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**SEMINAR ON STRATEGIC ISSUES IN BUSINESS STATISTICS**

**SESSION II: EMERGING AREAS, NEW DEVELOPMENTS AND USER NEEDS IN  
BUSINESS STATISTICS**

**CHALLENGES WHEN USING ADMINISTRATIVE AND SURVEY DATA IN THE  
COMPILATION OF STATISTICS ON THE STRUCTURE AND ACTIVITIES OF  
MULTINATIONAL ENTERPRISES**

Note by Statistics Norway

*Summary*

The Conference of European Statisticians selected in June 2008 (ECE/CES/74) the topic “Strategic issues in business statistics” for a seminar to be held at its 2009 plenary session. The Bureau, acting on behalf of the Conference, approved the outline for the seminar at its February 2009 meeting (ECE/CES/2009/2) and requested Norway to prepare a note to provide basis for the discussion.

The note considers challenges in the compilation of statistics on the structure and activities of multinational enterprises. It presents the main issues and solutions used in Norway to define and target the population for statistical surveys on the structure and activities of the multinational companies. The note also considers the related quality issues and the benefits and costs involved in the production of this kind of statistics.

## I. INTRODUCTION

1. Globalization has brought several issues to greater prominence. An increasing number of individuals and companies have connections to two or more economies and economies increasingly enter into economic arrangements. As a result of the internationalisation of businesses, there is a need to approach the production of statistics in new ways and to meet new user needs. The tasks related to defining the relevant population are also increasingly demanding. Difficulties related to the distinction between Norway and the rest of the world and to identifying the relationship between companies in different countries (intra- or extra-group) often arise from the lack of satisfactory sources of information on relations between residents and non-residents. Statistics as a science is fundamentally based on the concept "population" (of units), counting of units and adding together information that has been collected for these units. In economic statistics there are at present a lot of challenges regarding globalisation and getting the population right, as well as issues related to the quality of the data for the relevant economic concepts and variables to be provided for different sectors and industries.

2. This paper will present some main issues and solutions on how the population for two different surveys for statistics on the structure and activities of the foreign controlled multinational companies is defined and targeted in Norway (inward Foreign Affiliates Statistics (FATS)<sup>1</sup>). We will then go on to look at how we have compiled data for the inward FATS statistics to meet the forthcoming reporting obligations in the European Commission's Regulation of the activity and structure of foreign affiliates (the FATS-R<sup>2</sup>). For Statistics Norway, it has been important that the focus on these problems includes the basic work with the development of a strategy for data capture that is efficient for both respondents and the statistical institute. Some prerequisites for our work on establishing inward FATS statistics have been:

(a) To keep the response burden to a minimum by exploiting existing administrative data;

(b) To influence the owners of administrative data in their creation of the new administrative data sources; and

(c) When necessary, to amend existing surveys within Statistics Norway, in order to provide the information needed both for defining the population of foreign controlled multinational enterprises and for the relevant statistical characteristics.

3. At the end of the paper we will also give some thoughts on quality issues, both on the sources for and the resulting two data sets<sup>3</sup> established for inward FATS statistics. The paper

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<sup>1</sup> We have in parallel also worked with the planning and compilation on outward FATS statistics. In this paper we do however choose not to discuss challenges in this work, but may come back to that at a later stage.

<sup>2</sup> Regulation (European Commission (EC)) No 716/2007 of the European Parliament and of the Council of 20 June 2007 on Community statistics on the structure and activity of foreign affiliates.

<sup>3</sup> With support from Eurostat we are working with two pilot surveys for the year 2006. One pilot study is on establishing inward FATS data for the Structural Business Statistics (SBS) and Research and Development (R&D) variables as stated in the FATS-R, however broken down by employment size classes. This includes the same characteristics that are to be reported from the year 2007 on as stated in the FATS-R. However the employment size

will also briefly go into some aspects that deserve some attention when checking the consistency between the two quite detailed data sets. This nearly touches on some of the same quality issues as when linking different micro data sets in the areas of business and trade statistics. Some thoughts on the benefits and costs involved in this kind of statistics production are also presented briefly at the end of the paper.

