UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

ECE/CES/GE.20/2006/6
9 February 2006

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE **STATISTICAL COMMISSION**

CONFERENCE OF EUROPEAN STATISTICIANS

Group of Experts on National Accounts

Eighth Meeting
Geneva, 25-28 April 2006
Item 6 of the provisional agenda

PROBLEMS OF MEASUREMENT AND ANALYSIS IN THE NATIONAL ACCOUNTS UNDER RAPIDLY GROWING GLOBALIZATION[1]

Submitted by Central Bureau of Statistics Israel

The meeting is organised jointly with Eurostat and the Organization for Economic Co-operation and Development

1. Due to rapidly growing globalization of production, expanding trade in services, performance of international transactions and flow of information over the internet, important problems of measurement and analysis in the national accounts have emerged in recent years. The registration of the transactions between the countries involved may be complicated and inconsistent, impairing the quality of the balance of payments and national accounts data. The preparation of input-output tables, estimation of series at constant prices, and growth and productivity measures may be affected, so that economic analysis becomes flawed.

2. Among the issues that have gained prominence are growing flows of services and transactions that are not covered by existing surveys and administrative data, joint international

[1] This paper has been prepared by Soli Peleg and Shimon Arieli at the invitation of the secretariat.

production, outsourcing across borders, and complicated transactions such as those linked to mergers and swaps of stocks.

3. International recommendations for coverage and methods of measurement currently do not give satisfactory solutions to many of these problems.

4. Israel has experienced such difficulties for a number of years, and therefore solutions have been sought. Below some of the problems encountered are described, and a few possible solutions are suggested.

FLOWS OF SERVICES AND INTANGIBLES NOT COVERED BY EXISTING DATA COLLECTION

5. The general problem of coverage of flows of services and intangibles in the balance of payment and national accounts is well known in many countries. In Israel the problem seems important, since there has been a relatively fast change in the industry structure towards a larger share of production and foreign trade in services and intangibles. Table 1 below shows the growth in the service industries and exports of services since 1995.

Table 1. Value added of service industries and exports of services

Billion $ at 2000 prices

	Value added of service industries in the business sector	Exports of services
1995	33.5	8.3
1996	35.8	8.3
1997	36.4	8.9
1998	39.1	9.8
1999	41.7	11.9
2000	46.5	14.7
2001	46.0	12.1
2002	45.3	11.4
2003	45.6	13.0
2004	48.5	15.7

6. In the past international flows of services and intangibles were monitored through the banking data, since flows of foreign currency were controlled by the Central Bank, and detailed information on transactions was recorded by banks. However, after the control of foreign currency has been abandoned, the banking data may not cover all transactions – firms may choose to leave foreign currency abroad, so that only net flows are included, and classification of flows may be less reliable, since they are not needed for the control of currency flows or other administrative purposes. To improve measurement, banking data have gradually been supplemented and compared with alternative data sources at the Central Bureau of Statistics Israel (ICBS). An example of this is revenue data from exports by industry collected from the VAT authorities. These data are classified at the ICBS using the business register. They are linked to customs data on trade in goods and compared to the banking data in order to improve their classification and coverage. A special survey on foreign transactions in services has also been started recently, and the intention is to perform regular surveys in the future.

7. As more data become available and comparisons between various data sources are made, problems with the existing data sources become evident, and some special treatments have been developed. Three such special treatments are outlined in the next paragraphs.

JOINT PRODUCTION ACROSS BORDERS

8. Since the 1990's there has been a fast growth of subsidiaries of foreign corporations or branches of multinational enterprises within Israel that engage in joint production across borders. For example, many large international computing and software enterprises have opened R&D centers in Israel. Many international semiconductor corporations are also active in Israel.

9. On the other hand, Israeli firms have acquired firms or opened new subsidiaries abroad and engaged in joint production with these enterprises.

10. An impression of the growth of such links may be gained from the growth in international direct investment in recent years shown in Table 2 overleaf.

