11.M

The European Union

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11.M.1 Introduction

The Global Trade Analysis Project (GTAP) was established with the objective of lowering the cost of entry for those seeking to conduct quantitative analyses of international economic issues. A central activity of GTAP concerns the periodic update of its economic data base. The most recent version, GTAP 4, was released in 1998. A central component of the economic data base is the set of regional input-output tables for a certain base year. The version 4 GTAP data base included I-O tables for the EU member states Germany, Denmark, Great Britain, Sweden and Finland, and the rest of EU for the year 1995. The other EU countries, however, were not individually included in the data set and that could be considered as a limitation. Moreover, the different construction method for the aggregate EU15 table compared with that of each separate member state must be seen as another disadvantage of the previous data set. Therefore, version 4 lacked a complete harmonized set of EU input-output tables. A survey of the various methods applied can be found in McDougall et al. (1998). The new version 5 data base addresses the disadvantages of the previous version[1] .

[1] I would like to thank the European Commission (DG XI) which has financially supported this project. In addition, thanks are due to Jos Heuschling (Eurostat, Luxembourg), Jörg Beutel (Fachhochschule Konstanz, Germany), Ludo Peeters (Limburgs Universitair Centrum LUC-Diepenbeek, Belgium), Martina Brockmeier (Federal Agricultural Research Centre, Germany), Leena Kerkela (HKKK, Finland) and Asier Minondo (Universidad de Deusto, Spain) for providing me with national input-output tables. At last, special thanks are due to Henk Kelholt (LEI) and Maarten ‘t Riet (CPB) for supporting me with using the FAO/SUA’s, and to Frank van Tongeren (LEI) for his helpful collaboration.

This document describes the procedure followed in constructing harmonized input-output tables for each member state in the EU as well as for the entire EU15 for the GTAP version 5 data base. This must be considered as an important innovation as such a detailed set of EU tables had not been constructed before. Regional tables were collected from national statistical offices and supplemented with recent Eurostat information. Then, regional data from additional agricultural sources were gathered and included in the tables to reach the preferred GTAP sector classification. Finally, each regional EU table was updated to the year 1995. In addition, the table for the EU15 region was constructed on the basis of an aggregation of all fifteen individual input-output tables. Herewith, the quality of the newest GTAP version has evidently been improved through a better consistency in underlying data and disaggregation methods. This can be seen as another significant contribution of the new EU data base. Unfortunately, tax structures and import duties could still not be described in the regional input-output tables as they were not available. Previous GTAP data base versions, however, showed the same weakness.

The rest of this paper is organized as follows. Section 11.M.2 summarizes the approach used to create the complete set of individual member state tables as well as the aggregate EU15 table for version 5. Problems that appeared during the compilation procedure are discussed in the last section of the paper. In addition, some future work that could be helpful in the construction of better tables sre also mentioned there.

11.M.2. Methods for Creating the EU Data Base

Since 1996, the EU comprises Belgium, Luxembourg, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, United Kingdom, Austria, Finland, Spain and Sweden. The EU's position in the world economy amounted to 7,600 billion European Currency Units (ECU) in terms of gross value added in 1997, compared to 6,000 and 3,600 billion ECU, respectively, in the USA and Japan. One main objective of the new GTAP version has to do with the implementation of all individual EU member state tables. Due to the complexity and variety of the data material, it seemed desirable to apply a consistent approach to succeed that job. The steps followed in compiling the EU data base for GTAP version 5 are summarised as:

— collecting national input-output tables from national statistical offices and from Eurostat (section 11.M.2.1)
— mapping the national input-output tables to a common valuation (section 11.M.2.2)
— mapping the national sector classifications to the GTAP sector classification, excluding agricultural disaggregation (section 11.M.2.3)

— updating the national input-output tables to a common base (section 11.M.2.4)
— disaggregating the agricultural and food processing sectors in the national input-output tables (section 11.M.2.5)
— aggregating the national input-output tables to an EU15 table (section 11.M.2.6)

Generally speaking, the same procedure was implemented to obtain the EU15 table in the previous GTAP version 4 (Van Leeuwen and Verhoog, 1997). In the process of constructing that table, which was more limited than the work envisaged here, considerable experience was gained with harmonizing national input-output tables and preparing them in an internationally compatible format. The main difference with the recent version, however, refers to the disaggregation level of the agricultural and food processing sectors in the individual EU countries. That process was only applied to the EU15 table as a whole in version 4, whereas this disaggregation procedure is performed at member state level in version 5.

11.M.2.1 Collecting National Input-Output Tables

Depending on the country, national statistical offices have ongoing programs to compile input-output tables in annual, bi-annual or longer intervals. The amount of information contained in these national tables varies among countries. For example, sector classifications and valuation methods differ widely. Due to the complexity of the data material, it is very time consuming to construct harmonized national input-output tables. Nevertheless, an important part of the EU data base in the new GTAP version is based on input-output tables which were gathered from these national statistical offices. Table 11.M.1 summarises the national input-output tables presently available at LEI.

All national input-output tables are grouped industry by industry, and this feature can be considered as the only common factor between the tables. On the other hand, table 11.M.1 shows that the input-output tables vary with respect to the sector classification and valuation method. In addition, Austria's most recent table refers to the year 1983, while Luxembourg and Greece did not deliver a table at all. Flows are expressed in millions of national currency, while those of Spain and Italy are expressed in 1,000 millions of national currency.

Another source for national input-output tables of the 15 EU member countries is the input-output table data base of Eurostat. In co-operation with the national statistical offices of the member states, Eurostat has the intention to compile five-yearly input-output tables which are harmonized in accordance with the European System of Integrated National Accounts (ESA). Up to now, the most recent tables available at Eurostat are for the year 1995 and they comprise estimated matrices for domestic production of goods and services, imports from EU member states, and imports from third countries. Estimates are based on the so called EURO method, an iterative balancing procedure developed by Beutel (1999).The underlying idea of this approach is to use official Eurostat statistics

Table 11.M.1 Characteristics of Input-Output Tables Available at LEI

Country	Year	Classification of sectors	Valuation	Source
Belgium	1995 a)	59	Producer prices	Peeters (Limburgs Universitair Centrum LUC-Diepenbeek, Belgium)
Denmark	1992	127	Basic and producer prices	Statistics Denmark, Copenhagen
France	1992	97	Producer prices , inclusive imports, VAT	Institut national de la statistique et des études économiques, Paris
Germany	1995 b)	59	Producer prices	Brockmeier (Federal Agricultural Research Centre FAL, Braunschweig, Germany)
Greece	n.a.	n.a.	n.a.	n.a.
Ireland	1990	41	Basic and producer prices	Central Statistical Office, Dublin
Italy	1992	59	Producer prices	Instituto Nazionale di Statistica, Roma
Luxembourg	n.a.	n.a.	n.a.	n.a.
Netherlands	1995	88	Producer prices	CBS, LEI, The Hague
Portugal	1993	49	Producer prices, inclusive imports, VAT	Instituto Nacional de Estatistica, Lisboa
Spain	1994	56	Producer prices	Minondo (Universidad de Deusto, San Sebastian, Spain)
United Kingdom	1990	123	Basic prices	Office for National Statistics, London
Austria	1983	177	Producer prices	Austrian Central Statistical Office, Wien
Finland	1995	64	Basic prices	Kerkela (HKKK, Helsinki, Finland)
Sweden	1985	88	Producer prices	Statiskiska Centralbyran, Orebro
EU15	1995 a)	25	Producer prices	Eurostat, Luxembourg

a) estimate; b) provision; n.a.: not available

as macro targets for iteration, together with the most recent version of a national input-output table. The column and row vectors of intermediate use and final demand are derived as endogenous variables, rather than accepted as exogenous variables from unspecified sources. This new updating method for input-output tables avoids arbitrary changes of important input coefficients, which sometimes occur if more traditional updating procedures are applied. The outcome of this approach is a harmonized set of input-output tables for the individual member states for the year 1995, as well as for the EU15 as a whole. The tables cover 25 sectors, with flows expressed in value terms using millions of ECU. These Eurostat tables will be used as a consistent updating framework for the GTAP version 5 data base in cases where no national input-output tables for 1995 are available. Section 11.M.2.5 gives a further description of the manner in which the tables from the national statistical offices are integrated with the Eurostat tables. Tables for Belgium, Luxembourg and Greece, however, were missing because these countries did not provide Eurostat with information. In the case of Belgium, that was no real problem, as a table for 1995 was already supplied by another

source (see table 11.M.1). On the other hand, no alternative versions were available for Luxembourg and Greece. The solution for these missing input-output tables with respect to providing a complete EU data base are also discussed in section 11.M.2.5.

