
Seeking user views on the development of a set of Supply Use Tables for Northern Ireland

May 2014

Economic and Labour Market Statistics Branch
Northern Ireland Statistics and Research Agency



Contents

1	Introduction and Background.....	1
1.1	Introduction.....	1
1.2	Background.....	1
1.2.1	<i>National Accounts</i>	1
1.2.2	<i>SNA groupings and flows in the economy</i>	2
2	Overview of Supply and Use Tables (SUTs).....	3
3	Multipliers.....	4
4	UK, Scottish and Welsh Supply-Use Tables.....	5
4.1	UK Supply-Use Tables.....	5
4.2	Scottish Supply-Use Tables.....	5
4.3	Welsh Input-Output Tables.....	5
5	NI Context.....	6
5.1	NI developments.....	6
6	Scoping study to develop a set of Supply Use Tables for Northern Ireland.....	7
6.1	Quality Improvement Fund project 2013-14.....	7
6.2	Summary of Scoping Study Conclusions.....	7
7	Next Steps.....	8
7.1	Seeking User Views.....	8
	Annex A: Supply-Use Tables questionnaire.....	9
	Annex B: Overview of NISRA Economic and Labour Market Statistics publications.....	10
	Annex C: Overview of SNA groupings, and sector classifications.....	12
	Annex D: Overview of key elements of the Supply-use Tables.....	15
	Uses of National Accounts.....	15
	Calculation of Gross Domestic Product.....	16
	Annex D: Definitions of Multipliers and Effects.....	19

\

1 Introduction and Background

1.1 Introduction

NISRA requested a report on the feasibility of developing an integrated model of the NI economy using the internationally recognised standard Supply Use Tables (SUT) approach. This report was published on the 27th March 2014 and can be found at http://www.detini.gov.uk/deti-stats-index/economy_statistics.htm.

In line with the Code of Practice for Official Statistics NISRA is seeking the views of users to inform the further development of such a set of SUTs and Input-Output (I-O) tables for Northern Ireland. This document seeks firstly to provide users with a broad overview of National Accounting concepts which include SUTs/I-O tables and what these can be used for by government and others.

A number of questions are posed in Annex A of this document (please see attachment) to which we would ask users to provide written responses so that NISRA can investigate and document user needs in this area. (Replies can be sent to chris.ganley@dfpni.gov.uk.)

1.2 Background

NISRA's main official statistics series provide a range of key measures of societal change and economic performance. However, outputs tend to be reported by subject area with no facility available to place such measures within an overarching model of the NI economy. This limits commentators' ability to interpret the significance or importance of reported changes in any individual series. As such NISRA is seeking to develop a system of Economic Accounts (Supply-Use tables) to improve the integrity and coherence of its official statistics outputs and enable social and economic commentary to be placed in a wider context.

A list of NISRA's business and labour force surveys and publications can be found in Annex B.

1.2.1 National Accounts

The System of National Accounts (SNA) is the internationally agreed set of standards used to compile measures of economic activity in a country. It allows the integration of a wide range of social and economic statistics in a strictly defined accountancy framework which can be used to provide the evidence base for economic analysis and policy formulation.

The economy consists of various sectors which interact with each other in a range of transactions. The national accounts explain how we define the sectors and transactions and provide an accounting structure within which these transactions can be placed.

Annual I-O tables and the SUTs on which they are based are key elements within the national accounts framework used to display the transactions of all goods and services in the economy for a single year in matrix form. One of the most common uses of I-O tables is to compare the relative impact of potential policy interventions in terms of their contribution to jobs growth or other economic benefits.

1.2.2 SNA groupings and flows in the economy

Institutions are collections of people that take part in economic activity. For the purpose of national accounts similar types of institutions are grouped together into similar types of sectors to put a structure on the accounts and provide a framework for analysis. Institutions are grouped as follows¹:

Households	• Individuals, households and so on who consume goods and services, work, get paid, pay taxes, etc
Corporations	• Anybody or any organisation which produces a good or service for sale
Government	• The business of public administration
Rest of the world	• Anyone not resident in the UK with economic interactions with UK residents

Many transactions occur in the economy between these institutions, for example people and households buy things, companies export goods, government levies taxes and overseas companies set up subsidiaries in the UK. Sometimes money is associated with a transaction, and sometimes it is not. The SNA allows these transactions to be grouped together to identify the relative importance of various sectors and their interdependencies.