11. Since an important part of the production of many foreign affiliated units in Israel is R&D, software and support services, which can be transferred abroad over the Internet or telephone, the measurement of activities in these units is quite complicated. The transfer of output to the parent enterprises abroad may not be registered, due to its intangible nature. Even if the transfer of output is registered, it may be valued at cost or at "transfer" prices and not at market value as required in SNA.

12. Until recently the source of information for transactions between the linked enterprises was mostly the banking data mentioned above. For foreign affiliated units in Israel the only transactions covered in the balance of payments were, in practice, the transfer of money from the parent enterprise abroad to finance compensation of employees in the domestic enterprise. In the past such transactions were often registered as income and not as sales of output, and usually did not include a mark-up.

Table 2. Foreign direct investment in Israel

US$ millions

End of year	Direct foreign investments in Israel	Direct Investments abroad
1996	7,096	3,283
1997	9,566	5,223
1998	11,913	5,376
1999	18,658	6,283
2000	22,562	9,091
2001	23,896	9,249
2002	23,691	10,319
2003	30,265	13,064
2004	32,168	16,135

13. In order to improve the measurement, banking data have gradually been replaced by enterprise data collected from financial reports or in surveys, which often involve visits at the enterprises or personal telephone interviews, due to the complicated nature of the transactions. Data collected so far indicate that enterprises include the minimum mark-up required by the tax authorities in the countries involved. For example, Israeli enterprises affiliated with US enterprises include a mark-up as dictated by the IRS in USA, in the value of their production in their financial reports.

14. However, since the enterprises engage in joint production, it would seem important that the market value of the production should be divided between the enterprises, in a manner that reflects their part in the joint production adequately.

15. One important step is to separate enterprises that engage in a joint international production from other enterprises, since their structure and production methods necessarily will be different from those of other enterprises, and analysis of production in the economy will be affected. The ICBS has started collecting data from multinational enterprises (MNE's) according to the guidelines in the Handbook on Economic Globalization Indicators published in 2005 by OECD, and the first results have been published in January 2006. The results of the survey may be used to separate the firms engaged in joint production. The survey covers MNE's, where the parent enterprises are abroad (IN), and MNE's with parent enterprises in Israel (OUT), and the variables included are relevant for the analysis of production of such enterprises. However, the coverage recommended in the Manual is not sufficient to give a full picture of the joint activities,

since the data for IN MNE's only cover the data available from the domestic affiliate. The data also suffer from the deficiencies mentioned above – use of "transfer prices" and lack of information on the market value of parts in joint production. The data for MNE's with parent enterprises in Israel in Table 3 below indicate a significant amount of joint activities.

Table 3. Multinational Enterprises with a parent company based in Israel (OUT)

Billion $

	Total sales	Thereof: sales from Israel (not including exports to affiliates)	Exports from Israel to affiliates abroad
2002	24.7	9.7	3.9
2003	27.8	10.5	4.1

16. It might be possible to further improve the estimates by combining and analyzing domestic data together with data on enterprises that engage in joint production collected abroad.

17. If it is not possible to obtain adequate data on the share of the domestic economy in a joint international production, it might at least be useful to have figures on gross joint international production. Such information could be published in all countries involved, together with the partial data available on their share, in order to give the best information available to the users.

OUTSOURCING ACROSS BORDERS

18. Outsourcing across borders has been known in Israel for many years. In the first years the textile and clothing industries were the main industries outsourcing parts of the manufacturing to enterprises across borders. However, in recent years the use of outsourcing abroad has spread rapidly, and today a significant part of manufacturing of textile and clothes is outsourced abroad. Outsourcing has also become increasingly common in other industries such as the semiconductor and the diamond industries.

19. In the first years, the problems with registering flows of processed goods across borders and analyzing production processes were noticed, but since the size of the problem was relatively minor, no special measures were taken. However, as outsourcing has become common and many enterprises with full outsourcing of processing (so called fabless enterprises) have been established, problems have become so important that solutions for measurement and analysis had to be found. The solution found for fabless enterprises described below, which has also been presented to a forum on international trade at the OECD (Arieli, Peleg 2005), is also relevant for enterprises with partial outsourcing.