Finally, the new input-output framework of the European System of Nation Accounts (ESA, 1995) must be mentioned. A revision, which has consequences for the valuation in input-output tables, was implemented at the national statistical offices of the European Union in autumn 1999. It can be expected that from the year 2002 onwards a set of harmonized Eurostat tables will become available as an integral part of these revised national accounts. Unfortunately, these tables will not be comparable with the recent Eurostat data base due to a difference in flow valuation. For example, only *intersectoral* flows were valued in the pre-revision tables, while *intrasectoral* transfers must also be valued since the introduction of ESA 1995.

11.M.2.2 Mapping the I-O Tables to a Common Valuation

Domestic Usage Matrix

The GTAP model uses two different prices – agents' prices and market prices. Taxes make the difference between both prices, where the market price equals the agent price including net taxes. As a consequence, the GTAP data base requires information about the commodity net tax structure in a region. To match this commodity tax structure, input-output tables valued at basic prices[2] (excluding net commodity taxes) are required. Denmark, Ireland and the Netherlands provide tables that represent intermediate demand at both basic prices and producer prices[3] (including net commodity taxes). Therefore, full information is available for these countries. On the other hand, the United Kingdom and Finland publish their tables at basic prices, while the other member states are only reporting at producer prices. Tax matrices to convert input-output tables to a common valuation are not available for the other countries. A choice for a common valuation is required, however, to construct a consistent EU data base. Because the majority of input-output tables include commodity taxes, the valuation at producer prices is taken as base valuation for the EU member state input-output tables. This means that both the intermediate and final demands in the table are inclusive of net commodity taxes, while the tax matrix remains empty. The Finnish and British tables, however, remain reported in basic prices, which was the same in earlier GTAP versions. Because information

[2] Agents' prices in the GTAP model.
[3] Market prices in the GTAP model.

on their specific tax structure fails due to confidential issues[4], the tax matrices for these countries contain zeroes too.

Import Matrix

In addition, the GTAP data base needs information about the regional import structure. Most national input-output tables consist of a domestic usage matrix as well as a (more or less) recent import matrix valued at *c.i.f.* prices[5]. Such a separation is in accordance with GTAP's version 5. Intermediate and final usage data in the French and Portuguese tables includes imports, however, which requires an estimate of the split between domestic and import usage. Both the French and the Portuguese table have a column vector that reports total imports by commodity. With help of the structure implied by the total usage matrix (sum of domestic and import usage), the amount of the *row total of imports* allocated to each sector was computed (by the percentage of the *row total of usage* to each sector). Then, the estimated import matrix was subtracted from the total usage matrix to obtain the domestic usage matrix. Therefore, the structure of imports is assumed to be equal to the structure of total usage. This treatment of imports follows GTAP technical paper no. 1 (Huff et al., 1999).

Value Added Tax (VAT)

The same procedure was followed to subtract VAT from the intermediate and final usage matrix for France and Portugal, because these countries also value its intermediate and final usage inclusive of VAT. Total VAT, by commodity, is available from the national accounts information. In accordance with the structure implied by the total usage matrix, the amount of the *row total of VAT* was proportionally allocated to each sector. Next, the VAT matrix was subtracted from the total usage matrix and the column totals of the VAT matrix were considered as primary costs.

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[4] In the case of missing tax values, this might have been derived from the tax structure in Denmark, Ireland and the Netherlands. Subtracting the estimated tax structure from the intermediate and final demand at producer prices would contribute a table at basic prices. Such a method was not applied however, because the three underlying countries represent only approximately 7 per cent of all economic activity in the EU15 in 1995. Therefore, it is not reasonable to consider its tax structure representative for other member states in the European Union.

[5] The *c.i.f.* price of imported commodities covers the foreign producers price, foreign trade margins and the cost for insurance and transport from the place of production to the border of the importing country.

11.M.2.3 Mapping to GTAP Classification

Although GTAP prefers commodity by commodity tables, single region input-output tables often reflect an industry by industry structure. In that respect, 'industry' should be understood by shorthand for 'current production sector', where current production sector corresponds to commodity (McDougall, 1999). One of the main tasks in preparing a GTAP input-output table concerns the mapping of the national sector classification to the GTAP sector classification (GSC). As all EU member states must be implemented in the data base, this procedure was applied to fifteen countries. Unfortunately, the national input-output tables, which are industry by industry tables, vary in the number of sector detail (see table 11.M.1). Appendix table 11.M.A1 shows the mapping list of some member states that was used to reach the concordance. Several source sectors are much too aggregated to match the GTAP sector breakdown, in which case a split is imposed (indicated by an asterisk in the appendix). At this point in the procedure, it depends on the characteristics of a sector whether a breakdown is implemented now or in a later stage.

Primary Agricultural Sector

The first aggregated sector group in the national tables refers to primary agriculture, which must be divided among agriculture, forestry, and fishery in the GSC. The input-output tables for Denmark, France, Italy, the Netherlands, Portugal, United Kingdom, Sweden and Finland have the preferred GTAP split. The German I-O table is split between agriculture on the one hand, and forestry and fishery on the other. The remaining tables (Austria, Belgium, Ireland, Spain) just reflect one input-output structure for agriculture, forestry, and fishery as a whole. These are split on the basis of the economic accounts for agriculture and forestry (Eurostat, 1998)[6]. Those accounts were prepared by the statistical offices of the member states in accordance with a common methodology, and contain information on final output, intermediate consumption and gross value added for agriculture and forestry per member state. Thereafter, fishery is considered as a residual of the primary sector.

Agricultural and Food Processing Sector

A second sector group requires a further disaggregation of the agricultural sector on the one hand, and the food processing sector on the other. None of the national input-output tables provides a split of the twelve GTAP primary agricultural commodities. The degree of disaggregation for the food industries, however, varies among the countries. The break down of both industry types is based on special agricultural data sources and will be discussed in section 11.M.2.5.

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[6] Unfortunately, SPEL contains no data for the forestry and fishery sectors.

Other Sectors

The third sector group refers to the non-food sectors in the input-output table. In the where a particular sector split falls short in comparison with the GSC, additional information from other EU member states is borrowed to make the split. For example, the original input-output table for Spain shows no split between 'minerals' (GSC sector 18) and 'mineral products n.e.c.' (GSC sector 34). Therefore, its aggregate was divided into two sectors according to the related flow specific information on both sectors in the Portuguese table. This is a reasonable option because Portugal and Spain are neighboring countries with similar economic structure. Another example refers to the public utility sector in the Irish table which should be disaggregated in 'electricity' (GSC sector 43), 'gas manufacture, distribution' (GSC sector 44) and 'water' (GSC sector 45). The aggregate for these GTAP sectors in the Irish table was divided on the basis of flow specific information in the British input-output table.

