The net contribution of the Agri-Food Sector to the inflow of funds into Ireland: a new estimate

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REPORT

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Executive Summary

This new analysis of Ireland's Balance of International Payments (BOP) shows a surprisingly large net contribution from the Biosector. In 2005 net foreign earnings of the sector, comprising agriculture, forestry, fisheries, food, drink and tobacco industries, amounted to 32 percent of the total net earnings from primary and manufacturing industries. This is double the sector's 16 percent contribution to exports in that year. Reasons for the sector's disproportionately large net contribution to earnings from exports include:

1. Import requirements per euro of Biosector exports were lower than in the Non-Biosector, import requirements for every euro of output averaged 38 cent in the Biosector but 58 cent per euro of output in the Non-Biosector.

2. Foreign ownership, and thus profit repatriation outflow, was lower than in other sectors. This was despite strong growth in the activities of foreign based enterprises in some of the food and beverage industries. Profit repatriation by these enterprises in the Biosector was only 9 cent per euro of exports in 2000 while it was then 21 cent on average in the Non-Biosector. However, since 2000 the activities of foreign owned businesses in the Biosector have grown and their profit repatriation in 2005 accounted for 15 cent per euro of exports from this sector. On the other hand this growth propelled a 46 percent increase in exports from the sector between 2000 and 2005, though this is not visible in the Trade Statistics, possibly due to data confidentiality concerns. Profit repatriation by businesses in the Non-Biosector peaked at 26 cent per euro of exports in 2002, but by 2005 it was back again to 20 cent.

3. Receipts of EU payments were almost entirely in support of agriculture and its exports. This is especially a feature of the Biosector, unlike the Non-Biosector where they are negligible. EU payments grew at the same rate as exports from the Biosector in the years from 2000 to 2005 and continued to provide an important addition to BOP inflows.

Importation of capital goods was also analysed in the context of the BOP. Results showed that industries in the Biosector made almost as much use of imported capital goods as those in the Non-Biosector. Thus adjustment of net in-flow estimates for out-goings on the purchase of capital goods from abroad only raised the net contribution of the Biosector from 30 percent to 32 percent of the total, according to calculations for 2005. Corresponding figures for the year 2000 were higher at 38 percent and 39 percent respectively. In every one of the intervening years the Biosector's net contribution was found to be close to 30 percent.

Support for the overall conclusion that the Biosector contributed close to 30 percent of the net flow of funds into the economy generated by the primary and manufacturing industries is provided by the detailed analysis described in the Report. What is more, were the earnings of Irish companies operating abroad to be included, the result could have shown an even larger contribution from the Biosector, due to the overseas achievements of Irish food firms. Results for 2007 could also show a higher proportionate contribution from the Biosector, reflecting large increases in prices for food product exports between 2005 and 2007.

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PART I

Introduction

1.1 Overview

This Report provides estimates of the contribution of the agri-food sector, broadly defined, to the net external earnings of the economy from exports of merchandise. The focus is on agriculture, forestry and fishing as well as the industries processing their products, namely the food, beverage and tobacco industries. In total, these industries comprise a large part of Ireland's natural resource based industries and are distinguished by the biological origin of their products. For this reason the Report refers to this group of industries as the 'Biosector', to distinguish its coverage from any narrower definition of the agri-food sector.

Export earnings of the sector are initially seen as part of receipts, or credit items, for merchandise in the Balance of International Payments (BOP). These receipts are supplemented by International Subsidy Transfers, mainly related to the Common Agricultural Policy (CAP). However, the sector's net contribution is also affected by the size of the outflows related to these inflows. Outflows, seen as debit items in the Balance of International Payments, include imports of merchandise and services used-up in the process of producing the exports or in sustaining activities in receipt of International Transfers. Also imported is much of the plant and equipment on farms and in factories. However, the cost of these durable capital items would normally be spread over a number of years. Outflows of profit, and other payments to factors of production related to exports, must also be taken into consideration. These are prominent where foreign owned firms produce exports, as they do in many of the high technology industries, or what is frequently termed the 'modern' sector[1]. Subtraction of all these outflows from the export receipts to which they relate gives the net contribution of a sector to the Balance of International Payments and thus to the economy as a whole.

Measurement of the net contribution from the Biosector is the main aim of this Report. The significance of this contribution will be noted by comparison with the net contribution of other merchandise producing industries. For ease of reporting, these other industries will be called collectively the Non-Biosector, comprising all the other manufacturing industries as well as quarrying and mining.

[1] Definitions of these and other terms used in this report are provided in a Glossary at the back of the report.

1.2 Background

In 1987 Henry (1987) reported his estimate of the importance of agriculture for the economy of Ireland in 1982. He did this by an experiment where agriculture and its dependant industries disappear from the economy. He identified four industries that were so dependant on agriculture that they would disappear should agriculture in Ireland cease. His results were derived from a specially adapted Input-Output model of the economy including rows and columns for: agriculture, the four food processing industries dependant on agriculture, other food processing industries associated with agriculture, and the remaining standard sectors. The outcome of the experimental disappearance of agriculture and its dependant industries was that they were found to account for approximately 26 percent of Gross National Product (GNP) and 20 percent of exports and inflows, including payments from the European Commission.

Riordan (1989) used the linkages between agriculture and other industries in Ireland as the criteria for selecting those to be included in his definition of the Agri-Food sector. After taking account of data limitations Riordan included seven of the industries in the food group and excluded four (Riordan, 1989, Appendix A). He then focused on the flows of funds stemming from activities of these industries and reported in the Balance of International Payments. First came inflows from exports of a defined list of agricultural and food products and, in contrast, those from the rest of merchandise exports. Virtually all of the non Agri-Food products came from manufacturing industry. However, to deal with the great diversity of these other industries they were divided into two very dissimilar groups, namely: 'Manufacturing Export Industry', now accounting for 75 percent of merchandise exports, and 'Other Manufacturing'. These groups differed in the share of exports in their output, and, significantly, foreign ownership was far more extensive in 'Manufacturing Export Industry'. As a result, a far higher proportion of their net output flowed out of the country than was the case for businesses in the 'Other Manufacturing' group, that were largely Irish owned. Also associated with foreign ownership were relatively large payments for royalties and services provided from abroad.

Using data on use of imported materials in agriculture and industries covered by the Census of Industrial Production (CIP) Riordan calculated the import content of exports. This did not seem to include the import content of materials supplied from Irish sources, that is to say that indirect imports were not part of the calculation. Riordan also estimated the outflows on account of imported services and returns on foreign direct investment. In particular he estimated and used a statistical relationship between CIP gross output data for his group of

'Manufacturing Export Industries' and BOP debits on account of services acquired, royalties and profits. The overall result was that the Agri-food sector was found to have contributed an estimated 42 percent of net foreign earnings from merchandise exports in 1988.

The Department of Agriculture, Food and Fisheries regularly notes data for the Agri-Food Sector defined as the industries of agriculture, food, beverages and tobacco. These data are published in the Department's *Annual Review and Outlook for Agriculture & Food* and in the *'Fact Sheet on Irish Agriculture'* produced by the Department's Economics and Planning Division. The Review for 2006/2007 showed that the contribution of the Agri-Food Sector per thousand euro of Gross Domestic Product (GDP) was €88 in 2005.

Aggregation is often taken a step further with the inclusion of forestry and fisheries along with agriculture. These industries comprise a major part of Ireland's primary industries and combining data on all three would reflect the thinking that natural resource based industries are important and reliable contributors to the economy. This view has been a major consideration for decades and was strongly stated in the National Economic and Social Council *A review of Industrial Policy: A report prepared by the Telesis Consultancy Group* (1982), otherwise known as the Telesis Report. In addition, they are often aggregated in CSO data and, crucially, in the *Supply and Use and Input-Output Tables* as well as in the *National Income and Expenditure* tables (CSO, 2007). Furthermore, fishery products form part of the food industry aggregate. All three primary industries are also closely associated with the rural economy and this is reflected in the special attention they were given in *Rural Ireland 2025: Foresight Perspectives* (NUI Maynooth, Teagasc, UCD, 2005).

1.3 Scope of the work

The primary focus will be on industries that comprise the broadly defined agri-food sector, or Biosector. This is in line with the needs of policy making, especially for primary and manufacturing industries. It also fits the classification of statistical data, in particular, data provided by the Central Statistics Office are aggregated into industries defined in the NACE classification system used throughout the EU[2].

[2] **NACE** is the acronym for 'Nomenclature générale des activités économiques dans les communautés européennes' (Genaral Industrial Classification of Economic Activites within the European Communities). The version used from 1991 to 2002 was NACE Rev.1 followed by a slightly amended NACE Rev.1.1 from 1st January 2003.

In the NACE nomenclature the industries central to this report are as follows:

NACE No	Name of industry
01	Agriculture
02	Forestry
05	Fishing
15	Food and beverages
16	Tobacco

These industries comprise the Biosector.

Industries in the Non-Biosector comprise:

NACE No.	Name of industry
10 to 14	Mining and quarrying
17	Textiles
18	Wearing apparel
19	Leather and leather products
20	Wood and wood products (excluding furniture)
21	Pulp, paper and paper products
22*	Printed matter and recorded media
23	Petroleum and other fuels
24*	Chemical products and man-made fibres (including pharmaceuticals)
25	Rubber and plastics
26	Other non-metallic mineral products
27	Basic metals
28	Fabricated metal products
29	Machinery and equipment n.e.c.
30*	Office machinery and computers
31*	Electrical machinery and apparatus n.e.c.
32*	Radio, television and communications apparatus
33*	Medical, precision and optical instruments
34	Motor vehicles and trailers
35	Other transport equipment
36	Other manufactures
37	Recycling

* Constituents of the ‘modern sector’

These Non-Biosector industries together with the Food, Beverages and Tobacco industries (NACE codes 15 and 16) comprise the Transportable Goods Industries.

Products are also classified into categories in the 'Central Product Classification' (CPC) that match the NACE codes above[3]. In Ireland by far the largest part of the output of an NACE defined industry are products falling into the corresponding CPC class, as shown in Table 1 of the *2000 Supply and Utilisation and Input-Output Tables* (CSO, 2006). Put another way, industries show relatively little diversification away from their main line of business indicated by their two digit NACE classification. Henceforward this two digit NACE classification number will be used to refer to both products and industries. However it should be noted that there is a difference between the product coverage of NACE 15 used for the *National Income and Expenditure* 2006 (CSO, 2007) and that used for the *Trade Statistics* (CSO, 2007) where some 'Other food products' do not seem to be given codes falling in NACE 158. In this matter the *Census of Industrial Production 2005* (CSO, 2007) follows the NIE while *Trade Statistics* allocations of products are also used in *2000 Supply and Utilisation and Input-Output Tables* (CSO, 2006). Data used in this report are largely from the NIE and the CIP and thus differ from data in the Trade Statistics, particularly with regard to the value of exports of goods classed as 'Other food products'. Examination of the implications of these differences in coverage will be provided in the chapter on exports in Part II below.

1.4 Methodology

At the heart of measuring the net inflow of funds is the identification and quantification of outflows associated with inflows from exports. Previous estimates endeavoured to estimate the amount of imported materials directly incorporated in the exports (Riordan, 1989). Other outflows taken into account were those directly associated with these exports, including EU transfer payments under the Common Agricultural Policy and payments to owners of factories and intellectual property that are not resident in Ireland.

To give rigour to the analysis on this occasion, the process of generating exports was examined through its representation in a series of models of increasing complexity, described in Annex I. These models fall into three classes as follows:

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[3] The two digit NACE Groups used in this report are effectively the same as product classifications in the 'Central Product Classification' (CPC), thus the NACE codes used here refer to both the classification of units of economic activity, factories for example, and to their main product.

Descriptions of these classifications are available on the Eurostats's Classification server named RAMON http://ec.europa.eu/comm/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

RAMON also provides lists of classifications with official links to NACE and access to tables showing the correspondence between the codes in one classification and those in some other classifications. The application of the NACE codes in Ireland is described in the CSO *Census of Industrial Production.*

A. Static models abstracted from a need to import equipment and other capital goods, including models ranging from those for an export enclave, Model 1, to Model 4 where exporting firms, including foreign owned firms, have input supply linkages throughout the economy and abroad, while they sell on domestic as well as export markets;
B. Imports of equipment and other capital goods included as user costs in a static model;
C. Disturbances from year to year are included as affecting the performance of firms, these disturbances may be external to the firm, including weather affecting crop output or due to the firm's own choices.