The SNA may also be further adapted to provide a form of social accounting whereby the impact of policies on households with different characteristics may be modelled. Other uses include the development of so called “satellite” accounts to measure, for example, the impact of tourism or activities which have an impact on the environment. A fuller description of the economic sectors used in the SNA is provided in Annex C.

¹ Introduction to National Accounts training material, ONS

2 Overview of Supply and Use Tables (SUTs)

Supply and Use tables are at the heart of the SNA. They can be used as a framework for reconciling and balancing the various expenditure, income and production estimates assembled for the accounts, including the determination of the level of **Gross Domestic Product**. They also provide the basis for Input-Output tables which can be used to evaluate the impact on individual industry groups of fiscal and economic policy decisions, using multiplier modelling².

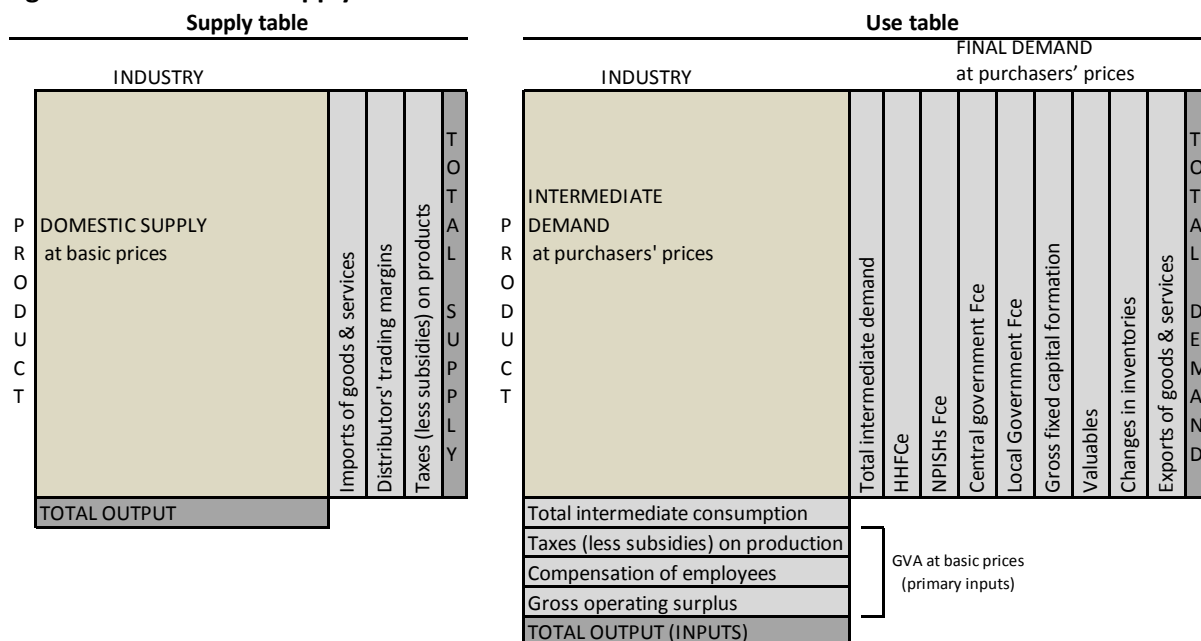
A modern open economy like that of Northern Ireland engages in four basic economic activities:

- i. Production involves industries producing goods and services;
- ii. Consumption represents purchases of goods and services by both industries and domestic final users comprising mainly households and Central and Local Government;
- iii. Accumulation involves all capital transactions including all fixed investment expenditure and changes in the level of stocks; and
- iv. Trade which involves “imports” from, and “exports” to Great Britain and the rest of the world (RoW).

Measurement of these four activities is captured in the framework of the Supply-Use Tables. The resulting tables serve a number of purposes, all of which may contribute in different ways to understanding the Northern Irish economy.

The SUTs are the basic building blocks and all other Input-Output, social accounting and satellite analyses are derived from them. The framework is illustrated below.

Figure 1. Overview of Supply-Use framework



Source: The Scottish Government; Input-Output Methodology Guide, 2011, pg 1

² Developing a pilot Social Accounting Matrix for the United Kingdom; Nigel Stuttard and Mari Frogner, ONS, 2003

A description of key elements of the tables is included in Annex D.

In broad terms, the output and supply table allows the user an appreciation of the absolute monetary values of each industry's output for a given calendar year. Additionally, and possibly more importantly, this table also presents the relationships between the output of products and the output of industries e.g. key statistics are produced on the extent of diversification within industries and the extent of competition between industries producing the same product.

