28 May 2002 Cabinet Office
Economic and Social Research Institute
Department of National Accounts

Outline of the New Estimation of Quarterly GDP (QE)

1. Use of Supply-side Statistics

< Present system >

-Annual accounts are estimated by the commodity-flow method based on supply-side statistics.

- Quarterly estimates are estimated by extrapolating quarterly breakdown of annual estimates using the rates of increase over a year before of demand-side statistics.

< Defects of the Present System >

- The revision often turns out large as annual estimates are based on supply-side statistics, while QE are based on demand-side statistics.
- Estimation accuracy may be insufficient due to the sampling nature of the demand side statistics.
- The timing of estimation and publication is late, in comparison to other major developed nations. (Note 2)

< New system >

- As in the estimation of annual accounts, supply-side statistics are used to estimate supply-side quarterly estimates. More specifically,

1) Quarterly information based on " Current Production Statistics Survey " and " Monthly Statistical Report on Trends in Selected Service Industries " are used to estimates the changes in total supply for 90 commodity classifications (see Appendix 1).

2) Total supply for the most recent year in annual accounts in each classification is distributed to quarters, based on the pattern of 1).

3) Based on 2), extrapolation is applied, using the quarterly change rates of 1).

4) For each classification, the distribution ratios to demand components are taken from the annual accounts and multiplied to the quarterly domestic supply.

- Supply-side estimates thus calculated are combined with demand-side estimates to obtain the overall estimates of the nominal value.

See Appendix 3 for detailed estimation methods for demand components.

2. Earlier Estimation and Publication

- At present, the 1st quarterly estimate is published about two months and 7 days after the end of the quarter, and four months and ten days later for the 2nd estimate. It has been hoped to make them earlier from the viewpoint of timely evaluation of economic trends.

- By using the supply-side statistics, the first estimation can be made earlier by nearly a month, which is comparable to other developed countries. The second estimate will be made about two months and 10 days after.

< Table > Timing of the first estimate in other countries (after the quarter)

U. S. A.	nearly a month
U. K.	nearly a month
Italy	about a month and half
France	nearly two months
Germany	nearly two months
Canada	nearly two months
Japan (present)	about two months and seven days

3. Improvements in estimation methods

(1) Extrapolation method

- The annual value of the most recent year is distributed into quarters, and then extrapolated based on the quarterly changes of the source statistics.
- This would remove the problem that the rate of increase over the previous period is altered after the annual estimation, as the latter involves a change in the quarterly pattern.

(2) Quarterly Distribution of the Annual Estimates

- Under the new system, the annual estimate is to be distributed into quarters, in principle, according to the quarterly pattern of the source statistics, while some special method is partially applied in the present system.

(3) Seasonal Adjustment

- Seasonal adjustment is recalculated every quarter inclusive of the most recent estimate,

while in the present system, the periods for seasonal adjustment is up to the end of the annual estimate and pre-calculated seasonal factor is applied.

- This would enable us to estimate the seasonal factor taking account of the latest information, while the seasonally adjusted series are revised retroactively every time.

(4) Revision Rule

- To accommodate the revisions in the source statistics, backward revisions will be made whenever necessary, while under the present system, there is basically no revision after the second QE until the annual estimation.

(5) Other Improvements

- The use of the results for singles in " Family Income and Expenditure Survey ", is suspended.
- Trend extrapolation is introduced for the final consumption by Private Non-profit Institutions (Private NPIs), instead of magnifying the results of some special surveys.
- The changes in the duration for construction of houses are taken care of.
- The extrapolation of public investment is based on the estimate for progress in " Integrated Statistics on Construction Work " only, without using the estimates for fiscal year total.
- The estimate of the deflator for fixed capital formation takes account of the current commodity composition, rather than using the information in the most recent annual estimates.

4. The Periods for Estimation and Related Remarks

(1) Revision of Past Annual Estimates

(The followings are based on the assumption that the new system has been introduced at the time of preparing new annual estimates this autumn.)

(i) The periods to apply the new estimation (demand components for quarterly estimation)

< original series >

- Quarterly estimates after the Jan-March 2000 will be made by the new system (in the process of annual estimates after this year) (Note 1).
- As for those before the Oct-Dec 1999, the existing series will remain official.