The model used in this work, Model 5, was an extension of Model 4 to include allowance for the use of capital goods, including imports. Subsequent chapters will note the assumptions that were made in deploying this model and how the empirical challenges of using the model were tackled. The focus is on transactions of enterprises aggregated into industries, and industry groups, following NACE classifications.

1.5 Data

Data for this research came from the Central Statistics Office, particularly from sources that show transactions of industries, the most prominent being the *Census of Industrial Production* (CIP). Most of the data is aggregated into industry groups at the NACE two digit level. This is reflected in the Report's tables showing exports, use of imports in the production of exports, operating surpluses generated by foreign enterprises from exports and, finally, the import element in capital assets used to produce exports. Data sources included: the National Accounts (NIE); Balance of International Payments (BOP); Census of Industrial Production (CIP); Outputs, Inputs and Income in Agriculture (OIIA), Trade Statistics, and the Supply and Utilisation and Input-Output (SUI-O) Tables. The aim was to measure the net contribution of the Biosector and the Non-Biosector in a way that is consistent with the National Accounts and reflects the structure of the economy in the Supply and Utilisation and Input-Output (SUI-O) Tables. The various sets of data and results were assembled in an MS Excel Workbook with a sheet per component, as set out in the Table of Workbook Contents in Annex II.

1.6 Structure of the report

Chapters in this Report relate to the various types of flow in the International Balance of Payments, shown in Table A, below. Chapter 1 will look at CIP data on exports and will compare them with those in the Trade Statistics and the BOP inflows from Merchandise Trade. Outflows associated with these inflows will be the topics of Chapters 2, 4 and 5. Chapter 2

will assess the value of imported materials and services consumed in production of exports. Deduction of these imports from the exports provides a measure of the net exports of a sector. Chapter 3 will introduce the International Transfer Payments related to the sectors, these are largely receipts from the European Commission connected with the Common Agricultural Policy (CAP). Addition of these receipts to the gross value of Biosector sector exports gives the inflow of funds generated by the sector. Outflows of the Operating Surpluses of foreign owned enterprises are assessed in Chapter 4. There follows, in Chapter 5, calculation of an annual charge for use of capital assets in the production of merchandise exports and the import content of these assets, particularly imports of plant, machinery, equipment and vehicles. Finally, all the inflows and outflows are brought together and reviewed in Chapter 6 followed by a summary and conclusions in Chapter 7.

Table A

Items from the Balance of International Payments: Current account

Item	Report Chapter	2005
		€ '000 million
Merchandise and services[1]		
Credit (Inflow from exports)		131
of which		
Merchandise	**1**	83
Debit (Outflow for imports)	**2 & 5**	112
International Subsidies less taxes	**3**	2
Other transfers (net)		-2
Income		
Credit		43
Debit		68
of which		
Income on equity (non-financial enterprises)	**4**	23
Net balance on current account		-6

1 Adjusted for balance of payments purposes

Sources:
CSO website 16th Jan 2008 (Database Direct)
National Income and Expenditure 2006, Table 30a

PART II

Calculation of Components of the Net Flow of Funds

1 Exports

1.1 Definitions and data

The broad definition of the agri-food sector used here covers all of the output and activities of biological natural resource based industries. These Biosector industries and their NACE classes are: Agriculture: 01, Forestry: 02, Fishing: 05, Food and Beverages: 15 and Tobacco: 16. Coverage is thus wider than the sum of exports of 'Agricultural Produce' and 'Forestry and Fishing Produce' in the *Trade Statistics* (CSO, 2007). Table 1a shows 2005 data for the values of exports by industries from the CIP and of products from the Trade Statistics with the corresponding entry in the BOP. Subsequent sections provide a commentary on these data for the Biosector and then the Non-Biosector[4].

Table 1a
Export Data in the Census of Industrial Production,
Trade Statistics and the Balance of International Payments

NACE	Items	2005
		€ million
1+2+5	Agricultural, Forestry and Fishery produce[1]	580
15 & 16	Food, Beverages and Tobacco industries[2]	13,719
01, 02, 05, 15 & 16	**Bio-sector**	**14,299***
10-14, 17-37	Other Transportable Goods Industries: the Non-Biosector[2]	77,629
01, 02, 05, 10-37	**Total**	**91,929***
1,2,5, 10-37	*Total excluding sales of services*	*89,450*
	Merchandise Exports (Trade Statistics)	86,732
	Adjustment of Trade Statistics to BOP definition	-4,046
	BOP Current Account Credit: merchandise exports[3]	82,686
	Biosector share of Total	**16%**

* These results contribute to the summary of results in Table 6a.
Sources

1 2000: SU I-O Tables; 2001-2005: Trade Statistics

2 Census of Industrial Production 2005.

3 Balance of International Payments, 2007, Quarter 3.

[4] CIP data for 2000 to 2005 are in Annex III Table A. 1. with corresponding Trade Statistics data in Annex III Table A. 1 Supplement.

Most of the differences between data from these three sources are definitional. Thus the major reason for the BOP showing smaller receipts from merchandise exports than data from Trade Statistics and CIP is the classification of exports of computer software as exports of services except when the software is embedded in hardware or other physical products. This is partly off-set in the BOP by inclusion of the estimated value of retail fuel exported to Northern Ireland. Data on exports of manufacturing enterprises in the CIP would include any output exported, including computer software, and other items not counted as merchandise in the Trade Statistics and even less so in the BOP. Exports of this sort have grown rapidly in recent years and may partly explain why the level of exports in NACE groups 10 to 37 shown in CIP data now exceeds that in the Trade Statistics, even though the coverage of the Trade Statistics is wider than exports of manufacturing enterprises. In general it is relevant to bear in mind that data from the Trade Statistics refer to specific products while data from the CIP are for exports of specific industries.

1.2 Results

1.2.1 Biosector exports

Data on exports of the industries in the Biosector in the CIP and of related products in the Trade Statistics are set out in Table 1b. Separation of the 'Other food products' item, NACE 158, from the rest shows that the difference between exports of the Biosector in the CIP and Trade Statistics seems to be largely due to differences in product codes used in these two compilations. As a result some of the 'Other food products' fall outside NACE 15 in the Trade Statistics. These products are nevertheless part of the output of the Biosector. Furthermore, efforts to move these products from one industry to another in the CIP data, used in so much of this analysis, could seriously detract from the integrity of the results. Thus, in general, export data from the CIP will be used.

Valuation of exports in data from the CIP is that invoiced to the importer, i.e. the purchaser's price as shown in Table 1b and in the summary table 6a, row 1. As these are sales out of Ireland, excise duty would not be charged. In contrast, some exports may entitle the exporting enterprise to receive a subsidy. These subsidies were largely paid on exports of meat, dairy products and cereals when prices on world markets were below those in the EU. These subsidies are recorded in the CIP and were added to valuations at 'purchasers prices' as part of

the adjustment to 'basic prices' used to value transactions of the enterprise. These valuations at basic prices are used in many subsequent calculations, including calculation of the share of exports in enterprise turnover.

Table 1b

Exports of the Biosector: comparison of data from the CIP and Trade Statistics

NACE classes	Items	2005	*2005*
		€ million	
		Classified by:	
		NACE	SITC
Agricultural, forestry and fishery products[1]			Trade Statistics
01	Live animals and other products of agriculture	462	*258*
02	Logs and forest products	9	*9*
05	Fish	109	*1*
1+2+5	**Agricultural, Forestry and Fishery products**	**580**	***235***
Food, Beverages and Tobacco		Census of Industrial Production	Trade Statistics
	including industries producing:		
151	Meat and meat products	1,857	*2,179*
152	Fish and fish products	202	*335*
153&154	Processed fruit and vegetables + Vegetable and animal oils and fats	36	*243*
155	Dairy products	1,137	*1,098*
156	Grain products	16	*231*
157	Prepared animal feeds	151	*177*
1, 2, 5, 151-157	**All the above products of agriculture, forestry, fisheries and food industries**	**3,980**	***4,498***
	By-products including hides		*167*
158	Other food products	9,489	*1,836*
159-16	**Beverages and Tobacco**	**830**	***1,112***
01, 02, 05, 15 & 16	**Bio-sector at purchasers' prices**	**14,299***	***7,613***

Notes

[1] Valued exclusive of export subsidy.

* These results contribute to the summary of results in Table 6a.

1.2.2 Non-Biosector exports

This sector includes mining and quarrying (NACE 10-14) and all of manufacturing industry other than Food, Beverages and Tobacco, that is to say all industries in NACE Groups 17 to 37. The sector is dominated by industries in the 'Modern Sector' as detailed in Table 1c.

Table 1c

Non-Biosector exports in 2005

NACE Classification	Industries	2005
		€ million
Modern Sector		
21-22	Pulp & products, printed matter, recorded media, software	12,601
24	Chemical products, including pharmaceuticals	29,657
30-33	Electrical apparatus, including computers, also instruments	29,052
Sub-total		71,309
Other Non-Biosectors		
10-14	Mining and quarrying	489
17 & 18	Textiles & wearing apparel	399
20	Wood and wood products (excluding furniture)	308
25	Rubber and plastics	575
26	Other non-metallic mineral products	410
27 & 28	Basic metals & fabricated metal products	760
29	Machinery and equipment n.e.c.	1,557
34 & 35	Motor vehicles and trailers, other transport equipment	846
19,23,36,37	Leather products, petroleum, manufacturing n.e.c & recycling	977
Non-Biosector total		**77,629**
	of which	
	Foreign owned enterprises	74,752

Source: *Census of Industrial Production*

2 Imports of Merchandise and Services used to Produce Exports

2.1 Import content estimation

Import usage by each industry in 2000 is shown in the *2000 Supply and Utilisation and Input-Output Tables* (CSO, 2006). Table 4 shows the value of imported of goods and services used directly for each product. Other rows in this table show the values of each of the classes of goods and services supplied by industries in Ireland for output of each of these products. The imports used to produce these supplies were taken into account by creating a table of Leontief multipliers. These multipliers show the proportion of an industry's output that came from the imports it bought directly as well as indirectly through imports of its Irish suppliers. The size of these multipliers in 2000 is given in Table 5 of *2000 Supply and Utilisation and Input-Output Tables* (SUI-O). However, these data do not distinguish between amounts used for exports and for domestic sales. It is assumed here that in producing exports an industry uses the same proportion of imports as it used for its entire output. Thus the imports of merchandise and services involved in the supply of exports from each industry were estimated by multiplying the exports of an industry by its Leontief multiplier for imports.

The multipliers apply to the output of domestic industry valued at 'basic prices' or in other words according to the value of the trade to the exporter. In contrast, export data do not include the subsidies that may be associated with the export, including EU export subsidies, or restitutions, on exports of some agricultural products. These subsidies were thus added to export values where appropriate. On the other hand exports include products that were originally imported then re-sold without further processing, a trade that is sometimes called 'factoring'. The cost of these 'factored' goods was deducted from the value of exports to arrive at the value of exports that were actually produced in Ireland. The value of factored goods exported appears as exports of imports in Table 3 of the 2000 SUI-O tables. These showed that factoring was very largely confined to the 'modern sector'. The value of factored products in years subsequent to the 2000 SUI-O tables was deduced from CIP data, particularly on purchases of goods for resale without further processing.

2.1.1 Agriculture, Forestry and Fishing

The calculations for the combined industries of Agriculture, Forestry and Fishing for the year 2000 are shown in Table 2a below. The first rows show the reported exports and the

adjustments required to show the exports of domestic industry at basic prices. Data from the 2000 SUI-O tables gave the value of imports used directly by these industries as 14 euro per 100 euro of output. These tables also showed a Leontief multiplier, that reflects both the direct and indirect import content of output and this, in round terms, was 24 euro per 100 euro of output. Application of this multiplier showed that imports involved in the output of €750 million of exports amounted to approximately €179 million, taking account of those bought directly by farmers, foresters and fishermen and those in their purchases of goods and services produced in Ireland. This method was also followed in calculating the imports required to produce exports of other industries, reported in subsequent sections. The main challenge was to repeat these estimations for subsequent years as there were no subsequent Input-Output data available from the CSO.