## **II. BRIEFLY ABOUT STATISTICS NORWAY'S WORK ON INWARD FOREIGN AFFILIATES TRADE STATISTICS**

4. The work on establishing inward FATS statistics in Statistics Norway has so far evolved around tasks performed in two pilot studies for the year 2006 financed by Eurostat:

(a) In the first pilot study data for exports and imports of respectively total and intra-group trade in both goods and services broken down by activity and ultimate controlling institutional unit (UCI) has been compiled;

(b) The second pilot study aims at providing inward statistics for characteristics in section 2 of annex 1 in the Commission Regulation of the activity and structure of foreign affiliates (the FATS-R), i.e. characteristics reported for Structural Business Statistics (SBS) and Research and Developments statistics (R&D statistics), activity breakdown according to the standard for Classification of Economic Activities (NACE) rev 1.1<sup>4</sup> and the country of residency of the ultimate controlling institutional unit. The data are also broken down by employment size class, and hence more detailed than the requirements in the FATS-R.

5. The figures from the first pilot study for 2006 have been released on Statistics Norway's website, please see [http://www.ssb.no/english/subjects/10/01/utfono\\_en/](http://www.ssb.no/english/subjects/10/01/utfono_en/), supplemented with data for the years 2000-2005. Data from the trade pilot study have not yet been published, awaiting some more quality checks and a final quality assessment.

6. A brief overview of the work we have done that will be described and commented on in this paper:

(a) The establishment of an inward FATS population for each of the years 2000-2006 using our register on foreign ownership in Norwegian enterprises (the SIFON-register) up to 2004, and the Share Holders' Register (from the Directorate of Taxes) and the Central Register of Enterprises in Statistics Norway from 2005 on;

(b) Discussing the possibilities of obtaining necessary characteristics not covered in population registers from the Directorate of Taxes through their new taxation control report on controlled transactions, assets and liabilities;

(c) Pilot study 1: Amending our surveys on exports and imports of services to give figures for inward FATS enterprises and also the intra-group trade in services. Assessing the

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class breakdown will then not be requested. The second one is about data on exports and imports of goods and services including intra-group trade.

<sup>4</sup> Cf. Commission Regulation (EEC) No. 29/2002.

possibilities of using data for trade in goods from the Directorate of Customs and Excise for inward FATS statistics, including intra-group trade in goods;

(d) Pilot study 2: Using our Structural Business Statistics-data (SBS-data) to compile statistics on number of enterprises, number of persons employed, turnover, production value, value added at factor cost, total purchases of goods and services, personnel costs, gross investments in tangible goods and our R&D survey for the characteristics “total intra-mural R&D expenditure” and “total intra-mural R&D personnel”, broken down by employment size classes. We will also present here some of the results from this exercise published on Statistics Norway’s website. Work on R&D data will not be presented in this paper;

(e) Checking the consistency between the two datasets in the pilot studies. It should be borne in mind that one outcome of the pilot studies should be to be able to come up with some conclusions on the feasibility and usefulness of the quality checks.

### **III. ESTABLISHING THE POPULATION OF FOREIGN OWNERSHIP IN NORWEGIAN COMPANIES**

7. To be able to produce the statistics on Norwegian foreign controlled enterprises’ relationship to other countries, we are dependent on a system which identifies companies with foreign economic relationships. In doing this, we have focused on establishing a permanent system to maintain the population<sup>5</sup>. Since 2004 Statistics Norway has used information from the Tax Directorate’s Register of Shareholders for several purposes. One important aspect is defining which companies are owned from abroad. The information from the Share Holders’ Register is together with some additional sources also used for producing stock statistics for Norwegian companies, including statistics on nominal share capital and paid-out dividends for foreign shareholders. These figures show that Sweden and the United Kingdom were the largest holders of nominal share capital in Norwegian companies in 2007, measured for the immediate foreign owners of Norwegian companies.

8. The files for producing stock statistics from the Register of Shareholders and some supplementary sources contain information about the country of residence for each shareholder, the number of shares and the amount of the total share capital in the company for each shareholder. Therefore, it is possible to use the register to identify foreign companies controlling more than 50 per cent of the share capital in Norwegian companies. In 2006 there were about 4 300 foreign controlled companies.

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<sup>5</sup> Statistics Norway is now responsible for statistics in the Balance of Payments (BoP) domain previously produced by the central bank (Norges Bank).

