



Economic and Social Council

Distr.: General
24 February 2010

Original: English

Economic Commission for Europe

Conference of European Statisticians

Group of Experts on National Accounts

Tenth session

Geneva, 26–29 April 2010

Item 6 of the provisional agenda

Review of the first draft of the publication

**“Impact of Globalisation on National Accounts:
Practical Guidance”**

Goods for processing

Note by the Statistics Canada

Summary

The 2008 System of National Accounts and the Balance of Payments Manual, 6th edition no longer recommend imputing change of ownership when goods are sent abroad for processing. This recording better reflects the associated financial transactions, but will require changes in a series of accounts. This paper examines the impacts of the revised treatment on input-output models and other structural indicators. It recommends a series of changes in data collection and compilation methods to handle the changes. And most importantly, the paper sets out how the revised treatment affects the analytical roles traditionally associated with input-output tables.

I. Introduction

1. The international organization of production has accelerated considerably in recent years; reflecting considerable improvements (and cheaper) communication and transportation technologies, trade liberalization, greater movement of capital and the presence of economies capable of offering reliable production infrastructure at low costs.

2. It used to be the case that when goods moved from one country to another, there would almost always be a change of ownership and this underlying reality reflected the position of the 1993 System of National Accounts (SNA). But increasingly, as the internalization of production networks has grown, this is no longer the case. In response to these new facts on the ground the 2008 SNA reflects a change from the 1993 SNA.

3. The 1993 SNA stipulates that in the absence of a change of ownership, a transaction must be imputed when measuring economic activity, that, in effect, assumes a change of ownership. As firms are increasingly sending material abroad for further processing, many have raised concerns about the meaning of international transactions as recorded in the balance of payments (BoP) and the SNA as the statistics become increasingly decoupled from the underlying and actual financial transactions.

4. The need to impute a value for goods sent for processing was extensively discussed during the preparation of the 2008 SNA and the BPM6 (*Balance of Payments and International Investment Position Manual 6th Edition*). The discussion led to a recommendation to no longer impute a value for goods sent for processing; which better reflects the size of international transactions and the type of transaction, namely a (processing) service rather than a good.

5. The recommendation also includes a provision to standardize the treatment of goods sent for processing in the SNA and BoP. The 1993 SNA records gross flows (imputation) only in cases where processing is substantial while it is always assumed substantial in BoP. Also, in the 1993 SNA, domestic processing is recorded without imputing a change of ownership unless the establishment is part of the same enterprise as that supplying the goods. Under the 2008 SNA, this difference in treatment is eliminated i.e. no transactions are imputed.

6. The decision to stop imputing transactions for goods sent for processing has an impact on a series of SNA accounts. The production account, notably the input-output account where the relationship between material inputs and production is central is affected. Under the new concept, emphasis is put on the contribution of each entity to the production process (or economic process) rather than on the physical technology.

7. The new standard also affects the compilation and the interpretation of trade in goods and services statistics. In a paper presented at the 2007 International Monetary Fund (IMF) Committee on Balance of Payments Statistics (BOPCOM \-07/20), the impact of the new standard was highlighted in the case of Hong Kong (see Annex I). With the implementation of the new standard on goods sent for processing, the balance of trade in goods of Hong Kong would be revised from a deficit to a surplus while the balance of trade in services would be revised from a surplus to a deficit.

8. This paper outlines the impact of the SNA 1993 and 2008 SNA treatments on input-output statistics and how they affect the measures derived from them such as input-output models, multifactor productivity indices, and other structural indicators. Second, it presents a summary of changes that need to be implemented at both the data-collection level and the statistical estimation stage. The paper also suggests some of the benefits and some of the drawbacks that can be expected for supply-use tables (SUT). Finally, the paper outlines

how the 2008 SNA treatment impacts the analytical roles that are traditionally associated with input-output tables.

II. Background

9. Firms are adopting a supply chain management strategy to conduct their business. Various aspects of optimizing the supply chain include liaising with suppliers to eliminate bottlenecks; outsourcing strategically to strike a balance between the lowest material cost and transportation; implementing just-in-time techniques in order to optimize manufacturing flow; maintaining the right mix of location of factories and warehouses to serve customer markets, etc.

10. In this kind of environment, producers are trying to optimize each step of the production process, often taking advantage of efficient production processes of other firms. Large firms, often multinationals, regularly provide material or semi-processed goods and specifications to other firms mandated to process or assemble goods for them. Given the reduced barriers to international trade, the processing firm can be in a different country from the multinational principal.

11. There are many advantages and benefits of having materials processed by another firm. A firm can rely on other firms that have efficient production infrastructure in place while not having to invest large amounts of money to put one in place. It allows firms not to have to undertake maintenance of a large infrastructure while benefiting from the expertise of the other firm. It is often a way to bridge the gap between product development, commercial scale production and growth of market share.

12. The practice of sending goods for processing represents a challenge for statistical agencies. Toll processing arrangements allow companies to move goods around without transferring legal ownership. When goods are moved between two units of the same group, difficulties may arise in setting a value for tolling fees due to the non-market nature of the transaction. Companies are required for tax purposes to report precisely the value of such transactions since they have a direct impact on profits. However, because of the sensitivity around profit and taxes, companies may be reluctant to report information about processing fees, making the work of statistical institutions more difficult. The fact that the value of the processing service is often embedded in the value of the goods exported or imported adds to the measurement challenge.

13. The trend of sending goods abroad to be further processed has far-reaching implications for the pattern of international trade and production, and far-reaching impacts on statistical systems that attempt to properly capture and measure the emerging pattern. These factors impact the configuration of domestic production and trade, but the international case is a more urgent and problematic issue, and this is why it received particular attention in the revisions recommended by the Advisory Expert Group on the update of the 1993 SNA (See *"The Recommendations Made by the Advisory Expert Group for the Update of the System of National Accounts, 1993"* by Intersecretariat Working Group on National Accounts, United Nations Statistical Commission, 2007).

14. It is however difficult to measure the size of goods sent abroad for processing. In many countries merchandise trade statistics record goods when they cross the border, not when they change ownership. Consequently, goods sent abroad for processing are included in the merchandise trade statistics. This implies that a change in ownership is always assumed (imputed).

15. A special study prepared by the Hong Kong Census and Statistics Department reports that Hong Kong sends a significant amount of goods for processing to Mainland China. The study shows that Hong Kong exports of goods would be adjusted down USD 53

billion while imports of goods would be adjusted down US\$ 99 billion. As a result Hong Kong balance of trade of goods would be adjusted up US\$ 46 billion from a deficit of US\$ 14 billion to a surplus of US\$ 32 billion. Imports of services would be adjusted up US\$ 46 billion, resulting in a deficit in the balance of trade in services of US\$ 11 billion from a surplus of US\$ 36 billion.

III. International Standards

A. Change of ownership

16. Contrary to the 1993 SNA, the 2008 SNA no longer requires imputing a change of ownership to goods exported for processing i.e. in a situation where the exporter remains the owner of the material being processed in another country. This chapter examines this change of treatment on the input-output framework (IO) from the vantage point of a country with a large international trade sector, where outsourcing and off-shoring is most likely present in both directions but difficult to measure, and where IO statistics serve both as benchmarks to Gross Domestic Product (GDP) in current and constant prices and as the basis for widely-used analytical models, productivity measures and other structural indicators.

17. It is becoming common practice for firms to send their material to an affiliate or non affiliate for processing. Sometimes the material (raw or semi-processed goods) is sent to firms within the domestic economy; sometimes the material is sent abroad. The process of sending material for processing is called "goods sent for processing". This process is very common among processing industries such as chemical, electronic and metallic manufacturing. In the industry, the process is often referred to as toll manufacturing, toll processing or custom manufacturing.

18. There is a particular variation of this process that is of particular interest for the SNA and the BoP, goods sent abroad for processing. For SNA and Balance of Payments purposes, "goods sent abroad for processing" refers to a well specified situation, namely, when raw or semi-processed goods are sent by a unit in country A (principal) - to a unit in country B (contractor), where they are transformed in a substantive way. The principal is a unit that enters in a contractual relationship with another unit - the contractor - to carry out part or all of the production process. The contractor is a unit that carries out a specific production process based on a contractual relationship with a principal. Over the course of the transformation process, the principal maintains legal ownership of the raw and semi-processed as well as the processed goods. The principal pays the contractor a fee for the processing or assembly.

