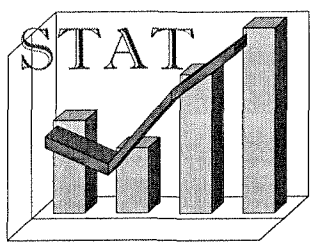
Collected Project Reports

Volume IV

NATIONAL ACCOUNTS



Statistical Assistance to the Government of Indonesia (STAT) Project
USAID Contract No. PCE-I-00-99-00009-00

BIDE
Boston Institute for Developing Economies

Development Alternatives, Inc.

Volume I : Agriculture

#	Report #	Author	Title	Date	Page
1	4	Vijay Verma	Surveying Agricultural Households	June 00	I.1
2	23	Vijay Verma	Agricultural Census and Surveys	Mar 01	I.7
3	33	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 1	May 01	I.21
4	39	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 2	Aug 01	I.29
5	44	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 3	Nov 01	I.72
6	48	Suwandhi Sastrotaruno/ Choiril Maksum	Aggregate Rice Data in Indonesia : A Brief Overview	Feb 02	I.95
7	53	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 3A	June 02	I.110
8	61	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 4	Sept 02	I.135
9	64	Yahya Jammal / Arizal Ahnaf	Is Susenas rice Consumption in Urban Areas of Indonesia Understated?	Nov 02	I.181
10	66	Suwandhi Sastrotaruno	Preparations for the 2003 Agricultural Census: Progress Report 5	Dec 02	I.216

Volume II : Methodology

#	Report #	Author	Title	Date	Page
1	1	Vijay Verma	Using Population Census 2000 to Improve BPS Integrated Household Survey Designs	June 00	II.1
2	2	Vijay Verma	Area Sampling for Economic and Agricultural Censuses Based on Population Census 2000	June 00	II.15
3	3	Vijay Verma	Notes on Sample Design and Re-Design for SUSI	June 00	II.31
4	7	Robert Torene	Evaluation of Establishment Directory	Aug 00	II.44
5	8	Robert Torene	Evaluation of SUSI Sample Design and Results	Aug 00	II.51
6	9	Robert Torene	Preparing a CHROMY Sample for Kabupaten Estimates	Aug 00	II.87
7	18	Sri Budianti Sukmadi	Use of Population Census 2000 to Improve Household Survey Frame	Dec 00	II.123
8	20	Vijay Verma	SUSI Estimation Procedures	Feb 01	II.161
19	21	Vijay Verma	Lectures Notes: Sampling Over Time	Feb 01	II.218
10	28	Sri Budianti Sukmadi	Area Sampling for Agriculture Census	Mar 01	II.231
11	32	Sri Budianti Sukmadi	Choice of Sampling Unit in the Agriculture Sample Census 2003	May 01	II.251
12	37	Sri Budianti Sukmadi	Sample Selection Method for Agricultural Sample Census 2003	July 01	II.267
13	43	Sri Budianti Sukmadi	Sample Design for the Second Pilot Planned under the Agriculture Census 2003	Nov 01	II.281
14	50	Sri Budianti Sukmadi	Geographical Integration of Household Surveys	Mar 02	II.298
15	52	Sri Budianti Sukmadi	Using Rolling Samples in Selected BPS Surveys	May 02	II.318
16	58	Sri Budianti Sukmadi	Linking Design and Organization in the Agriculture Census Sample	Aug 02	II.333
17	62	Vijay Verma	Notes on Estimation Procedures	Oct 02	II.351
18	63	Vijay Verma	Implementation of SUSI Estimation Procedures	Oct 02	II.372

Volume III : Labor Force					
#	Report #	Author	Title	Date	Page
1	5	Hananto Sigit	Employment Data in Indonesia : A Review of Existing Sources	June 00	III.1
2	10	Hananto Sigit	Earnings Data in Indonesia: A Review of Existing Sources	Aug 00	III.37
3	12	John Kuiper	Notes on Short-Term Labor Market Indicators	Aug 00	III.67
4	17	Hananto Sigit	*Survei Triwulanan Pemulihan Kesempatan Kerja*: A Proposed Survey to Monitor Short-Term Employment and Earnings Changes	Dec 00	III.77
5	25	Vijay Verma	Selected Issues in Labor Force Statistics	Mar 01	III.109
6	35	Uzair Suhaimi / Yahya Jammal	Measuring Open Unemployment in SAKERNAS	June 01	III.122
7	45	Hananto Sigit	Evaluation of the First Round of the Informal Sector Pilot Survey	Feb 02	III.140
8	65	Hananto Sigit	Evaluation of the Informal Sector Pilot Survey	Nov 02	III.162
9	68	Yahya Jammal/ Uzair Suhaimi	Quarterly Wage Survey of Livestock and Fishery	Apr 03	III.191

Volume IV : National Accounts					
#	Report #	Author	Title	Date	Page
1	6	Frank de Leeuw	Preliminary Evaluation of National Accounts and Prompt Indicators	July 00	IV.1
2	14	Yahya Jammal	Revision of Quarterly Production Accounts	Oct 00	IV.26
3	19	Frank de Leeuw	National Accounts and Prompt Indicators: Progress & Future Priorities	Feb 01	IV.61
4	24	Yahya Jammal	Quarterly National Accounts in Indonesia: Current Sources & Methods	Feb 01	IV.88
5	34	Yahya Jammal	Chain Linking National Accounts	June 01	IV.142
6	36	Frank de Leeuw	Unit Value Indexes for Exports and Imports	July 01	IV.160
7	42	Frank de Leeuw	Measuring Changes in Inventories in Indonesia	Sept 01	IV.180
8	51	Kusmadi Saleh	Indonesian Income Account: Progress Report 1	Apr 02	IV.200
9	54	Kusmadi Saleh	Indonesian Income Account: Progress Report 2	June 02	IV.206
10	55	Frank de Leeuw	Changes in Inventories Held by Manufacturers, 1998-99: Analysis of Annual Survey Data	Jul 02	IV.214
11	60	Kusmadi Saleh / Yahya Jammal	Toward Income Accounts for Indonesia	Sept 02	IV.232

Volume V : Industry

#	Report #	Author	Title	Date	Page
1	15	Yahya Jammal / Rosniaty Ismail	The Monthly Manufacturing Production survey	Nov 00	V.1
2	22	Sugiarto	Progress Report: Monthly Manufacturing Survey	Feb 01	V.68
3	30	Yahya Jammal / Vijay Verma	Monthly Manufacturing Production and Employment Indices	Apr 01	V.76
4	31	Sugiarto	Progress Report on Industrial Production	May 01	V.140
5	38	Sugiarto	Manufacturing Survey: Progress Report	July 01	V.149
6	40	Yahya Jammal / Rifa Rufiadi	Classifying Manufacturing Production by Commodity vs by Establishment Evidence Using 1998 Annual Survey Data	Aug 01	V.154
7	41	Sugiarto	Pilot for the Quarterly manufacturing Survey	Sep 01	V.196
8	47	Frank de Leeuw	An Expanded Industrial Production Index for Indonesia	Feb 02	V.207
9	49	Sugiarto	Planned Pilots for Manufacturing Surveys	Feb 02	V.234
10	56	Sugiarto	Progress on Pilots for Manufacturing Surveys	July 02	V.256
11	59	Sugiarto	Evaluation of Manufacturing Survey Pilots	Sept 02	V.291
12	67	Sugiarto/Suryamin	Capacity Utilization in Indonesian Manufacturing	Feb 03	V.308

Volume VI : Other Topics

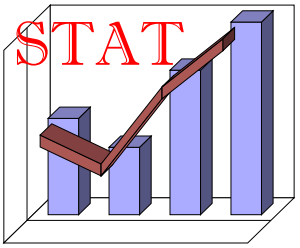
#	Report #	Author	Title	Date	Page
1	11	John Kuiper	Seasonal Adjustments of Indonesia Time Series	Aug 00	VI.1
2	13	John Kuiper	Comparison of Implicit Price Indexes for Manufacturing	Aug 00	VI.50
3	16	Sugito Suwito	Enhancing the Role of Functional Staff and Improving Performance Evaluation	Nov 01	VI.81
4	26	John Kuiper	The Consumer Price Index : Selected Conceptual Issues	Mar 01	VI.98
5	27	John Kuiper	Converting the Wholesale Price Index into a Producer Price Index	Mar 01	VI.118
6	29	Bruce A. Johnston	An Interactive Survey Questionnaire for the Badan Pusat Statistik of Indonesia	Mar 01	VI.125
7	46	John Kuiper	Seasonal Adjustment for Lebaran	Feb 02	VI.140
8	57	John Kuiper	Operational Manual for Benchmarking Using the BENCH Program	July 02	VI.183
9	69	Yahya Jammal / Wendy Hartanto	Benchmarking Susenas Health and Education Data	May 03	VI.220
10	70	Yahya Jammal	STAT Project Summary Report	June 03	VI.

PRELIMINARY EVALUATION OF NATIONAL ACCOUNTS AND PROMPT INDICATORS

Report # 6

by
Frank de Leeuw

July, 2000



Statistical Assistance to the Government of Indonesia (STAT) Project
USAID Contract No. PCE-I-00-99-00009-00

EXECUTIVE SUMMARY

This report covers a three-week mission to Jakarta, from June 24 through July 14, 2000, focusing on national accounts and other current economic indicators, including the index of industrial production. The report describes some areas that need attention, proposes some steps to help improve these areas in the short run, and discusses some additional steps which might be taken in the long run.

Indonesian statisticians themselves are well aware of areas that need attention. Among the areas they noted in discussions and memos are:

Absence of any direct measure of current private consumption, other than a household survey taken only every third year;
Absence of any direct measure of construction activity, necessitating the use of an estimate based on production and import of construction materials;
Absence of any direct measure of business fixed investment outside of manufacturing and government;
Absence of a prompt monthly industrial production index, as recommended in the Special Data Dissemination Standards of the International Monetary Fund;
Long lags in the availability of much basic data;

A problem of which Indonesian statisticians may be less aware is duplication; both the Central Statistical Bureau (Badan Pusat Statistik, or BPS) and Bank Indonesia (BI) conduct surveys of consumer attitudes and surveys of businesses attitudes; and each has its own index of leading indicators.

The present mission searched for possible improvements that could be accomplished, or at least started, in the next six months. Short-term improvements can generate a sense of accomplishment among data producers and a change in general perceptions about Indonesian statistics among users. The six improvements proposed were:

1. Comprehensive use of the commodity flow method to estimate private consumption;
2. Comparison of building permit data, available but not now used by BPS, with other data measuring construction activity, perhaps followed by use of permit data in estimating GDP origination in the construction industry;
3. Partial disaggregation of net imports of services into an export total and an import total;
4. Introduction into the index of industrial production of physical production data generated monthly by trade associations and government bureaus;
5. Coordination by BI and BPS of their work on consumer and business attitude surveys; and
6. Coordination by BI and BPS of their work on leading indicators.

An "action plan" at the end of this report suggests a series of concrete steps that BPS and BI can take during the next six months to implement these improvements.

The report also discusses other improvements that cannot be accomplished in the short run but that are of considerable importance. These include documentation of sources and methods used to estimate the national accounts; investigation of such potentially valuable data sources as an existing survey of large retail establishments and records of value added tax receipts; and possible ways of improving the deflation to constant prices of government purchases and foreign trade.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 2

TABLE OF CONTENTS 4

I. INTRODUCTION 5
- **A. Objective** 5
- **B. Some Areas Needing attention** 5
- **C. Improvements** 6

II. NATIONAL ACCOUNTS 7
- **A. Commodity Flow Estimates of Private Consumption** 8
- **B. Building Permits** 10
- **C. Net Imports of Services** 11
- **D. Future Improvements** 12
  - **1. Documentation** 12
  - **2. Advance Release Calendar** 14
  - **3. Data Sources** 14
  - **4. Deflation** 15
  - **5. Other Estimates** 16
  - **6. Seasonal Adjustment** 17
  - **7. 1993 SNA** 17

III. INDUSTRIAL PRODUCTION 17

IV. OTHER CURRENT INDICATORS 20
- **A. Consumer Attitudes** 20
- **B. Business Attitudes** 21
- **C. Indexes of Leading Indicators** 22
- **D. Coordination of Efforts** 24

V. A SUGGESTED ACTION PLAN 24

I. INTRODUCTION

A. Objective

This report covers a three-week mission to Jakarta, from June 24 through July 14, 2000, focusing on national accounts and other current economic indicators, including the index of industrial production. The Terms of Reference called for *evaluation* and *suggestions for improvement* in these areas. The capable staff of Badan Pusat Statistik (BPS), the Central Statistical Agency, offered wholehearted cooperation, as did staff of Bank Indonesia (BI).

B. Some Areas Needing attention

Indonesian statisticians themselves are well aware of areas that need attention. Among the areas they noted in the national accounts, in discussions and memos, are:

- Absence of any direct measure of current private consumption, other than a household survey taken only every third year;
- Absence of any direct measure of construction activity, necessitating the use of an estimate based on production and import of construction materials;
- Absence of any direct measure of business fixed investment outside of manufacturing and government;
- Absence of any measure of activity in trade, necessitating the use of percentage markups on goods entering into trade;
- Absence of any direct measure of changes in stocks;
- Little if any private data for a number of other industries;
- Inadequate price data for constructing estimates in constant prices, especially for government activity and for exports and imports;
- Long lags in the availability of much basic data;

In the area of industrial production, there is the issue of meeting the requirements of the Special Data Dissemination Standards of the International Monetary Fund (IMF), to which Indonesia has subscribed. The standards require a monthly industrial production index available six weeks after the end of each month. The present industrial production index in Indonesia is quarterly, and is usually not available within six weeks. An experimental measure based on electric power consumption was developed at BPS and was expected to meet the frequency and timeliness requirements, but the IMF did not consider it to be a satisfactory measure of production. Currently, BPS is experimenting with a monthly survey of a subsample of the respondents to the quarterly survey.

In the area of other current indicators, duplication is a serious issue which needs to be addressed an important problem. Both BPS and BI conduct surveys of consumer attitudes and

surveys of businesses attitudes. Each has its own index of leading indicators. BI calculates, in addition, a quarterly "activity index" available fairly promptly and composed of a variety of time series that serve as indicators of current production. As far as we know, no serious attempt had been made in the past to compare these alternative measures and discuss the possibilities of improving reliability and efficiency through coordination.

C. Improvements

Improvements in economic statistics stem from several sources. First of all, there are *improvements in basic data sources*, including business registers, censuses of population and business, and surveys of households and businesses. Second, there are *better adaptations of administrative records*--data that are compiled for other purposes by trade associations, government bureaus, and other organizations but that are nevertheless useful in measuring changes in the economy. Third, there is *better processing* of available data, including improvements in technical areas such as sampling, improvements in the speed and accuracy of processing information, and elimination of duplication. Finally, there is *better communication with users,* which can take the form of documentation of procedures, regular schedules of publication and revision, consultation with advisory groups, and accessibility to the public for responding to questions and criticisms.

We looked for possible improvements in all four areas, but sought especially to emphasize those improvements that could be accomplished, or at least started, in the next six months. The reasons for this emphasis are that (1) within BPS and BI, it is valuable to begin a process and a sense of accomplishment that will carry over in the future, and (2) among users of current economic statistics, short-term improvements can change general perceptions about Indonesian statistics.

Accordingly, the report focuses heavily on six improvements on which substantial work should be possible within the next six months. The report refers to other possible and valuable improvements, but does not propose immediate action to implement them. In focusing on short-term improvements, the report gives scant attention to issues that will receive more emphasis at a later time, such as possible organizational changes and refinements to the annual industry survey.

Of the six suggested improvements, two (numbers 2 and 4 below) represent better adaptation of administrative records and the other four represent better processing of available

data. The six are:

- Comprehensive use of the commodity flow method to estimate private consumption;
- Comparison of building permit data with other data measuring construction activity, perhaps followed by use of permit data in estimating GDP origination in the construction industry;
- Partial disaggregation of net imports of services into an export total and an import total;
- Introduction into the index of industrial production of physical production data generated monthly by trade associations and government bureaus.
- Coordination by BI and BPS of their work on consumer and business attitude surveys; and
- Coordination by BI and BPS of their work on leading indicators.

An "action plan" at the end of this report suggests a series of concrete steps that BPS and BI can take during the next six months to implement these improvements.

The report is in five sections. This introduction is the first. The next three cover national accounts, industrial production, and other current indicators. The final section presents the suggested six-month action plan.

II. NATIONAL ACCOUNTS

BPS publishes two quarterly accounts, a GDP industry account and a GDP expenditure account, both of them in current prices and in 1993 prices. The definitions underlying these estimates are those of the 1968 UN System of National Accounts (SNA). Initial estimates appear 45 days after the end of each quarter. Revised estimates appear after one quarter and two quarters. Sometimes there are additional revisions still later.

The introduction to this report listed some of the problems that BPS faces in estimating the accounts. The first two were:

- Absence of any direct measure of current private consumption, other than a household survey taken only every third year; and
- Absence of any direct measure of construction activity, necessitating the use of an estimate based on production and import of construction materials;

The first two subsections of this report contain recommendations for work during the next six months on these problems. Following these subsections are one dealing with a third problem--the absence of detail for net imports of services--and a final subsection discussing other improvements for future consideration.

A. Commodity Flow Estimates of Private Consumption

Every three years BPS conducts a survey of consumer expenditures. For years in between the surveys, and for quarters at all times, estimates of private consumption are based on trend extrapolation and interpolation, estimated elasticities with respect to GDP, and other methods subject to substantial uncertainty. The proposal in this report is to supplement these methods with another approach, the commodity flow method.

The commodity flow method is a technique for translating estimates of GDP by industry into estimates of GDP by type of expenditure. In the absence of direct information on expenditures, it provides a way of constructing estimates that utilize information on production by the industries that supply different types of goods and services. Even when direct information on expenditures is available, commodity flow estimates provide a valuable check and sometimes appear to be more accurate than the direct information.

The technique is based on two relationships for each industry. The first expresses the total supply of the products of an industry, S, as the sum of the industry gross output, G, and imports of the goods primary to the industry, M:

(1) $S = G + M$

The second relationship expresses the total supply, S, as the sum of all its uses: that is, the sum of intermediate inputs into other industries, Int; Private consumption, Cp, government consumption, Cg, Investment (in fixed capital and stocks), Inv, and exports, X:

(2) $S = Int + Cp + Cg + Inv + X$

From these two relationships, it follows that private consumption of the products of an industry is equal to the total supply (domestic output plus imports) minus all of the other uses:

(3) $Cp = G + M - Int - Cg - Inv - X$

To implement equation (3) for a particular industry, various sources of information are typically available. G, domestic output, is usually available directly or can be estimated by multiplying value added in the industry by a ratio of gross value to value added derived from an input-output table. Imports and exports, M and X, and government consumption, Cg, are usually available directly (that is the case in Indonesia). Finally, intermediate consumption and investment, Int and Inv, can be estimated from an input-output table. In Indonesia there is an input-output table for 1995, and it has been updated using the so-called "RAS" method for 1998.

The proposal in this report, spelled out in the action plan, is to apply the commodity flow method in stages. In the first stage, the method would be applied only to estimate private

consumption annually for the last few years using the most aggregated version (the 19-industry version) of either the 1995 or the 1998 input-output table. The results of the first stage would probably reveal some data problems and/or implausible results. After decisions on how to deal with these obstacles, the method would be applied using a more disaggregated input-output table, first to annual and then to quarterly data.

The strength of the method is that for many industries the proportion of total supply that goes into private consumption is either quite high or quite low. The more this tendency to extremes hold, the more accurate the translation of industry outputs into consumption. The accompanying Table 1 shows that even in the most aggregated 1995 table for Indonesia, the private consumption proportion is less than 10 percent for 8 of the 19 industries and more than 50 percent for 6 of the 19. A more disaggregated table will show a still greater tendency to extremes.

Table 1
Uses of Total Supply (Production plus Imports), 1995 Input-Output Table
Percent

		Total Supply	Intermediate (incl. trade/ trans. marg.)	Private Consumption	Government Consumption	Investment (fixed plus stock chg.)	Exports (goods and services)
1	Paddy	100	100	0	0	0	0
2	Other Food Crops	100	27	72	0	1	0
3	Other Agriculture	100	86	8	0	1	6
4	Livestock and Products	100	46	52	0	2	0
5	Forestry	100	88	6	0	5	2
6	Fishery	100	42	54	0	0	4
7	Mining and Quarrying	100	57	0	0	9	34
8	Manufacturing	100	23	69	0	2	6
9	Other Manufacturing	100	52	19	0	13	17
10	Petroleum Refinery	100	56	10	0	1	33
11	Electricity, Gas and Water	100	67	33	0	0	0
12	Construction	100	8	0	0	92	0
13	Trade	100	100	0	0	0	0
14	Restaurant & Hotel	100	15	74	0	0	11
15	Transport and Communication	100	58	32	0	0	10
16	Finance, Real Estate, Bus Serv	100	50	45	0	0	6
17	General Government, Defense	100	0	2	97	0	1
18	Other Services	100	22	58	14	4	2
19	Unspecified Sector	100	101	-13	0	0	12
Total		100	45	29	3	12	10

B. Building Permits

Production and imports of construction materials are the basis for current estimates of construction. The method is sometimes referred to as a "commodity flow" estimate, but it is not commodity flow in the sense used in the previous subsection. Rather, it uses information about intermediate input *into* the construction industry to estimate total supply (S) and/or value added. It can give inaccurate results when there are important changes in composition and technology in the construction industry.[1]

Approvals of new investment projects by an investment board (BKPM) are used to check the plausibility of the investment estimates which include construction output. However, the BKPM data are not very useful because they refer to approvals rather than actual spending. BKPM has attempted to conduct follow-up surveys on the translation of approvals into actual spending; but the response rate to these surveys has been extremely low.

There is another source of information on construction that might prove very valuable. Local governments of major urban areas in Indonesia require permits for new construction, and tabulate data on building permits. A private research organization, Danareksa Research Institute (DRI), has recently begun to aggregate these data so that they cover a substantial proportion of Indonesia. DRI has put together data on both value and area (in square meters).

An advantage of using building permits as a basis for construction estimates is that a permit, if it results in actual construction, has a value that is more reliably related to gross value of output than the value of materials inputs. Two disadvantages of using building permits are: (1) permits are not the same as actual construction, because some permits are never executed and some construction takes place without permits; and (2) even when permits do result in actual construction, there is a time lag that needs to be allowed for in estimating national accounts. With respect to this latter point, some countries have found it useful and not difficult to conduct occasional sample surveys of the typical lag between permit and actual construction for various types of structures (with some proportion of permits never resulting in construction) .

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[1] BPS also conducts a quarterly survey of about one thousand construction establishments; but results are available only after long delays and therefore cannot be used for current estimates. In addition, results from a fixed sample of construction establishments can be misleading because of the substantial turnover of firms in that industry and because of possibly substantial amounts of "own-account" construction performed by manufacturers, retailers, or other firms whose primary product is not construction.

In light of the uncertainties about the use of permits, the report recommends initially simply collecting the data (or obtaining it from DRI), comparing it with present estimates, and trying to understand any discrepancies. *If* the result is favorable--that is, *if* permits give plausible results and if discrepancies often seem likely to be due to deficiencies in the materials approach than to deficiencies in the permits data--then it would be appropriate to begin using permits data regularly as an important data source in national accounts estimation. At present, all that can be said is that permits are an available data source that needs to be investigated.

C. Net Imports of Services

A national accounts weakness not mentioned earlier is that for exports and imports of services, the only estimate that now enters the accounts is an estimate of net imports, based on a figure obtained from Bank Indonesia. The use of a net figure rather than separate figures for exports of services and imports of services does not affect total GDP; but it does mean that imports and exports are both understated.

There is, however, more information available than simply the net total. In particular, there is quarterly information about Indonesia's principal service export, travel and tourism, based on data collected by the Ministry of Tourism. Estimates based on this information are published by BI in its monthly release, *Indonesian Financial Statistics*[2].

The report recommends that these estimates of travel and tourism exports be treated as exports of services, and that the difference between the net import figure BPS now receives and the travel and tourism estimate be recorded as imports of services (since the net import figure has a negative sign and travel and tourism exports has a positive sign, the difference between them is equal to the sum of two negative numbers). Table 2, taken from two different tables in *Indonesian Financial Statistics,* shows net imports of services, travel and tourism, and the difference between them, all in millions of US dollars.

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[2] A detailed study of Indonesia's international trade in services, conducted by BPS a few years ago, concluded that both exports and imports of services were understated in the BI estimates. At some time in the future, the results of this study could be used to devise an improved measure of tourism/travel services.

Table 2:
Imports and Exports of Services by Indonesia, 1996-99
millions of US dollars

	Net imports of services	Exports of "travel"	Net imports of services excl. travel exports
	a	b	a - b
1996	-13749	6186	-19935
1997	-15075	6648	-21723
1998	-14332	4255	-18587
1999	-3607	1095	-4702
Q2	-4457	1064	-5521
Q3	-4242	1225	-5467

Source: Bank Indonesia, *Indonesian Financial Statistics*, April 2000

D. Future Improvements

The three tasks discussed above are ones on which substantial progress can occur in the next few months. Other equally important improvements will probably take longer to implement; but it would be useful to begin thinking about them as soon as time permits. The paragraphs below list some of these improvements.

1. Documentation

Perhaps the most basic improvement for increasing the public understanding and appreciation of national accounts estimates is documentation. For many countries, this takes the form of an extended table showing sources and methods for each published account.

The following hypothetical example gives a simplified illustration of the possible format of such a table:

Industry	Data Sources	Methodology
Agricultural crops	Ministry of Agriculture, forecast or estimated output of 11 major crops, tons	Indexes of crop output, weighted by 1997 value added, normal seasonal pattern assumed for some crops; initial estimate based on forecasts, revisions on actual output
.....	.....	.....
Manufacturing	Bureau of Statistics quarterly survey of production and value of large establish- ments in 33 3-digit SIC groups; annual survey of production and value in all establishments; electric power consump-tion quarterly in 2- or 3-digit groups	Gross output relative to previous quarter weighted by value in each 3-digit industry, weighted by current value added, adjusted for past trends in small establishments; initial estimates based partly on electric power consumption and partly on reported business attitudes; adjusted to conform to annual data, after 2-year lag
(Etc.)		

In the case of Indonesia, there might be four tables, one each for the production and expenditure accounts in current prices, and one each for these accounts in constant prices. Each table could describe, in several sections and in summary fashion, the sources and methods used for preliminary quarterly estimates, those used for regular revisions of the quarterly estimates, and those used for other, later revisions. The tables would not be sufficiently detailed for users to be able to duplicate the estimation process; but they would enable a user who, for example, wondered about the large change in agriculture for some quarter, to understand what data sources and statistical techniques BPS uses to arrive at its estimate. Some tables along these lines already exist. Probably they could serve as a starting point, to be extended and developed into a document available to the public.

Documentation sounds easier than it is. It involves several divisions and several staff members in each division; it is a changing process as data sources improve or become unavailable; and, especially for preliminary estimates, it involves judgment that is difficult to describe in words and that may depend partly on qualitative measures such as responses to questions about business attitudes. Arriving at a satisfactory table of sources and methods takes hard work for many months. Quite possibly the preparation of the table may itself suggest changes in some of the methods. However, the rewards in understanding and appreciation by users are worth the effort.

2. Advance Release Calendar

A published table showing in advance when estimates will be released and when revisions will appear is another important contribution to user understanding and appreciation of national accounts estimates. Revisions are much easier for users to accept without suspicion if it is known well in advance that major new data sources (for example, an annual survey for an important sector) will be used for the first time in revised estimates to be released on a particular date.

Indonesia has already moved far in the direction of a regular release schedule for national accounts estimates. A calendar with additional information about major revisions should not be difficult to prepare, especially in conjunction with documentation of the sources and methods used for revising initial estimates.

3. Data Sources

BPS is well aware of the need for continuing work on such data sources as an up-to-date business register, reconciliation of quarterly and annual surveys, the SUSI survey of small establishments, and other basic sources. This report has nothing to contribute to work in these areas, except perhaps for underscoring the value of recent efforts to initiate a monthly survey of manufacturing establishments, which should become a basic tool in constructing an index of industrial production that meets IMF standards. The next section of this report discusses approaches to improving that index.

There are, however, other data sources not now used by BPS that could be of value in improving the national accounts. Two of them, building permits, and data on travel and tourism, have already been described. Two others are: quarterly or monthly surveys of retail establishments, and receipts from value added taxes.

The A.C. Nielsen company now conducts a monthly survey of large retail establishments. The experience of other countries suggests that it is difficult to use such a survey, partly because seasonal changes are very large, partly because initial and revised sales figures often differ substantially, and partly because differences among stores are sufficiently great that a useful sample needs to be large and carefully selected. Nevertheless, the survey results could be a useful check on the plausibility of quarterly estimates of private consumption and possibly of output in the retail sector.

Value added tax receipts should, in principle, be a good indicator of value added. Receipts should be available fairly promptly and cover a very large portion of the Indonesian economy. The qualifier "in principle" is important, however, because enforcement of the tax may not be uniform and because the timing of tax payments may not correspond to the timing of production. Detailed receipts by industry would be especially valuable (receipts from individual taxpayers would, of course, be confidential); but the usefulness of such detail would depend on an accurate industry classification of taxpayers. In spite of these difficulties, it seems well worth exploring the possibility of cooperation between BPS and the Ministry of Finance in utilizing this source of current information.

4. Deflation

Two categories for which it is especially difficult to construct estimates in constant prices are government services and exports and imports. In Indonesia, employment is used as the indicator of real output of government, implying that the price of government services is proportional to labor compensation per government employee. For imports and exports, current values are deflated by general price indexes rather than by specific prices of traded goods.

In the case of government services, many countries use a weighted average index of compensation for different grades of government employees as a deflator, implying that a shift from low-grade to high-grade workers (or the reverse) has an effect on output of services. It would be worthwhile to investigate the possibility of constructing such an index for Indonesia. An alternative, or additional, procedure recommended by experts is to search for prices actually charged or costs actually incurred per unit for services such as a standard medical procedure or a year of primary education. However, very few countries manage to utilize such data.

In the case of foreign trade, customs bureaus routinely collect information on value and volume, and from these it is possible to calculate unit value indexes. Unit value indexes have the same dimensions as price indexes, but they are often very poor approximations to price indexes because of enormous changes in composition within any one category of import or export. BPS has done some work on using unit values as price indexes by removing outliers before calculating average prices, but so far this work has not led to usable results. The French statistical agency INSEE has developed a procedure for drastic editing of underrepresented categories of trade and outlying observations. It may be worth exploring the applicability of the

INSEE procedure to Indonesian foreign trade.[3]

5. Other Estimates

Improving estimates of retail trade output, of changes in stocks, and of fixed investment are three other areas where there are possibilities worth exploring.

For retail trade, the present approach is to apply fixed markup ratios to indexes of agricultural output, nonagricultural goods output, and imports. The use of surveys of retailers, mentioned above, may provide some direct information about this sector. Another useful approach would be to attempt to improve on the assumption of fixed markup ratios. It seems possible that a small-scale survey of retailers would be able to yield information on whether markups are undergoing rapid increases or decreases.

Changes in stocks are at present calculated as a residual between total GDP measured from the industry side and expenditures other than stock changes measured from the expenditure side. This is a procedure used in many countries; but it has the unfortunate result that errors in all other categories of output and expenditures affect the stock change estimate. Countries that do measure stock changes directly generally gather information on book values of stocks at historical cost and attempt to use information on producer price changes to eliminate capital gains or losses. Implementing such a procedure in Indonesia would require not only balance sheet information from enterprises but also improvements in the measurement of producer prices. Another approach that may be worth trying in Indonesia would be to use information on changes in physical quantities of stocks (mainly agricultural products). Finally, it is possible to make some inferences about stock change on the basis of business tendency surveys that ask whether stocks are increasing, decreasing, or staying the same. A number of assumptions, difficult to test, are necessary to use this approach.

In the area of fixed investment, the present approach does not yield a breakdown of investment by industry. Building permits, discussed earlier, could be of some help--at least in separating residential from nonresidential building. A study by BPS andd Statistics Netherlands devised an alternative method of disaggregating investment by industry in Indonesia.[4] It might

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[3] See Annex to "Rapport de Mission sur le statistique du Commerce Exterieur Albanais", Direction Generale des Douanes, Bureau de Statistique, Insee, Division Echange exterieurs, 1998 (in English)

[4] Piet Verbiest, "Investment Matrix: Final Report", TA:2206-INO, Nov. 1997

be worth investigating the feasibility of updating that study.

6. Seasonal Adjustment

For many industries, the presence of seasonal swings make it difficult to compare current quarterly estimates meaningfully with any period except the year-ago quarter. Seasonal adjustment would overcome this limitation, but the importance of the calendar-shifting Ramadan period in Indonesia makes seasonal adjustment difficult. Another BIDE expert will address this problem in the near future.

7. 1993 SNA

Finally, the new version of the System of National Accounts (SNA) completed in 1993 under the sponsorship of five international agencies is, in many countries, replacing the 1968 SNA that Indonesia still uses. At the level of total GDP, differences between the two versions are minor. The big differences are in the sectoral accounts and financial accounts of the two versions. When Indonesia reaches the stage of developing these accounts on a regular basis, then conformity to the 1993 SNA will be desirable.

III. INDUSTRIAL PRODUCTION

The current Indonesian index of industrial production is based on a methodology introduced in 1992. The data underlying the index are quarterly sample surveys and annual complete censuses of quantities and values in medium and large manufacturing establishments.[5] The data are processed to produce quarterly indexes of output and price, using current-quarter weights. The indexes are eventually adjusted to agree with annual indexes using current-year weights; an important feature of the adjustment is correction for understatement due to the appearance of new establishments not included in the quarterly sampling frame, by a process called "backcasting". The index is very well documented in other reports, so it is not necessary to go into detail in this one.[6]

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[5] Thus, the index does not cover mining, small manufacturing, or electricity, as do most countries' indexes of industrial production. It also excludes petroleum refining.

[6] See Yahya Jammal, "The New Quarterly Industry Survey," DSP #174, December 1992; and ibid., "Memoranda on Industry, National Accounts, and Prices," DSP #241, June 1995.

Late reporting has been a persistent problem in calculating the index. The reporting lag, plus the fact that the index has been quarterly rather than monthly, means that the index does not meet the requirements of the "Statistical Data Dissemination Standards" of the International Monetary Fund (IMF), to which Indonesia has subscribed. These standards recommend a monthly index of industrial production available six weeks after the end of each month. As mentioned in the introduction to this report, an experimental measure based on electric power consumption, developed at BPS to remedy these deficiencies, was rejected by the IMF.

Recently, BPS has begun experimenting with a monthly survey of establishments to help meet the frequency and perhaps the timeliness standards. If the monthly survey proves reliable and prompt, it may eventually replace the quarterly survey.

The reason for discussing the industrial production index in this report is that there is an available body of data not now utilized in the index: namely, production data compiled by trade associations and government bureaus. Some of the products measured by this source are:

Vans	Sugar
Auto sedans	Wheat Flour
Trucks (by 5 weight classes)	Fertilizer (4 kinds)
Motorcycles	Plywood
Cement	Wood pulp
Cigarettes	Paper
Selected textiles	Selected chemicals

According to one source, these products account for close to 20 percent of industrial production.[7] In addition, there are data on petroleum refining, crude petroleum and many minerals, and electricity generation that could be used to extend the scope of the index to industries usually included in industrial production indexes.

Two advantages of these quantity measures are that, typically, (1) they are monthly, and (2) they are prompt. In many cases, furthermore, they cover all or virtually all the establishments producing a given product, rather than a sample. They have disadvantages, to be noted below; but their advantages are great enough so that using them in some way in calculating current production seems highly desirable.

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[7] Alex Korns, "Toward a Prompt Monthly Index of Industrial Production: Final Report," Nathan Associates in cooperation with BPS, February 1999, p. 14. Korns cites a figure of 17 percent for a list of products excluding plywood, pulp, paper, chemicals, and textiles.

One way to use the production data would be to let each series represent the industry whose principal product it is. Other industries would continue to be represented by data from the quarterly or monthly surveys, perhaps with preliminary estimates based on other information such as electric power. Eventually estimates from all these sources would be adjusted to the same annual indexes as they are, or will be, under present procedures.

Although this way of using the data seems straightforward, there are some substantial objections. The most important objection is that some of the products--notably, autos--are so diverse that a simple count of numbers may conceal important shifts from low-value to high-value varieties (or the reverse). A second objection is that the monthly production data refer to products rather than establishments, and therefore do not measure the secondary products of the establishments in which they are produced. A third objection is that because the data from this source measure only production and not value or price, it would not be possible to calculate and use current monthly weights for these products.

It may be that there are ways of overcoming these objections. With respect to the first one--diversity of products--additional monthly data, such as production by type of auto, may be available or may be easy to begin collecting. If not, even annual data by type of product might be useful in judging whether shifts in composition have in fact been large in the past. With respect to the second objection-- absence of output of secondary products--its importance can be appraised by using past quarterly and annual surveys to determine the error introduced by omitting secondary products for establishments whose primary products are autos, cement, cigarettes, etc. With respect to the third objection--absence of data for quarterly weights--the quarterly weights in any case are only temporary, being replaced eventually by annual weights. Their absence may therefore not be of great importance.

What should be done in the light of these pros ands cons? A first step that should encounter no objection, and in fact should be beneficial even if it is the only step taken, is to begin using these data to check on the plausibility of quarterly and monthly estimates. In areas where the diversity objection or the secondary product objection turn out to be substantial, the use of monthly production data should perhaps go no farther than this first step. In other areas, primary reliance on the monthly production data may be a good way to improve the promptness and accuracy of the index.

IV. OTHER CURRENT INDICATORS

BPS and BI maintain a number of other current economic indicators. Each organization conducts tendency surveys of consumer and businesses attitudes and expectations. A private organization, the Danareksa Research Institute, also conducts such surveys. BPS and BI each calculate an index of leading indicators. This section compares the duplicated BPS and BI measures and raises the question of how they might be coordinated to improve quality and efficiency.

In addition, BI has calculated since 1993 a quarterly Activity Index based on measures of production or good proxies for production in a wide range of industries. The index appears to be useful and not duplicated elsewhere. This report will not comment further on that index.

A. Consumer Attitudes

Surveys of business and consumer attitudes are used in many countries to appraise the current economic situation. They lack the clarity and rigor of measures such as national accounts and price and quantity indexes, but they are easy to conduct, available promptly, and provide a qualitative impression of the latest economic trends.

In content, the BPS and BI consumer surveys are quite similar. Both ask about the topics that are generally considered the most important in such surveys; namely, recent and expected income changes and planned expenditures. Both ask about recent changes in saving. The BI survey asks more about expectations (for example, it asks about expected inflation and expected economic conditions), while the BPS survey asks about the effect price changes have had on total consumption and consumption patterns. The top section of table 3 summarizes the questions in the two surveys.

In other respects, the surveys have some important differences, noted in the remainder of table 3. The advantages of the BI survey has is that it has wider geographic coverage, a much larger number of respondents, and is monthly rather than quarterly.

With respect to methodology, it is more difficult to judge the two surveys. In Jakarta, the BI survey is restricted to telephone respondents, while the BPS survey aims to cover households without telephones as well. The BPS survey is conducted by BPS itself, which probably indicates that the sample of household contacted is designed to be representative of the population. The very low response rate, however, reduces the value of this careful sample selection. Less is known about the sampling properties of the BI survey, which is conducted by

the A.C. Nielsen company and by branches of BI.

Table 3:
Surveys of Consumer Attitudes, Bank Indonesia and BPS

	Bank Indonesia	BPS
Topics covered	Respondent characteristics Recent income change Expected income change Recent savings change Expected savings change Expenditure plans Expected price changes Expected economic conditions	Respondent characteristics Recent income change Expected income change Recent savings change Expenditure plans Effect of inflation on total consumption and pattern
Geographic area	Urban Indonesia	Jabotabek
Respondents	Continue contacting until 2600 responses; 600 by telephone in Jakarta, 2000 by interview or telephone elsewhere	1000 contacted by mail, fewer than 300 responses; new interview procedure being initiated.
Frequency	monthly	quarterly
Promptness	2 weeks after month end	2 weeks after quarter end
Organization conducting survey	A.C. Nielsen in Jakarta, branches of BI and contractors elsewhere	BPS

The Danareksa survey of consumer attitudes is also conducted by the A.C. Nielsen company, and is generally similar in content to the BI survey. BI and Danareksa have had talks about coordinating or merging their efforts, but so far there has not been any action.

B. Business Attitudes

The business attitude surveys of BI and BPS, like the consumer surveys, cover much of the same territory. Both ask about recent changes in sales or production, orders received, prices, and employment. Both ask about expected changes in these variables, except that BPS does not ask about expected changes in orders. Both furnish a checklist of possible problems, such as labor or materials cost changes, government regulations, and exchange rate fluctuations, and ask respondents to check the ones encountered recently. The BI survey includes a question on expected changes in general business activity, while the BPS survey separates domestic orders from foreign orders and includes questions on recent change in capacity, inventories, average hours, and overtime expense. The top portion of Table 4 summarizes the two questionnaires.

As the remainder of Table 4 notes, the BI business survey, like its consumer survey, has

wider geographic coverage and a much larger number of respondents than the corresponding BPS survey. For the business surveys, however, there is no difference in frequency--both are quarterly--and there is a longer delay in availability of results for the BI survey.

The BPS business survey is conducted by BPS, the BI survey by BI and its branch offices. A business survey by Danareksa is conducted by the A.C. Nielsen company.

Table 4:
Surveys of Business Attitudes, Bank Indonesia and BPS

	Bank Indonesia	**BPS**
Topics covered	Respondent characteristics	Respondent characteristics
	Recent change in: Sales/production Orders received, finished goods (total) Prices Employment Business activity	*Recent change in:* Sales/production Domestic orders rec'd Foreign orders rec'd Prices Employment Orders for materials Capacity Inventories Average hours Overtime expense
	Expected change in: Sales/production Prices Employment Orders received Business activity	*Expected change in:* Sales/production Prices Employment Capacity
Geographic area	Indonesia	Jabotabek
Respondents	1200-1400 forms mailed out; follow up by telephone; 1000 responses	250 contacted by mail, fewer than 150 responses
Frequency	quarterly	quarterly
Promptness	5 weeks after quarter end	2 weeks after quarter end
Organization conducting survey	Bank Indonesia	BPS

C. Indexes of Leading Indicators

Indexes of leading indicators are publicized in many countries as simple devices for forecasting changes in real economic activity. Like other forecasting devices, they have a mixed record; they sometimes have a tendency to give false signals--indications of changing trends which in fact never materialize. Their usefulness, naturally, depends on their being available promptly.

In contrast to the consumer and business surveys, the indexes of leading indicators of BI and BPS have nothing in common. The inputs into the BI index, as Table 5 shows, are the real money supply, a long term interest rate, recent changes in consumer prices, a stock price index, and a measure of consumer expectations. Presumably two of these--the interest rate and recent changes in consumer prices--enter with negative weights. The inputs into the BPS index are cement production and a variety of import and export series.

Table 5:
Components of Indexes of Leading Indicators,
Bank Indonesia and BPS

Bank Indonesia (BI)	Badan Pusat Statistik (BPS)
Real money supply (M2)	Cement production
Long-term interest rate	*Imports:*
Recent change in consumer price index	Total
Stock price index	Capital goods
Index of consumer expectations	Consumer goods
	Raw materials
	Non-oil
	Exports:
	Non-oil
	Plywood
	Shrimp farming output

Although the leading indicator technique is largely independent of any theory of the cause of business fluctuations, its founders have recommended that candidate series for leading indicators should be plausible under at least *some* view of how business cycles develop. The inputs into the BI index generally meet this test. Among BPS inputs, it is hard to see how imports would qualify as leading series under any view of business cycles. Exports, on the other hand, ought to be valuable leading indicators in an economy that is often driven by changes in the prices of, and the demand for, exports. If reliable export data are available promptly, it would seem well worth testing whether they could provide a valuable addition to the BI list of indicators.

The BI index was developed in conjunction with two American organizations specializing in such measures, FIBER and the National Industrial Conference Board. BI is currently engaged

in research to add additional series and improve its index. The BPS index was developed by applying an econometric technique, Granger causality analysis, to a wide range of available monthly time series. It appears that the BI index is more prompt than the BPS index. It is not clear, however, that forecasters or policy makers pay much attention to either index.

D. Coordination of Efforts

To date, there has been little or no coordination of efforts in these areas between BI and BPS. It appears that the two agencies do not systematically share results, and that users of results from one agency may well not be aware that competing results are available from the other.

Improved coordination could be of benefit to the producing agencies and to users. It could take a variety of forms. A minimal program might involve regularly sharing results and information on problems encountered, and making users aware of the full range of available results. At the other extreme, a program of full coordination might entail a merger of the two surveys and of the leading index, selecting the best features of each. Even the minimal program would involve some change in organizational responsibilities. A program of full coordination would probably require the organizing of a coordinating committee to which Divisions in the two agencies would report.

The choice among these possibilities involves factors outside of the scope of this report. The only recommendations in this report, therefore, are that a high-level group be convened and, in due course, make a decision about how to coordinate. The action plan in the next section lists concrete steps in this process.

V. A SUGGESTED ACTION PLAN

The table in this section, Table 6, outlines a possible plan for priority work on the recommendations made in the preceding three sections. Each recommendation is decomposed into a series of steps that could be undertaken in the next six months.

The word "suggested" should be emphasized. There may be plausible objections to many lines in the table: some steps may already have been taken, other steps may have been omitted, and so forth. However, it is important to have *some* plan in mind, even if it differs from the one in Table 6. The final recommendation of this report, therefore, is to establish a set of priority steps–a modified version of Table 6–that seems appropriate to BPS' commitments and resources,

and to adhere to it as far as possible.

Table 6:
A Suggested Action Plan, August - December 2000

1. NATIONAL ACCOUNTS	
Commodity Flow Estimates of Private Consumption	Prepare programs/worksheets for basic procedure
	Initial calculations with 19 x 19 I-O table(s)
	Evaluation of initial results
	Preparation of procedures for 2nd round, based on more detailed I-O table, etc.
	Second round of calculations
	Evaluation; decision of how to use method in preparing current GDP
Building Permits	Obtain data from Danareksa (or local govts); both values and square meters
	Prepare programs/worksheets for estimating nominal and real construction value added based on permits data
	Estimate nominal and real value added in construction, 1997 to present
	Compare results with present estimates; evaluate
	Decision on how to use method in preparing current GDP methods
Exports/Imports of Services	Obtain data for recent years/quarters from BI or Ministry of Tourism
	Prepare worksheets for incorporating exports of tourism, other net imports of services
	Incorporate in 3rd quarter estimates
II. INDEX OF INDUSTRIAL PRODUCTION	
Physical Production Data	Collect readily available monthly data, 1997 to present
	Search for additional series and additional detail on selected products
	Evaluate; decision on how to use in monthly or quarterly index
III. OTHER CURRENT INDICATORS	
Surveys of Consumer and Business Attitudes, and Indexes of Leading Indicators	Appoint high-level committee to deal with coordination on these duplicated series
	Prepare information for committee
	Convene committee as often as needed; make decision about coordination
	Prepare organizational/procedural changes to implement committee decisions

REVISION OF QUARTERLY PRODUCTION ACCOUNTS

Statistical Paper # 1
Report # 14

by
Yahya Jammal

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TABLE OF CONTENTS

I. INTRODUCTION 28

II. EXTENT OF GDP REVISIONS 28
- **A. Background** 28
- **B. Methodology** 32
- **C. Results** 33

III. CONCLUSIONS & RECOMMENDATIONS 43

APPENDIX A DETAILED TABLES 47

I. INTRODUCTION

Data revision is an essential and integral part of the work of a statistical agency. Its aim is to provide more reliable data by maximizing the use of relevant information. This applies particularly to data produced under tight deadlines, such as monthly or quarterly figures, which force reliance on partial information. As more complete data become accessible, information which had been previously missed or guessed need to be incorporated and may necessitate a revision of earlier estimates. While in principle this may seem self-evident, in reality complications do arise.

Let us first look at it from the user's perspective. If a user witnesses substantial and frequent revisions with potentially different policy implications, he might understandably question the reliability of the methods used by the data producer for estimating and/or for collecting data. On the other hand, if he witnesses only small revisions between initial estimates (which presumably may be based on guesswork) and final figures (which presumably are based on more complete data), he might understandably suspect that even the final numbers are based on guesswork. Looking at it from the producer's perspective, substantial and frequent revisions, even when dictated by better and more complete data, carry the risk of projecting an image of incompetence. On the other hand, small revisions between initial and final figures carry a risk of succumbing to self-fulfilling projections.

From both perspectives, therefore, a balance needs to be struck where one expects a few revisions based on facts, some resulting in substantial changes and others in only minor changes. But one needs to keep in mind that as long as time is a binding constraint, revisions will be inevitable. Moreover, an evaluation of revisions can provide a useful tool for producers: it may indicate a systematic bias in initial estimates which can be remedied with adequate modifications to the estimation method. This paper addresses this particular issue. By focusing on a critical and widely used variable, the quarterly GDP, it evaluates the extent of published revisions and whether any lessons can be drawn from them to improve users' confidence in the data.

II. EXTENT OF GDP REVISIONS

A. Background

Efforts at estimating quarterly national accounts started in 1985 by applying a mathematical model to annual data.[1] Further refinements of the methodology were later

[1] "Perkiraan Produk Domestik Bruto Triwulanan Indonesia 1968-1983," BPS, December, 1985.

introduced and applied to annual data through 1989.[2] It was not until about 1990 that a methodology based primarily on quarterly data was developed and that regular quarterly publications began.[3]

Since BPS started publishing quarterly National Accounts in 1991 its policy has been to provide preliminary estimates once enough usable data on all sub-sectors have been obtained. As more and better data are received, revisions are made and new numbers are published. Once data for four quarters of a particular calendar year are available, an initial estimate for the year is provided (a two-star label indicates that the numbers are "very preliminary"). A subsequent annual revision would then be given one star (indicating that the numbers are "preliminary") before the final figures are provided without qualification. Once final figures are published, they are never changed.[4]

Between 1993 and 1998, the first estimates for a particular quarter were published after 6-8 months of the end of the reference quarter. It was not until the 1998 crisis that BPS attempted to follow to some extent a fixed time schedule for publishing various quarterly estimates:[5]

- For a particular quarter "i" of year "t", the first estimate is provided two months after the end of quarter "i".

- One revision is planned for quarter "i" two months after the end of quarter "i+1", together with the first estimate for quarter "i+1".

- Another revision is planned for quarter "i" two months after the end of quarter "i+2", together with the first estimate for quarter "i+2" and one revision for quarter "i+1".

- Another revision is planned for quarter "i" two months after the end of quarter "i+3", together with the first estimate for quarter "i+3", one revision for quarter "i+2" and one for quarter "i+1". With estimates for all four quarters of year "t" available, the "very preliminary" estimate for the year is then published (with a "two-star" label).

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2 "Produk Domestik Bruto Triwulanan Indonesia, 1978-1983," BPS, November, 1986 which was followed by "Pendapatan Nasional Indonesia Triwulanan, 1983-1989," BPS, October, 1990.

3 Quarterly GDP figures were published in the monthly "Indikator Ekonomi" as well as a separate document entitled "Produk Domestik Bruto (PDB) Menurut Penggunaan Triwulanan".

4 In July 1997, "Indikator Ekonomi" started publishing what it referred to as "very very preliminary" figures (with a three-star label) and the practice continues to date. A casual look at earlier issues of that bulletin suggests that such a qualification was applied to the 1994 figures but was discontinued with the 1995 and 1997 figures before being reinstated again starting with the 1997 figures.

5 We found no documented reference to this particular publication policy. It was based on discussions with officials of relevant BPS bureaus and divisions.

- The same process continues into year "t+1", at the end of which a revised "preliminary" estimate for the year is published (with a "one-star" label). The revision of the annual figure would presumably be based on new data obtained from sources allowing measurement of *levels*, rather than the previous quarterly data sources which were designed to measure *trends*. However, a revision of the annual level would require adjustment of the quarterly levels. A revision is then made to the quarterly figures.

- The same process continues into year "t+2", at the end of which a revised "final" estimate for the year is published, again based on more complete annual data that would have been obtained. The quarterly figures would then be revised for the final time.

Table 1 illustrates the publication schedule according to that policy for the 1997-1999 period.

Table 1
Illustration of Quarterly GDP Publication Schedule 1997-1999

Release Date	Reference Period											
	1997				1998				1999			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
97:II	1st											
97:III	2nd	1st										
97:IV	3rd	2nd	1st									
98:I	'**'	'**'	'**'	'**'								
98:II					1st							
98:III					2nd	1st						
98:IV					3rd	2nd	1st					
99:I	'*'	'*'	'*'	'*'	'**'	'**'	'**'	'**'				
99:II									1st			
99:III									2nd	1st		
99:IV									3rd	2nd	1st	
00:I	final	final	final	final	'*'	'*'	'*'	'*'	'**'	'**'	'**'	'**'

Note: "1st", "2nd" and "3rd" refer to the sequence of estimates for a particular quarter. '**' refers to estimates based on the annual revision labeled "very preliminary" and '*' refers to those based on the annual revision labeled "preliminary".

According to this policy, therefore, first quarter estimates are usually subject to the largest number of revisions (five) while fourth quarter estimates are subject to the lowest (two). That policy also indicates that the final figures for a particular year (and its corresponding quarterly figures) will not be available until 26 months after the end of a particular calendar year. That is, by February 2000 the only final figures are those of 1997; and final 1998 figures are expected to be produced

in February 2001.[6]

The lack of any explicit written statement of its publication policy, coupled with a lack of a strict adherence to it has contributed to the confusion of outside users. Confusion stems from inconsistencies that users had witnessed in the past: some quarterly figures undergo five revisions while others only show two; some quarterly figures are published with a two-month lag while others have longer lags; some quarterly figures are different even when the underlying annual figures show the same revision status; some "final" quarterly numbers were never explicitly published while others were[7]. The fact that BPS was apparently not forthcoming in fully clearing this issue has helped fuel suspicions that the numbers were "cooked" rather than being based on actual data. If one examines the figures presented in Table 2 below, for example, one might understand why some users may be cynical.

Table 2
Latest vs Earliest Estimates for Annual GDP At Constant Prices

	Initial Estimate		Latest Estimate		Change
	Level	Announcement	Level	Annoucement	
GDP					
1996	413769	April 1997	413798	December 1998	0.01%
1997	433685	January 1998	433246	January 2000	-0.10%
1998	374719	February 1999	376893	July 2000	0.58%
1999	376903	February 2000	378052	July 2000	0.30%
Growth					
1996	7.82%		7.82%		0.00%
1997	4.65%		4.49%		-0.20%
1998	-13.68%[1)]		-13.01%		0.31%
1999	0.23%[2)]		0.31%		0.08%

1) In July, 1998, an official announcement in BPS's newly created monthly bulletin ("Berita Resmi") stated that the projected growth rate for 1998 was -13.06%. In the December, 1998 issue of that bulletin, the projected growth rate was -13.68%.
2) In April, 1999, an official announcement in "Berita Resmi" stated that the projected growth rate for 1999 was -1.02%. In the November, 1999 issue of that bulletin, the projected growth rate was 0.12%.

Sources: various issues of "Indikator Ekonomi".

The fact that the final figure for 1996 was virtually the same as the initial one, or that the final

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6 The May-July, 2000 issues of "Indikator Ekonomi" mistakenly indicated that the 1998 figures were final. They should have been given one star, as does the latest issue of "Produk Domestik Bruto (PDB) Menurut Penggunaan Triwulanan (Triwulan I/1996-I/2000)."

7 The latest numbers published in the May 1999 issue of "Indikator Ekonomi", for example, indicate a "preliminary" status for figures for the first quarter of 1997. The following issues published "final" figures for only quarters 2 through 4. The same applies to figures for quarters 1 and 2 of 1996.

1997 figure showed a difference of only 0.1% over the initial, understandably raise suspicions of whether the initial figures (which are presumably based on only partial information) actually undergo revisions which take into consideration more complete annual figures obtained at a later stage. Admittedly the most controversial figure relates to that of 1998. With only one-half of a historically unusual crisis year over, BPS announced its projection of a -13.06% growth for the year, and so far the latest available ("preliminary") figure shows a growth of -13.01%. If the "final" growth rate remains at this level, it will suggest a tremendously accurate initial projection in the middle of serious turmoil (a difference of only 0.3%), which cannot be easily accepted by users.

User skepticism is certainly understandable and legitimate. The only reliable way to erase any suspicion, and thus increase user confidence in these numbers, is to ensure that the process of computation and revision is as transparent as possible. That, it is hoped, will be the policy adopted by BPS in its future releases. For now, we provide an attempt to suggest that Table 2, although based on hard evidence, does not fully reflect the reality which lies behind quarterly GDP revisions because it leaves some important facts out of the picture. In what follows we provide an alternative approach of evaluating the impact of revisions.

B. Methodology

Our attempt was to trace the process of revision of quarterly GDP estimates in order to determine their magnitude. Our aim was to examine, from a user's perspective, whether revisions have been significant, and thus lend support to the plausibility of BPS's declared policy (i.e. revisions based on more complete annual data), or whether they have been merely window dressing to placate curious outside users. To do that, we relied fully on published figures obtained by users (in various issues of "Indikator Ekonomi"), and used the 9-sector classification of the production accounts.

One of the shortcomings of the comparisons in Table 2 is that they compare *annual* figures which are characterized as "very preliminary" and "final". By the time the "very preliminary" annual figure is published, quarterly figures for that year would have already undergone several revisions (three for the first quarter, two for the second quarter and one for the third quarter). So for one to truly measure the extent of revision of quarterly figures, one needs to trace all these revisions, not just compare what the annual figures characterize as "very preliminary", "preliminary" and "final".

Because of the time consuming nature of this exercise, we limited our investigation to the 1996-1999 period. We scanned all issues of "Indikator Ekonomi" with published quarterly figures for this period and extracted the very first estimate for a particular quarter which we labeled "initial". We then searched for the last published figure for that quarter and labeled it "latest". We then extracted three revisions in between and labeled them by sequence (e.g.

"second", "third", "fourth" estimate). As mentioned above, some quarters have undergone more revisions than others. For the present exercise, data comparisons were limited to three revisions between the "initial" and "latest" estimates. The analysis was done for both current and constant price data.

C. Results

Tables 3 through 5 show the percentage changes between initial and latest estimates in constant price figures, current price figures and implicit GDP deflators respectively, and Figures 1-20 show some of the more interesting results. Individual quarterly estimates as well as detailed sequential changes are provided in Tables A.1 through A.6.