Table 1  
**Nominal share capital and paid-out dividends for foreign shareholders, by selected countries. 2007. Norwegian kroner million<sup>1</sup>**

	Nominal share capital	Received dividends
Total	106 829	61 141
Sweden	22 457	6 924
United Kingdom	13 784	7 191
USA	9 778	9 988
Denmark	8 842	10 780
France	8 149	9 871
Netherlands	6 511	7 130
Luxembourg	4 719	1 511
Switzerland	4 463	1 458
Germany	3 838	709

<sup>1</sup> Preliminary figures

9. Hence, the information from the Register of Shareholders is the major source for updating the institutional sector code in Statistics Norway's Central Register of Enterprises (CRE). The CRE contains all legal units who are engaged in economic activity in Norway, their establishments and in addition the public sector, and also the units in a sub-register used for foreign ownership in Norwegian companies (the SIFON-register). Other sources for updating the institutional sector code have been feedback from the Balance of Payments (BoP) surveys and other available sources.

10. One major task when starting to use the new Register of Shareholders has been to make sure that the quality of the information on share capital held by non-residents is sufficiently high. It has been necessary to go through quite a substantial amount of data where no information on country of residence was available. When doing so, we have used data from years prior to 2005 in an annual census on assets and liabilities. We have also used company accounts, annual reports and other information in the quality assessments. An improvement can be seen now in the quality of the data in the Register of Shareholders.

11. The files for producing stock statistics from the Register of Shareholders are also the main source for the automatic creation of enterprise groups, since the files cover almost all links between Norwegian enterprises and also many of the immediate foreign owners of Norwegian enterprises. With this information it is possible to count the market share for each owner and create a hierarchic ownership structure in the Enterprise Groups Register in the CRE.

12. In addition, the ultimate foreign owner has to be registered for producing inward FATS statistics. All sources for updating the institutional sector code, and thus the inward foreign dimension in the SIFON-register and the CRE, provide the country of the immediate foreign owner but not the ultimate foreign owner/country. Having identified the first link of ownership in Norwegian companies from the Register of Shareholders, we have aimed at finding the country of registration of the UCI proceeding up the ownership chains as described in the FATS

manual<sup>6</sup>. In most cases this ends in the country where the enterprise in question is registered, has its headquarters and is primarily listed on the stock exchange.

13. Having no administrative data source or survey for the UCI information has made it quite a time-consuming task to establish this characteristic. The main sources for finding the UCI have been annual accounts, the companies' Internet homepages, information on the stock exchange, etc. It has been relatively easy to find the UCI for the larger companies. By having correct UCI information for the 2300 largest companies, about 92 per cent of the value added for inward FATS companies is covered and 70 per cent of the employment. However, it gets harder to find the information when the company size is smaller. We therefore looked into whether the country of the largest shareholder can be used as a proxy for the ultimate owner's country for the smaller companies. This works in many cases, but not in all. Hence, to obtain thorough information, smaller companies also need to be examined. With scarce resources it will be a question of whether the more simplified approach should be used for smaller companies for most years. This may in our point of view be a satisfactory method for getting a good distribution for many of the characteristics in inward FATS statistics (turnover, value added, etc.), but may lead to reduced quality for the distribution for the number of enterprises, number of persons employed and personnel costs in particular. Hence, thorough examinations every few years may be necessary.