19. Other similar arrangements also pose issues for SNA, but do not fall under the "goods sent abroad for processing" definition, and are not discussed here. For instance, a unit in country A may have its goods processed by a unit in country B, but then sells the goods to another unit in the same country (B) without repatriating them back to A. Similarly, if the processed goods were sold to another unit in a third country, C, without returning to country A, the practice would not fall under "goods sent abroad for processing".

20. In the 1993 SNA a transaction may or may not be recorded between two firms, depending on the situation (*Paragraph 14.61 to 14.64 of the 1993 SNA provides details on how to deal with goods sent for processing.*):

21. The fact that not all processing is treated the same way in the SNA 1993 (and BPM5) presents a challenge for IO compilers. Domestic processing is recorded without imputing a change of ownership unless the establishment is part of the same enterprise as that

supplying the goods. International processing is recorded without imputing a change of ownership if the goods remain in the processing country or go to a third country unless the establishment is part of the same enterprise as that supply the goods or is a direct investment enterprise of the owner. It is difficult to imagine that analysts are aware of these variations and can successfully discern exactly what changes are taking place in industries subject to growth in outsourcing without extensive assistance on untangling how many goods are subject to each of the different sorts of recording. Nor does the different treatment assist the IO compilers.

- When goods are sent abroad for processing, a change of ownership is assumed and a transaction is imputed between the two firms, resulting in an international transaction.
- However, international processing is recorded without imputing a change of ownership if the goods remain in the processing country or go on to a third country unless, as described above, the establishment is part of the same enterprise as that supplying the goods or is a direct investment enterprise of the owner.

22. According to the 1993 SNA a transaction should only be imputed when the amount of processing is considered significant - in practice when the goods from abroad are subsequently classified to a different group (3-digit level) after processing (*Minor transformation of goods such as repair and packaging are not regarded as processing and are excluded from this consideration.*) of the Central Product Classification (CPC). In the Balance of Payment, the treatment is much clearer cut. The Balance of Payment Manual (BPM5) suggests, by convention, that all processing be assumed substantial and therefore be recorded on a gross basis, as if a change of ownership occurred.

23. In reviewing the concept of imputation currently in place, it was concluded that this process was not consistent with one of the basic principles of the BoP that a transaction should involve a change of ownership. As a result it was decided that under BPM6 and the 2008 SNA, the value of goods for processing would no longer be recorded in the goods account. As well, under the new standard, the payment of processing fees by an outward processing economy would be recorded as imports of services. And this recommendation extends to goods sent for processing domestically. The new standard has the advantage of being more in line with records found in the accounting books of firms while meeting a desire to avoid imputations. To the extent it is desirable to have international trade statistics on goods and services that reflect the underlying financial transactions the implementation of the new standards represents an improvement from an analytical point of view.

B. 1993 SNA and 2008 SNA treatments

24. The 1993 SNA treatment of goods send abroad for processing affects three parts of the SNA, the:

- (a) Current account of the BoP
- (b) Production account of the SNA
- (c) Accumulation account of the BoP and SNA

1. Current account of the BoP

25. Under the 1993 SNA, for a country involved in "processing", a value is imputed for raw or semi-processed goods entering the country. The value of the material is recorded as an import of goods. After processing, the processed goods are exported back to the supplying country and a value is again imputed and recorded as export of goods. The difference between the two values is equal to the processing fee paid. In practice, it is

possible that the difference will not be equal to the processing fee. This will be the case if prices change over the processing period, notably if processing takes place over two accounting periods.

26. Under 2008 SNA, the imports and the exports of material and processed goods are no longer recorded. Processing fees are however recorded, but as a service. Overall, the current account balance is not affected. However, trade in goods diminishes while trade in services increases by the same amount.

2. Production account of the SNA

27. Under the 1993 SNA, the value of goods sent for processing entering the country of the contractor are allocated to intermediate inputs of the receiving industry. The value of gross output of that industry is equal to the value of the material and the value added to them by the contractor (processing fee). In SNA 2008, on the output side, processing fees only is imputed for intermediate inputs. In theory, value added remains the same under both treatments.

3. Accumulation account of the BoP and SNA

28. Having assumed a change of ownership in favour of the processor, it is necessary to record a change in inventories for that processor if processing is unfinished at the end of the accounting period. Under 1993 SNA, the changes in inventories must be recorded in the capital account and the balance sheet. Since the capital account and the balance sheet of the country providing the material will also be adjusted for inventories, it is necessary to impute an entry in the financial account of both countries to show that there is no call on the foreign exchange of the processing country for the value of the goods processed. Under SNA 2008, changes in inventories are no longer necessary since the ownership of the material will no longer be imputed to the contractor.

29. The next sections deal with the various implications of 2008 SNA on the industry and commodity accounts of the input-output framework. The focus is on the international aspect of this issue. The practice of "goods sent for processing" gives rise to two specific situations that will be dealt with separately: the client case (*the principal*) and the processor case (*the contractor*). In the client case, the principal sends goods it owns to another unit (contractor) abroad to be processed. In the most general case, these are semi-processed goods of the principal's own manufacture. Once the goods are processed, they are returned to the principal, where they may be further processed or sold. The client pays a fee to the processor for the services provided. In the processor case, a contractor receives goods belonging to the principal and, in return for a processing fee, transforms the goods using its own labour and capital before sending them back to the principal for further processing and sale by the latter.

IV. Measurement and analytical problems

A. Measurement problems

1. Goods for processing and the IO framework

30. This section deals with the impacts of the existing and proposed standards on the industry account and the commodity account of the IO framework. The input-output accounting framework contains two sets of accounts, the industry account and the commodity account. The industry account reflects the entries of columns in the supply-use framework. The commodity account reflects the entries of the rows in the framework. The former provides details about the commodity composition of output of industries and the

complete costs structure of production. The latter details the supply and use of individual commodities. The impacts are described in the context of the 1993 SNA and the 2008 SNA in order to better evaluate the consequences of each standard.

31. The case examined involves a principal unit in Country A sending its semi-processed goods for further processing to a contractor unit in Country B. The contractor does not pay for the material received from the principal unit. The value of the goods sent for processing is valued at 100 while the value of the goods after processing is estimated at 160. Processing fees are equal to 60.

(a) *Industry account*

32. Under the 1993 SNA treatment, when the goods sent for processing enter Country B, a change of ownership is assumed and a transaction is imputed between the principal and the contractor, resulting in an international transaction. In the BoP, Country B is shown as importing 100. The contractor is shown as buying 100 of semi-processed goods and this amount is recorded under intermediate inputs like all other purchases of goods and services. Gross output is equal to intermediate inputs and the value added by the contractor, 160 in this case. The nature of the goods produced is different from the goods supplied by the principal. Gross output is classified as a good.

Table 1

Industry account under the 1993 SNA

	<i>Contractor (Country B)</i>	<i>Principal (Country A)</i>
Gross output		
Goods (manufacturing)	160	100
Services (wholesaling)		20
Intermediate inputs		
Goods for processing	100	
All other goods	20	50
Processing fees services		
All other services	10	20
Value added	30	50

33. By imputing a change of ownership of the semi-processed goods (to the contractor), this allows compiling the industry account in Country B in a traditional way i.e. the full transformation of the commodity inputs into processed goods.

34. In Country A, the principal unit is currently shown as having manufactured 100 of semi-processed goods using its own intermediate inputs, labour and capital. Processed goods return from Country B, and they are treated as goods purchased for resale (GPRS) resulting in margins of 20 in the example above. The production of semi-processed goods and wholesaling activities remain secondary activities for the principal unit. Even though it does not appear in the production account, the main activity of the principal unit remains the production of a specific type of processed goods. If only part of the production process is outsourced, the principal is classified to the class that corresponds to the activity representing the complete production process, i.e., it is classified as if it were carrying out the complete process, including the contracted work, itself. As a result, the unit is coded to the industry that mainly produces that type of processed goods.

35. Under 1993, SNA, an incoherence will occur in preparing the production account of Country A if processing fees embedded in imports of goods processed are not removed from the operating expenses reported (in a survey) by the principal in Country A.

36. Under the 2008 SNA (Table 2), the industry structure in Country B will change significantly. In the processing country, gross output will only reflect the value of the processing (60) since no imputation will be made to value the semi-processed goods received from Country A. More, production will be classified as a service, not a good. Value added will remain the same, 30. However, the relationship between GDP and gross output will change. In this case the GDP to gross output ratio go from 19% under the 1993 SNA to 50% under the 2008 SNA, even though the amount of labour and capital has remained the same.