Table 3
Percentage Change Between Latest and Initial Estimates of the Production Accounts
(In constant 1993 prices)

Year	Agricul.	Mining	Industry	EGW	Const.	Trade	Transp.	Finance	Services	GDP
1996	1.5%	-0.7%	-0.6%	1.4%	-2.4%	-0.2%	-0.4%	-5.3%	0.1%	-0.7%
1997	2.1%	0.8%	-0.2%	1.3%	4.2%	1.1%	-1.3%	-2.3%	0.4%	0.6%
1998[1]	-2.1%	3.1%	5.0%	1.5%	1.8%	3.7%	-3.5%	0.5%	0.5%	1.7%
1999[2]	0.5%	-1.6%	1.9%	2.8%	5.0%	1.5%	-0.7%	7.1%	-0.7%	1.3%

1) The latest estimate for this year is still "preliminary"
2) The latest estimate for this year is still "very preliminary"

Source: Table A.2

Table 4
Percentage Change Between Latest and Initial Estimates of the Production Accounts
(In current 1993 prices)

Year	Agricul.	Mining	Industry	EGW	Const.	Trade	Transp.	Finance	Services	GDP
1996	3.0%	3.9%	2.5%	5.3%	-2.2%	-0.7%	-1.4%	-5.4%	-2.7%	0.4%
1997	0.9%	-4.9%	7.3%	3.1%	-2.9%	-4.1%	-9.0%	7.3%	3.5%	0.9%
1998[1]	0.7%	7.5%	-4.7%	6.5%	17.1%	21.1%	-1.4%	-5.5%	29.3%	5.5%
1999[2]	0.0%	-4.7%	-4.6%	6.0%	10.2%	-0.3%	9.3%	4.6%	5.8%	0.1%

1) The latest estimate for this year is still "preliminary"
2) The latest estimate for this year is still "very preliminary"

Source: Table A.4

Table 5
Percentage Change Between Latest and Initial Estimates of the Implicit GDP Deflator

Year	Agricul.	Mining	Industry	EGW	Const.	Trade	Transp.	Finance	Services	GDP
1996	1.5%	4.6%	3.2%	3.8%	0.2%	-0.5%	-1.0%	0.0%	-2.8%	1.1%
1997	-1.2%	-5.6%	7.5%	1.7%	-6.9%	-5.1%	-7.8%	9.8%	3.1%	0.3%
1998[1]	2.8%	4.2%	-9.3%	5.0%	15.0%	16.8%	2.1%	-6.0%	28.7%	3.7%
1999[2]	-0.5%	-3.1%	-6.4%	3.2%	4.9%	-1.8%	10.1%	-2.4%	6.5%	-1.2%

1) The latest estimate for this year is still "preliminary"
2) The latest estimate for this year is still "very preliminary"

Source: Table A.6

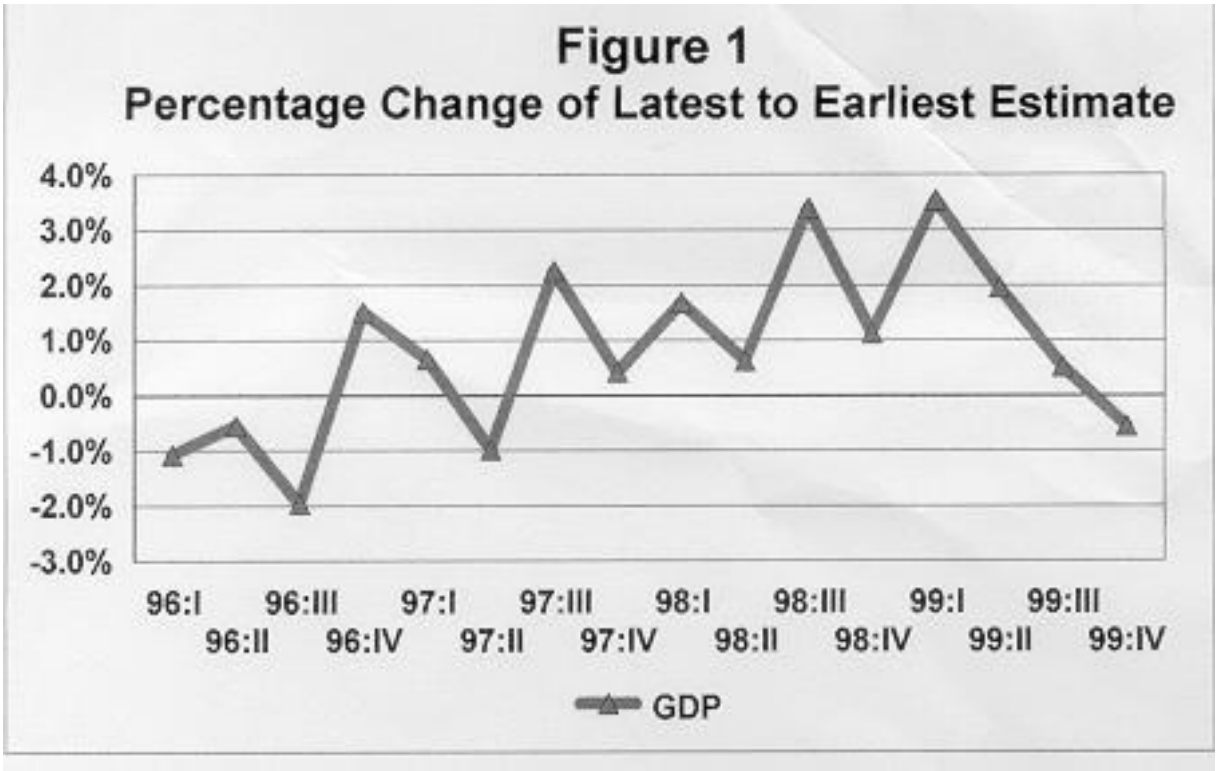
Figure 1
Percentage Change of Latest to Earliest Estimate
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
-3.0%
96:I
96:II
96:III
96:IV
97:I
97:II
97:III
97:IV
98:I
98:II
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98:IV
99:I
99:II
99:III
99:IV
GDP

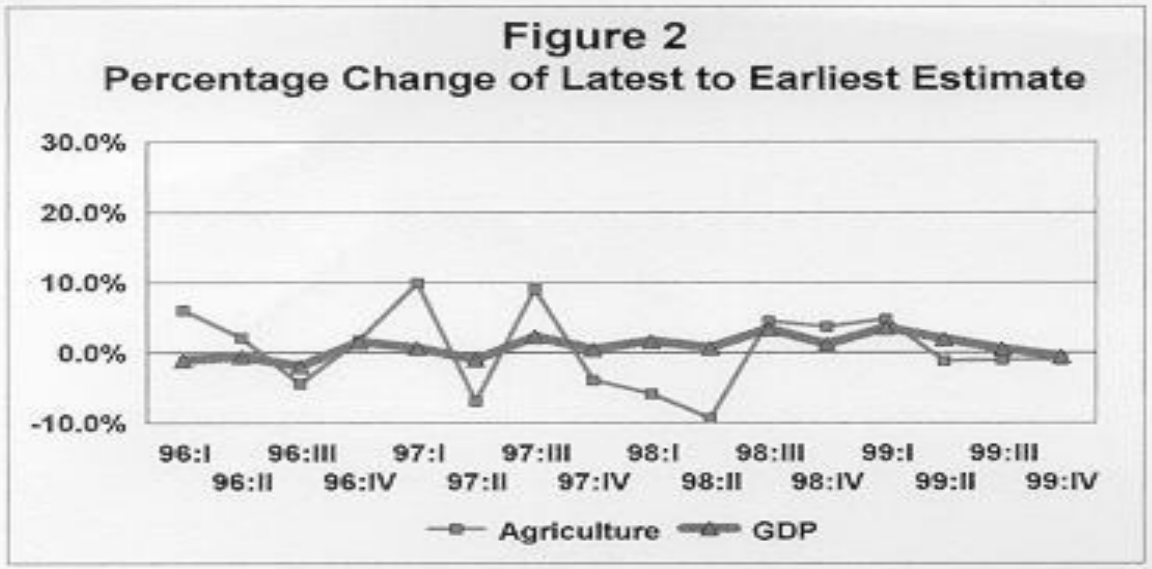
Figure 2
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
96:I 96:II 96:III 96:IV 97:I 97:II 97:III 97:IV 98:I 98:II 98:III 98:IV 99:I 99:II 99:III 99:IV
Agriculture
GDP

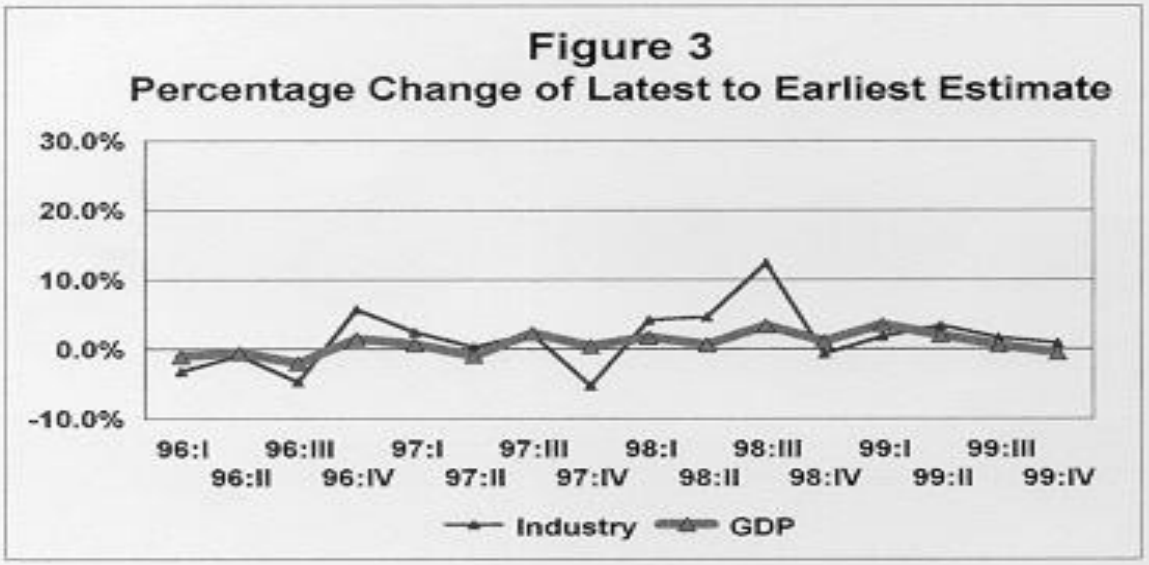
Figure 3
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
96:I 96:II 96:III 96:IV 97:I 97:II 97:III 97:IV 98:I 98:II 98:III 98:IV 99:I 99:II 99:III 99:IV
Industry
GDP

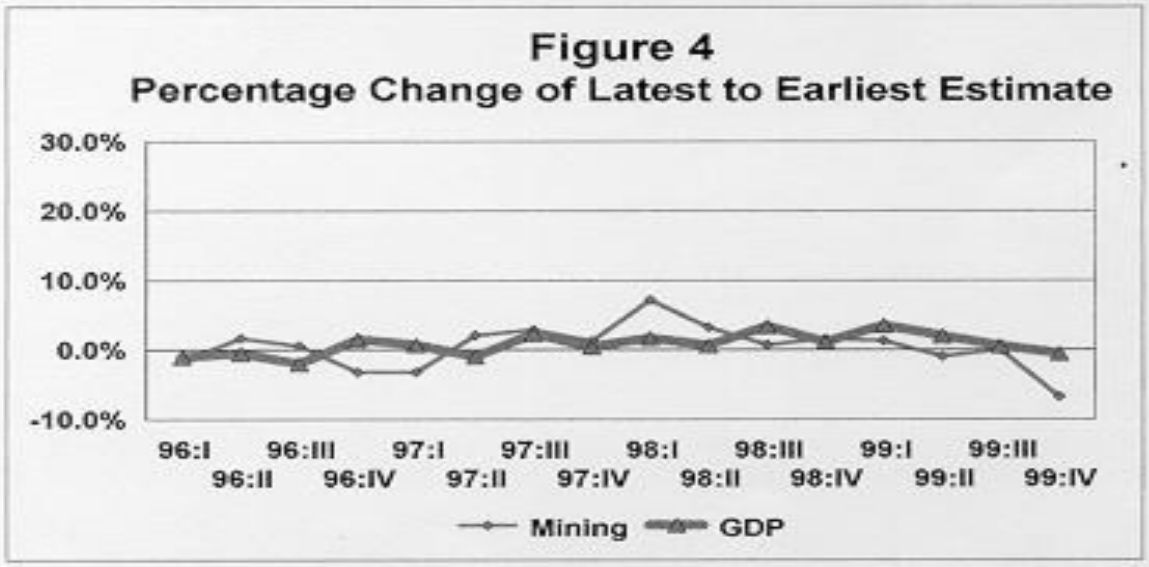
Figure 4
Percentage Change of Latest to Earliest Estimate
30.0%
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10.0%
0.0%
-10.0%
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Mining
GDP

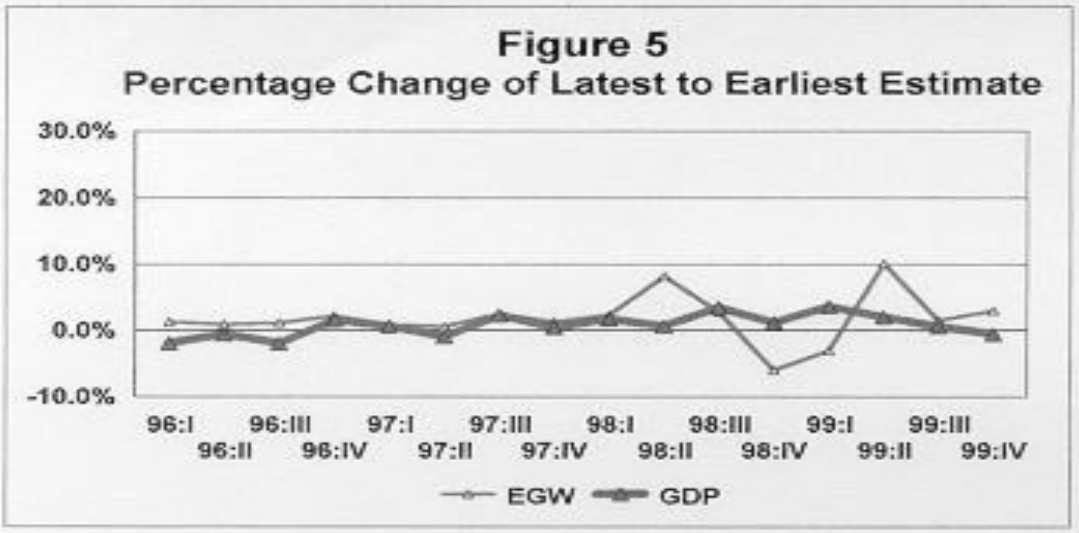
Figure 5
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
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96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
EGW
GDP

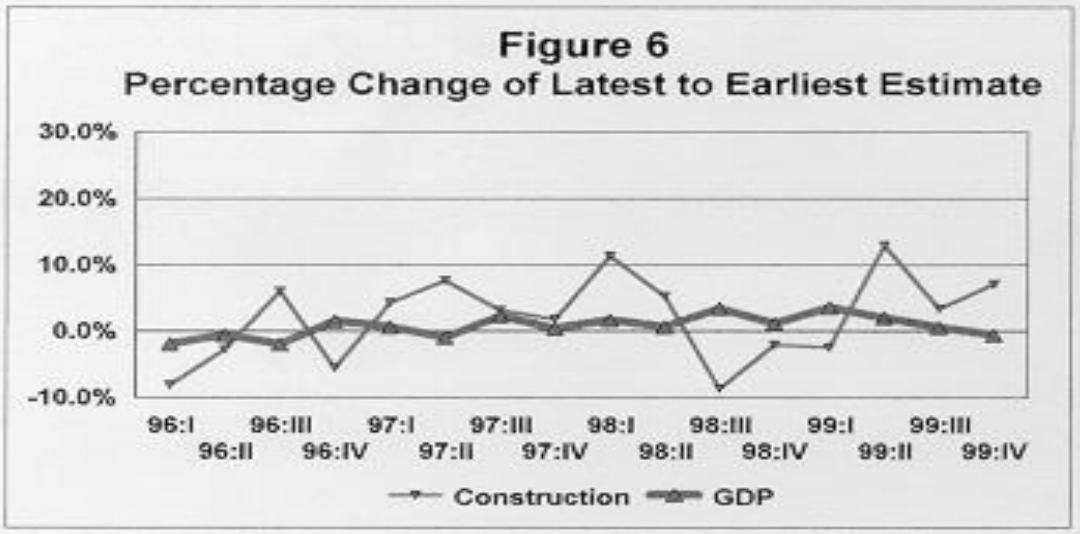
Figure 6
Percentage Change of Latest to Earliest Estimate
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20.0%
10.0%
0.0%
-10.0%
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96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Construction
GDP

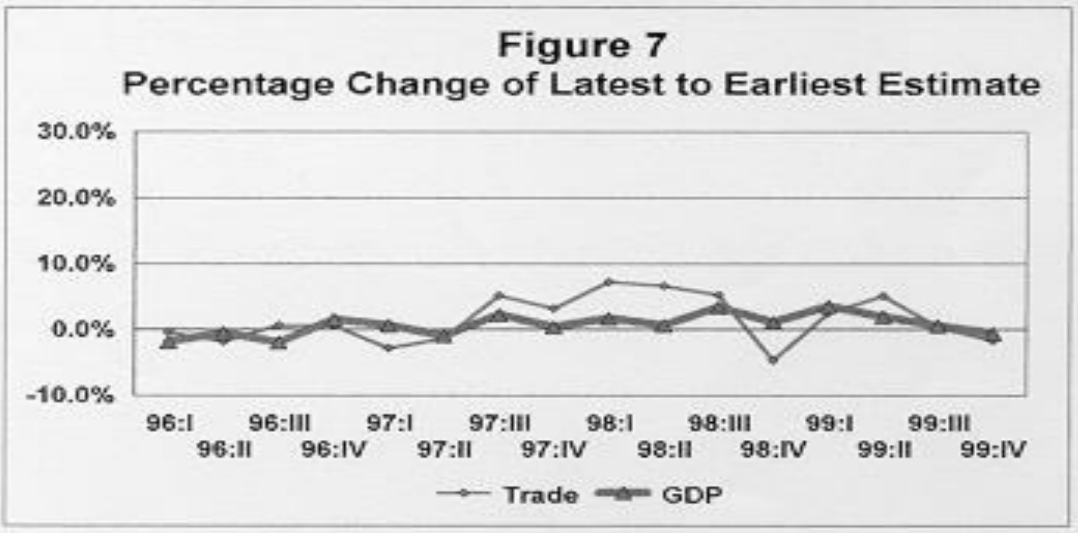
Figure 7
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Trade
GDP

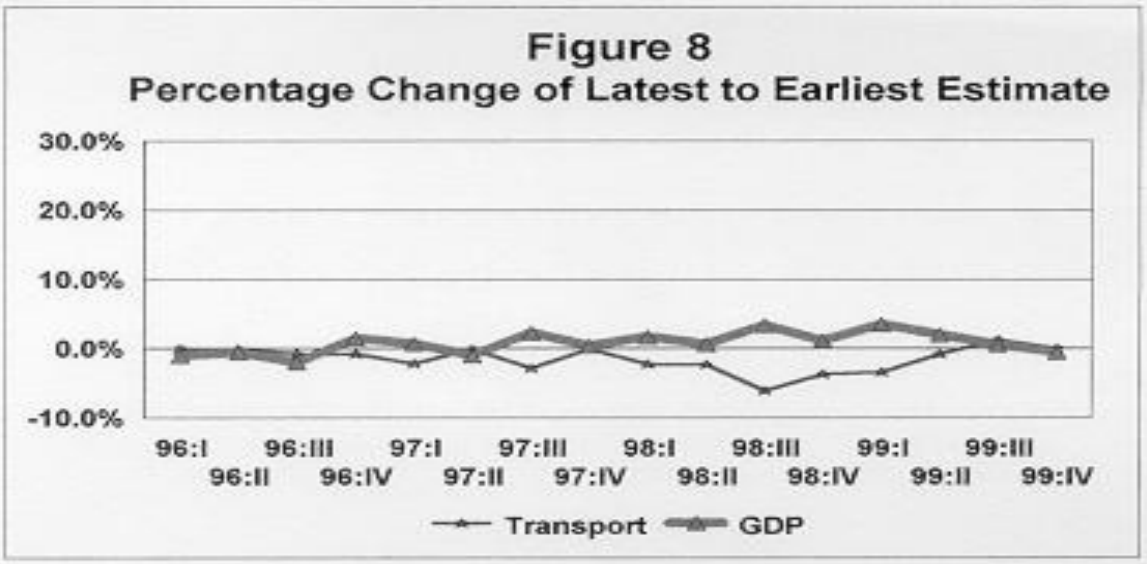
Figure 8
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Transport
GDP

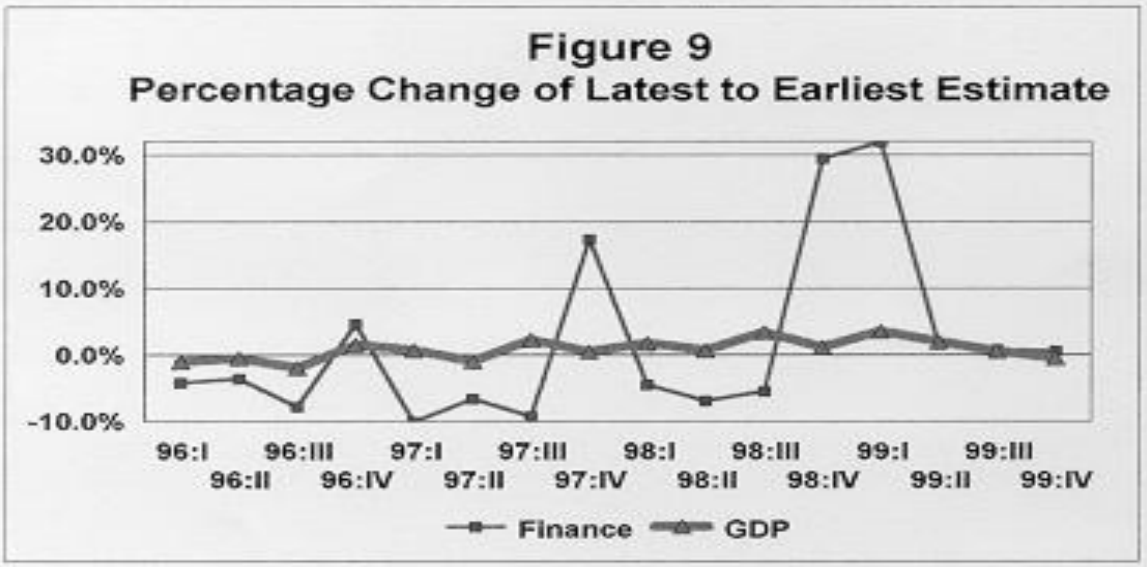
Figure 9
Percentage Change of Latest to Earliest Estimate
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20.0%
10.0%
0.0%
-10.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Finance
GDP

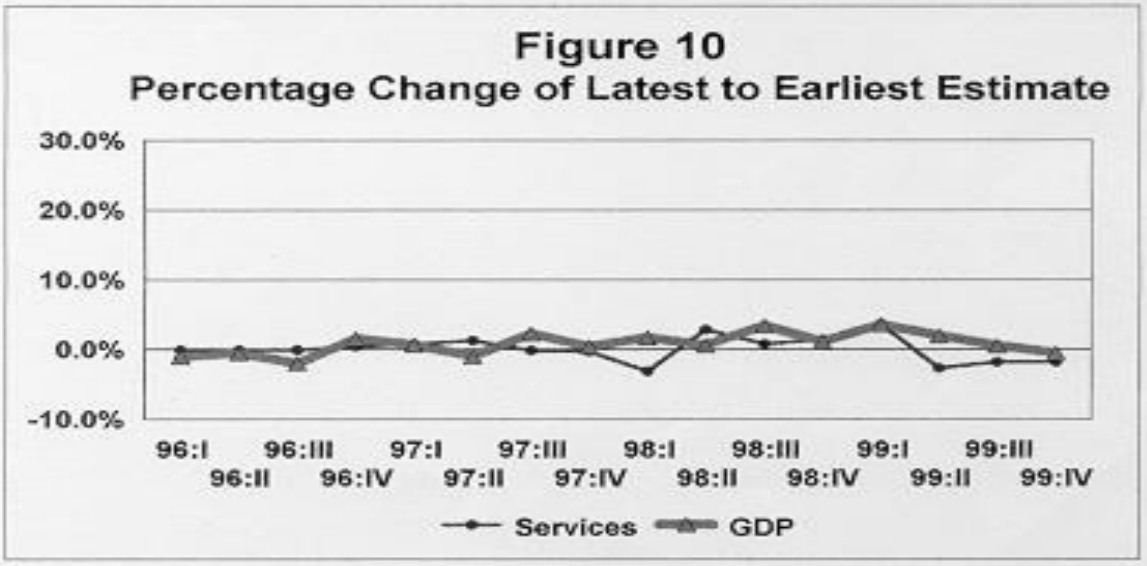
Figure 10
Percentage Change of Latest to Earliest Estimate
30.0%
20.0%
10.0%
0.0%
-10.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Services
GDP

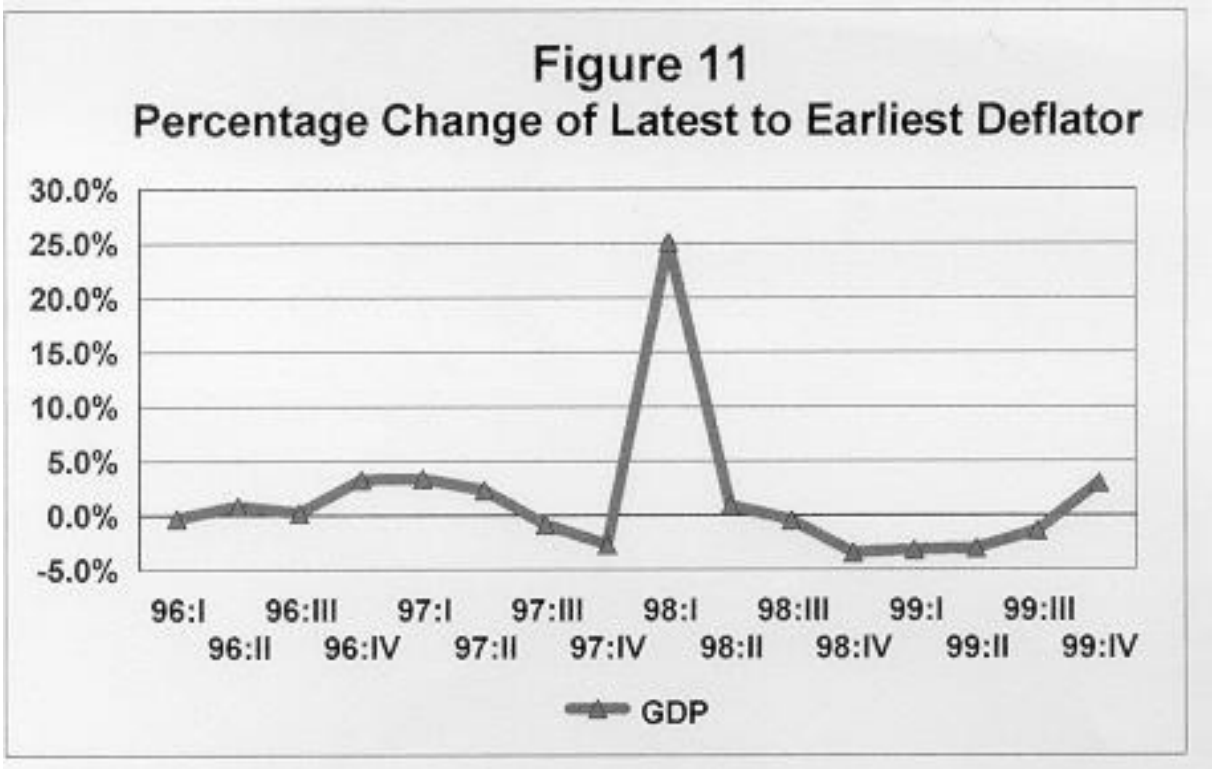
Figure 11
Percentage Change of Latest to Earliest Deflator
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
96:I
96:II
96:III
96:IV
97:I
97:II
97:III
97:IV
98:I
98:II
98:III
98:IV
99:I
99:II
99:III
99:IV
GDP

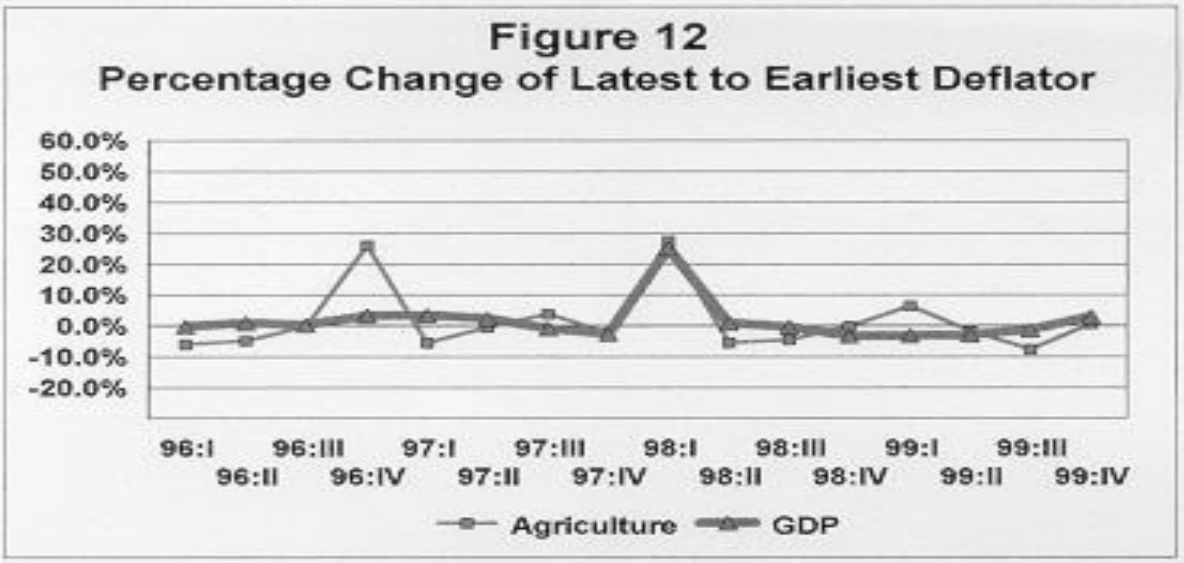
Figure 12
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Agriculture
GDP

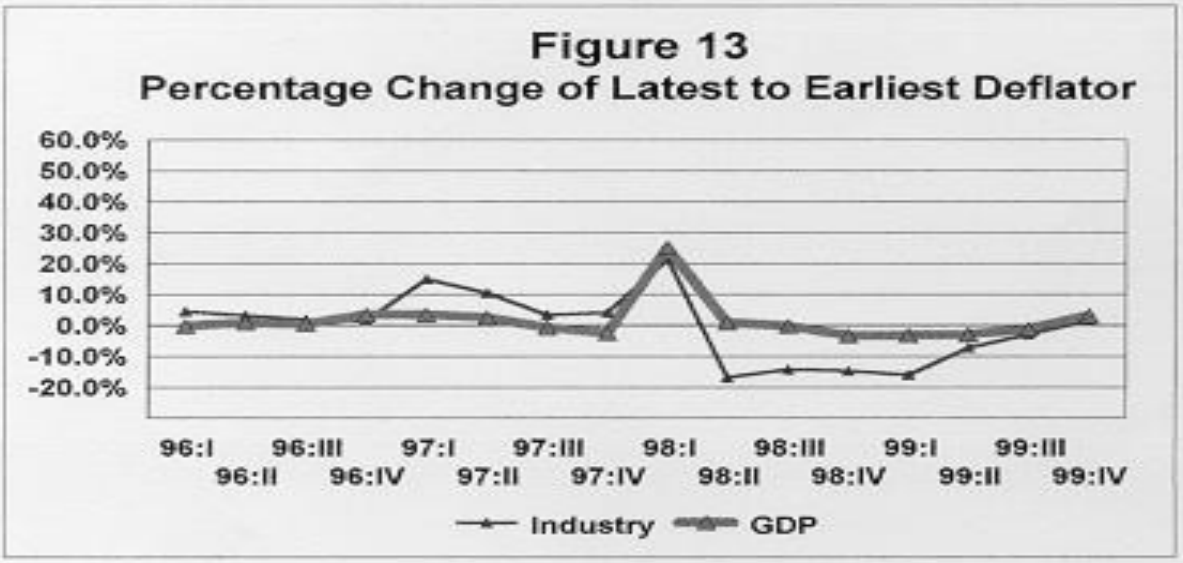
Figure 13
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Industry
GDP

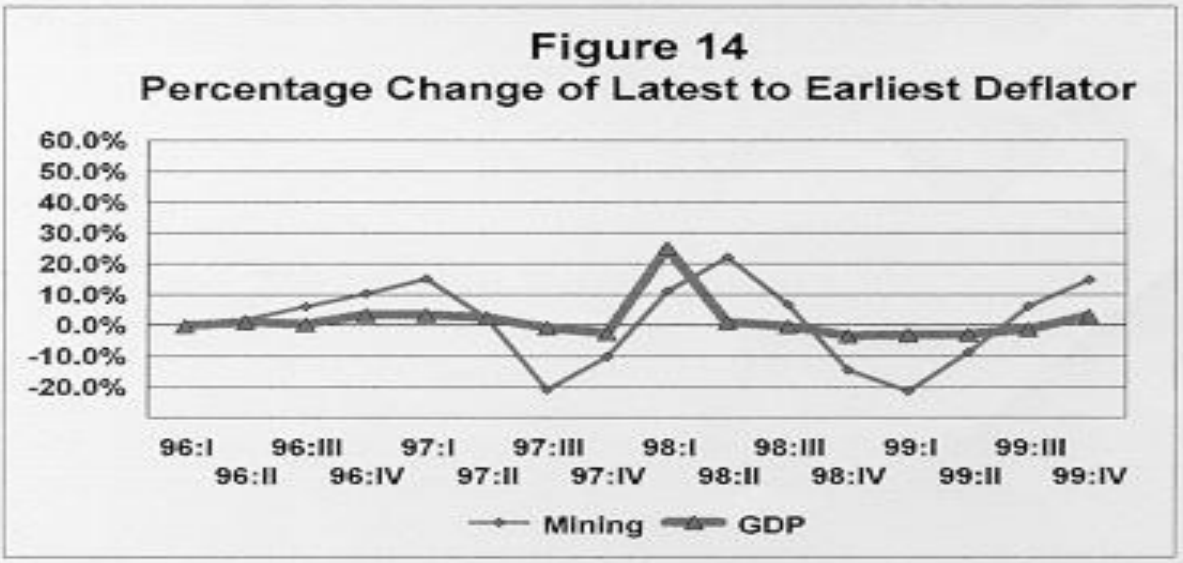
Figure 14
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Mining
GDP

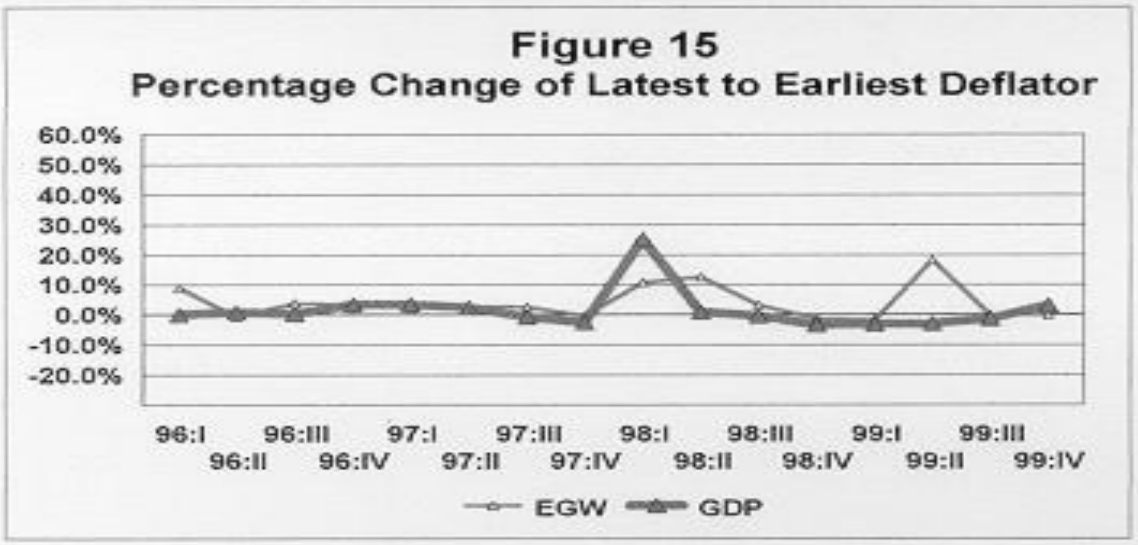
Figure 15
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
EGW
GDP

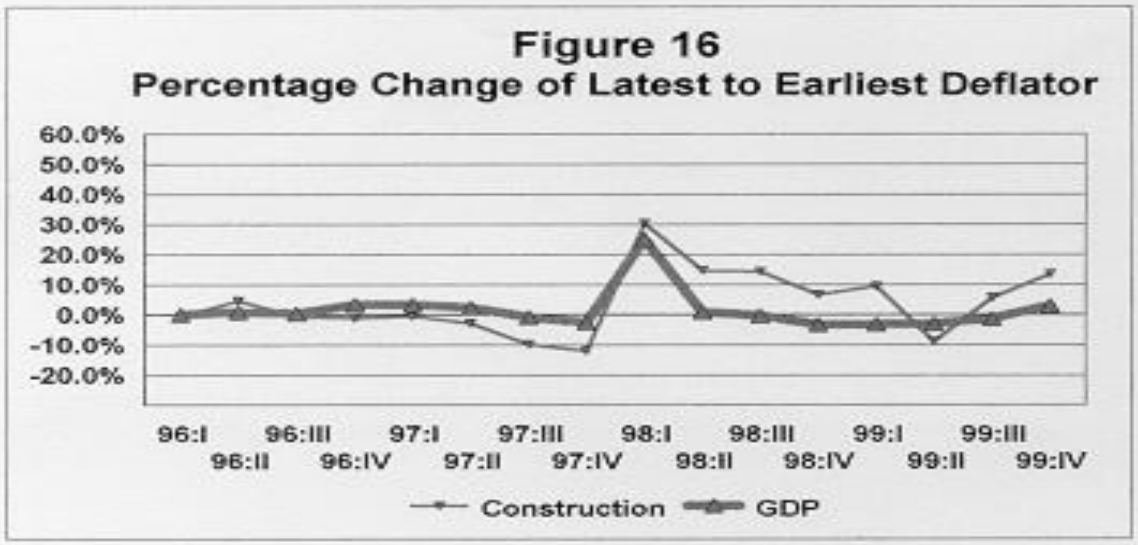
Figure 16
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Construction
GDP

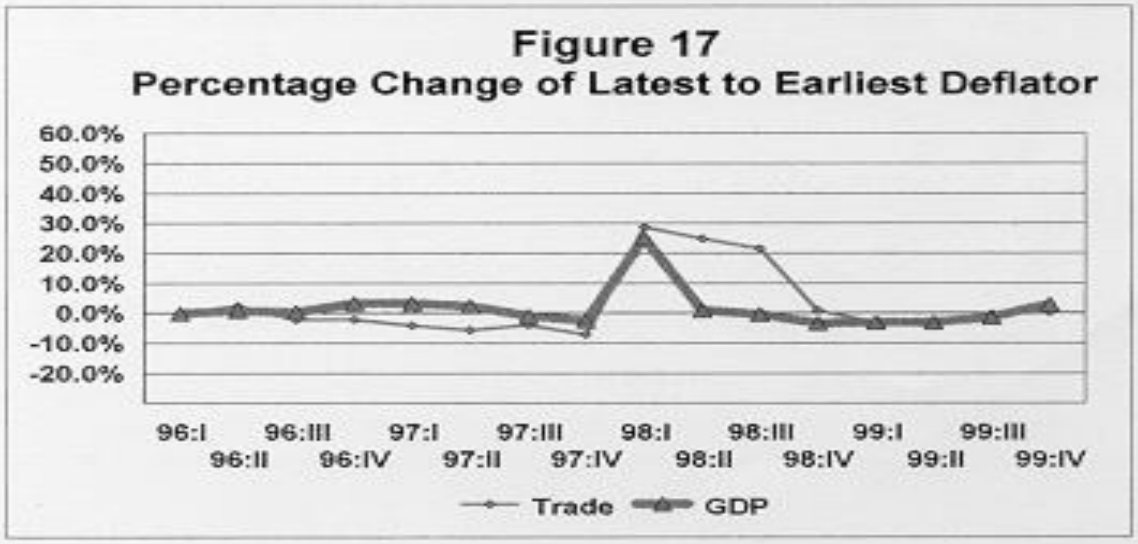
Figure 17
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Trade
GDP

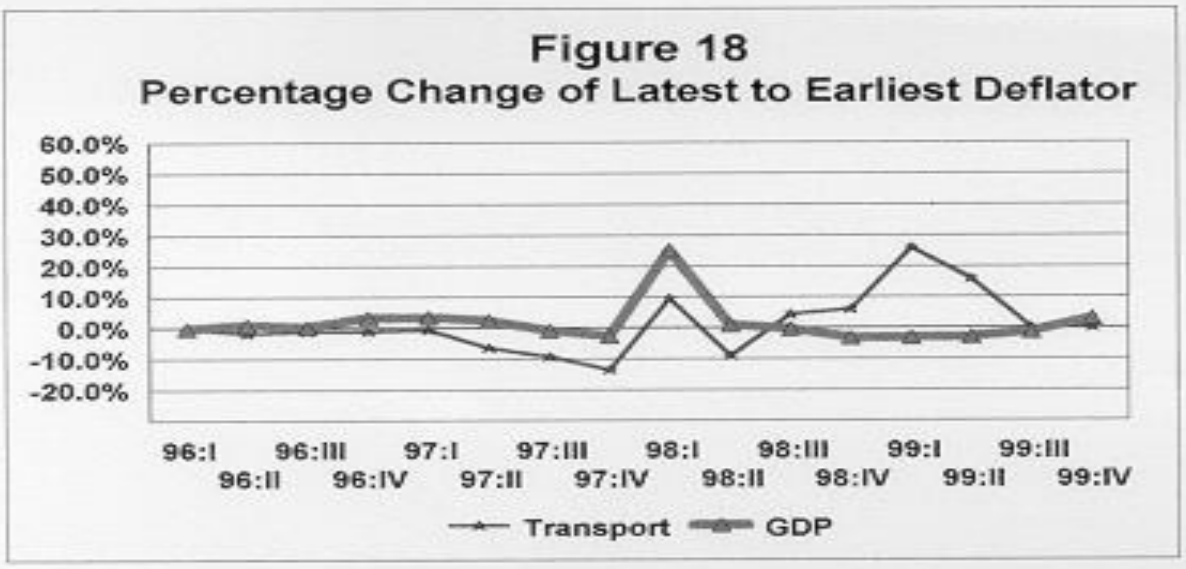
Figure 18
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Transport
GDP

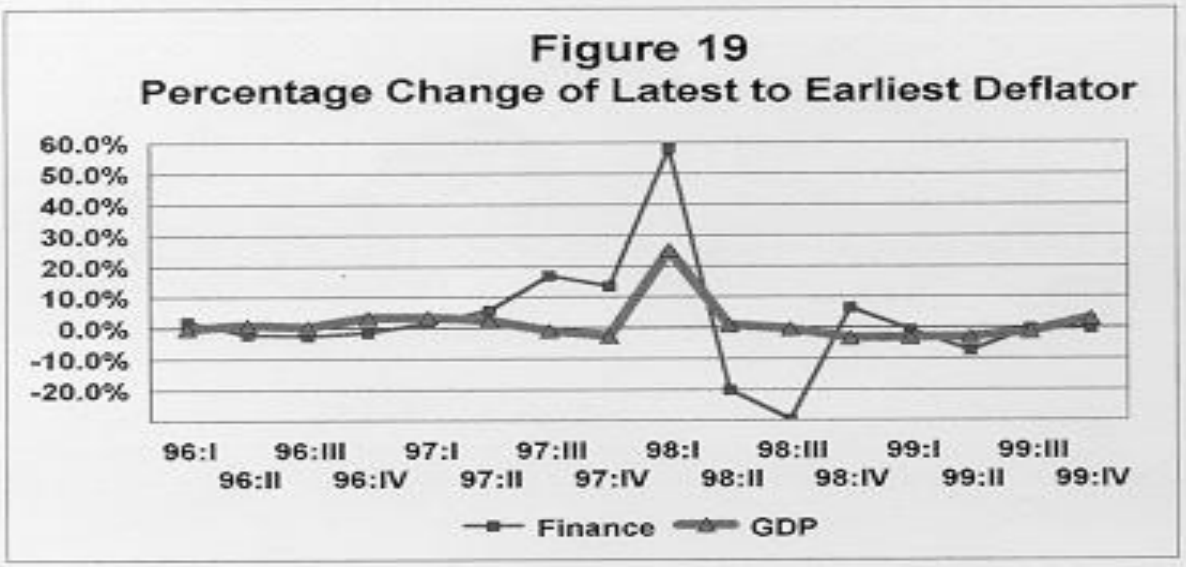
Figure 19
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Finance
GDP

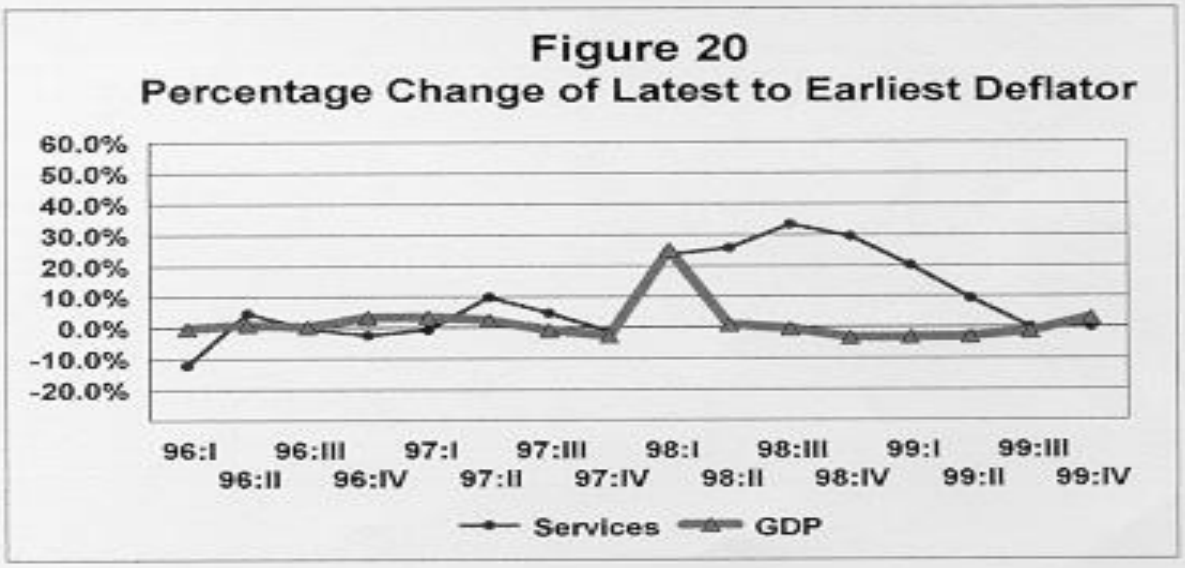
Figure 20
Percentage Change of Latest to Earliest Deflator
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
96:I 96:III 97:I 97:III 98:I 98:III 99:I 99:III
96:II 96:IV 97:II 97:IV 98:II 98:IV 99:II 99:IV
Services
GDP

Note the following:

- Quarterly revisions to real GDP result in significant changes: ranging from -2% for the third quarter of 1996 to 3.5% in the first quarter of 1999. However, resulting annual effects of these revisions are far less pronounced: -0.7% and 0.6% respectively for 1996 and 1997 (Table 3).

- Two thirds of revisions to total GDP, and all except one since the third quarter of 1997, have been upwards. In other words, the initial figure in these cases tended to consistently underestimate the final figure. That may indicate a systematic bias towards underestimation in the more recent years. However, given that the total GDP figure is actually computed from 58 underlying sub-sectoral figures, one needs to look into potential biases at the sub-sectoral level.

- At the sectoral level, ranges between initial and final estimates vary more widely: -10% to 10% for Agriculture, Industry, Electricity, Gas & Water and Construction; and -10% to 32% for Finance.

- While most sectors show the expected pattern of quarters of under-estimation and quarters of over-estimation, some exhibit systematic over-estimation or systematic under-estimation: e.g. Transport; Trade between the third quarter of 1997 and the second quarter of 1999.

- Some sectors show a change in pattern from no difference in estimates to a marked difference: e.g. Electricity, Gas & Water; Transport.

- The Finance sector exhibits the most striking behavior: it shows that the initial estimate had always over-estimated the final figure (by up to 10%), except in the fourth quarter of 1997 and the third and fourth quarters of 1998, when it over-estimated it by about 20%, 30% and 32% respectively.

- Some sectors show detectable deflation patterns: e.g. systematic over-estimation in Agriculture (with a couple of exceptions); systematic under-estimation in Industry before 1998, followed by systematic over-estimation after 1998; systematic under-estimation for services.

III. CONCLUSIONS & RECOMMENDATIONS

The above analysis points to two main conclusions:

- The first is that unlike the conclusion that one derives by only considering data provided in Table 2, quarterly revisions to total GDP, and particularly to its components, have not been insignificant.

- The second is that quarterly revisions in some sectors suggest a systematic under- or over-estimation of the final figures.

These points, as well as the analysis provided above, suggest that some concrete steps can be taken by BPS to increase user confidence in quarterly GDP figures by increasing transparency of its revision policy and improve the estimation methodology used. One such step is to:

Recommendation 1: Publish a clear explicit policy regarding the timetable and the extent of quarterly as well as annual revisions to GDP data, and stick to it.

What should that policy be? To answer that question, it may be useful to know what other countries do. Table 6 provides a brief comparison of the publication and revision policy of quarterly GDP in selected countries (including Indonesia) as reported by the IMF.

Table 6
Comparison of Quarterly GDP Release Policy & Timing in Selected Countries

Country	Lag	Release Policy	# Releases
Indonesia	no later than 3 months[1)]	advance release calendar giving one quarter ahead notice of the approximate release dates, and updated monthly[1)]	NA[1)]
US	- "advance": 1 month - "preliminary": 2 months - "final": 3 months[2)]	a schedule of release dates is issued in September of each year showing the precise release dates for the coming calendar year	"advance", "preliminary" & "final"[2)]
Canada	- "preliminary": 2 months - "revised": 3 months[3)]	precise release dates for the next 15 months are announced in November of each year	"preliminary" & "revised"[3)]
Singapore	- "advance": 10 days - "preliminary": 9 weeks	a quarter-ahead advance release calendar showing the "no later than" release dates is published which is updated one week prior to the data release to show precise release dates.	"advance", "preliminary"[4)]
Malaysia	60 days	one quarter ahead advance release calendar showing the no-later-than dates on which the data will be released.	NA
Thailand	3 months	advance release calendar giving one-quarter-ahead notice of precise release dates	NA
Korea	- within 2 months for GDP data at constant prices for the first 3 quarters. - within 3 months for the fourth quarter data on GDP at constant prices, GDP data at current prices for all 4 quarters, and the deflators.	advance release calendar which gives at least one-quarter-ahead notice of the approximate release dates, and at least one week ahead notice of precise release dates	NA

1) This is what is reported on the SDDS website (presumably submitted by Bank Indonesia, the IMF's counterpart). It is not fully consistent with the BPS policy discussed in Section II above.
2) Obtained from the US Bureau of Economic Analysis website.
3) Obtained from the Statistics Canada website.
4) Only "advance" and "preliminary" releases were mentioned. However, if a release was qualified as "preliminary", one expects that at least one more release would follow.

Sources: IMF's Standard Data Dissemination Standard (SDDS) website (http://dsbb.imf.org/country.htm).

Two points are particularly noteworthy:

- If the Canadian and American release policies are typical of those of industrialized countries, then these countries limit the number of quarterly revisions to one (Canada) or two (US). This may be prompted by a desire to limit the processing burden of the statistical agency and the potential confusion of users. One or two revisions seem to provide an acceptable balance between user demands and producers' capacity to deliver.

- While other developing Asian countries provide a one-quarter advance release date for their quarterly GDP, the US and Canada provide a fixed release schedule for the whole year in advance. Such a policy aims at avoiding any perception of political interference with the numbers.

A lesson can, therefore, be learned from the US and Canadian experiences:

Recommendation 2: Evaluate the possibility of limiting the number of revisions of quarterly figures to one or two and publish in advance a fixed release schedule for a full calendar year.

Limiting the number of revisions will ease the burden on BPS and will reduce potential user confusion. Adherence to a timetable released in advance would void any potential suspicion of political manipulation of the figures.[8]

Another step that can be taken to increase user confidence in the data is to relay to them the fact that published figures are subject to some margin of error. One way to do that is to:

Recommendation 3: Publish more rounded figures for both levels and growth rates. This will have the added effect of simplifying presentation. Publishing growth rates with two decimals, as is the current practice, gives the misleading impression of a high level of precision.

Finally, the second conclusion stated above, namely the possibility of a systematic under- or over-estimation of the final figures, suggests one obvious action:

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[8] Such a move would eliminate the need for the multiple revisions of estimates for the first 3 quarters of the year (see Table 1). The release schedule for these quarters would be the same as that of the fourth quarter.

Recommendation 4: Evaluate the methodology used in estimating initial figures in sectors where a possible bias occurs (e.g. Transport, Trade), and modify accordingly.

APPENDIX A
DETAILED TABLES

Table A.1
GDP At Constant Prices

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
First	15,602	9,201	23,357	1,116	8,121	16,554	7,347	9,225	8,980	99,501
Second	15,602	9,102	22,656	1,116	7,530	16,354	7,399	8,974	8,980	97,713
Third	16,556	9,061	22,624	1,119	7,468	16,441	7,349	8,839	8,974	98,432
Fourth	16,556	9,061	22,624	1,119	7,468	16,441	7,349	8,839	8,974	98,432
Latest	16,674	9,063	22,624	1,131	7,468	16,492	7,349	7,813	8,974	97,587
96:II										
First	17,025	8,995	23,499	1,387	7,774	17,060	7,212	9,651	9,078	101,481
Second	17,025	9,138	22,968	1,393	7,428	16,661	7,263	9,450	9,078	100,204
Third	17,389	9,146	23,286	1,398	7,564	16,752	7,211	9,304	9,072	100,922
Fourth	17,389	9,146	23,286	1,398	7,564	16,752	7,211	9,304	9,072	100,922
Latest	17,389	9,146	23,286	1,398	7,564	16,752	7,211	9,304	9,072	100,922
96:III										
First	16,881	9,586	28,261	1,247	8,832	17,511	7,479	9,693	9,207	108,697
Second	16,116	9,643	26,949	1,253	9,368	17,604	7,426	9,543	9,202	107,103
Third	16,116	9,643	26,949	1,253	9,368	17,604	7,426	9,543	9,202	107,104
Fourth	16,141	9,644	26,949	1,262	9,368	17,630	7,426	8,940	9,202	106,562
Latest	16,141	9,644	26,949	1,262	9,368	17,630	7,426	8,940	9,202	106,562
96:IV										
First	13,380	10,207	27,798	1,258	9,021	18,480	7,773	9,866	9,322	107,106
Second	13,682	9,719	29,401	1,270	8,524	18,576	7,715	9,715	9,362	107,963
Third	13,682	9,719	29,401	1,270	8,524	18,576	7,715	9,715	9,362	107,963
Fourth	13,623	9,887	29,401	1,285	8,524	18,602	7,715	10,327	9,362	108,726
Latest	13,623	9,887	29,401	1,285	8,524	18,602	7,715	10,327	9,362	108,726
Annual 96										
First	62,888	37,989	102,915	4,809	33,748	69,604	29,811	38,435	36,586	416,785
Second	62,424	37,602	101,974	4,835	32,849	69,194	29,803	37,681	36,621	412,981
Third	63,743	37,569	102,260	4,840	32,924	69,372	29,701	37,401	36,613	414,420
Fourth	63,710	37,737	102,260	4,864	32,924	69,425	29,701	37,411	36,610	414,642
Latest	63,828	37,739	102,260	4,877	32,924	69,475	29,701	36,384	36,610	413,798
97:I										
First	15,764	9,678	24,521	1,253	8,301	17,706	8,051	9,788	9,314	104,575
Second	16,768	9,324	24,976	1,258	8,213	17,860	8,055	9,537	9,268	105,259
Third	16,768	9,415	25,162	1,258	8,919	18,368	8,060	9,537	9,268	106,755
Fourth	16,449	9,361	25,137	1,266	8,788	18,454	7,916	8,773	9,268	105,411
Latest	17,336	9,377	25,139	1,263	8,869	17,209	7,879	8,801	9,388	105,261
97:II										
First	17,410	9,352	25,846	1,355	8,100	17,947	7,789	9,851	9,275	106,925
Second	17,410	9,568	25,975	1,355	8,796	17,735	7,795	9,851	9,275	107,759
Third	17,729	9,511	25,966	1,365	8,652	17,820	7,834	9,172	9,275	107,324
Fourth	17,729	9,511	25,966	1,365	8,652	17,820	7,834	9,172	9,275	107,324
Latest	16,215	9,555	25,933	1,364	8,718	17,697	7,785	9,201	9,399	105,867
97:III										
First	16,226	9,495	27,630	1,377	8,850	18,323	8,140	10,132	9,558	109,730
Second	16,226	9,495	27,630	1,377	8,850	18,323	8,140	10,132	9,558	109,730
Third	16,374	9,723	28,362	1,419	9,045	18,409	8,008	9,166	9,558	110,063
Fourth	17,707	9,772	28,245	1,412	9,133	19,282	7,916	9,198	9,549	112,213
Latest	17,707	9,772	28,245	1,412	9,133	19,282	7,916	9,198	9,549	112,213
97:IV										
First	13,746	9,704	29,865	1,423	8,472	18,735	8,208	9,664	9,623	109,440
Second	13,746	9,704	29,865	1,423	8,472	18,735	8,208	9,664	9,623	109,440
Third	13,737	9,791	29,364	1,449	8,556	18,820	8,413	11,620	9,548	111,297
Fourth	13,210	9,834	28,313	1,442	8,627	19,336	8,203	11,343	9,598	109,905
Latest	13,210	9,834	28,313	1,442	8,627	19,336	8,203	11,343	9,598	109,905
Annual 97										
First	63,146	38,229	107,862	5,408	33,923	72,710	32,189	39,435	37,769	430,670
Second	64,149	38,091	108,446	5,414	34,331	72,652	32,198	39,184	37,724	432,188
Third	64,603	38,440	108,853	5,492	35,172	73,418	32,314	39,495	37,649	435,440
Fourth	65,095	38,479	107,661	5,484	35,199	74,891	31,868	38,485	37,691	434,852
Latest	64,468	38,538	107,630	5,480	35,346	73,524	31,783	38,543	37,935	433,246

October 17, 2000 Revision of Quarterly Production Accounts

98:I										
First	17,660	8,767	24,317	1,322	6,171	16,041	8,002	8,583	9,267	100,130
Second	17,268	8,767	23,378	1,339	6,171	16,041	8,002	8,684	8,688	98,337
Third	17,299	9,000	22,559	1,382	4,952	14,307	6,938	8,740	8,972	94,129
Fourth	17,135	9,152	24,072	1,352	5,816	16,536	8,154	8,026	8,688	98,931
Latest	16,628	9,397	25,340	1,334	6,874	17,206	7,827	8,201	8,987	101,333
98:II										
First	16,995	8,778	20,958	1,283	5,025	13,755	6,825	7,431	8,907	89,935
Second	17,311	8,950	20,219	1,382	5,017	13,919	6,938	6,902	8,707	89,345
Third	16,931	8,985	21,858	1,379	4,766	14,694	6,659	6,917	9,204	90,403
Fourth	16,913	9,328	24,489	1,414	5,189	14,579	6,187	6,829	9,204	94,132
Latest	16,411	9,064	21,940	1,387	5,294	14,644	6,659	6,917	9,169	90,485
98:III										
First	16,292	9,199	21,825	1,387	5,529	13,832	6,587	7,221	9,062	90,933
Second	15,880	9,075	23,023	1,419	5,159	14,217	6,427	5,538	9,060	89,798
Third	16,913	9,328	24,489	1,414	5,189	14,579	6,187	6,829	9,204	94,132
Fourth	16,913	9,328	24,489	1,414	5,189	14,579	6,187	6,829	9,204	94,132
Latest	17,027	9,267	24,532	1,426	5,054	14,565	6,187	6,829	9,134	94,021
98:IV										
First	14,430	9,586	23,657	1,549	5,549	14,512	6,533	4,891	9,055	89,960
Second	14,951	9,861	23,508	1,460	5,305	13,737	6,292	6,332	9,307	90,733
Third	14,951	9,861	23,208	1,460	5,305	13,737	6,292	6,332	9,307	90,433
Fourth	14,951	9,861	23,208	1,460	5,305	13,737	6,292	6,332	9,307	90,433
Latest	14,963	9,745	23,508	1,457	5,239	13,802	6,292	6,332	9,186	90,563
Annual 98										
First	65,376	36,330	90,758	5,540	22,074	58,119	27,945	28,126	36,291	370,559
Second	65,410	36,653	90,129	5,580	21,652	57,914	27,658	27,456	35,762	368,213
Third	65,094	37,174	92,134	5,615	20,192	57,317	26,086	28,818	36,687	369,097
Fourth	65,913	37,669	96,258	5,620	21,499	59,431	26,819	28,016	36,403	377,627
Latest	64,029	37,473	95,321	5,623	22,460	60,257	26,975	28,279	36,475	376,893
99:I										
First	17,267	9,064	23,118	1,456	5,397	14,204	6,654	4,823	8,771	90,764
Second	17,698	9,070	22,929	1,353	5,014	13,613	6,417	6,290	9,243	91,618
Third	17,952	9,186	23,303	1,395	5,166	14,088	6,428	6,331	9,255	93,113
Fourth	18,093	9,188	23,547	1,412	5,266	14,566	6,438	6,365	9,097	93,973
Latest	18,093	9,188	23,547	1,412	5,266	14,566	6,438	6,365	9,097	93,973
99:II										
First	17,118	9,120	23,126	1,380	4,770	14,067	6,579	6,327	9,558	92,045
Second	16,924	8,999	23,587	1,502	5,241	14,631	6,459	6,380	9,479	93,202
Third	16,924	8,999	23,587	1,502	5,241	14,631	6,459	6,380	9,479	93,202
Fourth	16,925	9,038	23,923	1,519	5,387	14,790	6,529	6,426	9,310	93,848
Latest	16,925	9,038	23,923	1,519	5,387	14,790	6,529	6,426	9,310	93,848
99:III										
First	16,145	9,386	24,390	1,546	5,364	15,142	6,706	6,453	9,508	94,640
Second	16,145	9,386	24,390	1,546	5,364	15,142	6,706	6,453	9,508	94,640
Third	15,979	9,392	24,808	1,570	5,545	15,199	6,789	6,504	9,341	95,127
Fourth	15,979	9,392	24,808	1,570	5,545	15,199	6,789	6,504	9,341	95,127
Latest	15,979	9,392	24,808	1,570	5,545	15,199	6,789	6,504	9,341	95,127
99:IV										
First	14,514	9,877	25,288	1,539	5,502	15,699	7,026	6,662	9,536	95,642
Second	14,364	9,214	25,508	1,585	5,895	15,443	7,026	6,701	9,369	95,104
Third	14,364	9,214	25,508	1,585	5,895	15,443	7,026	6,701	9,369	95,104
Fourth	14,364	9,214	25,508	1,585	5,895	15,443	7,026	6,701	9,369	95,104
Latest	14,364	9,214	25,508	1,585	5,895	15,443	7,026	6,701	9,369	95,104
Annual 99										
First	65,044	37,447	95,922	5,920	21,032	59,112	26,976	24,264	37,373	373,091
Second	65,131	36,669	96,406	5,985	21,514	58,829	26,608	25,824	37,598	374,564
Third	65,219	36,790	97,207	6,052	21,848	59,571	26,702	25,916	37,442	376,547
Fourth	65,367	36,832	97,786	6,085	22,094	59,998	26,782	25,997	37,117	378,052
Latest	65,362	36,832	97,786	6,085	22,094	59,998	26,782	25,997	37,117	378,052

Note: underlined numbers are the same as the previous estimates because new estimates are not yet available

Table A.2
Percentage Change in Estimates

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
Second/First	0.0%	-1.1%	-3.0%	-0.1%	-7.3%	-1.2%	0.7%	-2.7%	0.0%	-1.8%
Third/Second	6.1%	-0.4%	-0.1%	0.3%	-0.8%	0.5%	-0.7%	-1.5%	-0.1%	0.7%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.7%	0.0%	-0.0%	1.1%	-0.0%	0.3%	0.0%	-11.6%	-0.0%	-0.9%
Latest/First	6.9%	-1.5%	-3.1%	1.3%	-8.0%	-0.4%	0.0%	-15.5%	-0.1%	-1.9%
96:II										
Second/First	-0.0%	1.6%	-2.3%	0.7%	-4.5%	-2.3%	0.7%	-2.1%	0.0%	-1.3%
Third/Second	2.1%	0.1%	1.4%	0.3%	1.8%	0.5%	-0.7%	-1.5%	-0.1%	0.7%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	2.1%	1.7%	-0.9%	1.0%	-2.7%	-1.8%	-0.0%	-3.6%	-0.1%	-0.6%
96:III										
Second/First	-1.5%	0.6%	-4.6%	0.5%	6.1%	0.5%	-0.7%	-1.6%	-0.1%	-1.5%
Third/Second	0.0%	0.0%	-0.0%	-0.0%	0.0%	0.0%	-0.0%	0.0%	0.0%	0.0%
Fourth/Third	0.2%	0.0%	0.0%	0.7%	-0.0%	0.1%	0.0%	-6.3%	-0.0%	-0.5%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-4.4%	0.6%	-4.6%	1.2%	6.1%	0.7%	-0.7%	-7.8%	-0.1%	-2.0%
96:IV										
Second/First	2.3%	-4.8%	5.8%	1.0%	-5.5%	0.5%	-0.8%	-1.5%	0.4%	0.8%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	-0.4%	1.7%	0.0%	1.2%	0.0%	0.1%	-0.0%	6.3%	0.0%	0.7%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	1.8%	-3.1%	5.8%	2.2%	-5.5%	0.7%	-0.8%	4.7%	0.4%	1.5%
Annual 96										
Second/First	-0.7%	-1.0%	-0.9%	0.5%	-2.7%	-0.6%	-0.0%	-2.0%	0.1%	-0.9%
Third/Second	2.1%	-0.1%	0.3%	0.1%	0.2%	0.3%	-0.3%	-0.7%	-0.0%	0.3%
Fourth/Third	-0.1%	0.4%	0.0%	0.5%	-0.0%	0.1%	0.0%	0.0%	-0.0%	0.1%
Latest/Fourth	0.2%	0.0%	-0.0%	0.3%	0.0%	0.1%	0.0%	-2.7%	0.0%	-0.2%
Latest/First	1.5%	-0.7%	-0.6%	1.4%	-2.4%	-0.2%	-0.4%	-5.3%	0.1%	-0.7%
97:I										
Second/First	6.4%	-3.7%	1.9%	0.5%	-3.4%	0.9%	0.0%	-2.6%	-0.5%	0.7%
Third/Second	0.0%	1.0%	0.7%	0.0%	8.6%	2.8%	0.1%	0.0%	0.0%	1.4%
Fourth/Third	-1.9%	-0.6%	-0.1%	0.6%	-1.5%	0.5%	-1.8%	-8.0%	0.0%	-1.3%
Latest/Fourth	5.4%	0.2%	0.0%	-0.3%	0.9%	-6.7%	-0.5%	0.3%	1.3%	-0.1%
Latest/First	10.0%	-3.1%	2.5%	0.8%	4.3%	-2.3%	-2.1%	-10.1%	0.8%	0.7%
97:II										
Second/First	0.0%	2.3%	0.5%	0.0%	8.0%	-1.2%	0.1%	-0.0%	-0.0%	0.8%
Third/Second	1.8%	-0.6%	-0.0%	0.7%	-1.6%	0.5%	0.5%	-6.9%	0.0%	-0.4%
Fourth/Third	-0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	0.0%	-0.0%
Latest/Fourth	-3.5%	0.5%	-0.1%	-0.3%	0.8%	-0.7%	-0.6%	0.3%	1.3%	-1.4%
Latest/First	-6.9%	2.2%	0.3%	0.7%	7.6%	-1.4%	-0.1%	-6.6%	1.3%	-1.0%
97:III										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	0.9%	2.4%	2.6%	3.1%	2.2%	0.5%	-1.6%	-9.5%	0.0%	0.3%
Fourth/Third	8.1%	0.5%	-0.4%	-0.5%	1.0%	4.7%	-1.1%	0.3%	-0.1%	2.0%
Latest/Fourth	-0.0%	0.0%	0.0%	-0.0%	0.0%	0.0%	-0.0%	0.0%	-0.0%	0.0%
Latest/First	9.1%	2.9%	2.2%	2.5%	3.2%	5.2%	-2.8%	-9.2%	-0.1%	2.3%
97:IV										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-0.1%	0.9%	-1.7%	1.8%	1.0%	0.5%	2.5%	20.2%	-0.8%	1.7%
Fourth/Third	-3.8%	0.4%	-3.6%	-0.5%	0.8%	2.7%	-2.5%	-2.4%	0.5%	-1.3%
Latest/Fourth	-0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-3.9%	1.3%	-5.2%	1.3%	1.8%	3.2%	-0.3%	17.4%	-0.3%	0.4%
Annual 97										
Second/First	1.6%	-0.4%	0.5%	0.1%	1.2%	-0.1%	0.0%	-0.6%	-0.1%	0.4%
Third/Second	0.7%	0.9%	0.4%	1.4%	2.4%	1.1%	0.4%	0.8%	-0.2%	0.8%
Fourth/Third	0.8%	0.1%	-1.1%	-0.1%	0.1%	2.0%	-1.4%	-2.6%	0.1%	-0.1%
Latest/Fourth	-1.0%	0.2%	-0.6%	-0.1%	0.4%	-1.8%	-0.3%	0.1%	0.6%	-0.4%
Latest/First	2.1%	0.8%	-0.2%	1.3%	4.2%	1.3%	-1.3%	-2.3%	0.4%	0.6%

98:I										
Second/First	-2.2%	0.0%	-3.9%	1.2%	0.0%	0.0%	0.0%	1.2%	-6.2%	-1.8%
Third/Second	0.2%	2.7%	-3.5%	3.2%	-20.1%	-10.8%	-13.3%	0.6%	3.3%	-4.3%
Fourth/Third	-0.9%	1.7%	6.7%	-2.1%	17.9%	15.6%	17.5%	-8.2%	-3.2%	5.1%
Latest/Fourth	-3.0%	2.7%	5.3%	0.1%	18.2%	4.1%	-4.0%	2.2%	3.4%	2.9%
Latest/First	-5.8%	7.2%	4.2%	2.4%	11.4%	7.3%	-2.2%	-4.5%	-3.0%	1.7%
98:II										
Second/First	1.9%	2.0%	-3.5%	7.7%	-0.2%	1.3%	1.7%	-7.1%	-2.2%	-0.7%
Third/Second	-8.0%	0.4%	8.1%	-0.2%	-5.0%	5.6%	-5.9%	0.2%	5.7%	1.2%
Fourth/Third	6.2%	3.8%	12.0%	2.5%	8.5%	-0.8%	-7.2%	-1.3%	0.0%	4.1%
Latest/Fourth	-8.9%	-2.8%	-10.4%	-1.9%	2.0%	0.4%	7.8%	1.3%	-0.4%	-3.9%
Latest/First	-9.3%	3.5%	4.7%	8.2%	5.3%	6.6%	-2.3%	-6.9%	2.9%	0.6%
98:III										
Second/First	-2.5%	-1.4%	5.5%	2.4%	-6.7%	2.8%	-2.4%	-23.3%	-0.0%	-1.3%
Third/Second	6.5%	2.8%	6.4%	-0.4%	0.6%	2.5%	-3.7%	23.3%	1.6%	4.8%
Fourth/Third	0.0%	0.0%	0.0%	-0.0%	-0.0%	0.0%	-0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.7%	-0.7%	0.2%	0.8%	-2.6%	-0.1%	0.0%	0.0%	-0.8%	-0.1%
Latest/First	4.5%	0.7%	12.4%	2.8%	-8.6%	5.3%	-6.1%	-5.4%	0.8%	3.4%
98:IV										
Second/First	3.6%	2.9%	-0.6%	-7.0%	-0.8%	-5.3%	-3.7%	29.5%	2.8%	1.3%
Third/Second	0.0%	-0.0%	-1.3%	0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%	-0.3%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.1%	-1.2%	1.3%	1.2%	-1.3%	0.8%	0.0%	0.0%	-1.3%	0.1%
Latest/First	3.7%	1.7%	-0.6%	-5.9%	-2.1%	-4.6%	-3.7%	29.4%	1.4%	1.1%
Annual 98										
Second/First	0.1%	0.9%	-0.7%	0.7%	-1.9%	-0.4%	-1.0%	-2.4%	-1.5%	-0.6%
Third/Second	-0.5%	1.4%	2.2%	0.6%	-6.7%	-1.0%	-5.7%	5.0%	2.6%	0.2%
Fourth/Third	1.3%	1.3%	4.5%	0.1%	6.5%	3.7%	2.8%	-2.8%	-0.8%	2.3%
Latest/Fourth	-2.9%	-0.5%	-1.0%	0.1%	4.5%	1.4%	0.6%	0.9%	0.2%	-0.2%
Latest/First	-2.1%	3.1%	5.0%	1.5%	1.8%	3.7%	-3.5%	0.5%	0.5%	1.7%
99:I										
Second/First	2.5%	0.1%	-0.5%	-7.1%	-7.1%	-4.2%	-3.7%	30.4%	5.4%	0.9%
Third/Second	1.4%	1.3%	1.7%	3.1%	3.0%	3.6%	0.2%	0.6%	0.1%	1.6%
Fourth/Third	0.8%	0.6%	1.0%	1.2%	1.5%	3.3%	0.2%	0.5%	-1.7%	0.9%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%
Latest/First	4.8%	1.4%	1.5%	-3.0%	-2.4%	2.5%	-3.4%	32.0%	3.7%	3.5%
99:II										
Second/First	-1.1%	-1.3%	2.0%	8.9%	9.9%	4.0%	-1.8%	0.8%	-0.8%	1.3%
Third/Second	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%
Fourth/Third	0.0%	0.4%	1.4%	1.1%	2.8%	1.3%	1.1%	0.7%	-1.8%	0.7%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-1.1%	-0.9%	3.4%	10.1%	12.9%	5.3%	-0.8%	1.6%	-2.6%	2.0%
99:III										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-1.0%	0.1%	1.7%	1.6%	3.4%	0.4%	1.2%	0.8%	-1.8%	0.5%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-1.0%	0.1%	1.7%	1.6%	3.4%	0.4%	1.2%	0.8%	-1.8%	0.5%
99:IV										
Second/First	-1.0%	-6.7%	0.9%	3.0%	7.2%	-1.6%	0.0%	0.6%	-1.8%	-0.6%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-1.0%	-6.7%	0.9%	3.0%	7.2%	-1.6%	0.0%	0.6%	-1.8%	-0.6%
Annual 99										
Second/First	0.1%	-2.1%	0.5%	1.1%	2.3%	-0.5%	-1.4%	6.4%	0.6%	0.4%
Third/Second	0.1%	0.3%	0.8%	1.1%	1.6%	0.9%	0.4%	0.4%	-0.4%	0.5%
Fourth/Third	0.2%	0.1%	0.6%	0.5%	1.1%	1.1%	0.3%	0.3%	-0.9%	0.4%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	0.5%	-1.6%	1.9%	2.8%	5.0%	1.5%	-0.7%	7.1%	-0.7%	1.3%