Special mention should be made about 'imputed bank services' which are often considered as services of the financial sectors (GSC sectors 52 and 53) in the EU tables. Basically, the 'imputed banking services' sector is an artificial sector where the total interest payments that are accruing to the banking services are recorded in one column. This is done by some, but not all, statistical agencies because they only have information on the total interest received by banks but they do not know the sectoral origin of these payments. Because gross output of imputed bank services is conceptually zero, the operating surplus of this kind of services is a negative value. The imputed bank services represent a significant activity of the financial sector which often results in a negative operating surplus for the sum of financial activities. The GTAP data base, however, requires non-negative values for all factor usage values. Therefore, we have incorporated this artificial sector in the input-output table by allocating total imputed banking services (intersection of row 'bank' and column 'imputed banking services') over banking services inputs used by (non-banking) sectors. A proportional allocation rule, namely the sectoral cost share of capital, was used. While this procedure eliminates the column 'imputed bank services' and preserves the size of output of 'bank services', it leads to smaller sectoral value added numbers for non-banking sectors.

11.M.2.4 Updating to a Common Base Year

After we have transferred the national input-output tables to a common valuation and to a common GSC map, the tables must be brought to a common base year[7]. The update method is distinguished

[7] An update of tables expressed in GSC was preferred over an update of tables expressed in national sector classification. Although an update at the national level would probably produce better results due to its further disaggregation, this procedure would have involved much more time.

from the RAS method, which was applied in the previous version 4 to balance the intermediate use and final use components of the tables. Version 5, however, uses an alternative but more pragmatic update approach (see figure 11.M.1). The Dutch, German, Belgium and Finnish input-output tables have 1995 as reference year, while the reference year of the other EU countries varies. The year 1995 is chosen as base year[8], especially because the Eurostat estimates refer to that year too. As a consequence, the tables for the Netherlands, Germany, Belgium and Finland need no further adaptation after the results at the end of the previous step (in section 11.M.2.3). On the other hand, the Spanish table refers to the year 1994, the Portuguese table to 1993, the Danish, French and Italian tables to1992, the Irish and British tables to 1990, the Swedish table to 1985 and Austria's to 1983. According to Beutel (1999), these national tables were already used as the basis for the Eurostat's 1995 updates together with official macro economic statistics. These Eurostat tables, which cover only 25 sectors, are in turn extended to the GTAP sectoral classification. Appendix table 11.M.A2 shows the concordance of the Eurostat sector classification to that of GTAP. Some Eurostat sectors are much too aggregated to map with GTAP sectors (e.g., 'textiles and clothing, leather, footwear'). Otherwise, other sectors have the same concordance (e.g., 'paper and printing products' or 'building and construction') or must even be aggregated (e.g., 'inland transport services' and 'auxiliary transport services') to map to the GSC. As can be imagined, the second and third cases present no real problems, whereas the first case requires additional estimations. The most highly aggregated sectors in question are split on the basis of their proportional share in the national version. With the exception of the agricultural and food processing sectors, that version was already brought in concordance with GSC. In mathematical terms, the disaggregation procedure applied is denoted in equation (1) for the intermediate usage of domestic products.

$$\acute{a}_{ij}^{r,95,gsc} = \left(\acute{a}_{ij}^{r,b,gsc} \Big/ \sum_{i=1}^{f} \sum_{j=1}^{h} \acute{a}_{ij}^{r,b,gsc} \right) \cdot \acute{a}_{fh}^{r,95,eur} \qquad (1)$$

where

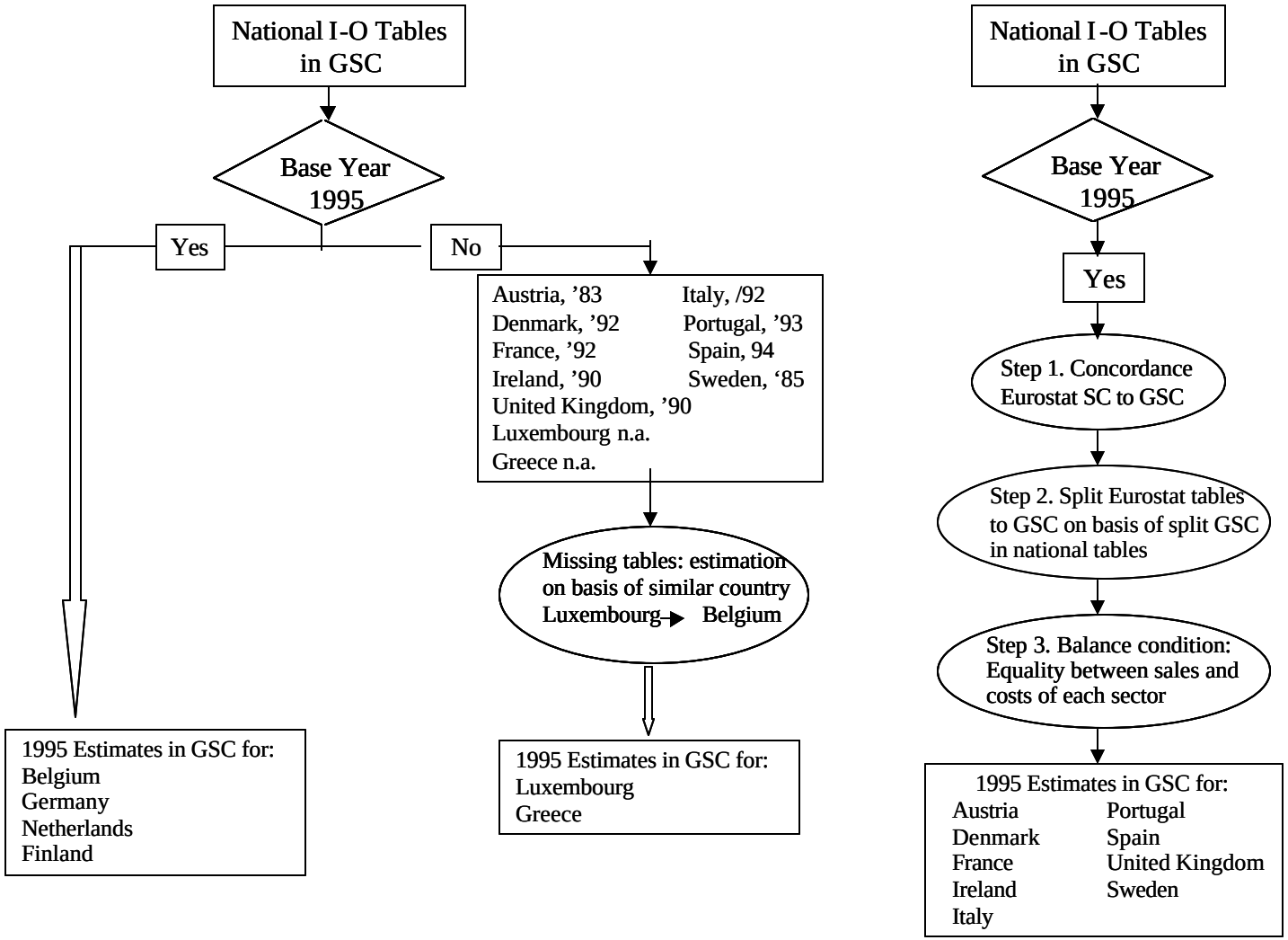
$a^{r,95,gsc}_{ij}$ = intermediate usage of domestic products by sector i (with i=1,..,f) from sector j (with j=1,..,h) in region r for 1995, GSC version 5

$a^{r,bt,gsc}_{ij}$ = intermediate usage of domestic products by sector i from sector j in region r for base year b, GSC version 5

$a^{r,95,eur}_{fh}$ = intermediate usage of domestic products by sector group f from sector group h in region r in 1995, Eurostat sector classification

[8] 1995 is the initial base year for the EU tables only. All regional I-O tables are updated to the 1997 base year for the entire global data set at the Center for Global Trade Analysis.