Table 2

Industry account under the 2008 SNA

	<i>Contractor (Country B)</i>	<i>Principal (Country A)</i>
Gross Output:		
Goods		180
Services	60	
Intermediate inputs		
Goods for processing		
All other goods	20	50
Processing fees services		60
All other services	10	20
Value added	30	50

37. Under 2008 SNA, the link between the domestic goods production and domestic employment as well as the link between goods production and the use of fixed capital will change as the size of the goods for processing phenomena increase. Other relationships such as the links between production and the consumption of energy or between production and environmental indicators, data on emissions or waste from the industries will also be affected.

38. The presentation of the production in Country A will also change with production (180) recorded under goods. That amount includes the value of the semi-processed goods (100), the processing costs (60) and a return on sales (20). The principal will not be attributed the production of semi-processed goods but the value of the processed goods. The contractor will be classified to the industry producing the processed goods. The principal would be coded to the same industry since he owns the material or semi-processed goods. Under the 2008 SNA, the principal will show an unusually small amount of capital and labour in relation to production. The relationship of capital and labour to gross output will be different to other units of the industry since its was the labour and the capital of the unit in Country B that was used to produce part of the goods now reported by the principal.

(b) Commodity account

39. The 2008 SNA, which emphasizes transactions instead of focussing on the production process, will also affect the commodity account. This section deals with the commodity account of the supply-use tables (SUT). The commodity account is examined under the 1993 SNA and 2008 SNA. The first commodity account deals with the goods sent for processing; the second one deals with the goods processed; the last one deals with processing fees.

40. Under the 1993 SNA, when goods sent for processing enter the processing country, a value is imputed under imports on the supply side of the SUT. The SUT are balanced by imputing a similar amount under intermediate inputs on the use side. The processed goods are recorded under production on the supply side and exports on the use side. No processing fees need to be recorded since that value is embedded in the value of the

processed goods. However, a statistical problem could occur if processing fees paid by the principal were captured in exports of services (trade in services).

Table 3

Commodity accounts under the 1993 SNA and 2008 SNA – Country of the contractor

<i>Country B</i>	<i>Supply</i>		<i>Use</i>			
	<i>Production</i>	<i>Imports</i>	<i>Intermediate inputs</i>	<i>Exports</i>	<i>Inventories</i>	<i>Other final demand</i>
1993 SNA						
Goods for processing		100	100			
Goods Processed	160			160		
Processing fees	NA			NA		
2008 SNA						
Goods for processing						
Goods Processed						
Processing fees	60			60		

41. Under the 2008 SNA, the commodity account will be quite different in the processing country. Semi-processed goods and processed goods will no longer appear in the commodity account. Processing fees will appear under production of a service and with a balancing item under export of services. This will result in a disconnect between the volume of production and exports of commodities. For example, for a country receiving crude oil for processing which is then exported back to the country of origin, analysts will have difficulty establishing a relationship between the volume of production of refined petroleum products and exports as only exports of services (related to petroleum) will be recorded under the 2008 SNA.

Table 4

Commodity accounts under the 1993 SNA and the 2008 SNA: Country of the principal

<i>Country A</i>	<i>Supply</i>			<i>Use</i>			
	<i>Production</i>	<i>Imports</i>	<i>Trade Margin</i>	<i>Intermediate inputs</i>	<i>Exports</i>	<i>Inventories</i>	<i>Other final demand</i>
1993 SNA							
Goods for processing	100				100		
Goods Processed		160	20	W	X	Y	Z
Processing fees							
2008 SNA							
Goods for processing	180			X		Y	Z
Goods Processed		60		60			
Processing fees							

42. In Country A, the commodity account will also be affected significantly under the 2008 SNA. Under the 1993 SNA, in the owning country, in order to balance the supply-use tables, it was necessary to make the semi-processed goods disappear as exports (100) and reappear as imports of another good at a higher value (160). In this example, goods processed returning to Country A are consumed as intermediate inputs, exported or consumed by other final demand users while some goes to inventories in various proportions.

43. Under the 2008 SNA, production of semi-processed goods disappears and processed goods will appear as being produced in the country (A). Only processing fees will appear in international trade, under services.

2. Measurement problems in compiling IO accounts in the presence of goods sent for processing

44. The implementation of the 2008 SNA will affect the compilation of the industry and commodity accounts and subsequently their analytical uses due to the difficulty establishing relationships such as between production and exports. However, it should be recognized that the IO accounts in many countries are already affected by the phenomena because of deficiencies of the data available to compute the IO accounts. The next two sections focus on compilation issues related to the two accounts.

(a) Industry account

45. In principle, the 1993 SNA and SNA 2008 lead to exactly the same GDP for the industry and for the economy in the processing country. Under the 1993 SNA, the value of goods processed will appear as an intermediate input and the same value will appear, implicitly, in the value of output, the difference between the two values being the processing fees. Under the 2008 SNA, only processing fees will appear in the industry accounts. Processing fees will appear on the output side as a service and no costs will be imputed on the intermediate input side.

46. In practice, differences will arise for many reasons, including:

- inconsistent reporting between the gross flows obtained from customs sources and the service flows obtained from production-related surveys,
- data gaps on international transactions of commercial services,
- the fact that groups of industries are composed of traditional producers and contractor/principal type of producers (non-homogeneity of the producers)

47. Table 5 below shows a situation where a traditional processing industry is now composed of traditional producers as well as contractors. In order to simplify the example, principal-type producers are not considered.

Table 5
Mixing traditional producers with contractors

<i>Industry</i>	<i>Traditional producer #1</i>	<i>Traditional producer #2</i>	<i>Traditional producers</i>	<i>Traditional producer</i>	<i>Contractor type</i>	<i>Total</i>
<i>Period</i>	<i>t</i>	<i>t</i>	<i>t</i>	<i>t+1</i>	<i>t+1</i>	<i>t+1</i>
Gross output	125	75	200	100	50	150
Intermediate inputs	78	47	125	62.5	12.5	75
Value added	47	28	75	37.5	37.5	75
IO coefficient	62.4%	62.7%	62.5%			50.0%

48. Table 5 above shows what an IO analyst would normally see when analysing its industry account. The table shows an industry composed of two producers. The analyst would not have access to micro records information in column 2 and 3. In period t , the analyst would only see column 4 where a value of 75 was added to the value of material inputs to produce a gross output of 200, resulting in an IO coefficient of 62.5%. In period $t+1$, as in period t , we assume the only information available to that same IO analyst is equivalent to column 7, where the IO coefficient changes to 50.5%. The analyst does not know the industry is now composed of a traditional producer and a contractor-type producer. Looking at the historical IO coefficient, the analyst would no doubt be tempted to adjust the industry structure since unless there is a huge change in price relative, the IO coefficient of an industry rarely change by more than a few percentage points annually.

49. Without information on the mix of producers (micro records), it is much more difficult for national accountants to assess the accuracy of the industry accounts. It is the case under the 1993 SNA; it will be the same under 2008 SNA. In the absence of proper information on the mix of producers it is difficult to produce industry accounts that are consistent over time.

50. The solution could be to compute within each industry a traditional component as well as contractor and principal components. From an analytical point of view, it would have the advantage of comparing production structures that are homogeneous. The solution could also be to regroup all contractors and all principal type contractors in industries of their own. In both cases, from a compilation point of view, it would make the production of the IO accounts very laborious. Another solution may be to add an adjusting entry in the commodity account to simulate the 1993 SNA. This aspect is covered later in this paper.

(b) *Commodity account*

51. The revisions to the 1993 SNA and BPM5 revolve around the question of whether a change of ownership of the goods should be attributed to the processing unit in country B when material inputs move there from the unit in Country A, and once again attributed to the processed goods when they are shipped back to the original unit in Country A. The revisions were, at least in part, motivated by the fact that attributing change of ownership introduces inconsistencies between financial accounts which record payments for services and the BoP which records the gross flows of goods underlying those services. When SNA 1993 and BPM5 were formulated, they adopted a coordinated treatment that was appropriate at the time. (*Prior to SNA 1993 and BPM5, the gross flows were excluded from exports and imports when presented on a BoP basis and the difference between the gross flows shown in merchandise trade were shown as service exports by the processing country.*) SNA 1993 recommended that, when processing is substantial, (*The criterion suggested for identifying substantial processing was that the good would be reclassified at the three-digit level of CPC.*) statistical agencies attribute a change of ownership every time the goods moved across borders for processing, even though the goods always remain the legal property of the principal unit. In the BoP, this would register an export of the gross value of pre-processed goods from A to B, and an import of the gross value of processed goods from B to A involving the same two economic units.