< seasonally adjusted series >

- In order to appropriately apply seasonal adjustment, estimates of original series under the new system are to be calculated back to Jan-March 1994. The seasonal adjustment is applied from this quarter up to the latest quarter (Note 2).

- Both original and seasonally adjusted estimates under the new system for the periods Jan-March 1994 to Oct-Dec 1999 will be made public as reference series (Note 3).
- As for the seasonally adjusted estimates for the periods up to Oct-Dec 1999, the official series will be the seasonally adjusted series of the already published (except for future possible revisions) original series, with the seasonal adjustment periods Jan-March 1980 to Oct-Dec 1999.

(ii) The periods to apply the new estimation (quarterly numbers except demand components)
- For the time being, the new system will be applied for Jan-March 2000 and after (in the process of new annual estimations).
- Retroactive estimation for Jan-March 1995 to Oct-Dec 1999 will be made on the occasion of shifting to new standard year (expected for 2005) (Note 4).

(iii) Coexistence of Tow series and Discontinuity
- As a result of (i) and (ii) above, there will be two series for the periods Jan-March 1994 to Oct-Dec 1999, both for original and seasonally adjusted series : the conventional official one and the new one as reference. The annual total (or total for fiscal year) of the new original series are basically the same as what have been published, but may be changed due to possible improvement in estimation.
- The official series are the combination of the conventional series (up to Dec. 1999) and the new series (after Jan. 2000), with a discontinuity in nature.
  a) Official numbers for rates of change will be those comparing the estimates of the same series.
  b) Official series are used for historical comparison (such as " largest increase since 1Q of 19** ").

(2) Revisions
- Estimates of demand components will be revised in response to annual revisions of source statistics. As this will involve the revision of Jan-March quarter of the preceding year, the estimate for the fiscal year ending with that quarter will be revised, before the final revision.
- Those series that appear only in annual accounts, will be revised in the process of annual estimation.
- As for other revisions of source statistics, such as a change in the standard year and/or in the classification etc., corresponding revision may be made, as the case may be. However, in principle, no revision will be made after the second (final) annual revision.

(Note 1) If the new system is adopted before the annual revision scheduled later this year, the quarterly estimates will be made for April-June 2001 and onwards, with the estimates for preceding periods made

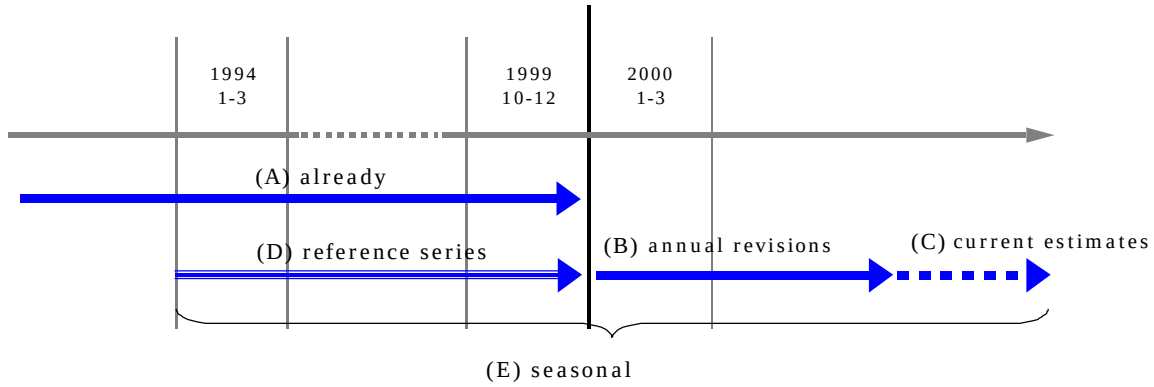
public as reference, while the official estimates up to Jan.-March 2001 will be the conventional ones.

(Note 2) In order to obtain reliable seasonally adjusted series, original series have to be of some length. Thus retroactive estimation by the same method for certain past periods is necessary.

(Note 3) As the reference series reflects not only the change in quarterly distribution, but also the improvements as explained at 3. (5), their annual sums may not necessarily coincide with the already published ones.