Figure 11.M.1 Updating Procedure for EU Input-Output Tables



The above equation is applied to each sector group in the Eurostat table that needs to be further disaggregated into the GTAP sector classification. For example, the sector group 'textiles and clothing, leather, footwear' in the Eurostat input-output table (denoted as $a^{r,95,eur}_{fh}$) is split in the GTAP sectors 'textiles', 'wearing apparel', 'leather products' and 'wood products' (denoted as $a^{r,95,gsc}_{ij}$). This procedure is not only applied to the domestic usage matrix, but also to the estimated Eurostat import matrix for 1995 (equation (2)), the value added components (equation (3)), and the final demand for consumption, gross investment and export (equation (4)).

$$\acute{a}i_{ij}^{r,95,gsc} = \left(\acute{a}i_{ij}^{r,b,gsc} \Big/ \sum_{i=1}^{f} \sum_{j=1}^{h} \acute{a}i_{ij}^{r,b,gsc} \right) * \acute{a}i_{fh}^{r,95,eur} \tag{2}$$

$$d_{ig}^{r,95,gsc} = \left(d_{ij}^{r,b,gsc} \Big/ \sum_{i=1}^{f} d_{ig}^{r,b,gsc} \right) * d_{fg}^{r,95,eur} \tag{3}$$

$$b_{kj}^{r,95,gsc} = \left(b_{kj}^{r,b,gsc} \Big/ \sum_{i=1}^{f} b_{kj}^{r,b,gsc} \right) * b_{kh}^{r,95,eur} \tag{4}$$

Here, ai_{ij} denotes intermediate usage of imports by sector i from sector j, d_{ig} denotes final demand for category g of sector i, and b_{kj} refers to value added of category k in sector j. Hereafter, the sectoral balance condition in the input-output table must be checked for equality between each sector's total sales and total costs. If that condition is not satisfied, balance is achieved via adjustments to the final demand component 'changes in stocks'.

The disaggregation method was applied to the Eurostat tables for Spain, Portugal, Denmark, France, Italy, Ireland, United Kingdom, Sweden and Austria, grouped according to the GSC for version 5. Together with the tables for the Netherlands, Germany, Finland and Belgium, which needed no further transformation, information for thirteen EU member states has become available. This means that the tables for Luxembourg and Greece are still missing. In 1995, both countries together represent not more than 1.5% of the EU15 gross domestic product. In the previous GTAP version, that small share was reason for keeping the two member states out of the data base. The objective of version 5, however, is to introduce all individual EU countries, including Luxembourg and Greece. Therefore, another approach is followed to estimate input-output tables for these two countries that rely partly on using other member state's data as proxies, and partly on specific country data. It should be recalled that Eurostat tables for Greece and Luxembourg are also not available.

Missing I-O Tables

It is assumed that the Greek input-output structure approximates that of Portugal. Their economic structure are similar. In 1995, gross domestic product amounted to 87 billion ECU for Greece and 78

billion ECU for Portugal, while total population numbered 10.5 million in Greece and 9.9 million in Portugal. Both countries are situated in the south of Europe and are relatively less developed in terms of economic activity. Specific Greek data on value added per sector and production value per sector were inserted into the 'borrowed' input-output structure. Afterwards, total sales and total costs for each Greek sector were balanced, with the agricultural sector still aggregated. The procedure used for disaggregation of the agricultural sector was similar to that of other member states (see section 11.M.2.5).

For Luxembourg, the same kind of approach was applied to include it in the GTAP data base. However, it differs in the sense that a table for Belgium and Luxembourg, as a pair, was estimated instead of a separate table for Luxembourg. This was not only because they are neighbor countries, but it is especially due to Luxembourg's small role in economic activity compared with that of other EU member states. Another reason to consider Belgium and Luxembourg as a pair is that international trade data are only available for the pair of countries together. Moreover, agricultural statistics like SPEL/EU[9] and the FAO's supply utilization accounts also denote data for the two states combined. These statistical sources are both used in the next section to disaggregate the agricultural and food processing sectors in the input-output tables. Therefore, it is reasonable to take account of the macroeconomic situation of both countries as a whole. The construction of the Belgium-Luxembourg input-output table was assumed to be based on the Belgium input-output structure, which is available for 1995 (see section 11.M.2.2). Then, specific Luxembourg data for items like value added per sector and production value per sector were added. Finally, total sales and total costs for each sector in the extended table were balanced, with the agricultural sector still considered as an aggregate.

In sum, this section has described the construction of input-output data bases that takes account of all EU15 member states. All tables (with matrices for domestic usage and total imports) refer to the year 1995 and are denoted in the GTAP sector classification of version 5, while their agricultural and food processing sectors are more or less aggregated. The next section describes the disaggregation of these sectors.

[9]SPEL/EU-model: Sectorales Produktions- und Einkommensmodell der Landwirtschaft der Europäischen Union (Sectoral Production and Income Model for the European Union).

11.M.2.5 Disaggregating the Agricultural and Food Processing Industries

Table 11.M.2 shows some characteristics of the EU member state tables after having implemented the steps as described in the previous sections.

This section documents the methodology used in disaggregating both the agricultural industry and the food processing industry into the GTAP sectoral classification. The split of the agricultural

Table 11.M.2 Characteristics of National Input-Output Tables

Country	Year	Classification	Valuation	Currency
Belgium- Luxembourg	1995 (est)	42 b)	Producer prices	BFR/LFR
Denmark	1995 (est)	46 a)	Producer prices	DKR
France	1995 (est)	45 b)	Producer prices	FF
Germany	1995 (est)	40 b)	Producer prices	DM
Greece	1995 (est)	42 b)	Producer prices	DR
Ireland	1995 (est)	42 b)	Producer prices	IRL
Italy	1995 (est)	42 b)	Producer prices	LIT
Netherlands	1995	46 a)	Producer prices	HFL
Portugal	1995 (est)	42 b)	Producer prices	ESC
Spain	1995 (est)	45 b)	Producer prices	PTA
United Kingdom	1995 (est)	45 b)	Basic prices	UKL
Austria	1995 (est)	46 a)	Producer prices	OS
Finland	1995	46 a)	Basic prices	FMK
Sweden	1995 (est)	45 b)	Producer prices	SKR

[a)] Agricultural sector aggregated; b) agricultural and (part of) food processing sectors aggregated; est: estimate.

sector is based on two sources, namely the SPEL/EU-model of Eurostat and the FAO supply utilization accounts (SUA). The SPEL/EU-model contains information on revenues and costs of 49 production activities (35 crop, 13 animal production activities and a fallow land activity) at the EU member state level and at the EU15 level for the period 1975-1997. It is especially suitable for disaggregating agricultural inputs. The FAO/SUA provides information for disaggregating the output side of agriculture, i.e. the set for destination of agricultural products.

Input Disaggregation

The procedure starts with drawing up the GTAP input-output framework in which the SPEL/EU-data can be placed. Appendix table 11.M.A3 shows the mapping used to associate the production activities of SPEL with the GTAP classification. All activities in the SPEL/EU-model produce commodities that are either used within agriculture itself or leave agriculture to be processed, exported or consumed. For example, a big part of cereal production is directly used as feed by animal activities while another part is used by the processing industry for flour production. Some SPEL

activities produce more than one product. Consequently, the inputs of these activities have to be allocated to two or more products. For example, 'dairy cow' and 'other cow' activities produce not only milk but also bovine meat. Their inputs have been allocated to the GTAP commodities 'bovine cattle meat' and 'raw milk' in proportion to their production value in SPEL. The same method is applied to the SPEL activity 'ewes and goats', which produces the GTAP commodities 'wool' and 'meat'.