52. It is helpful to describe at this point how transactions recorded under the 1993 SNA or "imputed" treatment would appear in a statistical system such as Canada's SNA where the production accounts are fully integrated with the BoP account. This is outlined below separately for Canadian contractors and principals.

53. At present, respondents acting as a contractor in Canada would report their inputs and outputs on a net basis, meaning that they would report as custom work the processing fee they receive for processing goods for principals and report only their own intermediate inputs. They would not report the value of semi-processed goods provided by the principal from abroad. At the same time, the imports of semi-processed goods and the exports of processed goods from Canada would appear in the system's input-output tables' imports and exports, consistent with the BoP data obtained from customs sources, on a gross basis. In order to arrive at a balance between the supply and use of output and input commodities, IO analysts must enter in the system a series of adjustments. This amounts to replacing custom work with the value of gross production (equal to the export amount), and raising the industry's inputs by the value of semi-processed goods (the import amount).

54. This exercise retains the industry's balance of outputs and inputs (since the processing fee is, in principle, equal to the difference between the two gross values) and the level of GDP while making the industry accounts compatible with the BoP. (*When production occurs over multiple periods, inventories are also adjusted.*) This imputation

procedure describes the actual compilation practice in Canada when analysts have had evidence of significant cases and had sufficient data to confidently improve the quality of industry statistics.

55. Unfortunately information about goods sent for processing is often missing, affecting the compilation of the supply-use tables. Even though several countries agreed with the proposal to never impute a transaction when material is sent for processing, many expressed their concern about the availability of data. In many countries, when a good crosses the border, free of charge, custom staff is asked to ensure the good is valued before it crosses the border. For administrative reasons, exports and imports are valued at some "market price equivalent".

56. In Canada, manufacturers normally provide the following type of information:

- Turnovers and inventories
- Revenues from custom work
- Cost of own material
- Sub-contracting expenses

57. The manufacturer is not asked to estimate a value for the material he would have received for processing. He is probably not in a position to do so. As a result, IO analysts must deal with international trade data that have been adjusted for the value of goods sent for processing and with manufacturing data where no imputation has been made for the value of goods received and processed. This creates difficulty when balancing the supply-use tables. The table below shows how.

Table 6
Supply-Use Tables and the contractor

<i>Balancing Supply-Use Tables – Contractor case</i>						
Step 1: Material is sent for processing from the principal in country A to the contractor in country B						
Production	Imports	=	Inputs	Final use	Exports	Inventories
	75		0			Imbalance
Step 2 : Production of a good						
Production	Imports	=	Inputs	Final use	Exports	Inventories
	0				100	Imbalance
Step 3: Payment stage – Processing fee						
Production	Imports	=	Inputs	Final use	Exports	Inventories
	25					Imbalance

58. In step 1 of the overall production process, semi-processed goods are imported in country B (75). Since they were not paid for by the contractor, a first imbalance appears in the SU tables. The Use of the commodity will be lower than its Supply. To the extent the IO analyst is able to verify the robustness of the various data of its SU table, the analyst will hopefully adjust inputs to balance the system, implicitly imputing a value for the material that enter the country, a value that was not captured during the collection process.

59. In step 2, production takes place and the processed good is sent back to its owner in country B. An export is recorded at say 100. However, on the collection side, no value would have been collected except the amount the contractor in country B would have

received for processing the material. As a result, a second imbalance could occur. Unless production is adjusted, the SU tables would not have been balanced properly.

60. Finally, in step 3, since the processing fee would have been embedded in the value of the exported processed goods, it is not clear to what extent national accountants are able to deal with the double-counting of processing fees which are, in theory, reported by the contractor and embedded in the value of exports.

61. Table 7 shows similar imbalances that could also occur in the case of the principal

Table 7

Supply-Use Tables and the principal

<i>Balancing Supply-Use Tables – Principal case</i>						
Step 1: Material is sent for processing from the principal in country A to the contractor in country B						
Production	Imports	=	Inputs	Final use	Exports	Inventories
75			75		75	Imbalance
Step 2 : Production of a good						
Production	Imports	=	Inputs	Final use	Exports	Inventories
100	100		X1	X2	X3	Imbalance
Step 3: Payment stage – Processing fee						
Production	Imports	=	Inputs	Final use	Exports	Inventories
			25			Imbalance

62. In this case, let's assume a manufacturer in country produces material for a value of 75. That material is then purchased by a principal in Country A at a value of 75 which export the material to Country B for processing. Assuming that for administrative reasons the export was valued at 75 by custom staff, this would have translated in a first imbalance in the SU tables in excess of use.

63. If it was the principal unit that had produced the semi-processed goods, the situation would have been different. Principal A would have recorded a production of 75 which would have translated into an export of 75 to Country B.

64. Another imbalance would have occurred after the contractor delivers the goods to the owner of the material. The goods would be imported back to country A at a value of 100. The owner would have reported turnovers of 100 in the manufacturing survey, creating an imbalance.

65. Finally, since the manufacturer (principal) in country A would have reported a processing fee (expense) of 25, an amount hidden in the value of the good imported, this would have created another imbalance.

66. The lack of coherence between the international trade data and the domestic surveys is potentially creating undesirable imbalances in the commodity accounts in the absence of explicit information on the value of goods sent for processing. This will change with the implementation of the 2008 SNA, provided the trade statistics are consistent with the corresponding financial transactions. Several countries, even those in favour of not imputing a value for goods sent for processing, have expressed concerns on this issue. Many countries have indicated that it would be difficult for their custom authorities to identify goods for processing from other merchandise trade. If this were the case, balancing the SU tables in the context of goods sent for processing will remain a challenge under the new standard.

3. Transportation margins

67. The link between transport margins and commodities will no longer exist when the 2008 SNA is implemented. It would not be very useful to associate transportation margins with processing fees. With the implementation of the new standards, transportation services will replace transportation margins in the IO account.

B. Analytical challenges

(a) *IO linkages*

68. A significant analytical disadvantage posed by not imputing a financial transaction for goods sent for processing is that supply and use tables will no longer serve as the data source for exports and imports of goods that have been involved in the goods for processing phenomenon. Under the 1993 SNA, on the other hand, supply and use tables facilitate the analysis of a variety of outsourcing questions by preserving the link between commodity flows, their producing industries as well as intermediate and final users.

69. One such significant consequence is that the forward and backward linkages articulated under the 1993 SNA treatment for processing industries would disappear under the 2008 SNA treatment. In particular, when studies look at the linkage of goods with other goods used to produce them, the processing units will be absent since the processed goods will not appear in the inputs or outputs of the industries concerned. For instance, if we need to answer a question, such as how much upstream production or employment is associated with petroleum by-products, input-output tables can address this question when they have linkages between upstream and downstream industries: chemical manufacturers producing petroleum by-products, petroleum refiners, and crude petroleum extraction. However if, in a hypothetical situation, the refining of petroleum was done by a contractor whose output in the system appears as "refining services", input-output linkages between upstream and downstream processes would be severed, preventing such a calculation.

(b) *Regional IO tables*

70. A key implication of the impact of not imputing a change of ownership on input-output linkages discussed above is for multi-regional supply and use tables, such as the Canadian interprovincial input-output tables. In such an integrated national-regional table, linkages between goods and services exist not only across production processes in different industries, but also across regions (Canadian provinces and territories). The Canadian tables show the linkages between processes in different regions through an inter-regional trade flow matrix. These regional tables are routinely used to assess the upstream or downstream values related to a given commodity or industry across all regions of the domestic economy. However, this is subject to an important exception in the case of goods sent for processing. Since surveys of Canadian goods producing industries ask for the revenues and the cost related to contract processing or "custom work", a net treatment is built into the compilation of regional supply and use tables. As in the petroleum example presented above, by not imputing a change of ownership would result in severing linkages when goods are sent to other regions for processing, thus limiting the ability of input-output tables in documenting and analysing technological dependencies between industries and between regions. In this particular case, an imputation was made and added to the interprovincial tables to effectively permit the technological linkages to be maintained for petroleum products.

(c) *International trade*

71. The 1993 SNA calls for reflecting gross values of imports and exports when goods are sent abroad for processing. The most clear and intuitive drawback of this treatment is that it exaggerates the highly visible and widely used measures of import intensity and export performance for goods producing industries generally and for the individual manufacturing industries in particular. Trade ratios such as exports/gross output and imports/production overstate true export and import intensities and make the industry appear more financially vulnerable to external trade. In addition, by subsuming the value of processing services in the gross values of traded goods, the treatment understates the values of international trade in services. To get a better sense of how much exports really matter to the economy's GDP, studies often net out the import content of exports (or vice versa) in order to correct the exaggerated effect of outsourcing, including the cases of "goods sent abroad for processing". Such overstated ratios in turn embellish the influence of factors such as exchange rates and the strength of foreign demand for exports on the domestic economy generally and goods producing industries in particular.