The combined use matrix shows the consumption of products (goods and services) and primary inputs, in terms of combined domestic and imported goods and services, used in each industry's production process and, in doing so, presents a comprehensive description of the domestic production functions of Northern Irish industries. This table also gives detailed purchasing information by final consumers.

Compiling supply and use tables requires exploiting all available data and information from the economy and society, in a logical way. The end result is a reliable and balanced set of national accounts, including the estimation of key aggregates like **Gross Domestic Product (GDP)** in current prices and in prices of the previous year³.

3 Multipliers

Input-output models, when applied correctly can be powerful tools for estimating the economy-wide effects an initial change in economic activity has on a regional economy. The initial change involves a change in final demand such as a new construction project, an increase in government purchases, or an increase in exports. Multipliers can be used to estimate the sectoral impact of industry-specific changes in final demand⁴.

For example, if there is an increase in final demand for a particular product, it can be assumed that there will be an increase in the output of that product, as producers react to meet the increased demand; this is the direct effect. As these producers increase their output, there will also be an increase in demand on their suppliers and so on down the supply chain; this is the indirect effect. As a result of the direct and indirect effects the level of household income throughout the economy will increase as a result of increased employment. A proportion of this increased income will be re-spent on final goods and services: this is the induced effect⁵.

There are numerous types of multipliers that exist: Type I multipliers sum together direct and indirect effects while Type II multipliers also include induced effects, the multipliers allow users to make estimates of the whole economy impacts of small changes in the economy. An overview of key multipliers and effects is presented in Annex D.

In addition to the above, National Accounts and Input-Output tables are integral inputs into other economic modelling techniques, such as Computable General Equilibrium (CGE) models and Social Accounting Matrices (SAM). These allow the more dynamic aspects of the economy and its relationship with the wider world, along with the distribution of incomes to be taken into account when analysing the economic effects of changes in policy.

³http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Building_the_System_of_National_Accounts_-_supply_and_use_tables

⁴ Input-Output Models for Impact Analysis: Suggestions for Practitioners Using RIMS II Multipliers; Bess and Ambargis, March 2011

⁵ <http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Multipliers>

4 UK, Scottish and Welsh Supply-Use Tables

4.1 UK Supply-Use Tables

A full set of SUTs is published for the UK each year by ONS. Supply-Use tables are also produced annually by the Scottish Government, with the most recent release of data covering 1998 to 2009. Supply-Use tables have also been produced periodically for Wales by the Cardiff Business School, most recently for 2007.

4.2 Scottish Supply-Use Tables

The Scottish Government publishes Supply and Use Tables and Analytical Input-Output tables which are a National Statistics Publication for Scotland. The latest reference year for which tables are available is 2009 (published in May 2013). These tables show the input and output of each of the 104 I-O industry groups by each of the 104 I-O product groups. The full Supply Table is no longer published due to the disclosive nature of the data. However, some information about the levels of supply and market share of each of the 104 industries is available, in summary form, in the Supply Table⁶.

The Scottish Government use the Supply-Use tables to calculate multipliers, and the Scottish Government Environmental Input-Output model (EIO) is used to estimate the Green House Gas emissions associated with Scottish Government spending plans as set out in the Scottish Draft Budget. Other examples of how the Scottish SUTs have been used include, inter alia, calculating the indirect and induced effects of the pharmaceutical and biotechnology sectors to the Scottish Economy, and the contribution of forest industries to the Scottish economy.

4.3 Welsh Input-Output Tables

A project to develop a set of Input-Output tables for Wales was undertaken by the Cardiff Business School in 2010, reference year 2007. These tables highlight the product (commodity) composition of total Welsh final demand and the intermediate consumption patterns for 88 separately defined industries. These tables have not been updated in recent years.

⁶ <http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/OutputSupply>

5 NI Context

5.1 NI developments

In January 2013 NISRA published an experimental Composite Economic Index⁷ (NICEI) which provides a short term indicator for the NI economy making the best use of available official statistics. This is a quarterly publication and the approach adopted was to combine private sector output measures from existing surveys: the Index of Services (IOS), the Index of Production (IOP), the Index of Construction (IOC) and Public sector employee jobs data from the Quarterly Employment Survey (QES), to provide a proxy measure of total economic activity.