Table A.3
GDP At Current Prices

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
First	22,552	10,684	29,103	1,491	9,672	19,849	8,233	10,851	12,602	125,035
Second	22,552	10,233	29,122	1,505	8,965	20,539	8,366	11,208	11,073	125,563
Third	22,508	10,477	29,437	1,510	8,830	20,643	8,220	10,625	11,073	123,324
Fourth	22,508	10,477	29,437	1,510	8,830	20,643	8,220	10,625	11,073	123,324
Latest	22,586	10,479	30,099	1,647	8,830	19,825	8,220	9,828	11,073	122,587
96:II										
First	24,773	10,521	30,135	1,626	9,072	21,005	8,829	11,645	10,843	128,448
Second	24,773	10,521	30,135	1,626	9,072	21,005	8,829	11,645	10,843	128,448
Third	24,093	10,896	30,807	1,632	9,231	21,112	8,678	10,992	11,347	128,788
Fourth	24,093	10,896	30,807	1,632	9,231	21,112	8,678	10,992	11,347	128,788
Latest	24,093	10,896	30,807	1,632	9,231	21,112	8,678	10,992	11,347	128,788
96:III										
First	23,722	10,992	37,052	1,704	11,098	22,304	8,891	12,014	11,594	139,370
Second	22,307	11,726	35,916	1,714	11,692	22,412	8,735	11,376	11,553	137,429
Third	22,307	11,726	35,916	1,714	11,692	22,412	8,735	11,376	11,553	137,429
Fourth	22,653	11,727	36,017	1,791	11,692	21,973	8,735	10,800	11,553	136,940
Latest	22,653	11,727	36,017	1,791	11,692	21,973	8,735	10,800	11,553	136,940
96:IV										
First	15,166	12,147	36,780	1,726	13,144	24,604	9,468	11,973	12,368	137,576
Second	19,133	12,817	39,421	1,737	12,272	24,712	9,293	11,378	12,327	143,090
Third	19,133	12,817	39,421	1,737	12,272	24,712	9,293	11,378	12,327	143,090
Fourth	19,460	12,986	39,504	1,823	12,272	24,228	9,293	12,362	12,327	144,253
Latest	19,460	12,986	39,504	1,823	12,272	24,228	9,293	12,362	12,327	144,253
Annual 96										
First	86,212	44,344	133,070	6,547	42,986	87,762	35,420	46,482	47,607	530,429
Second	88,765	45,297	134,593	6,582	42,001	88,667	35,223	45,607	45,795	532,530
Third	88,041	45,916	135,581	6,594	42,025	88,878	34,926	44,372	46,300	532,633
Fourth	88,714	46,086	135,764	6,756	42,025	87,955	34,926	44,779	46,300	533,305
Latest	88,792	46,088	136,426	6,893	42,025	87,137	34,926	43,982	46,299	532,568
97:I										
First	25,237	11,481	32,551	1,732	10,557	23,787	9,744	12,722	12,346	140,157
Second	25,453	12,259	34,778	1,718	10,771	24,126	9,680	12,258	11,691	142,735
Third	25,310	12,399	35,102	1,719	7,907	24,936	9,485	11,969	11,934	140,761
Fourth	24,702	12,319	35,942	1,796	10,823	24,771	9,485	11,593	11,517	142,948
Latest	26,248	12,808	38,351	1,784	10,955	22,168	9,483	11,634	12,370	145,801
97:II										
First	26,926	11,630	35,840	1,851	10,968	24,771	9,875	12,661	12,954	147,476
Second	27,109	11,793	36,361	1,853	12,536	24,231	10,033	12,323	13,140	149,380
Third	27,109	11,793	36,361	1,853	12,536	24,231	10,033	12,323	13,140	149,380
Fourth	27,349	11,714	36,998	1,934	11,361	24,087	10,033	12,460	12,944	148,879
Latest	24,947	12,166	39,708	1,916	11,469	23,037	9,236	12,502	14,426	149,406
97:III										
First	24,781	16,219	41,260	1,903	13,196	26,134	10,871	12,822	13,839	161,026
Second	24,781	16,219	41,260	1,903	13,196	26,134	10,871	12,822	13,839	161,026
Third	25,735	12,824	41,156	2,023	12,140	25,997	10,871	13,577	13,721	158,044
Fourth	28,079	13,211	43,570	1,999	12,282	26,431	9,578	13,618	14,468	163,237
Latest	28,079	13,211	43,570	1,999	12,282	26,431	9,579	13,618	14,468	163,237
97:IV										
First	23,149	19,081	47,106	2,111	13,374	29,131	11,843	12,450	14,925	173,170
Second	23,149	19,081	47,106	2,111	13,374	29,131	11,843	12,450	14,925	173,170
Third	22,364	17,653	45,653	2,186	11,857	28,908	11,843	21,061	14,110	175,635
Fourth	21,736	17,377	46,549	2,133	11,974	27,946	10,234	16,607	14,698	169,252
Latest	21,736	17,377	46,549	2,133	11,974	27,946	10,234	16,607	14,698	169,252
Annual 97										
First	100,092	58,411	156,757	7,597	48,096	103,824	42,333	50,656	54,063	621,829
Second	100,492	59,352	159,506	7,585	49,877	103,623	42,428	49,854	53,595	626,311
Third	100,519	54,689	158,271	7,782	44,440	104,073	42,232	58,931	52,905	623,820
Fourth	101,866	54,621	163,059	7,862	46,440	105,234	39,329	54,277	53,627	624,316
Latest	101,009	55,562	168,178	7,832	46,679	99,582	38,531	54,360	55,962	627,695

Table A.4
Percentage Change in Estimates

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
Second/First	0.0%	-4.2%	0.1%	0.9%	-7.3%	3.5%	1.6%	3.3%	-12.1%	-1.2%
Third/Second	-0.2%	2.4%	1.1%	0.4%	-1.5%	0.5%	-1.7%	-5.2%	0.0%	-0.2%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.3%	0.0%	2.2%	9.0%	0.0%	-4.0%	0.0%	-7.5%	-0.0%	-0.6%
Latest/First	0.2%	-1.9%	3.4%	10.5%	-8.7%	-0.1%	-0.1%	-9.4%	-12.1%	-2.0%
96:II										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-2.7%	3.6%	2.2%	0.4%	1.8%	0.5%	-1.7%	-5.6%	4.7%	0.3%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-2.7%	3.6%	2.2%	0.4%	1.8%	0.5%	-1.7%	-5.6%	4.7%	0.3%
96:III										
Second/First	-6.0%	6.7%	-3.1%	0.6%	5.4%	0.5%	-1.8%	-5.3%	-0.4%	-1.4%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	1.6%	0.0%	0.3%	4.5%	0.0%	-2.0%	0.0%	-5.1%	0.0%	-0.4%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-4.5%	6.7%	-2.8%	5.1%	5.4%	-1.5%	-1.8%	-10.1%	-0.4%	-1.7%
96:IV										
Second/First	26.2%	5.5%	7.2%	0.7%	-6.6%	0.4%	-1.5%	-5.0%	-1.9%	4.0%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	1.7%	1.3%	0.2%	4.9%	0.0%	-2.0%	0.0%	8.6%	0.0%	0.8%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	28.3%	6.9%	7.4%	5.6%	-6.6%	-1.5%	-1.9%	3.2%	-1.9%	4.9%
Annual 96										
Second/First	3.0%	2.1%	1.1%	0.5%	-2.3%	1.0%	-0.6%	-1.9%	-3.8%	0.4%
Third/Second	-0.8%	1.4%	0.7%	0.2%	0.1%	0.2%	-0.8%	-2.7%	1.1%	0.0%
Fourth/Third	0.8%	0.4%	0.1%	2.5%	0.0%	-1.0%	0.0%	0.9%	0.0%	0.1%
Latest/Fourth	0.1%	0.0%	0.5%	2.0%	0.0%	-0.9%	0.0%	-1.8%	-0.0%	-0.1%
Latest/First	3.0%	3.9%	2.5%	5.3%	-2.2%	-0.7%	-1.4%	-5.4%	-2.7%	0.4%
97:I										
Second/First	0.9%	6.8%	6.8%	-0.8%	2.0%	1.4%	-0.7%	-3.6%	-5.3%	1.8%
Third/Second	-0.6%	1.1%	0.9%	0.1%	-26.6%	3.4%	-2.0%	-2.4%	2.1%	-1.4%
Fourth/Third	-2.4%	-0.0%	2.4%	4.4%	36.9%	-0.7%	0.0%	-3.1%	-3.5%	1.6%
Latest/Fourth	6.3%	4.0%	6.7%	-0.7%	1.2%	-10.5%	-0.0%	0.4%	2.4%	2.0%
Latest/First	4.0%	11.0%	17.8%	3.0%	3.8%	-6.8%	-2.7%	-8.6%	0.2%	4.0%
97:II										
Second/First	0.7%	1.4%	1.5%	0.1%	14.3%	-2.2%	1.6%	-2.7%	1.4%	1.3%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	0.9%	-0.7%	1.8%	4.4%	-9.4%	-0.6%	0.0%	1.1%	-1.5%	-0.3%
Latest/Fourth	-8.8%	3.9%	7.3%	-0.9%	0.9%	-4.4%	-7.9%	0.3%	11.5%	0.4%
Latest/First	-7.4%	4.6%	10.8%	3.5%	4.6%	-7.0%	-6.5%	-1.3%	11.4%	1.3%
97:III										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	3.9%	-20.9%	-0.3%	6.3%	-8.0%	-0.5%	0.0%	5.9%	-0.9%	-1.9%
Fourth/Third	9.1%	3.0%	5.9%	-1.2%	1.2%	1.7%	-11.9%	0.3%	5.4%	3.3%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	-0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	13.3%	-18.5%	5.6%	5.0%	-6.9%	1.1%	-11.9%	6.2%	4.6%	1.4%
97:IV										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-3.4%	-7.5%	-3.1%	3.6%	-11.3%	-0.8%	0.0%	69.2%	-3.5%	1.4%
Fourth/Third	-2.8%	-1.6%	2.0%	-2.4%	1.0%	-3.3%	-13.6%	-21.2%	4.2%	-3.6%
Latest/Fourth	-0.0%	-0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%	0.0%	-0.0%	0.0%
Latest/First	-6.1%	-8.9%	-1.2%	1.1%	-10.5%	-4.1%	-13.6%	33.4%	-1.5%	-2.3%
Annual 97										
Second/First	0.4%	1.6%	1.8%	-0.2%	3.7%	-0.2%	0.2%	-1.6%	-0.9%	0.7%
Third/Second	0.0%	-7.9%	-0.8%	2.6%	-10.9%	0.4%	-0.5%	18.2%	-1.3%	-0.4%
Fourth/Third	1.3%	-0.1%	3.0%	1.0%	4.5%	-0.8%	-6.9%	-7.9%	1.4%	0.1%
Latest/Fourth	-0.8%	1.7%	3.1%	-0.4%	0.5%	-3.5%	-2.0%	0.2%	4.4%	0.5%
Latest/First	0.9%	-4.9%	7.3%	3.1%	-2.9%	-4.1%	-9.0%	7.3%	3.5%	0.9%

October 17, 2000 Revision of Quarterly Production Accounts

98:I										
First	29,919	24,520	41,036	1,876	11,651	26,485	11,016	11,776	12,835	171,113
Second	40,801	21,374	47,339	2,147	11,651	31,475	12,398	21,319	13,690	202,195
Third	43,636	29,240	48,366	2,148	12,570	32,440	12,335	21,629	13,690	216,053
Fourth	43,689	29,240	47,960	2,148	12,570	32,972	12,335	21,629	13,690	216,232
Latest	35,923	29,190	51,934	2,127	16,918	36,572	11,806	17,793	15,392	217,655
98:II										
First	44,970	26,152	58,424	2,329	11,587	31,524	13,966	23,662	16,369	228,983
Second	49,799	29,912	52,338	2,515	12,502	32,497	13,869	24,407	18,119	235,957
Third	48,833	28,499	55,593	2,860	12,251	33,177	13,869	30,761	17,750	243,592
Fourth	40,726	30,093	49,599	2,821	11,425	32,487	11,937	16,073	19,197	214,359
Latest	38,532	32,983	50,843	2,838	13,998	41,981	12,408	17,619	21,186	232,387
98:III										
First	50,935	35,915	68,607	2,909	14,344	36,396	13,672	26,229	16,614	265,621
Second	49,039	32,823	72,954	3,091	14,105	37,639	13,409	14,620	19,240	256,919
Third	53,273	37,567	66,882	3,059	15,617	38,420	11,741	17,476	19,203	263,238
Fourth	51,217	40,096	68,150	3,059	15,617	46,629	13,411	17,476	22,354	278,008
Latest	50,831	38,640	66,097	3,085	14,997	46,602	13,411	17,476	22,324	273,463
98:IV										
First	46,930	37,470	81,734	3,432	15,172	43,690	14,027	12,422	17,672	272,548
Second	51,516	28,378	67,509	3,150	16,330	41,588	12,295	17,118	20,164	258,048
Third	51,516	28,378	67,509	3,150	16,330	41,588	12,295	17,118	20,164	258,048
Fourth	49,244	33,742	71,521	3,150	16,330	42,231	14,312	17,118	23,336	270,984
Latest	48,626	32,541	69,191	3,185	15,844	42,090	14,312	17,118	23,201	266,108
Annual 98										
First	172,754	124,057	249,801	10,546	52,754	138,095	52,681	74,088	63,489	938,265
Second	191,155	112,487	240,140	10,903	54,587	143,199	51,971	77,464	71,213	953,119
Third	197,258	123,684	238,351	11,216	56,768	145,625	50,250	86,984	70,807	980,931
Fourth	184,876	133,171	237,230	11,178	55,943	154,319	51,995	72,297	78,576	979,584
Latest	173,912	133,353	238,064	11,235	61,756	167,244	51,937	70,007	82,103	989,612
99:I										
First	56,202	31,937	81,218	3,249	15,661	45,575	15,103	13,113	18,321	280,377
Second	64,011	30,327	68,755	2,985	16,846	42,968	13,838	17,610	20,572	277,912
Third	64,104	26,091	69,279	3,057	16,035	43,278	13,652	17,115	20,561	273,172
Fourth	62,681	25,456	69,435	3,093	16,738	45,268	18,384	17,188	22,809	281,052
Latest	62,681	25,456	69,435	3,093	16,738	45,268	18,384	17,188	22,809	281,052
99:II										
First	61,343	29,710	69,895	2,360	17,039	44,468	14,414	18,829	24,770	283,028
Second	60,846	28,244	71,243	3,295	16,313	45,027	14,115	17,698	27,119	283,900
Third	57,896	26,328	67,981	3,294	16,335	45,175	16,567	17,487	26,782	277,844
Fourth	59,686	26,881	66,994	3,330	17,524	44,740	16,567	17,697	26,393	279,812
Latest	59,686	26,881	66,994	3,330	17,524	44,740	16,567	17,696	26,393	279,811
99:III										
First	55,843	27,019	73,456	3,396	16,698	46,131	15,085	17,700	24,741	280,068
Second	50,484	27,639	72,811	3,404	16,783	45,777	15,275	17,670	24,741	274,584
Third	51,066	28,722	72,549	3,444	18,233	46,185	15,275	17,804	24,305	277,583
Fourth	51,066	28,722	72,549	3,444	18,233	46,185	15,275	17,804	24,305	277,583
Latest	51,066	28,722	72,549	3,444	18,233	46,185	15,275	17,804	24,305	277,583
99:IV										
First	44,763	29,497	73,987	3,405	17,208	48,085	15,850	18,130	23,587	274,513
Second	44,612	31,579	75,827	3,503	20,922	47,434	15,850	18,188	23,180	281,095
Third	44,612	31,579	75,827	3,503	20,922	47,434	15,850	18,188	23,180	281,095
Fourth	44,612	31,579	75,827	3,503	20,922	47,434	15,850	18,188	23,180	281,095
Latest	44,612	31,579	75,827	3,503	20,922	47,434	15,850	18,188	23,180	281,095
Annual 99										
First	218,151	118,162	298,556	12,610	66,605	184,258	60,453	67,772	91,419	1,117,986
Second	219,953	117,789	288,636	13,187	70,864	181,206	59,079	71,166	95,611	1,117,490
Third	217,677	112,720	285,636	13,298	73,525	182,072	61,345	70,595	94,828	1,109,695
Fourth	218,045	112,638	284,804	13,369	73,418	183,627	66,077	70,877	96,688	1,119,542
Latest	218,045	112,637	284,805	13,369	73,418	183,627	66,076	70,877	96,687	1,119,541

Note: underlined numbers are the same as the previous estimates because new estimates are not yet available

October 17, 2000 Revision of Quarterly Production Accounts

Table A.4
Percentage Change in Estimates

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
Second/First	0.0%	-4.2%	0.1%	0.9%	-7.3%	3.5%	1.6%	3.3%	-12.1%	-1.2%
Third/Second	-0.2%	2.4%	1.1%	0.4%	-1.5%	0.5%	-1.7%	-5.2%	0.0%	-0.2%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.3%	0.0%	2.2%	9.0%	0.0%	-4.0%	0.0%	-7.5%	-0.0%	-0.6%
Latest/First	0.2%	-1.9%	3.4%	10.5%	-8.7%	-0.1%	-0.1%	-9.4%	-12.1%	-2.0%
96:II										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-2.7%	3.6%	2.2%	0.4%	1.8%	0.5%	-1.7%	-5.6%	4.7%	0.3%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-2.7%	3.6%	2.2%	0.4%	1.8%	0.5%	-1.7%	-5.6%	4.7%	0.3%
96:III										
Second/First	-6.0%	6.7%	-3.1%	0.6%	5.4%	0.5%	-1.8%	-5.3%	-0.4%	-1.4%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	1.6%	0.0%	0.3%	4.5%	0.0%	-2.0%	0.0%	-5.1%	0.0%	-0.4%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-4.5%	6.7%	-2.8%	5.1%	5.4%	-1.5%	-1.8%	-10.1%	-0.4%	-1.7%
96:IV										
Second/First	26.2%	8.5%	7.2%	0.7%	-6.6%	0.4%	-1.5%	-5.0%	-1.9%	4.0%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	1.7%	1.3%	0.2%	4.5%	0.0%	-2.0%	0.0%	8.6%	0.0%	0.8%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	28.3%	6.9%	7.4%	5.6%	-6.6%	-1.5%	-1.5%	3.2%	-1.9%	4.9%
Annual 96										
Second/First	3.0%	2.1%	1.1%	0.5%	-2.3%	1.0%	-0.6%	-1.9%	-3.8%	0.4%
Third/Second	-0.8%	1.4%	0.7%	0.2%	0.1%	0.2%	-0.8%	-2.7%	1.1%	0.0%
Fourth/Third	0.8%	0.4%	0.1%	2.5%	0.0%	-1.0%	0.0%	0.9%	0.0%	0.1%
Latest/Fourth	0.1%	0.0%	0.5%	2.0%	0.0%	-0.9%	0.0%	-1.8%	-0.0%	-0.1%
Latest/First	3.0%	3.9%	2.5%	5.3%	-2.2%	-0.7%	-1.4%	-5.4%	-2.7%	0.4%
97:I										
Second/First	0.9%	6.8%	6.8%	-0.8%	2.0%	1.4%	-0.7%	-3.6%	-5.3%	1.8%
Third/Second	-0.6%	1.1%	0.9%	0.1%	-26.6%	3.4%	-2.0%	-2.4%	2.1%	-1.4%
Fourth/Third	-2.4%	-0.0%	2.4%	4.4%	36.5%	-0.7%	0.0%	-3.1%	-3.5%	1.6%
Latest/Fourth	6.3%	4.0%	6.7%	-0.7%	1.2%	-10.5%	-0.0%	0.4%	7.4%	2.0%
Latest/First	4.0%	11.0%	17.8%	3.0%	3.8%	-6.8%	-2.7%	-8.6%	0.2%	4.0%
97:II										
Second/First	0.7%	1.4%	1.5%	0.1%	14.3%	-2.2%	1.6%	-2.7%	1.4%	1.3%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	0.9%	-0.7%	1.8%	4.4%	-9.4%	-0.6%	0.0%	1.1%	-1.5%	-0.3%
Latest/Fourth	-8.8%	3.9%	7.3%	-0.9%	0.9%	-4.4%	-7.9%	0.3%	11.5%	0.4%
Latest/First	-7.4%	4.6%	10.8%	3.5%	4.6%	-7.0%	-6.5%	-1.3%	11.4%	1.3%
97:III										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	3.9%	-20.9%	-0.3%	6.3%	-8.0%	-0.5%	0.0%	5.9%	-0.9%	-1.9%
Fourth/Third	9.1%	3.0%	5.9%	-1.2%	1.2%	1.7%	-11.9%	0.3%	5.4%	3.3%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	-0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	13.3%	-18.5%	5.6%	5.0%	-6.9%	1.1%	-11.9%	6.2%	4.6%	1.4%
97:IV										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-3.4%	-7.5%	-3.1%	3.6%	-11.3%	-0.8%	0.0%	69.2%	-3.5%	1.4%
Fourth/Third	-2.8%	-1.6%	2.0%	-2.4%	1.0%	-3.3%	-13.6%	-21.2%	4.2%	-3.6%
Latest/Fourth	-0.0%	-0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%	0.0%	-0.0%	0.0%
Latest/First	-6.1%	-8.5%	-1.2%	1.1%	-10.5%	-4.1%	-13.6%	33.4%	-1.5%	-2.3%
Annual 97										
Second/First	0.4%	1.6%	1.8%	-0.2%	3.7%	-0.2%	0.2%	-1.6%	-0.5%	0.7%
Third/Second	0.0%	-7.5%	-0.8%	2.6%	-10.5%	0.4%	-0.5%	18.2%	-1.3%	-0.4%
Fourth/Third	1.3%	-0.1%	3.0%	1.0%	4.5%	-0.8%	-6.9%	-7.9%	1.4%	0.1%
Latest/Fourth	-0.8%	1.7%	3.1%	-0.4%	0.5%	-3.5%	-2.0%	0.2%	4.4%	0.5%
Latest/First	0.9%	-4.9%	7.3%	3.1%	-2.9%	-4.1%	-9.0%	7.5%	3.5%	0.9%

98:I										
Second/First	36.4%	-12.8%	15.4%	14.5%	-0.0%	18.8%	12.5%	81.0%	6.7%	18.2%
Third/Second	8.9%	36.8%	2.2%	0.0%	7.9%	3.1%	-0.5%	1.5%	0.0%	6.9%
Fourth/Third	0.1%	0.0%	-0.8%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.1%
Latest/Fourth	-17.3%	-0.2%	8.3%	-1.0%	34.6%	10.9%	-4.3%	-17.7%	12.4%	0.7%
Latest/First	20.1%	19.0%	26.6%	13.4%	45.2%	38.1%	7.2%	51.1%	19.9%	27.2%
98:II										
Second/First	10.7%	14.4%	-10.4%	8.0%	7.9%	3.1%	-0.7%	3.1%	10.7%	3.0%
Third/Second	-1.9%	-4.7%	6.2%	13.7%	-2.0%	2.1%	0.0%	26.0%	-2.0%	3.2%
Fourth/Third	-16.6%	5.6%	-10.8%	-1.3%	-6.7%	-2.1%	-33.9%	-47.7%	8.2%	-12.0%
Latest/Fourth	-5.4%	9.6%	2.5%	0.6%	22.5%	29.2%	3.9%	9.6%	10.4%	8.4%
Latest/First	-14.3%	26.1%	-13.0%	21.8%	20.8%	33.2%	-11.2%	-25.5%	29.4%	1.5%
98:III										
Second/First	-3.7%	-8.6%	6.3%	6.3%	-1.7%	3.4%	-1.9%	-14.3%	13.8%	-5.3%
Third/Second	8.6%	14.5%	-8.3%	-1.0%	10.7%	2.1%	-12.4%	19.5%	-0.2%	2.5%
Fourth/Third	-3.9%	6.7%	1.9%	-0.0%	0.0%	21.4%	14.2%	0.0%	16.4%	5.6%
Latest/Fourth	-0.8%	-3.6%	-3.0%	0.9%	-4.0%	-0.1%	0.0%	0.0%	-0.1%	-1.6%
Latest/First	-0.2%	7.6%	-3.7%	6.1%	4.6%	28.0%	-1.9%	-33.4%	34.4%	3.0%
98:IV										
Second/First	9.8%	-24.3%	-17.4%	-8.2%	7.6%	-4.8%	-12.3%	37.8%	14.1%	-5.3%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	-4.4%	18.9%	5.9%	0.0%	0.0%	1.5%	16.4%	0.0%	15.7%	5.0%
Latest/Fourth	-1.3%	-3.6%	-3.3%	1.1%	-3.0%	-0.3%	0.0%	0.0%	-0.6%	-1.8%
Latest/First	3.6%	-13.2%	-15.3%	-7.2%	4.4%	-3.7%	2.0%	37.8%	31.3%	-2.4%
Annual 98										
Second/First	10.7%	-9.3%	-3.9%	3.4%	3.5%	3.7%	-1.3%	4.6%	12.2%	1.6%
Third/Second	3.2%	10.0%	-0.7%	2.9%	4.0%	1.7%	-3.3%	12.3%	-0.6%	2.9%
Fourth/Third	-6.3%	7.7%	-0.5%	-0.3%	-1.5%	6.0%	3.5%	-16.9%	11.0%	-0.1%
Latest/Fourth	-5.9%	0.1%	0.4%	0.5%	10.4%	8.4%	-0.1%	-3.2%	4.5%	1.0%
Latest/First	0.7%	7.5%	-4.7%	6.5%	17.1%	21.1%	-1.4%	-5.5%	29.3%	5.5%
99:I										
Second/First	13.9%	-5.0%	-15.3%	-8.1%	7.6%	-5.7%	-8.4%	34.3%	12.3%	-0.9%
Third/Second	0.1%	-14.0%	0.8%	2.4%	-4.8%	0.7%	-1.3%	-2.8%	-0.1%	-1.7%
Fourth/Third	-2.2%	-2.4%	0.2%	1.2%	4.4%	4.6%	34.7%	0.4%	10.9%	2.9%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	11.5%	-20.3%	-14.5%	-4.8%	6.9%	-0.7%	21.7%	31.1%	24.5%	0.2%
99:II										
Second/First	-0.8%	-4.9%	1.9%	28.7%	-4.3%	1.3%	-2.1%	-6.0%	9.5%	0.3%
Third/Second	-4.8%	-6.8%	-4.6%	-0.0%	0.1%	0.3%	17.4%	-1.2%	-1.2%	-2.1%
Fourth/Third	3.1%	2.1%	-1.5%	1.1%	7.3%	-1.0%	0.0%	1.2%	-1.5%	0.7%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-2.7%	-9.5%	-4.2%	30.1%	2.8%	0.6%	14.9%	-6.0%	6.6%	-1.1%
99:III										
Second/First	-9.6%	2.3%	-0.9%	0.2%	0.5%	-0.8%	1.3%	-0.2%	0.0%	-2.0%
Third/Second	1.2%	3.9%	-0.4%	1.2%	8.6%	0.9%	0.0%	0.8%	-1.8%	1.1%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-8.6%	6.3%	-1.2%	1.4%	9.2%	0.1%	1.3%	0.6%	-1.8%	-0.9%
99:IV										
Second/First	-0.3%	7.1%	2.5%	2.9%	21.6%	-1.4%	0.0%	0.3%	-1.7%	2.4%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-0.3%	7.1%	2.5%	2.9%	21.6%	-1.4%	0.0%	0.3%	-1.7%	2.4%
Annual 99										
Second/First	0.8%	-0.3%	-3.3%	4.6%	6.4%	-1.7%	-2.3%	5.0%	4.6%	-0.0%
Third/Second	-1.0%	-4.3%	-1.0%	0.8%	0.9%	0.5%	3.8%	-0.8%	-0.8%	-0.7%
Fourth/Third	0.2%	-0.1%	-0.3%	0.5%	2.6%	0.9%	7.7%	0.4%	2.0%	0.9%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-0.0%	-4.7%	-4.6%	6.0%	10.2%	-0.3%	9.3%	4.0%	5.8%	0.1%

October 17, 2000 Revision of Quarterly Production Accounts

98:I										
Second/First	36.4%	-12.8%	15.4%	14.5%	-0.0%	18.8%	12.5%	81.0%	6.7%	18.2%
Third/Second	6.9%	36.8%	2.2%	0.0%	7.9%	3.1%	-0.5%	1.5%	0.0%	6.9%
Fourth/Third	0.1%	0.0%	-0.8%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.1%
Latest/Fourth	-17.3%	-0.2%	8.3%	-1.0%	34.6%	10.9%	-4.3%	-17.7%	12.4%	0.7%
Latest/First	20.1%	19.0%	26.6%	13.4%	45.2%	38.1%	7.2%	51.1%	19.9%	27.2%
98:II										
Second/First	10.7%	14.4%	-10.4%	8.0%	7.9%	3.1%	-0.7%	3.1%	10.7%	3.0%
Third/Second	-1.9%	-4.7%	6.2%	13.7%	-2.0%	2.1%	0.0%	26.0%	-2.0%	3.2%
Fourth/Third	-16.6%	5.6%	-10.8%	-1.3%	-6.7%	-2.1%	-13.9%	-47.7%	8.2%	-12.0%
Latest/Fourth	-5.4%	9.6%	2.5%	0.6%	22.5%	29.2%	3.9%	9.6%	10.4%	8.4%
Latest/First	-14.3%	26.1%	-13.0%	21.8%	20.8%	33.2%	-11.2%	-25.5%	29.4%	1.5%
98:III										
Second/First	-3.7%	-8.6%	6.3%	6.3%	-1.7%	3.4%	-1.9%	-14.3%	15.8%	-3.3%
Third/Second	8.6%	14.5%	-8.3%	-1.0%	10.7%	2.1%	-12.4%	19.5%	-0.2%	2.3%
Fourth/Third	-3.9%	6.7%	1.9%	-0.0%	0.0%	21.4%	14.2%	0.0%	16.4%	5.6%
Latest/Fourth	-0.8%	-3.6%	-3.0%	0.9%	-4.0%	-0.1%	0.0%	0.0%	-0.1%	-1.6%
Latest/First	-0.2%	7.6%	-3.7%	6.1%	4.6%	28.0%	-1.9%	-33.4%	34.4%	3.0%
98:IV										
Second/First	9.8%	-24.3%	-17.4%	-8.2%	7.6%	-4.8%	-12.3%	37.8%	14.1%	-5.3%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	-4.4%	18.9%	5.9%	0.0%	0.0%	1.5%	16.4%	0.0%	15.7%	5.0%
Latest/Fourth	-1.3%	-3.6%	-3.3%	3.1%	-3.0%	-0.3%	0.0%	0.0%	-0.6%	-1.8%
Latest/First	3.6%	-13.2%	-15.3%	-7.2%	4.4%	-3.7%	2.0%	37.8%	31.3%	-2.4%
Annual 98										
Second/First	10.7%	-9.3%	-3.9%	3.4%	3.5%	3.7%	-1.3%	4.6%	12.2%	1.6%
Third/Second	3.2%	10.0%	-0.7%	2.5%	4.0%	1.7%	-3.3%	12.3%	-0.6%	2.9%
Fourth/Third	-6.3%	7.7%	-0.5%	-0.3%	-1.5%	6.0%	3.5%	-16.9%	11.0%	-0.1%
Latest/Fourth	-5.9%	0.1%	0.4%	0.5%	10.4%	8.4%	-0.1%	-3.2%	4.5%	1.0%
Latest/First	0.7%	7.5%	-4.7%	6.5%	17.1%	21.1%	-1.4%	-5.5%	29.3%	5.5%
99:I										
Second/First	13.9%	-5.0%	-15.3%	-8.1%	7.6%	-5.7%	-8.4%	34.3%	12.3%	-0.9%
Third/Second	0.1%	-14.0%	0.8%	2.4%	-4.8%	0.7%	-1.3%	-2.8%	-0.1%	-1.7%
Fourth/Third	-2.2%	-2.4%	0.2%	1.2%	4.4%	4.6%	34.7%	0.4%	10.9%	2.9%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	11.5%	-20.3%	-14.5%	-4.8%	6.9%	-0.7%	21.7%	31.1%	24.5%	0.2%
99:II										
Second/First	-0.8%	-4.9%	1.9%	28.7%	-4.3%	1.3%	-2.1%	-6.0%	9.5%	0.3%
Third/Second	-4.8%	-6.8%	-4.6%	-0.0%	0.1%	0.3%	17.4%	-1.2%	-1.2%	-2.1%
Fourth/Third	3.1%	2.1%	-1.5%	1.1%	7.3%	-1.0%	0.0%	1.2%	-1.5%	0.7%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-2.7%	-9.5%	-4.2%	30.1%	2.8%	0.6%	14.9%	-6.0%	6.6%	-1.1%
99:III										
Second/First	-9.6%	2.3%	-0.9%	0.2%	0.5%	-0.8%	1.3%	-0.2%	0.0%	-2.0%
Third/Second	1.2%	3.9%	-0.4%	1.2%	8.6%	0.9%	0.0%	0.8%	-1.8%	1.1%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-8.6%	6.3%	-1.2%	1.4%	9.2%	0.1%	1.3%	0.6%	-1.8%	-0.9%
99:IV										
Second/First	-0.3%	7.1%	2.5%	2.9%	21.6%	-1.4%	0.0%	0.3%	-1.7%	2.4%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-0.3%	7.1%	2.5%	2.9%	21.6%	-1.4%	0.0%	0.3%	-1.7%	2.4%
Annual 99										
Second/First	0.8%	-0.3%	-3.3%	4.6%	6.4%	-1.7%	-2.3%	5.0%	4.6%	-0.0%
Third/Second	-1.0%	-4.3%	-1.0%	0.8%	0.9%	0.5%	3.8%	-0.8%	-0.8%	-0.7%
Fourth/Third	0.2%	-0.1%	-0.3%	0.5%	2.6%	0.9%	7.7%	0.4%	2.0%	0.9%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-0.0%	-4.7%	-4.6%	6.0%	10.2%	-0.5%	9.3%	4.0%	5.8%	0.1%

Table A.5
GDP Deflator

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
First	143	116	125	134	119	120	112	118	140	126
Second	145	112	129	135	119	126	113	125	123	126
Third	136	116	130	135	118	126	112	120	123	125
Fourth	136	116	130	135	118	126	112	120	123	125
Latest	135	116	133	146	118	120	112	126	123	126
96:II										
First	146	117	128	137	117	123	122	121	119	127
Second	146	115	131	136	122	126	122	123	119	128
Third	139	119	132	136	122	126	120	118	125	128
Fourth	139	119	132	136	122	126	120	118	125	128
Latest	139	119	132	136	122	126	120	118	125	128
96:III										
First	141	115	131	137	126	127	119	124	126	128
Second	138	122	133	137	125	127	118	119	126	128
Third	138	122	133	137	125	127	118	119	126	128
Fourth	140	122	134	142	125	125	118	121	126	129
Latest	140	122	134	142	125	125	118	121	126	129
96:IV										
First	113	119	132	137	146	133	122	121	135	128
Second	140	132	134	137	144	133	120	117	132	133
Third	140	132	134	137	144	133	120	117	132	133
Fourth	143	131	134	142	144	130	120	120	132	133
Latest	143	131	134	142	144	130	120	120	132	133
Annual 96										
First	137	117	129	136	127	126	119	121	130	127
Second	142	120	132	136	128	128	118	121	125	129
Third	138	122	133	136	128	128	118	119	126	129
Fourth	139	122	133	139	128	127	118	120	126	129
Latest	139	122	133	141	128	125	118	121	126	129
97:I										
First	160	119	133	138	124	134	121	130	133	134
Second	152	131	139	137	131	135	120	129	126	136
Third	151	132	140	137	89	136	118	126	129	132
Fourth	150	132	143	142	123	134	120	132	124	136
Latest	151	137	153	141	124	129	120	132	132	139
97:II										
First	155	124	139	137	135	138	127	129	140	138
Second	156	123	140	137	143	137	129	125	142	139
Third	153	124	140	136	145	136	128	134	142	139
Fourth	154	123	142	142	131	135	128	136	140	139
Latest	154	127	153	141	132	130	119	136	153	141
97:III										
First	153	171	149	138	149	143	134	127	145	147
Second	153	171	149	138	149	143	134	127	145	147
Third	157	132	145	143	134	141	136	148	144	144
Fourth	159	135	154	142	134	137	121	148	152	145
Latest	159	135	154	142	134	137	121	148	152	145
97:IV										
First	168	197	158	148	158	155	144	129	155	158
Second	168	197	158	148	158	155	144	129	155	158
Third	163	180	155	151	139	154	141	181	148	158
Fourth	165	177	164	148	139	145	125	146	153	154
Latest	165	177	164	148	139	145	125	146	153	154
Annual 97										
First	159	153	145	140	142	143	132	128	143	144
Second	157	156	147	140	145	143	132	127	142	145
Third	156	142	145	142	126	142	131	149	141	143
Fourth	156	142	151	143	132	138	123	141	142	144
Latest	157	144	156	143	132	135	121	141	148	145

October 17, 2000 Revision of Quarterly Production Accounts

98:I										
First	189	280	169	142	189	165	138	137	139	171
Second	236	244	202	160	189	196	155	246	158	206
Third	252	325	214	155	255	227	178	247	153	230
Fourth	255	320	199	159	216	199	151	269	158	219
Latest	216	311	205	157	246	213	151	217	171	214
98:II										
First	265	298	279	182	231	230	205	318	184	255
Second	288	334	259	182	249	233	200	354	208	264
Third	307	317	254	207	257	226	208	445	193	269
Fourth	241	323	203	200	220	223	193	235	209	228
Latest	250	364	232	205	264	287	186	255	231	257
98:III										
First	315	390	314	210	259	263	208	363	183	292
Second	309	362	317	218	273	265	209	261	212	286
Third	315	403	273	216	301	264	190	256	209	280
Fourth	303	430	278	216	301	320	217	256	243	295
Latest	299	417	269	216	297	320	217	256	244	291
98:IV										
First	325	391	345	222	284	301	215	254	195	304
Second	345	288	287	219	308	303	195	270	217	284
Third	345	288	291	219	308	303	195	270	217	285
Fourth	329	342	308	219	303	307	227	270	251	300
Latest	325	334	294	219	302	304	227	270	253	294
Annual 98										
First	264	341	275	190	239	238	189	263	175	253
Second	292	307	266	195	252	247	188	282	199	259
Third	303	333	259	200	281	254	193	302	193	266
Fourth	280	354	246	199	260	260	194	258	216	259
Latest	272	356	250	200	275	278	193	248	228	263
99:I										
First	323	352	351	223	290	321	227	272	209	309
Second	362	334	300	221	326	316	216	280	223	303
Third	357	284	297	219	310	307	212	270	222	293
Fourth	346	277	295	219	318	311	286	270	251	299
Latest	346	277	295	219	318	311	286	270	251	299
99:II										
First	358	326	302	186	357	316	219	298	259	307
Second	360	314	302	219	311	308	219	277	286	305
Third	342	293	288	219	312	309	256	274	283	298
Fourth	353	297	280	219	325	303	254	275	283	298
Latest	353	297	280	219	325	303	254	275	283	298
99:III										
First	346	288	301	220	331	305	225	274	260	296
Second	313	294	299	220	313	302	228	274	260	290
Third	320	306	292	219	329	304	225	274	260	292
Fourth	320	306	292	219	329	304	225	274	260	292
Latest	320	306	292	219	329	304	225	274	260	292
99:IV										
First	308	299	293	221	313	306	226	272	247	287
Second	311	343	297	221	355	307	226	271	247	296
Third	311	343	297	221	355	307	226	271	247	296
Fourth	311	343	297	221	355	307	226	271	247	296
Latest	311	343	297	221	355	307	226	271	247	296
Annual 99										
First	335	316	311	213	317	312	224	279	245	300
Second	338	321	299	220	329	308	222	276	254	298
Third	334	306	294	220	327	307	230	272	253	295
Fourth	334	306	291	220	332	306	247	273	260	296
Latest	334	306	291	220	332	306	247	273	260	296

Note: underlined numbers are the same as the previous estimates because new estimates are not yet available

October 17, 2000 Revision of Quarterly Production Accounts

Table A.6
Percentage Change in Estimates

	Agriculture	Mining	Industry	EGW	Construction	Trade	Transport	Finance	Services	GDP
96:I										
Second/First	0.0%	-3.2%	3.2%	1.0%	-0.0%	4.7%	0.9%	6.2%	-12.1%	0.6%
Third/Second	-5.9%	2.8%	1.2%	0.1%	-0.7%	-0.0%	-1.1%	-3.8%	0.1%	-0.5%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	-0.4%	-0.0%	2.2%	7.8%	0.0%	-4.3%	-0.0%	4.6%	-0.0%	0.3%
Latest/First	-6.3%	-0.4%	6.8%	9.1%	-0.7%	0.3%	-0.2%	6.9%	-12.1%	-0.0%
96:II										
Second/First	0.0%	-1.6%	2.3%	-0.7%	4.7%	2.4%	-0.7%	2.1%	0.0%	1.3%
Third/Second	-4.8%	3.5%	0.8%	0.1%	-0.1%	-0.0%	-1.0%	-4.1%	4.7%	-0.4%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-4.8%	1.9%	3.2%	-0.6%	4.6%	2.4%	-1.7%	-2.1%	4.7%	0.8%
96:III										
Second/First	-1.5%	6.1%	1.7%	0.1%	-0.7%	-0.1%	-1.1%	-3.3%	-0.3%	0.1%
Third/Second	-0.0%	-0.0%	0.0%	0.0%	-0.0%	-0.0%	0.0%	-0.0%	-0.0%	-0.0%
Fourth/Third	1.4%	0.0%	0.3%	3.7%	0.0%	-2.1%	-0.0%	1.3%	0.0%	0.2%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-0.1%	6.1%	1.9%	3.8%	-0.7%	-2.2%	-1.1%	-2.5%	-0.3%	0.2%
96:IV										
Second/First	23.4%	10.8%	1.3%	-0.3%	-1.2%	-0.1%	-1.1%	-3.5%	-2.3%	3.2%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fourth/Third	2.1%	-0.4%	0.2%	3.7%	0.0%	-2.1%	0.0%	2.2%	-0.0%	0.1%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	26.0%	10.4%	1.5%	3.3%	-1.2%	-2.2%	-1.1%	-1.4%	-2.3%	3.3%
Annual 96										
Second/First	3.7%	3.2%	2.1%	-0.0%	0.4%	1.6%	-0.5%	0.1%	-3.9%	1.3%
Third/Second	-2.9%	1.5%	0.5%	0.1%	-0.2%	-0.0%	-0.5%	-2.0%	1.1%	-0.3%
Fourth/Third	0.8%	-0.1%	0.1%	2.0%	0.0%	-1.1%	-0.0%	0.9%	0.0%	0.1%
Latest/Fourth	-0.1%	-0.0%	0.5%	1.8%	0.0%	-1.0%	-0.0%	1.0%	-0.0%	0.1%
Latest/First	1.5%	4.6%	3.2%	3.8%	0.2%	-0.5%	-1.0%	-0.0%	-2.8%	1.1%
97:I										
Second/First	-5.2%	10.8%	4.0%	-1.3%	5.6%	0.6%	-0.7%	-1.1%	-4.8%	1.2%
Third/Second	-0.6%	0.2%	0.2%	0.1%	-32.4%	0.5%	-2.1%	-2.4%	2.1%	-2.8%
Fourth/Third	-0.5%	-0.1%	2.5%	3.8%	38.5%	-1.1%	1.8%	5.3%	-3.5%	2.8%
Latest/Fourth	0.8%	3.8%	6.7%	-0.4%	0.3%	-4.0%	0.4%	0.0%	6.0%	2.1%
Latest/First	-5.4%	15.2%	14.9%	2.1%	-0.5%	-4.1%	-0.6%	1.7%	-0.6%	3.3%
97:II										
Second/First	0.7%	-0.9%	1.0%	0.1%	5.2%	-1.0%	1.5%	-2.7%	1.4%	0.5%
Third/Second	-1.8%	0.6%	0.0%	-0.7%	1.7%	-0.5%	-0.5%	7.4%	0.0%	0.4%
Fourth/Third	0.9%	-0.7%	1.7%	4.4%	-9.4%	-0.6%	0.0%	1.1%	-1.5%	-0.3%
Latest/Fourth	-0.3%	3.4%	7.5%	-0.9%	0.2%	-3.7%	-7.4%	0.0%	10.0%	1.7%
Latest/First	-0.5%	2.4%	10.4%	2.9%	-2.9%	-5.7%	-6.4%	5.7%	9.9%	2.3%
97:III										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	2.9%	-22.8%	-2.8%	3.2%	-10.0%	-1.0%	1.7%	17.1%	-0.9%	-2.1%
Fourth/Third	0.9%	2.5%	6.3%	-0.6%	0.2%	-2.9%	-10.9%	-0.0%	5.5%	1.3%
Latest/Fourth	0.0%	-0.0%	-0.0%	0.0%	-0.0%	-0.0%	0.0%	-0.0%	0.0%	-0.0%
Latest/First	3.8%	-20.9%	3.3%	2.5%	-9.8%	-3.9%	-9.4%	17.0%	4.6%	-0.9%
97:IV										
Second/First	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Third/Second	-3.3%	-8.3%	-1.4%	1.8%	-12.2%	-1.2%	-2.4%	40.7%	-4.7%	-0.3%
Fourth/Third	1.1%	-2.0%	5.7%	-2.0%	0.2%	-5.9%	-11.4%	-19.2%	3.6%	-2.4%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	-0.0%	0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-2.3%	-10.1%	4.2%	-0.2%	-12.1%	-7.0%	-13.5%	13.6%	-1.3%	-2.7%
Annual 97										
Second/First	-1.2%	2.0%	1.2%	-0.3%	2.5%	-0.1%	0.2%	-1.0%	-0.7%	0.4%
Third/Second	-0.7%	-8.7%	-1.1%	1.1%	-13.0%	-0.6%	-0.8%	17.3%	-1.1%	-1.1%
Fourth/Third	0.6%	-0.2%	4.2%	1.2%	4.4%	-2.8%	-5.6%	-5.5%	1.3%	0.2%
Latest/Fourth	0.1%	1.6%	3.2%	-0.3%	0.1%	-1.7%	-1.8%	0.0%	3.7%	0.9%
Latest/First	-1.2%	-5.6%	7.5%	1.7%	-6.9%	-5.1%	-7.8%	9.8%	3.1%	0.3%

October 17, 2000 Revision of Quarterly Production Accounts

98:I										
Second/First	39.5%	-12.8%	20.0%	13.1%	-0.0%	18.8%	12.5%	78.9%	13.8%	20.3%
Third/Second	6.8%	33.3%	5.9%	-3.1%	35.0%	15.6%	14.7%	0.8%	-3.2%	11.6%
Fourth/Third	1.1%	-1.7%	-7.1%	2.2%	-15.2%	-12.3%	-14.9%	8.9%	3.3%	-4.8%
Latest/Fourth	-15.3%	-2.8%	2.5%	-1.1%	13.5%	6.6%	-0.3%	-19.5%	8.7%	-2.2%
Latest/First	27.5%	11.1%	21.4%	10.8%	30.4%	28.7%	9.6%	58.1%	23.7%	25.1%
98:II										
Second/First	8.7%	12.2%	-7.1%	0.2%	8.1%	1.7%	-2.3%	11.1%	13.2%	3.7%
Third/Second	6.6%	-5.1%	-1.7%	13.9%	3.2%	-3.3%	4.0%	25.8%	-7.3%	2.0%
Fourth/Third	-21.4%	1.7%	-20.4%	-3.8%	-14.3%	-1.3%	-7.2%	-47.1%	8.1%	-15.5%
Latest/Fourth	3.8%	12.8%	14.4%	2.5%	20.1%	28.6%	-3.6%	8.2%	10.8%	12.8%
Latest/First	-5.5%	22.1%	-16.9%	12.6%	14.7%	24.9%	-9.1%	-20.0%	25.7%	0.9%
98:III										
Second/First	-1.2%	-7.4%	0.8%	3.8%	5.4%	0.6%	0.5%	-27.3%	15.8%	-2.1%
Third/Second	2.0%	11.3%	-13.8%	-0.7%	10.1%	-0.5%	-9.0%	-3.1%	-1.8%	-2.3%
Fourth/Third	-3.9%	6.7%	1.9%	0.0%	0.0%	21.4%	14.2%	-0.0%	16.4%	5.6%
Latest/Fourth	-1.4%	-3.0%	-3.2%	0.0%	-1.4%	0.0%	0.0%	0.0%	0.6%	-1.5%
Latest/First	-4.5%	6.8%	-14.3%	3.2%	14.4%	21.6%	4.4%	-29.5%	33.3%	-0.4%
98:IV										
Second/First	5.9%	-26.4%	-16.9%	-1.3%	8.5%	0.6%	-9.0%	6.5%	11.0%	-6.5%
Third/Second	-0.0%	0.0%	1.3%	0.0%	-0.0%	0.0%	-0.0%	0.0%	0.0%	0.3%
Fourth/Third	-4.4%	18.9%	5.9%	0.0%	0.0%	1.5%	16.4%	0.0%	15.7%	5.0%
Latest/Fourth	-1.3%	-2.4%	-4.3%	-0.0%	-1.7%	-1.1%	0.0%	0.0%	0.7%	-1.9%
Latest/First	-0.1%	-14.6%	-14.8%	-1.3%	6.6%	1.0%	5.9%	6.5%	29.4%	-3.4%
Annual 98										
Second/First	10.6%	-10.1%	-3.2%	2.7%	5.5%	4.1%	-0.3%	7.1%	13.8%	2.2%
Third/Second	3.7%	8.4%	-2.9%	2.2%	11.5%	2.8%	2.5%	7.0%	-3.1%	2.7%
Fourth/Third	-7.4%	6.3%	-4.8%	-0.4%	-7.4%	2.2%	0.7%	-14.5%	11.8%	-2.4%
Latest/Fourth	-3.2%	0.7%	1.3%	0.5%	5.7%	6.9%	-0.7%	-4.1%	4.3%	1.2%
Latest/First	2.8%	4.2%	-9.3%	5.0%	15.0%	16.8%	2.1%	-6.0%	28.7%	3.7%
99:I										
Second/First	11.1%	-5.1%	-14.6%	-1.1%	15.8%	-1.6%	-4.8%	3.0%	6.5%	-1.8%
Third/Second	-1.3%	-15.1%	-0.9%	-0.7%	-7.6%	-2.7%	-1.5%	-3.4%	-0.2%	-3.3%
Fourth/Third	-3.0%	-2.5%	-0.8%	-0.0%	2.4%	1.2%	34.4%	-0.1%	12.8%	1.9%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	6.4%	-21.4%	-16.1%	-1.8%	9.5%	-3.1%	26.0%	-0.7%	20.0%	-3.2%
99:II										
Second/First	0.3%	-3.7%	-0.1%	18.2%	-12.9%	-2.6%	-0.3%	-6.8%	10.4%	-0.9%
Third/Second	-4.8%	-6.8%	-4.6%	-0.0%	0.1%	0.3%	17.4%	-1.2%	-1.2%	-2.1%
Fourth/Third	3.1%	1.7%	-2.8%	-0.0%	4.4%	-2.0%	-1.1%	0.5%	0.3%	0.0%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-1.6%	-8.7%	-7.3%	18.2%	-8.9%	-4.3%	15.8%	-7.5%	9.4%	-3.0%
99:III										
Second/First	-9.6%	2.3%	-0.9%	0.2%	0.3%	-0.8%	1.3%	-0.2%	0.0%	-2.0%
Third/Second	2.2%	3.9%	-2.0%	-0.4%	5.1%	0.5%	-1.2%	-0.0%	-0.0%	0.6%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	-7.6%	6.2%	-2.9%	-0.1%	5.6%	-0.3%	0.0%	-0.2%	-0.0%	-1.4%
99:IV										
Second/First	0.7%	14.8%	1.6%	-0.1%	15.5%	0.3%	0.0%	-0.3%	0.0%	3.0%
Third/Second	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%
Fourth/Third	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/Fourth	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latest/First	0.7%	14.8%	1.6%	-0.1%	15.5%	0.3%	0.0%	-0.3%	0.0%	3.0%
Annual 99										
Second/First	0.7%	1.8%	-3.8%	3.4%	4.0%	-1.2%	-0.9%	-1.3%	1.0%	-0.4%
Third/Second	-1.2%	-4.6%	-1.9%	-0.3%	-0.6%	-0.4%	3.5%	-1.2%	-0.4%	-1.2%
Fourth/Third	-0.0%	-0.2%	-0.0%	-0.0%	1.5%	-0.2%	7.4%	0.1%	2.9%	0.5%
Latest/Fourth	0.0%	-0.0%	0.0%	0.0%	0.0%	0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Latest/First	-0.5%	-3.1%	-6.4%	3.2%	4.9%	-1.8%	10.1%	-2.4%	6.5%	-1.2%

NATIONAL ACCOUNTS AND PROMPT INDICATORS : PROGRESS AND FUTURE PRIORITIES

Report # 19

by
Frank de Leeuw

February, 2001

Statistical Assistance to the Government of Indonesia (STAT) Project
USAID Contract No. PCE-I-00-99-00009-00

EXECUTIVE SUMMARY

This report covers a 3 1/2 week visit, from January 18 through February 9, 2001, devoted to national accounts and economic indicators. It follows an earlier visit covering the same topics that took place in July 2000.

Activity to improve the national accounts and current indicators is taking place on several fronts. Perhaps the most important is a draft paper now being circulated inside BPS documenting the sources and methods used to produce quarterly national accounts. In the area of industrial production, a monthly survey of industrial establishments, designed to produce more prompt measurement than the quarterly survey, has been tested and is being conducted regularly. Seasonal adjustment of the accounts is now used widely to assess the plausibility of results, although seasonally adjusted results have not yet been published. The quarterly expenditure accounts are now prepared with the aid of a supply and use table covering 33 industries, potentially a valuable aid in improving estimates of household consumption. Two conceptual issues in compiling the accounts, the treatment of imputed banking services and the treatment of taxes on production, are scheduled for review and improvement in the near future. Finally, in the area of business tendency surveys, there has been discussion of developing a single survey instrument instead of the two surveys now conducted by BPS and Bank Indonesia (BI).

These activities are not in need of any change in direction or resources; under present plans they will continue to move ahead. However, the report recommends that consideration be given as well to several other activities that would require new initiative and resources.

The first of these activities is attempting to estimate inventory investment (changes in stocks) directly rather than as a residual. The three sources of information that could be used are: (1) physical units of inventories for agricultural products, petroleum, and some other minerals; (2) book values of inventories on the balance sheets of public corporations; and (3) responses on business tendency surveys to a question about whether inventories are increasing, decreasing, or staying the same.

A second major new proposed activity is trying a new approach to developing price indexes for foreign trade through the use of unit values of exports and imports. Past efforts have become mired in the complex problems of eliminating unusable observations due to radical changes in composition or quality; the report proposes a method of largely eliminating the influence of these outlying observations that is much simpler than past methods, but has not yet been tested.

A third proposed activity is using physical production data to expand the index of industrial production to include mining, petroleum, and electricity–industries included in such indexes in other countries-- as well as non-oil manufacturing.

Finally, the report notes the potential usefulness of value added tax return data in estimating current national accounts. Individual tax return data are of course confidential; but totals by industry, size class, or area could provide valuable indicators. The Department of Finance has data development plans that would make such aggregates available. BPS needs to stay informed about data availability and make plans to utilize value added estimates based on value added tax returns.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 62

I. INTRODUCTION 64

II. PRODUCTION ACCOUNT AND INDUSTRIAL PRODUCTION 65

- **A. Industrial Production** 65
  - **1. Monthly Survey** 65
  - **2. Physical Production Data** 65
- **B. Value Added Tax (VAT) Data** 66
- **C. Building Permits** 67
- **D. The Banking Sector** 68
- **E. Taxes on Production** 70
- **F. Base Year for Constant Price Estimates** 70

III. EXPENDITURE ACCOUNT 71

- **A. Quarterly Commodity Flow Tables** 71
- **B. Inventory Investment** 72
  - **1. Physical Units** 72
  - **2. Book values** 73
  - **3. Business Tendency Surveys** 74
- **C. Foreign Trade in Services** 75
- **D. Deflation** 76
  - **1. Government Expenditure** 76
  - **2. Foreign Trade** 76

IV. PRESENTATION AND ADJUSTMENT OF NATIONAL ACCOUNTS 79

- **A. Documentation** 79
- **B. Advance Release Schedule** 79
- **C. Seasonal Adjustment and Benchmarking** 79

V. REGIONAL ACCOUNTS 80

VI. PROMPT INDICATORS 80

VII. SUGGESTED PRIORITIES 81

APPENDIX A VALUE ADDED TAX DECLARATION FORM 83

APPENDIX B VALUE ADDED OF BANKING SECTOR 86

I. INTRODUCTION

This report covers a 3 1/2 week visit, from January 18 through February 9, 2001, devoted to national accounts and economic indicators. It follows an earlier visit covering the same topics that took place in July 2000.

The many activities investigated during the present visit are discussed in this report under five headings: Production Account and Industrial Production; Expenditure Account; Presentation and Adjustment of National Accounts; Regional Accounts; and Prompt Indicators. The concluding section of the report suggests some priorities for work during the coming year.

The overall picture emerging from the present visit is one of activity to improve the national accounts and current indicators on several fronts. Perhaps the most important is a draft paper now being circulated inside BPS documenting the sources and methods used to produce quarterly national accounts.[1] The release of the quarterly accounts, furthermore, now adheres to a fixed schedule known by most users. Seasonal adjustment of the accounts is now used widely to assess the plausibility of results, although seasonally adjusted results have not yet been published. Two conceptual issues in compiling the accounts, the treatment of imputed banking services and the treatment of taxes on production, are scheduled for review and improvement in the near future. BPS staff members are scheduled to receive training in implementing the updated version of national accounts concepts published in 1993.[2]

In the area of industrial production, a monthly survey of industrial establishments, designed to produce more prompt measurement than the quarterly survey, has been tested and is being conducted regularly. Finally, in the area of business tendency surveys, there has been discussion of developing a single survey instrument instead of the two surveys now conducted by BPS and Bank Indonesia (BI). In all these activities, participation by many BPS staff members has been essential.

Of course, these activities do not cover all of the areas of possible improvement in Indonesia's system of national accounts and economic indicators. They do not, for example, cover the problems of measuring inventory investment or price indexes for foreign trade. The concluding section of the report suggests some additional steps that would help to improve these and some other areas.

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1 Yahya Jammal, "Quarterly National Accounts in Indonesia: Current Sources and Methods (Draft)," February 2001. The document was prepared in close collaboration with many BPS staff members who compile the quarterly accounts.

2 System of National Accounts 1993 issued by the European Union, the International Monetary Fund, the Organization for Economic Cooperation and Development, the United Nations, and the World Bank.

II. PRODUCTION ACCOUNT AND INDUSTRIAL PRODUCTION

A. Industrial Production

1. Monthly Survey

Surveys of industrial establishments are the principal source of measuring the industrial sector of the GDP production account. A methodology introduced in 1992 calls for quarterly sample surveys and annual complete censuses of medium and large manufacturing establishments (excluding petroleum refining).[3] Late reporting has been a persistent problem with the survey, causing occasional substantial revisions of the preliminary production account estimates. This problem, plus the recommendation in the "Statistical Data Dissemination Standards" of the International Monetary Fund that industrial production be measured monthly rather than quarterly, has led to recent experimentation with a monthly survey of a relatively small sample of 195 establishments.[4]

The monthly survey was applied nationwide in January 2000. The results of the survey since then indicate that (1) estimates of production seem to be plausible in comparison with electricity sales, the most readily available other indicator of monthly industrial activity; (2) an aggressive policy for following up non-respondents is necessary in order to obtain an acceptable response rate. It seems probable that the survey will make an important contribution to improving the preliminary quarterly estimates of GDP, as well as improving the frequency and timeliness of the index of industrial production

2. Physical Production Data

A little used body of data measuring industrial sector output is physical production data compiled by trade associations and government bureaus. When available, such data are typically available monthly and often available promptly.

Following a recommendation of the previous visit, BPS contacted trade associations (not government bureaus, apparently) to assess the availability of physical production data. Eighteen associations were contacted and asked about the specifications, frequency, and promptness of any data they collect.

At first glance, the results were disappointing. Production data were already being sent to BPS by five associations, covering motor vehicles, motorcycles, cement, sugar, and fertilizers. Of the remaining 13 associations, only those representing pulp and paper and batik reported that monthly production or sales was available. Associations representing rubber, cigarettes, plywood,

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[3] See Yahya Jammal, "The New Quarterly Industry Survey," DSP #174, December 1992; and ibid., "Memoranda on Industry, National Accounts, and Prices," DSP #241, June 1995.

[4] See Yahya Jammal & Rosniaty Ismail, "The Monthly Manufacturing Production Survey," STAT Project Report # 15, November 2000.

textiles, and a number of other products reported that they did not collect monthly production or sales.

A project at Bank Indonesia in 1993 had been somewhat more successful in collecting monthly data. At that time data were available for iron and steel products, soap, detergents, and (curiously) cigarettes in addition to the products identified by BPS. For some other industries, monthly data on exports were available and could serve as a useful plausibility check for industries a large proportion of whose output was exported.

These earlier results perhaps provide some grounds for more optimism about the use of physical product data. Far more important, however, is the fact that BPS has searched only for physical product data in non-oil manufacturing, the subsector that the current Indonesian index of industrial production covers. In other countries, industrial production covers all of manufacturing, mining, and utilities. It is in the industries missing from Indonesia's index--oil manufacturing, mining, and electricity--that monthly physical production data are readily available.

It seems, then, that there remains an important role for physical production in an Indonesian index of industrial production. Taking account in some way of production data available for non-oil manufacturing is a part of that role. But more important is expanding the scope of the index to conform with general international usage-- surely a desirable objective. Physical production data would be a vital input in accomplishing this goal.

One step in achieving this goal would be specifying weights for the oil, mining, and electricity components. At present, the non-oil manufacturing index uses value weights that are updated each quarter; but, at least in principle, the quarterly index is adjusted to an annual index, based on an annual census of manufacturing, that uses annual value weights. International organizations have tended to recommend updating of weights annually but not more frequently, because too frequent updating can introduce a "drift" problem. In an expanded index it might be desirable to use weights throughout that are updated annually.

B. Value Added Tax (VAT) Data

Since the mid 1980's, Indonesia has levied a 10 percent value added tax on enterprises in many, although not all, branches of the economy. Some of the important final goods and services exempt from the tax are capital goods (machinery and construction), education and health services, hotels and restaurants, and public transportation. Important intermediate goods, such as mining products and (until recently) agricultural products are also exempt, but the effect of this exemption is that the tax is paid by later stages of processing rather than by primary producers. Firms below a small size threshold need not pay; and retailers have the option of paying a turnover tax rather than a value added tax. Appendix A shows the standard VAT declaration form.

The tax is of special interest to national accounts estimators because value added is a concept closely allied to GDP. Both measure gross value minus intermediate goods and services. One source of difference has to do with changes in stocks. The value added tax is based on sales minus purchases of intermediate products, while GDP is defined as production minus use of intermediate products. The difference between these two concepts is changes in stocks. Other differences may arise because VAT is applied to enterprises rather than individual establishments, because VAT payments in a particular month may relate in part to value added in an earlier month, and because of non-compliance with the tax law.[5]

In spite of these differences, the fact that detailed VAT forms are submitted monthly by many thousands of enterprises makes it a potentially excellent source for estimating some portions of the quarterly GDP production account. Even when some activity is exempt from VAT, an indicator related to value added may be available from producers at an earlier or a later stage of production than the exempt activity.[6] Returns for individual enterprises will, of course, be confidential; but groupings by industry and size class could be extremely helpful.

For VAT data to be useful they must be available promptly. At present, all that is available is total tax receipts from VAT, which is of little use as a source for national accounts. However, a detailed database is under development. When it is available, it should be able to provide monthly value added estimates by industry, size class, and geographic location. BPS needs to stay informed about database development and make known its strong interest in the data.

C. Building Permits

The present method of estimating construction activity is based on production and imports of construction materials. It uses intermediate input into the industry to measure its gross value and value added. It can give inaccurate results when there are changes in composition and technology in the construction industry. A shift from nonresidential building or highway building to building of single family houses, for example, could significantly change the relation of value added to materials inputs.

One of the recommendations of the previous visit was that BPS investigate building permit data available from the Danareksa Research Institute or from local governments. Building permit data, like materials input data, have serious drawbacks. A drawback of the building permit approach is that some permits are never executed and some construction takes place without permits. Even when permits do result in actual construction, there is a time lag that needs to be

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5 One study concluded that actual VAT collections fell short of potential collections by about 25 percent. See Geoffrey Walton, Barents Group, "Tax Incentives: Indonesian Experience since 1984 and the Way Ahead," November 1999, p. 8.

6 Some hypothetical examples are developed in Annette N. Brown, Barents Group, "Report on Tax Expenditures," August 2000, pp. 31-35.

allowed for in estimating current output (in some countries, the distribution is estimated based on periodic follow-ups of a sample of permits to measure the proportion constructed within one month, two months, etc., including a proportion never constructed).

Information from two imperfect indicators is generally preferable to full reliance on one. Consequently, it is again recommended to investigate building permit data. Data may be readily available from Danareksa or from a manageable number of local governments. If available data measure square meters as well as monetary value, they can be especially valuable.