72. Under the new 2008 SNA treatment, only imports and exports of services will be recorded in the final demand table of input-output tables. As a result, the analysis would produce a lower estimate of imports associated with (or used in the production of) exports because it would be restricted to imports with ownership transfer. In this case, the 2008 SNA treatment effectively alters the answer that the analyst would receive from performing a common input-output inquiry and it would be important to clearly explain to IO users how the 2008 SNA treatment affects the conclusions reached in the analysis.

(d) *Input-Output models*

73. Open output-determination models, such as those estimated from the Canadian input-output tables, depend critically on market shares and input cost shares of goods and services to compute the impact of an exogenous change or "shock" to a system of inter-industry linkages beginning from an equilibrium position. To the extent that an industry uses the outputs of other industries as its intermediate use it has a backward linkage to all those industries. And, to the extent that a given industry supplies the intermediate inputs of others through its own production it has a forward linkage to those industries. When the chain of inter-industry commodity flows is interrupted because products are imported from abroad, there is a "leakage" from the domestic economy. A larger leakage (a larger proportion of the supply of a commodity coming from imports) implies a smaller feedback from a demand shock on the production of the rest of the system. Under the 1993 SNA treatment, the import coefficient of a contractor industry is larger than under a no imputation treatment because intermediate inputs include the gross value of goods received from the principal for processing. The larger import coefficient leads to an understatement in impact coefficients of the output-determination model, thereby understating the total impact of any exogenous change on domestic production not necessarily in terms of value added.

74. On the other hand, a large number of industries could be involved in processing. For each of these industries, it would be ideal to identify separately the processing fees component separately from other industries. If processing could not be associated with a specific industry, allocating the demand for processing services to the proper producing industries based on market shares would spread the gross output to all producers involved in processing. For modelling purposes the 2008 SNA treatment requires a fair amount of detail on processing by industry in order to properly calculate IO impacts related to processing.

(e) *Productivity measures*

75. The implications of the increasing prevalence of "goods for processing" for productivity deserve a mention when a goods-producing industry consists of one segment that operates on a traditional business plan and another segment that uses contract processing. When processing goods for a principal becomes more prevalent in a given industry over the traditional own-account processing, the industry's measured GDP (and GDP growth) remains unaffected (imputing or not). It is clear in this case that the industry's productivity growth measured as the difference between real GDP growth and the growth in an index of labour inputs remains unaffected, as the same real GDP is produced with the same set of primary factors of production. However, in practice, one could expect higher efficiency from the contractor making better use of the capacity of its firm.

76. Looking at the principal side, when more producers in an industry make use of contract processing abroad in place of own-account goods processing, one would expect the overall industry's productivity growth to increase. Under a no imputation treatment, the measured input and output sets of the industry will not change as a result of the use of contract processing. However, when producers find it cost effective to send goods abroad for processing, the implication should lead to a reduction in unit costs of output compared to a traditional arrangement of production. Under competitive conditions, this means that, in real terms, more outputs are produced per combined unit of inputs for the producer in question. In nominal terms, while it is clear that contract processing abroad lead to greater profits for the industry, this may or may not be offset by the lower wage costs under contract processing so that it is not clear whether nominal GDP will be higher or lower.

77. For the calculation of multifactor productivity where the result is a function of gross output and intermediate inputs (KLEMS database), the impact of the 2008 SNA is unclear and will require researching.

V. Operational treatment

A. Adjusting entries

78. The implementation of the 2008 SNA should facilitate the balancing process of the commodity account. It is not so clear in the case of the industry account where homogeneity of the structure is an important element. Mixing traditional producers with contractors in a given industry will complicate the compilation process. One of the solutions could be to regroup contractors and principal type producers in separate industries. However, since in every industry, some units will be a blend of traditional producers and contractors, it would be difficult to implement such a strategy. The real solution may be to expand the commodity account to include adjusting entries. These adjusting entries would be equivalent to the value currently imputed. In the case of a contractor, output and intermediate inputs would contain an adjusting entry of the same value while processing fees would be reported in a separate service commodity. The implementation of adjusting entries in the IO framework would help alleviate some of the analytical issues the new concept will create to analysts focusing on structural analysis.

79. Adjusting entries could be stored separately in a file of the same dimension as the one containing the IO accounts data. The data could be added to the initial set of data which would exclude goods for processing. This type of information would be very useful to IO compilers in interpreting structural changes. This type of decomposition has been implemented in the compilation process of the Canadian IO tables where a series of conceptual adjustments are kept separate in the IO database. Conceptual adjustments consist of items such as the capitalisation of software, financial intermediation services

indirectly measured (FISIM) or head offices. The database also contains another series of adjustments showing necessary adjustments to source data to calibrate the IO accounts

B. Trade data

80. Input-output tables provide benchmarks for GDP in both current and constant prices. In addition, they are the sole source of data on gross output and GDP by industry in both price bases. The supply and use tables of the Canadian IO accounts have a rectangular format, providing for many outputs per industry. For each commodity (good or service) articulated in the IO accounts, supply from domestic production and imports are balanced with disposition (use). The latter consist of intermediate use, final domestic use (e.g., consumption, investment, and government expenditure), inventory change and exports. Elements that make up this commodity-balance are estimated within a framework where, in addition to equating supply and disposition, outputs of industries are equated with their total inputs and GDP components. Import and export data used to construct this commodity balance originate from the system's BoP. For goods, the BoP depends on merchandise trade data obtained from customs, adjusted to accord with BoP concepts and classification. For services, the data is obtained from the survey of International Transactions in Commercial Services. The latter encompasses some 3,200 firms, mostly large corporations, with significant involvement in imports or exports of services. The survey covers the entire spectrum of internationally traded services including "contract production abroad".

81. One possible approach to removing goods sent for processing values from merchandise trade is to identify goods that are declared as "for processing" when they are clearing customs and use the tagged information to adjust merchandise trade when it is estimated on BoP basis. Goods going into Free Trade Zones (FTZ), and those originating from them back into Canada, could be documented and tagged for treatment. Specific measures must be taken to distinguish the qualified goods - those which go into FTZ's and come back to the same unit in Canada-from other goods. For goods processed outside these zones-as is the case in Canada's contract processing industry - this requires international agreements between customs authorities of major trading partners that specifically deal with the terms and conditions of identification, evaluation and reporting of goods for processing. The tagged information on exports and imports must be collected at the lowest level of the Harmonized System of commodity classification in order to make it possible to link them with commodity categories of the supply and use tables. This will allow analysts to compare the net values of tagged exports and imports with processing costs from principal units and revenue data from processing units obtained from industry sources.

82. An alternative data source for both principal units and contractor units in Canada is to refine and improve the existing survey of International Transaction of Commercial Services. This survey is used to provide data on the services components of imports and exports in the balance of payments. At the present time, a major redesign project is in progress at Statistics Canada that will see the survey frames of the latter survey revamped and linked to the Agency's Business Register---the most comprehensive list of businesses in Canada from which samples are obtained for Statistics Canada's business surveys. A complete link between the two frames will allow data collected through this survey to be used in conjunction with the Annual Survey of Manufactures which is the principal source of data on inputs and outputs of goods producing industries. The survey presently collects data on contract production services from large Canadian plants that export and import commercial services. Further refinements to the questionnaire would permit an estimate of 'goods for processing' from other contract processing originating from or destined to abroad. Revenues and expenses related to 'goods for processing' from this source would then be used as a check on the difference between the gross values of exports and imports

of goods identified in merchandise trade that meet the definition of goods sent abroad for processing.

C. Sampling

83. The 1993 SNA exposes the data collection process to a sampling problem when it treats contractor-type producers and the traditional producers which make up the majority of units in an industry class as homogeneous. Surveys in Canada proceed by identifying a "take-all" portion of the industry's universe - those which are either multinational or account for a large proportion of the industry's turnovers. Other smaller establishments (the "take-some" portion) are sampled and used in an estimation procedure that infers values for non-sampled units from those that were selected to be in the sample. When units are not classified to different industries or treated as units of different sampling strata, they share the same probability of being selected to represent units with similar statistical attributes. This may lead to a situation where contract processing units are selected for a sample and their production statistics are used to make inferences about traditional units in the sample (and vice versa). A sampling error may arise when the contractor-type producers report their statistics in net terms (they produce a service), whereas traditional establishments report their gross production and gross intermediate cost values. Estimates for some periods would overestimate, and others underestimate, the true values depending on which type of manufacturing unit is actually sampled. This introduces excess variability into time-series of basic industry statistics even when a simple random sampling procedure is used.