There are four SPEL activities ('grass grazing', 'other root crops', 'fodder plants on arable land' and 'fallow land') that do not show up in the GTAP classification. According to SPEL, their outputs are used completely by the animal activities to produce animal products. On the other hand, the inputs of these four activities are used by agriculture. These inputs have been allocated in proportion to the use of fresh and ensilaged fodder to the animal activities. As a consequence, for the production of 'raw milk' certain amounts of fertilizer and pesticides are added as inputs.

In the second step, the SPEL input-output framework is used to disaggregate the agricultural sector of the national input-output tables described in the previous sections. Total input of agriculture in those tables is divided on the basis of the SPEL inputs for each GTAP commodity. A problem that arises has to do with the lack of detail in the SPEL data base. In such cases the same input item is applied to disaggregate several different cost components in the input-output table. Appendix table 11.M.A4 shows the mapping used to break down the agricultural sector column.

Output Disaggregation

The next step in the disaggregation procedure focuses on the split of total agricultural output. The SPEL supply balance sheets give some information about domestic usage, exports, imports and stock changes. In many cases, however, SPEL does not indicate whether the products originate directly from the farm or originate from processing industries. Therefore, it is not evident from SPEL whether e.g. grain export really is grain indeed or should be considered as processed grain (flour). This lack of distinction is solved by using the FAO/SUA data set since it contains detailed information on how much of each product is first processed and then consumed or exported. SUAs are available for about 250 raw and 750 processed agricultural commodities on a time series basis for individual countries. Firstly, the processed commodities were converted backward into raw material equivalent by dividing them by the extraction rate (e.g. flour per unit of wheat). This procedure is executed with the special software program AGDAT (Keyzer et al., 1994). Secondly, two separate balances were drawn up for each product. One balance for the raw commodity itself and one for the processed commodities in raw material equivalent. One product in GTAP (e.g., 'cereal grains n.e.c.') may include several products in the SUAs ('oats', 'barley', 'maize', etc.). Therefore, the different commodity flows in raw material equivalent were first valued against its trade prices and then aggregated to the GTAP classification.

The break down of the agricultural sector in GSC is completed now for both the input and output side. The last step deals with the disaggregation of the food processing industry. Some EU member states like Austria, Denmark, Finland and the Netherlands have sufficient detail in the processing industry in their input-output table. These countries need no further disaggregation. The food industry in the United Kingdom, Sweden, France and Spain is for the most part already in GSC concordance, with the exception of the meat processing industry. This industry should be split into a 'bovine cattle, sheep and goat, horse meat products' industry and a 'meat products n.e.c.' industry. To make that distinction, detailed information on the meat processing industry in the first set of member states (Austria, Denmark, Finland and the Netherlands) was used as proxy. The food processing industry in the group Belgium-Luxembourg, Germany, Ireland, Italy, Portugal and Greece is either reflected as a whole or on a three-sector level ('meat', 'dairy' and 'other food' industry). To achieve the desirable GSC break, the available disaggregated food industry structure in the earlier mentioned member states was also used as proxy. Unfortunately, the rice processing industry was not separately identified in any of the EU member states. For that industry, the same input structure as that of the food products industry was used, while its output structure was based on SUA data.

Import Disaggregation

The input-output tables also contain an import matrix with one column and one row for agriculture (and the food processing) industry. To be in line with the GTAP classification this import matrix needs to be disaggregated too. The SPEL/EU model contains information on imports of 'seeds and seedlings' and 'animals' by agriculture which is used to split the import side of agriculture. For simplicity, it is assumed that all inputs are produced by the same sector that buys the input. For example, 'seed' bought by the domestic 'wheat' activity is produced by the foreign 'wheat' activity, and 'animals' imported by the domestic 'animal' activity are of foreign 'animal' origin. As a consequence, all agricultural imports by the agricultural commodities are on the diagonal of the matrix. The other imports for the agricultural commodities are allocated in proportion to their domestic usage.

Similarly, the imports of the food processing industry were allocated in proportion to their domestic usage with the exception of agricultural products imported by the food processing industry. Agricultural imports of the dairy and meat industry were lowered and the agricultural imports of the food products industry were adjusted upwards. In particular, the feed industry, which is part of the food products industry, required a relatively larger amount of imported cereals and cereal supplements.

Primary Costs and Taxes

The last step in the agricultural disaggregation procedure deals with the primary cost components in the input-output table. First, disaggregation of the non-commodity taxes for agriculture was based on Common Agricultural Policy (CAP) subsidy data in SPEL. Second, rents on agricultural land were calculated in proportion to the area used for each agricultural commodity. The total area of the SPEL activities 'grass grazing', 'other root crops', 'fodder plants on arable land' and 'fallow land' was allocated in proportion to the use of fresh and ensilaged fodder by the animal activities. Third, compensation for labour was disaggregated in proportion to the gross value added of the SPEL agricultural sectors. Finally, compensation for capital input was calculated as a residual by subtracting all the inputs calculated so far from gross output value.

11.M.2.6 Constructing the EU15 Input-Output Table

This section focuses on the compilation of a data base for the EU15 as a whole, based on the individual member state tables, the construction of which was documented above. The national input-output tables were brought to concordance with the 57 sector classification of GTAP and were updated the tables to the year 1995. However, the tables are still expressed in millions of national currency, with the exception of Spain and Italy which are valued in thousand millions of national currency. Before the tables can be added up to one EU table, they must be converted to ECU's. Table 11.M.3 shows the exchange rates used between the national currencies and the ECU in 1995.

Table 11.M.3 Exchange Rates between National Currencies and the ECU in 1995

Country	Exchange rate	Country	Exchange rate
Belgium-Luxembourg	BFR 38.5519	Italy	LIT 2130.1400
Denmark	DKR 7.3280	Netherlands	HFL 2.0989
France	FF 6.5251	Portugal	ESC 196.1050
Germany	DM 1.8738	Spain	PTA 163.0000
Greece	DR 302.9890	United Kingdom	UKL 0.8288
Ireland	IRL 0.8155	Austria	OS 13.1824
Finland	FMK 5.7086	Sweden	SKR 9.3319

Source: Economic Accounts for Agriculture and Forestry 1992-1997

The national input-output tables io^r (with r=1,…,l), expressed in ECU, are added up to a table for the EU as a whole (equation (5)).

$$io^{eu,95,gsc}_{n\%m\%k,n\%g} = \sum_{r=1}^{l} io^{r,95,gsc}_{n\%m\%k,n\%g} \qquad (5)$$

where $io_{n+m+k,n+s}$ denotes a GSC formatted input-output table with n domestic sectors, m import sectors, k primary categories, and g final demand categories.

Special mention should be made about the treatment of EU trade. Trade in the national input-output tables sums the trade within EU countries (intra-trade) and trade with third countries (extra-trade), whereas no separate information is available. Consequently, EU trade is calculated as the sum of total imports and total exports of the individual member states. This is in concordance with the way in which GTAP prefers to treat intra-EU trade. E.g., intra-imports must be regarded as imports and not as domestic usage. That will permit the GTAP user to include a flexible number of individual EU member states in the aggregation module. A 'rest of EU' data base is then calculated as the difference between the original EU15 table and the chosen number of individual member state tables. Despite the fact that a split in intra- and extra-EU trade would give a theoretically better EU15 table, GTAP prefers this pragmatic approach to trade.

11.M.3. Remaining Problems and Issues for Further Research

After we have applied the previous steps to construct the EU15 data set for version 5 of GTAP, several shortcomings remain. The input-output tables do not include all required information to match the target structure of GTAP. For example, the tables still miss information on commodity taxes and on import duties. With respect to the last issue, the GTAP data base contains duty rates obtained from trade statistics. These can be used to calculate import duties for both member states and the entire EU15.