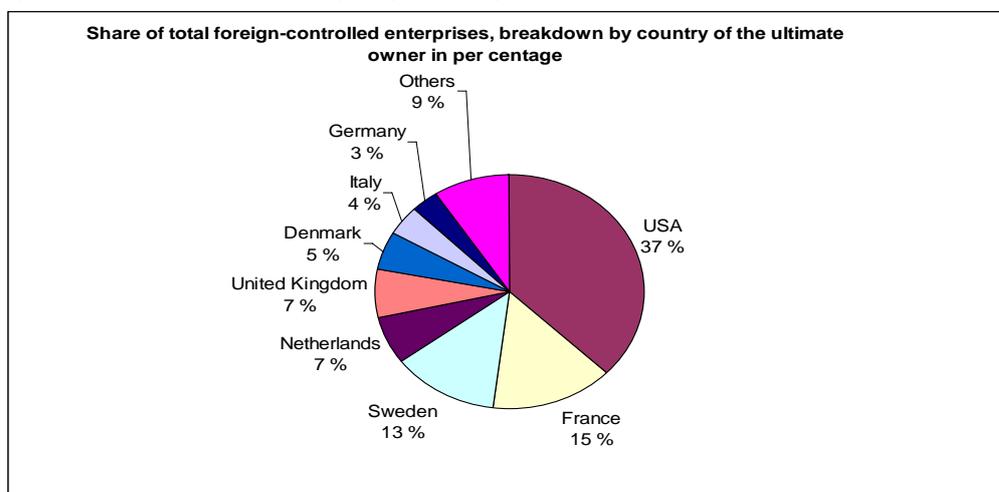
14. The outcome of our exercise on establishing information on the residency of the UCI for 2006 for the inward FATS companies shows that Sweden is the largest ownership country, measured by the number of enterprises and employees, accounting for 33 per cent and 27 per cent of these totals for all foreign-controlled enterprises respectively. Measured by value added as in Figure 1, the United States is the largest ownership country with a share of 37 per cent, followed by France with 15 per cent and Sweden with 13 per cent. Sweden thus seems to have more influence in smaller companies, whereas the United States and France control relatively larger inward FATS companies.

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<sup>6</sup> Recommendation Manual on the Production of Foreign Affiliates Statistics (FATS), 2007 edition.

Figure 1

**Enterprises under foreign control, by country of ultimate owner. Percentage share of the total value added at factor cost. 2006**



15. The next step in the work now will be to establish the UCI information in the Enterprise Group Register in the CRE, so that there is one single source for annual populations for future years. From the year 2007 we also aim at using information about the UCI from the Directorate of Taxes newly established data collection on controlled transactions and assets and liabilities for enterprises.

16. Statistics Norway has by law (the Statistical Act<sup>7</sup>) the right to use administrative data as the basis for official statistics. Statistics Norway should also forward proposals as to the design of such data-processing systems at the time of establishment or in connection with major revisions or changes in the system. Statistics Norway therefore met with the Directorate of Taxes before they established in 2007 data collection on controlled transactions and assets and liabilities for enterprises, to obtain data on the UCI, with success this time for this characteristic. Given that the quality of this administrative source is good, we believe that the time spent on updating the UCI information from one year to the next will become less time-consuming. We are now in the process of analysing the 2007 data for UCI from the Directorate of Taxes, comparing data to our established 2006 data.

#### **IV. USING EXISTING DATA SOURCES TO PRODUCE INWARD FOREIGN AFFILIATES TRADE STATISTICS FOR CHARACTERISTICS IN STRUCTURAL BUSINESS STATISTICS**

17. At first, when looking into which data sources to use for the SBS-characteristics for pilot study 1, we hoped to be able to use information already available and disseminated for all relevant industries. For inward FATS we are supposed to have the data for the foreign controlled enterprises (aggregate Z9 in the FATS-R) compared to the benchmark “the whole business economy” or world total figures (aggregate A1 in the FATS-R). Breaking these data further down by industry, employment size class, and place of residency for the UCI presented a

<sup>7</sup> The Statistical Act of 16 June 1989 No. 54.

challenge and we therefore discussed which way this would be done most efficiently. It was discussed which institutional sectors should and could possibly be included in the totals for the whole business economy at present, and it was decided to include non-financial enterprises (sector S.11) and quasi-corporate enterprises (in sector S.14). The financial enterprises in sector S.12 have not been included so far.

18. It did, however, become evident quite early on that statistics for all the relevant activities or industries was not available in one processed file at the enterprise level. Although Statistics Norway of course does produce and publish SBS figures for enterprises according to the SBS-regulation, the main focus when producing and presenting statistics for all industries has been the establishment level. This is due to the fact that our national accounts statistics uses the establishment level as the main statistical unit, and not the enterprise level, which is to be used in inward FATS. This is also due to the fact that for some of the major industries in Norway, i.e. oil and gas exploration, ocean transport and electricity supply, the business and trade surveys have been built up around the establishment, pool or licence level more than the enterprise level. It did, however, become clear very soon that we would need to use SBS data for the enterprise level to obtain the required information for the inward FATS companies and the whole business economy. This is because using data from the national accounts with the establishment level as the major statistical unit would lead to a wrong distribution between the various industries for inward FATS purposes. In addition, finding a method for size-class breakdown of data available for market activities in national accounts would not be feasible. The way forward was then to get the reported data from the various SBS divisions within Statistics Norway and link them to information on the UCI via the unique identification number for enterprises in the CRE, namely the organisational number. Hence, the task of producing inward FATS statistics also involved the first release on Statistics Norway's website of tables for the whole business economy at the enterprise level.