(Note 4) It is desirable to apply the new system to the whole System of National Account. However, as this would involve revisions of either the calendar year or fiscal year estimates, as well as many quarterly numbers, it can not be done before the next renewal of the standard year.

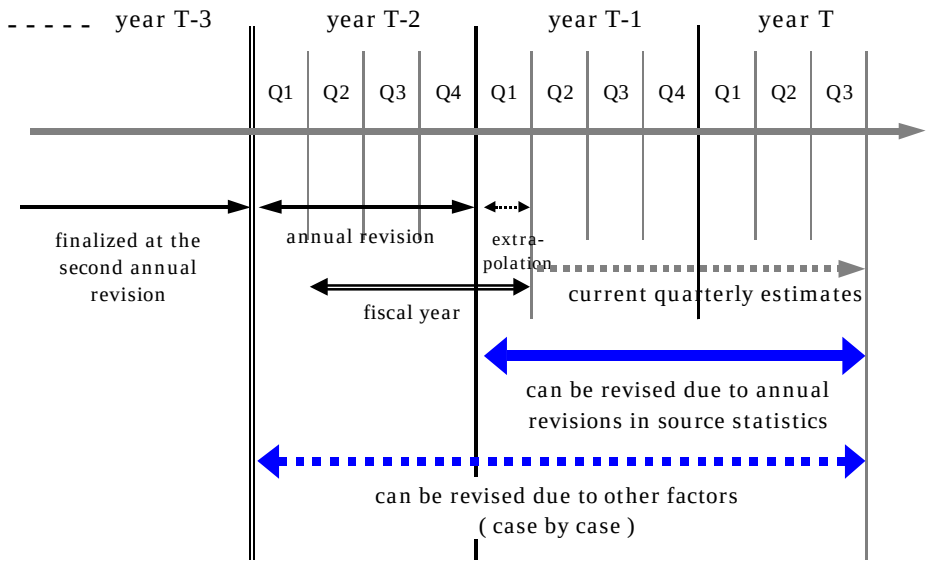
Chart 1 : Official vs. Reference Series



(A) Based on the present system of quarterly distribution.
- Original (seasonally unadjusted) series are already published.
- Seasonally adjusted series are made by the seasonal adjustment for Jan.-March 1980 to Oct.-Dec. 199

(B) Annual estimates are distributed into quarters by the new method (official estimates).
(C) Quarterly estimates by the new method (official estimates).
(D) Series made by the new method for the purpose of seasonal adjustment.
(E) Periods for seasonal adjustment for demand components.
Seasonal adjustment recalculated every quarter up to the latest period.
Past estimates are revised, due to this recalculation.
(C) and (D) are for demand components only.

Chart 2 Revisions



The New Estimation of Quarterly GDP

APPENDICES

(tentative translation)