Basically, the 'imputed banking services' sector is an artificial sector where the total interest payments that are accruing to the banking services are recorded in one column. This is done because statistical offices only have information on the total interest received by banks, but not on the sectoral origin of these payments. Because gross output of imputed bank services is conceptually zero, the operating surplus of this kind of services is a negative value. The imputed bank services represent a significant activity of the financial sectors, which often results in a negative operating surplus for the sum of financial activities. The GTAP data base, however, needs non-negative values for all factor usage values. Therefore, we have incorporated this artificial sector in the input-output table by a proportional dividing approach. This treatment of financial services is certainly an important area for future improvement.

The previous section already criticized the treatment of EU15 trade, which was calculated as the sum of total imports (intra- and extra-EU) and total exports (intra- and extra-EU) of the individual member states. Herewith, intra-trade is regarded as imports and exports for the EU, while it could

better be treated as a domestic usage. A split in intra- and extra-EU trade for the individual countries would have led to a theoretically better underpinned EU15 table. The Eurostat tables distinguished trade in intra- and extra-trade. This information could be helpful in the future to construct a EU15 input-output table that considers intra trade as a domestic usage.

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Appendix

Table 11.M.A1 Mapping between some National Sector Classifications and GSC

France		
National Classification		GTAP
1	* Agriculture [10]	1-12
2	Forestry	13
3	Fishing	14
4	Hard coal	15
5	Coke oven products	32
6	Crude petroleum	16
7	Natural Gas	17
8	Refined petroleum products	32
9	Electricity (distribution)	43
10	Gas (distribution)	44
11	Water (distribution)	45
12	Ferrous ores	18
13	Basic iron	35
14	First transformed products of steel	35
15	Other metal ores	18
16	Basic non-ferrous metals	36
17	Other mining and quarrying	18
18	Earthenware and pottery	34
19	Glass (products)	34
20	Non-organic basic chemicals	33
21	Organic basic chemicals	33
22	Chemical products	33
23	Pharmacy products	33
24	* Casting of metals	35-36
25	Fabricated metal products	37
26	Agricultural machinery	41
27	Tools	41
28	Industrial equipment	41
29	Mining, casting, construction equipment	41
30	War equipment	41
31	Office and communication equipment	41
32	Electricity equipment	40

contd

[10] Items which need to be split between GTAP categories are indicated with an asterisk.

Table 11.M.A1 Mapping between some National Sector Classifications and GSC
(Continued)

France		
National Classification		GTAP
33	Prof. electronic equipment	40
34	Household electronic equipment	40
35	Household machinery	41
36	Motor vehicles, bicycles	38
37	Railroad equipment	39
38	Ship building	39
39	Airplane building	39
40	Precision instruments	41
41	* Meat products	19-20
42	Dairy products	22
43	Canned food products	25
44	Bakery products	25
45	Cereal grain products	25
46	Vegetable fats and oils	21
47	Sugar	24
48	Other food products	25
49	Beverages	26
50	Tobacco products	26
51	Natural textiles	F27
52	Tricot	27
53	Artificial work of fibres	27
54	Leather	29
55	Leather products	29
56	Footwear	29
57	Wearing apparel	28
58	Wood products	30
59	Furniture	30
60	Paper products	31
61	Books and papers etc.	31
62	Rubber products	33
63	Plastics products	33
64	Work of art, antiques etc.	42
65	Construction	46
66	Recycling	47
67	Commerce	47

contd

Table 11.M.A1 Mapping between some National Sector Classifications and GSC
(Continued)

France		
National Classification		GTAP
68	Repair and sales of motor vehicles	47
69	Repair of other products	47
70	Hotels and restaurants	54
71	Railroad transport	48
72	Merchandise transport	48
73	Other land transport	48
74	Inland water transport	49
75	Sea transport	49
76	Air transport	50
77	Transport activities etc.	48
78	Post and telecommunications	51
79	Services for real estate etc.	54
80	Renting of movable goods	54
81	Renting of houses	57
82	Renting of real goods	54
83	Services education and research	55
84	Services health work	55
85	Services recreational, cultural and sporting activities	55
83	Insurance services	53
87	Services financial activities	52
88	Administration services	55
89	Social (security) services	55
90	Public education	56
91	Public research	56
92	Public health work	56
93	Public social work	56
94	Public recreational, cultural and sporting activities	56
95	Other public work	56
96	Services private households	55

Table 11.M.A2 Mapping between some National Sector Classifications and GSC

Germany

National Classification		GTAP
1	* Agricultural products	1-12
2	* Forestry and fishery products, etc	13-14.
3	Electric power, steam, hot water	43
4	Gas	44
5	Water	45
6	Coal, products of coal mining	15
7	Products of mining (exclusive of coal, crude petroleum, natural gas)	18
8	* Crude petroleum, natural gas	16-17
9	Chemical products (incl. nuclear fuel)	33
10	Refined petroleum products	32
11	Plastic products	33
12	Rubber products	33
13	Stones and clays, building and construction materials, etc	34
14	Ceramic products	34
15	Glass and glass products	34
16	Iron and steel	35
17	Non-ferrous metals, semi finished products thereof	36
18	Foundry products	37
19	Products of drawing plants, cold rolling mills, etc.	37
20	Structural metal products, rolling stock	37
21	Machinery and equipment (exclusive of electrical)	41
22	Office machinery, automatic data processing equipment	40
23	Road vehicles	38
24	Ships, boats and floating structures	39
25	Aircraft and spacecraft	39
26	Electrical machinery, equipment and appliances	40
27	Precision and optical instruments, clocks and watches	41
28	Tools and finished metal products	42
29	Musical instruments, games and toys, sports goods etc.	42
30	Wood	30
31	Wood products	30
32	Pulp, paper and -board	31
33	Products of paper and -board	31
34	Products of printing and duplicating	31
35	Leather and leather products, footwear	29
36	Textiles	27

contd

Table 11.M.A2 Mapping between some National Sector Classifications and GSC
(Continued)

Germany		
National Classification		GTAP
37	Wearing apparel	28
38	* Food products (exclusive of beverages)	19-25
39	Beverages	46
40	Tobacco products	26
41	Building and civil engineering works, etc.	46
42	Installation and building completion works	46
43	Services of wholesale trade, etc., recovery	47
44	Services of retail trade	47
45	Railway services	48
46	Water transport services, services of ports, etc.	49
47	Communication services	51
48	Other transport services, n.e.c.	50
49	Banking services	52
50	Insurance services (exclusive of social security funds)	53
51	Real estate renting services	54
52	Market services of hotels and restaurants, homes and hostels	47
53	Market services of education, research, culture and publishing services	55
54	Health and veterinary market services	55
55	Other market services, n.e.c.	55
56	Services of central and local government	56
57	Services of social security funds	56
58	Services of private non-profit institutions, domestic services	56

Table 11.M.A3 Mapping between some National Sector Classifications and GSC

Denmark

National Classification		GTAP
11101 *	Agriculture	1-12
11103 *	Horticulture	1-12
11109 *	Fur farming, etc	1-12
11200	Agricultural services	54
12000	Forestry and logging	13
13000	Fishing	14
20099	Extraction of coal, oil and gas	16
29000	Other mining	34
31113 *	Slaughtering etc. of pigs and cattle	19-20
31117	Poultry killing, dressing, packing	20
31121	Dairies	22
31123	Processed cheese, condensed milk	22
31124	Ice cream manufacturing	22
31130	Processing of fruit and vegetables	25
31140	Processing of fish	25
31151	Oil mills	21
31152	Margarine manufacturing	21
31153	Fish meal manufacturing	25
31160	Grain mill products	25
31171	Bread factories	25
31173	Cake factories	25
31174	Bakeries	25
31180	Sugar factories and refineries	24
31190	Chocolate and sugar confectionery	25
31210	Manufacture of food products n.e.c.	25
31229	Manufacture of prepared animal feeds	25
31310	Distilling and blending spirits	26
31338	Breweries	26
31400	Tobacco manufactures	26
32118	Spinning, weaving etc. textiles	27
32120	Manufacture of made-up textile goods	27
32130	Knitting mills	28
32158	Cordage, rope and twine industries	28
32200	Manufacture of wearing apparel	28
32300	Manufacture of leather products	29
32400	Manufacture of footwear	29
33100	Manufacture of wood products, exclusive of furniture	30

contd

Table 11.M.A3 Mapping between some National Sector Classifications and GSC
(Continued)