D. The Banking Sector

Value added in the banking sector is estimated by Bank Indonesia (BI) and transmitted to BPS for inclusion in the production account. Appendix B shows the form used by BI. The BI method seems to follow the recommended national accounts approach, including an estimated value of imputed bank services. In using these estimates, however, BPS does not at present adjust for the portion of imputed services that is considered to be intermediate product rather than final product (in most countries, this portion is taken to be 100 percent). BPS, however, plans to introduce such an adjustment in the near future.

Because the special treatment of the banking sector is not familiar within BPS, a simplified example may aid in understanding the BI estimates and the need for an adjustment for intermediate services. Table 1 presents an example.

Table 1
Bank Value Added as Recorded by a Bank vs as Recorded in the National Accounts

	Recorded by a Bank			National Accounts	
	Outlays	Receipts		Uses	Sources
1	90	100	Interest	-10	
2		10	Fees		10
3	8		Employee Compensation	8	
4	2		Depreciation	2	
5	5		Intermediate Purchases	5	
6	---		FISIM[1)]	10	10
7	5		Operating Surplus (residual)	5	
8	110	110	Total	20	20
9					
	15		*Value added*	*15*	
			(Value added without FISIM)	*5*	

1) Financial Intermediation Services Indirectly Measured.

On the left side of the table, income and outlay for a hypothetical bank are shown as they might be recorded by a bank. The bank's income comes from two sources, interest on loans and investments of 100 and income from fees of 10. Expenses are of four kinds; interest to depositors of 90, wages of 8, a depreciation allowance of 2, and intermediate purchases (e.g. paper, fuel, advertising, etc.) of 5. The difference between total income and these expenses comes to 5, recorded as an operating surplus (before taxes). The value added for the bank is equal to wages plus depreciation plus the operating surplus, or 15. Alternatively, value added can be calculated as income minus intermediate expense. In this alternative calculation interest paid to depositors needs to be included as an intermediate expense; then the alternative also yields a value added of 15.

On the right side of the table the same bank is measured using national accounts concepts. In the national accounts interest is a factor payment, like wages; therefore, instead of interest revenues of 100 and interest expense of 90, the net of these two is shown in the "uses" column as an expense of -10. If this were the only change from the banking treatment, value added would be equal to wages plus depreciation plus operating surplus plus (negative) interest, amounting to only 5 instead of 15. Alternatively, value added could be calculated as receipts of 10 minus intermediate purchases of 5, giving the same result. This result, however, is not considered to reflect the bank's activity. It could, in other hypothetical cases, lead to negative value added of a perfectly sound bank.

To restore plausibility to the banking sector, national accounts make use of a concept labeled FISIM, or financial intermediation services indirectly measured. This imputation is equal to the net interest total with the sign reversed, or +10 in our hypothetical case. It is added to the receipts side to represent imputed receipts for services the bank provides but does not charge for, such as record-keeping and cashing privileges. It is added to the expense side as an imputed factor payment. Once FISIM is introduced, value added is restored to the 15 that reflects the bank's approach. Value added can be calculated either as wages plus depreciation plus operating surplus plus (negative) interest plus imputed interest (that is, 8 +2 +5 -10 +10), or as income (10 in fees and 10 in imputed services) less intermediate purchases.

While FISIM restores plausibility to the banking sector, it raises the question of whether the imputed services it represents are intermediate products or final products, and if they are the former, whether they are reflected in the intermediate purchases that businesses normally record. The usual answer is that much of FISIM does represent intermediate product not recorded by nonfinancial businesses, and therefore some or all of FISIM needs to be subtracted from aggregate value added before arriving at GDP. Since the distribution of FISIM among producing sectors is unknowns, it is usually subtracted as a separate item after adding up GDP originating in all sectors. Common practice is to deduct all of FISIM, but the 1993 SNA recommends attempting to split FISIM between intermediate and final products.

In Indonesia, FISIM is calculated by Bank Indonesia and included in the banking sector estimates it submits to BPS. But the deduction of some or all of FISIM from aggregate value added is at present a missing step in the Indonesian production account.[7] The bureau that prepares the production account, as noted earlier, plans to introduce this missing step in the near future.

E. Taxes on Production

Indonesia has a value added tax, luxury taxes, and import taxes. In order for total GDP in the production account to equal total expenditures on final purchases and changes in stocks, it is necessary that the production account total include these taxes. Under normal accounting practices, this will not happen. A retail store, for example, will not consider a luxury tax as part of its receipts, but a consumer will consider it as part of his expenditure. The value of the tax needs to be added to the production account in order to reflect this portion of consumer expenditures. For value added taxes the situation is more complicated, but the result is generally the same–namely, the sum of value added of all sectors will not reflect total outlays, including value added taxes, by final purchasers.

The usual way to remedy this discrepancy is to increase total GDP in the production account by the amount of taxes on production. The increase could be allocated among the various sectors, but it is usually a separate item added to the sum of industry value added.

In Indonesia at present, import taxes are added to the value added of the retail trade industry, while other taxes on production are not added.[8] The bureau that prepares the production account realizes that this is an incomplete adjustment, and plans to include the value of all taxes on production in GDP in the near future.

F. Base Year for Constant Price Estimates

The problem of selecting a weight year, or series of years, for calculating GDP in constant prices has no perfect theoretical solution. A guiding principle, however, is that relative prices in the base year should not diverge greatly from actual relative prices in the years using that base. Until recently, practice among many countries with highly developed national accounts was to change weight years roughly every five years. Recently, experience of wide divergence in relative price movements, reinforced by the publication of the 1993 version of the System of National

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7 The effect of the omission is probably very small, because the amount is small and not highly variable.

8 As in the case of FISIM, the effect of the omission on estimated growth rates is probably quite small. Taxes on production do seem to have been added to value added in each sector in Indonesia's 1995 input output table. Such additions could have affected the value added estimates that are produced each quarter if the quarterly estimates were arrived at by estimating the change from the previous quarter, cumulated back to the input output table. But this is probably not the way quarterly estimates have been arrived at; and even if it is, the quarterly estimates would not reflect current quarterly taxes on production.

Accounts (SNA),[9] has led some countries to change weights every year.

Indonesia has in the past followed a practice of changing weight years every ten years. At present, constant price estimates in the national accounts are measured in 1993 prices. There are plans to change to a 2000 weight year when the necessary information is available. In view of the SNA recommendations and recent wide divergences in relative prices, BPS might consider moving to a system of even more frequent change in weight year.

III. EXPENDITURE ACCOUNT

A. Quarterly Commodity Flow Tables

Private consumption, the largest expenditure component of GDP, is measured directly only once every three years in Indonesia, in a large scale household survey. In between, private consumption is estimated in the national accounts by using elasticities with respect to GDP of about one dozen categories of consumption. Errors due to this procedure do not affect estimates of total GDP, because the total is estimated from the production side. Such errors do, however, lead to offsetting errors in one or more other components of expenditures.

One approach to improving consumption estimates is to use a commodity flow approach. Under that approach, private consumption of the products of each industry is measured by subtracting from total supply all other uses. That is,

$$Cp = S - Int - Cg - Inv(f) - Inv(i) - Exp$$

where Cp is private consumption, S is total supply (domestic production plus imports), Int is intermediate sales to other industries, Cg is government consumption, Inv(f) is fixed investment, Inv(i) is inventory investment (changes in stocks), and Exp is exports. The approach links consumption directly to each sector of the production account.

BPS has taken a first, important step to using a commodity flow approach by constructing quarterly supply and use tables for 33 GDP production sectors. Total supply, equal to production plus imports, is allocated for each sector to six categories of demand: intermediate purchases, government consumption, fixed investment, inventory investment (changes in stocks), exports, and private consumption. Two of the components, government consumption and exports, are measured from current data. A third, intermediate purchases, can be estimated by using an input-output table. A fourth, fixed investment, is measured in total and can be allocated among sectors by using information on investment sub-categories (construction, equipment, etc.) and an input-output table.

If current information on inventory investment were available, then private consumption

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[9] See System of National Accounts 1993, op.cit., chapter 16, especially section E.

could be estimated as a residual. This commodity flow approach to estimating consumption should lead to good results when consumption is either a very small proportion of supply or a very large proportion–conditions that apply to the great majority of the 33 sectors.

However, the method cannot be employed unless inventory investment estimates are available. At present, inventory investment is treated as a residual for most sectors. Estimates are prepared for both inventory investment (based on total output) and for private consumption (based on elasticities with respect to GDP); if they introduce a discrepancy between total supply and the sum of the six categories of demand, then there is a judgmental adjustment of inventory investment, consumption, or both.

Clearly, improvement in this method of using the quarterly supply and use table depends on obtaining better estimates of inventory investment. The next section of this report, accordingly, discusses the possibilities for obtaining direct estimates of inventory investment from available or potentially available data sources.

B. Inventory Investment

Three sources of inventory data, in combination, may make possible direct estimates of inventory investment in Indonesia. The first, and simplest to deal with, is physical units of inventories or of production and sales (the difference between production and sales is equal to changes in stocks). The second source, most widely used in other countries, is book values of inventories recorded on enterprise balance sheets. The third, rarely used but potentially useful as a short-term indicator, is business tendency surveys that include a question on whether inventories have increased, decreased, or stayed the same.

1. Physical Units

In Indonesia, data on physical units are available for major agricultural products and petroleum. For agriculture, the source is the Department of Agriculture. For petroleum, the source is Pertamina. To use these data, all that is necessary is to record inventory change in physical units and multiply by average prices. For estimates in current prices, the price should refer to the quarter being measured; for estimates in 1993 prices, the price should be an annual average for 1993. Table 2 presents some illustrative data.

Table 2
Physical Production Data on Stocks: Two Examples

	End of month stock, 1000 kg	Change from previous period	Quarterly average price per 100 kg	Stock change current prices (bn. Rupiah)	1993 average price per 100 kg	Stock change 1993 prices (bn. Rupiah)
RICE:						
Dec. 1997	1408686					
Mar. 1998	1163039	-245647	59000	-145	44818	-110
June 1998	2357929	+1194890	68000	+813	44818	+536
Sept. 1998	1951511	-406418	82000	-333	44818	-182
Dec. 1998	2172618	221107	134000	+296	44818	+99
SUGAR						
Dec. 1997	676532					
Mar. 1998	489832	-186700	146000	-273	110202	-206
June 1998	277989	-211843	182000	-386	110202	-233
Sept. 1998	321472	+43483	225000	+98	110202	+48
Dec. 1998	928359	+606887	285000	+1730	110202	+669

2. Book values

Data on book values of inventories on corporate balance sheets are being collected by BPS for 332 public corporations listed on the Jakarta or Surabaya stock exchanges. The figures are taken from the published annual reports of these companies. Tabulations for the years 1997-99 are expected in the near future.

Several steps are necessary to convert these book values into usable estimates of inventory investment, because a simple change in book values reflects price change as well as actual accumulation (or reduction) of inventories. The first step is to estimate the average age distribution of inventories in the stock. For example, such an estimate might find that half of end-of-year inventories were typically added to the stock in December, three tenths in the preceding November, and two tenths in October. There are various approaches to estimating the age distribution; the simplest is a small survey of firms.

The age distribution of inventories should be used to construct a weighted price index for deflating book values. Ideally, there should be separate price indexes for deflating stocks of finished goods and stocks of material; but if the underlying book value data do not distinguish between these two categories, then a single index of prices covering both finished goods and inventories is appropriate. In the hypothetical example of the previous paragraph, the weights would be .50 for the December index, .30 for November, and .20 for October.

Inventory investment in constant prices is the difference between deflated book values at the end of the current year and deflated book values at the end of the previous year. If the base year of the price indexes is 1993, then the difference represents inventory investment in 1993 prices. To estimate inventory investment in current prices, all that is necessary is to multiply the constant price estimate by the average price index for the current period.

The company data that BPS is collecting are concentrated in manufacturing. Nearly half of the reporting companies are engaged in manufacturing, and most of the remaining companies are in finance, where inventories are generally very small. If the company estimates are added to the estimates based on physical data, the total will represent (though with less than full coverage) the sectors responsible for the bulk of inventory investment, with one major exception–namely, retail trade.

3. Business Tendency Surveys

Of the two sources of data discussed so far, the first–physical product data for agricultural products and petroleum–is available quarterly, but the second–book value data for manufacturing and some other industries–is available only annually in Indonesia. To construct quarterly estimates for the sectors available annually, it is necessary to use a quarterly indicator.

Business tendency surveys that include a question on whether inventories are increasing, decreasing, or staying the same can be the basis for such an indicator. As in the case of book values, however, it takes several steps to convert the available data into a usable indicator. The basic methodology is outlined below. It will be useful to experiment with applying this methodology to actual tendency survey data.

Two basic assumptions about the properties of the survey data are necessary: the form of the distribution of responses, and the meaning of "no change." For the form, a natural choice would be a normal distribution of percent changes. For the meaning of no change, changes between minus "x" and plus "x" percent of the stock, with "x" equal to half a percent or one or two percent or some other fairly small value would seem plausible. In both cases, it would be desirable to get empirically-based estimates at some point by surveying a small sample of firms.

Given the form of the distribution and the meaning of no change, it is possible to derive the mean change from information on the percentage of firms reporting increases, decreases, and no change. Suppose, for example, that in a particular quarter 35 percent of respondents report inventories increasing, 40 percent report no change, and 25 percent report inventories decreasing Assume that responses are normally distributed and that no change represents any value between -1 percent and +1 percent of the initial stock. The use of cumulative normal distribution tables then leads to a distribution with a mean of 0.273 percent and a standard deviation of 1.885 percent (if no change represents values between -2 and +2 percent, the mean would be o.545). The results indicate that the stock increased by .00273 times the initial stock (in constant prices). Table 3 presents this example.

Table 3
Using Business Tendency Survey Results to Estimate Inventory Investment: Hypothetical Illustration

1. STOCK, END OF PREVIOUS QUARTER (constant prices) 10,000

2. RESULTS OF BUSINESS TENDENCY SURVEY:
   Inventories decreasing 25 percent
   No change 40 percent
   Inventories increasing 35 percent

3. ASSUMPTIONS:
   Normal distribution of percent changes
   "No change" means -1 to +1 percent

4. CALCULATED NORMAL DISTRIBUTION WITH
   CUMULATIVE VALUE TO -1 = .25,
   CUMULATIVE VALUE TO +1 = .65
   Mean = .273 percent
   Standard deviation = 1.885

5. CALCULATED INVENTORY INVESTMENT DURING QUARTER:
   .00273 * 10,000 = +27.3

C. Foreign Trade in Services

At present, the expenditure accounts include net imports of services–imports minus exports--as a sub-category of imports, rather than showing imports and exports of services separately. Using this net figure has no effect on GDP (which is estimated from the production side) or on the components of expenditures other than exports and imports; but it does mean that both exports and imports are understated. Calculations of imports or exports as a percent of GDP will therefore also be underestimated.

It should not be difficult to provide more detail than the single net figure now published. Bank Indonesia publishes estimates of the largest component of service exports, travel and tourism, and provides BPS with estimates of many other components on a not for publication basis. Probably there would be no objection to BPS publishing total service exports and total service imports, since the totals would not reveal any individual components that Bank Indonesia felt were too uncertain or confidential. All that is necessary is an agreement between BPS and Bank Indonesia.

D. Deflation

1. Government Expenditure

One of the difficult areas for measuring GDP in constant prices is government services. It is a problem for both the government sector of the production account and for government consumption in the expenditure account. Ideally, those government activities that provide identifiable services, such as education or health, should be deflated by indexes reflecting the prices of those services. In practice, the best that can usually be done is to use an index representing a weighted average of government compensation per employee or per employee-hour.

In Indonesia, output of government sectors is now measured by a weighted total of four categories of government employment, with weights representing relative compensation per employee. Using a weighted employment total to measure output is closely related to using a weighted total of compensation per employee to measure price. Government expenditures divided by a base-year weighted (Laspeyres) index of compensation per employee should give a current-year weighted (Paasche) index of employment, and government expenditures divided by a base-year weighted index of employment should give a current-year weighted index of compensation per employee. Indonesia is in effect using the second of these options, a base-year measure of output, implying a current-year weighted measure of price. This option is consistent with the procedure in many other sectors in which output is base-year weighted and implicit price is therefore current-year weighted.

There are two possible reasons for considering a change from the present procedure of using an employment index to represent output to using and index of compensation per employee to represent price. One is coverage; if coverage of employment and compensations statistics is incomplete, then an index of compensation per employee is probably more representative of total price than an index of employment is representative of total employment. The other is degree of detail; dividing employment into only four categories may miss some important shifts within categories, and if compensation per employee is available for more than four categories it might be a preferable data source. Unless one or both of these conditions holds, there does not seem to be any reason to change the present procedure.

2. Foreign Trade

The best way to deflate values of exports and imports is to use specially constructed indexes of import prices and export prices. In the absence of such indexes, countries use various approximations, none of them very satisfactory. Indonesia at present deflates exports and imports in dollars by an index of the exchange rate of the rupiah versus the dollar, implying that dollar prices of traded goods and services are stable and that the exchange rate represents relative purchasing power. Both these assumptions are at best approximations.

An alternative worth exploring is the use of unit value indexes based on quantities and values of traded goods. The Indonesian Customs Bureau routinely collects such data. The biggest problem with this approach is that the quantities–kilograms, in the Indonesian case–are a very crude measure, obviously not appropriate when a product includes very diverse varieties or qualities–for example, plain cotton and fine silk cloth, or Toyota and Mercedes autos–and there are changes in the relative importance of these varieties.

There have been a number of attempts to minimize this problem by editing out categories in which the implicit price per unit is highly variable. One such method, tested by a team from BPS and BI, was explored for possible use in Indonesia but was judged too difficult to use on a routine basis. The same appears to be true of a method developed by the French Statistics Agency INSEE,[10] Instead, a simpler method has been developed based on the idea that medians are much less influenced by outlying observations than means. The method is illustrated in Table 4. BPS has begun testing the simpler method for a few groups of export goods.

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[10] See Rapport de Mission sur le statistique du Commerce Exterieur Albanais, Direction Generale des Douanes, Bureaqu des statistiques, INSEE, Division Echanges Exterieurs, Mai 1998.

Table 4
Unit Value Indexes: Illustration of a Median-Based Method

BASIC DATA

	Month 1		Month 2		Month 3		Month 4	
	value	kg	value	kg	value	kg	value	kg
product 11	100	5	110	5	125	7	100	5
product 12	200	3	150	3	145	3	300	5
product 13	10	1	500	10	----	—	50	4
Section 1	*310*		*760*		*270*		*450*	
product 21	130	10	150	11	170	13	190	14
product 22	200	10	180	10	160	10	45	---
Section 2	*330*		*330*		*330*		*235*	
Total value	**640**		**1090**		**600**		**685**	

1. CALCULATE UNIT VALUES (value per kg) AND PRICE RELATIVES

	Unit values				Price relatives		
	Month 1	Month 2	Month 3	Month 4	month 1 to 2	month 2 to 3	month 3 to 4
Section 1:							
product 11	20.00	22.00	17.86	20.00	1.10	0.81	1.12
product 12	66.67	50.00	48.33	60.00	0.75	0.97	1.24
product 13	10.00	50.00	--	12.50	5.00	--	---
Section 2:							
product 21	13.00	13.64	13.08	13.57	1.05	0.96	1.04
product 22	20.00	18.00	16.00	---	0.90	0.89	---

2. CALCULATE MEDIAN PRICE RELATIVES FOR EACH PAIR OF MONTHS

	month 1 to 2	month 2 to 3	month3 to 4
Section 1:			
disregard	none	prod.13	prod.13
median %	1.10	0.89	1.18
Section 2:			
disregard	none	none	prod.22
median %	0.97	0.92	1.04

3. CALCULATE CHAINED INDEXES, MONTH 1 = 100

	month 1	month 2	month 3	month 4
Section 1	100.00	110.00	97.81	115.48
Section 2	100.00	97.45	90.03	93.44

4. CALCULATE TOTAL PRICE INDEX (harmonic mean)

	month 1	month 2	month 3	month 4
Total	**100.00**	**105.87**	**93.37**	**106.84**

Harmonic mean formula:
Index = (V1 + V2)] / [(V1 / P1) + (V2 / P2)]

5. CALCULATE VALUES IN MONTH 1 PRICES

	month 1	month 2	month 3	month 4
Total (constant prices)	**640**	**1030**	**643**	**641**

IV. PRESENTATION AND ADJUSTMENT OF NATIONAL ACCOUNTS

A. Documentation

A highly important step in developing and improving Indonesia's national accounts has been the preparation of a document explaining the data sources and methods used in preparing the quarterly accounts.[11] The document, now being circulated within BPS, should give BPS specialists a greatly improved understanding of how their areas of specialization fit into the broad national accounts framework. When the draft is circulated outside BPS, it should help national accounts users to understand the vast store of information BPS draws on in making the quarterly estimates. For both groups, the document may lead to fruitful suggestions for improvement.

The next steps in the documentation process, receiving comments on the present draft from within BPS and then circulating it among users, will take place shortly. It has been suggested that translation into Indonesian should also be undertaken in the near future. Eventually, a parallel document covering annual and benchmark estimates would be equally useful.

B. Advance Release Schedule

A schedule of release dates announced in advance is desirable for statistics agencies because it reduces the possibility of political interference with statistical measurement and because it increases public confidence in the results. In Indonesia, there now seems to be a schedule of current releases that is quite regular and is known in advance by most users. If the schedule is not now actually published, it might be useful to do so.

The schedule covers current releases of price indexes, foreign trade totals, and national accounts. For national accounts, furthermore, it is now well known that initial estimates for the most recent quarter will be accompanied by revised estimates going back several quarters.

The schedule does not now cover dates of annual or benchmark revision of the accounts. Eventually, an advance schedule that includes these dates will prove useful.

C. Seasonal Adjustment and Benchmarking

Two procedures that have proved highly useful to economic statisticians are adjustment of quarterly and monthly data to eliminate normal seasonal variation, and adjustment to make quarterly and monthly indicators conform to more accurate annual data while retaining, as far as possible, their short run contours.

Seasonal adjustment, the first of these procedures, has been used widely within BPS, using the "X12" method. Before long, it should enable BPS to issue some seasonally adjusted accounts.

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[11] See Yahya Jammal, " Quarterly National Accounts in Indonesia: Current Sources and Methods," op. cit.

Benchmarking or interpolation, the second of these procedures, is not yet used systematically at BPS. Software for the most sophisticated methods is currently either not available or extremely tedious to use. Software for older methods that are generally, if not always, satisfactory, is available. One of these older methods, the "Bassie method," is available to BPS and may be put to use in the near future, unless the preferred methods become more accessible.[12]

V. REGIONAL ACCOUNTS

While BPS prepares national accounts for Indonesia as a whole, provincial and kabupaten agencies prepare regional accounts for their jurisdictions, in varying amounts of detail. There is no requirement that these regional accounts add up to national totals, and in the past they have not added up. There are regular meetings in each province to review the kabupaten estimates, and at the BPS head office to review the provincial estimates. Changes are suggested at these meetings, usually based on detailed information about the location of economic activity in selected industries; but the changes need not be adopted. There does not seem to be any movement toward enforcing consistency between national, provincial, and kabupaten estimates.

One way to encourage consistency, without requiring it, is to develop a system of indirect indicators related to GDP or major components that can be disaggregated by region and compared on a regular basis with estimated regional accounts. Employment or adult population would be one such indicator; electric power use and bank loans or some other credit indicator are other possibilities. Publication of the indicators along with the regional accounts estimates could be a useful way of drawing attention to possible problems in the estimates.

VI. PROMPT INDICATORS

An earlier report pointed out that in the area of leading indicators, consumer attitude surveys, and business tendency surveys, BPS, BI and the private Danareksa Research Institute each conducted its own activities independent of the work done by the others.[13] The report recommended cooperation by BPS and BI with the goals of improving survey instruments and response rates and minimizing duplication of effort.

Since the publication of that report, staff members of BPS and BI involved in the preparation of these reports have proposed that the business tendency survey questionnaires that

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12 The version of the Bassie method available to BPS does not contain an error in the sequence of operations that has been criticized in some other versions.

13 See Frank de Leeuw, "Preliminary Evaluation of National Accounts and Prompt Indicators," STAT Project Report #6, July 2000, pp. 21-26.

the two groups prepare should be merged into a single questionnaire. Approval of this step, and further progress along these lines, would benefit both producers and users of these prompt indicators.

VII. SUGGESTED PRIORITIES

Activity to improve the national accounts and current indicators is already taking place on several fronts. Perhaps the most important is the draft paper now being circulated inside BPS documenting the sources and methods used to produce quarterly national accounts (see section IV.A. above). In the area of industrial production, a monthly survey of industrial establishments, designed to produce more prompt measurement than the quarterly survey, has been tested and is being conducted regularly (Section II.A.). Seasonal adjustment of the accounts is now used widely to assess the plausibility of results, although seasonally adjusted results have not yet been published (Section IV.C.). The quarterly expenditure accounts are prepared with the aid of a supply and use table covering 33 industries, potentially a valuable aid in improving estimates of household consumption (Section III.A.).Two conceptual issues in compiling the accounts, the treatment of imputed banking services and the treatment of taxes on production, are scheduled for review and improvement in the near future (Sections II.D. and II.E.).

There are two other areas where the next steps are clear, and simply await a decision to take them. One is business tendency surveys, where there has been discussion of developing a single survey instrument instead of the two surveys now conducted by BPS and Bank Indonesia (Section VI). Action awaits a decision to merge the surveys.The other is separate publication of imports and exports of services (Section III.C.), where the necessary data are already supplied to BPS by BI on a confidential basis, and action awaits a request to be able to publish just the totals of service imports and service exports.

These activities are not in need of any change in direction or resources; under present plans they are likely to move ahead. However, the report recommends that consideration be given as well to several other activities that would require new initiative and resources.

The *first* of these activities is attempting to estimate inventory investment (changes in stocks) directly rather than as a residual (Section III.B.). The three sources of information that could be used are:

- physical units of inventories for agricultural products, petroleum, and some other minerals (Section III.B.1.and table 2);
- book values of inventories on the balance sheets of public corporations (Section III.B.2.); and
- responses on business tendency surveys to a question about whether inventories are increasing, decreasing, or staying the same (Section III.B.3. and table 3).

A *second* major new proposed activity is trying a new approach to developing price indexes for foreign trade through the use of unit values of exports and imports (Section III.C. and table 4). Past efforts have become mired in the complex problems of eliminating unusable observations due to radical changes in composition or quality. The report proposes a median-based method of eliminating the influence of these outlying observations that is much simpler than past methods. Plans are underway to test the new method on a small number of export and import groups.

A *third* proposed activity is expanding the index of industrial production to include mining, petroleum, and electricity as well as non-oil manufacturing (Section II.A.2.). Such expansion would require reliance on physical production data for oil and petroleum products, other minerals, and electricity–data which are available monthly.

The *fourth* and final proposed activity is using, when they become available, value added tax return data in estimating current GDP (Section II.B.). Because value added is a concept closely related to gross product, the fact that detailed VAT forms are submitted monthly by many thousands of enterprises makes it a potentially excellent source for estimating some portions of the quarterly production account. Individual tax return data are of course confidential; but totals by industry, size class, or area could provide valuable indicators. The Department of Finance has data development plans that would make such aggregates available. BPS need to stay informed about data availability and make plans to utilize value added estimates based on value added tax returns.

APPENDIX A
VALUE ADDED TAX DECLARATION FORM

UNOFFICIAL TRANSLATION

THE MINISTRY OF FINANCE OF THE REPUBLIC OF INDONESIA DIRECTORATE GENERAL OF TAXATION	**DECLARATION OF VALUE ADDED TAX PERIOD (SPT MASA PPN)** ☐ Tax Period of..... 19..... ☐ .....Correction for Tax Period of..... 19.....	FORM 1195

ATTENTION :
- PLEASE READ CAREFULLY THE GUIDELINES FOR FILLING IN THE SPT MASA PPN
- PLEASE USE BLOCK/TYPED LETTERS
- TO BE PREPARED ONLY FOR A SINGLE TAX PERIOD
- FILL IN THE RELEVANT ☐ WITH THE X MARK
- NUMBERS TO BE FILLED IN WITH FULL RUPIAH AMOUNT

A.	TAXABLE COMPANY IDENTITY		
1.	TAX INCUMBENT ID:		Branch Code :
2.	TAXABLE COMPANY ID:	Date:	Change of Identity:
	Name of Taxable Company:	Address Code:	New Name
3.	Address:		New Address
4.	Telephone Number:		New Telephone No.
5.	Business Brand:		Type of Business
	Centralization Permit No.	Date:	
6.	Type of Business:	KLU:	
7.			
8.			

B.	DELIVERY WITH VALUE ADDED TAX PAYABLE, DELIVERY WITHOUT VALUE ADDED TAX PAYABLE, AND TOTAL DELIVERY	COLUMN CODE	CORRECTION	BASIS OF TAX IMPOSITION (DPP)	
				Current Month	As of Current Month
	1. Delivery of items with Value Added Tax payable:				
	1.1. Export:				
	1.1.1. With L/C	B.1.1.1			
	1.1.2. Without L/C	B.1.1.2			
	1.2. Delivery of items whose VAT is:				
	1.2.1. Waived/Postponed/Deferred	B.1.2.1			
	1.2.2. Exempted/Borne by the Government (DTP)	B.1.2.2			
	1.3. Delivery of items whose VAT is payable other than Export whose VAT is Waived/Postponed/Deferred/Exempted/ Borne by the Government (DTP):				
	1.3.1. Delivery to the VAT Collector	B.1.3.1			
	1.3.2. Delivery to other parties who are not VAT Collectors	B.1.3.2			
	1.3.3. Own use/Free Gift	B.1.3.3			
	1.3.4. Total (1.3.1. + 1.3.2. + 1.3.3.)	B.1.3.4			
	1.3.5. Delivery with Effective Tariff	B.1.3.5			
	1.3.6. Deducted with Sales Return from the Delivery whose VAT is payable	B.1.3.6			
	1.3. Total Delivery with VAT Payable (1.1.1 + 1.1.2 + 1.2.1 + 1.2.2 + 1.3.4 + 1.3.5 – 1.3.6)				
2.	Delivery whose VAT is not payable				
	2.1. Entire Delivery	B.2.1			
	2.2. Deducted with Sales Return from the Delivery whose VAT is not payable	B.2.2			

C.	EXIT/OUTWARD TAX	COLUMN CODE	CORRECTION	BASIS OF TAX IMPOSITION	
				Current Month	As of Current Month
1.	Exit/Outward Tax:				
	1.1. With 10% Tariff i.e. 10% x (Code B.1.3.4)	C.1.1			
	1.2. With Effective Tariff i.e. .....% x (Code B.1.3.5)	C.1.2			
	1.3 Total (1.1 + 1.2)	C.1.3			
2.	Deducted with Sales Return from the Delivery whose VAT is payable	C.2			
3.	Total (1.3 – 2)	C.3			
4.	Deducted with:				
	4.1. Exit/Outward Tax collected by the VAT Collector:				
	4.1.1. The SSP received (attached)	C.4.1.1			
	4.1.2. The SSP not received	C.4.1.2			
	4.2. The VAT that has been paid in advance within the same Tax Period	C.4.2			
5.	The Exit/Outward Tax that has been self collected (3 – 4.1.1 – 4.1.2 – 4.2)	C.5			
D.	THE TAX THAT MAY BE TAKEN INTO ACCOUNT				
1.	Entry/Inward Tax that may be Credited:				
	1.1. Import Entry/Inward Tax	D.1.1			
	1.2. Domestic Entry/Inward Tax	D.1.2			
	1.3. Entry/Inward Tax from a different Tax Period:				
	1.3.1. Import VAT	D.1.3.1			
	1.3.2. Domestic VAT	D.1.3.2			
	1.4. Deducted with VAT on Sales Return	D.1.4			
	1.5. Others	D.1.5			
	1.6. Total (1.1 + 1.2 + 1.3.1 + 1.3.2 – 1.4 + 1.5)	D.1.6			
2.	Entry Tax that uses the Entry Tax Crediting Guidelines Because of Opting to Use the Net Income Computing Norms	D.2			
3.	Compensation for the VAT excess in the previous month	D.3			
4.	Deducted by:				
	4.1. Advance Payment from the Financial BAPEKSTA	D.4.1			
	4.2. Results of the Reassessment of Entry Tax that has been Credited/Uncollected/Deferred/Exempted	D.4.2			
5.	Total Tax that may be taken into account (1.6 + 3 – 4.1 – 4.2) or (2 + 3)	D.5			
E.	SHORTAGE/EXCESS IN TAX PAYMENT				
	1. Shortage of Payment (C.5 –D.5)	E.1			
	2. Excess Payment (D.5 – C.5)	E.2			
	The total in Code E.1 has been paid on				
F.	THE TOTAL ENTRY TAX THAT CANNOT BE CREDITED				
G.	CORRECTIONS (ONLY TO BE FILLED WHEN THERE ARE ANY)				

	G.2		
The Total in Code G.1 has been fully paid on			

H.	COMPENSATION/REPAYMENT (RESTITUTION)
	The excess of VAT in:
1.	Code E.2.
2.	Code G.2 (for corrections)
	is requested to be:
3.	Compensated with the VAT payable in the next Tax Period Rp.
4.	Repaid (Restituted) Rp.
	4.1 Documents are attached 4.2 Documents to follow The Repayment (Restitution) was due to: 4.3. The export of Taxable Goods 4.4. Delivery made to the VAT Collector 4.5. Others
5.	The Repayment (Restitution) that is received by the Taxable Company Exporter or the Taxable Company who has delivered the Taxable Goods/Taxable Services to the VAT Collector within the last 6 (six) months (in thousands of Rupiah)

Month of	Month of	Month of	Month of	Month of	Month of .....
Rp.	Rp.	Rp.	Rp.	Rp.	Rp.

I.	SELF CONSTRUCTION ACTIVITY AND THE DELIVERY OF ASSETS WHICH INITIALLY WERE NOT MEANT TO BE TRADED	BASIS OF TAXATION	VAT
1.	Self Construction Activity 1.1. The Basis of Taxation = 40% X total expenditure made	Rp.	
	1.2. VAT payable: 10% X Basis of Taxation		Rp.
	The total in Code 1.1.2 has been fully paid on		
2.	Delivery of Assets which initially were not meant to be traded	Rp.	Rp.
	The total in Code 1.2 has been fully paid on		

J.	ATTACHMENTS
1.	Form 1195 A1; 1195 A2; 1195 A3.
2.	Form 1191 B1; 1195 B2; 1195 B3; 1195 B4.
3.	Form 1195 BM (to be attached only for Taxable Companies who produce Taxable Goods classified as Luxury Goods)
4.	A Certification that the VAT is Uncollected/Postponed/Deferred/Exempted/Borne by the Government as stated in Code B.1.2
5.	The Tax Invoice on the VAT is Uncollected/Postponed/Deferred/Exempted/Borne by the Government as stated in Code B.1.2
6.	The documents as mentioned in Code H.4.1 are to be attached in ..... copies
7.	A Specific Letter of Authority as mentioned in Code K.2
8.	The third copy of the SSP in Code C.4.1.1; Code C.4.2; Code D.1.1; Code D.1.3.1; Code D.1.3.2; Code E.1; Code G.1; Code I.1.2 and Code I.2.
9.	The third copy of the SSP that is received within this month from Code C.4.1.2 of the SPT Masa PPN of the previous months of ..... Copies = Rp.
10.	Initial Payment from the Financial Bapeksta in Code D.4.1
11.	.....

K.	STATEMENT
	Upon fully realizing the consequences including the penalties according to the prevailing regulations, I herby state that whatever have been disclosed by me as above along with the attachments are true, complete, clear and unconditional. ATENTION: ..... dated .....19 According to Section 3 sub-section (7) of Law Number 7 of 1983 as had

APPENDIX B
VALUE ADDED OF BANKING SECTOR

REGIONAL GROSS DOMESTIC PRODUCT (PRODUCTION APPROACH)
MONTH :
(In Million Rupiah)

Bank Classification	Service Inputation Income	Net Income from Forex Trx.	Provision and Commision	Others Operational Income	Gross Output	Intermediate Expenses	Gross Value Added
1. National Bank *)							
2. Foreign Bank **)							
3. Forg. Brc. Off. ***)							
Total							

Source: Banks Monthly Report Code/Form. 02
*) Consolidation of State Bank, Private National Bank, Regional Government Banks, and Joints Banks operated in Indonesia
**) Consolidation of 10 Foreign Banks operated in Indonesia
***) Consolidation of all of banks operated out of Indonesia

Regional Gross Domestic Product (Production Approach)
Source : Code/Form 02

- Service Inputation Income = Interest Income - Interest Expenditure
  Interest Income = (101, 106 up to 111, 115 up to 117, 119, 132 up to 137, 139, 141, 142, 145)
  Interest Expenditure = (181 s.d 186, 189, 191 s.d 195, 199, 211 s.d 215, 219, 221 s.d 225, 229, 230)
- Net Income of Forex Trx. = Profit - Loss
  Profit = (151 up to 160)
  Loss = (231 up to 234, 239, 241 up to 244, 249)
- Provision and commision = (162 up to 165, 167 up to 170) - (251, 252, 259, 261, 262, 269)
- Others Operational Income : Total of accounts code (179)
- Gross Output : Service Inputation Income + Net Income + Provision and Commision + Others Operational Income
- Intermediate Expenditures : (271, 272, 279, 290, 310, 320, 330, 340, 360, 385, 390)
- Gross Value Added : (Gross Output- Intermediate Expenditures)

REGIONAL GROSS DOMESTIC PRODUCT (PRODUCTION APPROACH)
MONTH :
(In Million Rupiah)

Bank Classification	Service Inputation Income	Net Income from Forex Trx.	Provision and Commision	Others Operational Income	Gross Output	Intermediate Expenses	Gross Value Added
1. National Bank *)							
2. Foreign Bank **)							
3. Forg. Brc. Off. ***)							
Total							

Source: Banks Monthly Report Code/Form. 02
*) Consolidation of State Bank, Private National Bank, Regional Government Banks, and Joints Banks operated in Indonesia
**) Consolidation of 10 Foreign Banks operated in Indonesia
***) Consolidation of all of banks operated out of Indonesia

Regional Gross Domestic Product (Production Approach)
Source : Code/Form 02

- Service Inputation Income = Interest Income - Interest Expenditure
  Interest Income = (101, 106 up to 111, 115 up to 117, 119, 132 up to 137, 139, 141, 142, 145)
  Interest Expenditure = (181 s.d 186, 189, 191 s.d 195, 199, 211 s.d 215, 219, 221 s.d 225, 229, 230)
- Net Income of Forex Trx. = Profit - Loss
  Profit = (151 up to 160)
  Loss = (231 up to 234, 239, 241 up to 244, 249)
- Provision and commision = (162 up to 165, 167 up to 170) - (251, 252, 259, 261, 262, 269)
- Others Operational Income : Total of accounts code (179)
- Gross Output : Service Inputation Income + Net Income + Provision and Commision + Others Operational Income
- Intermediate Expenditures : (271, 272, 279, 290, 310, 320, 330, 340, 360, 385, 390)
- Gross Value Added : (Gross Output- Intermediate Expenditures)

QUARTERLY NATIONAL ACCOUNTS IN INDONESIA : CURRENT SOURCES AND METHODS (DRAFT)

Report # 24
Statistical Paper # 3

by
Yahya Jammal

February, 2001

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TABLE OF CONTENTS

ACKNOWLEDGMENT 89

I. INTRODUCTION 92

II. COMPILATION OF PRODUCTION ACCOUNT 92
- **A. Agriculture, Livestock, Forestry & Fishery** 97
  - **1. Farm Food Crops** 97
  - **2. Non-Food Crops** 99
  - **3. Livestock** 101
  - **4. Forestry** 102
  - **5. Fishery** 102
- **B. Mining & Quarrying** 103
  - **1. Crude Petroleum & Natural Gas** 103
  - **2. Non-Oil & Gas Mining** 104
  - **3. Quarrying** 105
- **C. Manufacturing** 105
  - **1. Petroleum Refining** 105
  - **2. Liquefied Natural Gas** 106
  - **3. Food, Beverages & Tobacco** 106
  - **4. Textiles, Leather Products & Footwear** 108
  - **5. Wood Products** 108
  - **6. Paper & Printing** 108
  - **7. Fertilizers, Chemicals & Rubber Products** 108
  - **8. Cement & Non-Metallic Mineral Products** 109
  - **9. Basic Iron & Steel** 109
  - **10. Transportation Equipment & Machinery** 109
  - **11. Other Manufacturing Products** 109
- **D. Electricity, Gas & Water** 109
  - **1. Electricity** 109
  - **2. City Gas** 110
  - **3. Water Supply** 110
- **E. Construction** 110
- **F. Trade, Hotels & Restaurants** 112
  - **1. Wholesale & Retail Trade** 112
  - **2. Hotels** 112
  - **3. Restaurants** 113
- **G. Transport & Communications** 113
  - **1. Transport** 114
  - **2. Communications** 116
- **H. Financial, Ownership & Business Services** 116
  - **1. Banks** 116
  - **2. Non-Bank Financial Institutions** 117
  - **3. Services Related to Finance** 119

4. **Building Rentals** 120
5. **Business Services** 121
I. **Services** 121
1. **General Government** 121
2. **Social & Community Services** 123
3. **Amusement & Recreation** 125
4. **Personal & Household Services** 127

III. **COMPILATION OF EXPENDITURE ACCOUNT** 130
A. **Private Consumption Expenditure** 131
B. **Government Consumption Expenditure** 135
C. **Export of Goods & Services** 136
D. **Imports of Goods & Services** 136
E. **Gross Domestic Fixed Capital Formation** 137
F. **Changes in Stocks** 138

APPENDIX A COMMODITIES USED IN MANUFACTURING PRICE INDICES 139

I. INTRODUCTION

This report is an attempt to document the current methodologies used by BPS in compiling the country's quarterly national accounts. Many BPS staff members contributed substantially to the attempt. One should note that methodologies in national accounting evolve over time: as new data sources become available or old ones are eliminated, the computation methodology for a particular variable may change. What is documented here is the set of core methodologies which form the basis for the most current estimations. These methodologies have involved evaluating dozens of data sources, deciding which ones are most appropriate to use and forcing consistency when sources appear inconsistent. Adjustments in methodologies to take account of special statistical problems in a particular quarter –reporting problems or unusual compositional changes, for example– are not described here.

The report is aimed at educating users within as well as outside BPS. Within BPS, the overall description in the report should help the staff understand what is done outside the limited area in which each person works. Such broader understanding should promote interchange of ideas and better appreciation of the strengths, weaknesses and areas needing attention in Indonesia's national accounts.

For users outside BPS, more knowledge of how data are calculated should enable useful feedback which will in turn help improve the accuracy and usefulness of the data. In addition, the report should help users outside BPS recognize that national accounts estimation is beset by substantial sources of uncertainty. The large number of data sources tapped vary greatly in quality, coverage and frequency; and alternative data sources are sometimes contradictory. It is not practical to expect compilers of national accounts to wait until primary data sources on every sector of economic activity are available. Given limited resources and binding time constraints, compromises and judgments on the part of the compilers are inevitable. In short, users need to recognize that national accounts compilation inevitably involves some margin of error.

II. COMPILATION OF PRODUCTION ACCOUNT

The nine-sector final published GDP tabulations are the result of estimations of fifty-eight sub-sectors which, in turn, are the outcome of estimations of about two hundred commodities and commodity groups. The majority involve the use of primary data collected quarterly or monthly by BPS, and some collected by the departments of Agriculture, Forestry, Finance, Mining & Energy, Transportation, as well as Bank Indonesia and PLN. Some involve estimations based on less frequently collected primary data and some are based on administrative data. Every figure used at the sub-sectoral level (and by extension, at the sectoral level) is subjected to a plausibility check by evaluating:

- its implicit cumulative growth rate for the year,
- its growth rate relative to the previous quarter,
- its growth rate relative to the same quarter of the previous year,
- its seasonally adjusted value (this applies only at the sectoral level and for total GDP).[1]

Plausibility checks are conducted for estimates at both constant and current prices. They are done in addition to various consistency checks, both of the internal structure of these accounts and with other reliable data sources.

The general approach guiding compilation of these accounts is to rely on the most complete data available at the time of release. When only partial data are available, compilers use any such information and supplement it with estimations. When no data are available, they rely on pure estimations. When estimations are necessary, the general guiding approach is to rely on simple methods as much as possible (e.g. averages, ratios, growth rates etc.); if results are implausible then more sophisticated econometric techniques (e.g. moving averages, regressions, ARIMA etc.) may be used.

Tables 1 and 2 summarize the basic methodologies used for compiling GDP by sector and sub-sector for constant and then for current price estimates. The section that follows describes these sectoral methodologies in more detail. The paper then turns to GDP by expenditure, again presenting summary tables and following with a more detailed description.

---

[1] This set of checks (which are applied to constant price estimates) started in 2000 with the quarter II data. The program used for seasonal adjustment is the US Census Bureau's X12 ARIMA. The version used currently is Release 0.2.7.

Table 1
Summary of Sources & Methods of Production Account at Constant Prices

Sector	Sub-Sector	Data Sources	Basic Methodology
Agriculture, Livestock, Forestry & Fishery	1. Farm Food Crops	BPS Agriculture Bureau	Quantities for 9 commodities obtained by multiplying average yield by area harvested. 1993 prices applied
	2. Non-Food Crops	DG Estate Crops, Dept. of Agr. & BPS monthly producer survey	Monthly quantities for 11 primary commodities obtained from survey, and trend applied to remaining 13 commodities. 1993 prices applied
	3. Livestock	GD Livestock, Dept. of Agr.	Quantities obtained for 9 commodities. 1993 prices applied
	4. Forestry	Dept. of Forestry	Quantities obtained for 7 commodities. 1993 prices applied
	5. Fishery	DG Fishery, Dept. of Agr.	Quantities obtained for 3 commodities. 1993 prices applied
Mining & Quarrying	1. Crude Petroleum & Natural Gas	Dept. of Mining	Quantities for 3 commodities obtained. 1993 prices applied
	2. Non-oil Gas & Mining	Dept. of Mining	Quantities for 21 commodities obtained. 1993 prices applied
	3. Quarrying	BPS Industry Bureau	Quarterly construction index is applied
Manufacturing	1. Petroleum Refining	DG Oil & Gas, Dept. Mining	Monthly quantities for 35 commodities obtained. 1993 prices applied
	2. LNG	DG Oil & Gas, Dept. Mining	Monthly quantities obtained. 1993 prices applied.
	3. Nine 2-digit ISIC	BPS Industry Bureau	Medium & Large establishments: quarterly manufacturing index applied by 3-digit ISIC Small & Cottage: average compound growth rate of employment in the 1998-99 SUSI surveys is applied by 3-digit ISIC
Electricity, Gas & Water	1. Electricity	PLN	Monthly production of PLN + non-PLN multiplied by 1993 price. VA to output ratio applied.
	2. City Gas	PGN	Monthly quantities are multiplied by 1993 prices. VA to output ratio applied.
	3. Water Supply	BPS survey of Water Supply Establishments	Annual quantities are multiplied by 1993 prices. Historical quarterly trend used. VA to output ratio applied.
Construction		Industry Bureau, DG forestry, DG Mining	Quantity indices of wood, bamboo, asphalt, cement and manufacturing building materials are obtained from various sources and applied to previous quarter
Trade, Hotels & Restaurants	1. Wholesale/Retail Trade	BPS I/O Surveys	Ratio of VA margin to supply is applied to supply of other sub-sectors
	2. Hotels	Dep. Tourism	VA regressed against number of foreign visitors
	3. Restaurants	Current price series, CPI	Price change in "prepared food" component of CPI is applied to current price series

Transport & Communications	1. Transport	Dep. Transport., relevant public enterprises	Annual quantities for 18 commodities. Quarterly trend of a sample of commodities or of historical series applied.
	2. Communications	PT Indosat, PT Pos, PT Telkom	Quantities for 13 commodities sold obtained. Quarterly trend of PT Telkom applied to others
Financial, Ownership & Business Services	1. Banks	Current price series, CPI	Price change in total CPI is applied to current price series
	2. Non-bank Financial Institutions	Current price series, WPI	Price change in total WPI is applied to current price series
	3. Services Related to Finance	Current price series, WPI	Same as above
	4. Building Rentals	Current price series, CPI	Price change in total CPI is applied to current price series
	5. Business Services	Current price series, CPI	Same as above
Services	1. General Government	Current price series, Dep. Finance	Current price series deflated by an employee compensation index for civil servants
	2. Social & Community	Dep. Education, Dep. Health	Education: quarterly expenditure per student in 1993 prices multiplied by number of students Health: quarterly expenditure per patient in 1993 prices multiplied by number of patients
	3. Amusement/Recreation	Dep. Tourism, Association of TV/radios, IO table	quarterly expenditure per unit for 3 activities in 1993 prices multiplied by number of units
	4. Personal & Household	Dep. Transport., Susenas, IO table	Vehicle repair: quarterly expenditure per vehicle in 1993 prices multiplied by number of vehicles Other repair: quarterly expenditure per worker in 1993 prices multiplied by number of workers Servants: quarterly expenditure per household in 1993 prices multiplied by number of households

Table 2
Summary of Sources & Methods of Production Account at Current Prices

Sector	Sub-Sector	Data Sources	Basic Methodology
Agriculture, Livestock, Forestry & Fishery	1. Farm Food Crops	Constant price series, WPI	Price changes in relevant component of WPI are applied to constant price series
	2. Non-Food Crops	Constant price series, WPI	Same as above
	3. Livestock	Constant price series, WPI	Same as above
	4. Forestry	Constant price series, WPI	Same as above
	5. Fishery	Constant price series, WPI	Same as above
Mining & Quarrying	1. Crude Petroleum & Natural Gas	Constant price series	Export unit value changes (in rupiah) are applied to constant price series
	2. Non-oil Gas & Mining	Constant price series, BPS Services Bureau	Current export prices (converted to rupiah) are applied to constant price series
	3. Quarrying	Constant price series, WPI	Price changes in "quarrying" component of WPI are applied to constant price series
Manufacturing	1. Petroleum Refining	DG Oil & Gas, Dept. Mining	Monthly quantities for 35 commodities obtained. Current prices applied
	2. LNG	DG Oil & Gas, Dept. Mining	Monthly quantities obtained. Current export prices converted to rupiah applied
	3. Nine 2-digit ISIC	Constant price series, WPI	Price changes in relevant component of WPI are applied to constant price series
Electricity, Gas & Water	1. Electricity	Constant price series, CPI	Price changes in relevant component of CPI are applied to constant price series
	2. City Gas	Constant price series, CPI	Same as above
	3. Water Supply	Constant price series, CPI	Same as above
Construction		Constant price series, WPI	Price changes in relevant component of WPI are applied to constant price series
Trade, Hotels & Restaurants	1. Wholesale/Retail Trade	BPS I/O Surveys	Ratio of VA margin to supply is applied to supply of other sub-sectors
	2. Hotels	Constant price series, CPI	Price changes in relevant component of CPI are applied to constant price series
	3. Restaurants	Susenas	Expenditure per household x number of households, divide equally by quarter
Transport & Communications	1. Transport	Constant price series, CPI	Price changes in relevant component of CPI are applied to constant price series
	2. Communications	PT Indosat, PT Pos, PT Telkom	Value of sales for 13 commodities obtained. Quarterly trend of PT Telkom applied to others
Financial, Ownership & Business Services	1. Banks	Bank Indonesia	Value added estimates obtained directly from Bank Indonesia

	2. Non-bank Financial Institutions	Dep. Finance, BPS special survey	Operating revenue obtained for 5 activities, converted to quarterly using historical trend. VA/output ratio applied
	3. Services Related to Finance	Jakarta/Surabaya Stock Exchanges, Bank Indonesia	Operating revenue obtained for 3 activities, converted to quarterly using historical trend. VA/output ratio applied
	4. Building Rentals	Susenas, Population estimates, real estate association	Dwelling: per capita consumption on rentals multiplied by population Non-Dwelling: monthly output for major cities.
	5. Business Services	INKINDO, BPS special survey	VA per consultant for 5 activities multiplied by number of consultants
Services	1. General Government	Dep. Finance, BPS special survey	Quarterly personnel expenditure + 5% estimated consumption of fixed capital
	2. Social & Community	Dep. Education, Dep. Health	Education: quarterly expenditure per student multiplied by number of students Health: quarterly expenditure per patient multiplied by number of patients
	3. Amusement/Recreation	Dep. Tourism, Association of TV/radios, IO table	quarterly expenditure per unit for 3 activities multiplied by number of units
	4. Personal & Household	Dep. Transport., Susenas, IO table	Vehicle repair: quarterly expenditure per vehicle multiplied by number of vehicles Other repair: quarterly expenditure per worker multiplied by number of workers Servants: quarterly expenditure per household multiplied by number of households

A. Agriculture, Livestock, Forestry & Fishery

This includes five sub-sectors:[2]

1. Farm Food Crops

Constant Prices

Quantities for eleven commodities are computed, one ("sagu") based on data from BPS's Industry Bureau and the other ten based on data from BPS's Agriculture Bureau:

[2] Generally, initial quantity estimates are based on available quarterly or monthly commodity data. For commodities where data are not yet available, a quarterly growth equal to that of the same quarter in the previous year is projected and sometimes modified based on current relevant information obtained from mass media.

- paddy ("padi")
- corn ("jagung")
- cassava ("ketela pohon")
- yam ("ketela rambat")
- green beans ("kacang hijau")
- peanuts ("kacang tanah")
- soy beans ("kacang kedelai")
- vegetables ("sayuran")
- fruits ("buah-buahan")
- potatoes ("kentang")

Data collection of the first seven commodities provided by the Agriculture Bureau is done monthly for area harvested and in three sub-rounds (each covering a four-month period) every year for the average yield. Monthly production is calculated as the product of area harvested and the average yield of the relevant four-month period, and is then aggregated by quarter. Quantities for the last three categories of products (i.e. vegetables, fruits and potatoes) are obtained from the monthly/quarterly survey conducted by BPS jointly with the Directorate General of Horticulture of the Department of Agriculture. This survey, which aims at measuring production of these commodities, is conducted monthly for seasonal fruits and vegetables and quarterly for non-seasonal fruits and vegetables, and covers all regencies/municipalities in Indonesia.

Quantities are then multiplied by their relevant 1993 prices. Since these production figures are those used for computing subsequent annual figures for the relevant commodities, they are generally not revised. The only time a revision takes place is when a more complete production survey for the year, e.g. based on the household approach rather than on the crop-cutting approach, is conducted. But that does not take place on a regular basis.

For "sagu", only annual data are available after a relatively long lag. Quarterly growth in production is assumed to be the same as the average quarterly production growth of "sagu"-consuming sectors.[3] Growth is then applied to the previous quarter's output to arrive at the current quarter's estimate of production.

Figures are then summed-up and a value-added to output ratio (derived from the 1995 IO table) is then applied to produce a value added level at constant 1993 prices. A further 3.5% markup (derived from the 1995 IO table) of the aggregate level is added to take into consideration the contribution of other commodities in this category.

Current Prices

For all commodities except potatoes, vegetables, fruits and "sagu", the initial estimate of

[3] These include the following 5-digit ISICs: 31112, 31134, 31171, 31212, 31219, 31241, 31249, 31251.

the value of production relies on the use of the Wholesale Price Index (WPI)[4]. Once monthly rupiah data are available, about six months after the end of the reference year, the actual rupiah prices for individual commodities are used.

Let Q_i^I represent the quantity of commodity i produced in quarter I
Q_i^{II} the quantity of commodity i produced in quarter II
P_i^I the average price of commodity i in quarter I
P_i^{II} the average price of commodity i in quarter II

The methodology for computing the initial estimate of the value of production of commodity i in quarter II can be described as:

$$Q_i^{II} P_i^{II} = (Q_i^{II} / Q_i^I) \ (P_i^{II} / P_i^I) \ (Q_i^I P_i^I) \qquad (1)$$

The first term on the right hand side of the equation represents the change in real production in quarter II, the second term the change in the price index and the third term the value of production of quarter I. Once rupiah prices are available, P_i^{II} is simply multiplied by Q_i^{II}.

For potatoes, vegetables, fruits and "sagu", the Consumer Price Index (CPI)[5] is applied to quantity estimate for the quarter and the current value is calculated as in Equation (1). No revision to prices is done in this case since the only available data refer to index numbers.

Here again, a value-added to output ratio (derived from the 1995 IO table) is applied to convert the "value of output" estimate into a value-added estimate and a 5% markup (from the 1995 IO table) is applied.

2. Non-Food Crops

Constant Prices

Annual quantities are obtained for 22 commodities (from the Directorate General of Estate Crops of the Department of Agriculture), which are grouped into two main categories:[6]

a. Major commodities: these make up 77% of the value of all commodities in this sub-sector in 1993. They include:
   - cocoa ("cokelat")

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4 Specifically, it uses the average index for the relevant commodity under "food crops" calculated for 14 provinces.

5 Specifically, the "vegetables" and "fruits" components of the composite CPI for 43 cities is applied to the relevant category.

6 Before such annual data are available, the quarterly growth rate for various commodities is estimated as the average growth rate for the relevant quarter (and commodity) over the previous four years.

- cloves ("cengkeh")
- rubber ("karet")
- cane sugar ("tebu")
- coconut ("kelapa")
- palm oil ("kelapa sawit")
- coffee ("kopi")
- tobacco ("tembakau")
- tea ("teh")

b. Minor commodities: these make up 23% of the value of all commodities in this sub-sector in 1993. They include:

- vanilla ("panili")
- cotton ("kapas")
- pepper ("lada")
- nutmeg ("pala")
- cinnamon ("kayu manis")
- rosella ("rami")
- jute ("serat karung")
- ginger ("jahe")
- cashew ("jambu mete")
- "jarak"
- capok ("kapok")
- quinine ("kemiri")
- "kina"

A monthly survey of a sample of producers of major commodities is conducted for the purpose of estimating monthly production and its value. That monthly ratio of annual production is applied to the total annual production obtained from the Department of Agriculture to calculate quarterly production estimates.

For the thirteen minor commodities, the quarterly real quantity trend of the nine primary commodities is applied to the annual production figure obtained from the Department of Agriculture. Quantity data for commodities are multiplied by their corresponding prices in 1993. A value-added to output ratio (derived from the 1995 IO table) is then applied to produce a value added level at constant 1993 prices. These levels are then added up, a 4% markup of the aggregate level is added to take into consideration the contribution of the by-products ("produk ikutan") of the above commodities, and a further 5% for the contribution of other commodities in this category (both derived from the 1995 IO table)

Current Prices

The same valuation methodology used in food crops applies here. That is, an initial estimate of the value of production uses the "estates" component of WPI, as in Equation (1)

above. Once monthly rupiah data are available, about six months after the end of the reference year, the actual rupiah prices for individual commodities are used.[7]

Here again, a value-added to output ratio is applied to convert the "value of output" estimate into a value-added estimate and the same 4% and 5% markups are applied as in the case of constant price figures.

3. Livestock

Constant Prices

Quarterly quantities are obtained for nine commodities from the Directorate General of Livestock of the Department of Agriculture Bureau:[8]

- cows
- buffalos
- goats
- pigs
- horses
- chickens
- ducks
- eggs
- milk

Numbers are changed subsequently only if different annual data become available.

Quantity data for commodities are multiplied by their corresponding prices in 1993. A value-added to output ratio (derived from the 1995 IO table) is then applied to produce a value added level at constant 1993 prices. These levels are then added up, a 0.5% markup of the aggregate level is added to take into consideration the contribution of the by-products ("produk ikutan") of the above commodities, and a further 1.8% for the contribution of other commodities in this category (both derived from the 1995 IO table).

Current Prices

The same valuation methodology used in food crops applies here. That is, an initial

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7 Ten secondary commodities are not included in the WPI and therefore require the use of proxies. Commodities and corresponding proxies (in parentheses) are: cocoa; ginger, "jarak", "kemiri" and "kina" ("kayu manis" and "rempah-rempah"); "jambu mete", "panili", "rami" and "serat karung" ("tanaman perdagangan").

8 Quantity produced for a particular type of animal, measured by the number of heads, is defined as the sum of: quarterly increase in population + number of heads slaughtered + (exports - imports). For slaughtered animals, the following conversion factors (from kg of meat to heads) are used: cows (156.4 kg/head), buffalo (160 kg/head), goats (10 kg/head), pigs (50 kg/head), horses (125 kg/head), chicken (0.75 kg/head) and ducks (0.75 kg/head).

estimate of the value of production uses the "Livestock" component of WPI, as in Equation (1) above. Once monthly rupiah data are available, about six months after the end of the reference year, the actual rupiah prices for individual commodities are used.

Here again, a value-added to output ratio is applied to convert the "value of output" estimate into a value-added estimate and the same 0.5% and 1.8% markups are applied as in the case of constant price figures.

4. Forestry

Constant Prices

Monthly quantities are obtained for seven commodities from the Department of Forestry:

- teak ("kayu jati")
- "kayu rimba"
- "kayu rakyat"
- firewood ("kayu bakar")
- charcoal ("arang")
- bamboo ("bambu")
- rattan ("rotan")

Production data for the first two commodities are used as reported. However, monthly data for the other five commodities show implausible discontinuities. For these commodities, annual data obtained from the same source are used, monthly trends from the previous year are applied and used to calculate quarterly figures.

Quantity data for commodities are multiplied by their corresponding prices in 1993. A value-added to output ratio (derived from the 1995 IO table) is then applied to produce a value added level at constant 1993 prices. These levels are then added up and a markup of 1.6% (derived from the 1995 IO table) is applied.

Current Prices

The same valuation methodology used in food crops applies here. That is, an initial estimate of the value of production uses the "forestry" component of WPI, as in Equation (1) above. Once monthly rupiah data are available, about six months after the end of the reference year, the actual rupiah prices for individual commodities are used.

Here again, a value-added to output ratio is applied to convert the "value of output" estimate into a value-added estimate and a 1.6% markup is applied.

5. Fishery

Constant Prices

Annual quantities are obtained for three commodities from the Directorate General of Fishery of the Department of Agriculture):

- fresh water fish ("ikan darat")
- salt water fish ("ikan laut")
- shrimp ("udang")

Quarterly estimates before the annual data are available are computed by applying the average growth rate of the reference quarter over the past four years.

Quantity data for commodities are multiplied by their corresponding prices in 1993. A value-added to output ratio (derived from the 1995 IO table) is then applied to produce a value added level at constant 1993 prices. These levels are then added up, and a further 2.5% markup of the aggregate level is added to take into consideration the contribution of other commodities in this category (derived from the 1995 IO table).

Current Prices

The same valuation methodology used in food crops applies here. That is, an initial estimate of the value of production uses the "fishery" component of WPI, as in Equation (1) above. Once monthly rupiah data are available, about six months after the end of the reference year, the actual rupiah prices for individual commodities are used. A value-added to output ratio is applied to produce a value added level at current prices. These levels are then added up, and a further 2.5% markup is applied.

B. Mining & Quarrying

This includes three sub-sectors:

1. Crude Petroleum & Natural Gas

Constant Prices

Monthly quantity growth rates are obtained for four commodities from EKUIN reports (which are based on data provided by the Directorate General of Oil & Gas of the Department of Mining and Energy):

- crude oil (in barrels)
- condensate (in barrels)
- natural gas (LNG, in MSCF)
- geothermal steam (in tons)

These rates are applied to the previous quarter's levels to arrive at the current quarter's preliminary estimates. A revision is made when official monthly quantities are obtained from the Directorate General of Oil & Gas. These are then multiplied by their relevant 1993 prices.

When annual quantity data for the four commodities are produced by the Department of Mining & Energy, which is normally done with a lag of about six months, they are multiplied by their relevant 1993 prices to arrive at a constant price estimate of production. This estimate is then multiplied by the relevant value-added to output ratio computed for 1993, which was based on that year's BPS survey of Petroleum and Natural Gas Mining Companies.[9] Any difference in annual figures between the initial estimates (based on monthly official quantities) and final figures (based on annual quantities) is then attributed to the December figures.

Current Prices

Monthly quantities for every commodity are multiplied by a rupiah price computed as a weighted average of the domestic price and the export unit value (converted at the average monthly exchange rate), with weights obtained from the latest annual survey of petroleum and natural gas mining companies. A value-added to output ratio (from that survey) is then applied to arrive at total value added at current prices.

2. Non-Oil & Gas Mining

Constant Prices

Monthly total quantities are obtained for nine major (and seven minor) commodities from EKUIN reports (which contain the latest data from the Department of Mining):

- coal ("batubara")
- copper ("tembaga")
- bauxite
- tin ("timah")
- "ferro nickel"
- "bijih nickel"
- "nickel mattes"
- gold ("bijih emas")
- silver ("bijih perak")
- asphalt ("aspal alam")
- manganese ("bijih mangan")
- sulfur ("belerang")
- iodine ("yodium")

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9 This is an annual survey conducted by the division of Mining, Energy and Construction covering input and output structure of establishments in this sector.

- phosphate
- iron sand ("pasir besi")
- other minor commodities

Monthly exports of each commodity are then compared with total production, and the difference is defined as production for domestic consumption. Relevant 1993 prices (distinguishing between exported and domestic consumption) are applied to calculate production at constant prices. Finally, a value-added to output ratio is applied, obtained from the BPS annual survey of Non-Petroleum and Natural Gas Mining.[10] Revisions to monthly figures are only made when official figures obtained from EKUIN reports are changed.

Current Prices

Since the largest share of these commodities is exported, the principal source of valuation is export unit values. Monthly exported quantities of the above commodities are valued using the relevant unit price converted into rupiah at the average monthly exchange rate. For domestic commodities, a ratio of domestic/export price for the particular commodity is used based on historical behavior.

3. Quarrying

Constant Prices

Quarterly changes are estimated by applying the quarterly index of construction to the previous quarter's levels. These figures are revised when the quarterly construction index is, but no annual revision takes place since no other more complete data exist.

Current Prices

Constant price value-added estimates are inflated by using the "quarrying" component of the Wholesale Price Index.

C. Manufacturing

This includes eleven sub-sectors:

1. Petroleum Refining

Constant Prices

Three sets of data are obtained from the Directorate General of Oil and Gas of the Department of Mining and Energy: monthly, quarterly and annual. Data refer to quantity of

[10] This is a survey conducted by the division of Mining, Energy and Construction covering input and output structure of establishments in these sectors.

refined products during the relevant period. Refined products include:

- 11 types of fuels
- 22 types of non-fuels
- 4 types of refining fuels.

Preliminary estimates rely on monthly figures. Revisions, when necessary, are made subsequently based on quarterly and annual reports. Quarterly quantities (in barrels) are multiplied by their corresponding 1993 prices, then summed up. A value-added to output ratio (from the annual Survey of Petroleum Mining and Natural Gas conducted by BPS) is then applied.

Current Prices

Quarterly quantities (in barrels) are multiplied by their corresponding domestic prices,[11] then summed up. A value-added to output ratio (from the annual Survey of Petroleum Mining and Natural Gas conducted by BPS) is then applied.