1.List of Supply-side Source Statistics

2.Timetable of the Main Source Statistics

3.Estimation Methods of Nominal Demand Components

4.Precision of the Demand- and Supply-side estimates

Appendix 1.List of Supply-side Source Statistics

classifications under the 1995 commodity flow method				main source statistics
22 classifications		90 classifications		
1	Agriculture, Forestry, Fisheries	1	Rice and Wheat	Index Number of Commodity Prices in Rural Areas < MAFF >
		2	Other Crop Farming	Index Number of Commodity Prices in Rural Areas < MAFF >
				Statistics on the Marketing of Flowers < MAFF >
				Statistics on the Marketing of Vegetables and Fruits < MAFF >
		3	Livestock Farming	Statistics on the Marketing of Milk and Dairy Products<MAFF>
				Index Number of Commodity Prices in Rural Areas < MAFF >
				Survey of Milk and Dairy Products<MAFF>
				Statistics on the Marketing of Eggs < MAFF >
		4	Agricultural Services	the same as ' 3 Livestock Farming '
		5	Forestry	Statistics on Lumbering < MAFF >
				WPI < BOJ >
		6	Fisheries	Statistics on the Marketing of Fishery Products in Landing Areas < MAFF >
2	Mining	7	Metal Mining	IIP < METI > × WPI < BOJ >
		8	Non-Metal Mining except Coal and Petroleum	IIP < METI > × WPI < BOJ >
		9	Coal and Lignite Mining	IIP < METI > × WPI < BOJ >
		10	Crude Petroleum and Natural Gas Production	IIP < METI > × WPI < BOJ >
3	Food	11	Livestock Products	IIP < METI > × WPI < BOJ >
		12	Seafood products	IIP < METI > × WPI < BOJ >
		13	Flour and Grain Mill Products	IIP < METI > × WPI < BOJ >
		14	Agricultural Products	IIP < METI > × WPI < BOJ >
		15	Other food	IIP < METI > × WPI < BOJ >
		16	Beverages	IIP < METI > × WPI < BOJ >
		17	Prepared Animal Foods and Organic Fertilizers	Price Survey of Feedstuff < MAFF >
		18	Tobacco Manufactures	Estimate by the Cabinet Office
4	Textile	19	Spinning Mills	IIP < METI > × WPI < BOJ >
		20	Fabric Mills and Others	IIP < METI > × WPI < BOJ >
5	Pulp, Paper and Paper Products	21	Pulp and Paper	Current Production Statistics Survey < METI >
		22	Paper Products	Current Production Statistics Survey < METI >
6	Chemical and allied Products	23	Basic Products	Current Production Statistics Survey < METI >
		24	Chemical Fibers	IIP < METI > × WPI < BOJ >
		25	Drugs and Medicines	Estimate by the Cabinet Office
		26	Final Products	Current Production Statistics Survey < METI >
7	Petroleum and Coal Products	27	Petroleum Products	IIP < METI > × WPI < BOJ >
		28	Coal Products	IIP < METI > × WPI < BOJ >
				Current Production Statistics Survey < METI >
8	Ceramic, Stone and Clay Products	29	Glass and Its Products	Current Production Statistics Survey < METI >
		30	Cement and Its Products	Current Production Statistics Survey < METI >
		31	Pottery and Related Products	Current Production Statistics Survey < METI >
		32	Others	Current Production Statistics Survey < METI >
9	Metal	33	Iron and Steel	IIP < METI > × WPI < BOJ >
		34	Ferrous Metal Machine Tools and Tooling Products	IIP < METI > × WPI < BOJ >
		35	Non-Ferrous Metals	IIP < METI > × WPI < BOJ >
		36	Non-Ferrous Metal Machine Parts and Tooling Products	IIP < METI > × WPI < BOJ >