84. Finally, contractor-type producers will have fewer chances to be selected in the sample if sampling is based on turnover instead of value added. This presupposes that the classification system is such that processing units have already been identified. This is important in order to deal correctly with the issue underlying table 5 where without information about the mix of producers, it will be difficult for IO accountants to assess the accuracy of the production accounts.

D. Sub-annual surveys

85. Several countries are collecting sub-annually data on turnovers and inventories in order to monitor production in the manufacturing sector. To the extent the goods sent abroad for processing phenomena is important, surveys which are not explicitly differentiating between shipments and processing fees will undoubtedly give wrong signals. Finally, since the price of goods processed and the price for processing fees will most likely differ, price deflators for processing fees needs to be developed.

E. Survey questionnaires

86. Given the difficulties that can be foreseen in obtaining satisfactory data from the sub-annual survey source, existing industry surveys can be used as a second and complementary source to obtain estimates of exports and imports of "for processing" goods. For a principal unit, new questions in the Canadian Annual Survey of Manufactures should be about information on the value of goods of own manufacture that are sent abroad for processing, the post-processing value upon return to the unit, and the fees paid to foreign contractors that, adjusted for timing and transaction costs, would make up the difference between the two values. The two gross values, summed across all industries, can be compared with the tagged data obtained from customs sources to enhance data quality and consistency of a given class of goods.

87. An element required for implementing the 2008 SNA is data on costs of processing services when goods are processed abroad, and the revenues earned by Canadian contractors from foreign principals. For principal units located in Canada, revenues earned from processing principal goods are presently reported as a separate item in the Annual Survey of Manufactures. The survey does not specify, however, whether the principal is a foreign resident affiliate or subsidiary of the same enterprise or whether the goods are returned to the principal after processing or shipped to a third party or country. A more specific wording and a separate question that allows a separate estimate for goods for processing from other outsourcing costs needs to be added to the existing survey. Once a specific estimate is obtained from this survey, the costs of 'goods for processing' can be compared to the net value of gross trade data for this activity from customs sources to ensure data quality and consistency.

88. Processing units in Canada similarly report their gross income from contracting fees to the Annual Survey of Manufacturers as revenues from "custom work". Once again, the reported revenue would include processing for domestic and foreign principals and include processing that meets the conditions of goods for processing as well as other activities. More specific wording and a separate question in this survey will be needed in order to isolate income from goods in processing for foreign principals in order to allow comparison with the net values of trade data obtained from customs.

89. In the Netherlands, in the questionnaires collecting business statistics, the respondents are asked to report amounts paid to and received from sending or receiving goods for processing. The amounts are recorded as "amounts charged to foreign firms for active processing" and "amounts paid to foreign firms for passive processing". Active processing is defined as processing being done by a domestic firm while a foreign firm owns the material goods required for the processing. Passive processing depicts a situation where the domestic firm sends material goods abroad for processing. A foreign firm does the process and sends the processed goods back to the domestic firm. That firm pays fees to the foreign firm. As well, firms declaring foreign trade on goods are asked whether the transaction concerns imports or exports for processing abroad. The Netherlands Statistical Agency (CBS) recognized the flows concerning processing abroad are very difficult to observe. The fact that goods often return in a different time period, the difficulty for multinational enterprises to make a distinction between domestic processing and processing abroad as well valuation problems due to discrepancies caused by import tariffs and duties and transportation costs are other factors that represented a challenge in quantifying the goods sent abroad phenomena.

F. Prices

90. Industry statistics are not only prepared in nominal terms but also in real terms. Price indexes are normally available for products but much less information is available about prices related to assembling these products.

91. With the implementation of the 2008 SNA and the concepts of goods for processing, there is a need to develop price indexes different for both the production and intermediate consumption for contractor-type producers. The movements of the price of the product assembled by the contractor-type producer and the one related to assembly are most likely different.

VI. Concluding remarks

92. With the advent of the globalization, there is a need to portray production activities in a different way. In the context of globalization, the focus is more on how the production

process is spread (organized) than on the technology required for the production process to take place.

93. A better understanding of goods sent for processing is certainly a step towards a better understanding of globalization. It gives a much better idea of the size of international trade in overall economy. In many ways, the 2008 SNA will be simpler to apply compared to the 1993 SNA since it will no longer be necessary to impute values in various places of the IO framework. The recording of goods for processing has been discussed extensively during the updates of the SNA 1993 and BPM6 and a consensus has been reached to not impute a value for these kinds of transactions. The 2008 SNA has been accepted while recognizing its implementation could be difficult due to data gaps. However, the data gaps issue is no different than the one SNA analysts face in applying the 1993 SNA. Imputing for goods for processing requires adjusting annual surveys on production to custom data while not imputing requires removing goods for processing from custom data to align them with annual surveys on production. Consequently, national statistical institutes will most likely need to continue to gather a significant amount of information on goods sent for processing. Above all, there is a need to ensure they are removed from custom trade data where required for administrative reason.

94. While the international community reached a consensus on no longer imputing a value for goods sent for processing, it is recognized the organization of data required by the 2008 SNA limits the structural relationships that are shown within the IO framework based on the 1993 SNA. Without structural linkages, the tables cannot be effectively used, for instance, to study outsourcing phenomenon. This is a key feature of supply and use tables and has often been their "raison d'être".

95. The conclusion suggested by this analysis is that both the "imputation" and the "no imputation" treatments be maintained to ensure the traditional usefulness of supply and use tables. Compiling and presenting the data on both bases and appropriately informing data users preserves the advantages of both treatments without taking away the well-established and traditional application of supply and use tables. The fact that statistics on goods for processing are necessary to implement or not the concept make this very attractive.

96. The Supply and U framework is the only statistical framework that explicitly shows the combination of goods and services that enter into the production of other goods and services. How this relationship or "production technology" is represented is critically important to the types of questions that supply and use tables can accommodate and the kind of answers they would provide. It is important to explore further whether the new "net" representation of production technology - compared to one that is gross of inputs not owned by the producer - is capable of addressing questions traditionally dealt with by input-output tables.

[English only]

Annex I

The case of Hong Kong, China¹

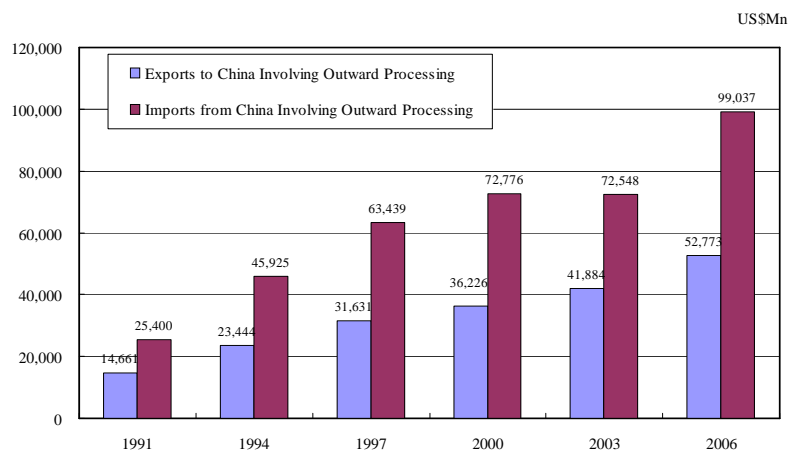
I. Introduction

1. Hong Kong is one of the world's largest trading entity and a premier trading hub in the Asia Pacific region. The past decades saw a continuous integration between the Hong Kong economy and the economy of Mainland China. Factories operated by Hong Kong entrepreneurs in the Mainland produce a wide range of commodities which are exported to many parts of the world.

2. Over the past years, trading activities relating to 'goods for processing' and 'merchanting' play a vital role in the external trade front of Hong Kong. In 2006, about 30% of imported goods into Hong Kong, and 17% of goods exported from Hong Kong were related to goods for outward processing in the Mainland, whereas about 26% of exports of services of Hong Kong were related to 'merchanting' activities. The historical trend of outward processing trade of Hong Kong with Mainland China², and exports of merchanting services from Hong Kong, is presented in Charts 1 and 2 respectively.