2. Liquefied Natural Gas

Constant Prices

Three sets of data are obtained from the Directorate General of Oil and Gas of the Department of Mining and Energy: monthly, quarterly and annual. Data refer to quantity of LNG produced by the two refineries in Arun and Badak. Preliminary estimates rely on monthly figures. Revisions, when necessary, are made subsequently based on quarterly and annual reports. Quarterly quantities (in cubic meters) are multiplied by their corresponding 1993 prices, then summed up. A value-added to output ratio (from the annual Survey of Petroleum Mining and Natural Gas conducted by BPS) is then applied.

Current Prices

As LNG is primarily destined for exports, quarterly quantities (in cubic meters) are multiplied by a corresponding average quarterly unit value converted to rupiah at the average quarterly exchange rate, then summed up. A value-added to output ratio (from the annual Survey of Petroleum Mining and Natural Gas conducted by BPS) is then applied.

3. Food, Beverages & Tobacco

Constant Prices

For every 3-digit ISIC component two quarterly indices are computed:

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[11] Prices for various refined products are set by the government and are produced in the quarterly reports of the Directorate General of Oil and Gas..

- first is the contribution of Medium & Large establishments. Data are obtained from the Industry Bureau's Quarterly Manufacturing Survey.[12]

- the second is the contribution of small and cottage industries. Since no quarterly primary data sources are available, a constant growth rate is estimated as the average quarterly compound growth rate of employment in the SUSI surveys of 1998 and 1999.[13]

Let	Q_i^I and Q_i^{II}	represent the quantities of 3-digit ISIC sub-sector i produced in quarters I and II respectively
	II_i^I and II_i^{II}	the quantities of intermediate inputs used by sub-sector i in quarters I and II respectively
	PO_i^{93}	the price of output produced by sub-sector i in 1993, the numeraire year
	PI_i^{93}	the price of intermediate inputs used by sub-sector i in 1993

The estimate of the value added of sub-sector i in quarter II is identically equal to:

$$(Q_i^{II} PO_i^{93} - II_i^{II} PI_i^{93}) = (Q_i^I PO_i^{93} - II_i^I PI_i^{93}) [(Q_i^{II} PO_i^{93} - II_i^{II} PI_i^{93}) / (Q_i^I PO_i^{93} - II_i^I PI_i^{93})] \quad (2)$$

The first term on the right hand side of the equation is the value added in quarter I, and the second term represents the change in value added between quarters I and II. Assuming that the value added to output ratio is constant in the short term, then Equation (2) becomes:

$$(Q_i^{II} PO_i^{93} - II_i^{II} PI_i^{93}) = (Q_i^I PO_i^{93} - II_i^I PI_i^{93}) (Q_i^{II} PO_i^{93} / (Q_i^I PO_i^{93}) \quad (3)$$

which can be simplified as:

$$(Q_i^{II} PO_i^{93} - II_i^{II} PI_i^{93}) = (Q_i^I PO_i^{93} - II_i^I PI_i^{93}) (Q_i^{II} / Q_i^I) \quad (4)$$

The second term of this equation is nothing but the growth in the quarterly production index for ISIC i in quarter II for medium and large establishments obtained from the Industry Bureau. For small and cottage industries, the same relationship in Equation (4) is used, except that the ratio

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12 If relevant indices from that survey are not available, the average growth rate for the reference quarter between 1993 and the latest available year is used.

13 SUSI (Survei Usaha Terintegrasi) is an area-based annual survey of non-agricultural small and cottage industries started in 1998.

Q_i^{II} / Q_i^{I} is constant from quarter to quarter.

Value added measures for 3-digit ISIC's are then added up to obtain the total value added at constant prices for the "Food, Beverages & Tobacco" sub-sector.[14]

Current Prices

Current price value-added figures are computed at the 3-digit ISIC in three stages:

- First, commodity output in constant prices ($Q_i^{II} PO_i^{93}$) is multiplied by the relevant monthly commodity (output) price indices[15] in the WPI to produce commodity output in current prices ($Q_i^{II} PO_i^{II}$),
- these figures are added up to produce a 3-digit ISIC output in current prices,
- this is then multiplied by the annual value added to output ratio derived from the latest annual survey of medium and large manufacturing establishments.[16]

4. Textiles, Leather Products & Footwear

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

5. Wood Products

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

6. Paper & Printing

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

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14 Output in constant prices ($Q_i^{II} PO_i^{93}$) is also computed (it is the product of the value-added ratio between the two quarters and the constant price output of the previous quarter), and is used primarily as a component of total supply for the compilation of the constant price value added of the Wholesale & Retail Trade sub-sector (see Section II.F.1).

15 Appendix A provides the correspondence between various WPI commodities and 3-digit ISIC.

16 A plan is underway for using the 3-digit implicit unit value indices produced by the Industry Bureau on a quarterly basis. These indices are more appropriate deflators of the quarterly production indices than the currently used components of the WPI for two main reasons: a) they cover far more commodities than the WPI; b) they rely on exactly the same data reported by establishments and used in computing the corresponding production index.

7. Fertilizers, Chemicals & Rubber Products

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

8. Cement & Non-Metallic Mineral Products

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

9. Basic Iron & Steel

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

10. Transportation Equipment & Machinery

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

11. Other Manufacturing Products

The same methodology used in "Food, Beverages & Tobacco" is applied to this sub-sector.

D. Electricity, Gas & Water

This includes three sub-sectors:

1. Electricity

Constant Prices

Monthly quantity of electricity produced (by both PLN and other producers) are obtained from PLN. These are then multiplied by their corresponding price in 1993. A 1993 value-added to output ratio (derived from that year's BPS survey of PLN[17]) is then applied to produce a value added level at constant 1993 prices. These levels are then added up, and a further 4% markup of the aggregate level is added to estimate the value added of self-generation by households (derived from the 1990 IO table).

Current Prices

Growth in the "Fuel, electricity, water" component of the Consumer Price Index is applied to the previous quarter's rupiah prices and multiplied by the quantities above. A value-added to

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17 The survey is conducted annually by the division of Mining, Energy and Construction covering input and output structure of all 22 units of PLN.

output ratio derived from the current year's survey of PLN is then applied as well as the same 4% markup used in estimating constant price figures.

2. City Gas

Constant Prices

Monthly quantity data are obtained from the monthly EKUIN report (which contain the latest available data from the state gas company Perusahaan Gas Negara, PGN) and multiplied by their corresponding 1993 price. This estimate is then multiplied by the 1993 value-added to output ratio obtained from the BPS annual survey of PGN.

Current Prices

Growth in the "Fuel, electricity, water" component of the CPI is applied to the previous quarter's rupiah prices and multiplied by the quantities above. A value-added to output ratio obtained from the current year's survey of PGN is then applied.

3. Water Supply

Constant Prices

For lack of primary data sources on production of drinking water, initial quarterly growth rates for a particular year are assumed to be the same as those of the previous year. Once results of the annual BPS survey of Water Supply Establishments[18] are available, estimates are revised: quantities of water produced is multiplied by their corresponding 1993 price and the same quarterly trend is kept. This estimate is then multiplied by a value-added to output ratio obtained from the 1993 survey.

Current Prices

Quarterly current price estimates are computed as the product of the constant price quarterly estimate and the level of the "Fuel, electricity, water" component of the CPI.

E. Construction

Constant Prices

Quarterly quantities are calculated using the following four-step procedure:

1) First, quarterly quantity indices are calculated for five categories of commodities:
   - "kayu pertukangan" (obtained from the Directorate General of Forestry)

[18] The survey is conducted by the division of Mining, Energy and Construction covering input and output structure of about 500 establishments.

- bamboo (obtained from the Directorate General of Forestry)
- asphalt (obtained from the Directorate General of Mining)
- cement input (obtained from various bureaus of BPS and computed as production (of ISIC 36310) + imports - exports[19]
- production of building materials (obtained from the Quarterly Manufacturing Survey) defined as ISICs: 33111, 33113, 35210, 36112, 362, 36310, 36320, 364, 371, 38131, 38139. Indices are aggregated using ISIC shares in industry output in 1990 Input-Output Table.
- imported building materials: dollar values are converted into rupiah and deflated using the "general" index of imported commodities of the WPI.

2) Changes in the indices are multiplied by the previous quarter's constant price series then summed up to obtain an estimate for intermediate inputs for the construction sector from the above sub-sectors.

3) A 3.9% markup is added to allow for other intermediate inputs not accounted for above (that was obtained from the 1990 Input-Output Table). The total then represents total intermediate inputs used by the construction sector.

4) Finally, a ratio of intermediate inputs to output (obtained from the 1990 IO table) is used to estimate quarterly output at constant prices. Value added is then computed as the difference between estimates of output and intermediate inputs.

Current Prices

The constant price components above are inflated using various relevant components of the WPI:

- the "kayu gelondongan" component for "kayu pertukangan",
- the "bamboo" component for bamboo,

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[19] Calculations for cement are a bit more complicated given the multiplicity of sources. First, the production index is multiplied by the previous quarter's level. Then imported and exported dollar values are converted to rupiah and divided by the "other non-metallic mineral products" component of the WPI.

- the "asphalt" component for asphalt, and
- the "general index" of manufacturing commodities is used for cement and other domestic building materials.

As with the constant price series, these values are summed up then inflated by 3.9% to estimate total intermediate inputs of the construction sector. A ratio of intermediate inputs to output (obtained from the current year's BPS survey of construction establishments) is used to estimate quarterly output. Value added is then computed as the difference between estimates of output and intermediate inputs.

F. Trade, Hotels & Restaurants

This includes three sub-sectors.

1. Wholesale & Retail Trade

During Input-Output years (and occasionally in between), BPS conducts a special survey for the Trade & Services sector involving about 1000 producers and 750 traders, and referred to as SKSPJ ("Survei Khusus Sektor Perdagangan Dan Jasa"). The latest survey includes separate questionnaires tailored to five sub-sectors: trade, restaurants, services related to communications, services supporting transportation, vehicle repairs and consulting activities. The purpose of the survey is to compute the structure of inputs and outputs of various sub-sectors. The main purpose of the survey of traders is to compute a trade margin to assign to various sectors in the Input-Output table. A value-added margin (defined as the trade margin less intermediate consumption) is then computed and aggregated by 5-digit ISIC, then to various sub-sectors in the production accounts. A ratio of the value-added margin to the value of production in that year is then computed.

Constant Prices

The ratio of value-added margin to total supply (defined as the sum of output and imports) from the 1995 survey is applied to total supply figures in constant prices of various sub-sectors of the production accounts computed above. Results are then summed up to produce the value added at constant prices of the Wholesale & Retail Trade sub-sector.

Current Prices

The ratio of value-added margin to the value of production from the 1995 survey is applied to the current prices supply of various sub-sectors of the production accounts computed above. Results are then summed up to produce the value added at current prices of the Wholesale & Retail Trade sub-sector.

2. Hotels

Constant Prices

No direct measure of the value added of this sector was available until 2000, when BPS started surveying this sub-sector to measure directly its output and value added. This survey will be run annually. Until data from the first survey are fully processed and results are evaluated, the indirect estimation method which had been used in the past will continue to be used. This method estimates only the contribution of hotels with a "star" ranking.[20] Monthly data on the number of foreign visitors to Indonesia are obtained from the Department of Tourism. These in turn are aggregated by quarter and a linear regression is estimated with value added as the dependent variable and the number of foreign tourists as the independent variable.

Current Prices

The constant price quarterly estimate is inflated using the "Recreational Services" component of the CPI.

3. Restaurants

Constant Prices

The current price quarterly estimate is deflated using the "Prepared Food" component of the CPI.

Current Prices

For 2000, as in previous years in which an Input-Output table was constructed, value added will be measured based on the special Trade & Services survey (SKSPJ). Until these results are available, and for lack of any source of primary data on the number and the output of restaurants, value added for this sub-sector is based on indirect estimates. The only available source of data on the output of this sub-sector is Susenas, and the closest variable in Susenas to the output of this sub-sector is household expenditure on prepared food ("makanan jadi"). Thus an annual measure of household expenditure on prepared food is calculated as the product of:

a. expenditure per household based on the detailed Susenas conducted once every three years. This is then inflated to current year values using the "Prepared Food" component of the CPI.

b. the number of households based on the core Susenas conducted annually.

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[20] About 800 such hotels exist in addition to about 8800 hotels with no "star" ranking.

Annual figures are then divided by four to obtain quarterly figures. A 5% markup is applied.

G. Transport & Communications

This includes two sub-sectors:

1. Transport

This sub-sector includes six activities:

Railway Transportation

Quarterly data on the number of passengers and total freight are obtained from PT Kereta Api Indonesia, the public enterprise managing this activity. Quarterly growth for each category is then calculated and applied to the relevant levels of the previous quarter. Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

Road Transportation

Annual data are obtained from the Department of Transportation for three commodities:

- passenger cars (number of passengers)
- buses (number of passengers)
- trucks (volume of freight)

Since the only quarterly data for any of the above commodities refer to data from two bus companies (PPD and Damri), the quarterly trend of passenger from these companies is applied to all other categories of road transportation.

Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

Ocean Transportation

Annual data are obtained for two commodities:

- passengers (number of passengers): obtained from PT PELNI, the public enterprise managing this activity
- freight (volume of freight): obtained from the Department of Transportation.

To produce quarterly estimates, the quarterly trend in the "Volume of Inter-Island Cargo Loaded at 4 Main Seaports" (produced by BPS) is used. Growth in volume for all four ports is used.

Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

River, Lake and Ferry Transportation

Annual data are obtained from the Department of Transportation for three commodities:

- number of passengers
- volume of freight
- number of vehicles carried by ferry

To produce quarterly estimates, historical trends for each one of the commodities are used.

Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

Air Transportation

Annual data are obtained from the Department of Transportation for four commodities:

- number of passengers on domestic flights
- number of passengers on international flights
- freight carried on domestic flights (volume of freight)
- freight carried on international flights (volume of freight)

To produce quarterly estimates, the following quarterly trends are used (all published monthly in BPS's "Indikator Ekonomi"):

- for the number of passengers on domestic flights: "Domestic Aircraft Passenger Traffic at 5 Main Airports"
- for the number of passengers on international flights: "International Aircraft Passenger Traffic at 4 Main Airports"
- for the volume of freight carried on domestic flights: "Volume of Domestic Aircraft Cargo Loaded/Unloaded at 5 Main Airports"
- for the volume of freight carried on international flights: "Volume of International Aircraft Cargo Loaded/Unloaded at 4 Main Airports"

Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

Services Supporting Transportation

For lack of data measuring directly this activity, the quarterly trend in freight activity is applied based on the following indicators (all published monthly in BPS's "Indikator Ekonomi"):

- "Volume of Inter-Island Cargo Loaded/Unloaded at 4 Main Sea Ports"
- "Volume of International Cargo Loaded/Unloaded at 4 Main Sea Ports"
- "Volume of Domestic Aircraft Cargo Loaded/Unloaded at 5 Main Airports"
- "Volume of International Aircraft Cargo Loaded/Unloaded at 4

Main Airports"

Current price estimates are obtained by inflating these figures by the "Transportation" component of the CPI.

2. Communications

This sub-sector includes three giant public enterprises: PT Indosat, PT Pos Indonesia and PT Telkom. The first two report only annually while the third one reports quarterly. All provide data on their value and volume of sales. Output of Indosat is computed using five commodities:

- telephone calls (number of minutes)
- telex (number of minutes)
- telegrams (number of words)
- direct telegraph transmission lines (meter usage measured in "sirkit")
- direct data transmission lines (meter usage measured in "sirkit")

For PT Pos Indonesia, output is computed using four commodities:

- number of letters
- number of packages
- money transfers (number of forms filled)
- checking/savings accounts "cek & giro"(number of transactions)

For PT Telkom, output is computed using four commodities:

- domestic telephone calls (meter usage)
- manual long-distance calls (minutes)
- telex (meter usage)
- telegrams (words)

A further estimate is made for "services related to communications" using the number of establishments involved in the "wartel/warpostel/warparpostel" activity obtained from PT Telkom. Quarterly trend in output for PT Telkom and PT Pos is applied to the annual output data of Indosat and for "services related to communications", since the share of these companies in the sub-sector exceeds two-thirds. Both current and constant price data are then multiplied by the sub-sector's value-added to output ratio (from the 1995 IO table) to obtain a value added figure and a further 5% markup is added (based on the 1995 IO table) for the contribution of other activities.

H. Financial, Ownership & Business Services

This includes five sub-sectors:

1. Banks

This sub-sector includes activities of three types of banking institutions: the central bank, commercial banks and small credit banks ("bank perkreditan rakyat").

Constant Prices

Quarterly current price figures are deflated as follows:

a. Central bank: the "wages and salaries" component is deflated using the "General" component of the CPI. The other three components are deflated using the implicit total GDP deflator (excluding the banking sector) obtained from the production accounts.

b. Commercial banks: the "wages and salaries" component is deflated using the "General" component of the CPI. The other three components of the income accounts are deflated using the implicit total GDP deflator (excluding the banking sector) obtained from the production accounts.

c. Small credit banks: as is the case with current price figures, the average quarterly growth rate of value added of commercial banks is applied to these institutions.

Current Prices

Quarterly value added figures are computed as the sum of the following components:

a. Central bank: value added figures computed using the production and the income (cost) approaches are obtained from Bank Indonesia. The income approach figures are divided into the four main components, namely employee compensation, depreciation, indirect taxes and operating surplus.

b. Commercial banks: value added figures computed using the production and the income approaches are obtained from Bank Indonesia.[21] Here again, the income approach figures are divided into the four main components as above.

c. Small credit banks: for lack of any reliable quarterly (or annual) data allowing computation of value added for these institutions, the average quarterly growth rate of value added of commercial

[21] These are computed by Bank Indonesia based on Form 02 (profit and loss statement) which banks are required to report monthly.

banks is applied to these institutions.[22]

2. Non-Bank Financial Institutions

This sub-sector includes activities of five types of institutions, each with its own computation methodology: insurance companies, pension funds, leasing companies, pawn shops and savings cooperatives.

Constant Prices

Current price figures are deflated as follows:

a. Insurance companies: the "General" component of the WPI is used.

b. Pension funds: the "General" component of the CPI is used.

c. Leasing companies: the "General" component of the WPI is used.

d. Pawn shops: the "General" component of the WPI is used.

e. Savings cooperatives: the "General" component of the WPI is used.

Current Prices

Quarterly value added figures at computed as the sum of the following components:

a. Insurance companies: annual output is computed from financial statements obtained from the Department of Finance.[23] A value-added to output ratio (from the 1995 IO table) is then applied. Quarterly figures are then derived using the average quarterly trend for the sub-sector in the past three years.[24]

b. Pension funds: annual value added is obtained from the annual survey of non-banking financial institutions (Survei Lembaga Keuangan Bukan Bank, LKBB) conducted by BPS for the purpose of computing the national flow of funds accounts. Quarterly figures are then derived using the average quarterly trend for the

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22 In the benchmark annual accounts of 1993, the share of these institutions in value added of this sub-sector was about 1.5%.

23 "Laporan Kegiatan Perasuransian di Indonesia".

24 These estimates are crossed-checked against results from the annual survey of non-banking financial institutions (LKBB), results of which are available with a relatively long lag.

sub-sector in the past three years. Since data from the survey are only available with a relatively long lag, preliminary growth rate of a particular quarter is estimated as the average real growth rate (in that activity) for that quarter in the past three years inflated by growth in the "General" component of the CPI.

c. Leasing companies: annual output is computed from financial statements obtained from the Department of Finance. A value-added to output ratio (from the 1995 IO table) is then applied. Quarterly figures are then calculated using the average quarterly trend for the sub-sector in the past three years.

d. Pawn shops: annual value added is computed from financial statements obtained from PT Perum Pegadaian, a public enterprise under the Department of Finance. Quarterly figures are then derived using the average quarterly trend for the sub-sector in the past three years.[25]

e. Savings cooperatives: value added of these institutions is assumed to be 1.5% that of the non-banking financial institutions, which was the share in the 1995 IO table. No special computation is made for this category. Rather, once value added of all above four categories is computed, a 1.5% markup is added to produce the value added of the non-banking financial institutions as a whole.

3. Services Related to Finance

This includes activities of three categories of institutions: capital markets, institutions related to capital markets and foreign exchange dealers.

Constant Prices

Current prices for each category of institution are deflated using the "general" component of the WPI.

Current Prices

Quarterly value-added figures are computed as the sum of the following components:

a. Capital markets: annual output (or operating revenue) is computed from financial statements of the two institutions in this category: the Jakarta and the Surabaya Stock Exchanges. A value-added to

[25] These estimates are crossed-checked against results from the annual survey of non-banking financial institutions (LKBB), results of which are available with a relatively long lag.

output ratio (from the 1995 IO table) is then applied. Quarterly figures are then derived using the average quarterly trend for the sub-sector in the past three years.

b. Institutions related to capital markets: quarterly value added trend of capital market institutions is applied here.

c. Foreign Exchange Dealers: monthly data are obtained from Bank Indonesia for the volume as well as value of foreign exchange transactions. This is used as a proxy for output of these establishments. A value-added to output ratio (from the 1995 IO table) is then applied, and data are aggregated quarterly.

4. Building Rentals

This includes two types of rentals: dwelling and non-dwelling. For lack of any source of primary data on the number and the output of establishments undertaking these activities, value added for this sub-sector is based on indirect estimates

Constant Prices

Quarterly estimates at current prices are deflated using the "cost of housing" component of the CPI.

Current Prices

Quarterly value added is computed in the following steps:

a. Dwelling:
- monthly per capita expenditure on housing rent (both direct and imputed) is derived from the latest Susenas survey.
- this value is converted into a current year value by applying the "cost of housing" component of the CPI.
- a quarterly value is then calculated from the monthly values.
- the quarterly per capita consumption is then multiplied by a quarterly estimate of the population (derived from the published BPS annual population estimates and subjected to a quarterly compound growth rate) to produce an estimate of output for this activity.
- a value-added to output ratio (from the 1995 IO table) is then applied.

b. Non-Dwelling:
- quarterly bulletins are obtained from the real estate association of the Jabotabek and Surabaya property markets. These include data on office and shop rentals (both area and value).[26]
- a value-added to output ratio (from the 1995 IO table) is then applied.

5. Business Services

This includes six types of consulting services: legal, accounting, architectural, research, data processing and machinery rental. Annual data are obtained from an annual directory published by the associations of Indonesian Consultants (INKINDO), Accountants (IAI), Advertisers (Perum Perusahaan Periklanan Indonesia) and from the 1996 Economic Census.

Constant Prices

Quarterly estimates at current prices are deflated using the "general" component of the CPI.

Current Prices

Quarterly value added is computed in three steps:

a. A quarterly number of consultants in each category is computed by applying the previous year's quarterly trend to the current year's annual level.

b. A value-added per consultant is obtained from the special survey conducted for input-output tables (SKSPJ) and converted to a current year value by using the "general" component of the CPI.

c. Value added per consultant (for each category) is then multiplied by the corresponding number of consultants in that category to produce the total value added for this sub-sector.

I. Services

This includes four sub-sectors:

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26 These numbers are crossed-checked against data published by some of the largest real estate service companies (e.g. Jones Lang LaSalle) for plausibility.

1. General Government

This involves two activities: government administration and defense and other government services.

Constant Prices

Quarterly estimates are calculated as follows:[27]

a. An annual Laspeyres-type quantity index for employees is computed, aggregating the number of civil servants over the four major ranks ("golongan") and using 1993 compensation levels as numeraire.

b. An increase in the index over the previous year is then derived and interpolated among the four quarters of the current year.

c. This quarterly increase is then multiplied by the previous quarter's level.

Current Prices

Quarterly value-added figures are computed for the central, provincial, regency and village governments in three steps:

a. Total value added for this sub-sector is calculated using the income (cost) approach as the sum of two components:[28]

- employee compensation: this includes wages and salaries as well as fringes (e.g. various allowances paid and contributions made for insurance, pension, social security etc.) provided to civil servants. The source of data for the central government figures is a quarterly report received from the Department of Finance on realized expenditures. For the other three levels of government, data are obtained annually and

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27 The current methodology is used for lack of reliable and consistent detailed current data on employee compensation and number of employees. A more common methodology would involve deflating current price estimates by an index for compensation per employee (aggregating compensation over the four major ranks in the civil service and using 1993 levels as a numeraire). An attempt to obtain such data regularly from both the Department of Finance and the Civil Service Agency (BKN) is underway, and results using this methodology will be evaluated.

28 Conceptually, indirect taxes should also be added. However, they are omitted in this case because the three levels of government in Indonesia pay no indirect taxes.

divided equally among the quarters.

- consumption of fixed capital: this item technically covers appropriately amortized expenditure on buildings, vehicles, equipment, machinery, furniture and fixtures and the like. The level of these expenditures is estimated at 5% that of employee compensation.[29]

b. Other government services: this activity includes educational, health, social, cultural and recreational services provided by various government institutions. Quarterly value added for these services is computed as follows:

- A special survey is conducted annually by BPS to determine the number of employees hired by institutions providing each of the above services as well as their compensation.[30] The 2000 survey covered about 300 offices at the central, provincial ("kanwil"), kabupaten ("kandep") and local ("dinas") levels as well as non-departmental institutions ("lembaga non-departemen").[31]

- The ratio of employee compensation for the above services to total employee compensation is then derived from the special survey, averaged out over these institutions, then applied to the total employee compensation figure in a above. This is then augmented by a 5% estimate for consumption of fixed capital for this activity.

c. Administration and defense: value added for this activity is then computed as the difference between total value added of the sub-sector (from a.) and that of other government services (from b).

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29 This was based on an analysis of annual realized expenditures (covering the 1994/95 - 1997-98 period) which found a more or less stable relationship between the two variables. Specific budget line items included in consumption of fixed capital are: land (budget code: 5910), machinery & equipment including vehicles (budget code: 5920, depreciated over 20 years), buildings (budget code: 5930, depreciated over 30 years), roads, bridges & the like (budget code: 5940, depreciated over 40 years) and other physical capital goods (budget code: 5950, depreciated over 20 years).

30 "Survei Khusus Jasa Pemerintah" (SKJP).

31 Starting in 2001, and following the decentralized structure of government in Indonesia, the geographic breakdown of government institutions will change. Coverage of the 2001 survey will, therefore, differ from that of previous years.

2. Social & Community Services

This involves two major activities: education and health.

Constant Prices

Quarterly value added is computed using the following steps:

a. Education:
- Annual data are obtained from the Department of Education on private school enrolment at six levels of education (kindergarten, "special school", primary, junior and senior high school as well as for higher education).
- This is then converted to a quarterly figure by applying an estimated quarterly population trend (derived from the published BPS annual population estimates and subjected to a quarterly compound growth rate).
- The average quarterly expenditure (as a proxy for output) per student in 1993 prices is multiplied by the estimated number of students by level of education.
- A value-added to output ratio (from the 1995 IO table) is then applied.

b. Health:
- Annual data are obtained from the Department of Health on three variables: the number of beds in hospitals, the number of doctors and the number of midwives in major urban areas.
- This is then converted to a quarterly figure by applying an estimated quarterly population trend (derived from the published BPS annual population estimates and subjected to a quarterly compound growth rate).
- The average quarterly expenditure (as a proxy for output) per bed/doctor/midwife in 1993 prices is multiplied by the estimated number of beds/doctors/midwives.
- A value-added to output ratio (from the 1995 IO table) is then applied.

c. The totals for the above two activities are then summed up and a further markup of 5% is applied to arrive at the total value added for the sub-sector.

Current Prices

Quarterly value added is computed using the following steps:

a. Education:
   - An average annual output per student is obtained from supporting tables used in compiling the 1995 IO table, and converted to a current year value by using the "education" component of the CPI. This is then divided by four to reflect a quarterly figure.
   - Quarterly output per student is multiplied by the estimated number of students (from the constant price computations above).
   - A value-added to output ratio (from the 1995 IO table) is then applied.

b. Health:
   - An average annual output per bed/doctor/midwife is obtained from supporting tables used in compiling the 1995 IO table, and converted to a current year value by using the "health services and medicines" component of the CPI. This is then divided by four to reflect a quarterly figure.
   - Quarterly output per bed/doctor/midwife is then multiplied by the estimated number of beds/doctors/midwives (from the constant price computations above).
   - A value-added to output ratio (from the 1995 IO table) is then applied.

c. The totals for the above two activities are then summed up and a further markup of 5% is applied to arrive at the total value added for the sub-sector.

3. Amusement & Recreation

This involves three activities: movie theater operation, TV and radio broadcasting and movie production.

Constant Prices

Quarterly value added is computed using the following steps:

a. Movie theater operation:
   - A quarterly number of movie goers is projected as the product of the previous quarter's figure and the

average growth (in that activity) for that quarter in the past three years.

- The average quarterly output per movie goer in 1993 prices is multiplied by the estimated number of movie goers.
- A value-added to output ratio (from the 1995 IO table) is then applied.

b. TV and radio broadcasting:
- Quarterly data are obtained from the association of radio/TV broadcasters on the number of TV and radio stations.
- The average quarterly output per station in 1993 prices is multiplied by the number of stations.
- A value-added to output ratio (from the 1995 IO table) is then applied.

c. Movie production:
- Annual data are obtained from the Department of Tourism on the number of movies produced.
- This is then converted to a quarterly figure by using the quarterly trend in the past three years.
- The average quarterly cost of production per movie in 1993 prices is multiplied by the estimated number of movies.
- A value-added to output ratio (from the 1995 IO table) is then applied

d. The totals for the above three activities are then summed up and a further markup of 5% is applied to produce the total value added for the sub-sector.

Current Prices

Quarterly value added is computed using the following steps:

a. Movie theater operation:
- An average annual output per movie goer is obtained from supporting tables used in compiling the 1995 IO table, and converted to a current year value by using the "recreation and sports" component of the CPI. This is then divided by four to reflect a quarterly figure.
- Quarterly output per movie goer is multiplied by the estimated number of movie goers (from the constant price computations above).

- A value-added to output ratio (from the 1995 IO table) is then applied.

b. TV and radio broadcasting:
   - A quarterly average output per station is obtained from the association of radio/TV broadcasters, which is multiplied by the estimated number of stations.
   - A value-added to output ratio (from the 1995 IO table) is then applied.

c. Movie production:
   - An annual average cost of production per movie is obtained from supporting tables used in compiling the 1995 IO table, and converted to a current year value by using the "recreation and sports" component of the CPI. This is used as a proxy for output per movie, it is then divided by four to reflect a quarterly figure.
   - The quarterly output per movie is then multiplied by the estimated number of movies produced.
   - A value-added to output ratio (from the 1995 IO table) is then applied.

d. The totals for the above three activities are then summed up and a further markup of 5% is applied to arrive at the total value added for the sub-sector.

4. Personal & Household Services

This involves three major activities: vehicle repair, other repairs and domestic servants.

Constant Prices

Quarterly value added is computed using the following steps:

a. Vehicle repair:
   - Annual data are obtained from the Department of Transportation on the number of vehicles on the road. This is multiplied by a fraction based on supporting tables used in computing the 1995 IO table representing the percentage of vehicles on the road subjected to repair.
   - This is then converted to a quarterly figure by using the quarterly trend in the past three years.

- The quarterly average output per vehicle in 1993 prices is multiplied by the estimated number of vehicles in repair.
- A value-added to output ratio (from the 1995 IO table) is then applied.

b. Other repairs:
- Annual data are obtained from Susenas on the number of workers performing this activity.
- This is then converted to a quarterly figure by using the quarterly trend in the past three years.
- The quarterly average output per worker in 1993 prices is multiplied by the estimated number of workers.
- A value-added to output ratio (from the 1995 IO table) is then applied.

c. Domestic servants:
- Annual data are computed by BPS on the number of households, which are then converted to a quarterly figure by applying a compound growth rate.
- The quarterly average household expenditure per servant in 1993 prices is multiplied by the estimated number of households.
- A value-added to output ratio (from the 1995 IO table) is then applied.

d. The totals for the above three activities are then summed up and a further markup of 5% is applied to produce the total value added for the sub-sector.

Current Prices

Quarterly value added is computed using the following steps:

a. Vehicle repair:
- An average output per vehicle (measured by the cost of repair) is obtained from the special survey conducted for the Trade and Services sectors (SKSPJ), and converted to a current year value by using the "transportation" component of the CPI, then divided by four to reflect a quarterly figure.
- Output per vehicle is then multiplied by the estimated number of vehicles in repair.
- A value-added to output ratio (from the 1995 IO table) is then applied.

b. Other repair:
- An average output per worker is obtained from supporting tables used in compiling the 1995 IO table, and converted to a current year value by using the "household equipment" component of the CPI, then divided by four to reflect a quarterly figure.
- Output per worker is then multiplied by the estimated number of workers.
- A value-added to output ratio (from the 1995 IO table) is then applied.

c. Domestic servants:
- An average household expenditure on servants is obtained from Susenas and converted to a current year value by using the "household operation" component of the CPI. This is then divided by four to reflect a quarterly figure.
- Expenditure per household is then multiplied by the estimated number of households.
- A value-added to output ratio (from the 1995 IO table) is then applied.

d. The totals for the above three activities are then summed up and a further markup of 5% is applied to produce the total value added for the sub-sector.

III. COMPILATION OF EXPENDITURE ACCOUNT

The expenditure account takes the GDP computed from the production account as the benchmark and then attempts to reconcile estimations of various components with that benchmark. Tables 3 and 4 summarize the basic methodologies used for compiling various sectors for constant and current price estimates respectively, and the sections that follow describe sectoral methodologies in more detail.

Table 3
Summary of Sources & Methods of Expenditure Account at Constant Prices

Sector	Data Sources	Basic Methodology
Private Consumption Expenditure	Susenas, Production Accounts, CPI	Use consumption elasticity with respect to GDP, apply to quarterly GDP. Incorporate adjustment in current price estimate by deflating by relevant component of CPI.
Government Consumption Expenditure	Current price series, quantity index of civil service employees, WPI	Personnel Expenditure & Depreciation: use growth in quantity index Material expenditure: apply WPI to current price series
Gross Domestic Fixed Capital Formation	Prod. Accounts, imports, Industry Survey	Construction: obtained from quarterly production accounts Machinery: monthly imports multiplied by rupiah at 1993 prices. Domestic production multiplied by growth in the production index Transportation: monthly imports multiplied by rupiah at 1993 prices. Domestic production multiplied by growth in the production index Other: apply markup
Change in Stocks	Current price series, WPI	Apply WPI to current price series
Exports of Goods & Services	Current price series, $ value index	Apply price changes in index to current price series
Imports of Goods & Services	Current price series, $ value index	Apply price changes in index to current price series

Table 4
Summary of Sources & Methods of Expenditure Account at Current Prices

Sector	Data Sources	Basic Methodology
Private Consumption Expenditure	constant price series, CPI	Apply relevant CPI component to constant price series. Apply iterative adjustments to reconcile supply and demand
Government Consumption Expenditure	budgets of central, level I, level II & village gov.	Relevant budget allocations + depreciation
Gross Domestic Fixed Capital Formation	constant price series, WPI	Construction: obtained from quarterly production accounts Machinery: monthly imports converted to rupiah. Domestic production in constant prices inflated by relevant WPI component. Transportation: monthly imports converted to rupiah. Domestic production in constant prices inflated by relevant WPI component. Other: apply markup
Change in Stocks	IO table	Start with same share in supply from IO table. Apply iterative adjustment to reconcile supply and demand.
Exports of Goods & Services	Services/Trade Bureau	Goods: get export value for 7 commodity groups; services: use trend in goods
Imports of Goods & Services	Services/Trade Bureau	Goods: get import value for 7 commodity groups; services: use trend in goods

A. Private Consumption Expenditure

Constant Prices

Estimates of private consumption are computed iteratively using to the following steps:[32]

a. First, annual consumption elasticities with respect to GDP are computed from the Susenas survey (conducted once every 3 years) for the following 13 commodities and commodity groups:

- "Food, Beverages and Tobacco": rice, roots, fish, meats, dairy products, vegetables, beans, fruits, other foods, prepared foods, alcoholic drinks, tobacco. For each commodity, data are available for both quantity and value.

- Non- "Food, Beverages and Tobacco": no breakdown is attempted for this group since only data on values are available.

Algebraically, this is calculated as:

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32 Another approach for measuring private consumption expenditure relies on the commodity flow method. The Bureau is currently evaluating a methodology which would provide a direct measurement of the changes in stock, to allow measurement of private consumption as a residual at the sectoral level, which is what the commodity flow technique does.

$$\varepsilon = \frac{\frac{\Delta C_i}{C_i}}{\frac{\Delta GDP}{GDP}}$$

where $_i$ is the elasticity computed for item i

C_i/C_i the percentage change in consumption of item i

GDP/GDP the percentage change in GDP computed in the production accounts.

For the first category of commodities, C_i refers to the quantity consumed whereas for the second category it refers to the value of consumption deflated by the "general" component of the CPI.

b. These elasticities are then multiplied by the change in GDP in the production accounts during the quarter to arrive at an estimated relative change in consumption for various items during the quarter, which is in turn multiplied by the consumption level of the previous quarter to obtain the preliminary estimate of consumption for the current quarter. That is,

$$C_i^{II} = C_i^{I}\left(1 + \varepsilon \frac{\Delta GDP^{II}}{GDP^{I}}\right)$$

where superscripts refer to relevant quarters.

c. Following a reconciliation of the current price estimates within the context of a Supply and Use table, adjustments to the estimated consumption levels are made and the new numbers are deflated using the relevant components of the CPI.

Current Prices

The preliminary constant price consumption expenditures are inflated using the CPI:

a. For "Food Beverages & Tobacco" items: the corresponding component of the CPI is used

b. For Non- "Food, Beverages & Tobacco", the "general" CPI index is used.

The derived consumption levels are then subjected to a reconciliation using a quarterly Supply and Use table (a simplified format is provided in Table 5). Such a table allows reconciliation of supply and demand using the following accounting identity:

$$SS + M = INT + C_p + C_g + GDFI + \Delta S + X \tag{6}$$

Where SS is domestic supply
C_p private consumption expenditure
C_g government consumption expenditure
GDFI gross domestic fixed investment
S change in stocks
X exports of goods and services
M imports of goods and services
INT intermediates

Table 5
Content of Supply & Use Table for Reconciling Expenditure Account

Sector	Supply[1]	Use				
		Intermediates[2]	Private Consumption[3]	Government Consumption[4]	Fixed Investment[5]	Exports
Farm Food Crops						
Non-Food Crops						
Livestock						
Forestry						
Fishery						
Crude Petrol. & Nat. Gas						
Non-Oil & Gas Mining						
Quarrying						
Petroleum Refining & LNG						
Food, Bev. & Tobacco						
Textiles, Leather, Footwear						
Wood Products						
Paper & Printing						
Fertilizers, Chemicals						
Cement Products						
Basic Iron & Steel						
Transportation Equipment						
Other Manufacturing						
Electricity, Gas & Water						
Construction						
Trade						
Hotels & Restaurants						
Railway Transportation						
Road Transportation						
Sea Transportation						
Air Transportation						
Other Transportation						
Communications						
Financial Services						
Rentals & Housing Services						
Public Administration						
Social Services						
Other Services						
Total						

Notes:
1) Supply has two components: domestic production (obtained from the production accounts) and imports (obtained from the Trade & Services Bureau). Imports are divided into three categories: consumption goods, raw materials and capital goods.
2) Value of intermediate inputs is obtained from the production accounts.
3) Private Consumption is computed using consumption elasticities of income applied to domestic production
4) Government consumption expenditure is obtained from the government budget documents.
5) Fixed investment is divided into: gross domestic fixed capital formation and changes in stocks.

The initial estimate of consumption is used as well as an initial estimate of stock changes (using the same shares in total supply in the 1995 IO table). A judgmental allocation of the residual (between consumption and stock changes) is then made for each item taking three constraints into consideration:

- supply and demand should balance
- the ratio of stock changes to total supply should not deviate substantially from that of the 1995 IO table
- the derived elasticity of consumption with respect to GDP should remain plausible, and not deviate substantially from that estimated in the previous quarter.

B. Government Consumption Expenditure

Constant Prices

Quarterly estimates are calculated as follows:

- "Personnel Expenditure" and Depreciation: growth in the quantity index of government employees (computed for measuring value added of government services at constant prices) is applied to the levels of the previous quarter.[33]
- "Material Expenditure:" current price estimates are deflated using the "general" component of the WPI.

Current Prices

Estimates of government consumption expenditure rely primarily on central government budget data, which are produced quarterly. Three sources are used for local government expenditure (all published annually by BPS): *Financial Statistics of the First Level Local Government*, *Financial Statistics of the Second Level Local Government* and *Financial Statistics of Village Government*. Quarterly estimates are then derived by dividing annual expenditure equally.

Computations for each type of government use the following relationships:

	Allocation for "Personnel Expenditures" in the budget
+	Allocation for "Material Expenditures" in the budget
+	Depreciation (in the budget)
=	Total revenues available in the budget for government's own current use
-	Non-budget revenue from services
-	Non-budget revenue from material sales
=	Government consumption expenditure

[33] A more common methodology is to deflate current price estimates by an index of average compensation per employee, which will be evaluated by the bureau.

C. Export of Goods & Services

Constant Prices

The total level of exports in current prices is deflated using a quarterly aggregate export index of dollar values converted into rupiah at an average quarterly exchange rate, with the average quarterly 1993 values used as a numeraire.[34]

Current prices

Dollar (fob) values of goods exported are obtained monthly from the Trade & Services Bureau by 2-digit HS code. These are then assigned to the following commodity groups:

- crude oil
- oil products
- gas
- agricultural products
- manufacturing products
- mining products
- all others

These values are then summed up by quarter and converted to rupiah at the average quarterly exchange rate.

For services, initial estimates use the same quarterly trend of goods. However, BPS has recently begun receiving detailed monthly data on services from Bank Indonesia (as part of the Balance of Payments). Direct measurement of services exports will, therefore, be possible.

D. Imports of Goods & Services

Constant Prices

The total level of total imports in current prices is deflated using a quarterly aggregate export index of dollar values converted into rupiah at an average quarterly exchange rate, with the average quarterly 1993 values used as a numeraire.[35]

Current Prices

Dollar (cif) values of goods imported are obtained monthly from the Trade & Services Bureau by 2-digit HS code. These are then assigned to the following commodity groups:

- Consumption goods
- Raw materials

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[34] The Trade & Services Bureau is currently devising new unit price deflators for exported goods to provide a more appropriate measure of these flows at constant prices.

[35] The Trade & Services Bureau is currently devising new unit price deflators for imported goods to provide a more appropriate measure of these flows at constant prices.

- Capital goods

These values are then summed up by quarter and converted to rupiah at the average quarterly exchange rate.

For services, initial estimates use the same quarterly trend of goods. However, BPS has recently begun receiving detailed monthly data on services from Bank Indonesia (as part of the Balance of Payments). Direct measurement of services exports will, therefore, be possible.

E. Gross Domestic Fixed Capital Formation

Constant Prices

GDFCF is calculated using four components:

a. Construction: this is the gross value obtained from the quarterly production accounts (at constant prices)

b. Machinery: this includes both imported and domestic components. Current price estimates for imported capital goods are deflated using the relevant component of the WPI.
For domestic production of machines, quarterly indices are obtained from the production accounts, and are applied to the constant price series.

c. Transportation Equipment: this includes both imported and domestic components. Current price estimates for imported equipment are deflated using the relevant component of the WPI. For domestic production of transportation equipment, quarterly indices are obtained from the production accounts, and are applied to the constant price series.

d. Other: this includes cattle, seeds, land preparation and the like. To allow for these capital goods, a markup of about 10% is added to the sum of the other three components.

Current Prices

GDFCF is calculated using four components:

a. Construction: this is the value obtained from the quarterly production accounts (at current prices)

b. Machinery: this includes both imported and domestic components. Data on imported machinery are obtained monthly from the Trade & Services Bureau. Dollar values are converted to rupiah at the

average monthly exchange rate. A quarterly figure is then computed.
For domestic production of machines, constant price figures are inflated using the relevant WPI component.

c. Transportation Equipment: this includes both imported and domestic components. Data on imported transportation equipment are obtained monthly from the Trade & Services Bureau. Dollar values are converted to rupiah at the average monthly exchange rate. A quarterly figure is then computed.
For domestic production of transportation equipment, constant price figures are inflated using the relevant WPI component.

d. Other: a markup of about 10% is added to the sum of the other three components.

F. Changes in Stocks

Constant Prices

The total level of stock changes at current prices is deflated using the "general" index of the WPI.

Current Prices

Due to a lack of data on this flow, it is computed iteratively (together with private consumption).[36] An initial estimate using the same share in total supply in the 1995 IO table is used in the reconciliation of the Supply and Use table. A judgmental allocation of the residual (between consumption and stock changes) is then made for each item taking three constraints into consideration:

- supply and demand should balance
- the ratio of stock changes to total supply should not deviate substantially from that of the 1995 IO table
- the derived elasticity of consumption with respect to GDP should remain plausible, and not deviate substantially from that estimated in the previous quarter.

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36 The Bureau is currently evaluating a methodology which would provide a direct measurement of this flow, and consequently allow measurement of private consumption as a residual. That method would conform with the commodity flow technique.

APPENDIX A
COMMODITIES USED IN MANUFACTURING PRICE INDICES

In computing non-oil manufacturing value added, commodity output in constant prices is inflated by using relevant components of the WPI (see Section II.C.3). Table A.1 provides a mapping of commodities in the WPI and their corresponding 3-digit ISIC.

Table A.1
Mapping of Commodities in the WPI and Corresponding ISIC

ISIC	Commodities in the WPI which are included in price indices applied to medium and large establishments	Commodities in the WPI which are included in price indices applied to small and cottage establishments
311	Daging Sapi	Daging Sapi
	Daging Kerbau	Daging Kerbau
	Daging Babi	Daging Babi
	Daging Kambing & Domba	Daging Kambing & Domba
	Daging Ayam	Daging Ayam
	Susu Kental Manis	
	Susu Bubuk Kaleng	
	Susu Tepung & Susu Bubuk	
	Pengolahan/Pengawetan Ikan	
	Ikan Dalam Kaleng	
	Ikan Pindang Asin	Ikan Pindang Asin
	Sayur-sayuran & Buah-buahan	
	Minyak Kelapa	Minyak Kelapa
	Minyak Goreng	Minyak Goreng
	Mentega/Margarine	
	Beras	Beras
	Tepung Terigu	
	Tepung Tapioka	Tepung Tapioka
	Biskuit	
	Roti	Roti
	Mie & Sejenisnya	Mie & Sejenisnya
	Gula Pasir	
	Kebang Gula	Kembang Gula
	Sirop	
312	Kopi Bubuk	Kopi Bubuk
	Teh	Teh
	Kecap	Kecap
	Tahu & Tempe	Tahu & Tempe
	Bumbu Masak/Penyedap Makanan	Bumbu Masak/Penyedap Makanan
	Kerupuk	Kerupuk
	Coklat Bubuk	Coklat Bubuk
	Garam	Garam
	Makanan Ternak/Hewan	Makanan Ternak
313	Minuman Keras	Minuman Keras
	Minuman Ringan	Minuman Ringan
314	Tembakau	Tembakau
	Rokok Putih	
	Rokok Kretek	Rokok Kretek
321	Benang Tenun	Benang Tenun
	Benang Sintetis	

	Kain Tenun	
	Kain Sintetis	
	Batik	Batik
	Handuk/Selimut & Seprai	
	Karpet/Permadani	
322	Pakaian dari Kaos	Pakain dari Kaos
	Pakain Pria	Pakaian Pria
	Pakain Wanita	Pakaian Wanita
	Pakaian Anak-anak	Pakaian Anak-anak
323	Kulit Sapi/Kerbau & Kambing	Kulit Sapi/Kerbau & Kambing
324	Sepatu Pria Dewasa	Sepatu Pria Dewasa
	Sepatu Wanita Dewasa	Sepatu Wanita Dewasa
	Sepatu Anak-anak	Sepatu Anak-anak
	Sepatu Olah Raga	Sepatu Olah Raga
331	Kayu Jati Gergajian	Kayu Jati Gergajian
	Kayu Rimba Gergajian	Kayu Rimba Gergajian
	Plywood, Teakwood & Triplek	
	Kusen Jadi, Daun Pintu, dll	Kusen Jadi, Daun Pintu, dll
332	Keranjang Bambu/Rotan	Keranjang Bambu/Rotan
	Meja Kursi, Meja Tulis, sll	Meja Kursi, Meja Tulis, dll
341	Kertas Tulis dan sejenisnya	
	Buku Tulis dan sejenisnya	Buku Tulis dan sejenisnya
	Kertas Tisue	
	Kertas Karton	
342	Barang Cetakan	Barang Cetakan
351	Pupuk Urea	
	Pupuk Lainnya	Pupuk Lainnya
	Pembasmi Hama	
	Pembasmi Nyamuk	Pembasmi Nyamuk
	Barang-barang Kimia	
352	Cat Kayu/Besi	
	Cat Tembok	
	Barang Cat Lainnya	
	Macam-macam Obat	
	Jamu Segala Jenis	Jamu segala jenis
	Sabun Cuci, Detergen, dll	Sabun cuci, detergen, dll
	Sabun Mandi	
	Tapal Gigi	
	Kosmetik lainnya	Kosmetik Lainnya
	Film/Kertas Photo	
	Minyak Atsiri	Minyak Atsiri
353,	Avigas	
	Avtur	
	Super 98	
	Premium	
	Minyak Tanah	
	Solar	
	Minyak Diesel	
	Minyak Bakar	
	Aspal	
	Gas Minyak Cair	
	Minyak Pelumas Segala Jenis	
355	Ban Kendaraan	
	Ban Sepeda Motor	
	Ban Sepeda	
	Karet RSS1, RSS11, dsb	Karet RSSI, RSS11, dsb
	Sepatu Karet	Sepatu Karet
356	Pipa PVC	Pipa PVC

361	Tegel, Porselin, Kloset, dll	Tegel, Porselin, Kloset, dll
362	Kaca Lembaran	
	Gelas, Piring dan Sejenisnya	Gelas, Piring, dan sejenisnya
363	Semen	Batako, Eternit, Asbes, dll
		Ubin Teraso dan sejenisnya
364	Batu bata, Genteng dan lainnya	Batu Bata, Genteng dan lainnya
369	Batako, Eternit, Asbes, dll	Batako, Eternit, Asbes, dll
	Ubin Teraso dan sejenisnya	Ubin Teraso dan sejenisnya
371	Besi Beton	
	Besi Propil	
	Besi Plat	
	Kawat Beton (bindrad)	
372	Emas	
	Perak	
	Logan Timah	
381	Cangkul	Cangkul
	Tempat Tidur, Kursi dari Besi	
	Seng	
	paku, Kawat, dan lainnya	Paku, kawat, dan lainnya
382	Alat-alat Berat	
	Mesin-mesin Industri	Mesin-mesin Industri
383	Televisi	
	Radio	
	Tape Recorder	
	Casset	
	Kipas Angin	
	Mesin Jahit	
	Air Condition	
	Lemari Es	
	Generator Set	
	Transformator dan sejenisnya	
	Batu Baterei	
	Aki (Accu)	
	Lampu	Lampu
	Kabel Listrik	Kabel Listrik
384	Mobil	Alat-alat Angkutan
	Sepeda Motor	
	Sepeda	
	kapal Laut	
385	Alat Photo/Optik	
	Arloji, Jam Dinding, dll	
390	Alat-alat Olah Raga	Alat-alat Olah Raga
	Alat Musik	Alat Musik

CHAIN LINKING NATIONAL ACCOUNTS

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Statistical Paper # 3

by
Yahya Jammal

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TABLE OF CONTENTS

I. INTRODUCTION 144

II. PRESENT MEASUREMENT OF REAL GDP 144

III. CHAINING 147
- **A. What is It?** 148
- **B. Advantages** 148
- **C. Disadvantages** 149

IV. ANNUAL VS QUARTERLY DATA 151

V. OTHER ISSUES 154
- **A. What Indexing Formula?** 156
- **B. What to Publish?** 157
  - **1. What Data?** 157
  - **2. In What Format?** 158
  - **3. What Level of Detail** 158

VI. CONCLUSIONS & RECOMMENDATIONS 158

I. INTRODUCTION[1]

Since its first publication of the nation's accounts in 1966, BPS has been producing these accounts in both "current prices" of the year in question and "constant prices" of some fixed reference year. This has been the standard international practice advocated by the United Nations since 1953 and formalized with the 1968 *System of National Accounts* (SNA). To economists, the GDP "at constant prices" has been the single tool used to approximate "real" GDP, which measures GDP after deducting the impact of price changes. Dissatisfaction with the use of fixed weights due to the changing structure of economies led to a different recommended approach as part of the updated SNA in 1993.

The 1993 SNA recommended using chained indices for measuring "real" GDP (and its components) instead of its traditional measurement at "constant prices". As such, this methodology would use *changing* weights every year instead of the *fixed* weights of the year chosen for reference. Some industrialized countries have adopted the new methodology, although at different times since 1993 and to varying degrees. The IMF and other international bodies have been urging developing countries to adopt it. BPS has decided to adopt this new methodology gradually and to carefully study its implications in the next few years. This report attempts to assist BPS in educating users about the reasons for adopting this methodology and its implications, both conceptual and practical.

II. PRESENT MEASUREMENT OF REAL GDP

Perhaps the best way to start is by defining terms clearly in order to avoid any semantic confusion. It is generally claimed that present Indonesian "real" economic data use 1993 as a "base year". The word "base" sometimes refers to the year from which fixed weights are derived, the year used as a numeraire (or reference) or both. In this report we will refer to the first as the "weighting year" and the second as the "numeraire year". The distinction between the two is very important: while the choice of a weighting year makes a substantial difference in the final results, the choice of a numeraire year is irrelevant. The discussion that follows will demonstrate that.

Let us take the very simple economy illustrated in Table 1. This economy produced only two commodities between 1983 and 2000: rice and computers. The first commodity has had both a stable price and quantity produced while the second commodity has seen its production double between 1983 and 1993 as a result of the halving of its price and tripling between 1993 and 2000 following a further halving of its price.

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[1] I am grateful to Frank de Leeuw, Kusmadi Saleh and John Kuiper for valuable comments on earlier drafts of this report.

Table 1
Illustrative Example of Production in a Simple Two-Commodity Economy

Product	1983			1993			2000		
	Price	Quantity	Value	Price	Quantity	Value	Price	Quantity	Value
Rice	1	50	50	1	50	50	1	50	50
Computers	10	5	50	5	10	50	2.5	30	75
All Products			100			100			125

The structure of the economy remained the same between 1983 and 1993, i.e. equal shares of total value for the two commodities, but is different in 2000: the share of the computer industry climbed to 60%. How is real production measured under the current BPS methodology? Tables 2 and 3 shed some light on this issue.

Table 2
Production Valued at Constant Prices of Alternative Years

Product	Prices of 1983			Prices of 1993			Prices of 2000		
	1983	1993	2000	1983	1993	2000	1983	1993	2000
Rice	50	50	50	50	50	50	50	50	50
Computers	50	100	300	25	50	150	12.5	25	75
All Products	100	150	350	75	100	200	62.5	75	125
Growth									
Rice		0%	0%		0%	0%		0%	0%
Computers		100%	200%		100%	200%		100%	200%
All Products		50%	133%		33%	100%		20%	67%

Table 3
Indices of Total Production Using Fixed Prices of Alternative Years

	Index			Growth	
	1983	**1993**	**2000**	**1993**	**2000**
Numeraire: 1983=100					
Fixed prices of 1983	100.0	150.0	350.0	50%	133%
Fixed prices of 1993	100.0	133.3	266.7	33%	100%
Fixed prices of 2000	100.0	120.0	200.0	20%	67%
Numeraire: 1993=100					
Fixed prices of 1983	66.7	100.0	233.3	50%	133%
Fixed prices of 1993	75.0	100.0	200.0	33%	100%
Fixed prices of 2000	83.3	100.0	166.7	20%	67%
Numeraire: 2000=100					
Fixed prices of 1983	28.6	42.9	100.0	50%	133%
Fixed prices of 1993	37.5	50.0	100.0	33%	100%
Fixed prices of 2000	50.0	60.0	100.0	20%	67%

Note in particular the following:

a. While for individual commodities with relatively homogeneous and identifiable units (rice and computers in this example) using the fixed prices of any year gives the same implied growth rate (0% for rice in both periods and 100% and 200% for computers in 1983-1993 and 1993-2000 respectively, see Table 2), in computing aggregate production the choice of year for fixed prices makes a substantial difference. Using 1983 prices, growth in aggregate production was 50% between 1983 and 1993 and 133% between 1993 and 2000, using 1993 prices it was 33% and 100%, and using 2000 prices it was 20% and 67%.

b. If a fixed weight index of production is constructed to track growth in quantities (as is done in Table 3), different widely behaving series result depending on the choice of weighting year. But the choice of a numeraire year make absolutely no difference (note that the implied growth rates for different weighting years are the same under all numeraire years).

Which story should we then believe? The one using as a weighting year 1983 (growth between 1983 and 1993 was 50% and that between 1993 and 2000 was 133%) or 1993 (1983-1993 growth was only 33% and that of 1993-2000 was 100%) or 2000 (1983-1993 growth was

only 20% and that of 1993-2000 was only 67%)? Clearly the implication for each scenario is very different. If we believe one particular story, e.g. that of 1983 as a weighting year, then the natural corollary is: what was so special about that year that we need to continue to value everything in the future at their value in that year?

These were the types of questions that analysts and national accountants have been wrestling with in the past two decades. From an economist's point of view, none of the above three scenarios is satisfactory. Since an economist's primary interest is in measuring the growth in the economy between two particular periods: the best way to value growth between 1983 and 1993 is at prices prevailing in those years (e.g. 1983 or 1993 or both); similarly, the best way to value growth between 1993 and 2000 is at prices prevailing in 1993 or 2000 or both. Hence, a superior indexing procedure to those presented in Table 3 would produce a real growth rate from 1983 to 1993 of 50% (based on prices of 1983) and from 1993 to 2000 of 100% (based on prices of 1993). These can be obtained by using a chain index with two links in it, an 1983-93 link and a 1993-2000 link. A chain index with more links in it--for example, an index with a new set of weights each year--would give still different growth rates.

III. CHAINING

The use of fixed-weight measures became widespread because such measures were simple to understand and easy to interpret. Their biggest drawback, namely that real growth depends on the choice of weighting year, became more serious in the 1980s and 1990s. When all prices in a particular economy move more or less consistently over time, the problem of a weighting year is reduced, but when relative prices change drastically, as in our example in Table 1,[2] fixed weights produce the type of problem indicated in the previous section. One way to mitigate such a problem is to regularly (e.g. every 5 or 10 years) move the weighting year forward. That has been the standard international practice in the past decades. However, changes in the structure of economies were occurring faster since the 1980s than could be captured by occasional reweighting. The recommended solution became to reweight every year instead of once every 5 or 10 years. That is the essence of the "chaining" methodology recommended by the 1993 SNA.

---

[2] Or when a significant substitution effect occurs between commodities as a result of significant relative price changes. This is referred to as the "substitution bias", which is caused by the fact that quantities for commodities with declining relative prices tend to grow much faster than those of other commodities.

A. What is It?

Table 4 provides an example of chaining using a Laspeyres index of production.[3] In other words, quantities produced in 1993 are priced at their level in 1983, and quantities in 2000 are priced at their level in 1993. That way, the implied growth in the aggregate index reflects the weights in the latest available year, rather than a fixed past year. As was done in Table 3, alternative numeraire years are used which make no difference in the implied growth rates.

Table 4
Chained Laspeyres Index of Total Production

	Index			Growth	
	1983	**1993**	**2000**	**1993**	**2000**
Numeraire 1983=100	100.0	150.0	300.0	50%	100%
Numeraire 1993=100	66.7	100.0	200.0	50%	100%
Numeraire 2000=100	33.3	50.0	100.0	50%	100%

B. Advantages

The use of chained measures provides substantial conceptual advantages:

a. **More realistic real growth measure between consecutive periods:** By using updated weights in comparing two consecutive periods, these measures reflect more realistically real growth between the two periods than any measure using fixed weights (of one or even two periods).[4] The more acute the change in relative prices the higher the difference between results using updated (i.e. changing) weights and fixed weights.

b. **More accurate long-term comparisons:** By using weights which reflect more realistically conditions prevailing in various years, comparisons of a particular series over the long run become more accurate than by using fixed weights.

c. **No more breaks in series:** The problem of apparent changes in growth rates resulting from changing weighting periods (when fixed weights are used) would disappear since weights are updated every year.

---

3 The Laspeyres indexing formula is used here for illustration. Alternative formulas (Paasche, Fisher, Tornqvist etc.) can be equally used.

4 Chain indexes are more realistic because they weight transactions at the prices and costs actually prevailing when they took place.

d. **Smaller differences between alternative index formulas:** The differences between alternative indexing formulas tend to be smaller, giving statistical agencies more flexibility in their choice of formulas.

C. Disadvantages

The above advantages are certainly significant. However, chain indices also have three drawbacks, one minor, one significant and one somewhere in between (i.e. it is generally minor but has the potential to be significant if not used properly):

a. **Require more data:** The first drawback is that they require more data than fixed weight series. Relevant price as well as quantity data need to be available every year if one is to use current weights for commodities.

b. **Non-additivity:** The most significant drawback, however, is that chained series are not additive. That is, if one derives a chained real (monetary) measure, the chained aggregate measure is not necessarily equal to the sum of the chained component measures. This issue is serious and potentially the most confusing to users, and therefore warrants further discussion. Using the data from Table 1, we have attempted to illustrate non-additivity in Table 5 below.

Table 5
Nominal vs Real Production Using Chain-Linked Aggregates

Product	Nominal (bn Rp)			Real								
				Bn Chained 1983 Rp			Bn Chained 1993 Rp			Bn Chained 2000 Rp		
	1983	1993	2000	1983	1993	2000	1983	1993	2000	1983	1993	2000
Rice	50	50	50	50	50	50	50	50	50	50	50	50
Computers	50	50	75	50	100	300	25	50	150	13	25	75
All Products	100	100	125	100	150	***300***	***67***	100	200	***42***	***63***	125
Component Total	100	100	125	100	150	***350***	***75***	100	200	***63***	***75***	125
Growth												
Rice		0%	0%		0%	0%		0%	0%		0%	0%
Computers		0%	50%		100%	200%		100%	200%		100%	200%
All Products		0%	25%		50%	100%		50%	100%		50%	100%
Component Total		0%	25%		50%	133%		33%	100%		20%	67%

The aggregate level of nominal production in any one year is the

sum total of the level of nominal production of individual components: that is, the 1993 level of Rp. 100 billion is the total of the value of production (in 1993 rp) of the two commodities produced. However, the aggregate level of "real" production in 2000, for example, is not necessarily equal to the sum of "real" production of its components. If we use 1983 as a numeraire year, i.e. if we choose to make the nominal and real values in that year the same, then the "real" aggregate level (computed by applying the cumulative growth rates of 1993 and 2000) is Rp. 300 billion whereas the sum of the real value of the components is Rp. 350 billion. Different *levels* and varying degrees of inconsistency between the aggregate and the components are obtained using different years as numeraire.

This non-additivity is an inconvenient consequence of having to use changing weights. It is usually not apparent if one only calculates growth rates, but is obvious if we calculate "real" monetary levels. If one uses "real" levels, one has to interpret their meaning very carefully. A "real chained 1983 rp" level, for example, cannot be interpreted as the production level valued at prices prevailing in 1983 (as was the case with the fixed weight series), but rather as "chained production in the current year using nominal production of 1983 as a numeraire." And there is no simple way to define "chained production". In the case of a "Laspeyres-chained production" in year t, it is the cumulative production in year t where production in any particular year was valued at prices prevailing in the previous year.

A consequence of non-additivity is that it will be no longer possible to derive directly from the published data the contribution to growth of any particular sector (or sub-sector). Such contributions can still be calculated, but they would require the use of data at a lower level of disaggregation than provided in standard publications.

c. **Drift:** A third drawback, although not as serious as the second one above, is that a chained series tends to "drift" away from what a true measure should indicate. Table 6 provides an example. Suppose that the basic data for 1983 and 1993 are the same as those used above, but that in 2000, instead of having the 1983-1993 trend for computers continue, the trend reverses course and produces the same data as in 1983, namely a price level of 10 and a production of 50.

Table 6
Illustration of the "Drift" Problem When Chaining

Product	1983			1993			2000		
	Price	Quantity	Value	Price	Quantity	Value	Price	Quantity	Value
Rice	1	50	50	1	50	50	1	50	50
Computers	10	5	50	5	10	50	10	5	50
All Products			100			100			100
Laspeyres Index									
Fixed 1983 prices		100			150			100	
Chain		100			150			112.5	

A realistic aggregate production index should provide the same index level for 1983 and 2000, since the underlying data for both years are identical. The fixed-based Laspeyres index will do just that (a 50% growth between 1983 and 1993 and a 33% decline between 1993 and 2000, with the index in 2000 at exactly the same level --100-- as in 1983), but the chained one will not. Instead, the chained Laspeyres index will indicate a growth of 50% between 1983 and 1993 but a decline of only 25% between 1993 and 2000 with an index of 112.5 in 2000 compared to 100 in 1983. Such a "drift" in the chained index is caused by the fact that different weights are used in measuring the increase in production (in 1993) than are used in measuring the decrease in 2000.

The drift problem is a serious drawback in theory, since abnormal behavior (such as the change between 1993 and 2000 in the example in Table 6) gets built into a chained index when it probably would be better to leave it out of the weighting scheme. However, in practice it is not because such behavior is not common in annual national accounts data. Annual data tend to move as a trend rather than display sharp oscillations which may cause drifts.

IV. ANNUAL VS QUARTERLY DATA

Quarterly data tend to be more volatile than annual data, since they are subject to seasonal factors, and thus are likely to show severe "drifts" if chained quarterly. That is why the 1993 SNA recommends annual, rather than quarterly, chaining of data. Table 7 provides basic illustrative quarterly data for three consecutive years. In the same two-commodity economy discussed above, the first commodity (rice) faces no change in either quantity produced or price over the three-year period. The second commodity (computers) displays a 12% quarterly increase in quantity and a

10% quarterly drop in price. How to construct a chained quarterly index of production for the economy? Table 8 provides alternative answers.

Table 7
Illustrative Example of Quarterly Production

Product	1993				1994				1995			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Rice[1]												
Quantity	50	50	50	50	50	50	50	50	50	50	50	50
Price	1	1	1	1	1	1	1	1	1	1	1	1
Value	50	50	50	50	50	50	50	50	50	50	50	50
Computers[2]												
Quantity	5	6	6	7	8	9	10	11	12	14	16	17
Price	10	9	8	7	7	6	5	5	4	4	3	3
Value	50	50	51	51	52	52	52	53	53	54	54	55

1) No change in either quantity or price is assumed for this product.
2) Quantity is assumed to increase by 12% per quarter and price is assumed to decrease by 10% per quarter.