classifications under the 1995 commodity flow method				main source statistics
22 classifications		90 classifications		
10	Fabricated Metal Products	37	Constructional and Architectural	Current Production Statistics Survey < METI >
		38	Others	Current Production Statistics Survey < METI >
11	General Machinery	39	General Industry Machinery and Equipment	Current Production Statistics Survey < METI >
		40	Special Industry Machinery	Current Production Statistics Survey < METI >
		41	Other Industry Machinery	Current Production Statistics Survey < METI >
		42	Office, Service Industry and Household Machines	Current Production Statistics Survey < METI >
12	Electorical Machinery, Equipment and Supplies	43	Household Electric Appliances	Current Production Statistics Survey < METI >
		44	Electronic and Communication Electronics Equipment	Current Production Statistics Survey < METI >
		45	Heavy Electrical Equipment	Current Production Statistics Survey < METI >
		46	Others	Current Production Statistics Survey < METI >
13	Transportation Equipment	47	Motor Vehicles	Current Production Statistics Survey < METI >
		48	Shipbuilding and Repairing	IIP < METI > × WPI < BOJ >
		49	Others	Current Production Statistics Survey < METI >
14	Precision Instruments and Machinery	50	Precision Instruments and Machinery	Current Production Statistics Survey < METI >
15	Other Manifacturing	51	Other Manufacturing	Current Production Statistics Survey < METI >
		52	Apparel and Other Finished Products	IIP < METI > × WPI < BOJ >
		53	Lumber and Wood Products	Current Production Statistics Survey < METI >
		54	Furniture and Fixtures	Current Production Statistics Survey < METI >
		55	Printing and Allied	IIP < METI > × WPI < BOJ >
		56	Plastic Products	Current Production Statistics Survey < METI >
		57	Rubber Products	Current Production Statistics Survey < METI >
		58	Leather Products	Current Production Statistics Survey < METI >
16	Construction	59	Construction	Monthly Labour Survey < MHLW >
				Labour Force Survey < MPHPT >
17	Electricity, Gas, Heat Supply and Water	60	Electricity	Current Survey on Electricity < ANRE >
		61	Gas and Heat Supply	Current Production Survey on Gas Utility Industry < ANRE >
		62	Water	Family Income and Expenditure Survey < MPHPT >
		63	Waste Disposal	Monthly Labour Survey < MHLW >
18	Wholesale and Retail Trade	64	Wholesale	Report on Statistics on Sales in Commerce < METI >
				Financial Statements Statistics of Corporations by Industry < MOF >
				Basic Survey of Commercial and Manufacturing Structure and Activities < METI >
		65	Retail	Report on Statistics on Sales in Commerce < METI >
				Financial Statements Statistics of Corporations by Industry < MOF >
				Basic Survey of Commercial and Manufacturing Structure and Activities < METI >
19	Finance and Insurance	66	Finance	Financial Records of Banks < japanese Bankers Association >
				Investment Trends < Tokyo Stock Exchange >
		67	Insurance	Transaction and Return on Life Insurance < The Life Insurance Association >
				Monthly Report on Transportation < MLTI >
				Consumer Price Index (CPI) < MPHPT >
20	Real Estate	68	Brokers and Lessors	Monthly Labour Survey < MHLW >
		69	House Lenting	Housing and Land Survey < MPHPT >
				Building Construction Started < MLIT >
				Buildings Loss Statistics Survey < MLTI >
				Consumer Price Index (CPI) < MPHPT >

classifications under the 1995 commodity flow method				main source statistics
22 classifications		90 classifications		
21	Transport and Telecommunication	70	Railway Transport	Monthly Report on Transportation < MLTI >
		71	Road Transport	Monthly Report on Transportation < MLTI >
		72	Water Transport	Monthly Report on Transportation < MLTI >
				Summary Report on Trade < MOF >
		73	Air Transport	Monthly Report on Transportation < MLTI >
		74	Other Transport	Sales of 50 Travel Agencies < MLTI >
		75	Postal Service	Statistics on Postal Services < MPHPT >
		76	Telecommunication	Current Survey on Telecommunication < MPHPT >
22	Services	77	Education	Monthly Labour Survey (preliminary) < MHLW >
		78	Scientific Research	Monthly Labour Survey (preliminary) < MHLW >
		79	Medical, Health Care and Welfare	Survey on Medical Expense of National Health Insurance
				< All-Japan Federation of National Health Insurance Organizations >
				Monthly Report on Fund < Social Insurance Medical Fee Payment Fund >
				Survey on Long-term Care Insurance Benefits
				< All-Japan Federation of National Health Insurance Organizations >
				Report on Long-term Care Insurance Business <MHLW>
		80	Other Public Services	Survey on Private Non-profit Institutions < Cabinet Office >
		81	Advertising and Research	Monthly Statistical Report on Trends in Selected Service Industries < METI >
		82	Goods Rental and Leasing	Monthly Statistical Report on Trends in Selected Service Industries < METI >
		83	Automobile and Machine Repair	Monthly Report on Transportation < MLTI >
		84	Other Business Services	Monthly Statistical Report on Trends in Selected Service Industries < METI >
				Monthly Labour Survey < MHLW >
		85	Braodcasting	Number of Subscribers < Nippon Hoso Kyokai >
				Current Survey on Telecommunication < MPHPT >
		86	Amusement and Hobbies	Monthly Statistical Report on Trends in Selected Service Industries < METI >
		87	Eating and Drinking Places	Current Survey of Food-Service Industry < Japan Food Service Association >
		88	Accomodations	Sales of 50 Travel Agencies < MLTI >
		89	Other Personal Services	Monthly Statistical Report on Trends in Selected Service Industries < METI >
		90	Unable to classify	

(Note) Abbreviations stand for the followings:

IIP: Index of Mining and Industrial Production
WPI: Wholesale Price Index
ANRE: Agency for Natural Resource and Energy, METI
BOJ: Bank of Japan
MAFF: Ministry of Agriculture, Forestry, and Fisheries
METI: Ministry of Economy, Trade and Industry
MHLW: Ministry of Health, Labour and Welfare
MLIT: Ministry of Land, Infrastructure and Transport
MOF: Ministry of Finance
MPHPT: Ministry of Public Management, Home Affairs , Post and Telecommunications

Appendix 2.Timetable of the Main Source Statistics

	after the quarter	statistics
	first third of the next month	Wholesale Price Index (WPI) < BOJ > Investment Trends < Tokyo Stock Exchange >
	second third of the next month	Exports and Imports (preliminary) < MOF > Statistics on the Marketing of Vegetables and Fruits < MAFF > Current Production Survey on Gas Utility Industry < ANRE > Current Survey on Electricity < ANRE > Integrated Statistics on Construction Work (2) < MLIT >
	last third of the next month	Consumer Price Index (CPI) < MPHPT > Labour Force Survey < MPHPT > Family Income and Expenditure Survey (working family) < MPHPT > Trade Statistics (final) < MOF > Monthly Labour Survey (preliminary) < MHLW > Statistics on Rice and Wheat < Food Agency > Statistics on the Marketing of Meats < MAFF > Survey of Milk and Dairy Products<MAFF> Statistics on the Marketing of Fishery Products in Landing Areas < MAFF > Index of Mining and Industrial Production, Shipments, Inventories and Inventory Rates (IIP) (preliminary) < METI > Current Production Statistics Survey (preliminary) < METI > Preliminary Report on Statistics on Sales in Commerce < METI > New Dwellings Started < MLIT > Building Construction Started < MLIT >
	about a month later	Transaction and Return on Life Insurance (2) < The Life Insurance Association >
first QE (planned) ⇨	a month and 5 days later	Number of Subscribers < Nippon Hoso Kyokai > Family Income and Expenditure Survey (all household) < MPHPT >
	a month and 10 days later	Business and Investment Survey of Incorporated Enterprises (estimate) < Cabinet Office > Preliminary Monthly Statistical Report on Trends in Selected Service Industries < METI > Monthly Report on Transportation < MLTI > (automobile(2), truck(2), bus(2), taxi(2), air trasportation, rail passengers(2), JR cargo, and domestic marine transportation(1)) Sales of 50 Travel Agencies < MLTI >
	a month and 15 days later	Balance of Payments (preliminary) < MOF and BOJ > Family Income and Expenditure Survey (single) < MPHPT > Index Number of Commodity Prices in Rural Areas < MAFF > Statistics on the Marketing of Flowers < MAFF > IIP (final) < METI >
	a month and 20 days later	Current Survey on Telecommunication < MPHPT > Monthly Labour Survey (final) < MHLW > Statistics on the Marketing of Eggs < MAFF > Preliminary Monthly Statistical Report on Trends in Selected Service Industries < METI > Production Statistics Survey (final) < METI > Integrated Statistics on Construction Work < MLIT >
	a month and 25 days later	Trade Statistics (final) < MOF > Report on Long-term Care Insurance Business (1) <MHLW> Survey on Medical Expense of National Health Insurance (2) < All-Japan Federation of National Health Insurance Organizations > Monthly Report on Fund (2) < Social Insurance Medical Fee Payment Fund > Survey on Long-term Care Insurance Benefits (2) < All-Japan Federation of National Health Insurance Organizations >
	about two months later	Special Survey on Expenditure of Local Governments < Cabinet Office > Unincorporated Enterprise Survey < MPHPT >
second QE (planned) ⇨	two months and 5 days later	Financial Statements Statistics of Corporations by Industry < MOF >

(Note)1. Publication dates of the results of the last month of the quarter.
(1) or (2) after the name of the statistics indicates dates for the results of first or second month.
2. Abbreviations stand for the followings:
ANRE: Agency for Natural Resource and Energy, METI
BOJ: Bank of Japan
MAFF: Ministry of Agriculture, Forestry, and Fisheries
METI: Ministry of Economy, Trade and Industry
MHLW: Ministry of Health, Labour and Welfare
MLIT: Ministry of Land, Infrastructure and Transport
MOF: Ministry of Finance
MPHPT: Ministry of Public Management, Home Affairs , Post and Telecommunications

Appendix 3.Estimation Methods of Nominal Demand Components

(The following is a tentative plan and can be modified later.)