19. When describing the various sources for our SBS, we will go into more detail about the challenges using this source. However, here are some results for 2006 for the size-class breakdown for inward FATS companies, clearly and expectedly showing that inward FATS companies in Norway are relatively large, measured by employment size. In 2006, one in five employees worked in a foreign-controlled enterprise. The largest share was within oil and gas exploration. In this industry, 35 per cent were employed by a foreign-controlled enterprise. In real estate, renting and business activities the share was 24 per cent, and in manufacturing 23 per cent. The foreign ownership becomes even more evident if we look at enterprises with 100 or more employees. Among enterprises of this size, foreign-controlled enterprises accounted for 37 per cent of the employment and 40 per cent of the value added for enterprises of this size.

Table 2

**Enterprises under foreign control<sup>1</sup> compared to the whole business economy<sup>2</sup> by number of persons employed in per cent. 2006**

	Number of enterprises	Number of persons employed	Personnel costs	Turnover	Production value	Value added at factor costs	Total purchases of goods and services	Purchases of goods purchased for resale in the same condition as received	Gross investments
Enterprises under foreign control (A2) in per cent of all enterprises within the whole business economy (A1)	1.7	18.8	24.7	26.7	26.2	27.9	25.3	28.7	22.3
Data not available or 0 persons employed	1.1	:	15.4	22.3	22.0	23.0	20.6	34.9	10.9
1-4 persons employed	0.8	1.1	3.6	12.2	12.8	18.1	8.6	9.7	12.1
5-9 persons employed	2.7	2.8	5.4	11.4	9.3	10.5	11.3	14.9	9.7
[10-19 persons employed	4.6	4.8	8.1	14.6	13.0	12.7	15.1	17.2	24.1
20-49 persons employed	9.1	9.7	13.6	20.0	18.8	17.6	20.6	22.4	53.8
50-99 persons employed	16.6	17.2	20.9	25.5	23.1	24.1	25.9	30.4	26.4
100-249 persons employed	27.1	27.9	33.2	45.8	49.6	61.2	36.8	35.2	70.8
250 and more employed	40.5	40.3	41.1	33.4	31.4	32.1	32.7	41.3	23.6

<sup>1</sup> Subsidiary enterprises under direct or indirect control by foreign enterprises

<sup>2</sup> Sections E Electricity, gas and water supply and J Financial intermediation are not included

<sup>3</sup> Acquisition of tangible assets

## V. THE PRODUCTION SYSTEM FOR STRUCTURAL BUSINESS STATISTICS IN STATISTICS NORWAY

20. To reduce the response burden and obtain uniform information from the enterprises, all Structural Business Statistics include or are based on the Standard Industry Form (SIF) given to the tax authorities by the enterprises. The SIF comprises account information that has to be sent to tax authorities for corporate income tax purposes. The SIF is now the main source of information for the SBS in Statistics Norway. Using manufacturing as an example, for the year 2006 information from the SIF was available for 15 072 manufacturing enterprises (72% of the manufacturing population) covering 98% of the turnover in manufacturing. The picture is also more or less the same for other industries. The SIF can be automatically aggregated from the basic accountancy information that each enterprise has access to through standard accountancy software. At the enterprise level it comprises most of the information needed for producing the characteristics to be reported according to the SBS and FATS regulations, see Table 2. By law, Statistics Norway gets the SIF-information from the Directorate of Taxes. In addition, turnover data from the Register of Value-Added Taxes (VAT) are used as well as employment figures from the Employers and Employees Registers, and also information in the company accounts from the Register of Company Accounts.

