixed-based

$$LV_t = \frac{\sum P_{i,0} Q_{i,t}}{\sum P_{i,0} Q_{i,0}} = \sum w_{i,0} \cdot \frac{Q_{i,t}}{Q_{i,0}}$$

Chain-linking

$$LV_t = LV_{t-1} \times \frac{\sum P_{i,t-1} Q_{i,t}}{\sum P_{i,t-1} Q_{i,t-1}} = LV_{t-1} \times \sum w_{i,t-1} \cdot \frac{Q_{i,t}}{Q_{i,t-1}}$$

Chart 10: Comparison of Fixed-based and Chain-linking Methods – e.g. GDP deflator –



Digression : A Quiz

- Some Buzzwords in National Accounts; Do you know the meanings of the following words?
  - Contributions (how to calculate?)
  - Current/capital transfer
  - CFC
  - Gross and net (double meanings)
  - Accrual and cash accounting
- National Accounts as Statistics; What is the meaning of “estimation”?

4. Special Topics I : Households and Government Consumption Expenditures

- Imputation in HCE
  - Owner-occupied dwellings
- Concept of Government Expenditure
  - Non-market activities; output estimated from input data
  - Final demand by government = output by government (A) – commodity and non-commodity sales (B) + purchases by government (C)
  - Composition of GCE
    - Intermediate input
    - Compensation of government employees
    - CFC
    - Tax less subsidies

    } (A)

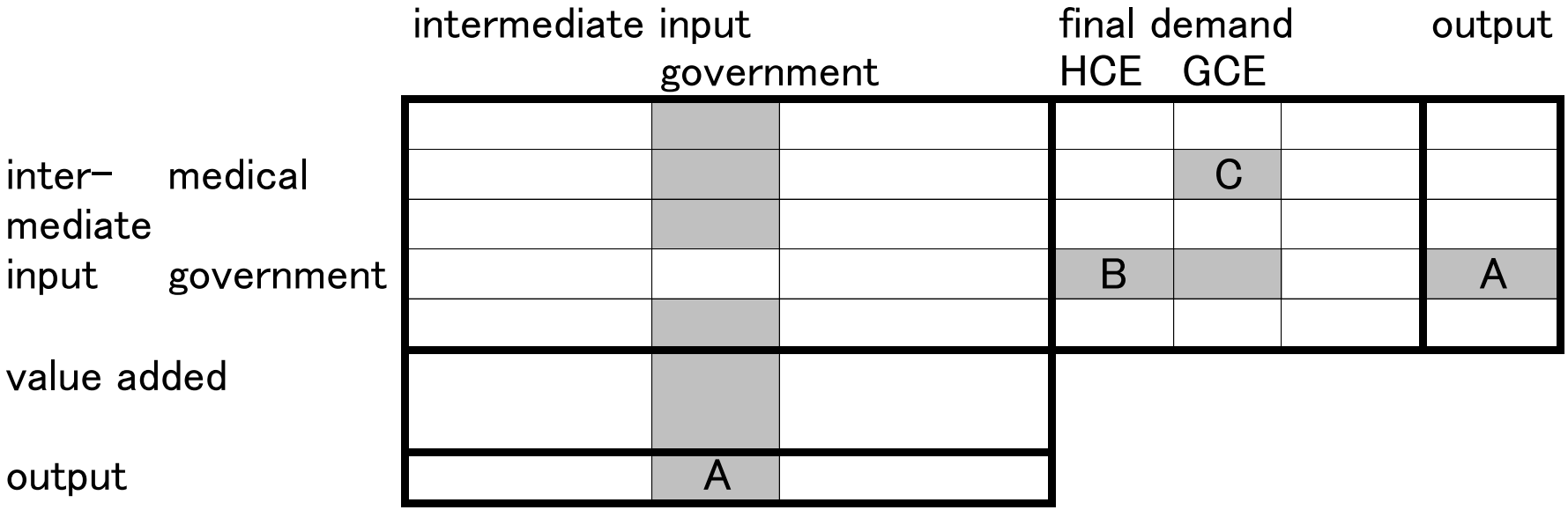
    - (less) Commodity and non-commodity sales (B)
    - Social transfers in kind (C)

Chart 11: Estimation of Imputed Rents

- Composition of HCE
  - Domestic final consumption expenditure of households: 274 trillion yen for 2003
  - Imputed rents: 53 trillion yen for 2003
- Estimation method of imputed rents
  - Unit rent in housing market (for equivalent category (i)): UR (i) (yen/m^2)
  - Floor space of owner-occupied dwellings: FSOD (i) (m^2)
  - Imputed rents: ΣIR (i) = UR (i) x FSOD (i)

Chart 12: Household and Government Consumption Expenditure

- Relationship Between Household Expenditure and Government Sales
- Treatment of Medical and Long-term Care Expenditures (Social transfers in kind)