0.Supply-side Estimates

Please see the main text.

Among the supply-side estimates, " private consumption " and " fixed capital formation " will be combined with demand side estimates to obtain integrated estimates.

1.Private consumption

(1) Domestic Household Consumption

(i) Integrated approach

a) Demand-side

Extrapolated, based on " Family Income and Expenditure Survey " etc. and the number of households, for each " purpose classification ". The use of the results for single families of " Family Income and Expenditure Survey " will be suspended, and substituted by the results of " families of two or more members " after an appropriate adjustment.

b) Supply-side

Total domestic supply, by 90 commodity classifications, is multiplied by coefficients for household consumption, which are taken from the latest annual accounts.

c) Integration

The Integrated estimate will be a weighted average of the estimates from the both sides. The weights is calculated based on the estimation accuracy and/or the fit to the past annual estimates.

(Note 1) When we have two estimates for the variable C (Household Consumption), Cd (demand-side estimate) and Cs (supply-side estimate).

$kCd + (1-k)Cs$

is the Best Linier Unbiased Estimator of C, with k being a coefficient depending of the estimation accuracies of Cd and Cs etc.

(ii) Common Approach

a) House Rents

As the present methods, the benchmarks are taken from " Housing and Land Survey." Quarterly extrapolation is based on " Building Construction Started ", " Building Loss Statistics Survey " and the rental prices from " Consumer Price Index ".

b) Medical Service and Long-term Care

As the present method, total expenditure is estimated and then payment by the insurance is subtracted. The extrapolation is based on " Survey on Medical Expense of

National Health Insurance " and " Monthly Report on Fund " for medical services. For long-term care, " Survey on Long-term Care Insurance Benefits " and " Report on Long-term Care Insurance Business " are used. The missing observation is filled by taking the rate of increase over a year before of the latest months, etc..

c) Water

The same as (i) a). (estimated by the demand side only)

d) Automobile, Insurance, Financial Services, Brokers of Real Estate.

Supply-side estimates are used. Although these are estimated from the supply-side even under the present system, the new estimate will be used.

(iii) Services Purchased from Governments and Private NPIs.

As these are not a part of the supply-side estimate, trend extrapolation etc. will be applied individually.

(iv) Direct Purchases Abroad by Residents, and Direct Purchases in the Domestic market by Foreign Residents (to be subtracted)

Based on " Balance of Payments " as in the present system, except for the unavailable third month, for which the rate of increase over a year before for the observed two months etc. will be assumed.

(2) Final Consumption by Private NPIs Serving Households

Trend extrapolation will be applied, for education and for others.

2. Residential Investment

As is basically the same in the present method, total residential investment is estimated first, based on the " Building Construction Started ", after transforming it into the progress base according to the estimate of the average duration of construction. Then public residential investment is subtracted to obtain the estimate for private residential investment. The fact that average duration has become longer is newly incorporated.

3. Private Investment in Plant and Equipment

a) Demand-side Estimate

At the second QE, extrapolation is made based on " Financial Statements Statistics of Corporations by Industry " (for non-financial corporations)," Business and Investment Survey of Incorporated Enterprises " (for financial institutions) and " Unincorporated Enterprise Survey " (for unincorporated firms). This is the same as the present method.

b) Supply-side Estimate

Public investment and private residential investment, which are estimated separately, are subtracted from the supply-side estimate of the fixed capital formation. This is used for

the first QE.

c) Integration

At the second QE, the above two estimates are integrated by taking a weighted average. The weights are set depending on the estimation accuracy of the estimates and/or the past tracking performance of the annual estimates.