21. In addition to the administrative data we have a survey part in SBS. The surveys have questionnaires for the various industries to get additional information with a conceptual coherent link to this financial report. Supplementary information on e.g. investments, expenditure on information and communications technology equipment and the breakdown to the establishment level for enterprises with more than one establishment is collected in the survey part.

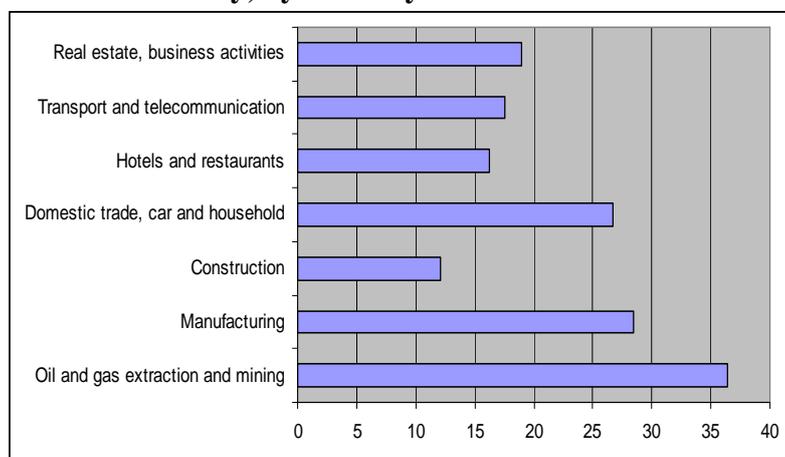
22. To obtain the total numbers for the whole enterprise population and the establishment population, statistical methods are applied for the implementation of missing information. Most of the missing enterprises are organised as joint-stock companies, and thus main figures from the profit and loss account and balance sheet are available through the annual financial statements in the Register of Company Accounts. For enterprises organised in other forms, turnover data from the VAT Register are used as keys, in addition to employment figures from the Employers and Employees Registers.

23. For SBS the estimation system is used to estimate a full set of characteristics for all enterprises in the population, and hence we get a match for all inward FATS enterprises on enterprise level. The unique organization number in the CRE is used to link the enterprises to information on the country of the UCI.

24. The exercise of matching the SBS data for 2006 to the inward FATS population gave us the following distribution by industry for 2006:

Figure 2

**Value added for foreign controlled companies in Norway in per cent of all companies in the business economy, by industry**



25. A brief sum-up of main results shows that foreign-controlled enterprises, especially within manufacturing and oil and gas extraction, had a large share of the value added in Norway in 2006. The foreign-controlled enterprises' value added was Norwegian kroner (NOK) 361 billion in 2006. This accounts for slightly more than 29 per cent of the total value added in all enterprises in Norway. Foreign-controlled enterprises within manufacturing and oil and gas exploration accounted for more than 28 and 36 per cent of the value added, respectively. The value added per employee was around NOK 1 451 000 in the foreign-controlled enterprises, compared with around NOK 978 000 in the business economy as a whole. Average wage costs

per employee were higher for foreign-controlled enterprises. In 2006, average wages for employees in these enterprises were NOK 505 000, compared with NOK 385 000 in the whole business economy.

## VI. TRADE IN GOODS AND SERVICES

26. SIFON and the CRE (including information on activity and the UCI) were used to identify the foreign controlled enterprises likely to be trading with non-residents and data were linked via the organisational number for figures both for trade in services and trade in goods. In the part of the trade surveys below covering the intra-group imports and exports of services group, companies are defined as relating to each other via direct or indirect control, in line with Eurostat's FATS-manual. For Norwegian inward FATS enterprises this means that all services bought from enterprises abroad, which are controlled by the same controlling unit as the Norwegian company directly or indirectly, should be reported as imports of services within the group (and of course also as part of the company's total imports of services).

### A. Data sources for trade in services

27. Total imports and exports of services are based on two existing surveys in Norway:

- (a) Balance of Payments (BOP) Survey on the External trade in services;
- (b) Survey on Structural Business Statistics on Water transport, etc.