Chart 1

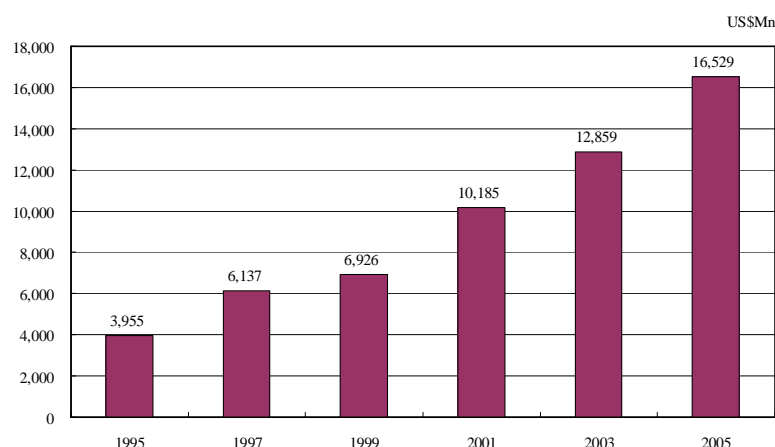
Outward Processing Trade of Hong Kong with China



¹ Based on a paper prepared for the Twentieth Meeting of the IMF Committee on Balance of Payments Statistics, Washington D.C., October 29 – November 1, 2007

² In the past 20 years, the Mainland of China remains to be the hinterland for outward processing activities of producers in Hong Kong (HK). As Mainland China develops into a major manufacturing and processing centre in the region, its production cost remains relatively low. Producers in HK would import major components from say, Japan, arrange to send the components to the Mainland for assembling, and then export the final products to the US. Producers in HK mainly perform the management, marketing and other manufacturing related functions. As an illustration, for every sales of US\$100 of these computer monitors, roughly about US\$50 would be the value of components imported from Japan, US\$17 the processing fees received by plants in the Mainland, and US\$33 the margins earned by producers and traders of HK.

Chart 2
Exports of Merchanting Services from Hong Kong



3. At present, data required for the compilation of goods account of Hong Kong's BoP statistics primarily come from external merchandise trade statistics compiled on the basis of trade declarations submitted by importers and exporters. The external merchandise trade statistics record all movements of goods at the time they cross the border of Hong Kong, but not at the time of change of ownership. "Goods for processing" are thus included in the merchandise trade statistics, and are recorded at the time they are exported to the processing economy or returned to the original economy for local use or re-export. This implies that a change in ownership is always imputed for "goods for processing" whenever they move into or out of Hong Kong, and are recorded on gross terms under the goods account. Under the present framework, "merchanting" is also treated as an exception to the "change of ownership" principle.

4. The new international statistical standards on 'goods for processing' and 'merchanting' which will be promulgated in BPM6 would have a substantial impact on the presentation, compilation and interpretation of external trade statistics of Hong Kong. The implementation of the new statistical standards would be one of the major initiatives and challenges of the Census and Statistics Department of the Hong Kong SAR in the coming years.

5. The major focus of this paper is to present preliminary ideas regarding future plan of the Hong Kong SAR in implementing the new statistical standards under BPM6. Specific issues relating to data collection and dissemination of statistics are also briefly addressed in this paper. It should however be noted that the ideas as presented in the paper in the present form are only preliminary at this stage. It is expected that a thorough consultation process involving various parties concerned would be initiated shortly to provide inputs to enhance the implementation plan within resource limits.

II. Impact of Implementing the New International Statistical Standards

6. In order to roughly assess the impact of implementing the new international statistical standards on relevant statistics of Hong Kong, an adjustment was made to the statistics for the year 2006 based on a crude estimation method. The adjusted figures help to illustrate the likely order of magnitude of the impact of the change.

7. It can be seen from Table 1 that implementation of the new international statistical standards would have a sizeable impact on the external trade statistics of Hong Kong. In particular, the balance of trade in goods in 2006 would be revised from a deficit of US\$14Bn to a surplus of US\$51Bn, and the balance of trade in services from a surplus of US\$36Bn to a deficit of US\$29Bn. In addition, given the significance of 'goods for Processing' and 'merchanting' to the Hong Kong economy, the significant downward revision in the figures in respect of exports of goods and exports of services would change the relative ranking of Hong Kong in world exports of goods and services.

8. A comparison of the rankings of Hong Kong and major trading economies in terms of exports of goods and exports of services for 2006 are presented in Tables 2 and 3 respectively.

Table 1

Impact of Implementing the New International Statistical Standards on 'Goods for Processing' and 'Merchanting'

(US\$Bn)

<i>External Trade of Hong Kong</i>	<i>Value for Year 2006</i>	<i>Adjusted for 'Goods for Processing' Only³</i>	<i>Adjusted for 'Merchanting' Only</i>	<i>Adjusted for Both 'Goods for Processing' and 'Merchanting'⁴</i>
Imports of Goods	332	233 (-30%)	332	233 (-30%)
Exports of Goods	318	265 (-17%)	336 (+6%)	283 (-11%)
<i>Balance of Trade in Goods</i>	<i>-14</i>	<i>+32</i>	<i>+5</i>	<i>+51</i>
Imports of Services	37	83 (+127%)	37	83 (+127%)
Exports of Services	73	73	54 (-25%)	54 (-25%)
<i>Balance of Trade in Services</i>	<i>+36</i>	<i>-10</i>	<i>+18</i>	<i>-29</i>
<i>Balance of Trade in Goods and Services</i>	<i>+22</i>	<i>+22</i>	<i>+22</i>	<i>+22</i>

³ Based on the assumption that the processing activities not related to the Mainland is not significant in size.

⁴ Summing up the adjustment for 'goods for processing' and the adjustment for 'merchanting' to obtain a combined adjustment. For example, the adjustment on exports of goods for both 'goods for processing' and 'merchanting', US\$(283-318)Bn, is equal to the sum of adjustment for 'goods for processing', US\$(265-318)Bn, and the adjustment for 'merchanting', US\$(336-318)Bn. Any remaining discrepancy is due to rounding.

Table 2
Top 15 Economies in Exports of Goods for Year 2006
 (US\$Bn)

<i>Economy</i>	<i>Exports of Goods</i>	<i>Exports of Goods (Adjusted Figures)⁵</i>
Germany	1,131 (1)	1,131 (1)
United States	1,027 (2)	1,027 (2)
China	969 (3)	969 (3)
Japan	616 (4)	616 (4)
France	483 (5)	483 (5)
United Kingdom	450 (6)	450 (6)
Italy	417 (7)	417 (7)
Canada	402 (8)	402 (8)
Netherlands	391 (9)	391 (9)
Korea, Republic of	332 (10)	332 (10)
Hong Kong	318 (11)	283 (13)
Russian Federation	304 (12)	304 (11)
Belgium	284 (13)	284 (12)
Singapore	275 (14)	275 (14)
Mexico	250 (15)	250 (15)

Table 3
Top 15 Economies in Exports of Services for Year 2006
 (US\$Bn)

<i>Economy</i>	<i>Exports of Services</i>	<i>Exports of Services (Adjusted Figures)⁴</i>
United States	409 (1)	409 (1)
United Kingdom	230 (2)	230 (2)
Germany	174 (3)	174 (3)
France	118 (4)	118 (4)
Japan	117 (5)	117 (5)
Spain	106 (6)	106 (6)
Italy	99 (7)	99 (7)
China	92 (8)	92 (8)
Netherlands	85 (9)	85 (9)
India	75 (10)	75 (10)
Hong Kong	73 (11)	54 (15)
Ireland	68 (12)	68 (11)
Belgium	60 (13)	60 (12)
Canada	59 (14)	59 (13)
Singapore	59 (15)	59 (14)

Figures in brackets are rankings among economies in the world.

Sources: International Financial Statistics of the IMF and statistics published in websites of relevant national statistics offices

9. As trade statistics are an important source of information used in bilateral trade negotiations among economies, a significant revision in trade figures would likely cause confusion to data users and policy makers. The likely impact of this revision on trade

⁵ Figures for Hong Kong are adjusted for 'goods for processing' and 'merchandising' based on BPM6 standard, whereas figures for other economies are assumed unchanged.

negotiations has to be carefully assessed. Issues concerned have to be identified and addressed before implementing the new international statistical standards.

III. Important Issues in Implementing the New International Statistical Standards

A. Additional Data Requirement

10. In order to implement the new statistical standards on ‘goods for processing’, the following additional information will have to be collected for Hong Kong:

(a) Exports and re-imports of goods for outward processing with breakdown by commodity group and by country; and

(b) Value of processing fee payment.