Table 8
Alternative Chained Laspeyres Production Indices

Product	1993				1994				1995			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Annual Indices												
Constant 93 prices: 1993=100	100.0				**128.8**				174.2			
Constant 94 prices: 1994=100					100.0				**129.3**			
Chain: 1993=100[1]	100.0				128.8				166.6			
Quarterly Indices with Annual Overlap												
Constant 93 prices: 1993=100	91.8	96.8	102.5	108.8	**115.9**	**123.9**	**132.8**	**142.8**	153.9	166.4	180.4	196.1
Constant 94 prices: 1994=100					91.7	96.8	102.5	109.0	**116.2**	**124.3**	**133.3**	**143.4**
Chain: 1993=100[2]	91.8	96.8	102.5	108.8	115.9	123.9	132.8	142.8	149.7	160.1	171.8	184.8
Quarterly Indices with Overlap in Fourth Quarter												
Constant 93 prices: 1993=100	91.8	96.8	102.5	108.8	**115.9**	**123.9**	**132.8**	**142.8**	153.9	166.4	180.4	196.1
Constant 94 prices: QIV 94=100								100.0	**106.6**	**114.0**	**122.3**	**131.6**
Chain: 1993=100[3]	91.8	96.8	102.5	108.8	115.9	123.9	132.8	142.8	152.2	162.8	174.6	187.9
Implicit Annual Growth												
Chain annual					28.8%				29.3%			
Chain quarterly: annual overlap					28.8%				29.3%			
Chain quarterly: 4th Q overlap					28.8%				31.5%			

1) 128.8 = 100.0 x (128.8 / 100.0)
166.6 = 128.8 x (129.3 / 100.0)
2) 149.7 = 116.2 x (128.8 / 100.0)
160.1 = 124.3 x (128.8 / 100.0)
3) 152.2 = 142.8 x (106.6 / 100.0)
162.8 = 152.2 x (114.0 / 106.6)

Two chained quarterly indices are calculated: one using a one-year overlap (1994) and one using

a one-quarter overlap (the fourth quarter of 1994 is chosen arbitrarily in the table).[5] Calculating a chain index with 1993 as a numeraire year and using a one-year overlap involves the following three steps:

a. First, a quarterly index at constant 1993 prices is calculated with 1993 values used as a numeraire (first row of the second panel of Table 8).[6] Note that the average index for 1993 should by necessity equal to the level assigned to the numeraire year (100 in this case).
That forms the 1993-1994 portion of the chain index series. The 1995 portion, to be chained to the 1993-1994 series, requires computation of a quarterly series for 1995 using 1994 as a weighting year.

b. A quarterly index at constant 1994 prices is calculated with 1994 values as a numeraire (second row of the second panel). Again, note that the average index for the four quarters of 1994 should also equal 100.

c. Chaining 1995 with the earlier year requires converting the quarterly 1995 indices (which used 1994 as a numeraire year) into indices with 1993 as a numeraire year by using growth in the whole year of 1994 as a link. In other words, the 1995 quarterly indices at constant 1994 prices and with 1994 as a numeraire (in the second panel) are multiplied by the annual growth factor between 1993 and 1994 in the first panel (i.e. the ratio of 128.8 -- the annual index for 1994-- and 100.0 --the annual index for 1993). By the same token, if 1996 quarterly indices were computed (at 1995 constant prices and with 1995 as a numeraire year), they would be chained by multiplying them by the cumulative annual growth achieved through 1995 (i.e. the ratio of 166.6 --the annual chain index for 1995-- and 100.0 --the annual index for 1993).

Calculating a chain index with 1993 as a numeraire year and using a one-quarter (the fourth quarter of 1994 in our example) overlap also involves three steps:

a. The first step is identical to the first step used in computing

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5 A third alternative technique, using annual overlaps based on changes from the same period in the previous year (rather than changes in the calendar year), can also be used but is generally not recommended because it may result in distorted seasonal patterns.

6 Since 1993 is the first year, we use the average prices for that year to compute quarterly constant price indices for the same year.

indices with a one-year overlap. Note, for example, that the first row of the third panel of Table 8, which demonstrates these calculations, is the same as that of the second panel.

b. A quarterly index at constant 1994 prices is calculated, but having values in the fourth quarter of 1994, instead of the whole year, as a numeraire (second row of the third panel).

c. Chaining 1995 with the earlier year in this case starts with the first quarter of 1995: the index for that quarter is calculated by multiplying the index of the fourth quarter of 1994 (third row of the third panel) by the quarterly growth factor using the fourth quarter of 1994 as a numeraire (i.e. by the ratio of 106.6 --the index for quarter I, 1995 with quarter IV, 95 as a numeraire-- and 100.0 --the index for quarter IV, 94). Similar calculations are done for the remaining quarter of 1995. To compute 1996 chained indices, one has to calculate a new quarterly index series for 1996 at constant 1995 prices with the fourth quarter of 1995 as a numeraire. The same logic used for computing the 1995 indices can then be applied.

Which chaining method should be used: the one with a one-year overlap or the one with a one-quarter overlap? Either method can be used, although the one-year overlap method has the advantage of producing indices which show an annual growth equal *exactly* to the growth obtained from computing annual indices (as the fourth panel of Table 8 shows), which is a desirable property in the context of national accounts compilation.

V. OTHER ISSUES

The previous sections established that it is desirable for BPS to begin calculating quarterly (and annual, since these are computed as the sum of the quarterly) national accounts using the chaining methodology recommended by the 1993 SNA. BPS has made the decision to do just that. In attempting to implement this decision, however, a number of further issues have to be addressed: What indexing formula to use for chaining? What format should be used for publication? What level of detail should chaining be applied to?

The sections that follow will attempt to provide answers to these questions. But first, it may be useful to learn how other countries have dealt with these issues. Table 9 shows what a select number of countries (developed as well as developing) are currently publishing.

Table 9
Present Publication Format of "Real" GDP Measure in Select Countries

Country	"Real" GDP Measure
United States	in Fisher-chained 1996 dollars
Canada	in constant 1992 prices[1)]
Australia	in annually Laspeyres-chained index
Netherlands	in constant 1995 prices
United Kingdom	in constant 1995 prices
France	in constant 1995 prices[2)]
Japan	in constant 1995 prices
India	in constant 1993-94 prices
Singapore	in constant 1990 prices
Malaysia	in constant 1987 prices
South Korea	in constant 1995 prices

Source: websites of various countries' statistical agencies as of May 4, 2001.

1) Although what is currently published is limited to the series in constant 1992 prices (with a Fisher-chained dollar value series made available to users upon request), Statistics Canada plans to change its policy in 2001. Starting in June 2001, it plans to follow the US lead and publish only Fisher-chained dollar values, but will make available to users upon request for the next 2-3 years the series in constant 1992 prices.
2) Also provides *annual* growth rates in previous year's prices

The table points to a very interesting conclusion, namely that countries, even developed ones, have not rushed to implement the 1993 SNA recommendations about chaining national accounts.[7] Among developed countries, only the US and Australia have discontinued publishing fixed-weight constant price series altogether and only publish chained series. Canada produces both fixed weight and chained series, France produces a chained supplemental series only to its fixed-weight annual series. Other European countries produce only fixed weight series in constant 1995 prices. In Asia, no country in the table has produced chained series yet. Their publication to date has been limited to fixed-weight constant price series.

So BPS, by producing only a fixed-weight series in constant 1993 prices, has not been out of step with other countries. In fact, it is currently in line with the majority of countries. That should not be interpreted as a recommendation to drop the chaining methodology altogether. Rather, it should be interpreted as a recommendation to approach this issue with caution in order to minimize potential problems that users may encounter in the future.

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7 One should note that Table 9 shows what other countries are currently publishing, not what they plan to publish. It is probable that several of these countries are doing what BPS is currently doing, namely evaluating options for future releases.

A. What Indexing Formula?

In computing a chained volume index series, a number of alternative indexing formulas can be used. The most widely known procedures are Laspeyres (which uses fixed prices of the previous period) and Paasche (which uses fixed prices of the current period); but two others are becoming more common: Fisher (which is the geometric mean of the Laspeyres and Paasche, thus using prices of both periods) and Tornqvist (or Discrete Divisia, which uses the average weights of the two periods).

Let p_{it} be the price of commodity i in period t

q_{it} the quantity of commodity i in period t, and

v_{it} the value of commodity i in period t, equal to $p_{it}\, q_{it}$.

A volume index using the Laspeyres procedure can be expressed as:

$$\frac{\sum_i p_{it-1} q_{it}}{\sum_i p_{it-1} q_{it-1}}.$$

Using the Paasche procedure it would be:

$$\frac{\sum_i p_{it} q_{it}}{\sum_i p_{it} q_{it-1}}.$$

Using the Fisher procedure it would be:

$$\left[\left(\frac{\sum_i p_{it-1} q_{it}}{\sum_i p_{it-1} q_{it-1}}\right)\left(\frac{\sum_i p_{it} q_{it}}{\sum_i p_{it} q_{it-1}}\right)\right]^{\frac{1}{2}}.$$

Finally, using the Tornqvist procedure, the volume index can be expressed as:

$$\prod_i \left(\frac{q_{it}}{q_{it-1}}\right)^{\left(\frac{1}{2}\right)\left(\frac{v_{it}}{\sum_i v_{it}} + \frac{v_{it-1}}{\sum_i v_{it-1}}\right)}$$

The advantages and disadvantages of all these procedures are well known and therefore need not be dwelled on in this report.[8] The difference between alternative procedures would be significant if fixed weights were used for all periods. However, by requiring updated weights between two consecutive periods, chaining reduces substantially such differences. BPS may want to experiment with various procedures and compare results. However, the easiest course of action would be to use the chained Laspeyres procedure, since the fixed-weight Laspeyres procedure was used in the past and both compilers and users of Indonesian national accounts have been used to it for some time.

B. What to Publish?

Based on other countries' experiences (see Table 9), the decision regarding what to make available to users to allow them to measure real GDP growth rates needs to be approached with caution. More specifically, three important questions need to be answered: what data to publish, in what format and what level of detail. The provision of adequate answers to these questions will require lengthy discussions making sure that no stone is left unturned. What follows can hopefully provide a starting point for these discussions.

1. What Data?

The issue here is whether to publish chain volume data or continue to produce GDP at "constant prices" of some fixed year. The greatest advantage of the former, as we have shown above, is that figures would provide a more realistic reflection of the economy. Its biggest drawback is the potential confusion among users which would be due primarily to their lack of familiarity with it. The biggest advantage of continuing to produce "constant price" data is the simplicity of that methodology and users' current familiarity with it. Its biggest drawback is its sensitivity to the arbitrary choice of a weighting year and its potential overstatement of real growth.

One advisable course of action, at least in the short run, is to produce both sets of figures and allow users themselves to choose between the two based on their particular need. Although such an action would be applauded by academics and researchers since it provides them with more information, it may sow confusion with the general public or even among government policy makers: for many there can only be one "true" number that should be believed and should be used for planning and evaluation. One way to resolve this dilemma is for BPS to choose one of the series as the "official" one but to make the other series available to users upon request. That

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8 One disadvantage of the Fisher and Tornqvist procedures that may not be well known is that measuring the contribution of each component to a percent change in an aggregate is not simple, as it is for the Laspeyres and Paasche procedures. That may provide additional support to the recommendation in this section to use the chained Laspeyres procedure.

was the approach used by Statistics Canada since 1997.

Which series should then be chosen as the "official" one? Since the chained series cannot be made available to the general public without adequate (and probably pretty lengthy) education, it may be more practical to continue to consider the "constant price" series as the official one until the public is ready to accept the chained series.

2. In What Format?

When BPS deems itself ready to make available to users the chained volume series, in what format should the data be provided? Based on the experience of countries which have adopted this methodology, two options are available:

- The first is to provide the data in terms of growth over the previous period (either in the form of a rate or an index). This option has the big advantage of avoiding the inconvenience of non-additivity, hence lowering the potential of user confusion. Its biggest drawback is that users will not be able to derive from it a long-term historical series.

- The second option is to provide the data in the form of "real" monetary aggregates using some recent year as a numeraire. The advantages and drawbacks of this option are the exact flip side of those of the first option. That is, while it provides the user with a convenient long-term series, it will suffer from the non-additivity problem.

With either options, however, BPS will need to produce a supplementary table with the sectoral contribution to aggregate growth.

3. What Level of Detail

Here again, when BPS deems it advisable to provide chained volume data to users, at what level of detail should chaining be made? Theoretically, it would be desirable to chain at the finest level of detail--every single product. In practice, it will probably be feasible and sufficient to carry it out at a somewhat more aggregate level, perhaps at a more detailed level than the 3-digit ISIC. This remains an issue subject to the level at which data are available and other practical considerations.

VI. CONCLUSIONS & RECOMMENDATIONS

To sum up, we will present the conclusions and recommendations of this report as answers to the following questions:

- **Should quarterly national accounts be chained?** The answer is yes.

- **How often should they be chained?** Annually, as recommended by the 1993 SNA.

- **What indexing formula to use?** Laspeyres, since this has been the procedure with which BPS staff (and users) are most familiar. Other indexing procedures can be adopted, but one must weigh the cost of introducing a new procedure against the potential benefits, which will not be substantial if data are annually chained.

- **What should BPS publish?** The easiest course of action would be to continue to provide a "constant price" series as the official one, but at the same time making available to users upon request a chained series for the same period. In any case, it is imperative to ensure that a campaign is conducted by BPS aiming at educating users about the chaining methodology and the way numbers should be interpreted.
  Evaluation of user reaction over the next couple of years can then determine whether the chaining methodology has been fully absorbed and endorsed by users, thus determining whether a switch to exclusive publication of a chained series is advisable.

- **What format to use for publication?** Both options (growth rates and "real" monetary levels) are appropriate. However, the first option has the advantage of avoiding the non-additivity problem in the presentation of numbers, since users already know that growth rates are not additive.

UNIT VALUE INDEXES FOR EXPORTS AND IMPORTS

Report # 36
Statistical Paper # 9

by
Frank de Leeuw

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TABLE OF CONTENTS

I. INTRODUCTION 162

II. METHODOLOGY 164
- **A. Collection of Value and Kilogram Data** 164
- **B. Changes in Unit Values** 164
- **C. Exclusion** 164
- **D. Median Unit Value Change for Industries** 165
- **E. Weighted Average of Industries** 166

III. RESULTS 166

IV. RECOMMENDATIONS 170

APPENDIX A INDUSTRIES DISCARDED BECAUSE OF FEW OBSERVATIONS 171

APPENDIX B FORMULAS 172

APPENDIX C DATA FOR INCLUDED 2-DIGIT INDUSTRIES . . . 174

I. INTRODUCTION[1]

Price indexes for exports and imports are essential ingredients in measuring GDP expenditures in constant prices; but good data is often difficult to obtain. This paper introduces a new set of indexes for Indonesia based on values and kilograms of exports and imports recorded in customs documents. The indexes are one kind of what is usually referred to as unit value indexes.

The best way to measure export and import prices is to develop a detailed reporting system for prices of many narrowly specified items, adjusted for quality change when appropriate. It is the same approach as is used to measure producer or wholesale prices.[2] The drawbacks of the method are that (1) it is a major and costly undertaking, and (2) it takes a long time to implement. Nevertheless, it should be considered in any plan for overall development and improvement of the Indonesian statistical system.

Countries without detailed reporting of export and import prices use other sources of information. One source is domestic wholesale or producer price indexes; some components of these indexes usually seem roughly appropriate to components of foreign trade. The problem with this source is that the available wholesale indexes are often poorly matched with actual exports and imports, including no matching at all in many cases. Another source is foreign exchange rates, usually with the US dollar, as an indicator of what is happening to prices of traded goods (measured in the domestic currency). Foreign exchange rates are unquestionably useful--and are used in this report--to convert price changes measured in one currency to price changes in another--for example, dollar prices of exports into rupiah prices of exports. However, foreign exchange rates alone are a questionable indicator of prices of traded goods, because other factors besides prices--for example, foreign investment demand and cross-country interest rate differentials--influence exchange rates. Certainly in Indonesia, the assumption that exchange rate movements reflect only price changes seems implausible.

A third source of information, the one used here, is customs documents that report values and quantities. In the case of Indonesia, values are reported in dollars and quantities in kilograms. Value divided by quantity, or unit value, is taken as an indicator of price, and a weighted average of unit values serves as a price index.

There are three major problems with the unit value approach:

(1) *Heterogeneity.*--The goods reported in customs documents, even those within one (9-digit) product classification, vary greatly in

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[1] Dantes Simbolon, Irlan Indrocahyo and Rusman Heriawan were very helpful in collecting and explaining the data underlying this report.

[2] The wholesale price indexes for exports and imports that BPS now publishes are based on only a small number of items, and therefore fall far short of complete price indexes for foreign trade.

specification, so that it is impossible to know whether unit values in successive months change because of price change or because of shifts in composition--for example, to brands made of heavier or lighter materials.

(2) *Inaccuracy*.--Reports may be inaccurate because of clerical errors or, in some cases, because of falsification.

(3) *Quality change*.--Changes in unit values may reflect not just price changes but changes in the quality of a good--for example, changes in durability or input requirements--that should be counted as a change in output rather than a price change.

The challenge in constructing unit value indexes is to try to minimize the effects of these problems.

Two other unit value methodologies that have influenced the present effort have dealt with the problems of heterogeneity and inaccuracy in different ways. The methodology proposed by the French Statistics Agency INSEE includes an elaborate set of rules for acceptance or rejection of the observations for each product.[3] The rules relate to coverage of larger product classes and variability of the unit values for individual products. There seems no reason to believe that they are inferior to the rules used in the present approach; but implementing them is clearly more time-consuming. Earlier efforts by BPS to develop unit value indexes seem to have failed because of the time required for implementation; therefore, a simpler approach seemed desirable.

A recent study by Peter Rosner uses the same source as this report to construct a measure of non-oil export volume for Indonesia covering the period from April 1994 to December 1999.[4] Rosner deals with the problems of heterogeneity and inaccuracy by rejecting observations in which the monthly change in unit value for a product is above or below certain thresholds, and substituting a volume measure in which value is deflated by the previous month's unit value. The present study uses a different statistical technique, described below. Both approaches are fairly simple to apply.

Neither these approaches nor the present effort deal with the problem of quality change. The measurement of quality change requires detailed investigation of individual products, and is therefore not amenable to easily applied statistical rules. At times, however, it is an important source of error in measures of prices and output. It is therefore another appropriate topic for consideration in overall improvement of the Indonesian statistical system.

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[3] The INSEE approach is described in various places, including Annex to *Rapport de Mission sur les Statistiques du Commerce Exterieur Albanais, Direction Generale des Douanes*, Bureau des statistiques, INSEE, Division des Echanges Exterieurs, 28 Mai 1998.

[4] Peter Rosner, "Indonesia's Non-Oil Export Performance During the Economic Crisis: Distinguishing Price Trends from Quantity Trends," *Bulletin of Indonesian Economic Studies*, vol 36, no. 2, August 2000, pp. 61-95

II. METHODOLOGY

To deal with the problems of heterogeneity and inaccuracy, the steps in the present approach include: collecting customs reports on value and kilograms, grouped into thousands of individual products; measuring the ratio of unit value in the current month to that in the previous month wherever data is available; counting the number of unit value ratio observations in each industry (specifically, the 98 2-digit classes in the Harmonized System (HS)) and discarding of industries with very few observations; and construction of price change for larger product industries by using the median change of the products in each industry. A step-by-step description with comments on each step follows.

A. Collection of Value and Kilogram Data

BPS already collects these data, grouped into the 6000 or so products in the HS code. It is a tedious and time-consuming operation. For some products, a count of units is available, and might be preferable to kilograms for measuring quantity.

B. Changes in Unit Values

For each product, value is divided by kilograms to obtain a unit value, separately for exports and imports. The next step is to calculate ratios of unit values in the current month to unit values in the previous month for each product. Wherever observations for two successive months are not available, there is no recorded change in unit value.

For many products and many months, these changes in unit values are within a reasonable range for changes in prices. However, there are also cases in which unit values suddenly increase several fold or drop by 75% or more--changes that would be most unusual for the price of a narrowly specified product. Presumably, such changes are due to shifts in composition or to inaccurate recording of basic data.

C. Exclusion

To eliminate, or at least greatly reduce, the influence of heterogeneity and inaccuracy, the procedure followed here is (a) to classify products by their industry--specifically, by the 98 2-digit codes in the Harmonized System of international trade classification, (b) to eliminate industries with very few products, and then (c) to take medians of the changes in unit values for each included industry (as always, separately for exports and imports).

Three thresholds for eliminating an industry on the basis of the number of observations were tested: elimination of groups with no observations at all for three months or more during 2000; elimination of all groups with fewer than four observations in at least three months of 2000, and elimination of all groups with fewer than six observations in three or more months. Results presented here are for the first and third thresholds. For exports, 4 industries were excluded

because of no observations in three months or more, and an additional 17 because of fewer than six observations. The total value of all these exclusions amounted to about five percent of the value of exports. For imports, the corresponding number of industries were 1 because of no observations and an additional 12 because of fewer than six observations, amounting in total to less than one percent of the value of imports. Generally, the omitted industries had much larger and more irregular unit value ratios than the included industries. The specific industries omitted are listed in Appendix A.

Application of the exclusion rules in future years raises some problems. For the moment, industries omitted based on the months of 2000 are being omitted during 2001; but a review of the twelve months of 2001, when the data become available, will produce a new list that may differ from the list based on the months of 2000. The new list could be used to revise indexes for 2001, or could simply be applied to calculations in 2002. The second procedure is simpler, and would be satisfactory unless the possible revision of the total index for 2001 is substantial.

In either case, if the new list fails to exclude some industry that had been excluded in 2000, it will be necessary to establish, for this newly included industry, a link to the base month of January 2000, since all the indexes are equal to 100 in that month. The link could be established in at least two ways: by calculating ratios of unit values in the first included month to unit values in January 2000 for all the 9-digit products in that industry that have observations in both months, and then taking the median of those ratios; or by imputing the movement of the total index (or some appropriate sub-index) to that industry from January 2000 to the first month when it is included. Again, the second procedure is simpler; but it may be worth trying both when the problem first arises, to see if the total index is affected significantly.

D. Median Unit Value Change for Industries

The next, and probably most crucial, step is calculating the median change in unit value for each industry group that was not discarded in the previous step. Using medians rather than means drastically reduces the effect of outliers. The median of the numbers 1, 2 , 3, 4, and 5 is 3; but the median of 1, 2, 3, 4, and 5000 is also 3. The only influence the "outlier" of 5000 has on the median arises from its being above rather than below the middle observation. Medians seem a simple and effective way to eliminate the influence of sporadic instances of large shifts in composition and inaccurate records.

Where there are only one or two observations, of course, an outlier will have a big effect even on a median. Even where there are three or four observations, the presence of two or more outliers can drastically affect the median. That is the reason for discarding industries with a small number of observations. Where the number of observations is substantial, outliers will have virtually no influence on the median.

E. Weighted Average of Industries

The final step is combining the unit value changes for industry groups into overall unit value indexes for exports and for imports. Weights reflecting the relative importance of different industries are necessary for this step. Two weighting systems have been tried: a Laspeyres, or fixed-weight index, with weights based on total values for the year 2000; and a Paasche index, or a weighted harmonic mean with current-month weights for each month. The Laspeyres index is a better measure of month-to-month changes in import and export prices, since its movements depend solely on price changes and not on changes in composition. However, the Paasche indexes are the correct ones to use as deflators if the goal is a 2000-weighted index of the volume of exports and imports.[5]

An important caution in constructing weighted indexes is to adjust the index for excluded industries. For example, assume that weights for all industries add to 100, but that excluded industries account for 5 of the 100. Then it is necessary to divide the sum of weights times included indexes by 0.95 to obtain a correct index.

Indexes for groups of 2-digit industries can be constructed in exactly the same way as indexes for total exports and imports. It may be useful to show separate indexes, for example, for agricultural products or products of heavy industry together with the overall indexes.

III. RESULTS

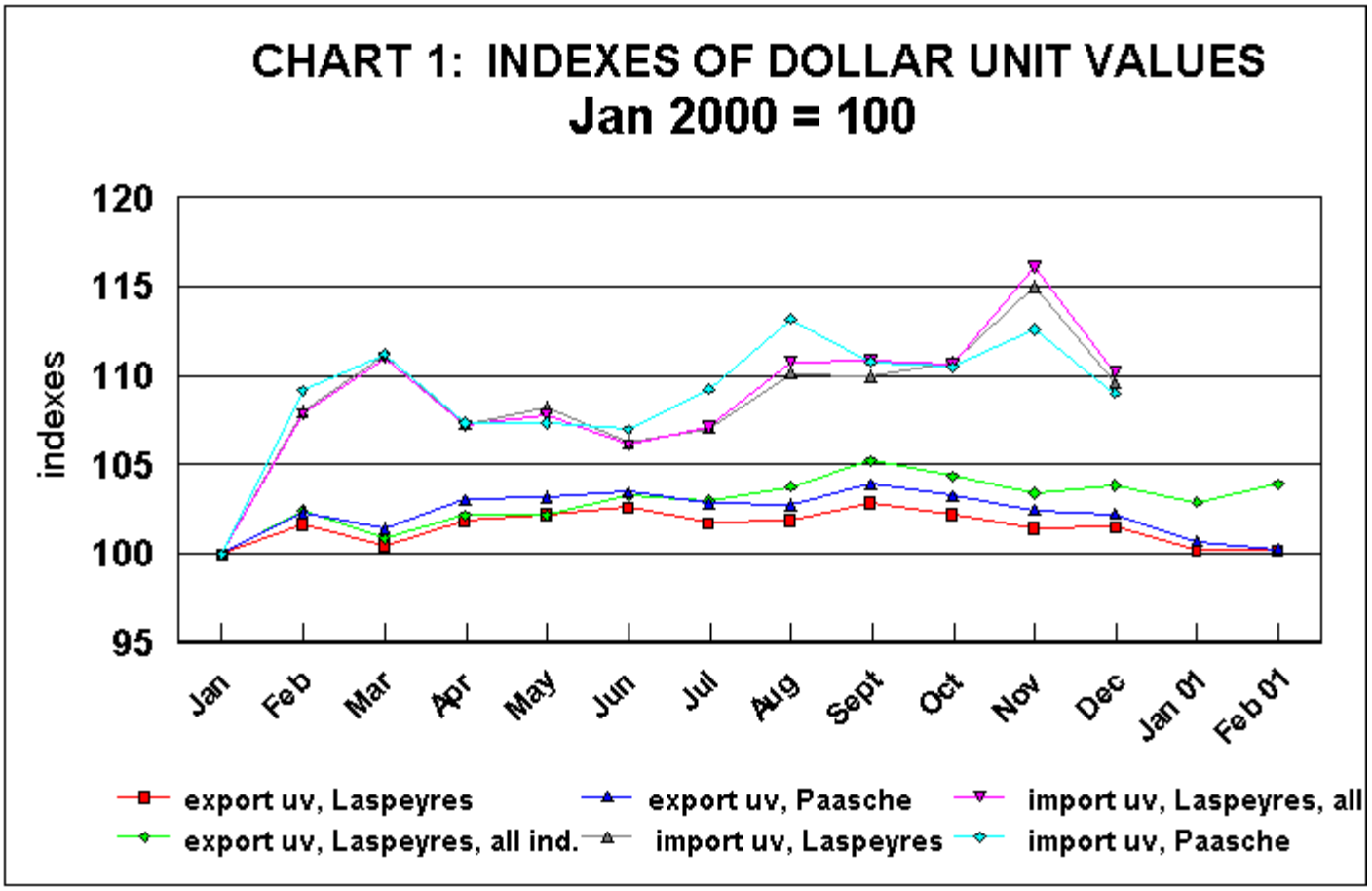
There are numerous unit value indexes to compare. Table 1 and Chart 1 show three indexes of the dollar unit value of exports and three indexes of the dollar unit value of imports. The export indexes are available through February 2001, import indexes through December 2000. The indexes of the dollar unit value of exports shows little change, while the unit value index for imports rise by about 10 percent from January to December.

---

5 In decomposing a change in value into a price change and a quantity change, it is desirable to have consistent measures--that is, measures in which an index of quantity or real value times an index of price equals an index of value. Fixed-weight indexes for both quantity and price do not have this property. Of the various combinations of indexes that do have the property, the best known is a Laspeyres index for one component and a Paasche index for the other. That is the system in the Indonesian national accounts; the quantity measures, in 1993 prices, are Laspeyres, and the derived deflators (value in current prices divided by value in 1993 prices) are Paasche. Another consistent system is Fisher indexes–geometric means of Laspeyres and Paasche indexes–for both price and quantity. The final choice of weighting system for these export and import unit value indexes should be one that fits best with weighting plans for the national accounts.

Table 1
Dollar Unit Value Indexes of Exports and Imports
(January 2000 = 100)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan 01	Feb 01
A. Exports														
1. Laspeyres														
included industries	100.00	101.69	100.49	101.90	102.24	102.62	101.76	101.88	102.93	102.24	101.43	101.50	100.19	100.22
all industries	100.00	102.44	100.88	102.21	102.21	103.27	103.00	103.80	105.22	104.34	103.38	103.89	102.88	103.93
2. Paasche														
included industries	100.00	102.35	101.42	103.03	103.20	103.49	102.86	102.77	103.94	103.24	102.46	102.23	100.73	100.26
B. Imports														
1. Laspeyres														
included industries	100.00	108.03	111.16	107.26	108.20	106.26	107.05	110.14	109.99	110.81	115.00	109.58		
all industries	100.00	107.90	111.02	107.23	107.83	106.10	107.11	110.78	110.82	110.60	116.12	110.23		
2. Paasche														
included industries	100.00	109.20	111.18	107.35	107.33	106.98	109.25	113.19	110.81	110.51	112.63	109.02		



The fairly smooth behavior of these indexes, especially those for exports, might suggest that the use of medians produces indexes with very little change; but detailed examination of the 2-digit indexes--the stage at which medians are applied--indicates that such is not the case. Even if the industries discarded under the fewer-than-six observations are not included, the February 2001 indexes for exports (with January 2000 equal to 100) range from 57 to 165, while the December indexes for imports range from 61 to 269. The smooth behavior of the aggregates results from weighting all these indexes together, not from lack of variability in the individual industry indexes.

Rupiah unit values of imports and exports of course rose much more than dollar prices. The rupiah-dollar exchange rate rose by 30 percent between January and December of 2000. The dollar indexes for December 2000 should therefore be multiplied by 1.3 to obtain rupiah unit value indexes. Indexes for each other month should be multiplied by the ratio of the average exchange rate for that month to the average exchange rate in the reference month.

The three lines for exports measure (1) a fixed-weight (Laspeyres) unit value index covering only the included industries, (2) a fixed-weight unit value index covering all industries, included or excluded, and (3) a current-month-weight (Paasche) unit value index covering only the included industries. Differences between the first two measure the effect of excluding industries with few observations. For exports, the effect is small at first but shows a gradual increase. Differences between the first and the third lines measure the effect of shifting from fixed weights to current-month weights. The effect is small for export unit values.

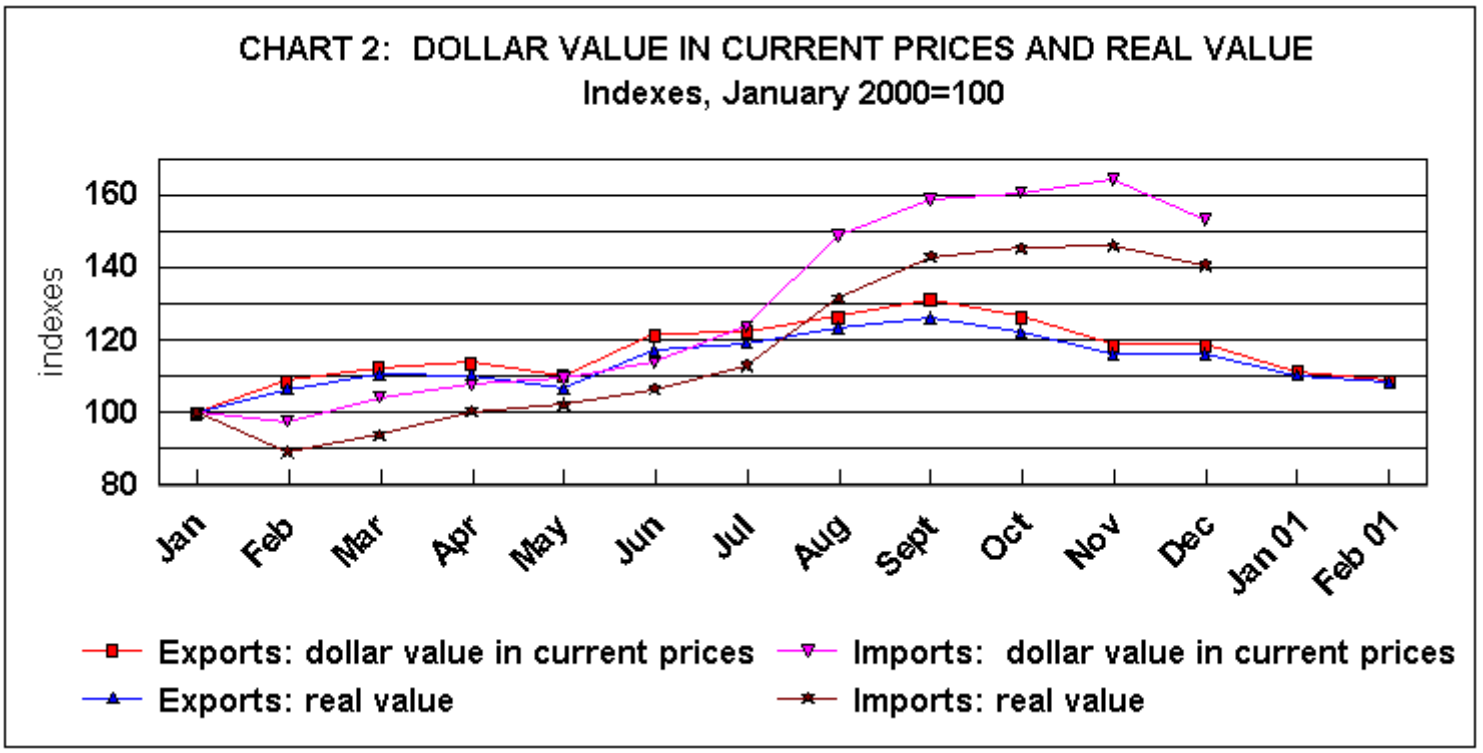
For imports, the three lines measure the same concepts as for exports. Here the effect of omitting industries matters much less than for exports–probably because a much smaller proportion of value is omitted for imports than for exports. For imports, however, the difference between fixed-weight and variable-weight unit value indexes is more variable than for exports.

Finally, Table 2 and Chart 2 show indexes of nominal and real dollar value . The real value indexes are based on deflation by Paasche unit value indexes that omit industries with fewer than six products in 3 months or more. Real exports, according to this measure, rise by more than 20 percent from January to the September period, then begins to decline. Real imports are weak for a few months; but then rise more than exports–about 45 percent between January and October-November; they then decline slightly in December.

These results for real value can be compared with the national accounts in constant (1993) prices. From the first to the fourth quarter, the change in exports is almost the same in the two series. For imports, the index in this study rises more than real imports in the national accounts. Possible sources of difference include the difference in weighting formula and year, the inclusion of net imports of services in the national accounts series, and of course the different methodologies used to convert current values to real values.

Table 2
Deflated Value Indexes (January 2000 = 100)
(Deflators are Paasche, included industries)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan 01	Feb 01
A. Exports														
Value	100.00	109.10	112.69	114.06	110.56	121.67	122.69	126.90	131.38	126.61	119.18	118.87	111.28	109.10
Price	100.00	102.35	101.42	103.03	103.20	103.49	102.86	102.77	103.94	103.24	102.46	102.23	100.73	100.26
Deflated Value	100.00	106.59	111.11	110.71	107.13	117.56	119.27	123.47	126.40	122.63	116.31	116.28	110.47	108.82
B. Imports														
Value	100.00	97.74	104.41	107.81	109.87	114.01	123.87	149.18	158.85	160.79	164.74	153.57		
Price	100.00	109.20	111.18	107.35	107.33	106.98	109.25	113.19	110.81	110.51	112.63	109.02		
Deflated Value	100.00	89.50	93.91	100.42	102.36	106.58	113.38	131.80	143.35	145.50	146.26	140.86		



IV. RECOMMENDATIONS

It seems desirable to calculate unit value indexes for exports and imports on a regular basis, using the methodology described in this report, and make them available to users. The results seem to eliminate many of the difficulties arising from heterogeneity and inaccuracy in the underlying information. The indexes should be useful in preparing the national accounts and in analyzing Indonesian economic conditions generally.

Choices of which industries to exclude and which weighting system to use should not be made permanently at this point. Among the indexes described in this report, Paasche indexes excluding industries with 6 observations or fewer for at least three months seem the best choices. But the final choices should await final decisions on the weighting formulas and time periods that will be used in the national accounts.

APPENDIX A

INDUSTRIES DISCARDED BECAUSE OF FEW OBSERVATIONS

I. EXPORTS

A. Discarded because of 0 observations

43 Furskins and artificial fur
51 Wool horse hair yarn woven fabric
81Other base metals
93 Arms and ammunition

B. Discarded because of 1-5 observations

02 Meat and edible meat offal
10 Cereals
26 Ores slag and ash
31 Fertilizers
36 Explosives matches pyrotechnic prod
37 Photographic and cinematogr. goods.
45 Cork and Articles of Cork
50 Silk
53 Other vegetable textile fibers
75 Nickel and articles thereof
78 Lead and articles thereof
79 Zinc and articles thereof
80 Tin and articles thereof
86 Railway loc. tramway track and part
88 Aircraft spacecraft and parts
89 Ships, boats, and floating structures
98 PEBT

II. IMPORTS

A. Discarded because of 0 observations

43 Furskins and artificial fur

B. Discarded because of 1-5 observations

01 Live animals
06 Live trees and other plants
14 Veg. plaiting mat veg. products.nes
36 Explosives matches pyrotechnic prod
45 Cork and articles of cork
46 Manufac. of straw basketware
50 Silk
66 Umbrellas whips walking-sticks
67 Prepared feathers artifice. flowers
88 Aircraft spacecraft and parts
93 Arms and ammunition
97 Works of art antiques

APPENDIX B
FORMULAS

I. Individual product formulas

These are all elementary. Unit values for each product are dollar values divided by kilograms. Ratios of unit values for each product are unit values for the current month divided by unit values for the previous month.

II. Industry index formulas

Each industry's unit value ratio for each month is the median of the unit value ratios for all of the products in that industry. In the case of an odd number of products, it is the middle one of the ratios ranked by size. In the case of an even number of products, it is the arithmetic mean of the two middle ratios.

The unit value ratios for each industry are chained together to construct an index of unit values for that industry, symbolized by $I_{i,t}$ for industry i in month t. With January 2000 equal to 100, $I_{i,t}$ for February is $100*R_{feb}$, where R_{feb} is the unit value ratio for the industry in February. For March, $I_{i,t}$ is$100*R_{feb}*R_{mar,}$ where R_{mar} is the unit value ratio for the industry in March.

III. Indexes for groups of industries and all industries

The report shows Laspeyres and Paasche indexes. Both of them make use of the total value of each industry in the year 2000, and the index for each industry.

The Laspeyres formula for an index with the average for 2000 equal to 100 is:

$$L_{t,2000} = 100 * \sum_i \left(\frac{V_{i,2000}}{\sum_i V_{i,2000}} \right) * \left(\frac{I_{i,t}}{I_{i,2000}} \right)$$

where $L_{t,2000}$ is the index in month t, $V_{i,2000}$ is the value of industry i in 2000, the summation of values is over all industries included in the index, $I_{i,,t}$ is the index for industry i in month t with January equal to 100, and $I_{2000,i}$ is the average of index $I_{i,,t}$ in the year 2000.

To convert this index, in which the average for all the months of 2000 equals 100, to an index in which January 2000 is equal to 100, divide the index by the index for January 2000 and multiply by 100.

The Paasche formula for an index with the average for 2000 equal to 100 is:

$$P_{t,2000} = 100 * \left[\sum_i \left(\frac{V_{i,t}}{\sum_i V_{i,t}} \right) / \left(\frac{I_{i,t}}{I_{i,2000}} \right) \right]^{-1}$$

where $P_{t,2000}$ is the index in month t, $V_{i,t}$ is the value of industry i in month t and the rest of the notation is exactly the same as in the Laspeyres index.

As in the Laspeyres case, to convert these indexes to indexes with January 2000 equal to 100, simply divide by the index for January 2000 and multiply by 100.

APPENDIX C
DATA FOR INCLUDED 2-DIGIT INDUSTRIES

Table C.1
Dollar Value of Exports (000)

HS	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3396	2134	3210	3542	3225	3126	2805	3963	3178	3580	3190	3810	2438	2134
3	108875	99355	112180	110008	116892	140287	146447	138318	133002	126110	124067	124929	137010	99355
4	2920	4304	7638	9026	8123	12266	12278	10432	7552	12786	13684	10531	9865	4304
5	256	246	575	361	342	385	452	444	743	495	642	625	466	246
6	837	594	795	687	573	668	759	927	1103	1127	837	676	1388	594
7	3534	2541	3074	4016	2559	3831	2722	2980	4136	3963	3168	4151	3867	2541
8	15822	15310	12297	10187	8695	6474	8774	6878	8694	10096	12664	10893	8135	15310
9	45359	42851	41957	46324	60032	79248	101604	101213	79968	63842	44086	41987	38596	42851
11	697	519	611	999	750	2570	832	1374	1397	709	431	1226	810	519
12	3013	3480	3128	3109	3789	6120	3778	3287	3515	2704	2747	3921	2180	3480
13	1818	1875	2330	2037	2135	2625	2555	2527	2572	2473	1895	2060	1633	1875
14	1251	1469	2378	1256	1823	2559	2821	3049	2603	2740	2881	1619	1414	1469
15	100752	131582	154437	143457	133681	204511	165500	164561	184861	128133	130407	121681	80433	131582
16	5067	6569	8457	8196	8582	13388	8713	9356	11881	9330	10496	7628	7098	6569
17	3496	3787	4559	4060	5524	4830	5396	6349	6290	6582	4929	4163	4382	3787
18	19592	18984	17606	15821	36567	40153	48665	36280	20964	29265	27634	30328	18288	18984
19	4697	4575	5355	5105	4983	6243	6467	7214	6979	7628	6592	6243	6003	4575
20	8834	9021	8865	11534	11771	10427	13704	12027	11865	11586	9987	5755	9614	9021
21	2846	3018	3054	2957	4262	3247	2877	4421	2940	3320	1962	2240	3546	3018
22	1189	1220	1798	2048	1380	3361	2355	3122	2350	1875	2105	1081	1693	1220
23	8428	5996	6998	6808	7792	8001	7564	9631	8742	7710	7219	7629	5462	5996
24	8237	8615	22105	13569	20253	16608	20159	28544	24508	23242	15881	19255	17131	8615
25	18723	18538	17696	22410	25526	23406	17281	21873	17980	15702	13799	16089	24718	18538
27	1241854	1205490	1194904	1086371	1138439	1291559	1242284	1412198	1446009	1543856	1450282	1430671	1347505	1205490
28	10011	11169	8781	11280	16024	18623	18123	12139	14975	19596	27031	19150	21156	11169
29	94479	82171	109237	91178	89647	98983	80663	84077	82255	94732	81442	89551	71883	82171
30	5130	4468	6182	4012	4251	3888	6725	5098	6803	7232	5152	8383	4724	4468
32	6165	7350	8396	6831	8748	10068	10471	9933	8779	10374	8161	8449	5335	7350
33	8214	10244	8029	9871	9478	8694	12486	10399	10607	12492	9710	10273	8685	10244
34	17634	15348	19164	19710	14927	18386	17361	18939	17322	19039	16434	10541	17166	15348
35	1093	1313	962	664	965	991	544	1062	678	574	756	674	1007	1313
38	30226	22625	27378	30086	35129	33795	26981	32773	29943	25283	31426	23443	20665	22625
39	92072	97175	92579	96575	91355	98136	116876	117641	95254	108268	96343	82200	94017	97175
40	99687	112358	119826	120954	112391	102061	138497	113593	124088	123912	90141	92452	91807	112358
41	5525	6401	8964	8479	7987	8584	8853	8246	7405	8679	8893	8636	5897	6401
42	18434	22695	26693	24768	27128	29420	29409	22970	31114	21936	27974	22998	29020	22695
44	269616	298105	323937	338027	314791	331815	307481	297561	310698	318741	283283	243275	253424	298105
46	4507	5383	7936	6469	5414	5782	6062	4847	5368	6083	5623	6710	5419	5383
47	57029	69633	55164	84699	97070	80613	53906	38687	82278	39147	25644	30113	22239	69633
48	175414	183318	213170	192806	193531	209872	196549	196208	218129	195688	145938	142490	134906	183318
49	777	762	2347	1483	1859	2117	3221	3767	4170	1743	1245	1239	1432	762
52	53984	64363	65067	68711	60771	71996	61392	64259	61758	72552	65720	57631	62329	64363
54	85493	107871	105083	97144	97637	109834	115220	111951	103882	111491	98839	92860	93434	107871
55	78337	81747	83838	85779	81147	84994	98650	92191	83687	94365	79743	72724	74301	81747
56	2853	2827	4192	2495	3411	3169	3465	3554	3640	2705	3178	3171	2643	2827
57	2323	2727	2005	2265	2020	2633	2165	2325	2196	3108	2683	1852	2328	2727
58	5801	7365	7042	8571	8408	10225	7447	9843	8362	7383	7561	13086	7596	7365
59	10347	10953	13189	11365	9633	13632	13302	12329	10968	11147	9792	10156	10962	10953
60	3649	24318	7056	4502	5134	5537	4946	4102	3987	3568	4215	4834	4359	24318
61	87240	100481	109020	99325	116262	146759	193618	167905	164798	126713	121589	122241	109404	100481
62	186158	221889	217353	215945	244033	278074	336971	264591	298819	232474	246077	263483	231048	221889
63	14078	17035	20735	19034	17731	18870	20306	21091	21595	23878	18247	16219	15886	17035
64	164624	162727	131815	154351	152002	139617	149192	104802	151974	100667	126761	133580	152924	162727
65	1644	2369	2785	2378	2301	2757	3412	3183	1788	1852	2002	2919	3187	2369
66	3608	3549	2822	948	1031	368	418	275	539	700	2544	2452	3131	3549

67	3533	4000	4642	4117	4730	4883	5014	11722	5166	4064	3614	3528	3185	4000
68	7998	6698	9277	7960	7597	10363	8059	9024	8056	6472	6545	6503	5078	6698
69	11300	14563	14658	17204	15418	18895	19538	18455	17087	23064	15604	12734	17444	14563
70	24911	36627	30151	29799	27829	27931	29518	31427	33093	28960	23827	19906	25585	36627
71	47689	48720	58217	35489	34161	37485	50874	49911	39050	49011	52163	48251	65094	48720
72	36784	36902	37735	27229	32407	43547	19759	30758	35554	37701	16558	31976	13638	36902
73	32530	26346	36214	32311	34740	50040	40575	42090	36156	42213	35631	36878	27430	26346
74	34149	33933	43257	34626	12557	31749	44287	37770	30442	38493	35017	31757	30340	33933
76	37559	36891	34362	36491	33065	46784	37417	34478	50971	34603	34915	34477	40681	36891
82	5478	7868	8307	9501	6855	6538	7895	7078	8657	8616	7362	7599	4853	7868
83	2747	2869	3793	4325	3502	3891	3869	4954	4689	4307	3840	2903	3150	2869
84	218998	318719	265403	306916	299801	308450	259211	433868	404535	357256	336923	328931	297840	318719
85	313731	547606	476733	681178	524430	521911	489441	620631	677222	552603	520169	537815	551426	547606
87	35149	38131	45251	43783	40452	45558	47894	44721	33848	46326	39338	31954	38198	38131
90	23832	23149	24325	30226	27652	26578	25941	27966	37410	23277	27964	22223	24103	23149
91	380	338	433	407	446	406	590	322	515	645	554	269	360	338
92	6908	15609	14306	18816	14500	15406	14721	16657	19200	13846	16107	12150	13340	15609
94	129749	133399	151387	143028	135104	121106	108238	104620	128787	149573	129142	125698	105959	133399
95	14717	27107	32348	47994	26207	41107	36973	41489	45149	31917	21100	15718	14788	27107
96	7140	9668	12206	10960	13165	13252	12289	12706	11383	11062	9836	9093	9048	9668
97	337	374	660	305	748	459	309	105	272	173	127	107	150	374
Total	4203266	4722334	4750418	4857257	4735280	5212528	5133916	5412061	5588933	5289163	4882068	4777444	4587683	4722334

Table C.2
Industry Export Indexes (January 2000 = 100)

HS	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	100.00	101.14	108.42	104.58	90.29	88.32	99.97	104.74	91.07	81.00	86.42	99.54	72.82	92.01
3	100.00	105.50	99.71	97.38	100.03	87.84	92.70	92.02	89.82	94.06	97.97	92.69	105.97	106.70
4	100.00	99.73	102.81	102.72	83.56	96.27	102.51	90.27	118.09	119.95	119.95	303.83	124.50	148.24
5	100.00	63.13	98.97	178.52	146.44	135.34	187.74	169.45	159.98	151.73	128.05	231.33	124.21	78.37
6	100.00	65.36	77.46	61.21	89.93	119.23	113.75	104.76	101.60	122.35	94.91	117.62	109.78	73.02
7	100.00	93.98	95.82	101.49	97.09	94.07	114.86	105.28	99.91	109.05	113.46	100.05	109.94	106.59
8	100.00	89.43	87.68	98.00	95.21	92.63	80.96	81.11	74.34	74.02	71.78	67.52	61.70	69.98
9	100.00	103.31	102.86	103.01	109.79	110.43	105.24	104.19	99.75	103.23	95.36	100.72	89.50	117.11
11	100.00	121.01	91.96	94.43	88.70	86.27	87.39	85.71	76.34	104.19	252.43	219.70	238.51	274.39
12	100.00	122.19	97.40	90.54	83.63	95.86	111.19	103.56	94.84	114.46	72.12	77.36	73.15	93.14
13	100.00	95.87	94.27	97.21	80.38	76.90	83.20	67.67	79.77	79.36	85.05	107.86	84.48	104.99
14	100.00	83.92	84.54	92.06	110.13	101.51	92.33	89.97	89.55	95.82	107.51	111.02	109.43	112.41
15	100.00	98.76	93.33	89.35	90.24	85.54	88.25	76.89	89.48	76.81	70.71	72.60	68.56	95.61
16	100.00	110.81	105.26	90.95	98.80	98.60	89.05	96.19	98.47	110.48	104.82	90.72	104.51	147.16
17	100.00	99.75	100.17	101.28	97.82	96.02	94.39	82.28	89.32	100.03	104.77	93.01	108.46	113.05
18	100.00	100.06	106.18	110.32	108.91	105.16	103.04	102.12	105.15	111.51	106.33	112.50	110.24	97.63
19	100.00	91.20	92.29	89.32	82.83	77.41	73.83	76.72	68.72	74.86	67.28	73.52	70.49	67.08
20	100.00	92.76	90.01	96.31	94.72	100.07	100.92	108.52	114.72	108.83	109.69	115.31	101.99	107.45
21	100.00	103.73	108.69	99.74	113.83	88.07	102.05	123.77	103.37	110.08	111.58	119.84	118.61	107.99
22	100.00	110.95	117.13	120.65	108.23	111.46	98.96	100.85	98.25	105.10	90.54	103.18	108.38	83.04
23	100.00	100.00	95.09	103.43	85.52	85.12	82.47	82.05	85.59	83.57	85.84	90.59	91.46	97.62
24	100.00	104.04	115.26	128.51	109.18	112.86	100.04	101.15	99.93	93.18	128.02	141.61	139.43	136.89
25	100.00	90.12	93.81	97.08	90.37	88.53	89.00	84.83	82.71	84.63	85.15	83.03	85.30	90.86
27	100.00	101.31	106.16	108.12	110.57	112.43	111.71	114.83	117.00	121.22	114.93	109.00	103.94	94.85
28	100.00	100.52	100.12	97.65	96.69	97.80	97.57	98.46	99.41	96.09	97.05	97.29	95.14	89.65
29	100.00	99.28	101.02	104.84	100.73	100.86	99.71	99.87	99.58	102.17	101.77	101.66	101.67	101.67
30	100.00	87.85	120.54	102.42	108.92	90.78	97.74	113.68	108.71	111.55	126.26	149.49	163.81	89.11
32	100.00	107.53	109.60	106.38	109.04	106.59	108.60	106.16	95.85	93.45	80.22	79.44	75.47	82.00
33	100.00	116.37	116.01	108.34	119.35	103.42	122.01	124.95	122.94	118.93	108.46	118.45	100.57	143.79
34	100.00	105.30	97.25	94.85	93.04	100.43	99.47	98.74	100.74	100.03	95.50	89.01	90.95	99.07
35	100.00	100.84	101.06	134.79	145.91	141.13	145.01	155.66	119.01	195.72	164.78	271.47	179.64	237.30
38	100.00	108.36	105.25	104.62	105.51	99.96	95.68	95.56	99.00	98.83	101.44	98.20	97.09	105.47
39	100.00	102.74	104.11	104.79	104.78	103.75	101.79	102.69	101.52	101.64	99.40	98.91	99.37	93.69
40	100.00	101.93	101.59	101.00	99.78	100.92	99.53	98.38	100.78	99.58	100.28	96.77	96.88	100.52

41	100.00	111.54	106.91	104.42	87.44	95.34	95.48	94.62	81.76	77.14	80.16	77.96	83.59	73.30
42	100.00	106.56	90.79	94.40	79.31	97.24	104.82	97.75	96.24	77.33	92.05	87.84	80.83	102.41
44	100.00	104.38	99.54	99.08	98.88	99.82	99.10	99.33	99.20	97.04	95.32	96.22	96.24	101.87
46	100.00	119.40	88.87	102.84	77.23	116.66	84.89	96.95	107.61	71.20	73.60	106.38	96.16	127.56
47	100.00	110.50	96.49	86.49	90.31	92.80	111.79	92.60	101.26	105.85	89.66	79.66	88.02	109.79
48	100.00	105.01	105.46	108.93	111.58	111.79	115.06	115.07	109.77	109.77	108.21	110.39	111.53	107.84
49	100.00	56.22	52.47	71.29	60.47	49.03	51.87	43.73	50.63	47.37	46.90	48.98	44.31	50.11
52	100.00	100.71	99.46	99.64	102.14	101.85	99.09	99.09	102.16	97.57	97.58	96.87	97.04	101.56
54	100.00	98.31	100.44	101.95	93.71	93.91	93.32	90.91	94.50	93.07	93.85	96.07	94.04	97.54
55	100.00	102.60	103.45	103.31	107.44	105.93	103.24	105.12	106.12	103.16	107.65	106.55	103.73	109.11
56	100.00	94.51	98.42	90.16	101.80	98.65	112.11	106.97	104.36	103.52	104.02	101.03	114.62	113.75
57	100.00	84.30	83.72	84.84	83.63	70.08	70.08	86.20	80.74	82.00	82.51	90.83	81.83	77.03
58	100.00	139.42	153.96	150.96	146.23	174.84	146.97	132.87	128.38	103.24	90.05	112.49	92.01	105.07
59	100.00	108.44	125.01	110.49	112.56	96.20	96.72	98.69	92.27	96.89	108.26	124.70	133.30	125.88
60	100.00	105.76	108.13	106.36	103.78	110.26	109.27	107.25	107.81	99.06	111.10	108.11	95.79	108.10
61	100.00	102.51	101.25	95.37	98.98	102.88	101.59	101.28	106.41	97.92	103.09	105.83	105.04	104.96
62	100.00	92.72	88.75	91.01	88.05	90.80	90.51	86.18	86.29	82.93	89.21	97.22	99.84	91.54
63	100.00	111.40	108.12	109.36	113.90	109.40	113.97	109.19	105.88	104.35	99.25	103.60	100.03	105.91
64	100.00	107.88	105.99	104.25	103.27	114.22	118.28	113.32	112.16	103.88	103.73	111.47	117.72	132.99
65	100.00	156.60	120.32	115.02	99.19	59.52	62.94	55.62	41.55	48.46	44.82	45.13	32.51	40.64
66	100.00	125.46	109.49	117.68	51.54	109.89	92.86	193.63	188.51	257.53	396.73	237.84	781.98	714.79
67	100.00	103.14	101.24	124.56	119.82	103.49	105.66	121.15	87.36	98.65	118.17	126.79	108.50	84.09
68	100.00	100.91	95.89	96.78	94.96	95.99	85.06	85.45	90.15	84.18	91.81	95.75	99.80	103.55
69	100.00	100.95	100.94	104.40	93.12	82.26	81.03	83.58	75.49	66.56	72.09	79.61	73.07	77.59
70	100.00	95.30	98.00	97.90	99.57	100.45	102.58	107.21	108.47	105.58	105.88	108.04	103.62	103.87
71	100.00	110.23	64.07	81.76	76.15	105.52	89.34	68.45	58.99	56.74	64.34	53.40	59.12	104.46
72	100.00	100.03	98.92	100.72	100.72	96.20	103.83	101.31	100.52	106.49	105.69	105.07	107.61	99.32
73	100.00	103.32	104.13	101.70	109.62	111.01	112.78	116.11	114.65	113.87	111.20	114.33	116.98	114.57
74	100.00	104.41	102.17	109.15	112.04	112.21	112.72	111.35	112.39	116.94	119.96	117.30	113.72	116.39
76	100.00	102.73	100.86	97.78	99.58	99.52	100.73	101.36	100.83	99.91	107.66	107.01	107.38	108.81
82	100.00	130.82	139.60	141.52	101.03	97.23	87.19	67.19	74.63	70.62	66.73	58.83	54.81	64.18
83	100.00	98.46	79.52	86.64	90.03	89.23	78.88	92.99	90.05	92.88	88.99	105.97	101.56	101.30
84	100.00	103.52	99.89	102.76	103.05	99.07	92.88	101.64	105.99	100.75	103.94	103.32	108.51	105.84
85	100.00	99.03	96.08	100.09	101.76	98.70	93.66	96.01	94.93	95.10	96.19	100.55	96.75	92.66
87	100.00	101.14	94.24	98.35	95.83	91.82	94.94	94.57	88.56	84.27	87.72	90.24	91.74	92.51
90	100.00	98.87	116.47	115.39	105.57	116.45	120.94	103.90	105.14	97.89	100.21	105.11	133.06	105.99
91	100.00	93.52	110.66	110.90	114.19	72.88	118.23	53.51	53.54	37.89	34.01	44.19	43.39	44.13
92	100.00	98.38	102.65	100.22	100.28	105.07	106.19	102.95	120.77	109.20	117.13	112.39	103.68	100.34
94	100.00	99.68	95.42	99.03	100.33	100.67	105.07	104.14	104.40	104.41	105.00	106.00	100.24	103.11
95	100.00	117.61	113.39	119.61	111.76	115.18	113.28	112.24	120.24	117.39	115.33	108.21	96.83	104.77
96	100.00	102.35	90.72	93.72	92.29	88.16	86.45	89.85	90.79	89.60	86.60	84.30	84.22	106.88
97	100.00	116.50	221.31	175.17	132.74	189.46	99.94	99.82	123.35	69.69	44.87	64.73	73.92	75.04

Table C.3
Dollar Value of Imports (000)

HS	MONTH 1	2	3	4	5	6	7	8	9	10	11	12
2	2707	2904	3356	5308	3534	4389	6971	8189	9125	6967	10169	9594
3	1833	1872	2256	2130	3106	1997	3746	3514	4277	3037	3012	4086
4	7171	9347	18801	14160	20702	17149	27300	22589	26598	31098	38695	25940
5	470	1328	836	832	890	1281	1775	1207	2374	1425	1641	2743
7	3555	2308	4692	6532	8541	5592	11119	9146	9018	8084	7894	8157
8	6680	5165	6325	8546	8918	6390	10966	15458	17867	14800	18700	20788
9	5159	4727	4688	4754	7965	7493	12962	13833	3504	4825	3376	3847
10	56336	77901	64795	60596	94172	94070	62894	73199	51280	119413	112132	115826
11	11340	15018	13219	11761	8557	9668	8996	9922	12772	12313	13492	12490
12	45026	33019	29642	31548	36144	39979	22824	7994	23713	19252	19217	27436
13	1241	2038	1388	1533	1606	1454	1359	2657	2421	2111	2380	1678
15	1896	1439	2198	2185	2734	2900	3815	4255	4224	3541	4645	4197
16	226	131	217	352	311	251	360	314	527	337	817	378
17	26606	18014	32143	31389	42660	24019	12391	23328	24750	11035	26168	42798
18	1294	1521	2951	1709	456	935	2051	1997	2037	2145	2111	2848
19	1227	779	1061	1751	1057	2592	2509	2300	2813	2553	2858	2221
20	1037	608	795	876	935	1533	1970	2106	3492	1903	2355	1634
21	2844	2241	4411	3081	3074	3296	4941	6094	6275	5452	7660	5108
22	1826	1135	1477	3091	1103	1027	1516	1028	1159	1420	2605	834
23	25567	34122	27066	26283	37068	45602	35288	58712	44750	56660	48933	47339
24	14943	16329	12638	14838	11929	13062	9647	8900	13793	13350	19061	15204
25	17397	16617	24573	20227	15883	15825	21852	23449	20273	20122	18134	16897
26	10723	20680	968	11263	6343	8514	16878	9672	8596	4295	2826	2524
27	431695	366592	482742	468815	451064	476816	501278	679998	692137	608359	613854	302278
28	23991	37014	39042	31535	38057	45051	51692	54882	52205	62549	48886	50848
29	135225	194113	192482	203365	182769	203571	213118	225807	267573	214136	250218	302786
30	4969	6124	8367	6100	7342	8026	8512	11905	7870	5159	8118	6237
31	19267	22963	20227	14965	10863	15164	10239	9485	15338	11537	15687	19365
32	21011	27624	30799	32089	27409	30687	48334	54292	55131	43436	53227	43099
33	6246	6454	11271	12279	8889	14610	17617	19978	21044	16785	20738	16234
34	12970	11294	14388	11841	11370	14846	21598	19336	20862	19464	23074	20839
35	9793	9135	8797	9512	9849	6878	10581	10663	10273	12965	12855	12804
37	5040	7108	5780	5626	5582	5415	6444	5103	6415	6939	7917	6227
38	24706	31742	31354	33104	34422	33869	47866	52379	50249	45090	51318	55386
39	48449	66810	80762	84756	69470	69251	116939	123595	141185	120649	141016	142500
40	24639	21347	22478	28019	28524	27508	32678	33838	36731	33806	40045	40524
41	9690	15802	13235	13991	9743	8027	15171	17518	27279	24756	28431	17421
42	490	478	632	357	1637	407	698	3886	468	911	447	582
44	6332	8038	6842	8139	10565	9857	13259	14500	14198	11410	12038	11955
47	51125	51320	76761	66422	74811	78938	99916	132688	114019	112635	121554	84635
48	20593	17472	17804	22925	20563	20138	28755	31452	29942	30397	38533	31813
49	2532	1082	1089	1056	1118	1480	1357	2010	3778	1199	2757	3164
51	1233	1163	1651	1958	1402	2295	4508	2383	1646	2282	3122	1831
52	49760	56403	62669	74512	70790	60253	90344	90862	109439	96939	119882	83703
53	388	696	1087	1125	495	519	481	1730	2305	1979	1946	1574
54	17636	24080	25344	24218	24711	20599	37237	41836	48621	35047	45701	31081
55	19721	23193	22825	24472	19813	21431	42618	40393	45878	36973	47105	31356
56	3404	3973	5217	4848	3376	4099	6832	5798	8336	6773	6982	6774
57	158	97	137	169	156	172	266	278	201	349	229	614
58	2951	4522	5549	4483	4493	4519	5823	6947	8950	7682	7675	6684
59	11328	11887	14697	14902	12196	10700	18647	17746	22646	19160	23551	21650
60	4893	6768	10443	9068	7679	10894	16432	13998	18341	14940	18203	14028
61	522	446	515	536	452	486	1074	1161	835	743	955	576
62	1056	822	832	1307	1688	1533	1394	1565	1642	1794	2071	1453
63	1544	620	667	505	885	764	1447	1677	1068	1160	1338	2135
64	4758	5239	7202	5861	6699	4708	7917	6677	9163	9282	10600	9277
65	48	99	137	58	54	137	318	102	111	56	110	65
68	2388	2264	2377	2654	3907	2677	3833	6247	4323	4205	5417	6087
69	3912	4206	3485	4039	5201	6114	4351	10400	7338	5585	6723	6164
70	4340	3683	6202	4541	4572	4612	6819	7042	8607	7870	9453	7426

71	325	441	597	287	249	156	546	2253	392	1952	711	2713
72	77872	72770	103707	115813	96613	80213	109572	126839	145249	170654	146069	128830
73	147885	31462	32379	44317	49108	50768	54559	59533	45745	68609	67089	71891
74	7747	9680	6518	9301	8118	5172	10427	14250	15068	12393	22734	16456
75	208	772	1695	834	715	599	1364	645	2006	978	2125	898
76	18752	20226	24126	21847	26896	23042	28625	32868	38511	32302	42615	41474
78	1516	2065	1506	907	451	1371	2228	2545	3575	3743	3454	2888
79	5227	6140	8431	5761	9081	4510	11828	10746	11340	13307	18841	11522
80	188	350	241	851	180	872	462	69920	910	345	818	260
81	382	504	471	1384	1179	914	799	1156	1339	1513	906	916
82	6002	8062	6018	6143	5918	6812	9210	9752	8522	8035	10873	12091
83	3978	3888	4716	4834	4884	5279	8643	9533	9581	9473	11544	9977
84	268817	285003	297053	326097	294732	324814	358631	439771	498258	523926	586662	614922
85	87760	68933	90372	86376	83626	115964	112868	129781	133618	131168	135483	175964
86	1145	1338	597	1013	1501	1777	803	2238	1776	20264	2092	2173
87	81656	92465	106275	102713	121565	126905	123420	170144	203158	252595	229276	280371
89	94564	118648	28206	62578	136165	132482	7655	3996	52343	107562	34499	88479
90	106466	29098	31847	21665	19941	24641	32083	43207	41152	62875	41619	36328
91	557	356	331	274	717	587	380	590	2218	1157	597	782
92	2070	2347	2375	1775	631	2095	2967	3364	3043	4001	2357	3225
94	4094	19929	917	1906	2504	6755	2223	7736	1660	4548	1642	2088
95	2035	948	1087	1455	2044	2941	2621	2502	2765	2437	3144	3257
96	4333	5415	5592	6332	5774	6054	6897	6998	8292	7393	9685	9154
Total	2159488	2102759	2251442	2323363	2362898	2460795	2669336	3220385	3392309	3422369	3545495	3292405