FABLESS ENTERPRISES

20. The increasing use of outsourcing has led to the establishment of enterprises that are full-fledged outsourcers – that is, all processing is outsourced, and what is left is called a fabless enterprise. Such outsourcing has been especially common for enterprises engaging in semiconductor development (hence the word “fabless”, coming from computer enterprises having “fab”s), but it is by no means confined to the semiconductor or electronics industry.

21. The partial data on fabless enterprises in the semiconductor industry collected for the balance of payment in Israel indicate the fast growth of such enterprises (see Table 4).

Table 4. Exports of fabless companies from the semiconductor industry in Israel

US$ millions

	Gross revenues from sales abroad	Net revenues from sales abroad
2001	380.0	131.1
2002	510.5	176.1
2003	612.6	211.3
2004	752.1	259.4

22. In most cases the final product is sent directly from the sub-contractor to customers, and no flow of imports or exports of goods from the domestic country are registered in the country where the fabless enterprise is located. Consequently, at first glance the activities of fabless enterprises resemble that of enterprises engaged in merchanting services – they buy products from non-residents and sell them to non-residents, and they may have a relatively large amount of marketing activities. But there are some important activities, which usually do not exist in merchant enterprises. Among these additional activities are R&D and management of joint production. In fact, the large value added obtained by fabless enterprises can probably mainly be attributed to those activities.

23. The following example, based on data from various Israeli fabless enterprises in the semiconductor industry, illustrates the typical structure of their activities:

> A fabless enterprise designs and markets finished products, which are produced by non-affiliated enterprises in an Asian country. In the financial reports of the domestic enterprise, the whole value of the sales of the final production is registered as domestic income. The net income of the domestic enterprise, after deducting payments to sub-contractors abroad, amounts to a substantial percentage of the value of the production.

Statement of annual income in thousands US $:
Revenues
Exports of products to final customers…….110,000
Costs of revenues
Product sales (outsourced production)……..…… 60,000

Gross profit……50,000

Operating expenses
Research and Development……. ……. 20,000
Sales and marketing……10,000
General and administrative …… 5,000
Total operating expenses……..…35,000
Operating income……15,000

24. In Israel, the problems of measurement of these activities were first discovered when it was found out that transactions related to such enterprises were not included in the balance of payments. On one hand, data reported by these enterprises to the banking system on their international transactions were classified as exports and imports of goods. On the other hand, since no cross-border trade takes place, the transactions of these enterprises were not included in the customs records, which are the source of data on international trade in goods used for the balance of payments in Israel. The problems of measurement affected the series of business indicators, the national accounts, and the balance of payments.

25. After the problem was discovered, special data collection from these enterprises was started, the problem was analyzed in depth, and a treatment was suggested.

26. First of all it was proposed, if possible, to separate an R&D unit supplying R&D services to the main fabless enterprise, in the compiling economy.

27. Then the activities of the main enterprise were considered in order to decide how to classify the enterprise and account for its transactions with the rest of the world. The concept of "converter" defined in the NACE 1.1 classification was chosen as a basis for deciding whether to classify the enterprise's activities as trade (ISIC G) or manufacturing (ISIC D). According to this definition: "Converters are units which sell goods and services under their own name, but arrange for their production by others. These units are classified to Sector G (wholesale and retail) except when they own the legal right and the concept of the product, in which case they are classified as if they produce the goods themselves." An enterprise outsourcing production totally and selling goods without being involved in any production process will be classified in trade. On the other hand, if an enterprise is the owner of patent rights on the products, is engaged in significant R&D activity, and is the owner of the final products, which are being sold under its name, then it will be classified as manufacturing.

28. As explained above, fabless enterprises are deeply involved in the production process, since R&D is a crucial input in the process, and the foreign unit carrying out production can only sell the goods to the fabless enterprise that takes the commercial risks and the responsibility for the products. Therefore, the proposal was to classify the fabless enterprises as manufacturing enterprises, and the following treatment was proposed:

- a domestic flow of R&D (to be used in production) from the R&D unit to the main fabless enterprise should be registered;
- the main fabless enterprise transfers R&D temporarily to the sub-contractor abroad to be used for a certain production with no change of ownership. It was proposed not to impute a change of ownership, and not to register the temporary flow;
- the sub-contractor abroad sells manufacturing services (on input owned by others) to the main fabless enterprise. The value of these services should be registered as imports of the country of the fabless enterprise;
- the main fabless enterprise sells the final manufactured goods to a third country, and the sub-contractor ships these goods directly to this country. Although a net registration was considered for practical reasons (with registration of the remaining value as exports of the country of the sub-contractor), it was decided to propose a gross registration of the full value of the goods, which would be consistent with the definition of a fabless enterprise as a manufacturing converter;

29. In order to facilitate the analysis of such treatment by the data users, it is proposed to show the transactions in a separate sub-category: Goods/services under outsourced production. This sub-category could be further divided between:

- Outsourced to affiliates;
- Outsourced to non-affiliated enterprises.

30. According to the proposal, the external transactions from the above example should be recorded in the country of the fabless enterprise as follows:

Imports from country of subcontractor
Goods/services under outsourced production …….60,000
Exports to country of final customer
Goods under outsourced production ……..……110,000

31. However, in practice it may be quite difficult to implement the proposed treatment, due to the standard procedures for recording of international trade transactions used by each country. Consequently, it seems necessary to adopt some international procedure, in order to avoid discrepancies, duplications and/or asymmetries in the recording of transactions related to outsourced production. The suggestion is that residence countries of fabless enterprises record transactions of these enterprises in a separate list and by partner countries to enable corrections to the registration of trade in those partner countries.

EVALUATION OF TRANSACTIONS IN CONNECTION WITH TAKEOVERS OF COMPANIES ACROSS BORDERS

32. Transactions in connection with takeovers of companies across borders have become increasingly common in Israel since the late 1990's, and the measurement of the transactions in connection with such takeovers has been complicated. Especially problematic are mergers of companies in different countries involving transfers of intangible assets. Such transactions are often made through a swap of stocks, which may further complicate the measurement. The incidence of takeovers of start-up companies is especially high, and the ICBS has tried to tackle the problems with registration of such takeovers for a number of years. The solutions found so

far are described below.