It is important to recognise that the NICEI is **not** a comprehensive measure of quarterly Gross Domestic Product that meets the full requirements of the System of National Accounts. Rather, it relies heavily on quarterly surveys of businesses' sales and public sector employee jobs weighted to annual Gross Value Added to approximate to a measure of GDP calculated mainly on an output basis. For this reason comparison with GDP measure for the UK and Scotland are e approximate. NISRA has also recently improved the timeliness of two of the key input series for the NICEI (from March 2014). The Index of Services and the Index of Production are now published some 4 weeks earlier than they were available in 2013. In addition, the release of the Business Register and Employment Survey, which normally publishes at the end of September, is being brought forward to early Summer.

There have also been a number of recent improvements to how local economic activity is measured. ONS released in December 2013 for the first time an additional measure of Gross Value Added (GVA) for the countries and regions of the UK (based on the Production approach). This supplements the existing measure of GVA (based on the income approach).

However, Northern Ireland has a wide range of social and economic data sets that could inform the development of a comprehensive set of social and economic accounts – similar to UK National Accounts. An experimental set of NI tables was compiled by external consultants in 2007 to establish the economic impact of tourism. This exercise covered the whole of the NI economy, was consistent with UK regional accounts and made full use of Northern Ireland business and social survey data sets, public expenditure information, administrative sources and UK national and regional data. This enabled, for the first time a comprehensive description of the role of the tourism sector in the NI economy and demonstrated the utility of the approach. However, it has not been possible to validate fully or update these tables, outside of tourism, due to lack of in-house expertise on national and social accounts methodology.

A project to assess the feasibility of developing a set of Supply-Use tables for NI was undertaken in 2013-14 as a NISRA milestone target to “*Assess feasibility of developing a set of Input-Output Tables for NI and if feasible develop prototype and consult users.*”

⁷ Please see the DETI website for further details [http://www.detini.gov.uk/deti-stats-index/stats-surveys/ni-composite-economic-index-nicei .htm](http://www.detini.gov.uk/deti-stats-index/stats-surveys/ni-composite-economic-index-nicei.htm)

6 Scoping study to develop a set of Supply Use Tables for Northern Ireland

6.1 Quality Improvement Fund project 2013-14

During 2013/14 NISRA was awarded funding from the UK Statistics Authority's Quality Improvement Fund (QIF)⁸ to facilitate the investigation into the development of a set of Economic Accounts (Supply-Use tables) for NI. This enabled an ONS Consultant from their Methodology Advice Service to provide expertise to undertake a Scoping Study to develop a set of Economic Accounts for NI.

An overview of the conclusions of the Scoping Study along with the areas of weakness identified, and recommendations for the way forward is provided below.

6.2 Summary of Scoping Study Conclusions

The ONS Methodology Advice Service consultant prepared a Scoping Study on the feasibility of producing SUTs for NI, a copy of the full report can be found at NISRA's [Economy Statistics](#) webpage. The report concluded that it was possible to create a trial balance for Northern Ireland for 2010.

The SUT information has been made available to an expert group of users including academics, economic commentators and consultants for their detailed consideration. The minutes of these meetings can be found at our [user consultation and information webpage](#).

It was the view of the expert user group that the development of the NI SUTs has still some way to go before it would be appropriate to publish any estimates. NISRA have accepted this recommendation.

The process of compiling a trial balance for Northern Ireland has helped to identify several data sources that can be used to populate parts of the table. It has also identified areas of weakness, including in particular:

- The product split for intermediate consumption (which requires a new Purchases Inquiry survey of businesses);
- International trade in services, particularly imports;
- Trade with Great Britain;
- Measures of the output of the financial and insurance sectors, and consumption of their primary products;
- Estimates of household final consumption from the Living Costs and Food Survey; and
- Inputs and outputs of the charitable sector.

⁸ Administered by the Office for National Statistics (ONS)

7 Next Steps

NISRA are continuing to work with ONS to develop this project and to address identified weaknesses. This includes:

- Taking on board the views of a wider range of users;
- Identifying priorities;
- Include new 'Exports' and 'Imports' data available from the ABI;
- Collect GB 'Imports' data (potentially through new ABI questions);
- Investigate the possibility of conducting a Purchases inquiry for NI and increasing the sample size for the Living Costs and Food survey;
- Investigate how other data gaps identified might be addressed e.g. in the Financial Sector / NGO / Charitable Sectors; and
- Build expertise within NISRA and update Tables for 2012, incorporating new data as it becomes available.