Table 2a. Calculation of imports for the supply of exports in 2000: Agriculture, Forestry and Fishing

Row No.		**Agriculture, Forestry, Fishing**
	NACE Groups:	01, 02, 05
	Items	€ million
1	Exports at purchasers' prices	750
	Less	
2	Imports for Export (factored products)	0
	Plus	
3	Subsidies less taxes on above exports	0
4	Domestic exports at basic prices (1)-(2)+(3)	750
5	Direct import content	14%
6	Direct and indirect import content (Leontief Multiplier)	24%
7	Direct and indirect imports in domestic exports (4)x(6)	179
8	Net exports (4)-(7)	571

Source: 2000 Supply and Utilisation and Input-Output Tables.

For Agriculture, by far the largest part of this group, there is the annual CSO series of data on *Output, Input and Income in Agriculture (CSO, 2007).* Data for 2000 from this source linked satisfactorily with figures for this group in the 2000 SUI-O Tables. Data for subsequent years

from *Output, Input and Income in Agriculture* indicated increases in levels of input purchases relative to output. An initial assumption, that the role of imports in input usage did not change appreciably, was rejected when estimates of imports for agricultural production based on this assumption did not rise to the same extent as figures for 'materials for further production in agriculture', shown in the *Trade Statistics*, Table 3. This discrepancy is unlikely to have been caused by trends in usage of imported services, as these only accounted for one percent of imports for this group of industries in 2000. Thus the import content of materials used in these industries was raised so as to generate estimates of imports that reflected levels in the Trade Statistics import item: 'materials for further production in agriculture'. The result was a series showing import content of 29 percent in 2000 rising to 31 percent in 2003 and to 33 percent for 2004 and 2005. The consequence of the combined rise in input use relative to output, and this rise in the import content of these inputs, would have been a gradual increase in the direct import multiplier. This was 14 percent of output in 2000 and was increased by annual increments to 20 percent in 2005, reflecting trends in the data reviewed above.

These increases in the direct multiplier would be expected to add to the size of the Leontief multiplier. On the other hand this multiplier would also be affected by any change in the indirect import content of output. These changes would reflect changes in usage of materials and services from the rest of the economy and changes in the import content of these purchases. The increased use of imports in agriculture would tend to reduce the previously high degree of linkage between agriculture and the rest of the economy. In 2000 the indirect usage of imports in agriculture accounted for the gap between a direct multiplier of 0.14 and a Leontief multiplier of 0.24, that is a ratio of 1:1.7. This was far higher than in most industries except the food industry where the ratio was 1:3.4. The observed increased in the use of imports would tend to weaken links with Irish suppliers and thus reduce the size of the indirect imports and the Leontief multiplier.

Thus changes in the Leontief multiplier for imports for output of agriculture, forestry and fisheries were limited to increases in the direct multiplier for this sector. Accordingly the Leontief multiplier of 0.24 in 2000 was raised in line with increases in the direct multiplier to 0.29 by 2005, the increase, 0.05, being equal to the rise in the direct multiplier.

Imports for production in Agriculture, Forestry and Fishing were thus calculated as the value of exports of products from these industries times the Leontief multipliers for imports described above and shown in Table 2b in section 2.1.2 below.

2.1.2 Imports for the Food, Beverage and Tobacco industries (NACE 15 and 16)

These were reviewed as an aggregate. They were put together as they are the other components in the Biosector and, in addition, they are so grouped in several series of CIP data. The analysis considered:

1. Data from SUI-O calculations for 2000.
2. Data from the CIP for 1998, and 2000 to 2005 showing changes in purchases of materials and services relative to output.

Data from the 2000 Supply and Utilisation and Input-Output (SUI-O) Tables show that for Food and Beverage products (NACE 15), the Leontief multipliers for imports directly and indirectly involved in their manufacture was 0.35 and that for Tobacco products (NACE 16) was 0.27. However, as noted in section 1.1, the product coverage of NACE 15 in these tables excluded some 'Other food products' of importance. Inclusion of all these products was found to increase the Leontief import multiplier from 0.35 to 0.44 in 2000.

Data from the Census of Industrial Production were reviewed to see if there was evidence of changes in the performance of Irish industry that would indicate that the Leontief multiplier for imports by Food, Beverage and Tobacco industries (NACE 15 and 16) may have changed between 2000 and 2005. One clear trend was for a decline in usage of materials and fuel from accounting for 48 percent of the Output in 2000 to 41 percent of Output in 2005[5]. In contrast, usage of services rose somewhat from accounting for 25 percent of Output in 2000 to 27 percent of output in 2005. Aggregating these opposing trends showed that intermediate consumption by these industries declined from 72 percent of Output in 2000 to 69 percent of Output in 2005. This reflects the decline in input usage by the now major 'Other food products' industries.

The CIP also provides data on the share of imports in the purchases of materials by each industry, however, analysis of these data for a trend in import content was inconclusive. There

[5] 'Output' was measured at 'basic prices', that is including subsidies paid on the products but excluding indirect and other taxes levied on products.

are no data on the usage of imported services by this or any other industry. It was thus assumed that the import content of services purchased was unchanged from the level in the 2000 SUI-O tables.

The direct multiplier for imports of materials and services for output of this industry group was obtained by multiplication of the direct multiplier for purchases of materials by their import content and adding the direct multiplier for services multiplied by their assumed import content. The result was an increase in the direct multiplier for imports of goods and services for Food, Beverages and Tobacco production from 0.13 in 2000 to 0.19 in 2005.

Assessment of the implications of this rise for the combined direct and indirect multiplier, the Leontief, involved all the issues considered in assessing the Leontief multiplier for imports used in Agriculture, Forestry and Fishing, noted above. However this case was more extreme as:

1. For the 'Other food products' industries there had been a major rise in output, 49 percent, and in exports, from 2000 to 2005, while there had been a slight reduction in the value of output and exports of the other industries in this group. The structure of this group had thus changed considerably between 2000 and 2005;

2. Decline in the usage of materials and services in 'Other food products' industries was greater than in the rest of this group and was below the group average by 2005. A lower than average proportion of these supplies was purchased in the country reflecting greater reliance on imports.

Taken together these trends indicated a reduction in the previously high level of the indirect import multiplier for output of this group, implicit in its Leontief multiplier of 0.44 relative to its direct multiplier of 0.13 in analysis of the data for 2000. Indeed the increase in the direct multiplier may have been offset a decline in the indirect multiplier. It was thus concluded that there may well have been no important change in the overall size of the Leontief import multiplier for the Food, Beverages and Tobacco group of industries from 2000 to 2005.

Table 2b

Leontief Multipliers for Imports

	2000	2001	2002	2003	2004	2005
	Multipliers for imports					
Biosector						
Agriculture, Forestry, and Fishing	0.24	0.25	0.25	0.26	0.27	0.29
Food & Beverages[1]	0.44	0.44	0.44	0.44	0.44	0.44
Tobacco	0.27	0.27	0.27	0.27	0.27	0.27

Note: Multipliers actually used have been rounded to two decimal places in this table and in the text.

[1] These multipliers are larger than those in Table 5 of the *2000 Supply and Utilisation and Input-Output Tables* (CSO, 2006) reflecting the inclusion of some of the 'Other food products' that were not in the product coverage of NACE 15 used in the CSO tables.

2.1.3 Non-Biosector imports for production

Data from the SUI-O Tables for the Non-Biosector for 2000 show that, relative to Output, overall usage of materials and services for production, was lower than in the Biosector. There was also a difference between the sectors in usage of the goods relative to services. Spending on services in the Non-Biosector was equivalent to 32 percent of Output but only 21 percent in the Food, Beverage and Tobacco industries. Within these overall figures direct usage of imports was markedly higher in the Non-Biosector amounting to 57 percent of Output, with materials estimated to be 30 percent and services to be 27 percent of Output.

Calculation of the multiplier for direct and indirect imports for production by the Non-Biosector shows this Leontief multiplier to have been 0.62 in 2000, markedly higher than that for the Biosector. This reflects higher levels of imports related to production of major exports, particularly the Office machinery and computer manufacturing industry, NACE 30, where the Leontief multiplier was 0.83 in 2000.

Data from the CIP showed that total purchases of materials and fuels by Non-Biosector industries declined relative to Output[6] between 2000 and 2005, while the opposite was true for their purchases of services. The net result was an eight percent increase in the weighted

[6] Output is production value in the CIP plus subsidies minus indirect taxes.

average rate of usage of materials and service relative to the Output of these industries (NACE 10–14 and 16–37).

Direct multipliers for imports of materials and services were calculated for each industry using the same methods and assumptions as were used for the Food, Beverages and Tobacco group and described in the previous section. However, amongst these Non-Biosector industries there were some declines on the direct multiplier for imports of goods and services for production. Importantly these declines were in industries in the 'Modern Sector', including chemicals and pharmaceuticals as well as electronics. In these industries multipliers declined by four to five percent and the weighted average decline was also five percent, reflecting the preponderance of these industries in the Non-Biosector.

Indirect use of imports by Non-Biosector industries was not important and this is reflected in the combined direct and indirect multipliers being only slightly larger than the direct multipliers for imports. For both the Chemicals and Computer industries (NACE 24 and 30) the ratio of the Leontief to the direct multiplier was 1.0. In these circumstances the Leontief multiplier for the years after 2000 was its value in 2000 adjusted by the percentage change in the direct multiplier. The values of the Leontief multiplier in 2000 are in Table 5 of *2000 Supply and Utilisation and Input-Output Tables* (CSO, 2006).

2.2 Imports arising from production of exports: results

Multipliers for imports of the Biosector, described in the foregoing section and summarised in Table 2b, were used to estimate the overall level of imports used directly and indirectly in by domestic industries in producing exports, with results for 2005 in Table 2c. The 'Imports for production of exports' row in this table goes forward to the summary table, Table 6a in Chapter 6. Similarly imports arising from domestic production exports from the Non-Biosector were calculated from the value of these exports from each group of industries times the Leontief multiplier for the group in each year from 2000 to 2005 with results for 2005 in Table 2d and those for the earlier years for both sectors in Annex III Table A. 2.

Table 2c
Biosector net exports

	2005
	€ million
Exports of Domestic Industry at Basic Prices[1]	
Agriculture, Forestry, and Fishing	580
Food & Beverages	12,106
Tobacco	90
Biosector Total Exports	**12,776**
Imports for Production of Exports in Ireland[2]	
Agriculture, Forestry, and Fishing	170
Food & Beverages	5,301
Tobacco	24
Biosector Imports for Production of Exports	**5,495***
Net Exports[3]	
Agriculture, Forestry, and Fishing	410
Food & Beverages	6,805
Tobacco	65
Biosector Net Exports	**7,281**

Table 2d
Non-Biosector net exports

	2005
	€ million
Exports of domestic industry at Basic Prices[1]	76,682
Imports for production of exports in Ireland[2]	45,092*
Net Exports[3]	31,590

Notes for Tables 2c and 2d

[1] Sales valued at prices received by the seller, including the value of export subsidies.

[2] Exports of domestic industry multiplied by the relevant Leontief multiplier for imports.

[3] Exports after deduction of imports involved in production of exports.

* These results contribute to the summary of results in Table 6a.

3 International Transfer Payments connected with Merchandise Exporting Industries

3.1 Main payments received

Subsidies are the topic of this chapter and the third element in the overall Balance of Payments table that introduced this study. These subsidies appear as credits in the Balance of International Payments (BOP) and are almost wholly from the EU for measures in the Common Agricultural Policy, as shown in Table 3a, below.