TAKEOVERS OF START-UP COMPANIES

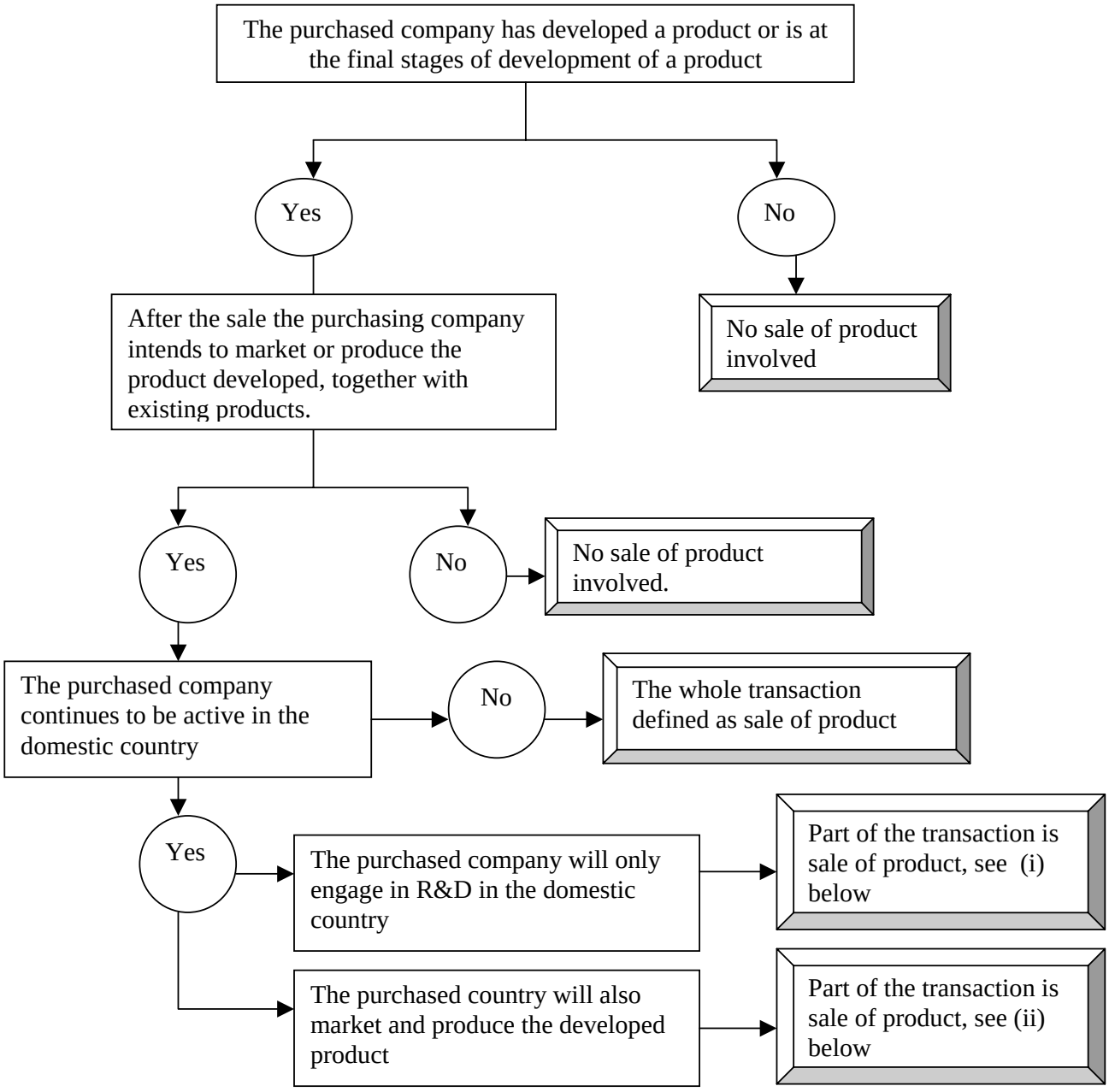
33. The importance of activities in hi-tech start-ups in Israel grew rapidly during the 1990's, and at its peak in the year 2000 the value added of activities in start-ups was estimated to 3% of GDP. During the recession in the years 2001-2003, the value added of start-ups decreased to 1-2%, but in 2004 and 2005 a renewed expansion of start-up activities has taken place. The major part of production of the start-ups in Israel can be characterized as R&D, and the products developed are mainly intended for the software, electronics, and telecommunication industries.

34. Many start-ups or young high-tech companies have been sold or merged with companies abroad at high prices, which have no apparent relation to their recorded production costs, operating surplus or revenues – some of them at prices of half a billion US$ or more - when the total GDP of Israel is a bit over 100 billion US$ (in 2004 GDP was 122 billion US$). For example, in 2000 three exceptional large takeovers amounting to 4.8 billion, 2.7 billion, and 1.6 billion US$ took place, in addition to a number of sales at over half a billion US$. In the years following the recession, the number of takeovers has been smaller and at lower values, but takeovers valued at half a billion can still be found.

35. In most of the cases, the high price of such transactions will reflect the value of a product – a new communication technology, originals of software, etc. developed within the company. The product is handed over abroad in connection with the sale of the whole enterprise. Since most such products are of an intangible nature, in practice, the transfer of the product in connection with the enterprise sale is often not registered, and only a financial transaction is recorded. As a result, exports or imports are undervalued.

36. To improve measurement, newspaper clippings or reports disseminated by market analysts on sales of high-tech companies to abroad are collected at the ICBS on a daily basis and entered in a database. These sales data are compared with banking data, which are currently the source for estimates of financial transactions in the Balance of Payments estimates, to check how the transactions are registered. In each case, the transaction is examined in detail and, if possible, additional information is gathered from persons involved in the transaction. A decision tree (reproduced in Figure 1 overleaf) has been constructed for deciding whether the transaction involves sale of a product or not.

Figure 1. Decision tree for sales of start-up companies



(i) If only part of the transaction is sale of a product, the book value of the purchased company can serve as an approximate estimate of the part that reflects the sale of the company as such - a financial transaction. The difference between the value of the sale and the book value can serve as an estimate of the value of the product sold.