7.1 Seeking User Views

To inform the development of the project NISRA are seeking feedback from users of economic statistics, to this end we are asking users to complete the questionnaire in Annex A. Responses can be provided to NISRA at the following email address: chris.ganley@dfpni.gov.uk

Annex A: Supply-Use Tables questionnaire

Please see attached.

Annex B: Overview of NISRA Economic and Labour Market Statistics publications

[Labour Market statistics](#)

- Labour Force Survey
- Northern Ireland Claimant Count
- Quarterly Employment Survey
- Business Register and Employment Survey
- Census of Employment
- Annual Survey of Hours and Earnings
- Northern Ireland Redundancies

[Economic Output Statistics](#)

- NI Composite Economic Index
- Index of Production
- Index of Services
- [Index of Construction](#)
- Exporting NI Services
- Manufacturing Sales and Exports Survey

[Business Statistics](#)

- Annual Business Inquiry
- Inter-Departmental Business Register
- Research and Development Survey

[Tourism Statistics](#)

- Northern Ireland Occupancy Surveys
- External Visitors to Northern Ireland
- Trips by Northern Ireland residents
- Northern Ireland Visitor Attraction Survey
- Self-Catering Survey
- Local Government District Tourism Statistics

[Economy Statistics](#)

- Northern Ireland Composite Economic Index

Statistics are also available for the following topics:

- [Northern Ireland Ports Traffic](#)
- [UK Petroleum Industry - Deliveries to Northern Ireland](#)
- [NI Annual Coal Inquiry](#)
- [Innovation Survey](#)
- [NI Access to Finance](#)

Further information on the regional analysis/trends can be found at the following link <http://www.detini.gov.uk/deti-stats-index/stats-regional-analysis.htm>

In addition, the [Northern Ireland Neighbourhood Information Service](#) provides free access to statistical and locational information relating to small areas across Northern Ireland. Information is available across a range of themes including Population, Health & Social Care, Education & Skills and Crime.

Annex C: Overview of SNA groupings, and sector classifications

From a national accounts perspective it is necessary to group together transactions, an overview of the most common transactions is presented below:

- **Transactions in products:** transactions relating to the origin and use of goods and services.
- **Distributive transactions:** by which the income generated by production is distributed.
- **Financial transactions:** acquiring financial assets or incurring a financial liability.
- **Transactions in products include:**
 - Domestic output – what is produced in the UK;
 - Imports;
 - Intermediate consumption – things bought for use in the production process which are used up (or transformed) in that process e.g. raw materials;
 - Household final consumption expenditure – spending by individuals and households;
 - Government final consumption – spending by central or local government;
 - Fixed capital formation – companies and government buying things for use in the production process which are not used up in the process e.g. machinery or a computer; and
 - Exports
- **Distributive (and redistributive) transactions include:**
 - Compensation of employees and operating surplus;
 - Taxes;
 - Social security contributions;
 - Income support payments; and
 - Interest payments.
- **Financial transactions include:**
 - Putting money in a building society account;
 - A company issuing shares; and
 - Buying foreign currency.

Sectors and sector classification

The institutional sectors are groupings of units (individuals or corporations) in the economy brought together for the purpose of analysis. The main groupings used in the European System of Accounts (ESA) are:

- Non-financial corporations;
- Financial corporations;
- Government;
- Non-profit institutions serving households;
- Households; and
- The rest of the world.

When considering the sectors it is important to understand the distinction between market and non-market output:

- **Market output:** the production of goods and services where the sale price covers most of the production costs e.g. normal profit making businesses; and
- **Non-market output:** where the sale price does not cover the majority of costs e.g. output by government such as defence and policing, or by charities.

The classification of an economic unit into a sector depends on their:

- **Functions** (i.e. do they produce goods and services for sale at 'market prices'); and
- **Ownership and control** (who owns them: government, private concerns or charities)