Table 3a
International Transfers in the public sector related to specific industries

	2000	2001	2002	2003	2004	2005
			€ million			
International Transfer Payments (BOP)	951	764	1,407	1,304	1,464	1,807
Subsidies less taxes[1]						
of which						
EU subsidies[2]	1,634	1,520	1,896	1,839	1,788	2,239
of which related to:						
Agricultural, Forestry and Fishery measures[3]						
for payments to farmers, foresters & fishermen	1,038	1,273	1,501	1,428	1,431	2,030
for subsidisation of exports and processing use	557	219	255	337	336	200
for costs associated with the above	-46	26	138	72	21	9
Biosector Total*	**1,549**	**1,518**	**1,894**	**1,837**	**1,788**	**2,239**
Non-Biosector Total*	2	2	2	2	0	0

Sources

[1] National Income and Expenditure 2006, Table 30

[2] National Income and Expenditure 2006, Table 23

[3] Departments of Agriculture, Fisheries and Food, and Finance.

* These results contribute to the summary of results in Table 6a.

In 2000 there was a discrepancy for the Biosector between the CSO figures and the total of those from the Departments. For consistency the CSO figures were used and it is assumed that, as in subsequent years, all but two million of these transfers are on account of Agricultural, Forestry and Fishery Policy measures. The main subsidy to other sectors was through the European Social Fund (ESF).

Only those transfers associated with industries in the primary and manufacturing sectors were included in the calculations. However, part of these payments appear as subsidies to exports and were included in calculating the value of exports at basic prices. The remainder of the amounts ‘for subsidisation of exports and processing use and all of the EU payments ‘for farmers, fishermen and foresters’ were subsequently added to the value of exports as other EU transfers. In the summary table, Table 6a, this division was overcome by stating Biosector exports, row 1, at purchasers’ prices, that is excluding subsidy, and showing all transfers to the Biosector in row 2.

4 Profit repatriation and other Outflows from Exporting of Merchandise

4.1 Introduction

This chapter focuses on Balance of Payment (BOP) Outflows through payments to foreign owners of factors of production used to make merchandise exports. These flows appear as debit items in the BOP, however, these data are only subdivided into those relating to Financial and Non-Financial businesses and do not provide sectoral detail. Included in the Non-financial group are outflows of income on equity of all foreign owned businesses in the manufacturing and service industries. The two main tasks were then to:

1. Calculate the outflows from Non-Financial businesses arising from the Biosector, the Non-Biosector and the non-financial service industries. These were estimated from the net operating surpluses of foreign owned businesses in each of these sectors. The results were then calibrated to the aggregate data in the NIE and compared with aggregates in the BOP data. Foreign owned enterprises in Agriculture, Forestry or Fishing were assumed to be so minor as to give rise to insignificant out-flows of income on equity.
2. Calculate the amount of outflows from foreign firms in each sector that arose from production of exports.

4.2 Outflows from manufacturing and non-financial service businesses

These outflows appear as a debit item in the BOP under the heading 'Income on equity'. They amounted to €30,597 million in 2005 of which €23,371 was contributed by the Non-Financial manufacturing and service businesses, Table 4a, row 14, below. This outflow arises from the net operating surpluses (NOS) of foreign owned businesses. For manufacturing industries data from Census of Industrial Production (CIP) was used and for services, data from the Annual Services Inquiry (ASE).

4.3 Basis of calculations

Detailed data for foreign enterprises in the CIP were used to quantify the following variables for foreign owned firms in each industry group:

- Gross Value Added (GVA) at factor cost calculated as GVA at market prices from the CIP + operating subsidies – indirect taxes on production
- Gross Operating Surplus (GOS) calculated as GVA at factor cost - labour costs
- Net Operating Surplus (NOS) calculated as GOS - depreciation

The method set out above arises from the definitions given in the 'Glossary'. These estimates were then calibrated to be consistent with NIE data by applying the foreign business share of the CIP aggregate to the NIE aggregate. This was done for GVA and Labour costs where data from the NIE Table A31 goes down to the NACE two digit level used for the current calculations. For depreciation in each manufacturing industry, an overall calibration factor was calculated by division of the total depreciation charge for all manufacturing industries, derived from CIP data, by the comparable figure in NIE Table A17. A similar procedure was used for depreciation in mining and quarrying.

4.4 Details of the calculations for Manufacturing Industries

Gross Value Added of foreign enterprises at market prices came from the CIP. Adjustment to valuation at factor cost required addition of subsidies received by foreign businesses and deduction of the indirect taxes they paid, also from the CIP. These data are particularly important for the food, beverage and tobacco industries. The subsidies were mainly received by food industries that are largely Irish owned, most notably in the meat and dairy industries, which are the main destination of subsidies.

Indirect taxes largely arise in the Beverages and Tobacco industries (NACE codes 159 and 16). In 2004 these industries accounted for €1,064 million of indirect taxes out a total of €1,114 million for the entire NACE 15 and 16 group and €1,593 million for all manufacturing industry (CIP 2004 Table 13)[7]. Most of the indirect taxes paid by enterprises in NACE 15 and 16 were thus paid by producers of beverages and tobacco where foreign owned businesses account for most of the output.

Gross Value Added (GVA) at factor cost in the Transportable Goods Industries calculated from CIP data, came quite close to data in the NIE and virtually matched NIE results in 2004 and 2005. For each year the ratio of CIP to NIE data for each NACE group was then used to adjust the figures for foreign owned business derived from the CIP so that the results would be exactly consistent with the NIE.

[7] Comparable data for 2005 is not available because NACE 16 has been merged with other industries.

Labour costs at foreign owned enterprises were estimated using the method described for GVA above, starting with CIP data for enterprises then calibrating these to NIE data. Gross Operating Surpluses of foreign owned businesses were then derived from the figures for GVA at factor cost by deduction of labour costs.

Depreciation of capital assets, including plant, machinery and equipment, acquired by foreign owned enterprises came from Chapter 5 below. These were adjusted to ensure conformity with totals in NIE Table A17 and then deducted from the Gross Operating Surpluses of foreign owned businesses to give their Operating Surpluses. The overall results of applying these methods gave figures for Operating Surpluses in 'All Industries' close to NIE Table 2 Row 20a, as would be expected. Differences between the two sets of figures amounted to one percent in 2004 and 2005 reflecting the inclusion of owner occupier rents in the NIE data.

Corporation Tax at 12.5 percent on these operating surpluses of foreign enterprises was then deducted and the results compared with outflows of Foreign Direct Investment income on equity. Table 4a shows results for 2004 and 2005 for the Transportable Goods Industries and the non-financial service industries. Results for 2000 – 2005 for the Transportable Goods Industries are in Annex III table A.4.

4.5 Operating Surplus outflows arising from exports of manufacturing industry

These figures were derived from the foregoing results for foreign owned enterprises multiplied by the proportion of their turnover that went for export. This ratio was derived from CIP data. A notable feature of these data was that the proportion of turnover going for export was far higher in the foreign owned enterprises than in those in Irish ownership. In 2005 foreign businesses in the Biosector (NACE 15 and 16) exported 84 percent of output while the comparable figure for Irish businesses was 39 percent. For Non-Biosector manufacturing industry the corresponding ratios were 94 percent and 33 percent in 2005. The likely outflows of operating surpluses of foreign owned enterprises arising from their exports in 2005 are shown in Table 4b for industries in NACE 15 and 16, the Biosector in this context, and all the Transportable Goods Industries (NACE 10 – 37), the combined Biosector and Non-Biosector for the purposes of this chapter.

Table 4a

Operating Surpluses calculations and Income on Equity, 2004 and 2005

Row N°		All Enterprises		Foreign Enterprises	
		2004	**2005**	**2004**	**2005**
		€ million			
	Transportable Goods Industries	**NACE 10 to 37**			
1	Gross Value Added at market prices (CIP**)**	36,265	36,157	28,681	28,148
2	*add Subsidies (CIP)*	268	198	61	86
3	*deduct Indirect taxes (CIP)*	1,495	1,584	1,294	1,351
4	Gross Value Added at factor cost CIP sources calibrated to NIE	34,977	35,335	28,342	28,534
5	Remuneration Labour costs (CIP) calibrated to NIE	9,596	9,871	5,368	5,579
6	Gross Operating Surplus at factor cost (4) -(5)	25,381	25,464	22,973	22,955
7	Depreciation charge CIP derived calibrated to NIE	3,012	2,781	2,061	1,983
8	**Net Operating Surplus (6) - (7)**	**22,369**	**22,683**	**20,913**	**20,972**
	Non-financial service industries	NACE 55-64, 70-74, 92, 93			
9	Gross Operating Surplus at factor cost	26,416	29,126	6,488	11,168
10	Depreciation (NIE)	7,788	9,568	1,913	3,668
11	**Net Operating Surplus (9) - (10)**	**18,628**	**19,558**	**4,575**	**7,499**
	All the above	**NACE 10 to 37 and 55-64, 70-74, 92, 93**			
12	Total Net Operating Surplus Transportable Goods and Services industries (8) + (11)	40,997	42,241	25,488	28,471
13	After Tax at 12.5%			22,302	24,912
14	FDI Income on Equity: non IFSC (BOP)			22,957	23,371

Sources: Census of Industrial Production (CIP) and Annual Services Inquiry (ASI)
National Income & Expenditure 2006 (NIE) and Balance of International Payments (BOP)

Table 4b

Foreign enterprises NOS and BOP outflow of income on equity, 2005

Items	Food Beverages & Tobacco industries	Transport-able Goods industries
	NACE group	
	15-16	10-37
	€ million	
Foreign Enterprises' Net Operating Surpluses	**2,971**	**20,972**
After Tax @ 12.5%	2,600	18,350
Export share of net receipts from sales	84%	93%
BOP income on equity outflow related to exports	**2,185***	**17,405***

* These results contribute to the summary of results in Table 6a.

5 Charge for use of Imported Capital Goods in Production of Merchandise Exports

5.1 Overview of the estimation procedures

Plant, machinery, equipment and vehicles generally account for 90 percent of the capital goods that are imported and are thus the main concern in this chapter. However, acquisitions of capital goods of all sorts, including buildings, are also the foundation of capital consumption calculations that featured in calculations of the Operating Surpluses of enterprises, used in the previous chapter. Methods used to calculate the relevant charges for use of capital goods are described in the following sections of this chapter:

5.2. Data on acquisition of capital goods, that is to say Gross Fixed Capital Formation (GFCF);

5.3**.** BOP debit likely to arise from imports of capital goods;

5.4. BOP debits to set against BOP credits from exports, allowing for the longevity of capital goods;

5.5. Capital consumption, or depreciation, amounts to be deducted from Gross Operating Surpluses to give the net Operating Surpluses used in the previous chapter.

5.2 Data on acquisition of capital goods

Primary data was taken from the Census of Industrial Production (CIP), in keeping with the practice in other parts of this work. Specifically the data was for 'Local Units' (LUs). This part of the CIP was used, rather than the Census of Enterprises used in the previous chapter, as it provided data back to 1980. This long run of data was required to calculate capital consumption figures for long lasting capital items, including buildings. In addition, data for Agriculture was taken from the CSO series specific to that industry.

In 2005 the CIP showed that 'Additions to capital assets' by the Transportable Goods Industries amounted to €4,381 million of which €2,646 million was for plant, machinery, equipment and vehicles. Excluding purchases of land and sales of capital assets, the CIP total came to €3,879 million, somewhat above the figure for Gross Fixed Capital Formation (GFCF) in manufacturing industries in the NIE. Agriculture had GFCF of €585 million out of a total for Agriculture, Forestry and Fishing of €766 million. However, only the figure for agriculture was used in calculating the charge against exports as an important part of the balance may have been investment in trawlers not destined to deliver fish to Ireland. Of the GFCF in Agriculture of €585 million, acquisition of plant, machinery, equipment and vehicles amounted to €467

million. Taking data for all these sectors together their additions to capital goods in 2005 amounted to €5,147 million of which €3,677 million was for plant, machinery, equipment and vehicles.

5.3 BOP debit likely to arise from imports of capital goods

Comparison of the levels of acquisition of plant, machinery, equipment and vehicles and levels of imports of capital goods confirmed the close relationship between the two (Table 5a).