Denmark

National Classification		GTAP
33200	Manufacture of wooden furniture, etc.	30
34110	Manufacture of pulp, paper, paperboard	31
34128	Manufacture of paper containers, wallpaper	31
34210	Reproducing and composing services	31
34221	Book printing	31
34222	Offset printing	31
34223	Other printing	31
34230	Bookbinding	31
34240	Newspaper printing and publishing	31
34291	Book and art publishing	31
34292	Magazine publishing	31
34293	Other publishing	31
35110	Manufacture of basic industrial chemicals	33
35120	Manufacture of basic fertilizers and pesticides	33
35130	Manufacture of basic plastic materials	33
35210	Manufacture of paints and varnishes	33
35220	Manufacture of drugs and medicines	33
35230	Manufacture of soap and cosmetics	33
35290	Manufacture of chemical products n.e.c.	33
35300	Petroleum refineries	32
35400	Manufacture of asphalt and roofing mater.	33
35510	Tyre and tube industries	33
35590	Manufacture of rubber products n.e.c.	33
35600	Manufacture of plastic products n.e.c.	33
36100	Manufacture of earthenware and pottery	34
36200	Manufacture of glass and glass products	34
36910	Manufacture of structural clay products	34
36920	Manufacture of cement, lime and plaster	34
36993	Concrete products and stone cutting	34
36998	Non-metallic mineral products n.e.c.	34
37101	Iron and steel works	35
37102	Iron and steel casting	35
37201	Non-ferrous metal works	36
37202	Non-ferrous metal casting	36
38121	Manufacture of metal furniture	37

contd

Table 11.M.A3 Mapping between some National Sector Classifications and GSC
(Continued)

Denmark

National Classification		GTAP
38138	Manufacture of structural metal products	37
38191	Manufacture of metal cans and containers	37
38198	Manufacture of other fabricated metal products	37
38220	Manufacture of agricultural machinery	41
38238	Manufacture of industrial machinery	41
38280	Repair of machinery	41
38293	Manufacture of household machinery	41
38298	Manufacture of refrigerators, accessories	41
38320	Manufacture of telecommunication equip.	40
38330	Manufacture of electrical home appliances	40
38392	Manufacture of accumulators and batteries	40
38398	Manufacture of other electrical supplies	40
38410	Ship building and repairing	38
38438	Railroad and automobile equipment	38
38498	Manufacture of cycles, mopeds, etc	39
38500	Professional and measuring equipment	40
39010	Manufacture of jewellery, etc.	42
38098	Manufacture of toys, sporting goods, etc.	42
41010	Electric light and power	43
41020	Gas manufacture and distribution	44
41030	Steam and hot water supply	44
42000	Water works and supply	45
51000	Building	46
52001	Repair of buildings	46
52002	Materials for own repair of buildings	46
53000	Other construction	46
61000	Wholesale trade	47
62000	Retail trade	47
63000	Restaurants and hotels	54
71118	Railway and bus transport, etc	48
71138	Other land transport	48
71210	Ocean and costal water transport	49
71230	Supporting services to water transport	49
71300	Air transport	50

contd

Table 11.M.A3 Mapping between some National Sector Classifications and GSC
(Continued)

Denmark		
National Classification		GTAP
71509	Services allied to transport etc.	50
72000	Communication	51
81000	Financial institutions	52
82000	Insurance	53
83110	Dwellings	57
83509	Business services	54
93109	Education, market services	54
93300	Health market services	54
94000	Recreational and cultural services	55
95130	Repair of motor vehicles	54
95299	Household services	54
95400	Domestic services	54
97099	Private non-profit institutions	54
98100	Government: General public services	56
98200	Government Defense	56
98300	Government: Education and research	56
98400	Government: Health	56
98500	Government: Social security and welfare services	56
98600	Government: Housing and community amenities	56
98700	Government: Recreational and cultural services	56
98800	Government: Economic services	56
99005	FISIM (Last final demand)	54

Table 11.M.A4 Mapping between some National Sector Classifications and GSC

Netherlands

National Classification		GTAP
1	* Rundveehouderij	1-12
2	* Overig vee	1-12
3	* Kalvermesterij	1-12
4	* Varkenshouderij	1-12
5	* Legpluimvee	1-12
6	* Slachtpluimvee	1-12
7	* Akkerbouw	1-12
8	* Glasgroente	1-12
9	* Snijbloemen	1-12
10	* Potplanten	1-12
11	* Champignons	1-12
12	* Opengrondsgroente	1-12
13	* Fruit	1-12
14	* Bloembollen	1-12
15	* Boomkwekerij	1-12
16	* Hoveniers	1-12
17	Agr. dienstverlening	54
18	Bosbouw	13
19	Visserij	14
20	Aardolie- en aardgaswinning	17
21	Overige delfstoffenwinning	18
22	Varkens slachterij	20
23	Rundvee slachterij	19
24	Pluimvee slachterij	20
25	Kalveren slachterij	19
26	Overig vee slachterij	19
27	Zuivel- en melkproduktenindustrie	22
28	Visverwerkende industrie	25
29	Groente- en fruitverwerkende industrie	25
30	Graanverwerking, mens	25
31	Graanverwerking, veevoer	25
32	Suikerindustrie	24
33	Bloemverwerkende industrie	25
34	Cacao-, chocolade- en suikerverwerkende industrie	25
35	Margarine-, zetmeel- en overige voedingsmiddelenindustrie	21

contd

Table 11.M.A4 Mapping between some National Sector Classifications and GSC (Continued)

Netherlands

National Classification		GTAP
36	Drankenindustrie	26
37	Tabakverwerkende industrie	26
38	Wolindustrie	27
39	Katoenindustrie	27
40	Tricot- en kousenindustrie	27
41	Textielindustrie	27
42	Kledingindustrie	28
43	Leder-, schoen- e.a. lederwarenindustrie	29
44	Hout- en meubelindustrie	30
45	Papier- en kartonindustrie	31
46	Papierwaren- en golfkartonindustrie	31
47	Grafische industrie, uitgeverijen	31
48	Aardolie-industrie	32
49	Kunstmestindustrie	33
50	Chemische basisproduktenindustrie	33
51	Chemische eindproduktenindustrie	33
52	Rubber- en kunststofverwerkende industrie	33
53	Bouwmaterialen-, aardewerk- en glasindustrie	34
54	Basis metaalindustrie	35
55	Metaalproduktenindustrie	37
56	Machine industrie	41
57	Electrotechnische industrie	40
58	Auto-industrie	38
59	Transportmiddelenindustrie	39
60	Instrumenten-, optische en overige industrie	42
61	Elektriciteitsbedrijven	43
62	Gasdistributiebedrijven	44
63	Waterleidingbedrijven	45
64	Bouwnijverheid- en installatiebedijven	46
65	Groothandel en detailhandel	47
66	Hotels, restaurants, cafe's e.d.	47
67	Reparatiebedrijven	47
68	* Zee- en luchtvaart	49-50
69	Overige transport en opslagbedrijven	48

contd

Table 11.M.A4 Mapping between some National Sector Classifications and GSC
(Continued)