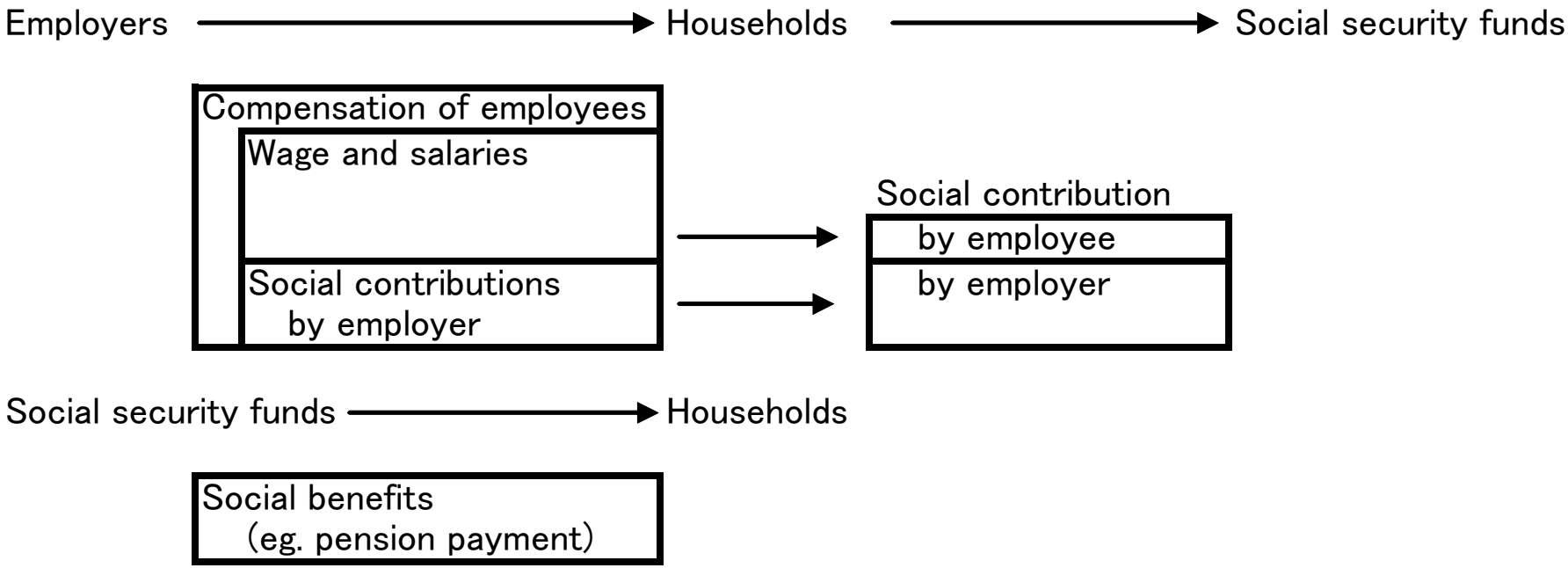


4. Special Topics II : Compensation of Employees, etc.

- Composition of Compensation of Employees
  - Compensation of employees = wage and salaries + social contributions
- Operating surplus and mixed income
  - Operating surplus for owner-occupied dwellings
  - Mixed income
    - Proprietors' income = profit + wage

Chart 13: Treatment of Social Contribution and Social Security Benefits

- Social Security Pension System – One Case



＊ Social benefits comprise a part of household income.

Other Issues

- Ongoing Benchmark Revision in Japan
  - Quinquennial revision (to be published from this coming December)
  - Major revisions under consideration (may be announced in the next month)
  - Introduction of a chain index (introduced in advance)
- SNA Update (revision in *SNA93*)
  - Reflect economic development thereafter
  - More detailed explanation
  - Expansion of accounts incorporating recent academic works
  - “Revision I” will be finalized in 2008.

References and Sources

References

- "System of National Accounts 1993" (UN)
  - Current world standard
- "European System of Accounts 1995" (Eurostat)
  - European standards, almost same as the *SNA93*
- "Annual Report on National Accounts" (ESRI, Japan)
  - Annual estimates of Japanese national accounts, with explanatory notes

Sources

- http://www.esri.cao.go.jp/en/sna/menu.html
  - Japanese SNA website in English.
- http://www.oecd.org/topicstatsportal/0,2647,en_2825_495684_1_1_1_1_1,00.html
  - Member countries' national accounts database run by OECD.
- http://unstats.un.org/unsd/snaama/Introduction.asp
  - UN webpage on main aggregates by country.
- http://dsbb.imf.org/Applications/web/sddsnsdppage/
  - IMF's Data Standard webpage; a short-cut of "jumping" to national accounts webpage of major member countries.

Thank you for your attention ☺