Table 5a
Capital goods: levels of investment and imports

Description	Row	2005
		€ million
Gross domestic fixed capital formation	**1**	**43,582**
of which		
Transport equipment	2	4,335
Agricultural machinery	3	261
Other machinery and equipment	4	4,467
Sub-total machinery and equipment GFCF	5	9,063
Imported capital goods	6	8,139
Imports of Producers Capital Goods	7	8,255
Relationships between aggregates		**Percent**
Percentage of machinery and Equipment GFCF imported (6)/(5)	8	90%
CSO factor to estimate BIP debit arising from imported capital goods	10	84%
Import content of machinery and equipment GFCF (8)*(10)	11	75%

Sources

Rows 1 to 5: Gross Domestic Physical Capital Formation at Current Market Prices, NIE Table 15
Row 6: Imported capital goods, NIE item 153 Table 11, includes trade margin.
Row 7: Trade Statistics Table 3 (c.i.f.)

Data for 2005 in this table also show that for every €100 of machinery and equipment in Gross Fixed Capital Formation, there is now likely to arise a BOP debit of €75. This same relationship was likely to hold true for the plant, machinery, equipment and vehicles acquired by the sectors considered in this report. The result would be that, of their outlay of €3,677 million on these capital goods in 2005, the BOP debit was likely to have been of the order of €2,758 million.

5.4 BOP debits to set against BOP credits from exports

Spreading the cost of imported capital goods over the years of service expected of them has the following attractive features: (i) it reflects the fact that this year's output and exports came

from the use of capital goods acquired over a number of years, (ii) it conforms with the charging of depreciation in accounting practice and (iii) it reduces the impact of the year's imports of capital goods on the overall results. The importance of this last point was illustrated in data on acquisitions of plant, machinery, equipment and vehicles by industries in NACE 1 – 37 which surged from a relatively low level of €2,541 million in 2003 to €3,677 million in 2005. For these industries, including the Food, Beverages and Tobacco group, the NIE charge for depreciation 'is generally taken as being the amount allowed for tax purposes (adjusted appropriately for *free depreciation*, etc)'[8]. For plant and machinery the tax code allows a 'Wear and Tear Allowance' that depreciates each item over a five year period beginning in the year of acquisition. This rule was applied and the acquisition costs of plant, machinery, equipment and vehicles were spread over five years. Other capital goods were depreciated over 20 years. The results for plant etc were multiplied by 0.75 to convert them into BOP debits. Finally these BOP debits were related to exports in proportion to the share of exports in the output of each industry, as was done in Chapter 4 for outflows arising from foreign ownership of enterprises. Aggregate results from this exercise, Table 5b, are carried forward to the summary table in the final chapter (Table 6a).

The results above resemble the direct multipliers for imports discussed in Chapter 2. However, in that chapter calculation of overall usage of imports also took account of import use by suppliers of production inputs, that is the indirect multiplier that formed part of the Leontief multiplier. In this chapter capital used by input suppliers has not been taken into account. It would indeed be difficult to allow for these indirect effects and the Input-Output Tables used in Chapter 2 only show an overall capital consumption charge for each industry group. Thus there are no figures for a capital consumption charge for plant and machinery, still less the role of imported capital goods, within the overall table of Leontief multipliers. What is certain is that the results for imports of capital goods shown in this chapter understate this element of BOP debits attributable to exports as they omit charges for capital consumed by suppliers of inputs to exporting enterprises.

5.5 Capital consumption charge deducted from gross operating surpluses

Calculation of the Operating Surpluses of foreign enterprises, in Chapter 4, involved the deduction of a capital consumption charge from Gross Operating Surpluses (GOS). These

[8] *National Income and Expenditure 2006* (CSO, 2007), Appendix 2, note 28.

were calculated in the same way as depreciation used in this chapter. However these CIP based calculations did not take into account *free depreciation*, nor were investment grants etc deducted. It was thus not surprising that the NIE figures for capital consumption were lower than those derived as described above. The gap between these two sets of figures was particularly large for the mining and quarrying sector. For this reason capital consumption figures from the CIP data were adjusted to agree with NIE aggregates when they were used to calculate Operating Surpluses.

Table 5b
Plant, Machinery, Equipment and Vehicles capital consumption:
BOP Import charge against exports

NACE	Industries	2000	2001	2002	2003	2004	2005
				€ million			
1+2+5	**Agriculture, Forestry and Fish**	**96**	**95**	**103**	**104**	**107**	**112**
10 - 14	Mining and quarrying	10	13	15	19	23	23
15+16	**Food, beverages and Tobacco**	**127**	**128**	**151**	**173**	**172**	**166**
17+18	Textiles & Wearing apparel	11	12	12	11	8	7
20	Wood & wood products (excl furniture)	6	6	8	7	8	7
21+22	Pulp, paper & products, Printed matter, Recorded media	83	83	89	85	80	74
24	Chemical products & man-made fibres	333	336	404	408	393	403
25	Rubber & plastics	19	17	17	15	14	14
26	Other non-metallic mineral products	19	20	24	34	28	29
27+28	Basic metals & Fabricated metal products	19	18	19	18	15	17
29	Machinery and equipment n.e.c.	28	28	27	28	26	25
30-33	Office machinery & computers, electrical machinery, medical, precision & optical instruments	413	516	581	541	577	728
34+35	Motor vehicles and trailers, Other transport equipment	49	64	68	71	63	48
19,23, 36,37	Leather and leather products & Petroleum & other manufacturing products & Recycling	23	22	26	22	23	17
1,2,5, 15,16	**Biosector**	**223**	**223**	**254**	**278**	**279**	**277***
10-14, 17-37	Non-Biosector	1,014	1,136	1,288	1,257	1,256	1,392
1,2,5, 10-37	Total	1,237	1,358	1,542	1,534	1,535	1,669*

* These results contribute to the summary of results in Table 6a.

Source: Import content of estimated capital consumption times ratio of Turnover Exported to Total Exports

6 Results and Discussion

Results from previous chapters are assembled in Table 6a with an indication of which Tables in this Report provided data for each of the rows. The key result in bottom row is that in 2005 the Biosector's contribution to net foreign earnings from exports amounted to 32 percent of that from all primary and manufacturing industries.

Analysis of BOP flows per 100 euro of exports, Table 6b, shows how the Biosector came to account for 32 percent of net earnings but only 16 percent of merchandise exports in 2005. The largest disparity between the Biosector and the Non-Biosector was in the import content of exports where these were €38 per €100 euro in the Biosector but amounted to €58 per €100 euro of exports in the Non-Biosector. Also contributing to the disparity are the Biosector's lower outflows arising from foreign ownership of businesses in the sector and the inflows of payments for elements of the EU Common Agricultural Policy (CAP).

Attention was also given to the time path of these results and data for 2000 to 2005 is in Annex III tables A6a and A6b. In the Biosector there has been a considerable change in the pattern of results over the past 6 years. The main influence has been strong growth in exports classified as 'Other food products' and largely produced by foreign owned enterprises. Export of these products doubled in value between 2000 and 2005, in contrast the value of exports of the rest of food products (NACE 151-157) hardly increased at all. Consequently, the share of 'Other food products' in food exports rose from 53 percent to 69 percent of the total. The results for the sector thus increasingly reflected the activities of enterprises in the 'Other food products' group. This is most clearly seen in the share of receipts from exports going into operating surpluses of foreign owned businesses rising from €9 to €15 per €100 of exports. These enterprises also accounted for most of the imports of products that are exported without further processing, however their imports of raw materials and services were below average. Decline in import usage in this and many parts of the Food, Beverages and Tobacco group also added to the overall decline in import usage from €44 to €38 per €100 of exports between 2000 and 2005.

Results for the Non-Biosector over the six years show little change in charges against exports. Most notable was a spike in out-flows on account of the operating surpluses of foreign owned businesses, which hit €26 per €100 of exports in 2002.

Table 6a
Summary of Balance of Payments flows arising from exports of the Biosector and all primary and manufacturing industries in 2005

Balance of Payments Flows	Table	2005
		€ million
Biosector industries (NACE 1, 2, 5, 15, 16)		
Exports of Enterprises at purchasers' prices	1a	14,299
EU Transfers related to exporting industries[1]	3a	2,239
Deductions		
Imports exported without further processing		-1,723
Imports for production of exports in Ireland	2c	-5,495
Operating surplus of foreign businesses from exports[2]	4b	-2,185
Net inflow from exports		7,135
Consumption of imported plant etc. in production of exports	5b	-277
Net foreign earnings		**6,858**
All Primary and Manufacturing Industries (NACE 1, 2, 5, 10-37)		
Exports of Enterprises at purchasers' prices	1a	91,929
EU Transfers related to exporting industries[1]	3a	2,239
Deductions		
Imports exported without further processing		-2,774
Imports for production of exports in Ireland	2c&d	-50,588
Operating surplus of foreign businesses from exports[2]	4b	-17,405
Net inflow from exports		23,402
Consumption of imported plant etc. in production of exports	5b	-1,669
Net foreign earnings		**21,733**
Biosector as a percentage of all Primary and Manufacturing Industries		
Exports		16%
Net inflow from exports		30%
Net foreign earnings of exports		**32%**

Note:
[1] All Payments to these industries from the EU including subsidies on exports.
[2] Operating surpluses stated after deduction of corporation tax at 12.5 percent.

Table 6b
Outflows per 100 euro of exports

Items	2005	
	Biosector	Non-Bio.
Exports of Enterprises at purchasers' prices	100	100
EU Transfers related to exporting industries	16	0
Imports exported without further processing	-12	-1
Imports for production of exports	-38	-58
Operating surplus of foreign businesses from exports[2]	-15	-20
Consumption of imported plant etc. in production of exports	-2	-2
Net foreign earnings of exports	**48**	**19**

Stability in the six years of results for the Biosector points the reliability of the calculations used in this analysis. The contrast between the Biosector's increasing share of exports and its decreasing share of net foreign earnings is largely explained by the rise in exports of industries in the 'Other food product' class, noted above.

Export orientation and relatively low out-flows thus make the Biosector a far more valuable part of the economy than might be seen in its modest share of Gross National Product. At its core are the natural resource based industries of agriculture, forestry and fishing and industries using their output. Ownership of enterprises in these industries is very largely in Irish hands so, in addition to their relatively low levels of import use, other outflows are on the low side, particularly those on account of the operating surpluses of foreign owned businesses. In fact the large and rising involvement of Irish food businesses in overseas operations may well result in considerable inflows of their earnings on these investments. Had these inflows been included in the calculations reported here, they would have added still more to the contribution of the Biosector to the Balance of International Payments net inflow of funds.

Finally this study emphasises the strength of the Biosector's linkages with Irish businesses. These connections would be particularly close for the natural resource based industries of agriculture, forestry and fishing as well as industries using their output. Global price increases for food and forestry products, in the two years since the 2005 data used here, have boosted the prospects of these industries and strengthened their position as a major contributor to the future prosperity of Ireland.

7 Summary and Conclusions

Unexpectedly the importance of agriculture, forestry, fishing and their associated industries as contributors to the State's Balance of International Payments is still relatively large. This is despite over a decade of transformational growth in the Irish economy centred on export oriented foreign owned companies in the modern sector. Just prior to this rapid growth a measure of their importance was calculated as their contribution to the nation's net foreign earnings from exports of merchandise (Riordan, 1989). That study indicated that the Agri-Food sector provided 42 percent of the net foreign earnings arising from merchandise exports in 1988. The current calculation showed this to be 32 percent in 2005. Greater rigour was achieved on this occasion by calibration of each element in the calculation to National Income and Expenditure aggregates. Also, a broader definition of the Agri-Food sector was used that included forestry and fishing as well as agriculture and all industries in the Food, Beverages and Tobacco group (NACE 15 and 16). Results for this Biosector group were then put in the context of results for all merchandise producing industries, including all primary and manufacturing industries (NACE 01, 02, 05 and NACE 10 to 37).