11. There are three different options for collecting these additional information, namely:

(c) Expanding the trade declaration documents to be reported by traders to Hong Kong Customs;

(d) Conducting an enhanced survey on outward processing trade activities; or

(e) Applying new data models and imputations.

12. In comparison with ‘goods for processing’, the implementation of the new standards on ‘merchanting’ is relatively less complicated. The additional information required can be obtained by enhancing the existing survey on trade in services. In the existing survey, data on the sales of goods and cost of goods sold for ‘merchanting’ are collected to compile the gross margin, i.e. value of merchanting services provided, which is the difference between the two components. However, the existing survey can only provide annual data and cannot simply be taken as the source data for compiling quarterly BoP statistics. Moreover, the existing survey must also be enhanced to provide data breakdown of “merchanting” by commodity group and by country.

13. The pros and cons of each of the three options are elaborated below.

B. Expanding the Trade Declaration Documents

14. Any person in Hong Kong who imports or exports any article other than an exempted article is required to lodge with the Commissioner of Customs and Excise an accurate and complete import or export declaration within 14 days after the importation or exportation of the article under the Import and Export (Registration) Regulations. Currently, the volume of trade declarations reported by traders each quarter is more than 4.5 million. In order to provide the new data for ‘goods for processing’, additional items of information will need to be reported on each trade declaration.

15. The benefit of this option is that it can provide all additional statistical information required under the new standards. Reliable and timely statistics of exports and imports of ‘goods for processing’ can be compiled. Moreover, detailed breakdown on commodity group, country of origin and destination can also be compiled. Nevertheless, this method requires a huge amount of resources in processing new data items collected from a large number of declarations each quarter. Besides, it imposes additional reporting burden on traders. In general, past experiences showed that traders and legislators would have a great concern on any expansion of the data requirements on the trade declaration documents since this would make the declaration procedures more costly and time-consuming. Hence, considerable resistance to the expansion of trade declaration is expected from the stakeholders who may see this as a move against further trade facilitation.

C. Conducting an Enhanced Survey on Outward Processing Trade Activities

16. The existing survey covers only the outward processing activities in the Mainland of China where there exists some contractual arrangement for subsequent re-importation of processed goods back into Hong Kong. Processing trade in areas other than the Mainland of China is not covered in the present survey since it is considered that this is relatively insignificant. Statistics on outward processing trade are available only with a time lag of around 3 months after the reference period. The sample size of the existing survey is about 7,200 trade declarations per quarter. In the existing survey, reporting burden imposed on traders is kept to a minimum. Only information on processing activities is collected from traders selected in the survey whereas information on value of goods involved are extracted directly from the selected trade declarations. In order to fulfil the new international statistical standards, several major enhancements to the survey are required. These include the following:

- (a) Expanding the survey to cover 'Goods for Processing' in places other than the Mainland of China, e.g. Vietnam;
- (b) Expanding the survey to cover processing activities in the Mainland where there is no contractual arrangement for subsequent re-importation of processed goods back into Hong Kong;
- (c) Reducing the time lag of statistics on processing trade to support the timely release of GDP and BoP statistics; and
- (d) Increasing the sample size substantially to support detailed data breakdown required.

17. The benefit of this option is that it can provide all the additional data required for compiling statistics on trade aggregates under the new standards. Moreover, less resistance is expected from traders because additional reporting burden will not be imposed on all of them but only on those selected in the survey. Nevertheless, this approach can only reasonably support a limited breakdown of statistics by commodity group and by country, and the extent to which the time lag of statistics can be further reduced is rather limited even if substantial enhancement is made to the existing survey.

D. Applying New Data Models and Imputations

18. Based on existing information, new data models and imputation procedures can be constructed to provide additional data at the aggregate level. An obvious benefit of this option is that no additional reporting burden will be imposed on traders. However, this approach cannot provide reasonably accurate breakdown of processing trade by commodity group and by country, due to the lack of more detailed information for the breakdowns.

19. The data models will be designed to produce estimates on the proportion of goods related to processing trade within the overall trading activities, taking into account historical trends and relevant proxy indicators. Regression of relevant historical trends on a set of explanatory variables and proxy indicators, with appropriate time lag structures, will provide workable data models for producing timely data at the aggregate level. One of the examples of an explanatory variable to be included in such model for testing may be imports of raw materials into Hong Kong from various sourcing markets, since these raw materials would need to be imported into Hong Kong before they are delivered to the Mainland of China for outward processing.

20. These data models, with appropriate input assumptions, will also produce estimates on processing fee for inclusion into trade in services statistics. Benchmark ratios of processing fee to the value of goods involved by commodity group and by country can be collected from benchmark surveys once every few years to supplement the model estimates.

E. Pragmatic Modular Approach for Implementation

21. Since each of the three options has its own pros and cons, it is quite clear that a pragmatic approach to implement the new standards is to flexibly combine the three options at different stages of implementation, and for different levels of statistical detail. First, new data models will be constructed to produce preliminary estimates of trade aggregates under the new standards for supporting timely compilation of major macroeconomic aggregates, such as GDP and BoP statistics. These aggregate statistics must be released with short time lags, and it is not practical to incorporate current information on processing trade collected from the enhanced survey into the preliminary aggregates when they are released for the first time.

22. Second, the existing survey on outward processing trade activities will be enhanced to collect additional information for compiling external trade statistics under the new standards with broad breakdown by commodity group and by country. Such information will be available only with longer time lag but it can be used to revise the preliminary estimates of the trade aggregates produced by the data models, and to support more in-depth analysis. The enhanced survey will also provide the information necessary for regularly updating the parameters of the data models used for estimating the preliminary trade aggregates.

23. As a longer term development, it is our target to produce external trade statistics under the new standards with comprehensive breakdown by commodity group and by country. Among the various possible options, the possibility of collecting detailed information through expanding the trade declaration documents will also be explored. It is obvious that the most fundamental problem is obtaining source data of reasonable accuracy. In view of significant resistance from traders and the high cost involved, a strong policy support of the initiative from Hong Kong SAR Government is essential. In order to solicit the support and co-operation of traders and the business community, a long-term strategy has to be developed involving various parties concerned

24. A study will be conducted to examine the cost-effectiveness and technical details of various options, and to draw up a detailed implementation plan. The study will also cover two major tasks:

(a) Consulting key stakeholders in Hong Kong SAR Government and in the private sector to assess their views on each of the options; and

(b) Conducting research and consultation on international best practices in data collection, compilation and dissemination of statistics on 'goods for processing' and 'merchanting'.

F. Presentation and Interpretation of New Statistics

25. Under the new statistical standards, the value of external trade in goods shown under national accounts will be significantly different from that shown under merchandise trade statistics since the latter statistics are not compiled based on the change-of-ownership principle. To reduce confusion to data users, the following alternative dissemination practices will be carefully considered:

G. Releasing Two Different Figures on Trade in Goods with Appropriate Bridge Tables to Explain the Gaps

26. The benefit of this option is that it supports the specific needs of different data users and allows them to choose the figure of trade in goods, either from national accounts or from merchandise trade statistics, that best meets their need. The bridge tables which

explain the gaps between the two set of figures on trade in goods would help to reduce the confusion to data users.

H. Releasing Only One Single Figure for Trade in Goods and Services in National Accounts

27. The benefit of this option is that it avoids the publication of two different set of statistics on trade in goods, one under national accounts and one under merchandise trade. Given that the distinction between goods and services is increasingly blurred, an increasing number of users may accept that they have to perform analysis by pooling trade in goods and services together. However, there are always some data users who need to have breakdowns in goods and services, and their statistical needs must also be met. Hence, this option will not be adopted without first obtaining strong support and consent from major data users.

28. Views of major data users on these alternative dissemination practices will be sought. In particular, the following activities will be organized for different target groups of data users:

(a) Organise talks for the media to explain the rationale behind the new international statistical standards;

(b) Organise discussion sessions with analysts and academics to capture their responses and comments; and

(c) Arrange visits to major data users in both public and private sectors to consult their views.

29. It will also be helpful to provide illustrative examples on the appropriate applications of the two set of figures on trade in goods. For example, the figures of trade in goods under national accounts should be adopted for macroeconomic analysis, such as forecasting overall economic growth, whereas the figures of trade in goods under merchandise trade statistics should be adopted for analysis relating to physical handling of goods flow, such as forecasting demand on port facilities. Educational pamphlets elaborating on these applications will be prepared and distributed to data users.

[English only]

Annex II

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