(ii) If the purchased company will engage in marketing and production in the domestic country (and not only in R&D), then after the export of the product to its new

owner, there will be use of services from the product by the purchased company in future periods. Such cases are treated separately, since the transactions between the purchasing and purchased companies will have be monitored in future periods, and information on the value of the product combined with data on market shares may be helpful to estimate these transactions.

37. Even after making a decision about the nature of the transaction, the registration in the national accounts is quite complicated due to the many investments from abroad in start-ups.

38. The following illustrative example is based on some of the takeovers registered in recent years:

Consider a start-up company which has been active for 4 years, with about 30 employees and engaged in R&D to develop a new kind of communication software. The company received finance of 7 million $ from a foreign investor, who acquired half of the shares of the company. The rest of the shares were equally divided between the domestic founders of the start-up and the employees. Half a year ago, the company announced that the development was finished. Right after the announcement, a note in a business newspaper said that a communication company abroad has shown interest in buying the start-up company for a sum of 400 million $, and currently the deal has been announced as finalized, and the 400 million $ are paid in shares of the communication company abroad. The costs of developing the product are estimated to be around 20 million $. The communication company abroad intends to leave the start-up company as an affiliated research center in the domestic country.

Since the market price of the shares of the communication company at the time of the deal was 400 million $, this is the total sum to be registered. The book value of the company as such, without the finished product, is 10 million $. The remaining sum $390 million $ is the price of the product developed. The operating surplus is 370 million $, half of which goes to the investor abroad.

The following would be registered in balance of payments and the national accounts:
Exports: 390 million $;
Payments of earnings to foreign residents: 185 million $.

RECENT PROBLEMS

39. As mentioned above, the process of improving measurement also reveals new problems with available statistics that were not noticed before the process had begun. Among the issues that recently caught the attention of the ICBS was the issue of production involving a number of countries in Qualified Industrial Zones (QIZs).

40. Various QIZ's have been established since 1999 in Jordan and Israel as part of the peace process in the region in cooperation with the US. Recently, QIZ's in Egypt were also established. According to the agreement for QIZ's in Egypt: "Under U.S. law, Egypt and Israel can establish Qualified Industrial Zones or "QIZs" and export products manufactured in these QIZs to the United States duty-free. In order for a QIZ article to gain duty-free entry, QIZ factories must add at least 35% to the value of the article. This 35% minimum content figure can include costs incurred in Israel, Egypt, or the United States. By agreement between Egypt and

Israel, Egypt and Israel must each contribute at least one-third (11.7%) of the 35% minimum content requirement. QIZs must encompass portions of Egypt and Israel, though the areas do not have to be contiguous."

41. Such zones apparently have an impact on production and trade in the countries involved, and currently work has begun to check and improve the registration of the activities in the balance of payments and national accounts. Flow of goods from Israel to the zones abroad for further production is registered as part of foreign trade statistics, but it is not clear if any other flows such as part of the operating surplus from the sales of the final product should also be registered. Although it seems that the treatment for outsourcers or joint producers will probably be as outlined above, it would be necessary to separate the data for such zones, and analyze their production separately.

PROBLEMS OF ANALYSIS

42. Even if all measurement problems are overcome and additional data on the domestic share in international co-production are published separately to aid users, one could still argue if production analysis should not be changed and expanded. The joint international production may have some important differences from domestic production, measured and analyzed according to the current SNA. It should perhaps be proposed to publish figures for joint international production with details on input, output, and income distribution. Such figures could be produced either through cooperation by partner countries, or by international organizations. The structure of input-output tables could be changed to facilitate such work.

CONCLUSION

43. The growing globalization creates serious problems of measurement and analysis in the national accounts. Even if problems of coverage and classifications in data sources are solved by conducting special surveys and improving classifications, problems of analysis due to joint international production and outsourcing across borders cannot easily be overcome. The fast growth in such international links seems to necessitate new approaches for the analysis of production processes and growth that focus not only domestic production, but also analyze international joint activities. This development also requires a development of balance of payments data to enable detailed analysis of transactions in services and intangibles, and also seems to demand more cooperation between national statistical agencies.

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