28. The main data source is the BOP Survey on the External trade in services, where exports and imports of services are classified according to the Classification of Products by Activity (CPA). In this survey we added questions on intra-group imports and intra-group exports of services for each CPA category for 2006, hence following the same level of detail for intra-group trade as for total imports and exports of services. This is done due to the need of the external trade division in Statistics Norway to get the data reported in CPA 982000 "Trade in services within the same enterprise group not stated elsewhere" broken down into other CPA codes. This was not done as a specific need for the inward FATS-pilot study, where the data requirement is for total intra-group trade in services distributed by industry and UCI, for exports and imports respectively.

29. The above applies to all industries apart from enterprises operating in international ocean transport (NACE 61.101, 61.106 and 71.220). For these industries the data are collected in the Survey on Structural Business Statistics and are linked to the Structural Business Statistics on Water Transport and the Operating Survey for Vessels in International Trade. Exports and imports of services are classified according to the CPA standard.

30. Statistical methods were applied in the BOP Survey on the external trade in service to gross up the sample data to full population data, by using a ratio model. The sample for 2006 was divided into various strata, taking into account whether the enterprise was an inward FATS enterprise or not and with regards to the size of the total turnover, the NACE-code, the size of the enterprise's imports and exports for previous years and in the register of cross-border

transactions for 2006. The survey population comprised about 62 000 enterprises, and the sample comprised 3 700 enterprises of which about 1 100 were inward FATS enterprises.

31. A ratio model was also used to gross up for enterprises operating in international ocean transport. Exports were estimated by turnover and imports were estimated using operating costs. The sample comprised 1200 enterprises of which 66 were inward FATS enterprises.

## **B. Data sources for trade in goods**

32. The foreign trade statistics is a monthly census of all transactions in goods between residents and non-residents. The census is based on administrative data from the customs authorities. In addition, cross-border trade outside the Norwegian customs area (but to/from Norwegian territory) and with change of ownership between residents and non-residents is collected directly. This applies to exports of crude oil and natural gas from the Norwegian off-shore area, imports and exports of ships and aircraft and imports and exports of electric power.

33. Intra-group trade was identified through computer based matching of the name of the Norwegian importer (exporter) with the same or a similar name of the foreign exporter (importer) in the foreign trade statistics. The matching results were supplemented by knowledge of intra-group relations between large Norwegian importers (exporters) and large foreign importers (exporters), although the names were not equal or similar. This method will not identify all intra-group trade and estimates of the missing trade may be needed in the future. A separate survey of intra-group trade for FATS purposes only is not very likely, but it may be that a combination with other user needs will encourage the trade statisticians to include this breakdown in the foreign trade statistics in the future.

34. However, the number of transactions is so big that the trade in only one month was examined in the way described above. October was the month chosen to be examined. The grossing up of the October data to data for the year 2006 was done in the following way: the link between the organisational numbers and the corresponding industry code was used to break down the October and the 2006 data by 2-digit NACE industry. The ratio between 2006 and October 2006 was calculated for each industry. Export of crude oil and natural gas required special attention. As the value of this export is calculated by Statistics Norway based on different sources, it is not attributed to certain enterprises and thus did not fit into the industry ratios model. However, we were able to find a ratio which grossed up the October data quite well. These combined NACE/CPA ratios were applied on all breakdowns of the foreign trade in goods demanded by the FATS requirements, i.e. further breakdown by industry and breakdown by country of residency for the UCI.

## **C. Some comments on preliminary results from the trade pilot study**

35. Results from the trade in services and goods pilot studies have not been published nationally so far, since more quality checks need to be performed. We are in the process of doing so now, and may publish the results in spring this year. The results so far indicate that the imports and exports of services and goods for inward FATS companies as a share of the total foreign trade in services and goods for Norway in 2006 was substantial. The figures also suggest that the intra-group trade is substantially larger for inward FATS companies than for all enterprises in the business economy.

## **VI. SOME OF THE QUALITY ISSUES FOR INWARD FOREIGN AFFILIATES TRADE STATISTICS IN NORWAY, INCLUDING CONSISTENCY CHECKS BETWEEN THE TWO DATASETS**

36. The challenges in obtaining correct data have been numerous. Hence, elaborating all interesting issues would take too long, and we will only mention some of the problems here. At present, March 2009, we are in the phase of validating the data in cooperation with Eurostat. The data are checked for consistency with regards to the geographical breakdown of the UCI information, the activity breakdown and for consistency between the SBS characteristics in pilot study 2, cf. pages 94-95 in the FATS manual. Checks are also made for characteristics in the two pilot studies, i.e. for exports versus turnover and for imports versus total purchases of goods and services.