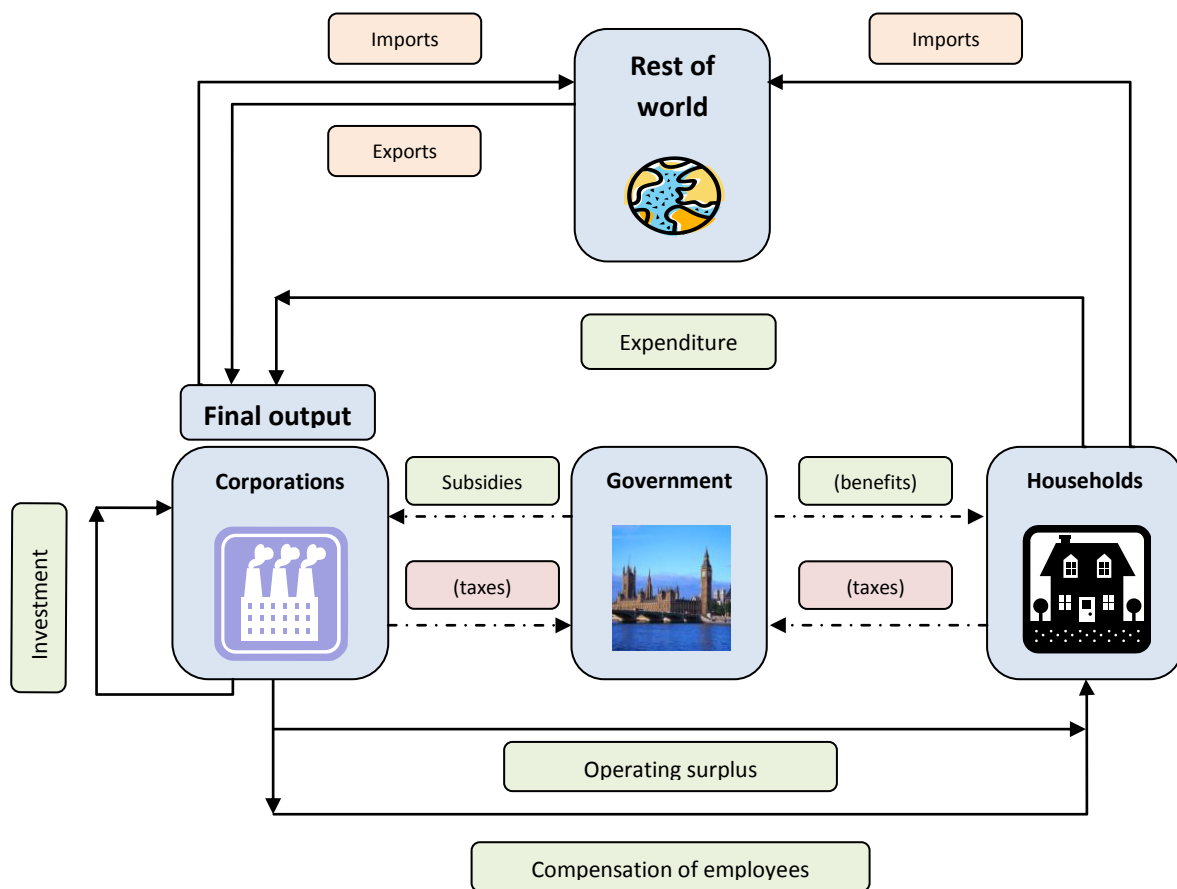
In light of this, further information on each of the institutional sectors of the national accounts is provided below.

Non-Financial Corporations	Companies who produce goods and services other than financial services. Their output must be marked output; examples include companies such as Sainsbury's. This sector also includes companies owned by the government including Royal Mail. Some organisations are partnerships, owned by senior staff and not formally companies. These partnerships which include accountancy, consultancy and legal service firms, are included in this sector as their behaviour is thought to be similar to other members of the sector.
Financial Corporations	Financial corporations include those companies involved in financial services industries including banking, insurance and pension funds. Some institutions in this sector will be companies with shareholders others will be 'mutual' institutions owned by the people whose money is being looked after.
General Government	In the UK general government is made up of central government and local authorities. The institutions of both local and central government are included in this sector provided they are non-market producers. For example, schools and hospitals are included as well as government departments. This also includes non-profit institutions which are controlled and mainly funded by government.
Households	Households cover individuals or groups of individuals in their role as consumers. It also covers individuals and small partnerships which are involved in market output, meaning that self-employed are included in this sector.
Non-Profit Institutions Serving Households	These are organisations which are not profit making, do not operate in the market place and get most of their money from donations. Trade Unions, professional associations, most universities, religious organisations and general charities are included in this sector.
Rest of World	The rest of the world consists of everything which is not in the UK and has economic transactions with individuals or institutions in the UK. National accounts use the term resident and non-resident units to decide whether something should be in one of the domestic sectors or the rest of the world. Resident units are those which 'have a centre of economic interest in the economic territory of the UK'. These may include foreign owned companies, such as Nissan UK, foreigners living in the UK, as well as all non-resident units. These will mostly be foreign organisations, operating abroad, which have some exchange with the UK. It may also include British owned companies operating outside of the UK such as Tesco in the Czech Republic.