Netherlands

National Classification		GTAP
70	Communicatiebedrijven	51
71	Bankwezen	52
72	Verzekeringswezen	53
73	Woningbezit	57
74	Zakelijke dienstverlening	54
75	Overheid, burgerlijk	56
76	Overheid, militair	56
77	Overheid, onderwijs	56
78	Maatschappelijke dienstverlening	56
79	Gezondheids- en veterinaire diensten	56
80	Cultuur, sport en recreatie	55
81	Overige dienstverlenende bedrijven	54
82	Particuliere huishoudens met personeel	54
83	Goederen en diensten niet verdeeld	54

Table 11.M.A5 Mapping between the Eurostat Sector Classification and GSC

GTAP Sectoral Classification		Eurostat (25 sectors)
1	Paddy rice	Agriculture, forestry and fishery
2	Wheat	Agriculture, forestry and fishery
3	Cereal grains n.e.c.	Agriculture, forestry and fishery
4	Vegetables, fruit, nuts	Agriculture, forestry and fishery
5	Oil seeds	Agriculture, forestry and fishery
6	Sugar cane, sugar beet	Agriculture, forestry and fishery
7	Plant-based fibers	Agriculture, forestry and fishery
8	Crops n.e.c.	Agriculture, forestry and fishery
9	Bovine cattle, sheep and goats, horses	Agriculture, forestry and fishery
10	Animal products n.e.c.	Agriculture, forestry and fishery
11	Raw milk	Agriculture, forestry and fishery
12	Wool, silk-worm cocoons	Agriculture, forestry and fishery
13	Forestry	Agriculture, forestry and fishery
14	Fishing	Agriculture, forestry and fishery
15	Coal	Fuel and power products
16	Oil	Fuel and power products
17	Gas	Fuel and power products
18	Minerals n.e.c.	Fuel and power products
19	Bovine cattle/sheep/goat/ horse meat	Food, beverages, tobacco
20	Meat products n.e.c.	Food, beverages, tobacco
21	Vegetable oils and fats	Food, beverages, tobacco
22	Dairy products	Food, beverages, tobacco
23	Processed rice	Food, beverages, tobacco
24	Sugar	Food, beverages, tobacco
25	Food products n.e.c.	Food, beverages, tobacco
26	Beverages and tobacco products	Food, beverages, tobacco
27	Textiles	Textiles and clothing, leather, footwear
28	Wearing apparel	Textiles and clothing, leather, footwear
29	Leather products	Textiles and clothing, leather, footwear
30	Wood products	Textiles and clothing, leather, footwear
31	Paper products, publishing	Paper and printing products
32	Petroleum, coal products	Fuel and power products
33	Chemical, rubber, plastic products	Chemical products Rubber and plastic products
34	Mineral products n.e.c.	Non-metallic mineral products
35	Ferrous metals	Ferrous, non-ferrous ores & metals
36	Metals n.e.c.	Ferrous, non-ferrous ores & metals
37	Metal products	Metal products except machinery

contd

Table 11.M.A5 Mapping between the Eurostat Sector Classification and GSC (Continued)

GTAP Sectoral Classification		Eurostat (25 sectors)
38	Motor vehicles and parts	Transport equipment
39	Transport equipment n.e.c.	Transport equipment
40	Electronic equipment	Electrical goods
41	Machinery and equipment n.e.c.	Agricultural and industrial machinery Office and data processing machines
42	Manufactures n.e.c.	Other manufacturing products
43	Electricity	Fuel and power products
44	Gas manufacture, distribution	Fuel and power products
45	Water	Fuel and power products
46	Construction	Building and construction
47	Trade	Recovery, repair services, wholesale and retail trade
48	Transport n.e.c.	Inland transport services Auxiliary transport services
49	Water transport	Maritime and air transport
50	Air transport	Maritime and air transport
51	Communication	Communication services
52	Financial services n.e.c.	Credit and insurance services
53	Insurance	Credit and insurance services
54	Business services n.e.c.	Lodging and catering services
55	Recreation and other services	Other market services
56	Public administration and defense, education, health services	Non-market services
57	Dwellings	Other market service

Table 11.M.A6 Mapping between SPEL/EU Activities and GSC

GTAP Sectoral Classification		SPEL/EU Activities
1	Paddy Rice	Paddy Rice
2	Wheat	Soft Wheat Durum Wheat
3	Cereal grains n.e.c.	Rye and Meslin Barley Oats Maize Other Cereals
4	Vegetables, fruits, nuts	Potatoes Cauliflowers Tomatoes Other Vegetables Apples, Pears and Peaches Other Fruits Citrus Fruits
5	Oilseeds	Rape and Turnip Seed Sunflower Seed Soya Beans Olives for oil Other Oilseeds
6	Sugar cane, sugar beet	Sugar beets
7	Plant-based fibers	Flax and hemp
8	Crops n.e.c.	Pulses Tobacco Unmanufactured Other Industrial Crops Table Grapes Table Olives Table Wine Other Wine Nursery Plants Flowers, Ornamental Plants, etc. Other Final Crop Products
9	Bovine cattle, sheep and goats, horses	Male Adult Cattle for Fattening Calves for Fattening Calves, rearing Heifers Sheep and Goats for Fattening
10	Animal products n.e.c.	Pigs for Fattening Pig breeding Laying Hens Poultry for Fattening Other Animals
11	Raw milk	Dairy cows Other cows
12	Wool, silk-worm cocoons	Ewes and goats

Table 11.M.A7 Mapping between SPEL/EU Inputs and GSC

GTAP Sectoral Classification		SPEL/EU Inputs
1-12	Agriculture	Seed and feed
13	Forestry	Variable and overheads other inputs
14	Fishing	Variable and overheads other inputs
15	Coal	Variable and overheads energy
16	Oil	Variable and overheads energy
17	Gas	Variable and overheads energy
18	Minerals n.e.c.	Variable and overheads energy
19	Bovine cattle/sheep/goats horse meat	Total fodder input
20	Meat products n.e.c.	Total fodder input
21	Vegetable oils and fats	Fodder: other
22	Dairy products	Fodder: milk
23	Processed rice	Fodder: cereal
24	Sugar	Total fodder input
25	Food products n.e.c	Total fodder input
26	Beverages and tobacco products	Variable and overheads other inputs
27	Textiles	Variable and overheads other inputs
28	Wearing apparel	Variable and overheads other inputs
29	Leather products	Variable and overheads other inputs
30	Wood products	Variable and overheads repairs
31	Paper products, publishing	Variable and overheads other inputs
32	Petroleum, coal products	Variable and overheads energy
33	Chemical, rubber, plastic products	Mineral fertilizer and plant protection
34	Mineral products n.e.c.	Mineral fertilizer and plant protection
35	Ferrous metals	Variable and overheads repairs
36	Metals n.e.c.	Variable and overheads repairs
37	Metal products	Variable and overheads repairs
38	Motor vehicles and parts	Variable and overheads repairs
39	Transport equipment n.e.c.	Variable and overheads repairs
40	Electronic equipment	Variable and overheads repairs
41	Machinery and equipment n.e.c	Variable and overheads repairs
42	Manufactures n.e.c.	Variable and overheads other inputs
43	Electricity	Variable and overheads energy
44	Gas manufacture, distribution	Variable and overheads energy
45	Water	Variable and overheads water
46	Construction	Variable and overheads repairs
47	Trade	Variable and overheads other inputs
48	Transport n.e.c.	Variable and overheads other inputs
49	Water transport	Variable and overheads other inputs
50	Air transport	Variable and overheads other inputs

contd

Table 11.M.A7 Mapping between SPEL/EU Inputs and GSC (Continued)

GTAP Sectoral Classification		SPEL/EU Inputs
51	Communication	Variable and overheads other inputs
52	Financial services n.e.c.	Variable and overheads other inputs
53	Insurance	Variable and overheads other inputs
54	Business services n.e.c.	Variable and overheads other inputs
55	Recreation and other services	Variable and overheads other inputs
56	Public administration, health services, etc	Pharmaceutical inputs
57	Dwellings	Variable and overheads other inputs