Table C.4
Industry Import Indexes (January 2000 = 100)

HS	MONTH 1	2	3	4	5	6	7	8	9	10	11	12
2	100.00	102.34	102.52	97.54	103.62	103.28	103.30	99.62	90.57	84.94	90.25	86.17
3	100.00	100.06	72.46	80.52	86.40	84.07	85.39	83.02	80.51	80.35	88.93	83.46
4	100.00	95.57	98.05	96.91	97.75	98.76	98.89	94.08	92.31	93.79	92.99	90.51
5	100.00	104.99	108.70	76.33	64.62	75.88	75.88	53.26	59.16	50.26	66.04	53.17
7	100.00	98.38	93.76	89.62	102.61	105.05	110.13	113.36	101.28	97.96	96.33	105.23
8	100.00	103.05	105.17	102.66	99.53	101.92	96.65	92.08	94.66	94.47	95.02	92.08
9	100.00	157.73	134.85	169.33	174.19	213.51	185.50	200.90	177.48	176.74	181.65	140.94
10	100.00	93.21	87.76	84.77	88.76	77.89	78.37	80.36	80.92	76.84	68.38	78.54
11	100.00	99.94	114.66	104.36	106.98	105.68	110.70	115.52	115.90	117.01	121.08	109.38
12	100.00	104.01	104.56	108.70	104.84	104.73	121.46	113.14	114.41	112.65	110.40	114.70
13	100.00	94.01	93.00	99.30	86.39	94.15	154.16	135.23	112.04	129.24	127.75	133.39
15	100.00	101.48	107.64	111.91	111.91	117.40	109.53	104.67	102.76	99.64	104.99	105.12
16	100.00	114.73	146.93	151.50	127.00	111.39	91.81	87.59	93.63	87.93	113.64	66.50
17	100.00	91.92	98.96	96.85	106.58	106.70	108.26	105.64	102.56	111.53	111.65	109.16
18	100.00	86.95	91.21	90.90	76.91	77.60	83.92	87.92	78.27	78.62	78.80	79.56
19	100.00	111.27	115.77	118.26	100.04	88.88	104.96	88.42	105.71	89.99	90.22	97.82
20	100.00	101.37	128.18	111.94	114.40	109.25	99.30	101.99	101.38	96.14	105.85	96.21
21	100.00	129.33	154.76	139.06	116.54	89.25	116.11	125.14	136.69	142.13	121.37	130.71
22	100.00	101.33	89.35	147.35	157.70	145.73	89.60	115.27	97.25	136.00	111.49	96.29
23	100.00	102.10	101.85	104.39	97.50	104.16	106.88	103.53	110.69	107.76	107.20	109.31
24	100.00	131.24	123.40	103.64	107.52	115.49	117.51	132.13	142.81	124.63	119.11	120.53
25	100.00	99.58	100.93	97.23	96.18	99.11	102.83	98.53	98.79	96.02	104.89	108.17
26	100.00	146.36	142.54	144.50	144.50	147.01	132.88	136.33	148.78	141.20	141.81	145.61
27	100.00	104.11	111.09	105.46	110.19	110.24	112.57	123.37	120.73	121.82	116.73	121.21
28	100.00	103.36	98.79	97.91	100.39	97.05	97.40	98.38	93.97	100.12	96.71	94.64
29	100.00	101.17	104.11	104.11	105.78	104.46	103.43	101.37	102.16	102.84	99.36	98.75
30	100.00	104.84	127.34	101.82	119.71	120.11	124.20	119.55	75.43	108.52	112.52	93.90
31	100.00	113.03	98.93	98.18	99.13	97.24	114.00	108.34	103.41	100.64	91.53	92.28
32	100.00	103.22	101.14	99.90	103.50	93.14	103.53	100.63	99.24	103.81	100.75	96.26
33	100.00	91.50	104.47	103.67	93.80	71.75	78.35	81.40	90.05	85.53	95.19	89.66
34	100.00	93.03	91.85	89.49	83.21	92.88	96.32	77.70	78.64	69.47	79.50	68.35
35	100.00	136.03	123.75	127.80	117.71	123.07	122.21	121.67	120.65	132.12	118.17	115.01
37	100.00	119.35	130.97	87.30	115.26	109.40	108.51	112.02	114.50	93.09	106.62	77.37
38	100.00	103.24	105.11	96.58	102.23	98.80	91.28	91.24	86.53	86.77	91.62	88.17

39	100.00	107.02	110.52	109.55	108.87	106.11	107.75	112.44	109.92	113.40	118.12	112.82
40	100.00	103.40	105.74	106.32	106.83	100.73	103.58	106.54	104.21	103.70	110.32	110.62
41	100.00	119.48	91.93	114.12	96.58	102.84	107.56	99.12	92.24	88.00	87.52	84.39
42	100.00	114.36	182.88	167.83	121.95	115.83	110.80	131.70	145.83	123.87	94.81	152.07
44	100.00	100.74	91.78	86.65	85.76	89.23	94.19	92.45	94.28	95.33	90.90	103.11
47	100.00	103.71	107.59	112.93	124.67	134.05	138.08	150.43	144.72	151.41	147.63	143.64
48	100.00	102.20	104.39	97.99	98.06	99.23	95.12	98.57	98.02	98.57	103.32	94.42
49	100.00	104.29	151.40	126.36	100.15	114.39	112.40	136.25	136.73	204.38	183.46	145.28
51	100.00	92.29	89.93	87.04	65.47	71.36	61.89	61.59	61.38	56.42	56.74	54.89
52	100.00	106.39	97.87	95.21	90.60	92.26	94.41	89.66	105.11	100.54	100.97	97.72
53	100.00	76.93	75.46	76.58	77.75	116.59	110.29	121.80	121.17	106.60	127.32	129.60
54	100.00	121.67	118.07	116.40	122.67	124.18	137.24	135.39	132.69	125.47	126.74	120.64
55	100.00	105.69	110.23	102.55	107.58	103.96	104.06	101.56	100.98	97.86	93.45	93.00
56	100.00	107.57	129.79	112.42	117.51	118.76	127.12	129.57	133.16	127.34	136.29	115.96
57	100.00	88.22	142.75	150.00	163.72	105.35	147.08	152.70	151.08	154.61	230.65	211.30
58	100.00	142.29	132.58	130.81	129.34	131.95	132.74	140.14	154.03	154.34	143.89	146.89
59	100.00	104.97	97.73	99.44	126.14	111.13	114.58	118.34	110.64	110.45	127.55	120.72
60	100.00	113.32	102.73	93.05	99.82	108.40	105.00	99.16	100.11	105.97	106.42	106.22
61	100.00	95.31	113.35	117.23	143.98	169.95	178.92	157.11	146.54	119.77	165.63	96.82
62	100.00	82.27	109.25	138.84	118.76	110.03	139.46	149.13	146.84	122.90	128.52	100.37
63	100.00	125.09	98.00	67.99	78.98	82.26	77.24	71.22	101.16	80.58	81.67	81.73
64	100.00	108.08	116.28	102.22	136.53	78.22	92.19	96.00	118.65	113.05	111.34	104.09
65	100.00	56.22	101.64	45.81	93.70	42.91	26.45	50.86	28.85	78.70	33.52	78.60
68	100.00	103.44	122.25	118.35	136.27	155.41	178.18	207.28	187.50	192.56	207.67	202.03
69	100.00	101.80	164.16	124.44	114.34	133.08	167.58	177.99	173.68	150.60	155.87	156.12
70	100.00	100.98	101.09	104.25	102.30	101.61	114.37	121.08	117.32	112.17	119.76	131.05
71	100.00	92.47	44.19	39.23	35.54	40.41	36.08	36.45	28.27	13.23	14.42	18.08
72	100.00	101.27	104.99	103.80	106.76	106.42	103.13	105.23	104.27	102.79	102.19	100.26
73	100.00	102.72	113.43	102.39	106.76	116.33	118.64	116.91	121.91	116.42	131.48	124.38
74	100.00	98.78	119.46	104.32	108.59	97.31	100.39	107.33	112.58	101.46	105.99	103.00
75	100.00	182.52	197.98	234.31	252.94	211.61	322.36	325.69	459.66	382.73	301.75	253.54
76	100.00	105.91	107.80	102.42	124.61	119.82	121.64	119.06	111.46	112.89	114.94	109.06
78	100.00	90.12	54.26	52.01	49.92	63.16	50.67	66.33	68.30	66.54	63.81	62.03
79	100.00	98.07	108.34	71.27	132.97	111.28	120.32	96.49	107.30	108.83	102.98	109.23
80	100.00	130.86	146.07	225.93	148.45	150.49	164.15	244.06	244.88	224.88	200.79	227.37
81	100.00	103.91	97.19	90.56	102.16	109.59	107.39	84.93	107.46	89.93	37.42	57.93
82	100.00	144.09	154.21	134.57	133.14	101.46	119.63	113.77	106.40	110.15	134.62	108.50
83	100.00	115.92	125.15	114.35	93.38	99.13	118.35	130.85	130.09	120.98	104.49	134.04
84	100.00	123.89	138.19	127.64	127.44	118.27	126.88	128.53	120.76	121.67	134.81	127.32
85	100.00	110.94	126.13	110.86	109.58	100.45	110.32	112.59	120.05	112.63	111.26	104.72
86	100.00	69.62	19.59	49.30	33.44	68.23	96.10	179.74	116.70	121.46	308.50	336.18
87	100.00	98.46	109.00	118.90	111.14	105.59	99.14	104.45	103.52	96.44	107.77	101.55
89	100.00	167.04	84.28	98.01	78.84	108.27	35.64	47.44	85.55	153.72	240.61	108.92
90	100.00	105.25	130.41	98.35	85.36	73.77	74.75	76.88	72.93	66.94	86.65	75.31
91	100.00	127.20	138.59	130.88	210.93	180.49	192.18	199.96	202.28	234.51	219.09	244.91
92	100.00	106.17	120.80	79.35	102.06	126.43	170.43	176.89	237.10	234.96	255.30	238.39
94	100.00	102.21	123.94	132.53	128.93	134.71	146.98	212.63	200.92	167.03	161.73	145.03
95	100.00	85.15	104.71	116.12	113.88	92.01	84.25	86.57	86.77	78.72	76.70	66.58
96	100.00	127.54	141.49	112.79	132.23	122.77	145.52	147.12	163.53	143.17	133.46	131.80

MEASURING CHANGES IN INVENTORIES IN INDONESIA

Report # 42
Statistical Paper 11

by
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TABLE OF CONTENTS

I. INTRODUCTION 182

II. PHYSICAL INVENTORY DATA 183
- **A. Basic Data** 183
- **B. Methodology** 185
- **C. Next Steps** 185

III. BALANCE SHEET DATA 185
- **A. Basic Data** 185
- **B. Methodology** 188
- **C. Next Steps** 191

IV. SHORT-RUN INDICATORS 191
- **A. Availability** 191
- **B. Methodology** 191
- **C. Next Steps** 193

V. COVERAGE 193
- **A. Overlapping Coverage** 193
- **B. Undercoverage** 194
- **C. Next Steps** 194

VI. SUMMARY & PRIORITIES 195
- **A. Summary** 195
- **B. Priorities** 197

I. INTRODUCTION

Direct measurement of changes in inventories, wherever possible, is preferable to the procedure followed in many countries (including Indonesia) of deriving inventory changes as a residual between total production and final sales. One advantage of direct measurement is that the inventory change estimates themselves should improve. When they are residuals, they reflect not only actual inventory change, but also errors in measuring production and final sales. Improved estimates based on direct measurement should enable a better understanding of the magnitude and the timing of inventory change in economic fluctuations.

Perhaps even more important, at least in Indonesia, is the potential advantage of improving estimates of private consumption, the largest component of final expenditures. If direct estimates are available for fixed investment, net exports, government consumption, and inventory change, then private consumption can be estimated as a residual between value added and these non-consumption components of final demand--the so-called "commodity flow" approach. The commodity flow approach can be applied selectively; some categories of consumption can be estimated using commodity flow, and others can retain the present methodology of interpolating consumption estimates between household surveys conducted every three years. The commodity flow approach should be more accurate for many categories, especially for goods and services for which fixed investment and net exports are of little importance.

But how can BPS measure changes in inventories directly? Three sources of information should prove useful: (1) data on inventories in physical units (kilograms, barrels) for selected commodities; (2) data on the value of inventories on the balance sheets of enterprises; and (3) short-run indicators related to inventory investment, such as responses to business tendency survey questions about the direction of change in inventories. The first two sources ought to account for a large proportion of total inventory changes in the economy from year to year. The third source should be helpful in interpolating quarterly estimates between annual benchmarks.

The next three sections of this report will focus on these three sources. For each sources, the report will discuss (1) what *basic information* seems to be available; (2) the *methodology* of converting that information into inventory change estimates for the national accounts (including what supplementary data and assumptions are necessary for such conversion); and (3) what *next steps* would seem most useful in improving the basic information and improving the methodology.

Following these three sections is a section on coverage. It mentions the possibility of overlap between the first two sources. It then focuses on areas of inventory change that are not covered by existing sources and what next steps could help to fill this gap.

The final section summarizes the main points of the report, presents a table (Table 4) listing all of the "next steps" of the earlier sections, and discusses priorities.

II. PHYSICAL INVENTORY DATA

A. Basic Data

Inventories in physical units such as tons or barrels or kilograms are available for petroleum products, other minerals, major crops, and livestock. The annual change in inventories for these commodities in physical units is simply the difference between successive year-end levels.

Table 1 shows data on physical inventories for selected time periods for 17 products. That so many products have stock data is encouraging; but there are important gaps in the information. Data are shown for only three agricultural commodities (rice, wheat, sugar); and even for these three there are only a few entries in the table. The table does not include any entries since 1998, though quite possibly such data do exist.

The table does not include data on livestock and other farm animals. Inventories of farm animals, however, do fall within the scope of the national accounts.[1] If data on populations of livestock and other farm animals are available, population change multiplied by average unit value should be included as a component of in-process inventory change.

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[1] Treatment of livestock may be somewhat confusing (and was explained incorrectly at a meeting at BPS in July 2001). Some may believe that livestock, like natural forests, falls outside the scope of the national accounts until conversion to consumable products. That view is incorrect; according to *System of National Accounts 1993,* "the natural growth of plants, trees, and livestock, including farmed fish, is included within the production boundary *when it is carried out under the direct control, responsibility, and management of an institutional unit....* Any ... livestock that have not yet been ... slaughtered at the end of the accounting period constitute work-in-progress [inventories]..." (SNA 1993, 10.106-10.107; italics added).

B. Methodology

One advantage of using data on physical inventories is that the methodology for converting the data to national accounts estimates is very simple. All that is necessary is to multiply the change in units from the beginning to the end of a year by the annual average unit value. For inventory change in current prices, the unit value should be the average for the current year. For inventory change in constant prices, the unit value should be the average for a base period--for example, the average unit value for the year 2000 in order to measure inventory change in 2000 prices. Thus, unit values are the only additional data needed besides the inventory data themselves. Table 1 illustrates the methodology for products where the necessary data are available.

This simple procedure--change in physical units times average unit value--does not take account of changes in quality or composition. If the number of tons of a mineral--coal, for example--is the same at the beginning and the end of a year, the procedure will show no change in inventories even if the coal at the end of the year is of a higher average grade than the coal at the beginning of the year. For livestock as well, the average animal at the end of a year may represent more real value than the average animal at the beginning. Where it is possible, disaggregation of a product into two or more classes, with separate unit values for each class, will reduce the importance of the problem.

However, at this stage of statistical development, problems of change in composition can safely be ignored. They are almost certainly of minor importance in measuring the overall change in inventories. For livestock, even *SNA 1993* recommends that "changes in work-in-progress [inventories] for livestock ... may be approximated by changes in the number of such livestock between the beginning and the end of the accounting period multiplied by the average price of the animals or poultry concerned." (*SNA 1993*, 10.108).

C. Next Steps

The next steps in making use of physical inventory data is to fill in, as far as possible, all of the information missing from Table 1, add to the table any additional inventory data available (including livestock and other farm animals), and extend the information beyond 1998. Table 4 in the final section of this report lists these tasks.

III. BALANCE SHEET DATA

A. Basic Data

The value of end-of-year inventories is one item on the balance sheet of an enterprise. In

Indonesia, there are at least two sources for such information: values reported in BPS' Annual Survey of Manufacturing and balance sheets published by publicly listed corporations, available from stock exchange records. Balance sheet information may be available from other organizations or government agencies besides stock exchanges. A search for such other records could be fruitful.

The coverage of these data centers on manufacturing. The Annual Survey is of course restricted to manufacturing (actually, to medium and large manufacturing establishments). Corporate balance sheets extend beyond manufacturing; however, the data BPS has gathered from the Surabaya stock market seem to cover mainly manufacturing and finance. Since inventory holdings of financial corporations are very small, the Surabaya inventory data reflect mainly manufacturing. They contain very little representation of the trade sector, which has large inventory holdings.

The top part of Table 2 shows inventory data reported in BPS' Annual Survey of Manufacturing, covering the years 1997 through 1999 (the bottom part of the table is discussed below). The first two columns show the number of establishments and their production, in billions of rupiahs. The remainder of the top part of the table shows inventory book values, also in billions of rupiahs.

Inventories are separated into three types; materials inventories, inventories of goods in process, and finished goods inventories. These distinctions will prove important because the methodology of converting balance sheet or book values to national accounts concepts requires price indexes for each category of inventory, and the appropriate price index for the three types could be quite different. For example, for a shoe manufacturer the price of leather might be the principal component of the price index for materials inventories, while the price of shoes would be the principal component of the price index for finished goods inventories. If information is available only for total inventories, an index based on prices of leather and of shoes would be appropriate; but deflation of total inventories by such a price index would be less accurate than separate deflation of each type.

Examination of the table raises questions about some of the entries. Throughout the table there are large differences between closing estimates for one year and opening estimates for the next. For example, the closing estimates for materials inventories in 1997 is 42,279 billion rupiahs, but the opening estimate for the same category in 1998 is only 32,541 billion rupiahs. Furthermore, all of the estimates include values for some establishments that did not report inventories and for which BPS made estimates based on other reported data. There were many more such establishments in 1999 than in earlier years, and examination of individual records reveals that estimates of zero were entered for some establishments. In short, there is need for further work on the basic data.

B. Methodology

Deriving inventory change estimates for national accounts is far more complex for balance sheet data than for physical inventory data. Unlike physical inventory data, the change in the balance sheet value from year-end to year-end is NOT a useful number, even for measuring inventory change in current prices. The reason it is not useful is that such a change represents *holding gains* (capital gains) as well as *changes in actual production stored in the form of inventories.* The latter is the concept required for the national accounts. Holding gains are excluded from GDP and other production measures because they do not reflect actual production.

A simple example may help explain this important point. Suppose a shoe manufacturing establishment holds exactly the same physical inventories at the end of year "t+1" as at the end of year "t"--the same number of pairs of shoes of each type, the same quantity of leather, etc. The contribution of the establishment to inventory change in the national accounts should clearly be zero, both in current and in constant prices, since the amount of production stored in the form of inventories has not changed. But suppose that prices of shoes and leather have gone up during the year. Then the value of such inventories on a company balance sheet will have increased, according to most commonly used accounting systems.[2] The increase--a holding gain--will be due solely to price change, and cannot be reduced to zero even if it is deflated by a large price index. Taking the change in balance sheet value is simply the wrong way to start deriving the national accounts concept of inventory change.[3]

Instead, the basic methodology consists of three tasks:

- *first* (and most complex), express end-of-year inventories for each pair of years in terms of a common price level--that is, prices of 1993, prices of 2000, or prices of some other base year;
- *second*, calculate the change in these deflated inventories, thus estimating inventory change in prices of whatever base year was selected in the first step; and
- *third*, multiply these step 2 estimates (a) by ratios of current-year to base-year price indexes to convert them to estimates in current prices and (b) by ratios of prices in some desired base year to prices in the base year chosen in step 1 (if the two are not the same) to convert them to estimates in constant prices. The following paragraphs explain each step in more detail.

---

[2] The LIFO accounting system is the one exception.

[3] There is one method of estimating inventory change according to national accounts concepts which does involve taking the change in balance sheet values. In that method, a direct estimate of holding gains is made and subtracted from the balance sheet change. The procedure for estimating holding gains directly is highly complex and will not be explained here, since it seems most unlikely that Indonesia will make use of this method.

The *first* task requires information, to begin with, on the accounting system underlying the balance sheet values and information on the age distribution of inventories. With respect to the accounting system, the most common rule is to enter each item of inventory at the cost of production or (in the case of materials inventories) the purchase price at the time of entry, and to keep that valuation unchanged until the item is removed from inventory. The exposition that follows will be based on that so-called FIFO accounting rule. For other accounting rules the procedures below would need some modification.

To obtain information on which accounting systems Indonesian firms use, the best procedure would be a representative survey of enterprises every few years. A satisfactory initial procedure, however, would be to interview accounting departments of a few large enterprises and accounting firms, asking the enterprises not only about the valuation rules they follow but also about their impression of the rules that firms in general follow.

With respect to age distribution, the reason such information is necessary is that it determines which price indexes should be used to deflate the level of inventories. If all of the end-of-year inventories were acquired in December, price indexes for December are appropriate; but if one third of end-of-year inventories date back to each of the preceding three months, then averages of price indexes for October, November, and December are appropriate. Again, the best procedure for obtaining such information is a representative survey every few years. Interviews with a few enterprises is an alternative procedure to use initially, but this informal approach is less satisfactory for determining age distribution than it is for determining accounting rules.

A third approach to estimating the age distribution of inventories is to base estimates on the average size of inventory-to-sales ratios. The logic of this approach is as follows: if every finished good stays in inventory half a month, then the ratio of finished goods inventories to monthly sales will be 0.5; if every item stays in inventory for one month, the ratio will be 1.0; etc. (for in-process and materials inventories, the analogous logic will be slightly more complex, involving ratios of raw materials cost to final product value). The problem with the approach is that if different items stay in inventory for different lengths of time, there is no longer any fixed relation between inventory-sales ratios and age distribution. At best, it is possible to derive a number of plausible age distributions from a single inventory-sales ratio. Deriving a few such distributions, however, might be a useful check on the results of the other approaches.

Once information or assumptions about accounting system and age distribution are completed, the next step is to select price indexes for each industry and each category of inventory. The base year of all price indexes selected (i.e. the year in which they are equal to 100) should be the same; any price index that does not have the selected base year should be converted to the selected base year before being used.

For materials inventories, the deflators will generally be components of the wholesale price index. The most recently available input-output tables will provide guidance as to which

indexes are appropriate and what their weights should be. For finished goods inventories, the appropriate price indexes are either wholesale price indexes or unit value indexes from BPS' quarterly survey of manufacturers. For in-process inventories, a weighted average of indexes for the other two types is appropriate. If total inventories are not separated into materials, in-process, and finished goods, then a weighted average of the appropriate materials price indexes and finished goods price indexes is appropriate.

To complete task one, book values are divided by price indexes, expressing inventories at the end of year "t" and inventories at the end of year "t-1" in prices of the same base year.

Balance sheet data thus require substantial additional information for conversion to the national accounts concept of inventory investment. Information is necessary on (a) the accounting rules businesses follow in entering inventories on their balance sheets, (b) the lag distribution of inventories in the stock at a given time, and (c) price indexes for deflation. If available, separate book values for materials, in-process, and finished inventories are useful.

The *second* task is much simpler than the first. It consists simply of subtracting estimates for year "t-1" from estimates for year "t", with both estimates in prices of the base year selected in step one. The result is a set of estimates of inventory change in constant prices of the base year selected in the first task.

The *third* task is converting the results of the second task into estimates in current and constant prices. For conversion to estimates in current prices, the estimates in constant prices--the results of the second task--should be multiplied by the deflator for the current year (with deflators for the constant-price year equal to 100). No conversion is necessary for estimates in constant prices if the constant-price year desired in this step is the same as the base year selected in task one. If the two years are not the same, then it is necessary to multiply the results of the second task by deflators for the desired constant-price year. For example, if the base year selected in step one is 1993, but it is desired to express the results in prices of 2000, then the results of the second task must be multiplied by deflators for 2000 relative to 1993.

The bottom part of Table 2 shows a set of calculations illustrating the methodology. They are not based on actual information about accounting rules or age distribution or appropriate price indexes, and therefore are of no value as actual estimates of inventory change. They are useful *only* as a simple guide to the methodology.

The first three columns at the bottom of the table show end-of-year inventories in prices of 2000. The columns are based on the simplifying assumptions that (a) businesses record inventories at cost or purchase price at the time they enter the stock and do not subsequently revise these values; (b) end of year inventories were entered in equal amounts in the preceding three months; and (c) the appropriate deflator for all stages is the unit value index for all manufacturing. The first three rows at the bottom of the table thus represent the closing book values at the end of 1997 divided by the ratio of the unit value index for all manufacturing in the

fourth quarter of 1996 to the average unit value index for all manufacturing in 2000. This ratio is .49768; the corresponding ratios for 1998 and 1999 are .90705 and .91201.

The fourth column at the bottom of the table is the sum of the first three columns. The final column is the year-end to year-end change in the preceding column. The result of the calculation--again, based on unrealistic assumptions--is inventory liquidation during 1998 of 64642 billion rupiahs, and further liquidation during 1999 of 12155 billion rupiahs.

C. Next Steps

Plausible next steps for making use of balance sheet data are listed in Table 4. The first three steps involve collecting basic data and examining them critically . The next two steps are gathering some preliminary rough information about accounting rules and lag distributions. The following step is gathering price data for deflating inventories, and the last step is making some initial pilot calculations based on the work in the previous steps. All in all, the steps add up to a formidable amount of work; accomplishing them will require significant resources and dedication.

IV. SHORT-RUN INDICATORS

A. Availability

The simplest way to produce quarterly estimates of inventory investment is to use the same data sources and methodologies as are used for the year-end estimates. Wherever quarterly data on physical inventories are available, they should be the primary data source for quarterly estimates. The same is true of any quarterly balance sheet data.

Quarterly physical inventory data are probably available promptly for petroleum, and may be available for some major agricultural products. Quarterly balance sheet data are probably not available for most enterprises. It will therefore be necessary to use other data sources to interpolate. One possible source is discussed in this section: business tendency surveys that include a question on whether inventories are increasing, decreasing, or staying the same.

B. Methodology

Quarterly data on physical inventories and quarterly balance-sheet data can be treated in the same way as annual data from these two sources. Data from business tendency surveys on the direction of inventory change, however, require a separate, complex methodology. The

following paragraphs outline this methodology.[4] It should be noted that this data source has not been used, at least in major industrial economies. If there is interest in using it in Indonesia, a small pilot study applying the methodology below would be a useful first step.

Two basic assumptions about the properties of the survey data are necessary: the frequency distribution of actual percent changes underlying the plus-minus-no-change responses, and the meaning of "no change." For frequency distribution, a natural choice would be a normal distribution of percent changes. For the meaning of no change, a plausible assumption is that firms report changes between minus "x" and plus "x" percent of the stock as no change, with x equal to half a percent or one or two percent or some other fairly small value. For the typical value of "x", as well as for the frequency distribution of changes, it would be desirable to get empirically-based estimates at some point by surveying a small sample of firms.

Given the form of the distribution and the meaning of no change, it is possible to derive the mean change from information on the percentage of firms reporting increases, decreases, and no change. Suppose, for example, that in a particular quarter 35 percent of respondents report inventories increasing, 40 percent report no change, and 25 percent report inventories decreasing Assume that responses are normally distributed and that no change represents any value between -1 percent and +1 percent of the initial stock. The use of cumulative normal distribution tables then leads to a distribution with a mean of 0.273 percent and a standard deviation of 1.885 percent (if no change represents values between -2 and +2 percent, the mean would be 0.545). The results indicate that the stock increased by .00273 times the initial stock (in constant prices). Table 3 presents this example.

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4 This discussion is adapted from "National Accounts and Prompt Indicators: Progress and Future Priorities," STAT Project Report #19, February 2001, pp.11-12.

Table 3
Using Business Tendency Survey Results to Estimate Inventory Investment: Hypothetical Illustration

1. STOCK, END OF PREVIOUS QUARTER (constant prices) 10,000

2. RESULTS OF BUSINESS TENDENCY SURVEY:
   Inventories decreasing 25 percent
   No change 40 percent
   Inventories increasing 35 percent

3. ASSUMPTIONS:
   Normal distribution of percent changes
   "No change" means -1 to +1 percent

4. CALCULATED NORMAL DISTRIBUTION WITH CUMULATIVE VALUE TO -1=.25
   CUMULATIVE VALUE TO +1 = .65
   Mean = .273 percent
   Standard deviation = 1.885

5. CALCULATED INVENTORY INVESTMENT DURING QUARTER:
   .00273 * 10,000 = +27.3

C. Next Steps

The first three steps listed under the heading of short-run indicators in Table 4 are determining the availability of three data sources on a quarterly or monthly basis: physical inventory data, balance sheet data, and business tendency surveys including a question on the direction of inventory change. If business tendency survey data are available, then it is possible to take the fourth step, a preliminary investigation or pilot study of the usefulness of the tendency survey data.

V. COVERAGE

This section takes up the twin problems of (1) possible overlapping coverage of existing sources, and (2) industries whose inventories are not covered by existing sources.

A. Overlapping Coverage

Overlapping coverage--that is, duplication of inventories measured by physical inventory data and by balance sheets--is probably a minor problem. Physical inventory data cover agricultural crops, petroleum, other minerals, and perhaps livestock. Balance sheet data from the annual survey of manufacturing cover only manufacturing industries, and data from the Surabaya stock exchange seem to cover largely manufacturing and finance. The main area of potential

overlap would be minerals or agricultural products that are included in the physical product data and also in the materials component of the balance sheet data. Probably, however, the physical product data include only inventories owned by minerals producers or farmers, not inventories that have been sold to manufacturers and not yet processed. For the moment, it seems safe to ignore the overlap problem.

B. Undercoverage

The problem of undercoverage--inventories not measured by existing sources--is a serious one. Existing sources cover agriculture, minerals (including petroleum), and manufacturing. Some of the uncovered industries, such as finance or communications or service industries, account for only minor shares of the economy's total inventories. Very important exceptions, however, are the wholesale and retail trade industries, which have large inventory holdings and in most countries account for a significant portion of the short-run swings in inventory investment.

Another area of undercoverage is construction. Using definitions prior to the 1993 SNA, inventories held by construction establishments were not of great importance. But the 1993 SNA reclassified uncompleted construction projects--buildings, roads, bridges, etc., that have been started but are not yet in operation--as inventories. Adoption of the 1993 SNA will thus entail a large addition to construction inventories (formerly they had been classified as fixed capital).. The data sources discussed in this report will not cover these inventories of uncompleted construction projects; additional data on projects starts and completions will be necessary.

A comment on inventories held by households is appropriate at this point. Households do hold large stocks of inventories, especially inventories of food between the time crops are harvested and the time food is finally consumed. However, the official national accounts ignore these inventories. Households are considered to consume products at the time of purchase (or, in the case of food for farm households, at the time of harvest), not at the time of actual final use. This treatment is a matter of convenience; it would be difficult to obtain information on inventories held by households. The treatment occasionally raises problems in the interpretation of national accounts; but as long as Indonesia follows the official concepts, it need not undertake the measurement of household inventories.

At present, then, the main areas of undercoverage are retail and wholesale trade. Possibly some untapped source of balance sheet data will cover some firms in this sector. Even if they do, however, the represented firms will be large trading enterprises; and much of the trade sector's inventory holdings in Indonesia are probably in small, unincorporated enterprises.

C. Next Steps

A representative sample survey of retail establishments is the logical way to remedy this

data gap. Experience in other countries, however, suggests that it is very difficult to design a survey that will accurately measure *levels* of inventories or sales for wholesale and retail trade, in which small establishments with wide geographic distribution play a major role. It may be better to design a survey of *ratios* of inventories to sales, and then apply these ratios to national accounts estimates of the appropriate categories of private consumption. The accuracy of such a survey will benefit from any tendency for cyclical swings in these ratios to be similar across many establishments.

Reported inventory-sales ratios will of course reflect the accounting rules that firms use to enter inventories on their balance sheets. If firms use FIFO accounting, valuing inventories at the time of acquisition, then inventory-sales ratios need to be multiplied by price relatives to convert them to inventory-sales ratios in current prices--the same adjustment described earlier for levels of inventories. Other accounting rules would require different adjustments.

The final next step listed in Table 4 is a pilot study of the availability of inventory-sales ratios for a small sample of wholesale and retail establishments. If the pilot study indicates that such a survey could yield prompt responses from an acceptable proportion of firms, then BPS can move ahead to developing a continuing survey.

VI. SUMMARY & PRIORITIES

A. Summary

The previous sections of this report have made it clear that measuring inventory change in Indonesia is a challenging task. It is a task, furthermore, that draws on a wide variety of data sources, some of them within BPS and others from outside sources. There are three principal sources of inventory data: (1) annual physical inventory data; (2) annual balance sheet data; and (3) short-run (quarterly) indicators of inventory change. These must be supplemented by other information--on prices, on accounting practices, etc. For each source, there is a series of "next steps" needed to develop national accounts estimates. Table 4 brings together the next steps recommended in each section of the report.

Table 4: Next Steps

Next step	*Comment*
A. Physical Inventory Data	
1. Collect annual data for 1995-2000 (Use Table 1 as a starting point)	End of year inventories and annual average unit values for petroleum, minerals, crops, livestock, etc.
2. Gather information on release schedule of annual data, and create a table of expected release dates by commodity	Note availability of preliminary estimates and forecasts as well as final estimates. Note timing of revisions.
3. Design and fill worksheets for calculating inventory change in current and constant prices.	See Table 1.
B. Balance Sheet Inventory Data	
1. Collect and review Annual Survey of Manufacturing Data for 1995-2000	Review estimates for nonreporting establishments and discrepancies between closing inventories and next-year opening inventories. Make recommendations for improvement.
2. Collect and review stock exchange data	Approach the Jakarta as well as the Surabaya exchange. Find out about promptness of balance sheet reports.
3. Investigate other sources of balance sheet data.	Possibly some ministries or regulatory bodies collect balance sheet data.
4. Find out about accounting rules	Initially, interview a few enterprises and accounting firms about general practice with respect to entering balance sheet values of inventories. Eventually, design a small sample survey of firms' accounting practices.
5. Find out about age distribution	Follow the same two-step procedure as recommended for step 4.
6. Select price deflators for each 2-digit industry.	Choose deflators from either the wholesale price index or unit value indexes for manufacturing industries.
7. Calculate weights for the deflators within each industry.	Weights should ideally reflect the relative importance of different products in total inventories; in practice, weights will have to be based mainly on proportions of total production and purchases, based on input-output tables.
8. Plan for initial, experimental calculations of inventory change based on balance sheet data.	Initial calculations will be only crude approximations, but will be useful to compare with the present residual estimates of inventory change.
C. Short-run indicators	
1. Investigate the availability of quarterly physical inventory data.	
2. Investigate the availability of quarterly balance sheet data.	
3. Investigate the availability of quarterly tendency survey data on the direction of inventory change	
4. If tendency survey data are available, conduct a small pilot study to see if they give plausible results.	Results over 4 quarters should be compared with annual data from other sources.
D. Coverage	
1. Conduct a pilot study of the availability of inventory-sales ratios for wholesale and retail establishments.	

Inventories in physical units such as tons or barrels or kilograms are available annually for petroleum products, other minerals, major crops, and perhaps livestock. The methodology

of converting these data to national accounts concepts is straightforward; the only additional information needed is average unit values in rupiahs corresponding to each physical unit. The next steps in making use of this data source, listed in Table 4, are collecting all available data, noting schedules of data availability and revisions, and designing worksheets for conversion to national accounts concepts.

Balance sheet information on inventories seem to be available annually mainly for manufacturing enterprises, although further investigation of possible data sources might uncover information about other sectors with important inventory holdings. The methodology of converting balance sheet data to national accounts concepts is complex. It requires not only information about prices, but also about accounting practices and the age distribution of inventories. There are, as Table 4 shows, many next steps needed to make use of this data source. They include tabulation and careful investigation of existing data sources; a search for additional sources of balance sheet data; collection of information about accounting practices and age distribution; selection of price indexes or unit values corresponding to inventory categories; and experimental calculations of inventory change following national accounts concepts.

Short-run indicators of inventory change include any available quarterly physical inventory data, any available quarterly balance sheet data, and questions about the direction of change of inventories in business tendency surveys. For physical inventory and balance sheet data, the methodology is the same for quarterly as for the annual data; the next steps in utilizing such information are simply to determine whether the information exists, and if it does, how promptly it becomes available. For business tendency data the methodology is complex, requiring information or assumptions about the form of the frequency distribution of percent changes and about the definition of "no change." Next steps here include determining the availability of tendency survey data (and, where possible, strongly encouraging the inclusion of questions on the direction of inventory change), and conducting a pilot study of converting such information to estimates of quarterly inventory change.

Even if these data sources are fully utilized, undercoverage remains a problem, principally because the wholesale and retail trade sectors are not represented by either physical inventory data or balance sheet data (at least in sources investigated to date). The report suggests that a survey of the inventory-sales ratios of wholesalers and retailers might be the best way to gain information about this sector; accordingly, the next step to remedy undercoverage is a pilot study of the availability of such information from a sample of trading enterprises.

B. Priorities

Making plans for taking the "next steps" listed in Table 4 is itself a difficult step. These plans need to be made within BPS, because they must take into account budget and personnel resources and all the other obligations that BPS needs to fulfill. To conclude this report, however,

it may be helpful to suggest some *groups* of steps that (a) logically belong together and (b) in some cases, will themselves produce useful indicators.

An initial group of steps that meet these criteria consists of the three steps under "Physical Inventory Data" in Table 4; collection of physical inventory data, establishing a schedule for expected revisions and updates, and preparing worksheets. These steps could be accomplished in one or two months and could, if enough data are available, produce an aggregate indicator of *inventory change of primary products*--minerals, crops, and perhaps livestock. The aggregate could be subdivided into petroleum, rice, and all other. At the same time as these steps were taken, it would be convenient to take the first step under "Short-Run Indicators" in Table 4, investigating the availability of quarterly physical inventory data.

A possible second group of steps consists of the first five steps under "Balance Sheet Inventory Data" in Table 4; collecting and reviewing Annual Survey of Manufacturing data, stock exchange data, other possible sources of balance sheet data, and investigating accounting rules and lag distributions. At the same time, it would be convenient to take the second step under "Short-Run Indicators," investigating the availability of quarterly balance sheet data. This would be a very time-consuming group of steps--it could easily take a year--and it would not produce an immediately useful result. But this group would prepare the ground for converting balance sheet data to national accounts concepts, and is therefore a necessary preliminary to useful estimates of inventory change derived from balance sheet data.

The next logical group of steps consists of steps 6 and 7 under "Balance Sheet Inventory Data" in Table 4; selecting price deflators and making initial calculations of inventory change. This group would incorporate the results of the second group of steps, but would nevertheless require additional time, because the selection of deflators and appropriate weights is a complex task. At the end, it would produce an aggregate measure of *inventory change in manufacturing* and perhaps in some other sectors as well.

As this third group of steps is proceeding, it would be helpful to begin work on the pilot study recommended in Table 4 under "Coverage". Once BPS has some indication of inventory change for primary products and for manufacturing, the main missing sector will be trade. The pilot study would provide guidance about how to proceed in estimating inventory change for trade, though additional steps would be required to produce actual estimates.

A final group of steps that belong together are the ones listed under "Short-run Indicators" in Table 4; three having to do with data availability, and the fourth consisting of a pilot study of the use of tendency survey data on the direction of change in inventories. The first two of these steps were recommended for inclusion in the work on annual physical inventory data and annual balance sheet data. If the third step, availability of tendency survey data, yields positive results, then it should not be too time-consuming to complete this group of steps. Again, however, additional steps would be required to produce actual quarterly estimates.

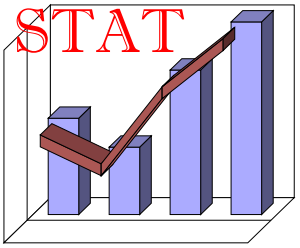
This discussion of priorities makes it clear once more that the development of direct estimates of inventory change is a time-consuming and difficult process. Fortunately, some useful indicators--measures of inventory change for primary products and for manufacturing--should emerge long before the end of the process. But even apart from these indicators, it is worth pursuing the process to the end because direct investment of overall inventory change can substantially improve the expenditure side of the national accounts.

INDONESIAN INCOME ACCOUNT: PROGRESS REPORT 1

Report # 51

by
Kusmadi Saleh

April, 2002



Statistical Assistance to the Government of Indonesia (STAT) Project
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TABLE OF CONTENTS

I. INTRODUCTION 202

II. CONCEPTUAL FRAMEWORK 202
- **A. Distribution of GDP by Income Type** 202
  - **1. Employee Compensation** 202
  - **2. Property Income** 203
  - **3. Mixed Income** 203
  - **4. Taxes on Production (less subsidies)** 203
  - **5. Consumption of Fixed Capital** 204
- **B. Disposable Income** 204

III. DATA SOURCES 204

IV. RESULTS 205

I. INTRODUCTION

This report documents preliminary steps taken in an attempt to develop income accounts for Indonesia. In estimating a country's GDP, three approaches can be used: the production, expenditure and income approaches. The production approach estimates GDP as the sum of value added created by all production units operating in the country. The expenditure approach estimates GDP as the sum of expenditures fulfilling final demand (i.e. consumption, capital formation and net exports). The income approach estimates GDP as the sum of remunerations to factors of production (capital, labor) in the country.

Income accounts provide information about two features of a national economy. First, they show how the GDP is divided among different types of income, such as compensation of employees, profits and other property income, so-called "mixed income" of owners of unincorporated business, and taxes (less subsidies) on production. Second, they help explain differences between a country's GDP and its disposable income. Such differences can arise when, for example, profits from domestic production are paid to foreign owners of an enterprise, or when transfers are received from the rest of the world.

This report provides a brief description of the conceptual framework for these accounts (Section II), a preliminary assessment of available data sources in Indonesia that can be used in estimating them (Section III) and a first attempt at estimating the relative magnitude of the major components for the year 2000 (Section IV).

II. CONCEPTUAL FRAMEWORK

A. Distribution of GDP by Income Type

The income side of the GDP can be divided into five major components:

1. <u>Employee Compensation</u>

Employee compensation includes:

- Wages and salaries, including cash bonuses, commissions etc.
- Supplements to labor income, e.g. employer contributions to social security, employee welfare funds and direct pension payments to retired employees.
- Compensation in kind, e.g. maintenance allowances, health and educational services etc.

2. Property Income

Property income (or capital income) includes:

- Dividends
- Undistributed profits of private corporations before taxes
- Interest on bonds, mortgages, and savings deposits
- Interest earned by insurance companies and credited to the insurance policy reserves
- Net interest paid out by commercial banks
- Net rents from land, buildings, etc., including imputed net rents on owner-occupied dwellings
- Royalties
- Profits of government enterprises.

3. Mixed Income

Mixed income (or operating surplus) includes:

- Profits of the self-employed, whether taken in cash or retained in the enterprise (often referred to as "profits of unincorporated enterprises")
- Incomes of the self-employed in kind (e.g. farm products consumed on the farm, services of farm dwellings).

Nearly all incomes earned by producers, whether they come from capital, from labor, or from both, eventually become the incomes of households. Even employer contributions to social security, pension, and other welfare funds can be considered as such, because they are regarded by the households as part of their total, long-run, spendable resources.

4. Taxes on Production (less subsidies)

Taxes are compulsory payments, in cash or in kind, made by institutional units to government units. Taxes covered in this category include those payable on goods and services when they are produced, delivered, sold, transferred or otherwise disposed of by their producers. In addition to sales taxes and VAT, these include:

- taxes and duties on imports that become payable when goods enter the economic territory of a country by crossing the frontier or when services are delivered to resident units by non-resident units.
- taxes on the ownership or use of land, buildings or other assets used in production or on the labor employed, or compensation of employees paid.

Subsidies, on the other hand, are current transfer payments that government units (including non-resident units) make to enterprises on the basis of the levels of their production activities or of the quantities or values of the goods or services which they produce, sell or import.

5. Consumption of Fixed Capital

Consumption of fixed capital (or depreciation) measures the degree to which the country's stock of fixed capital assets is used up. As such, this variable is a cost of production, not a component of income. It is not measured directly. Rather, it is estimated indirectly based on the estimated increase or decrease in the capital stock (the "gross fixed capital formation" component of the expenditure account).

B. Disposable Income

Disposable income is the balancing item in what is referred to in the 1993 SNA as the "secondary distribution of income account." It is derived from the balance of the five components of GDP discussed in the previous section (referred to in the 1993 SNA as the "primary distribution of income account"), by further:

- Adding all current transfers (except social transfers in kind), employee compensation and property income, received by a particular institutional unit or sector from the rest of the world, and
- Subtracting all current transfers (except social transfers in kind), employee compensation and property income, paid by that unit or sector to the rest of the world.

Disposable income, like the balance of primary incomes, may be recorded gross or net of consumption of fixed capital.

III. DATA SOURCES

Adequate measurement of various components of the income account will require tapping into a substantial number of existing data sources as well as the possible development of new ones. Among existing sources, the following are the potential primary sources:

- The survey conducted by BPS on household saving and investment (SKTIR). This survey is conducted regularly for the purpose of compiling the household account. Results are not published.
- Financial statements of state-owned enterprises collected annually by BPS on a sample basis.
- Financial statements of publicly listed companies on the Jakarta and Surbaraya stock exchanges, collected regularly by BPS.
- Balance of payments data (primarily data on transfers) obtained quarterly from Bank Indonesia.
- Detailed data on government receipts and expenditures, obtained quarterly by BPS from the Ministry of Finance to be used for statistical purposes.
- Input-Output tables. The latest, for the year 2000, is currently in progress. These tables provide reliable information on inter-industry flows which would help estimate labor income by industrial origin.
- Social Accounting Matrices (SAM). These are matrices which have been published periodically by BPS. Many of the supporting tables contain information (e.g. on factor incomes) which can be used for estimating some of the income account components.
- Labor force surveys (Sakernas) and wage surveys (Survei Upah), the first produced annually and the second quarterly, can also be used for estimating some of the income account flows.

IV. RESULTS

Data from the above sources for the year 2000 were briefly analyzed and put together to assess the possibility of obtaining a consistent and plausible set of components for the income account. Table 1 provides results of our initial attempt. These results will be further evaluated, refined and documented in subsequent reports.

Table 1
Distribution of 2000 GDP by Type of Income

Component	Share
Employee Compensation	34.5%
Property Income	35.7%
Mixed Income	27.3%
Taxes on Production (net of subsidies)	-3.0%
Depreciation	5.0%
GDP	100%

INDONESIAN INCOME ACCOUNT: PROGRESS REPORT 2

Report # 54

by
Kusmadi Saleh

June, 2002

Statistical Assistance to the Government of Indonesia (STAT) Project
USAID Contract No. PCE-I-00-99-00009-00

TABLE OF CONTENTS

I. INTRODUCTION 208

II. GDP BY INCOME & INSTITUTION 208
- **A. Financial Sector** 209
  - **1. Employee Compensation** 209
  - **2. Property Income** 209
  - **3. Net Taxes on Production** 209
  - **4. Consumption of Fixed Capital** 209
  - **5. Mixed Income** 209
  - **6. GDP** 209
- **B. Government** 210
  - **1. Employee Compensation** 210
  - **2. Property Income** 210
  - **3. Net Taxes on Production** 210
  - **4. Consumption of Fixed Capital** 210
  - **5. Mixed Income** 210
  - **6. GDP** 210
- **C. Public Enterprises** 210
- **D. Private Non-Financial Enterprises** 211
- **E. Households** 211
- **F. Total** 212
  - **1. Employee Compensation** 212
  - **2. Property Income** 212
  - **3. Net Taxes on Production** 212
  - **4. Consumption of Fixed Capital** 212
  - **5. Mixed Income** 212
  - **6. GDP** 212

III. RESULTS 212

I. INTRODUCTION

This is the second progress report documenting ongoing work on preliminary estimation of Indonesia's Income Account for 2000. The report documents work undertaken to date in our attempt to construct an Income Account for Indonesia for the year 2000 and a system for regular updating of these accounts.

II. GDP BY INCOME & INSTITUTION

The best organizing framework for computing GDP by income type is the matrix provided in Table 1.

Table 1
GDP by Income and Institutional Sector: Data Sources

Income Type	Financial Sector (A)	Government (B)	Public Enterprises (C)	Private Non-Financial Enterprises (D)	Households (E)	Total (F)
1. Employee Compensation	IO	Budget	Financials	HR	--	HHA
1.1 Wages & salaries	survey %	Budget	Financials	survey %	--	RS
1.2 Fringes	survey %	Budget	Financials	survey %	--	RS
1.3 Income in kind	survey %	Budget	Financials	survey %	--	RS
2. Property Income	VR	Budget	Financials	HR	--	HHA
2.1 Profits	--	--	Financials	survey %	--	--
2.2 Interest	--	--	Financials	survey %	--	--
2.3 Dividends	--	--	Financials	survey %	--	--
2.4 Royalties	--	--	Financials	survey %	--	--
2.5 Rentals	--	--	Financials	survey %	--	--
3. Net Taxes on Production	IO	--	Financials	HR	--	IO
4. Consumption of fixed capital	IO	IO	Financials	HR	HHA	IO
5. Mixed Income (residual)	--	--	--	HR	HHA	VR
6. GDP	IO	CS	CS	HR	CS	IO

Notes:
IO: 2000 Input-Output table
Budget: Government budget
Financials: official financial statements of public enterprises
survey %: share applied to category total based on results of a survey
HR: Horizontal residual
VR: Vertical residual
RS: Row sum
CS: Column sum
HHA: derived from the reconciliation tables underlying the household sector account
"–": not applicable

Let us now turn into the various data sources consulted for filling various cells in the matrix. Cells in the table include a one-word summary description of the main source of data used for computing it. For ease of reference in the text, columns in the table have been labeled A through F and rows have been assigned numbers (with decimals assigned to sub-categories).

A. Financial Sector

This sector includes four broad categories of institutions: Bank Indonesia, commercial banks, insurance companies and non-bank financial institutions.

1. Employee Compensation

Total employee compensation (A1) for 2000 was derived from the latest available figures under preparation for the 2000 Input-Output table (covering 172 sectors). The relevant row of the IO table is 201 (*upah dan gaji*).

The breakdown of compensation into the three categories in the table (A1.1 to A1.3) was done by applying relevant shares obtained from a special survey of the financial sector conducted by BPS in (*Statistik Lembaga Keuangan 2000*). The survey, conducted in 2000, covers 159 banks and 931 small credit institutions (*bank perkreditan rakyat*), 543 non-bank financial institutions and 2969 credit cooperatives. It provides data on these institutions' operations in 1999.

2. Property Income

This item (A2) was derived as a column residual. No breakdown into its four components was attempted.

3. Net Taxes on Production

This item (A3) was also derived from the 2000 Input-Output table, row 204 (*pajak tidak langsung*).

4. Consumption of Fixed Capital

This item (A4) was also derived from the 2000 Input-Output table, row 203 (*penyusutan*).

5. Mixed Income

Mixed income is assumed to be zero for the financial sector.

6. GDP

This item (A6) was derived from the 2000 Input-Output table, row 209 (*nilai tambah bruto*).

B. Government

This sector includes central, provincial, district/regency (*kabupaten/kota*), sub-district (*kecamatan*) as well as village (*desa*) governments.

Central Government figures for all items in this column were obtained from actual expenditure accounts obtained regularly from the Ministry of Finance. Expenditure by governments at other levels were obtained from the annual BPS surveys of local authorities (*Statistik Keuangan Pemerintah Tingkat I, Statistik Keuangan Pemerintah Tingkat II and Statistik Keuangan Desa*).

1. Employee Compensation

Item B.1 and its components were derived from the corresponding budget categories in the "Personnel Expenditures" (*belanja pegawai*) of the routine budget.

2. Property Income

Government is assumed to have no property income, so item B.2 is zero.

3. Net Taxes on Production

Government is assumed to pay no such taxes or provide such subsidies, so item B.3 is zero.

4. Consumption of Fixed Capital

This item (B4) was derived from the 2000 Input-Output table, row 203 (*penyusutan*).

5. Mixed Income

By definition, the government has no mixed income, so item B5 is zero.

6. GDP

This item (B.6) is calculated as the sum of all items in column B.

C. Public Enterprises

This sector includes all enterprises over which the government (represented by the Ministry of Finance or other ministries such as Oil and Mining, Industry and Trade) has actual control. This covers enterprises fully-owned by the government (e.g. Pertamina) as well as those partially owned. They are referred to in Indonesian as BUMN (*Badan Usaha Milik Negara*). All items under column C were derived from the annual financial statements reported by these enterprises to the Ministry of Finance and provided to BPS in its annual survey of these

enterprises (*Survei BUMN*). The latest available data were for 1999.[1] The 2000 estimates used the projected 1999-2000 trend in a special report on "Trend of Productivity of Government Enterprises: 1997-2001" produced by the Ministry of Finance.

The column entries are then summed up to provide the total GDP for the column (item C.6).[2]

D. Private Non-Financial Enterprises

This sector covers private enterprises in all sectors of the economy other than finance. All categories in this sector (items D.1 - D.6) are calculated as row residuals. Sub-categories (items D1.1-D1.3 and D2.1-D2.5) are computed by applying shares obtained from a special survey conducted by BPS in 2000 covering 698 such establishments (*Survei Khusus Perusahaan Swasta*).

E. Households

Conceptually, this sector is supposed to cover all households engaged in a production activity of goods and services for sale as well as for own consumption. This is supposed to include all of what is often referred to as "informal" sector activities in agriculture, quarrying, manufacturing, construction, trade, transportation and other services. Given the lack of data measuring directly these various activities, we have relied on several sources used within BPS for compiling the Household Sector Account used in constructing the Social Accounting Matrix, which forces consistency among various production and institutional accounts.

Compilation of the Household Sector Account involves the construction of three T-accounts:

- the household production account: this reconciles household credits (from production) on one side and debits on the other (including cost of production, depreciation and mixed income–the latter being a residual)
- the household income and outlay account: this also reconciles household credits (wages, mixed income, transfers in) and debits (final consumption, transfers out and savings–the latter being a residual)
- the household accumulation account: this also reconciles household credits (savings, depreciation and net capital transfer–the latter being a residual) and debits (change in stock, capital formation and net borrowing).

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1 The 1999 survey included 155 out of a total of 177 such enterprises. In 2000 there were 188 enterprises.

2 Mixed income for these enterprises (item C5) is assumed to be zero.

Building such accounts is very time-consuming and involves using data from many difference sources with varying degrees of quality and frequency. This report will not attempt to document this process. Suffice it to say that the outcome of this exercise is a consistent set of accounts which describes the behavior of households as an institutional sector. Two items in column E of Table 1 rely on these calculations: item E.4 and E.5. Total GDP attributed to the household sector (item E6) is then calculated as the sum of these two entries.

F. Total

1. Employee Compensation

Item F1 is obtained from the Income and Outlay T-account of the Household Sector Account. Items F1.1 to F1.3 are simply the row total of entries pertaining to other institutional sectors.

2. Property Income

Item F2 is also obtained from the Income and Outlay T-account of the Household Sector Account.

3. Net Taxes on Production

This item (F3) was derived from the 2000 Input-Output table, row 204 (*pajak tidak langsung*).

4. Consumption of Fixed Capital

This item (F4) was derived from the 2000 Input-Output table, row 203 (*penyusutan*).

5. Mixed Income

This item (F5) was calculated as a column residual.

6. GDP

This item (F6) provides the control total of all entries in the table. It was obtained from the 2000 Input-Output table, row 209 (*nilai tambah bruto*).

III. RESULTS

Results to date remain broadly consistent with those provided in the earlier progress report. They are provided in summary form in Table 2. Once all individual cell described in Table 1 are completed, our plan is to provide numbers in that detail.

Table 2
Distribution of 2000 GDP by Type of Income

Component	Share
Employee Compensation	34.5%
Property Income	35.7%
Mixed Income	27.3%
Taxes on Production (net of subsidies)	-3.0%
Depreciation	5.0%
GDP	100%

CHANGES IN INVENTORIES HELD BY MANUFACTURERS, 1998-99: ANALYSIS OF ANNUAL SURVEY DATA

Report # 55

by
Frank de Leeuw

July, 2002

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TABLE OF CONTENTS

I. INTRODUCTION & SUMMARY 216

II. ANNUAL SURVEY DATA 217

III. BOOK VALUES & SNA CONCEPT OF INVENTORY CHANGES 218

IV. FOUR SETS OF ASSUMPTIONS 221
- **A. Holding Period** 221
- **B. Composition of Inventories of Materials** 221

V. RESULTS 223

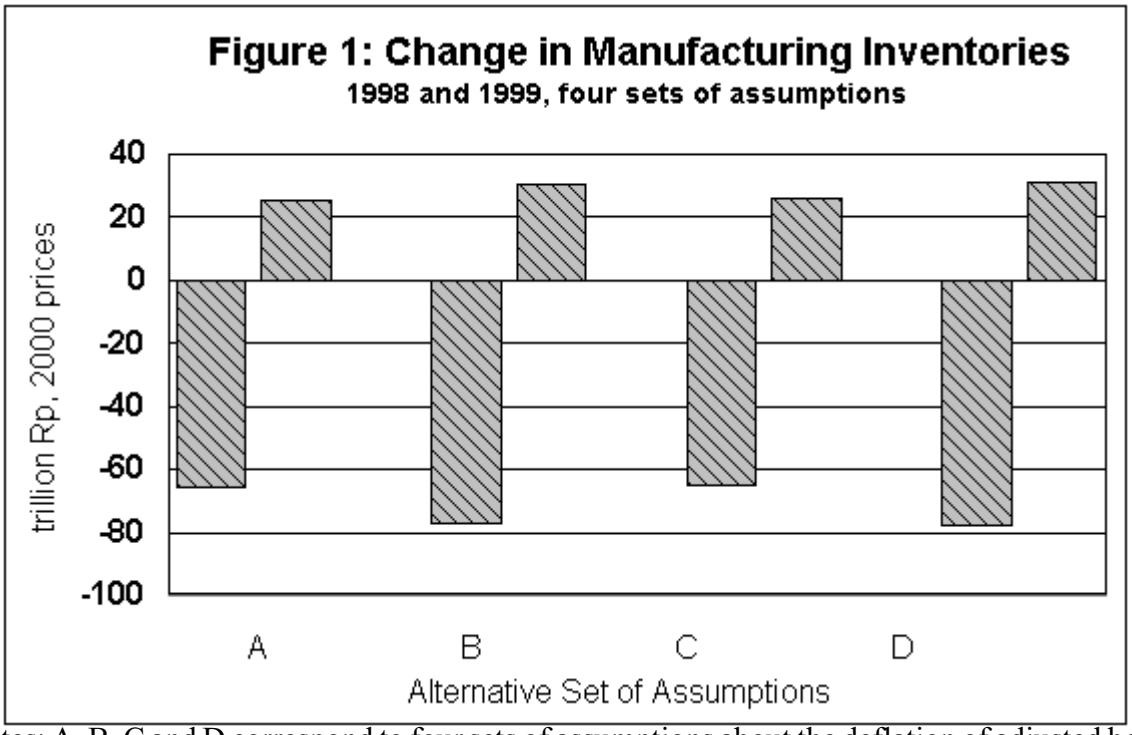
VI. NEXT STEPS 224

APPENDIX A DATA USED 227

I. INTRODUCTION & SUMMARY

This paper presents four alternative estimates of changes in inventories held by manufacturers during the years 1998 and 1999. The estimates use as their common starting-point the values of inventories reported in the survey of large and medium manufacturing establishments that BPS conducts each year. As is well known, however, the concept of inventories used in national accounts--namely, the replacement cost of inventories--differs from the "book values" that survey respondents report. Conversion of book values to the national accounts concept requires information that is not readily available--for example, information on the holding periods and composition of inventories. The purpose of this paper is to present four alternative reasonable sets of assumptions about this missing information and see how sensitive the results are to these alternatives.

Figure 1 summarizes the aggregate results. The aggregates in the chart are sums of 30 components; inventories in three stages for each of ten 2-digit industries. Clearly, the aggregates are only mildly sensitive to which of the four sets of assumptions underlies them. For each of the four sets, as the figure shows, the result is a sharp decline in inventories during 1998 and some recovery during 1999. The results thus suggest that it may not be important to achieve great precision in the measurement of stock holding periods or composition.



Notes: A, B, C and D correspond to four sets of assumptions about the deflation of adjusted book values, as follows:

A: 2-digit industry price indexes, fourth quarter
B: 2-digit industry price indexes, second half
C: 2-digit industry price indexes and wholesale price indexes, fourth quarter
D: 2-digit industry price indexes and wholesale price indexes, second half.

The figure is of interest not only for its comparison of alternative assumptions. At least equally interesting is the size of the stock changes in both years. The results indicate that the 1998 decline in manufacturing inventories was of the same order of magnitude as the decline in total inventories in the published GDP expenditure accounts. However, the 1999 change in manufacturing inventories differs not only in size but in direction from the overall change in the published expenditure accounts. The four alternative measures of stock change in manufacturing are all positive, while stock change in the national accounts is negative. The change in the national accounts of course includes many other sectors besides manufacturing; but manufacturers hold a very large share of total inventories, and it is difficult to see how holdings by other sectors could make the two estimates consistent. Data on physical stocks of minerals and agricultural products do not show large changes during these years.[1] The figure thus suggests that direct measurement of inventories, as exemplified in the Annual Survey-based estimates, may give different results from the residual method (total production less final sales) underlying the present national accounts estimates.

The remainder of this paper is in five sections. The first describes some adjustments made to the annual survey data. The second reviews the steps needed to convert book values of inventories to the national accounts concept of inventory. The third describes the four sets of assumptions about the holding period and composition of inventories. The fourth section presents results. The final section lists some desirable next steps for improving measurement of changes in inventories. Tables of data appear in Appendix A of the report.

II. ANNUAL SURVEY DATA

Inventory data reported in the Annual Manufacturing Survey for 1997, 1998, and 1999 are shown in Table A.1 at the end of this report. The first two columns of the table show the number of reporting establishments and their production . The remaining columns show stocks reported at the beginning and the end of each year for the three categories of materials, goods in process, and finished goods. Production and inventories are reported in billions of rupiahs.

The separation into three categories will be important because the methodology of converting book values to the national accounts concept requires price indexes for each category of inventories, and the appropriate price index for the three types could be quite different. For example, for a paper manufacturer the price of lumber might be an important component of the price index for materials inventories, while the price of paper would be the principal component

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[1] The data on physical stocks are described in Statistical Paper #11 in this series, *Measuring Changes in Inventories in Indonesia*, September 2001, pp. 2-4. The minerals series include oil and gas as well as mining products. The agricultural series do not include rice.

of the price index for finished goods inventories. If information is available only for total inventories, an index based on prices of lumber and paper would be appropriate; but deflation of total inventories by such a price index would be less accurate than separate deflation of each type.

Examination of the table raises questions about some of the entries. Throughout the table there are large differences between closing estimates for one year and opening estimates for the next. For example, the closing estimates for inventories of materials in 1997 is 42,279 billion rupiahs, but the opening estimate for the same category in 1998 is only 32,541 billion rupiahs. Probably the main cause of this discrepancy is that some establishments fail to report start-of-year inventories and therefore are recorded as having zero inventories at the start of the year. For this reason, the results reported in this paper are based on successive end of year inventories, and ignore the estimates of inventories at the beginning of each year.

The 1999 stock estimates raise additional questions. In every year there are establishments that report on production but do not complete the stock questions in the survey. BPS makes estimates of inventories for these establishments. Examination of the estimated portion of inventories (not shown separately in the table) revealed that the number of establishments for which BPS made estimates was far larger in 1999 than in the two preceding years, and that production represented by these establishments was a larger proportion of total production. However, the estimates of inventories for these establishments was far smaller than in preceding years. Inspection of individual records showed that for many, inventories were estimated at zero for 1999, in spite of positive levels of production.

To remedy this apparent understatement, inventories were re-estimated for the end of 1999 in this study. The revised estimates are based on the assumption that the ratio of inventories to production is the same for establishments for which inventories were estimated as for establishments that reported end-of-year inventories. This assumption was applied in disaggregated fashion to inventories at each stage of each 2-digit industry. The results are shown at the bottom of Table A.1.

III. BOOK VALUES & SNA CONCEPT OF INVENTORY CHANGES

Deriving inventory change estimates for national accounts from book values is a complex operation. The change in the book value from year-end to year-end is NOT a useful number, even for measuring stock change in current prices. The reason it is not useful is that such a change represents holding gains (capital gains) as well as changes in the replacement cost of goods stored in the form of inventories. The latter is the concept required for the national accounts. Holding gains are excluded from GDP and other production measures because they do not reflect actual production.

A simple example may help explain this important point. Suppose a shoe manufacturing establishment holds exactly the same physical inventories at the end of year "t+1" as at the end of year "t"--the same number of pairs of shoes of each type, the same quantity of leather, etc. The contribution of the establishment to inventory change in the national accounts should clearly be zero, both in current and in constant prices, since the amount of production stored in the form of inventories has not changed. But suppose that prices of shoes and leather have gone up during the year. Then the value of such inventories on a company balance sheet will have increased, according to most commonly used accounting systems.[2] The increase--a holding gain--will be due solely to the price change, and cannot be reduced to zero even if it is deflated by a large price index. Taking the change in book values is simply the wrong way to start deriving the national accounts concept of change in inventories.

The correct way to convert book values to the national accounting concept begins by using deflation by price indexes to express values in terms of a common price level--that is, in prices of 1993, prices of 2000, or prices of some other base year. In this study, deflated inventories are measured in prices of 2000. To select appropriate price indexes for deflation, it is necessary to know--or to make some assumption about--the typical period for which inventories are held and about the commodity composition of inventories. With respect to age distribution, the reason such information is necessary is that it determines which price indexes should be used to express book values in a common price level. If all of the end-of-year inventories were acquired in December, price indexes for December are appropriate; but if one third of end-of-year inventories date back to each of the preceding three months, then averages of price indexes for October, November, and December are appropriate. If the goods presently held as inventories were acquired or produced throughout the last two quarters, then average price indexes for the last half year are appropriate.

With respect to commodity composition, as noted earlier, if the stock of materials in some manufacturing industry consists of commodities produced in agriculture, forestry, or mining, then price indexes for the relevant primary products are the appropriate deflators. If the stock of materials includes commodities produced in another manufacturing industry--for example, primary metals or chemicals--then a price index for industries that produce these commodities should have some weight in the deflator.

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[2] The LIFO accounting system is the one exception. According to interviews with a few manufacturing companies by BPS staff, domestic Indonesian companies do not use LIFO accounting. Rather, they are closer to the FIFO method, in which book values represent the cost of inventories at the time of acquisition. Changes in book values based on the FIFO method reflect holding gains as well as changes in replacement value, and therefore are subject to the criticism above.