It should be noted that the above sector classifications are different from the standard industrial classifications (SIC) used to group economic units according to their main activity without reference to who owns or operates them.

In economics the reciprocal circulation of income between producers and consumers is referred to as the circular flow of income. The circular flow of income shows how financial payments flow between corporations and households within the economy. It also shows the interaction between different sectors of the economy and the rest of the world. An overview of these interactions is presented below.

Figure 2. The Circular Flow of Income⁹



⁹ Diagram based on National Accounts training material provided by ONS. The arrows in the diagram show the flow of money between the different institutions as a result of transactions between them.

Annex D: Overview of key elements of the Supply-use Tables

The box below provides an overview of the main elements of the SUT framework.

- **Intermediate consumption**¹⁰: is defined as all goods and services used up or transformed in a process of production. This includes raw materials, power and fuel, rental on buildings and business services such as advertising, recruitment consultancy and cleaning. It specifically excludes staff costs and capital investment which are handled elsewhere in the accounts.
- **Household final consumption expenditure** comprises all the goods and services purchased and consumed by households. This will include food, alcohol, clothing, cars, rental on houses and holidays, to name but a few items. It does not include the purchase of houses or payment of interest on loans, which are expenditure on assets and property income respectively, and not consumption expenditure).
- **Government final consumption expenditure** relates to the purchases government has to make to deliver its services and, like non-market output, is valued as procurement plus staff costs plus depreciation. This is so defined as government, by convention, is assumed to consume its own output, in other words, government provides services, such as defence, which it then uses on behalf of society. This does not include government's capital expenditure (see gross capital formation).
- **Gross capital formation** (which can be thought of as investment) is made up of three parts.
 - i. The first (and largest) is **gross fixed capital formation** (GFCF), which relates to the purchase (and disposal) of fixed assets. Fixed assets are items which contribute to a productive process for more than a year and are not used up in the process of production. Examples of such assets are buildings (including dwellings), vehicles, plant and machinery, computer systems and aircraft.
 - ii. The second component is **changes in inventories**, which is made up of materials and fuel, work in progress and unsold finished goods.
 - iii. The third component is **acquisitions less disposals of valuables**. Valuables are defined as goods which do not contribute to a process of production but are a store of value for the owners. These include jewellery, precious metals, works of art and antiques.
- **Exports** are goods and services produced in the UK purchased by units in the rest of the world, conversely **imports** are goods and services produced in the rest of the world and purchased by UK residents. These do not include financial flows which form part of the balance of payments, which is discussed in a later chapter. The total of **exports minus imports** is known as the **balance of trade**.
- **Compensation of employees** is the sum of all employment income, including wages and salaries, employers' pension and National Insurance contributions, bonuses and benefits in kind.
- **Gross operating surplus** is officially defined as the balance between GVA and labour costs paid by producers. In effect, it is equal to the sum of gross trading profits and income earned through the ownership of buildings (rental income).
- **Mixed income** is a combination of these two for the self-employed and recognises that the income of the self-employed is a combination of employment income and profits, but it is not realistic or appropriate to split it into these two components.

Uses of National Accounts¹¹

National Accounts are an important tool for government as they provide an integrated description of all economic activity within an economic territory, including activity involving both domestic units (for example individuals and institutions) and external units (those

¹⁰ UK National Accounts: a short guide; pg 12

¹¹ <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/economy/national-accounts/index.html>

resident in other countries). In addition to being comprehensive, the accounts are fully integrated and internally consistent.

In the UK the coverage of the core accounts is wide, encompassing:

- Production;
- Consumption;
- Generation;
- Distribution;
- Redistribution of income;
- Capital investment; and
- The financing of the above

The national accounts are drawn together using data from a vast range of sources. These different sources not only help to ensure that the national accounts are comprehensive; they provide different perspectives on the economy, for example sales by retailers and purchases by households. By comparing and contrasting these different sources, the national accounts produce a single picture of the economy which is consistent, coherent and fully integrated.

Many of the most well-known economic statistics are produced within the national accounts produced for the UK by the ONS, including GDP, the household saving ratio, public sector net borrowing, the balance of trade and household consumption.

In the UK, the national accounts are heavily used by policy makers and analysts as highlighted below.