37. For the SBS datasets with the required characteristics<sup>8</sup>, broken down by employment size classes the major issues have been as follows:

(a) Some industries, particularly oil and gas exploration, electricity supply and water supply (NACE 11, 40 and 41) deviated initially from the SBS reporting of enterprise figures to Eurostat. Cut-off samples have so far been applied for NACE 11 for the SBS reporting. This is because the smaller enterprises do not comprise as much with regard to getting the correct figures for value added, etc. as for the figures for the number of enterprises. In inward FATS we have chosen not to use cut-off samples to get correct figures for the number of enterprises in particular. For these industries there were also substantial challenges in getting good correspondence between data on the enterprise and establishment levels. New data were constructed for the enterprise level for oil and gas exploration for pilot study 2, based on the SIFs;

(b) There were also some issues on duplicate records for the years 2000-2006. This is due to the facts that SBS samples are not constructed at exactly the same time. This may lead to differences in the NACE code for the same enterprises in the different surveys, if the CRE has been updated with regard to the NACE code between the slightly different points in time for the sampling for the various industries in the SBS. Also, figures for all industries are not published on the same date, and hence some duplicate records may appear if there is a slight difference as to when information on the industry classification has been revised in the data editing process for the different industries;

(c) There has to some extent been a slight variation in the treatment of auxiliary enterprises between the SBS for different industries;

(d) We believe that we still need to work on quality improvements for the updating of the inward FATS population, including information on the residency of the UCI;

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<sup>8</sup> Number of enterprises, number of persons employed, turnover, production value, value added at factor cost, total purchases of goods and services, personnel costs, gross investments in tangible goods and our R&D survey for the characteristics "total intra-mural R&D expenditure" and total intra-mural R&D personnel"

(e) We see that a lot of cells need to be flagged as confidential before sending data to Eurostat. Hence, such detailed produced statistics for inward FATS have to be published at a higher aggregate level for activity, employment size class and UCI.

38. These aspects are now being looked into in the SBS work in Statistics Norway and we believe that most of these problems will be solved when producing the 2007 inward FATS statistics.

39. For the trade in goods and services the following issues have been the most prominent when linking the trade data with the SBS data on a detailed level (industry at NACE 3-digit level by country of residency for the UCI):

(a) For trade data, a more macro-based editing approach is often applied compared to SBS data. Hence, linking data at a very detailed level will provide us with some inconsistencies that may be too costly to solve. Also, when the trade statisticians edit the data, not all the input for the SBS characteristics are available (the SIF, etc), and the deadline for the trade statisticians for the first data delivery to the BOP system is much earlier than the deadline for reporting inward FATS data to Eurostat. Hence, another system of editing needs to be implemented if the consistency at the detailed level of activity by UCI can be met. In other words, running more detailed editing procedure after the first BOP deadline may be necessary.

(b) For some entities, in particular within ocean transport, the total exports and imports of services are reported from the enterprise heading the pool of ships owned by different enterprises, whereas turnover and operating costs in the SBS data are reported at the enterprise level. This is taken into account in the trade statistics, but at a more aggregated level. Hence, this leaves us with discrepancies between, for instance, turnover and exports of goods and services and total purchases of goods and services and imports of goods and services for some combinations of UCI and industry.

(c) There may also be data problems when linking administrative data on trade in goods and survey data on trade in services. Although we in the trade in services surveys stress that services only should be reported, some figures may comprise elements from trade in goods. It may also be the case that the figures for trade in goods from the administrative records comprise service elements. This has so far not been controlled for in detail at the enterprise level and is one issue that we need to look into further, assessing the benefits of such detailed checks against the costs.

40. Overall, the work with consistency checks between the two data sets has left us with useful insight for further work. As statisticians we want to ensure that our data is of the best quality. However, at the same time we have to take the costs and benefits into consideration. We clearly see that if trade characteristics are to be reported according to the FATS-R in the future, we need to undertake more work to get a balanced and more automatic system for editing and analysing the data. Also, the consistency checks should perhaps be applied for more aggregated level than has been the case in our exercise for 2006.

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