(Note 2) When there are three variables A (Private Investment in Plant and Equipment), B(Public Investment in Plant and Equipment), and C (sum of A and B), that satisfy A + B = C, and each has independent observation a(based on the " Financial Statements of Corporations by Industry ") , b(based on the " Construction Statistics Monthly ") and c (Supply-side estimate),

$k_a a+(1-k_a)(c-b)$, $k_b b+(1-k_b)(c-a)$, and $(2-k_a-k_b)c+(k_a+k_b-1)(a+b)$

are the best linear unbiased estimator (BLUE) of A, B, and C respectively, where k_a, k_b are coefficients depending on the estimation accuracy of a, b and c.

4. Changes in Private Inventory

At the first QE, inventory stock of the " Manufacturing Census " is extended based on the inventory index of the " Index of Industrial Production (IIP) ", except for wholesale and retail sectors. For those sectors, the change in inventories for large establishments reported in " Report on Statistics on Sales in Commerce " is used to estimate the total change after taking account of the difference in the magnitude of fluctuation.

At the second QE, changes in stock in production process and raw materials are estimated based on the " Financial Statements of Corporations by Industry ", especially its estimate on large firms.

5. Final Consumption by Governments

As is basically the same as the present system, estimation is based on budget, related statistics, hearings, and trend extrapolation. As for compensation for public employees, number of employees is estimated through hearings from the Self-Defense Force, police, public schools, Tokyo Metropolitan Government etc., while wage is estimated based on the Recommendation by the National Personal Authority. Other expenditures are estimated based on the budget for the central Government and on " Special Survey on Expenditure of Local Governments " for local governments, while taking account of the past quarterly breakdown. Trend extrapolation is applied for capital consumption.

As for social transfers in kind, those for medical services are estimated based on " Payment by Social Insurance " and " Medical Expenses," while those for long-term care are estimated based on " Report on Long-term Care Insurance " and " Payment by Long-term Care

Insurance." Other expenditures such as those for textbooks for schools are extrapolated based on budget.

6. Public Fixed Capital Formation

At the first QE, the progress value of the " Integrated Statistics on Construction Work " is used for extrapolation, both for dwelling and other construction. At the second QE, this estimate is integrated, through weighted averaging, with an independent estimate calculated by subtracting private investments from the supply-side estimate of fixed capital formation (see Note 2).

(The present system takes account of the estimate of the fiscal year based on the budget for the central government and " Special Survey on Expenditure of Local Governments " as well as the progress value of the " Construction Statistics Monthly " and past quarterly pattern.)

7. Change in Public Inventories

As in the present system, major components such as rice and wheat, provision of petroleum, gold, raw silk, and rear metals are estimated based on hearings form relevant authorities. Increase in the value of living tree is estimated based on trend. Others are assumed zero.

8. Exports and Imports

As in the present system, estimation is based on the " Balance of Payments ", except for the last month at the first QE, which is estimated based on " Trade Statistics " for goods, and on the ratio over a year before for the two preceding months for services.

Appendix 4. Precision of the Demand- and Supply-side estimates

Precision of estimates is evaluated for demand- and supply-side estimates and this information is used when integrating the two estimates.

(1) Demand side

Household consumption

" Family Income and Expenditure Survey ", which is the major source statistics, discloses the standard error for its estimates.

Private Investment in Plant and Equipment

As for " Financial Statements Statistics of Corporations by Industry " which is the major source, the standard error of its investment estimates is estimated by combining its sampling structure and the distribution pattern of investment.

For the latter, financial records of the listed companies and " Basic Survey on Service Industries " are used. As for financial institutions, estimate by the Statistical Council is used.

(2) Supply-side

Supply-side is estimated by 90 commodity categories based on " Current Production Statistics Survey ", " Monthly Statistical Report on Trends in Selected Service Industries " etc. Since their estimate is the sum of the reported values, there is no sampling error in the conventional sense. Instead, the accuracy of them as a proxy of the total, in terms of the rate of increase, is estimated, based on the distribution of the rate of increase in shipment, which is available at the Appendix of " Manufacturing Census 1999 ". The accuracy estimates for 90 categories thus obtained are aggregated to obtain those for private consumption and fixed capital formation.

(3) Public Fixed Capital Formation

" Current Survey on Orders Received ", which is the source statistics, discloses the standard error for its estimates.