Transactions affecting the Balance of International Payments included in the calculation were: exports, relevant international transfer payments, imports of goods and services for exports, outflows of foreign owned businesses' income on equity, and a charge for use of imported capital goods directly linked to production of exports. These items were calculated for all primary and manufacturing industries, except for income on equity in agriculture, forestry and fishing, which were assumed to be negligible as it was largely Irish owned. Calculation of the value of imports of goods and services, the largest outflow or BOP debit item, included the import content of goods and services purchased by exporters from suppliers in Ireland. This was done by using each industry's Leontief multiplier for imports from the national Input-Output table.

Results consistent with the Balance of International Payments showed that in 2005 the Biosector contributed 32 percent of the total net foreign earnings of all primary and manufacturing industries in 2005. In contrast the share of the Biosector in exports was 16 percent. An even lower share of exports would be seen if some 'Other food products' were excluded, as they are in data for the sector shown in the Trade Statistics. Reasons for the Biosector's share of net earnings from its exports being twice its share of exports were mainly

the lower content of imports in its exports and the smaller role of foreign owned businesses in its export activities. Results in terms of Balance of International Payments outflows per €100 of exports showed that imports of goods and services amounted to €38 for the Biosector compared with €58 for the Non-Biosector. In addition, outflows of income on equity of foreign owned businesses took €15 in the Biosector compared with €20 in the Non-Biosector. The results were found to be stable over the six years studied, that is from 2000 to 2005, the only exception was 2002 when there was a spike in income on equity of foreign owned enterprises in the Non-Biosector. These results are thanks to comprehensive data provided by the CSO and, in particular, the latest set of results from the Census of Industrial Production, that is those for 2005.

This study emphasises the strength of the Biosector's linkages with Irish businesses. These connections would be particularly close for the natural resource based industries of agriculture, forestry and fishing along with industries using their output. Global price increases for food and forestry products in the two years since the 2005 data used here, have boosted the prospects of these industries and strengthened their position as a major contributor to the future prosperity of Ireland.

References

CSO (1997) *Input-Output Tables, 1990,* Stationery Office, Dublin.

CSO (2004) *1998 Supply and Use and Input-Output Tables,* Dublin, Stationery Office.

CSO (2006) *2000 Supply and Use and Input-Output Tables,* Dublin, Stationery Office.

CSO (2007) *Annual Services Inquiry 2005,* Dublin, Stationery Office.

CSO (2007) 'Balance of International Payments, Quarter 4 and Year 2006', Central Statistics Office, Dublin, March 2007.

CSO (2007) *Census of Industrial Production 2005,* Dublin, Stationery Office.

CSO (2007) *National Income and Expenditure 2006,* Dublin, Stationery Office.

CSO (2007) 'Output, Input and Income in Agriculture', Central Statistics Office, Dublin.

Department of Agriculture and Food, *Annual Review and Outlook for Agriculture & Food 2006/2007.*

Henry E (1987), 'The impact of the agriculture and food dependant processing sectors on the Irish economy during 1982', *Irish Journal of Agricultural Economics and Rural Sociology,* vol.12, pp.1-17.

National Economic and Social Council (1982), *A review of Industrial Policy: A report prepared by the Telesis Consultancy Group,* National Economic and Social Council, Report No 64.

NUI Maynooth, Teagasc, UCD (2005) *Rural Ireland 2025: Foresight Perspectives,* NUI Maynooth, Teagasc, UCD and at www.teagasc.ie/publications/2005/20051216/rural_ireland_2025_foresight_perspectives.pdf

Riordan, B (1989) 'The net contribution of the agri-food sector to earnings of foreign exchange', *Situation and Outlook Bulletin No 20,* Dublin, Rural Economy Research Centre, Teagasc.

ANNEXES

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Annex IV. Glossary of Terms and Abbreviations

ANNEX I

Review of Models of the Export Sector

AI-1 Introduction

At the heart of estimating the net inflow of funds is the identification and estimation of outflows associated with inflows. Previous estimates endeavoured to estimate the amount of imported materials directly incorporated in the exports. In addition, some allowances were made for other outflows directly associated with these exports, including EU transfer payments under the Common Agricultural Policy and payments to owners of factories and intellectual property who are not resident in Ireland.

To give rigour to the analysis, the process of generating exports was examined through its representation in a series of models of increasing complexity. These models fall into three classes as follows:

A. Static models abstracted from a need to import equipment and other capital goods,
B. Imports of equipment and other capital goods included as user costs in a static model;
C. Disturbances from year to year are included as affecting the performance of firms, these disturbances may be external to the firm, weather, for example, affecting crop output, or due to the firm's own choices.

On reading the outlines of these models examples may come to mind, however, no illustrations are provided in the interests of brevity and to avoid confusion, as most businesses depart in some way from the exact specification of any one model.

AI-2 Review of models to represent the export production process

Models of Class A: Static and abstracted from a need to import capital goods

Model 1. The export enclave

Assumed: All exports are from factories[9] owned by Irish businesses and entirely dedicated to exporting, in addition, they import all their raw materials. In this model their only connection with the rest of the economy is through the factors of production that they employ, including payment of their workforce and profits of these Irish businesses.

Net inflow is the difference between merchandise exports and raw material imports.

[9] 'Factory' and other terms are defined in the Glossary at the end of the Report. Thus here 'Factory' signifies any production activity that is distinguishable from others by virtue of its main output, location and ownership. In the terms of the *Census of Industrial Production* it is synonymous with a 'Local Unit' or, in agriculture, a 'farm'.

Model 2. A detached export sector

Assumed: Foreign businesses operate in the same way as assumed in Model 1.

Net inflow: Exports minus imports and outflows on account of earnings of foreign owned firms and their foreign based workers.

Estimation challenge: The special difficulty here is to identify the relevant payments in the Balance of International Payments tables and then to assess the relationship between these payments and the exports to which they relate. This is further complicated by allowing for the imports of services and the corresponding outflows.

Model 3. An integrated export sector

Assumed: Exporters buy products from other businesses in Ireland as well as using imports in the export production process. However, exporters do not sell on the home market.

Net inflow: Exports minus imports going directly to the exporter and, in addition, the import content of exporters' purchases made from Irish businesses, as well as deduction of outflows on account of earnings of foreign owned firms and their foreign based workers.

Estimation challenge: The additional challenge is to estimate the import content of domestically sourced inputs. These are often called indirect imports in contrast to those made directly by the firm itself.

Model 4. Factories producing for both home and export markets

Assumed: Exporting factories also supply the home market from production that uses imported and Irish products.

Net inflow: Exports minus the share of the imported inputs used in their production, whether directly or indirectly, as well as deduction of a proportionate part of the outflows on account of earnings of foreign owned firms and their foreign based workers.

Estimation challenge: The novelty here is that output from a single factory goes to two distinct markets. The question is whether it is possible to disentangle the inputs used to produce exports from those used to produce for the home market.

Models of Class B: Static but allowing importation of capital goods

Model 5. Allowance for use of imported capital

Assumed: All of Model 4 plus an allowance for use of imported capital goods

Net Inflow: Exports minus the share of imported materials used in their production, whether directly or indirectly and a further debit item for the use of imported capital goods to produce these exports, also a deduction for outflows on account of earnings of foreign owned firms and their foreign based workers.

Estimation challenge: The extra task is to devise, for each annual set of accounts, an appropriate rate of contribution to the overall import bill to account for these capital goods. Here again there are direct imports and indirect imports to be considered.

Models of Class C: Fluctuations from year to year in the relationship between exports and associated outflows

Model 6. Disturbances in the rate of outflows

Assumed: All of model 5.*Net Inflow:* As defined in Model 5.

Estimation challenge: This model would give rise to erratic variation in the pattern of Balance of International Payments data. Debit items would often be 'lumpy' with changes between periods somewhat disconnected from the level of production and credits from exports.

Model 7. Exports from a growing and developing economy

Assumed: All of Model 5 in a context of growth and development in the economy that may involve large transformational inward investment as also major imports of capital goods, both leading to abrupt shifts in performance.

Net inflow: As defined in Model 5.

Estimation challenge: quantification that incorporates the parameter shifts.

ANNEX II

Table of Workbook Contents

Sheet N°	Topics of each sheet	Derivation of content post 2000[b]
1	Trade Statistics: Exports (fob)	Trade Statistics
2	Turnover Exported: Foreign Enterprises	CIP
3	Turnover Exported: Irish Enterprises	CIP
4[a]	**Exports of Enterprises**	CIP Table 11
5[a]	Imports of goods exported without further further processing	Inferred from CIP Table 11
6	Subsidies received by manufacturers	18 + 22
7	**Exports of Domestic Production at Basic Prices**	4 + 6 - 5
8	Import Share of Materials Purchased	CIP
9	Input-Output calculations	
10	Import Multipliers (Leontief)	Extension of SUI-O using sheet 9.
11[a]	**Imports for production of exports in Ireland**	7 * 10
12	Net Exports of Merchandise	4 - 5 - 11
13[a]	**EU Transfers related to exporting industries**	Depts. of: Ag, Fish & Food, Finance
14	Summary: Inflows from net exports	12 + 13
15	NIE Gross Value Added at Factor Cost: All merchandise businesses	NIE A31 tabulation
16	Gross Value Added at market prices: foreign enterprises	CIP Table 14
17	Indirect Taxes paid by foreign owned enterprises	CIP
18	Subsidies received by foreign owned enterprises	CIP
19	Gross Value Added at factor cost: foreign enterprises	16 - 17 + 18
20	Gross Value Added at market prices: Irish enterprises	CIP Table 14
21	Indirect Taxes paid by Irish enterprises	CIP
22	Subsidies received: Irish enterprises	CIP
23	Gross Value Added at factor cost: Irish enterprises	20 - 21 + 22
24	Gross Value Added at market prices: All enterprises	16 + 20
25	Gross Value Added at factor cost: All enterprises	19 + 23
26	Gross Value Added at Factor Cost (NIE): Foreign Businesses	15 * 19 / 25
27	NIE: Remuneration in all Businesses	NIE A31 tabulation
28	Labour Costs: Foreign enterprises	CIP Table 14
29	Labour Costs: Irish enterprises	CIP Table 14
30	Labour Costs: All enterprises	28 + 29
31	Remuneration (NIE): Foreign Businesses	27 * 28 / 30
32	NIE: Gross Operating Surplus at factor cost, All Businesses	NIE A31 tabulation
33	Gross Operating Surplus (NIE): Foreign Businesses	26 - 31
34	Operating Surplus (NIE): Estimates for All Businesses	32 - (54 calibrated to NIE total)
35	Foreign Businesses' Operating Surpluses and BOP Outflows	33 - (52 calibrated to NIE total)
36	Cash Flow: Foreign Businesses	33 - 43
37	Turnover: Foreign Enterprises	CIP Table 14
38	Turnover: Irish Enterprises	CIP Table 14
39	Total Turnover: All Enterprises	37 + 38
40	Share of exports in net sales receipts of foreign enterprises	(2 + 18) / (37 - 17 + 18)
41	Share of exports in net receipts of all enterprises	(4 + 18 + 22) / (39 -Tax+Subsidies)
42[a]	**Operating Surplus of Foreign Businesses from Exports**	35 * 40

Sheet N°	Topics of each sheet	Derivation of content post 2000[b]
43	Capital Asset Additions: Foreign Local Units (Establishments)	CIP
44	Capital Asset Additions: Irish Local Units (Establishments)	CIP
45	Capital Asset Additions: All Local Units (Establishments)	43 + 44
46	Plant, Machinery, Equipment and Vehicles Additions: Foreign L.U.s	CIP
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49	Plant, Machinery, Equipment and Vehicles: Deprecation, Foreign L.U.s	46 @ five-year moving average
50	Plant, Machinery, Equipment and Vehicles: Deprecation, Irish L.U.s	47 @ five-year moving average
51	Plant, Machinery, Equipment and Vehicles: Deprecation, All L.U.s	49 + 50
52	Depreciation Charge: All Capital Assets of Foreign L.U.s	49 + 20 yr MA of (43 - 46)
53	Depreciation Charge: All Capital Assets of Irish L.U.s	50 + 20 yr MA of (44 - 47)
54	Depreciation Charge: All Capital Assets of All L.U.s	52 + 53
55	Plant, Machinery, Equipment and Vehicles consumption: Import charge against BOP	51 * M[1]
56[a]	**BOP Import charge against exports**	55 * 41
57	**Summary of Balance of Payments flows arising from exports**	**4 - 5 - 11 + 13 - 42 - 56**

Notes: [a] Items included in calculation of the Balance of Payments flows in sheet N° 57.