Once these matters of holding period and commodity composition have been resolved, the resulting deflated series measure the value of inventories in constant prices; and changes in the series measure the stock change component of GDP. The deflated series accord with the national accounts concept of replacement cost. They measure values at prices of whatever base year was chosen for deflation; to express them in constant prices of some other year, it is necessary to multiply by ratios of price indexes in the other year to price indexes of the base year chosen for deflation. To express them in current prices, it is necessary to multiply deflated values in each year by ratios of price indexes in that year to price indexes in the base year. This study will not include such calculations, but will be restricted to measurement of inventories (and their changes) in constant prices of 2000.

An example drawn from the Annual Survey and price data used in this study provides a convenient illustration of the method of measuring stock change outlined above. For the wood products industry, as Table 1 shows, the book value of inventories of materials rose from 2244 billion rupiahs at the end of 1997 to 2569 at the end of 1998 to 2905 at the end of 1999 (adjusted). The change in the book value was positive in both years; but, as the rest of the table shows, the change in inventories according to national accounts concepts was sharply negative in 1998.

Table 1
Inventories of Materials held by Manufacturers of Wood Products (ISIC 33)

	1997	1998	1999
1. Book value, end of year (bn Rp): 1999 adjusted	2244	2569	2905
2. Price index, wood products, 4th quarter			
a. 1993 = 100	167.09	270.79	284.75
b. 2000 = 100	51.91	84.12	88.46
3. Value in 2000 prices (1 divided by 2b), end of year	4323	3054	3285
4. Inventory change in 2000 prices, SNA concept (change in 3)		-1269	+231

The first step in converting book values to a national accounts concept is choosing a price index for deflating book values. The one in the table is the wood products price index for the fourth quarter of the year, taken from the quarterly survey of manufacturing. This is the first of the four alternative choices used in this paper. The second step is converting this price index to the base year chosen for measuring stock change--in this case, the year 2000. Each price index on a 1993 base is divided by the average price index for the year 2000 (equal to 321.91, not shown in the table).

The next step is dividing the book values by these price indexes. Because of the sharp price increase from 1997 to 1998, the value in 2000 prices, shown in row 3, drops sharply from

the end of 1997 to the end of 1998, in contrast to the increase in book value. The final step is taking the change from year end to year end, which gives inventory change during the year according to the national accounts concept.

IV. FOUR SETS OF ASSUMPTIONS

Four assumptions are made in this study: two regarding the holding period and two applying to the stock of materials.

A. Holding Period

The two alternative assumptions made about holding period were: first, that inventories are held for one quarter, a value similar to ratios observed in other countries; the second was that inventories are held for 6 months, rather longer than typical for many countries. The first assumption implies that book values at the end of a year should be deflated by price indexes for the fourth quarter of that year. The second assumption leads to deflation by price indexes for the second half of the year.

Of course, actual holding periods almost certainly fall outside these ranges for some industries and for some stages of inventories. But calculations using these two alternatives should give some indication of how sensitive results are to assumptions about holding periods.

B. Composition of Inventories of Materials

For inventories of goods in process and finished goods, the price indexes used for deflation are "own" price indexes--that is, the food processing price index is used to deflate food inventories, the textile and apparel price index to deflate textile and apparel inventories, and so forth. The price indexes are ones derived from BPS' quarterly manufacturing survey.

For inventories of materials, the study tested two alternatives. The first was to use the same "own" price indexes for materials as for in-process and finished goods. "Own" price indexes are relevant for materials, because the materials inventories in some 3- and 4-digit industries come from other industries in the same 2-digit group. For example, materials inventories for establishments producing apparel come largely from the output of textile manufacturers, and materials inventories for machinery producers come in part from the output of metal fabricating establishments. However, the exclusive use of "own" price indexes is clearly inaccurate in the case of industries that add value to the output of primary producers--for example, food processors that add value to agricultural products. It is also inaccurate in the case of industries whose technology requires significant input from completely different industries--for example, the chemicals required to manufacture paper.

The exclusive use of "own" prices is thus not realistic in itself. It is, however, useful as an extreme case, because comparing results under the use of "own" prices to results under a more realistic alternative can be helpful in judging how sensitive results are to accuracy in the specification of price indexes.

The alternative assumption used in this study is based on alternative price indexes for inventories of materials in four industries for which (a) inventories of materials are a large share of total inventories, and (b) input-output tables and common knowledge suggest that giving full weight to "own" price indexes is unrealistic.

The four industries and the alternative price indexes used to deflate materials inventories are:

Food processing:	an average of the WPI index for crops, the WPI index for fish, and the quarterly survey index for food processing;
Paper:	an average of the WPI index for forest wood, the quarterly survey index for chemicals, and the quarterly survey index for paper;
Nonmetallic minerals:	an average of the WPI index for mining and the quarterly survey index for nonmetallic minerals; and
Metal fabricating:	an average of the quarterly survey indexes for primary metals and for metal fabricating.

The 1995 Input-output table indicates that the commodities whose price indexes are used were important inputs. However, input-output tables do not contain information about the extent to which these commodities were held as inventories, rather than simply being used on arrival. Simple averages of price indexes are used in this alternative deflation procedure because there is no readily available information to support more appropriate weights.

Table A.2 at the end of this report lists the price indexes--both the own price indexes and the WPI components--used in the study.

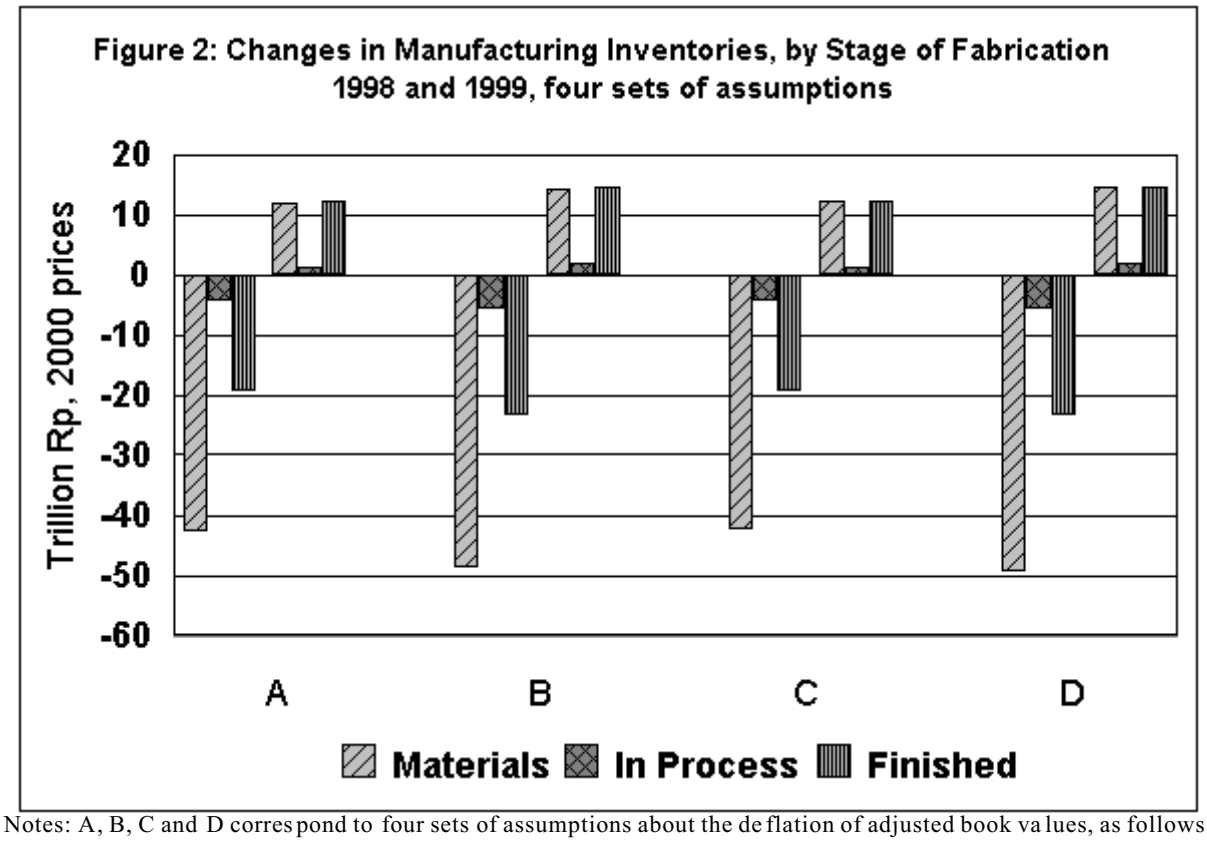
The combinations of two assumptions about holding period and two assumptions about materials composition leads to four alternative sets of assumptions:

- 4th quarter and "own" price indexes (A);
- second half and "own" price indexes (B);
- 4th quarter and mixed price indexes (C); and
- second half and mixed price indexes (D).

V. RESULTS

Figure 1 at the beginning of this paper showed that for each of the four alternative sets of assumptions, changes in manufacturers' inventories fell in 1998 and rose in 1999. One further comment on this result is appropriate now that the methodology has been explained: the results in the figure do depend on use of the 1999 results after adjustment for understatement. Without such adjustment, inventories in 1999 would show little or no increase. However, the case for adjustment seems very strong, even if there is uncertainty about the precise amount.

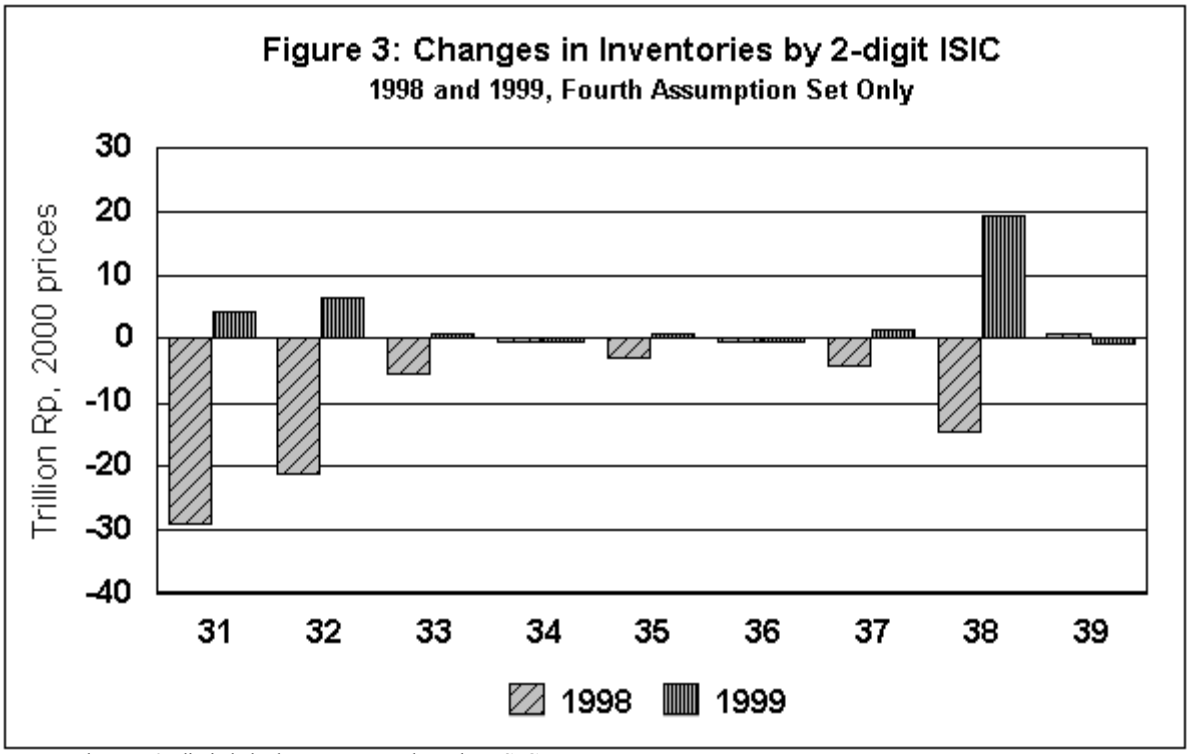
Separate results by stage of fabrication, shown in Figure 2 (and in Table A.4), increase confidence in the overall result because inventories in each of the three stages--materials, goods in process, and finished goods--show the same pattern of 1998 decrease followed by 1999 increase, under each of the four sets of assumptions.



Notes: A, B, C and D correspond to four sets of assumptions about the deflation of adjusted book values, as follows:
A: 2-digit industry price indexes, fourth quarter
B: 2-digit industry price indexes, second half
C: 2-digit industry price indexes and wholesale price indexes, fourth quarter
D: 2-digit industry price indexes and wholesale price indexes, second half.

The figure also shows that inventories of materials had by far the biggest drop in 1998, and that inventories of goods in process accounted for only a small fraction of the overall changes.

Results by 2-digit industry, shown in Figure 3, vary widely. These results are shown only for the fourth set of assumptions in order to avoid a confusing overload of exhibits. Results for other assumptions, shown in Table A.5, are similar to the ones in the chart. Three industries--food processing (31), textile and leather products (32), and fabricated metals (38)--account for the great bulk of the changes in total manufacturing. Stock changes in all three fall sharply in 1998 and then rise in 1999. Three other industries--wood products (33), chemicals (35), and basic metals (37)--are less important but display the same pattern of decrease followed by increase. The remaining three--paper and printing (34), nonmetallic minerals (36), and other manufacturing (39)--do not follow the pattern but show very small changes.



Note: Industry 2-digit labels correspond to the ISIC.

VI. NEXT STEPS

An earlier paper on inventory measurement included a long list of steps covering not just conversion of book value data but also data collection, physical stocks data, and questions about stock changes in business tendency surveys.[3] The present set of five "next steps" is much less comprehensive. It covers only steps that will lead to improved annual estimates of changes in manufacturing inventories. It therefore does not replace the previous list, but simply updates the portion of that list dealing with book values for manufacturing.

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[3] See *Measuring Changes in Inventories in Indonesia*, op. cit., pp. 15-18.

Step 1: Improve, if possible, the adjustments of 1999 Annual Manufacturing Survey (AMS) stock data.

The adjustments made in this paper, as noted, are based on ratios of end-of-year stock levels to production for establishments that reported inventories. The ratios were calculated by stage and by 2-digit industry--30 ratios in all. The adjustments had a significant impact on the result--probably an inevitable and desirable outcome, because a great many establishments failed to report inventories in 1999.

Improved adjustments, however, may be feasible. Perhaps 3- or 5-digit industries would be a more appropriate level of disaggregation. Perhaps disaggregation by geographic area or size of establishment would be desirable. Survey experts, within or outside of BPS, may have some advice on what adjustment methods might be feasible and more accurate.

Step 2: Evaluate 2000 AMS data on inventories, and adjust if necessary

The sooner annual data are available for incorporating into national accounts estimation, the more likely it is that quarterly revisions will be able to incorporate them during the regular revision cycle.

Step 3: Conduct a few informal interviews with cooperative establishments in different industries about their holding periods and their composition of materials inventories.

The results in this study indicate that no substantial differences emerged between estimates of manufacturing stock change based on different assumptions about holding period and composition of materials inventories. However, while not substantial, the differences are not negligible. The first set of assumptions resulted in a swing from -65 to +25 trillion rupiahs; the fourth set of assumptions resulted in a larger swing, from -78 to +31. Furthermore, the study is confined to only two years; more substantial differences could emerge in other years.

For these reasons, it would be desirable to conduct informal talks or interviews with at least a small number of manufacturing establishments. The goal would not be to obtain precise measurements–probably they are not obtainable--but to get an impression of whether the bulk of inventories have been held for less than a quarter or more, or whether materials inventories consist heavily of non-manufactured commodities (such as agricultural output), commodities from unrelated industries (such as chemicals in paper manufacturing), or commodities from closely related (in the same 2-digit group) industries.

Step 4: Compare AMS data for recent years with manufacturing balance sheet data collected from company financial statements.

There are now two sources of data on book values of inventories in Indonesia; results from the AMS used in this study, and results from manufacturing companies included in tabulations of company balance sheet reports. It will be important to compare these two sources in several dimensions:

coverage: are book values collected from company reports as big as estimated totals from AMS's? Does relative size vary from industry to industry?

time series: do the two bodies of data show similar year-to-year fluctuations?

promptness: is one body of data available substantially in advance of the other? Can annual stock data be made available early enough to affect the regular cycle of quarterly revisions in the national accounts?

Step 5: Make final decisions about estimation procedures for manufacturing inventories

After completion of the previous steps, especially step 2 and step 4, a decision will be necessary as to how to construct official annual estimates of stock change by manufacturers. The decision need not be for total reliance on one source or the other. One source could be used for preliminary estimates, the other for final estimates. Or one source could be used for some industries, the other for remaining industries. But it is important to keep in mind that the goal of all this preliminary work is to specify a final methodology as soon as feasible.

APPENDIX A
DATA USED

Table A.1
Book Value of Inventories in Manufacturing: 1997-99

		----------billions of rupiahs----------						
	# establ.	**produc-tion**	**materials inventories**		**in-proc. inventories**		**finished inventories**	
			opening	*closing*	*opening*	*closing*	*opening*	*closing*
1997								
31 food, bev., tbc	5544	51989	9830	13979	314	477	4673	5405
32 textile, leather	4942	43755	3973	9934	1994	2324	3388	5677
33 wood & prod.	3069	19445	1923	2244	708	994	2310	2625
34 paper & printing	1004	11448	1298	1460	206	243	653	1209
35 chemicals & pr.	2561	41551	3369	4203	688	840	2523	2939
36 nonmetallic min.	2064	9229	1009	1145	203	241	609	770
37 basic metals	200	15410	2087	2563	217	410	963	1353
38 fabric. metals	2543	49301	4709	6613	1363	1788	2661	2868
39 other manuf.	459	2000	127	137	56	74	60	76
Total, 1997	**22386**	**244130**	**28326**	**42279**	**5747**	**7391**	**17841**	**22923**
1998								
31 food, bev., tbc	5357	88745	7791	9946	369	601	2361	3393
32 textile, leather	4673	79370	4809	6049	2424	3400	3339	4902
33 wood & prod.	3024	34986	1979	2569	679	963	1893	2469
34 paper & printing	963	24274	3131	3684	369	545	1071	1600
35 chemicals & pr.	2388	68525	4944	5994	856	1263	4140	6066
36 nonmetallic min.	1937	11094	1020	1490	205	346	667	886
37 basic metals	211	20392	2398	2084	388	604	1451	1563
38 fabric. metals	2354	62120	6149	7073	1305	2261	2290	2791
39 other manuf.	516	3637	322	368	217	189	230	572
Total, 1998	**21423**	**393144**	**32541**	**39257**	**6811**	**10171**	**17442**	**24241**
1999 (unadjusted)								
31 food, bev., tbc	5456	104394	10460	11829	698	867	2183	3032
32 textile, leather	4846	93729	4529	5691	2235	3044	3499	3778
33 wood & prod.	3122	35651	1744	2236	739	980	1552	1897
34 paper & printing	966	28864	1067	1149	260	299	409	463
35 chemicals & pr.	2696	78307	2810	3296	613	905	2257	2725
36 nonmetallic min.	1887	12604	1102	1231	249	328	518	538
37 basic metals	199	19035	1695	1622	312	395	1202	1208
38 fabric. metals	2414	79195	5895	6557	944	1195	7938	7371
39 other manuf.	484	3829	131	201	59	60	129	90
Total, 1999 unadj.	22070	455608	29431	33812	6109	8073	19686	21101
1999 with non-respondents re-estimated								
31 food, bev., tbc	5456	104394	12045	13093	1063	1205	3345	4653
32 textile, leather	4846	93729	6708	8426	3201	3773	5187	5601
33 wood & prod.	3122	35651	2264	2905	908	1190	2014	2470
34 paper & printing	966	28864	3040	3284	570	669	1167	1325
35 chemicals & pr.	2696	78307	5533	6479	1181	1518	4461	5388
36 nonmetallic min.	1887	12604	1111	1302	291	336	731	740
37 basic metals	199	19035	2326	2226	403	480	1650	1658
38 fabric. metals	2414	79195	11373	12684	1627	1894	15408	14309
39 other manuf.	484	3829	237	364	106	106	234	164
Total, 1999 adj.	22070	455608	44638	50764	9348	11172	34197	36306

Source: Annual Manufacturing Survey

Table A.2
Price Indexes

A. Price Indexes from the Quarterly Manufacturing Survey

		1993=100				2000=100		
		1997	**1998**	**1999**	**2000 annual**	**1997**	**1998**	**1999**
31 food, bev., tbc	3rd quart.	137.59	271.81	274.46	298.42	46.11	91.08	91.97
	4th quart.	152.11	277.24	283.57		50.97	92.90	95.02
32 textile, leather	3rd quart.	131.73	312.44	247.65	272.93	48.27	114.48	90.74
	4th quart.	148.69	260.96	237.12		54.48	95.61	86.88
33 wood & prod.	3rd quart.	144.60	308.35	279.72	321.91	44.92	95.79	86.89
	4th quart.	167.09	270.79	284.75		51.91	84.12	88.46
34 paper & printing	3rd quart.	176.21	470.03	389.58	501.80	35.12	93.67	77.64
	4th quart.	189.37	414.07	413.15		37.74	82.52	82.33
35 chemicals & pr.	3rd quart.	128.93	298.07	266.94	281.89	45.74	105.74	94.70
	4th quart.	145.22	262.42	267.64		51.52	93.09	94.94
36 nonmetallic min.	3rd quart.	139.85	169.76	181.69	214.41	65.23	79.17	84.74
	4th quart.	135.90	170.55	198.84		63.38	79.54	92.74
37 basic metals	3rd quart.	133.64	372.13	247.18	293.01	45.61	127.00	84.36
	4th quart.	181.87	284.61	253.64		62.07	97.13	86.56
38 fabric. metals	3rd quart.	115.40	284.70	284.85	324.29	35.59	87.79	87.84
	4th quart.	122.28	294.75	310.09		37.71	90.89	95.62
39 other manuf.	3rd quart.	123.39	273.55	202.09	366.54	33.66	74.63	55.13
	4th quart.	146.83	210.65	323.89		40.06	57.47	88.36
Total	3rd quart.	134.03	299.83	268.68	302.32	44.33	99.18	88.87
	4th quart.	150.46	274.22	275.72		49.77	90.71	91.20

B. Selected Wholesale Price Indexes

		1993=100				2000=100		
		1997	**1998**	**1999**	**2000 annual**	**1997**	**1998**	**1999**
food crops	3rd quart.	178.35	401.45	537.89	651.00	27.40	61.67	82.62
	4th quart.	193.70	470.90	559.50		29.75	72.33	85.95
fishing	3rd quart.	183.93	313.12	367.20	404.00	45.53	77.50	90.89
	4th quart.	190.00	343.17	371.44		47.03	84.94	91.94
forest woods	3rd quart.	146.85	185.59	225.95	244.00	60.19	76.06	92.60
	4th quart.	149.40	205.01	229.08		61.23	84.02	93.89
mining	3rd quart.	124.96	279.68	225.27	224.00	55.78	124.86	100.57
	4th quart.	126.99	259.62	223.35		56.69	115.90	99.71

Table A.3
Estimates of End-of-Year Inventories in 2000 Prices (billions of rupiahs)

A. Materials Inventories

	based on industry unit values, Q4			based on industry unit values, 2nd half			based on unit valuesand WPI's, Q4			based on unit val. and WPI's, 2nd half		
	1997	**1998**	**1999**	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**
31 food, bev., tbc	27425	10706	13779	28799	10812	14004	32826	11927	14393	33987	12421	14591
32 textile, leather	18235	6327	9699	19338	5759	9488	18235	6327	9699	19338	5759	9488
33 wood & prod.	4323	3054	3285	4635	2856	3314	4323	3054	3285	4635	2856	3314
34 paper & printing	3870	4465	3989	4009	4182	4106	2911	4257	3701	3006	4131	3675
35 chemicals & pr.	8158	6438	6824	8642	6029	6833	8158	6438	6824	8642	6029	6833
36 nonmetallic min.	1807	1874	1404	1781	1878	1467	1907	1525	1353	1900	1492	1378
37 basic metals	4130	2145	2572	4761	1859	2605	4130	2145	2572	4761	1859	2605
38 fabric. metals	17539	7781	13264	18047	7916	13827	13257	7523	13924	14618	7023	14316
39 other manuf.	342	641	412	372	557	508	342	641	412	372	557	508
Total	85827	43430	55227	90384	41848	56151	86089	43837	56162	91258	42128	56709

B. In-process Inventories

	based on industry unit values, Q4			based on industry unit values, 2nd half		
	1997	**1998**	**1999**	**1997**	**1998**	**1999**
31 food, bev., tbc	935	647	1269	982	654	1289
32 textile, leather	4266	3556	4343	4524	3236	4249
33 wood & prod.	1915	1145	1345	2054	1071	1357
34 paper & printing	643	660	812	666	618	836
35 chemicals & pr.	1631	1357	1599	1728	1270	1601
36 nonmetallic min.	379	435	363	374	436	379
37 basic metals	661	622	554	762	539	561
38 fabric. metals	4742	2487	1981	4880	2531	2065
39 other manuf.	184	329	120	200	286	148
Total	15357	11237	12386	16169	10641	12485

C. Finished Inventories

	based on industry unit values, Q4			based on industry unit values, 2nd half		
	1997	**1998**	**1999**	**1997**	**1998**	**1999**
31 food, bev., tbc	10605	3652	4896	11136	3688	4976
32 textile, leather	10420	5126	6446	11051	4666	6306
33 wood & prod.	5058	2935	2792	5423	2745	2817
34 paper & printing	3203	1939	1609	3318	1816	1656
35 chemicals & pr.	5705	6516	5675	6044	6101	5682
36 nonmetallic min.	1215	1114	798	1198	1116	834
37 basic metals	2181	1609	1916	2514	1394	1941
38 fabric. metals	7605	3071	14964	7825	3124	15599
39 other manuf.	189	995	185	206	865	228
Total	46181	26956	39281	48714	25517	40039

Table A.4
Estimates of Changes in Inventories in 2000 Prices (billions of rupiahs)

A. Materials Inventories

	based on industry unit values, Q4		based on industry unit values, 2nd half		based on values and WPI's, Q4		based on values and WPI's, 2nd half	
	1998	**1999**	**1998**	**1999**	**1998**	**1999**	**1998**	**1999**
31 food, bev., tbc	-16719	3073	-17987	3192	-20900	2466	-21566	2170
32 textile, leather	-11908	3372	-13579	3730	-11908	3372	-13579	3730
33 wood & prod.	-1269	231	-1779	458	-1269	231	-1779	458
34 paper & printing	595	-476	173	-77	1346	-556	1125	-456
35 chemicals & pr.	-1719	386	-2614	804	-1719	386	-2614	804
36 nonmetallic min.	67	-470	97	-411	-382	-172	-408	-114
37 basic metals	-1985	426	-2902	745	-1985	426	-2902	745
38 fabric. metals	-9758	5483	-10131	5911	-5733	6401	-7595	7293
39 other manuf.	299	-228	186	-49	299	-228	186	-49
Total	**-42397**	**11796**	**-48535**	**14303**	-42252	12325	-49130	14581

B. In-process Inventories

	based on industry unit values, Q4		based on industry unit values, 2nd half	
	1998	**1999**	**1998**	**1999**
31 food, bev., tbc	-288	621	-328	635
32 textile, leather	-711	787	-1288	1012
33 wood & prod.	-770	200	-983	286
34 paper & printing	17	152	-48	218
35 chemicals & pr.	-275	242	-458	331
36 nonmetallic min.	55	-72	62	-57
37 basic metals	-39	-67	-223	23
38 fabric. metals	-2255	-506	-2349	-465
39 other manuf.	145	-209	86	-138
Total	**-4120**	**1148**	**-5529**	**1845**

C. Finished Inventories

	based on industry unit values, Q4		based on industry unit values, 2nd half	
	1998	**1999**	**1998**	**1999**
31 food, bev., tbc	-6952	1244	-7448	1288
32 textile, leather	-5294	1320	-6385	1640
33 wood & prod.	-2123	-143	-2679	72
34 paper & printing	-1264	-330	-1502	-160
35 chemicals & pr.	811	-841	58	-419
36 nonmetallic min.	-101	-316	-81	-283
37 basic metals	-572	307	-1119	546
38 fabric. metals	-4534	11893	-4701	12475
39 other manuf.	805	-809	659	-637
Total	**-19225**	**12325**	**-23198**	**14522**

Table A.5
Summary of Changes in Inventories by Industry

	based on industry unit values, Q4		based on industry unit values, 2nd half		based on values and WPI's, Q4		based on values and WPI's, 2nd half	
	1998	**1999**	**1998**	**1999**	**1998**	**1999**	**1998**	**1999**
31 food, bev., tbc	-23959	4938	-25763	5115	-28140	4331	-29341	4093
32 textile, leather	-17913	5480	-21252	6382	-17913	5480	-21252	6382
33 wood and prod.	-4163	288	-5440	817	-4163	288	-5440	817
34 paper and printing	-652	-654	-1377	-19	99	-734	-424	-398
35 chemicals and pr.	-1183	-213	-3014	716	-1183	-213	-3014	716
36 nonmetallic min.	21	-858	78	-751	-428	-561	-427	-453
37 basic metals	-2596	666	-4244	1314	-2596	666	-4244	1314
38 fabric. metals	-16546	16870	-17181	17920	12522	17787	-14645	19302
39 other manuf.	1249	-1246	931	-825	1249	-1246	931	-825
Total	**-65742**	**25270**	**-77261**	**30670**	**-65596**	**25798**	**-77856**	**30948**

Table A.6
Summary of Changes in Inventories for Stages of Fabrication and for Total Manufacturing (billions of rupiah)

---change in---	based on industry unit values, Q4		based on industry unit values, 2nd half		based on values and WPI's, Q4		based on values and WPI's, 2nd half	
	1998	**1999**	**1998**	**1999**	**1998**	**1999**	**1998**	**1999**
Materials Inventories	-42397	11796	-48535	14303	-42252	12325	-49130	14581
In-process Inventories	-4120	1148	-5529	1845	-4120	1148	-5529	1845
Finished Inventories	-19225	12325	-23198	14522	-19225	12325	-23198	14522
Total Inventories	**-65742**	**25270**	**-77261**	**30670**	**-65596**	**25798**	**-77856**	**30948**

TOWARD INCOME ACCOUNTS FOR INDONESIA

Report # 60
Statistical Paper # 14

by
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TABLE OF CONTENTS

LIST OF ACRONYMS 234

I. INTRODUCTION 235

II. CONCEPTUAL FRAMEWORK 235
- **A. Distribution of GDP by Income Type** 235
  - **1. Employee Compensation** 236
  - **2. Property Income** 236
  - **3. Mixed Income** 236
  - **4. Taxes on Production (less subsidies)** 237
  - **5. Consumption of Fixed Capital** 237
- **B. Disposable Income** 237
- **C. Sectors of the Economy** 238

III. METHODOLOGY 238
- **A. Computations for 2000** 239
  - **1. Financial Sector** 239
  - **2. Government** 240
  - **3. Public Enterprises** 241
  - **4. Private Non-Financial Corporations** 241
  - **5. Households** 242
  - **6. Total** 242
- **B. Computations for 1990-1999** 244
  - **1. GDP** 244
  - **2. Employee Compensation** 244
  - **3. Property Income** 244
  - **4. Net Taxes on Production** 245
  - **5. Consumption of Fixed Capital** 245
  - **6. Mixed Income** 245

IV. RESULTS 246

APPENDIX A INCOME ACCOUNTS FOR 2000 BY INSTITUTIONAL SECTOR 252

APPENDIX B EMPLOYEE COMPENSATION USING SAKERNAS . . 253

LIST OF ACRONYMS

BUMN	*Badan Usaha Milik Negara* (State-Owned Enterprise)
IO	Input-Output table
SAKERNAS	*Survei Angkatan Kerja Nasional* (National Labor Force Survey)
SAM	Social Accounting Matrix
SKTIR	*Survei Khusus Tabungan dan Investasi Rumah Tangga* (Special Survey of Household Saving and Investment)
SNA	System of National Accounts
SUSENAS	*Survei Sosial Ekonomi Nasional* (National Socio-economic Survey)

I. INTRODUCTION[1]

There are three approaches to estimating GDP: the production, expenditure and income approaches. The *production approach* estimates GDP as the sum of value added created by all production units operating in the country. The *expenditure approach* estimates GDP as the sum of expenditures on final demand (i.e. consumption, capital formation and net exports). The *income approach* estimates GDP as the sum of remunerations to factors of production (capital, labor) in the country.

Income accounts provide information about two features of a national economy. First, they show how the GDP is divided among different types of income, such as compensation of employees, profits and other property income, so-called "mixed income" of owners of unincorporated business, and taxes (less subsidies) on production. Second, they help explain differences between a country's GDP and its disposable income. Such differences can arise when, for example, profits from domestic production are paid to foreign owners of an enterprise, or when transfers are received from the rest of the world.

One drawback of the income approach is that, unlike the other two approaches, it does not support constant price (or volume) estimation, since some income components (e.g. mixed income, operating surplus) do not have an analytically meaningful volume dimension. The most common analytical use of the income approach is in depicting changes in relative shares of major components over time (e.g. employee compensation).

This report documents an attempt to develop income accounts for Indonesia, which can hopefully be regularly updated by BPS in the future. It provides (in Section II) a brief description of the conceptual framework for these accounts.[2] Section III describes the methodology used in computing an annual series for the 1990-2000 period. Finally Section IV presents the results and a few concluding remarks regarding followup steps.

II. CONCEPTUAL FRAMEWORK

A. Distribution of GDP by Income Type

The income side of the GDP can be divided into five major components: employee

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[1] We would like to thank Frank de Leeuw for his comments on earlier versions of this report; Dyan Pramono and Uzair Suhaimi for their invaluable insight and suggestions in areas of their extensive expertise; and Aden Gultom, Emil Azman and Wiwiek Arumwaty for their assistance in providing data and in explaining the strengths and weaknesses of these data.

[2] For a more detailed discussion of definitions and accounting treatment, see *System of National Accounts 1993*, chapters VII and VIII--pp. 157-202.

compensation, property income, mixed income, net taxes on production and consumption of fixed capital. In what follows, we will discuss briefly what these components cover.

1. Employee Compensation

Employee compensation includes:

- Wages and salaries, including cash bonuses, commissions etc.
- Supplements to labor income, e.g. employer contributions to social security, employee welfare funds and direct pension payments to retired employees.
- Compensation in kind, e.g. maintenance allowances, health and educational services etc.

2. Property Income

Property income (or capital income) includes:

- Dividends
- Undistributed profits of private corporations before taxes
- Interest on bonds, mortgages, and savings deposits
- Interest earned by insurance companies and credited to the insurance policy reserves
- Net interest paid out by commercial banks
- Net rents from land, buildings, etc., including imputed net rents on owner-occupied dwellings
- Royalties
- Profits of government enterprises.

3. Mixed Income

Mixed income (or operating surplus) includes:

- Earnings of the self-employed, whether taken in cash or retained in the enterprise (often referred to as "profits of unincorporated enterprises")
- Incomes of the self-employed in kind (e.g. farm products consumed on the farm, services of farm dwellings).

4. Taxes on Production (less subsidies)

Taxes are compulsory payments, in cash or in kind, made by institutional units to government units. Taxes covered in this category include those payable on goods and services when they are produced, delivered, sold, transferred or otherwise disposed of by their producers.[3] In addition to sales and value-added taxes, these include:

- taxes and duties on imports that become payable when goods enter the economic territory of a country by crossing the frontier or when services are delivered to resident units by non-resident units.

- taxes on the ownership or use of land, buildings or other assets used in production or on the labor employed, or compensation of employees paid.

Subsidies are current transfer payments that govemment units (including non-resident units) make to enterprises on the basis of the levels of their production activities or of the quantities or values of the goods or services which they produce, sell or import.[4]

5. Consumption of Fixed Capital

Consumption of fixed capital (or depreciation) measures the degree to which the country's stock of fixed capital assets is used up. It is not measured directly. Rather, it is estimated indirectly based on the estimated level and composition of the capital stock.

B. Disposable Income

Disposable income is the balancing item in what is referred to in the 1993 SNA as the "secondary distribution of income account." It is derived from the sum of the five components of GDP discussed in the previous section (referred to in the 1993 SNA as the "primary distribution of income account"), by further:

- Adding all current transfers (except social transfers in kind), employee compensation and property income, received from the rest of the world, and

- Subtracting all current transfers (except social transfers in kind), employee

---

[3] Taxes on production do not include income (or some property) taxes. The reason that production taxes are included is that businesses report earnings and profits after paying production taxes and before paying income (or some property) taxes. Including production taxes is necessary to make total income equal to total final expenditures at market prices.

[4] The subtraction of subsidies, like the addition of production taxes, is necessary to make total income equal to total expenditures at market prices.

compensation and property income, paid to the rest of the world.

Disposable income, like the balance of primary incomes, may be recorded gross or net of consumption of fixed capital.

C. Sectors of the Economy

Each of the income components can be defined and measured separately for major sectors of the economy: namely, financial corporations, government, public enterprises, private nonfinancial corporations, and households.[5] Thus, employee compensation consists of the sum of employee compensation in each of the five sectors. Separation by sector is useful for analyzing economic developments and is necessary to make use of the diverse data sources available for particular sectors.

III. METHODOLOGY

Estimates of income accounts for Indonesia require the use of a substantial number of data sources of varying frequency, coverage and quality. Table 1 summarizes the major data sources for each income component (the rows of the table) and for each sector of the economy (the columns of the table).

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[5] The 1993 SNA includes an additional sector: non-profit institutions serving households (NPISH). This covers non-profit institutions which "provide goods or services to households free or at prices that are not economically significant" (*System of National Accounts 1993*, IV.B.5 paragraph 4.64, p. 95). They include two main types of institutions: one consisting of those created by households for the provision of such services and the other consisting of charities and relief organizations. As it is difficult in Indonesia to separately account for activities of these institutions and of those of households, activities of both are included in what we refer to in this report as the "household" sector.

Table 1
GDP by Income and Sector: Data Sources

Income Type	Financial Sector (A)	Government (B)	Public Enterprises (C)	Private Non-Financial Corporations (D)	Households (E)	Total (F)
1. Employee Compensation	IO	Budget	Financials	HR	--	HHA
2. Property Income	VR	Budget	Financials	HR	HHA	HHA
3. Net Taxes on Production	IO	--	Financials	HR	--	IO
4. Consumption of fixed	IO	IO	Financials	HR	HHA	IO
5. Mixed Income	--	--	--	HR	HHA	VR
6. GDP	IO	CS	CS	HR	CS	IO

Notes:
IO: Input-Output table
Budget: Government budget
Financials: official financial statements of public enterprises
HR: Horizontal residual
VR: Vertical residual
CS: Column sum
HHA: derived from the reconciliation tables underlying the household sector account
"–": not applicable

This table reflects the procedure used in computing figures for 2000, a year for which an input-output (IO) table is currently being constructed by BPS. The input-output table draws on a large number of data sources for computing income estimates and checking their plausibility. Computations for other years were done at more aggregated levels given that detailed relevant tabulations were not available.

Let us now turn to the data sources consulted for filling various cells in the matrix (Table 1) for the estimation of figures for 2000. Cells in that matrix include a one-word summary description of the main source of data used for computing it. For ease of reference in the text, columns in the table have been labeled A through F and rows have been assigned numbers.

A. Computations for 2000

1. Financial Sector

This sector includes four broad categories of institutions: the central bank, commercial banks, insurance companies and non-bank financial institutions.

Employee Compensation

Total employee compensation (A1) was obtained from the IO table.[6]

---

[6] Row 201 (*upah dan gaji*) and columns 157 (*bank dan lembaga keuangan lainnya*) and 158 (*asuransi*).

Property Income
This item (A2) was derived as a column residual.

Net Taxes on Production
This item (A3) was also derived from the IO table, row 204 (*pajak tidak langsung*).

Consumption of Fixed Capital
This item (A4) was also derived from the IO table, row 203 (*penyusutan*). It is probably understated, because it is based on the historical cost of structures and machinery rather than on the conceptually correct (but extremely difficult to measure) current replacement cost. Understatement of this component will be matched by overstatement of property income.

Mixed Income
Mixed income is assumed to be zero for the financial sector.

GDP
This item (A6) was derived from the IO table, row 209 (*nilai tambah bruto*) and columns 157 (*bank dan lembaga keuangan lainnya*) and 158 (*asuransi*).

2. Government

This sector includes central, provincial, district/regency (*kabupaten/kota*), sub-district (*kecamatan*) as well as village (*desa*) governments. Central Government figures for all items in this column were obtained from actual expenditure accounts obtained regularly from the Ministry of Finance. Expenditure by governments at other levels were obtained from the annual BPS surveys of local authorities (*Statistik Keuangan Pemerintah Tingkat I, Statistik Keuangan Pemerintah Tingkat II and Statistik Keuangan Desa*).

Employee Compensation
Item B.1 and its components were derived from the corresponding budget categories in the "Personnel Expenditures" (*belanja pegawai*) of the routine and development components of the budget.

Property Income
Government is assumed to have no property income, so item B.2 is zero.

Net Taxes on Production
Government of course receives taxes and pays subsidies. However, the inclusion of these items

as income components, as explained earlier, is an adjustment to *business income* necessary to make total income equal to GDP expenditures at market prices. For the government sector, therefore, item B.3 is zero.

Consumption of Fixed Capital

This item (B4) was derived from the IO table, row 203 (*penyusutan*) and columns 161 (*jasa pemerintahan umum*), 162 (*jasa pendidikan pemerintahan*), 163 (*jasa kesehatan pemerintahan*) and 164 (*jasa pemerintahan lainnya*).

Mixed Income

By definition, the government has no mixed income, so item B5 is zero.

GDP

This item (B.6) is calculated as the sum of all items in column B.

3. Public Enterprises

This sector includes all enterprises over which the government (represented by the Ministry of Finance or other ministries such as Oil and Mining, Industry and Trade) has actual control, and which cover a substantial portion of their costs through charges for the goods and services they provide. This covers enterprises fully owned by the government (e.g. Pertamina) as well as those partially owned. They are referred to in Indonesian as BUMN (*Badan Usaha Milik Negara*). All items under column C were derived from the annual financial statements reported by these enterprises to the Ministry of Finance and provided to BPS in its annual survey of these enterprises (*Survei BUMN*). The latest available data were for 1999.[7] The 2000 estimates used the projected 1999-2000 trend in a special report on "Trend of Productivity of Government Enterprises: 1997-2001" produced by the Ministry of Finance.

The column entries are then summed up to provide the total GDP for the column (item C.6).[8]

4. Private Non-Financial Corporations

This sector covers private enterprises in all sectors of the economy other than finance. However, it does not include enterprises under the direct control of households, such as family farms or domestic service. Income of these enterprises is included in the household sector.

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[7] The 1999 survey included 155 out of a total of 177 such enterprises. In 2000 there were 188 enterprises.

[8] Mixed income for these enterprises (item C5) is assumed to be zero.

All categories in the non-financial corporations sector (items D.1 - D.6) are calculated as row residuals.

5. Households

Conceptually, this sector is supposed to cover all households engaged in a production activity of goods and services for sale as well as for own consumption. This is supposed to include all of what is often referred to as "informal" sector activities in agriculture, quarrying, manufacturing, construction, trade, transportation and other services. Given the lack of data measuring directly these various activities, we have relied on several sources used within BPS for compiling the Household Sector Account used in constructing the Social Accounting Matrix (SAM), which forces consistency among various production and institutional accounts.

Compilation of the Household Sector Account involves the construction of three T-accounts:

- **the household production account**: this reconciles household credits (from production) on one side and debits on the other (including cost of production, depreciation and mixed income–the latter being a residual)

- **the household income and outlay account**: this also reconciles household credits (wages, mixed income, transfers in) and debits (final consumption, transfers out and savings–the latter being a residual)

- **the household accumulation account**: this also reconciles household credits (savings, depreciation and net capital transfer–the latter being a residual) and debits (change in stock, capital formation and net borrowing).

Building such accounts is very time-consuming and involves using data from many different sources with varying degrees of quality and frequency. This report will not attempt to document this process. Suffice it to say that the outcome of this exercise is a consistent set of accounts which describes the behavior of households as an institutional sector. Three items in column E of Table 1 rely on these calculations: items E.2, E.4 and E.5. Total GDP attributed to the household sector (item E6) is then calculated as the sum of these three entries. In addition, supplementary tables involved in constructing the household accounts yield estimates of two other items, as noted below: total employee compensation (F1) and total property income (F2).

6. Total

Employee Compensation

Item F1 is obtained from the Income and Outlay T-account of the Household Sector Account. The

main data source was a survey conducted intermittently since 1990 called *Survei Khusus Tabungan dan Investasi Rumah Tangga* (SKTIR). This survey, which covers a sub-sample of households in the much larger socio-economic survey (Susenas),[9] asks households to provide a detailed breakdown of what amounts to their financial statements (profit and loss, balance sheet and funds flow). The aggregate level of compensation provided by this survey was more plausible than that provided by the annual labor force survey Sakernas (see Appendix B for a discussion of differences between the two sources).[10]

Property Income

Item F2 is also obtained from the Income and Outlay T-account of the Household Sector Account.

Net Taxes on Production

In our first attempt, this item (F3) was derived from the IO table, row 204 (*pajak tidak langsung*). However, upon comparing resulting shares[11] with those of the historical series, this item was recalculated. We took its share in GDP for 2000 as the average share displayed in previous input-output years, which turned out to be 5.6%, instead of the -2.7% derived from the preliminary version of the 2000 IO table.[12]

Consumption of Fixed Capital

This item (F4) was derived from the IO table, row 203 (*penyusutan*). It is probably understated because, as noted for the financial sector, it is based on historical cost rather than replacement cost. Generally, understatement of this component will be matched by overstatement of property income.

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9 SKTIR has typically covered about 5000 households versus 60,000 for Susenas.

10 Another important data source covering this component was the 2000 IO table (covering 172 sectors), which has not yet been published by BPS. The relevant row in that table was 201 (*upah dan gaji*). However, the level obtained from the preliminary version of the table was lower than that in the SKTIR. The latter source, in our judgement, is more plausible. Discussions within BPS to reconcile these two sources are currently under way. We believe that the final version of the 2000 IO table will have a level consistent with that of SKTIR.

11 for both this variable and the consequent effect on the residual (mixed income)

12 Our implicit assumption in doing so is that we believe that the financial figures reported in the documents used in compiling the 2000 IO table under-report the true level for this item by overstating the level of relevant subsidies (e.g. by possibly including those not related to the establishments' production activities), understating the actual taxes collected for the year (e.g. by possibly delaying collection) or both. We believe that this is the best that can be done given the time constraint we had. Our main recommendation to BPS in this regard is to investigate this issue further before the 2000 IO table is finalized. The final results may well confirm that the actual share was -2.7%. However, until a more in-depth investigation confirms it, we believe that our estimate is more plausible.

Mixed Income

This item (F5) was calculated as a column residual.

GDP

This item (F6) provides the control total of all entries in the table. It was obtained from the IO table, row 209 (*nilai tambah bruto*).

B. Computations for 1990-1999

Given the lack of relevant data sources, computations for 1990-1999 differed from those of 2000 in that no breakdown by institutional sector was done (i.e. by various columns in Table 1).

1. GDP

Annual total GDP was obtained as the sum of benchmarked sub-sectoral production accounts. Annual series for the 43 sub-sectoral accounts were benchmarked to their corresponding levels in the 1990, 1995 and 2000 IO tables.[13]

2. Employee Compensation

In measuring total employee compensation during the 1990-2000 period, we attempted to use results from the large annual labor force survey (Sakernas). However, as stated earlier (and discussed in Appendix B), the levels derived from that survey were not plausible. Our methodology for estimating the annual levels of employee compensation followed two steps:

- First, the 2000 *level* from SKTIR was taken because of its higher plausibility
- Then the annual wage *growth* from Sakernas (between 1990 and 2000) was applied to that level.

3. Property Income

Figures during IO years (whether regular or estimated tables)[14] were obtained

---

13 This was part of a statistical revision of the historical series currently underway in BPS, which will be documented in a forthcoming internal report.

14 The 1990, 1995 and 2000 IO tables were regular tables based largely on new data. Those of 1993 and 1998 were estimated tables following what BPS refers to as a "modified RAS" method. That is, the coefficients of the previous table were used and applied to new totals then the RAS raking method was applied. When reliable data for particular cells were available, they were used. However, such "modifications" were usually limited.

from compiled Social Accounting Matrices (SAM). The SAM computes factor income for two broad categories (labor[15] and non-labor) with each in turn divided into different sub-categories. For non-labor income, the two sub-categories are: incorporated and non-incorporated (mainly informal) institutions. The property income component was calculated as the sum of the following items:

- rentals for agricultural land (non-incorporated institutions)[16]
- imputed rents for owner occupied dwellings[17]
- capital income of private domestic corporations[18]
- capital income of government institutions[19]
- capital income of foreign corporations[20]

For years between IO tables, figures were interpolated.

4. Net Taxes on Production

Figures for 1990, 1993, 1995 and 1998 were obtained from the corresponding IO tables. For years in between, figures were interpolated.

5. Consumption of Fixed Capital

Figures for 1990, 1993, 1995 and 1998 were obtained from the corresponding IO tables. For years in between, figures were interpolated.

6. Mixed Income

This was calculated as a residual.

IV. RESULTS

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15 Values for actual paid labor income in the SAMs are the same as those in the corresponding IO tables.

16 Code 17 (*Usaha tidak berbadan hukum: Tanah, modal pertanian lainnya*)

17 Code 18 (*Usaha tidak berbadan hukum: Rumah ditempati pemilik*)

18 Code 21 (*Usaha berbadan hukum: Modal swasta dalam negeri*)

19 Code 22 (*Usaha berbadan hukum: Modal pemerintah*)

20 Code 23 (*Usaha berbadan hukum: Modal asing*)

Results of the above computations for Indonesia's GDP by income type for the 1990-2000 period are provided in the following series of tables and graphs: Table 2 and Figure 1 show levels for the main aggregates, Table 3 shows the level of disposable income and Table 4 and Figure 2 show the relative shares of various income components in GDP.

Table 2
Indonesian GDP by Type of Income 1990-2000 at Current Market Prices (trillion rupiah)

Component	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Employee Compensation	68	83	98	128	156	187	219	269	298	373	470
Property Income	71	80	91	103	130	163	229	321	450	459	469
Mixed Income	44	59	76	89	97	118	93	47	190	185	260
Net Taxes on Production	12	15	18	22	27	32	37	43	50	83	78
Consumption of Fixed Capital	15	18	22	25	33	43	54	68	85	97	109
GDP	211	256	305	368	443	543	633	748	1072	1197	1386

Table 3
Indonesian Disposable Income 1990-2000 at Current Market Prices (trillion rupiah)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP	211	256	305	368	443	543	633	748	1072	1197	1386
Net Factor Income from Abroad	-10	-11	-12	-13	-14	-13	-14	-18	-54	-79	-89
Disposable Income	201	245	292	356	428	529	618	729	1018	1118	1297

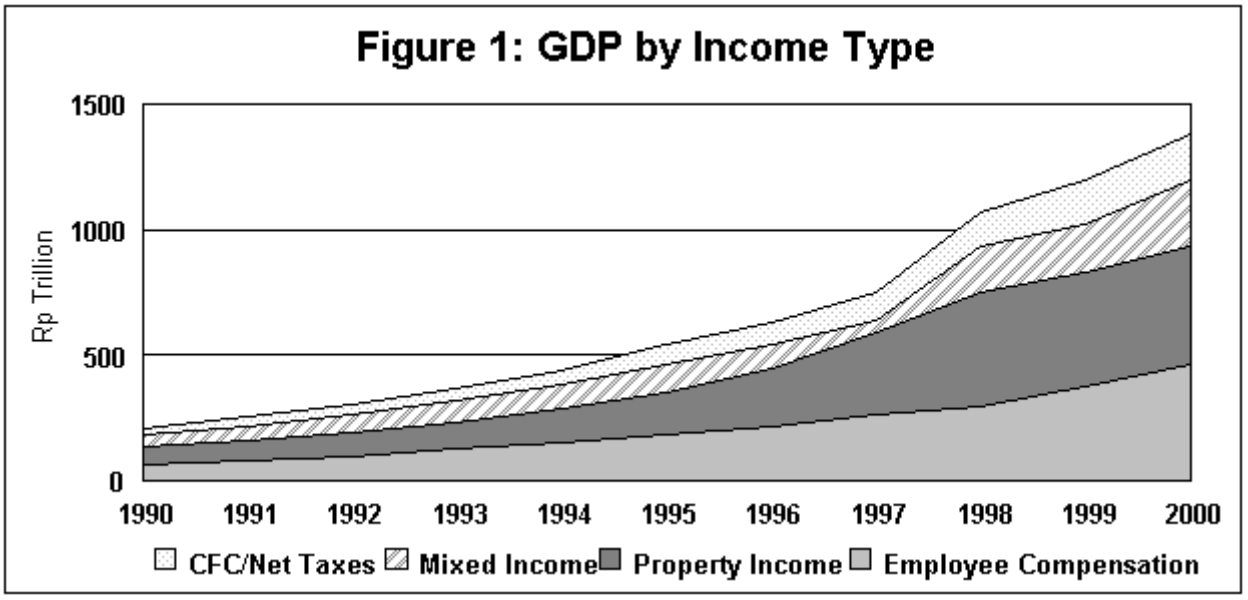
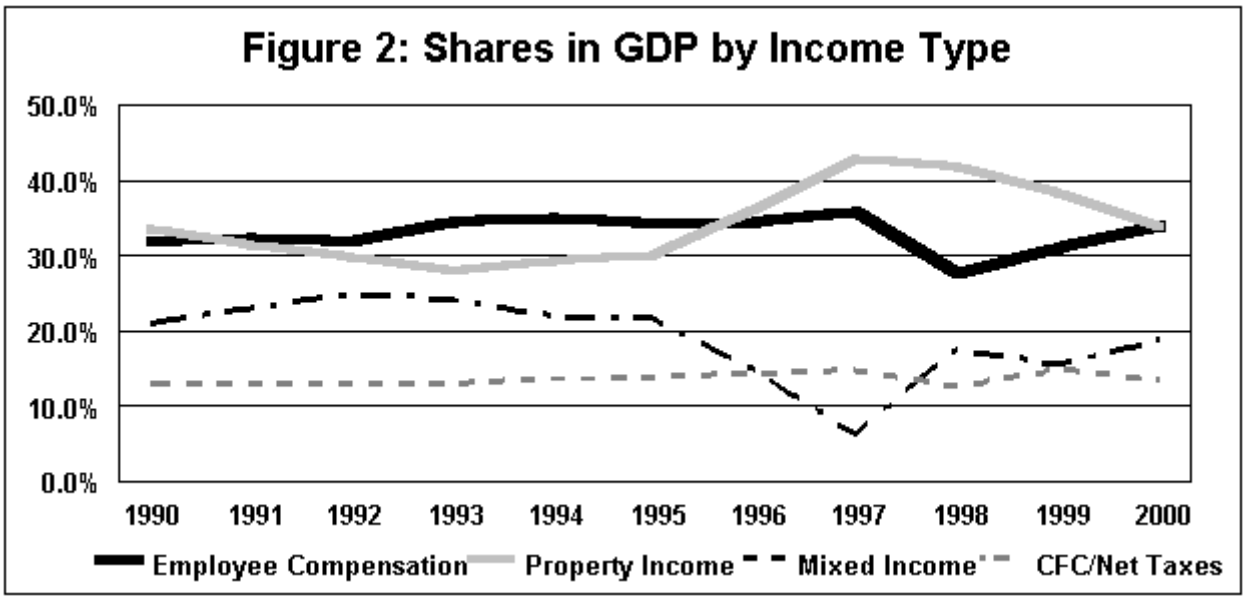


Table 4
Indonesian GDP by Type of Income 1990-2000 at Current Market Prices (percentage shares)

Component	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Employee Compensation	32.1	32.6	32.1	34.9	35.2	34.4	34.7	35.9	27.7	31.2	33.9
Property Income	33.7	31.4	29.9	28.0	29.3	30.0	36.2	42.9	41.9	38.4	33.9
Mixed Income	21.1	23.0	25.0	24.2	22.0	21.7	14.7	6.3	17.7	15.5	18.7
Net Taxes on Production	5.8	5.9	6.0	6.1	6.0	5.9	5.8	5.7	4.7	6.9	5.6
Consumption of Fixed Capital	7.3	7.1	7.1	6.9	7.5	8.0	8.6	9.1	8.0	8.1	7.9
GDP	100	100	100	100	100	100	100	100	100	100	100



The following observations are worth noting:

- The (combined) contribution of consumption of fixed capital and net indirect taxes has remained more or less the same over time at about 13-15%

- The share of employee compensation has also remained more or less the same over the period (around 32%-35%). The only exception was 1998, which showed a decline of over eight percentage points that was quickly restored to the historical norm in the following years.

- The behavior of property income was different: starting with roughly the same share as employee compensation in 1990, that share declined slightly through 1995, then rose sharply in 1996 and 1997 only to decline gradually to the same share as employee compensation in 2000.

- The behavior of mixed income is a bit problematic and should be interpreted with great caution. As a residual, this variable incorporates the cumulative effect of errors in measuring all other variables. It is thus not advisable to read too much into its behavior.

How do the shares for Indonesia compare with those from other countries? In our attempt to obtain comparative income account shares with various countries, we wanted to do two levels of comparisons: first with other developing countries at more or less the same stage of development as Indonesia (and preferably in the same geographical region); and secondly with other more developed countries with indications of changes in these shares over time (with preferably a time when the structure of their economy would conceivably be closer to that of present day Indonesia). We could not find data on the first category of countries.[21] As for other developed countries, Tables 5-8 provide selected comparative shares for four such countries: the US, Canada, the Netherlands and Australia.

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21 The exception was Taiwan, but the only document that was available dates back to 1981. The following table provides these numbers.

Percentage Shares of GDP by Type of Income in Taiwan

Component	1965	1970	1975	1980
Employee Compensation	39.5	41.9	45.9	47.7
Property Income[1)]	23.1	25.7	24.8	25.7
Consumption of fixed capital	6.3	6.8	7.0	7.4
Taxes on Production (net of subsidies)	12.8	14.8	14.5	14.7
Other income[2)]	18.3	10.8	7.8	4.6
GDP	100	100	100	100

1) sum of "income from property", "profit of government enterprises" and "savings of public corporations."
2) "compound income", which includes "income from firms, professionals and other unincorporated enterprises."
Source: Directorate General of Budget, Accounting and Statistics, Executive Yuan, *National Income of the Republic of China*, December, 1981, Tables 1 (pp. 90-91) and 2 (pp. 114-115).

Table 5
Percentage Shares of GDP by Type of Income in the US

Component	1980	1985	1990	1995	2000
Employee Compensation	59.1	57.6	57.7	56.8	58.3
Consumption of Fixed Capital	12.3	12.3	12.3	12.3	12.5
Taxes on Production (net of subsidies)	7.1	7.3	7.3	7.7	7.3
Other income[1)]	21.5	22.8	22.7	23.2	21.9
GDP	100	100	100	100	100

1) computed in this table as a residual.
Source: figures obtained from Tables 1.1., 1.09 and 1.14, Bureau of Economic Analysis.

Table 6
Percentage Shares of GDP by Type of Income in Canada

Component	1980	1985	1990	1995	2000
Employee Compensation	57.0	53.9	55.6	51.6	50.8
Property Income[1)]	20.3	19.4	15.9	16.8	18.4
Consumption of fixed capital	12.0	11.7	11.7	12.9	12.7
Taxes on Production (net of subsidies)	9.7	9.9	11.5	13.2	11.0
Other income[2)]	1.0	5.2	5.3	5.5	7.0
GDP	100	100	100	100	100

1) sum of: "corporate profits before taxes," "government business enterprise profits before taxes," "interest and miscellaneous investment income," and "accrued net income of farm operators from farm production."
2) computed in this table as a residual
Source: figures obtained from Statistics Canada, *National Income and Expenditure Accounts, Annual Estimates* [for various years], Table 1, Catalogues no. 13-201, 13-201-XPB and 13-001. Note that concepts and computations may have changed over the period.

Table 7
Percentage Shares of GDP by Type of Income in the Netherlands

Component	1980	1986	1990	1995	2000
Employee Compensation	58.8	52.9	51.6	50.9	51.1
Consumption of fixed capital	9.6	11.3	15.4	15.1	15.2
Taxes on Production (net of subsidies)	9.5	9.0	8.5	10.2	11.2
Other Income[1)]	22.1	26.8	24.5	23.8	22.5
GDP	100	100	100	100	100

1) computed in this table as a residual.
Source: figures since 1990 (in euros) were downloaded from the Statistics Netherlands website. Figures for the prior period (in gld) were obtained from Statistics Netherlands, *National Accounts 1994*, Table M5.

Table 8
Percentage Shares of GDP by Type of Income in Australia

Component	1989-90	1994-95	1999-2000
Employee Compensation[1)]	49.2	49.3	48.0
Taxes on Production (net of subsidies)	12.0	12.3	11.6
Other income[2)]	38.8	38.4	40.3
GDP	100	100	100

1) "wages and salaries and supplements"
2) computed in this table as a residual
Source: figures before 1999-2000 were obtained from W. McLennan, *Measuring Australia's Economy*, Fourth Edition, Australian Bureau of Statistics, 1996. For 1999-2000, they were derived from Australian Bureau of Statistics, *National Income, Expenditure and Product*, March Quarter 2002.

So overall, we believe that the figures produced in this report for Indonesia are plausible.

What next? The methodology described in this report provides a good starting point for computation of annual income accounts for Indonesia. Our recommended course of action is for BPS to evaluate these figures and disseminate them to users for their feedback. Annual updates of these accounts can be produced with existing data sources by following the same methodology documented in this report. In cases where data sources used for annual updates are weak, BPS may want to develop new sources which will provide more reliable numbers. The focus, however, should remain on producing these accounts annually, since this is the coverage of the underlying basic data sources. Temptations to produce quarterly accounts should be resisted at least until enough confidence has been built in the annual accounts by having them produced regularly over several years.

APPENDIX A
INCOME ACCOUNTS FOR 2000 BY INSTITUTIONAL SECTOR

As mentioned in Section III, computation of income accounts for 2000 was done by institutional sector. Table A.1 presents these results.

Table A.1
GDP in 2000 by Income and Sector at Current Market Prices
(trillion rupiah)

Income Type	Financial Sector	Government	Public Enterprises	Private Non-Financial Corporations	Households	Total
1.Employee Compensation	14.11	66.15	13.34	376.63		470
2.Property Income	18.78		37.04	386.28	27.06	469
3.Mixed Income				149.46	110.18	260
4.Net taxes on production	0.43		0.03	77.16		78
5.Cons. of fixed capital	1.57	3.31	28.72	64.89	10.80	109
6. GDP	34.9	69.5	79.1	1054.4	148.0	1386

We attempted a further breakdown (by institutional sector) of:

- Employee compensation into three components: wages and salaries, fringes and income in kind

- Property income into five components: profits, interest, dividends, royalties and rentals.

However, available data at the time of writeup of this report did not permit coverage of enough cells in the matrix to enable production of consistent and plausible figures. Serious gaps remained which required further investigation before figures could be adopted.

APPENDIX B
EMPLOYEE COMPENSATION USING SAKERNAS

As mentioned in Section III.A, in measuring total employee compensation we attempted to use results from the large annual labor force survey (Sakernas). However, the levels derived from that survey were less plausible than those obtained from the source we finally settled on, the SKTIR.[22] Table B.1 provides the basic historical data obtained from Sakernas.

Table B.1
Employment and Nominal Wages Derived from Sakernas

Description	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Employment											
Level (000)	21077	22374	23023	24457	27063	28008	28952	30489	28806	29384	29498
Growth (%)		6.2	2.9	6.2	10.7	3.5	3.4	5.3	-5.5	2.0	0.4
Annual Wages											
Level (trillion Rp)	22.2	27.3	32.0	42.1	51.1	61.2	72.0	88.1	97.6	122.3	154.2
Growth (%)		22.9	17.4	31.5	21.2	19.9	17.6	22.4	10.8	25.4	26.0

Sources: various years' issues of two BPS publications, employment figures were derived from *Labor Force Situation in Indonesia*, and wage figures were based on data in *Laborers/Employees Situation in Indonesia.*

A wage bill of 154 trillion rupiah in 2000 is highly implausible, as it indicates a share of this variable in GDP of only 11%, particularly when compared with the more plausible 34% obtained from SKTIR. The same applies to other years as well. Why are Sakernas levels consistently lower than expected? Some possible reasons may include:

- coverage: by following the standard labor force approach, Sakernas is limited to covering only persons aged 15 years and older, and reporting wages for only those that were employed in the week prior to enumeration, which took place in August in the past few years. SKTIR, on the other hand, includes any household member who had been paid a wage in the previous year. Thus, wages for household members younger than 15 who had worked for pay, and for those who had worked during the year but not during the week prior to enumeration, would be included in

[22] One needs to keep in mind that SKTIR is not a labor force survey. It was not designed to measure aggregate employee compensation in the economy according to the standard labor force approach, but rather to provide a breakdown of household saving and investment. The aggregate level of employee compensation in that survey, which we used for 2000, was computed by multiplying the average ratio of compensation to final consumption (derived from the household Income and Outlay T-account constructed from data obtained from respondents to the survey) and the level of household final consumption expenditure in the IO table. For non-IO years, SKTIR applies the average ratio for a particular year to the level of final consumption expenditure in the GDP.

SKTIR but not in Sakernas.

- period: Sakernas asks for wages paid to the individual during the month prior to enumeration, which covers July in the past years.[23] SKTIR asks individuals to report any wages paid during the previous year. Thus if reported wages in July were not typical of those earned during the year, figures from the two sources may differ.

- activity: Sakernas asks for wages only from the "primary activity," whereas SKTIR enquires about wages from all activities. The true wage level of households engaging in multiple activities would thus be under-reported in Sakernas.

- net vs gross: Sakernas asks for wages after taxes (and other compulsory deductible fees), whereas SKTIR asks for gross wages before taxes.

All these reasons may have contributed to producing what we believe is an implausibly low level for wages and salaries for the nation as a whole in Sakernas. There may well be other more important factors at play. Measurement of the magnitude of these (or other) factors is beyond the scope of the present paper. The methodology that we finally adopted for estimating the annual levels of employee compensation followed two steps:

- First, the 2000 *level* from SKTIR was taken because of its higher plausibility

- Then the annual wage *growth* from Sakernas was applied to that level. We believe that while the aggregate level of wages derived from Sakernas may have been under-estimated, annual growth in wages is highly plausible given that Sakernas was designed to provide an adequate measure of growth from year to year.

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[23] Annual wage figures in Table B.1 are based on published monthly numbers.