[b] Numbers in columns refer to Sheet Numbers,
Census of Industrial Production (CIP) table numbers refer to those in CIP 2005.

[1] M is the estimated import content of Plant etc in GFCF (0.75 in 2005).

ANNEX III

Results for 2000 to 2005 for key tables in the Report

Table A.1: Exports of Enterprises, 2000-2005

Table A.1 Supplement: Trade Statistics, Exports (fob), 2000-2005

Table A.2: Imports for Production of Exports in Ireland, 2000-2005

Table A.4: Foreign Businesses' Operating Surpluses and BOP Outflows of Income on Equity, 2000-2005

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Table A.6b: Outflows per 100 euro of Exports of Biosector and Non-Biosector, 2000-2005

Table A.1
Exports of Enterprises, 2000-2005

NACE	Industries	2000	2001	2002	2003	2004	2005
				€ million[1]			
1	Agricultural products		406	424	442	412	462
2	Forestry products		22	19	16	20	9
5	Fish and molluscs		149	144	141	127	109
1+2+5	**Agriculture, Forestry and Fish**	**750**	**577**	**587**	**599**	**558**	**580**
10 to 14	Mining and quarrying	217	277	253	319	408	489
15+16	**Food, beverages and Tobacco**	**9,074**	**9,640**	**9,894**	**12,109**	**13,845**	**13,719**
17+18	Textiles & Wearing apparel	608	596	524	473	347	399
20	Wood and wood products (excl furniture)	240	239	245	261	300	308
21+22	Pulp, paper & products, Printed matter and recorded media	8,388	8,240	8,840	10,717	12,517	12,601
24	Chemical products including pharmaceuticals	22,292	25,057	30,233	28,476	28,466	29,657
25	Rubber and plastics	615	530	487	514	529	575
26	Other non-metallic mineral products	477	444	432	449	385	410
27+28	Basic metals & Fabricated metal products	808	689	729	731	701	760
29	Machinery and equipment n.e.c.	1,265	1,284	1,207	1,354	1,346	1,557
30-33	Office machinery & computers, Electrical machinery, Medical, precision & optical instruments	28,554	30,317	26,611	26,050	25,813	29,052
34+35	Motor vehicles and trailers, Other transport equipment	833	816	794	801	790	846
19,23, 36,37	Leather products, Petroleum, manufacturing n.e.c & Recycling	822	966	1,072	879	912	977
1,2,5,15,16	**Biosector[1]**	**9,824**	**10,217**	**10,481**	**12,708**	**14,403**	**14,299**
10-14, 17-37	Non-Biosector	65,122	69,456	71,427	71,023	72,515	77,629
1,2,5, 10-37	**Total**	**74,945**	**79,673**	**81,908**	**83,731**	**86,918**	**91,929**
	Biosector share of total	**13%**	**13%**	**13%**	**15%**	**17%**	**16%**
Addendums							
10-37	***Transportable Goods Industries (T.G.I.)***	***74,195***	***79,096***	***81,321***	***83,133***	***86,360***	***91,348***
10-37	*T.G.I excluding sales of services*	*71,832*	*76,604*	*78,682*	*80,819*	*84,657*	*88,869*
1,2,5, 10-37	*Total all mechandise from Biosector and Non-Biosector*	*72,582*	*77,181*	*79,269*	*81,418*	*85,215*	*89,450*
1,2,5, 10-37	*Total Merchandise Exports (Trade Statistics)*	*83,889*	*92,690*	*93,675*	*82,076*	*84,410*	*86,732*
	Adjustment to BIP definition	-3,918	-6,000	-4,180	-3,762	-3,866	-3,040
	BIP Current Account Credit[2]	79,971	86,690	89,495	78,314	80,544	83,692

[1] Valued exclusive of subsidies.

[2] Balance of International Payments

Sources

Agriculture, forestry, fishing: Trade Statistics

Other industries: CIP

Table A.1 Supplement
Trade Statistics, Export (fob), 2000-2005

NACE[1]	Products	2000	2001	2002	2003	2004	2005
				€ million			
1	Agricultural products		406	424	442	412	462
2	Forestry products		22	19	16	20	9
5	Fish		149	144	141	127	109
1+2+5	**Agriculture, Forestry and Fish**	**750**	**577**	**587**	**599**	**558**	**580**
10 to 14	Mining and quarrying	212	245	197	221	281	333
15	**Food and beverages**	**6,779**	**6,530**	**6,491**	**6,567**	**6,873**	**7,216**
16	**Tobacco products**	**106**	**114**	**107**	**95**	**88**	**90**
17	Textiles	384	355	312	250	268	265
18	Wearing apparel	540	296	289	285	262	248
19	Leather and leather products	88	125	96	90	82	75
20	Wood and wood products (excl furniture)	177	236	283	302	312	339
21	Pulp, paper and paper products	259	232	216	259	248	228
22	Printed matter and recorded media	9,039	3,722	2,577	2,261	1,887	1,911
23 & 36	Petroleum and other manufacturing products	669	656	706	544	776	967
24	Chemical products including pharmaceuticals	26,070	32,232	39,149	35,765	37,398	40,147
25	Rubber and plastics	714	775	671	639	659	687
26	Other non-metallic mineral products	852	757	730	655	668	694
27	Basic metals	290	230	203	214	274	272
28	Fabricated metal products	399	467	527	458	489	508
29	Machinery and equipment n.e.c.	1,773	1,744	1,650	1,526	1,801	1,636
30	Office machinery and computers	19,507	21,035	17,330	14,837	13,383	13,993
31	Electrical machinery and apparatus n.e.c.	2,576	2,229	1,677	1,528	1,412	1,328
32	Radio, television and communications apparatus	9,180	11,252	11,204	4,633	5,357	5,630
33	Medical, precision and optical instruments	3,141	3,819	4,314	5,993	6,671	7,130
34	Motor vehicles and trailers	547	630	550	320	296	217
35	Other transport equipment	861	598	591	478	589	599
37	Recycling	-	-	-	-	-	-
	Other merchandise exports	0	3,835	3,216	3,559	3,777	1,639
1,2,5, 10-37	**Total Merchandise Exports**	**83,889**	**92,690**	**93,675**	**82,076**	**84,410**	**86,732**
	Adjustment to BIP definition	-3,918	-6,000	-4,180	-3,762	-3,866	-3,040
	BOP Current Account Credit[2]	79,971	86,690	89,495	78,314	80,544	83,692

Note: Dotted rules demarkate NACE groupings used in the CIP.

Sources

[1] 2000: SU, I-O Tables, 2001-2005: Trade Statistics: special compilation

[2] Balance of International Payments

Table A.2
Imports for Production of Exports, 2000-2005

NACE	Products	2000	2001	2002	2003	2004	2005
				€ million			
1+2+5	**Agriculture, Forestry and Fish**	**179**	**144**	**149**	**158**	**153**	**170**
10 to 14	Mining and quarrying	71	101	97	120	156	185
15	**Food and beverages**	**4,073**	**4,258**	**4,374**	**5,061**	**5,370**	**5,301**
16	**Tobacco products**	**29**	**31**	**29**	**26**	**24**	**24**
17	Textiles	174	170	150	125	120	122
18	Wearing apparel	119	116	102	86	82	83
19	Leather and leather products	32	46	35	33	30	27
20	Wood and wood products (excl furniture)	97	121	120	119	123	150
21	Pulp, paper and paper products	122	100	88	109	107	107
22	Printed matter and recorded media	4,996	4,470	4,521	5,706	6,892	7,548
23 & 36	Petroleum and other manufacturing products	345	395	459	373	390	424
24	Chemical products and man-made fibres	11,971	11,056	12,374	13,114	13,552	15,259
25	Rubber and plastics	279	220	196	215	220	270
26	Other non-metallic mineral products	149	180	137	129	113	161
27	Basic metals	73	60	53	51	56	65
28	Fabricated metal products	207	181	207	205	176	201
29	Machinery and equipment n.e.c.	572	724	630	641	667	801
30	Office machinery and computers	14,023	12,377	11,518	11,160	11,539	13,752
31	Electrical machinery and apparatus n.e.c.	1,243	1,474	1,319	1,391	1,648	1,517
32	Radio, television and communications apparatus	3,240	3,107	2,039	1,752	1,487	1,758
33	Medical, precision and optical instruments	1,288	1,611	1,736	1,892	1,881	2,212
34	Motor vehicles and trailers	296	316	274	154	153	105
35	Other transport equipment	152	90	119	237	253	345
37	Recycling	0	0	0	0	0	0
1,2,5, 15,16	**Biosector**	**4,281**	**4,433**	**4,552**	**5,244**	**5,546**	**5,495**
10-14, 17-37	Non-Biosector	39,447	36,915	36,176	37,610	39,644	45,092
1,2,5, 10-37	**Total imports of goods and services for production of Exports**	**43,728**	**41,348**	**40,727**	**42,854**	**45,190**	**50,588**

Source: Derived from Exports of Domestic Industry and Leontief import multipliers

Table A.4
Foreign Businesses' Operating Surpluses and BOP of Income on Equity, 2000-2005

NACE	Industries	2000	2001	2002	2003	2004	2005
				€ million			
1+2+5	**Agriculture, Forestry and Fish**	**0**	**0**	**0**	**0**	**0**	**0**
10 to 14	Mining and quarrying	19	11	15	41	52	84
15+16	**Food, beverages and Tobacco**	**1,426**	**1,941**	**2,471**	**3,030**	**3,047**	**2,971**
17+18	Textiles & Wearing apparel	39	56	33	64	52	50
20	Wood and wood products (excl furniture)	43	18	14	34	32	37
21+22	Pulp, paper & products, Printed matter & recorded media	3,061	3,145	2,850	3,228	3,574	3,632
24	Chemical products and man-made fibres	8,396	10,651	15,038	11,802	9,996	9,671
25	Rubber and plastics	70	70	56	70	95	41
26	Other non-metallic mineral products	74	98	84	117	74	111
27+28	Basic metals & Fabricated metal products	98	119	105	126	130	61
29	Machinery and equipment n.e.c.	198	139	202	227	218	259
30-33	Office machinery & computers, Electrical machinery, Medical, precision & optical instruments	4,445	3,944	3,576	3,380	3,567	3,918
34+35	Motor vehicles and trailers, Other transport equipment	81	65	94	75	83	63
19,23, 36,37	Leather and leather products & Petroleum and other manufacturing products & Recycling	21	74	55	58	-8	72
1,2,5, 15,16	**Biosector**	**1,426**	**1,941**	**2,471**	**3,030**	**3,047**	**2,971**
10-14, 17-37	Non-Biosector	16,547	18,392	22,121	19,222	17,865	18,000
1,2,5, 15-37	**Total**	**17,973**	**20,333**	**24,593**	**22,251**	**20,913**	**20,972**
	Operating Surplus of Foreign Enterprises in Transportable Goods Ind. after tax at 12.5%	15,726	17,791	21,519	19,470	18,299	18,350
	FDI income on equity	**17,838**	**19,982**	**24,524**	**22,878**	**22,957**	**23,371**
	Post tax Operating Surplus as a percentage of FDI income on equity	88%	89%	88%	85%	80%	78%
Source:	Derived from estimates of Gross Operating Surplus of foreign businesses - depreciation in foreign businesses from CIP data adjusted to align the levels in these results to those in the NIE.						

Table A.6a
Summary of Balance of Payments flows arising from Exports of the Biosector and all Primary and Manufacturing Industries, 2000-2005

Balance of Payments Flows	Source Table	2000	2001	2002	2003	2004	2005
				€ million			
Biosector industries (NACE 1, 2, 5, 15, 16)							
Exports of Enterprises at purchasers' prices	1b	9,824	10,217	10,481	12,708	14,403	14,299
EU Transfers related to exporting industries[1]	3a	1,549	1,518	1,894	1,837	1,788	2,239
Deductions							
Imports exported without further processing		0	0	0	-698	-1,695	-1,723
Imports for production of exports in Ireland	2c	-4,281	-4,433	-4,552	-5,244	-5,546	-5,495
Operating surplus of foreign businesses from exports[2]	4b	-883	-1,230	-1,606	-2,156	-2,362	-2,185
Net inflow from exports		6,209	6,071	6,217	6,445	6,587	7,135
Consumption of imported plant etc. in production of exports	5b	-223	-223	-254	-278	-279	-277
Net foreign earnings of exports		**5,985**	**5,849**	**5,963**	**6,168**	**6,308**	**6,858**
All Primary and Manufacturing Industries (NACE 1, 2, 5, 10-37)							
Exports of Enterprises at purchasers' prices	1b&c	74,945	79,673	81,908	83,731	86,918	91,929
EU Transfers related to exporting industries[1]	3a	1,551	1,520	1,896	1,839	1,788	2,239
Deductions							
Imports exported without further processing		-1,614	-2,134	-1,760	-2,290	-2,766	-2,774
Imports for production of exports in Ireland	2c&d	-43,728	-41,348	-40,727	-42,854	-45,190	-50,588
Operating surplus of foreign businesses from exports[2]	4b	-14,666	-16,682	-20,066	-18,302	-17,346	-17,405
Net inflow from exports		16,489	21,029	21,250	22,123	23,403	23,402
Consumption of imported plant etc. in production of exports	5b	-1,237	-1,358	-1,542	-1,534	-1,535	-1,669
Net foreign earnings from exports		**15,252**	**19,670**	**19,709**	**20,589**	**21,868**	**21,733**
Biosector as a percentage of all Primary and Manufacturing Industries							
Exports		13%	13%	13%	15%	17%	16%
Net inflow from exports		38%	29%	29%	29%	28%	30%
Net foreign earnings of exports		**39%**	**30%**	**30%**	**30%**	**29%**	**32%**

Notes:
[1] All Payments to these industries from the EU including subsidies on exports.
[2] Operating surpluses stated after deduction of corporation tax at 12.5 percent.
Source: Estimates derived from CSO data

Table A.6b
Outflows per 100 euro of Exports of Biosector and Non-Biosector

	2000	2001	2002	2003	2004	2005
Biosector industries (NACE 1, 2, 5, 15, 16)						
Exports of Enterprises at purchasers' prices	100	100	100	100	100	100
EU Transfers related to exporting industries	16	15	18	14	12	16
Imports exported without further processing	0	0	0	-5	-12	-12
Imports for production of exports	-44	-43	-43	-41	-39	-38
Operating surplus of foreign businesses from exports[2]	-9	-12	-15	-17	-16	-15
Consumption of imported plant etc. in production of exports	-2	-2	-2	-2	-2	-2
Net foreign earnings of exports	**61**	**57**	**57**	**49**	**44**	**48**
Non-Biosector Industries (NACE 10 & 17 to 37)						
Exports of Enterprises at purchasers' prices	100	100	100	100	100	100
EU Transfers related to exporting industries[1]	0	0	0	0	0	0
Imports exported without further processing	-2	-3	-2	-2	-1	-1
Imports for production of exports	-61	-53	-51	-53	-55	-58
Operating surplus of foreign businesses from exports[2]	-21	-22	-26	-23	-21	-20
Consumption of imported plant etc. in production of exports	-2	-2	-2	-2	-2	-2
Net foreign earnings of exports	**14**	**20**	**19**	**20**	**21**	**19**

Source: Derived from data in Table A.6a

ANNEX IV

Glossary of Terms and Abbreviations

Balance of Payments (BOP) is a statistical statement that summarises, for a specific time period, the economic transactions of the residents of an economy with the rest of the world.

- **BOP 'Inflows'** refers to credit items in the *Balance of International Payments* accounts including exports and EU transfers to Ireland, as under the Common Agricultural Policy.
- **BOP 'Outflows'** refers to debit items in the *Balance of International Payments* accounts, including imports and the profits of businesses that are branches of businesses owned by non-residents.

Basic Price is the price receivable by the producer for a unit of a good or service produced, plus any subsidy received on the sale of that unit, minus taxes payable as a consequence of its production or sale, as, for example, excise duties. Definition following *Supply and Use Tables for Ireland, 2001-2002* (CSO, 2007, p. 8).

Biosector is taken to include agriculture, forestry and fishing as well as the industries processing their products, namely the food, beverage and tobacco industries. In terms of the NACE classification of industries, the Biosector comprises all industries in NACE groups 1, 2, 5, 15 and 16. All other transportable goods industries are here classified as 'Non-Biosector' and this sector comprises industries in NACE groups 10-14 and 17 to 37.

Capital Goods: any item that is used in more than one production cycle including: buildings, tools, equipment, machinery, plant and vehicles used by businesses.

Depreciation provision, or capital consumption, 'is generally taken as being the amount allowed for tax purposes (adjusted appropriately for *free depreciation*, etc)' from CSO *National Income and Expenditure 2004*, p. 46. In this report it is estimated using rates of annual depreciation from the tax code as follows: plant, machinery, equipment and vehicles at 20 percent of the cost of their addition to the capital stock; all other capital assets at 5 percent of the cost of their addition to the capital stock.

'Domestic': pertaining to activities within the national territory, synonymous with 'Home' production etc.

Enterprise: "the smallest combination of 'Local Units' that is an organisational unit producing goods or services (e.g. company or partnership)" *Census of Industrial Production.*

'Factory' signifies any production activity that is distinguishable from others by virtue of its main output, location and ownership. In the terms of the *Census of Industrial Production* it is synonymous with a 'Local Unit' or, in agriculture, a 'farm'.

'Foreign' signifies businesses with a majority ownership in the hands of non-residents.

Gross Fixed Capital Formation (GFCF) is the cost of additions to the stock of capital including: machinery, agricultural machinery, plant, transport equipment, buildings and construction. The acronym GFCFexB is used to signify GFCF excluding buildings and construction and items other than machinery, agricultural machinery, plant, transport equipment.

Gross Value Added (GVA)

1. GVA at Market Prices: this measure of value added by an economic activity is the difference between its output valued at the prices that purchasers paid, minus the cost of goods and services used to produce the output, also valued at market prices. These data are tabulated in the NIE. In the Census of Industrial Enterprises this is Production Value minus Intermediate Consumption.

2. GVA at Basic Prices is GVA at Market Prices increased by subsidies on the output and reduced by excise duties and similar indirect taxes on the sale, but excluding VAT. GVA on this definition is tabulated in the NIE and Supply and Utilisation and Input-Output tables.

3. GVA at Factor Cost is GVA at Basic Prices plus non-product subsidies minus non-product taxes, also tabulated in NIE.

'High Tech' see 'Modern'

Imports refer to quantities and values of goods entering the National territory and are reported the *Trade Statistics.* The valuation of imports includes charges for insurance and freight, and is thus on a 'cost, insurance and freight' (cif) basis, however in the Balance of Payments the corresponding debit item for merchandise trade excludes the insurance and freight items as these are included in service transactions.

Industrial Input of a 'Local Unit' is the sum total of its purchases of: materials for processing, industrial services and fuel and power. It is thus narrower in coverage than the 'Intermediate Consumption' data collected in the Census of Industrial Enterprises.

Intermediate Consumption of enterprises is the Purchases of the enterprise plus the value of increases in stocks of materials and fuels minus purchases of goods for resale without further processing.

Labour Costs in the Census of Industrial Local Units is the total of wages, salaries and other labour costs, all prior to deductions. In addition, the Census of Industrial Enterprises takes into account: employers' social welfare contributions and their contributions to superannuation funds or other pension schemes and similar benefits, benefits in kind, abnormal or supplementary payments in respect of sickness or injury to employees, as also insurance covering such payments, training costs and contributions to employees' social activities are also included. Excluded are payments to proprietors and members of their families not paid a fixed wage or salary.

Leontief Multiplier: this is a measure of the 'complete direct and indirect impacts on the economy resulting from the increase in demand for domestic output of a given product' (CSO, *2000 Supply and Use and Input-Output Tables*, p. 10). In the context of this Report the direct impact is the addition to imports by exporters of the product consequent on each euro of additional exports, or otherwise called the **direct multiplier**. The indirect impact is the sum of all the other additions to imports consequent on this one additional euro of exports of the same product. These arise along the supply chain that provides the goods and services consumed in the production of this addition to exports. This impact is measured by the **indirect multiplier.**

Local Unit (LU): is an enterprise or part thereof situated in a geographically identified place.

'Modern' Sector: NACE Groups 22, 24 and 30 to 33 (CSO, *Industrial Production and Turnover*, March 2007).

Multiplier: See Leontief Multiplier.

Nationality of Ownership is determined by the nationality of the owners of 50 percent or more of the share capital (CSO, *Census of Industrial Production 2004*, p. 7).

NACE is the acronym for 'Nomenclature générale des activités économiques dans les communautés européennes' (General Industrial Classification of Economic Activities within the European Communities). The version used from 1990 to 2002 was NACE Rev.1 followed by a slightly amended NACE Rev.1.1 from 1st January 2003. The two digit classes used in this report are effectively the same as product classifications in the 'Central Product Classification' (CPC) thus the NACE codes used here refer to both the classification of units of economic activity units, factories for example, and to their main product. Descriptions of these classifications are available on the Eurostats's Classification server named RAMON http://ec.europa.eu/comm/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

RAMON also provides lists of classifications with official links to NACE and access to tables showing the correspondence between the codes in one classification and those in some other classification. The application of the NACE codes in Ireland is described in the CSO *Census of Industrial Production.*

National Income and Expenditure (NIE) is a compilation of tables reporting the performance of the economy. Data in these tables are the point of reference for data in other CSO publications and in this study. The categorisation of firms into industries and sectors in this publication reflects the NACE classification and is the same as that used in the CIP, however, as the sources of CIP data and NIE data differ so too may the data that they report.

Output at Basic Prices: Output at the price receivable by the producer, i.e. the **purchaser's price**, plus any subsidy receivable on that unit as a consequence of its production or sale, i.e. subsidies on production, minus any tax payable, i.e. taxes on products including excise taxes, and the trade margin.

Output, Gross in the Census of Industrial Local Units is the net selling value of all goods manufactured by a 'Local Unit' (establishment), whether sold or not, including the value of work done and capital assets manufactured for own use; this value *includes receipts of subsidies* related to production or sales, however it *excludes excise duty* and Value Added Tax payable on the output, from 'Census of Industrial Local Units – Definitions of Variables in the Tables' (CSO, *Census of Industrial Production 2004*, p. 155). Note that this concept differs from 'Turnover' as used in the Census of Enterprises, in particular 'Turnover' *excludes* subsidies on products and *includes* excise duty.

Production Value 'is defined as the sum of total Turnover, capital assets manufactured by enterprises for their own use, increases in stocks of finished goods and work in progress and increases in stocks of goods for resale without further processing but excluding goods sold without further processing' (CSO, *Census of Industrial Production 2004*, p. 167).

Software Licence Exports are entered as exports of services in the BOP starting with the introduction of the New Series of the BOP in 1998, they were previously included in exports of merchandise.

Supply and Use and Input-Output Tables (SUI-O) provide a detailed picture of the transactions in goods and services throughout the economy, especially the flows between industries as well as data on final output and use of products. Products are classified as in the Trade Statistics with a related NACE classification of industries, however, as with the Trade Statistics, coding of some products, and the businesses that produce them, differs from that used in the NIE and CIP. These differences in coding lead to differences between data in the CIP and in the Supply and Use and Input-Output Tables, particularly with regard to 'other food products' in NACE 15.

Turnover in the Census of Enterprises 'comprises the net selling value of the goods manufactured by the enterprise, of industrial services provided by the enterprise for others, of goods sold without further processing and the value of miscellaneous items of turnover (such as rents, licence fees, royalties etc).' It is valued inclusive of excise duty but exclusive of subsidies and VAT (CSO, *Census of Industrial Production 2004*, p. 167). Note that in contrast 'Production Value' excludes goods sold without further processing.