- They feed into the discussions of the Monetary Policy Committee of the Bank of England when setting interest rates and they are also used by the Office for Budgetary Responsibility in forecasting economic growth and public sector debt;
- Components of the national accounts are used by decision makers and advisers across the whole of society, including corporations, private individuals and government;
- Input-output tables provide multipliers that can be used to estimate the economy-wide effects of a change in the economy (discussed further below);
- Furthermore, many of the national accounts statistics are provided to Eurostat (the statistical office of the European Union) and are used by institutions such as the European Central Bank;
- The largest proportion of the UK's contribution to the EU budget is determined by the level of gross national income, a key statistic from the national accounts; and
- Conversely, EU payments to 'deprived' regions of the union are determined by regional gross domestic product per head of population.

Calculation of Gross Domestic Product

An important feature of the Supply and Use framework is that it presents Gross Domestic Product as measured using three distinct approaches.

GDP measured using the Production approach

GDP at basic prices is also known as Gross Value Added (GVA); that is, it is a measure of the gross value added to the economy by each producing unit in Northern Ireland. Broadly speaking, it is simply the sum of each company's outputs (sales) less inputs (purchases).

The output of an organisation is approximately equal to the total value of sales (turnover) over a given period although account is also taken of goods manufactured but held in

inventory and work in progress (which is particularly relevant for industries like ship-building where the outputs are high-value but infrequent). The final component of output includes any items of a capital nature created in-house for the companies own final use e.g. databases and other computer systems. These are valued and added to the other items to form a figure for the total value of goods and services produced by an organisation - their Gross Output at Basic Prices.

In producing these outputs, an organisation will have to purchase raw materials, energy and other intermediate inputs of goods and services: these are subtracted from the output (including any taxes relating to these purchases) to yield Gross Value Added. The following shows the calculation of GVA (production approach):

Table 1: Calculation of GDP (Production approach)	
Total output at basic prices	A
- Total intermediate inputs at purchasers' prices	B
= Gross Value Added at basic prices	A-B
+ Taxes less subsidies on products	C
= Gross Domestic Product at market prices	A-B+C

GDP measured using the Income approach

Gross Value added (GDP at basic prices) is also equal to the costs of employment (wages, national insurance and pension contributions), any taxes, less subsidies, levied upon production (e.g. business rates, vehicle excise duty) and Gross Operating Surplus (broadly analogous to profit). The following shows the calculation of GDP (income approach):

Table 2: Calculation of GDP (Income approach)	
Compensation of Employees	A
+ Taxes, less subsidies, on production	B
+ Gross Operating Surplus	C
= Gross Value Added at basic prices	A+B+C
+ Taxes less subsidies on products	D
= Gross Domestic Product at market prices	A+B+C+D

GDP measured using the Expenditure approach

GDP (Gross Domestic Product at Market Prices) is usually defined/calculated as the sum of total final demand less total imports.

Total domestic demand comprises purchases (including all taxes that may apply) by: Households, Non-profit institutions, Tourists (or rather expenditure by non-residents), and Government. Gross fixed capital formation, changes in inventories and valuables are also included.

Final demand also includes the value of exports (which from a Northern Irish perspective include exports of goods and services to Great Britain). Imports include goods and services imported from Great Britain and will also include expenditure by Northern Ireland residents outside Northern Ireland. The following shows the calculation of GDP (expenditure approach):

Table 3: Calculation of GDP (Expenditure approach)	
Household final consumption	A
+ Non-profit making institutions serving households	B
+ General Government final consumption	C
+ Gross capital formation	D
+ Exports	E
= Total final demand	A+B+C+D+E
- Total imports	F
= Gross Domestic Product at market prices	A+B+C+D+E-F

Annex D: Definitions of Multipliers and Effects

The table below highlights the various multipliers derived from Input-Output tables which can be useful tools for informing government and economic policies.

Output Multipliers	The output multiplier for an industry is expressed as the ratio of direct and indirect (and induced if Type II multipliers are used) output changes to the direct output change due to a unit increase in final demand. So that multiplying a change in final demand (direct impact) for an individual industry's output by that industry's Type I output multiplier will generate an estimate of direct + indirect impacts upon output throughout the economy.
Employment Multipliers	The employment multiplier is the ratio of direct plus indirect (plus induced if Type II multipliers are used) employment changes to the direct employment change.
Employment Effects	Employment effects show the direct plus indirect (plus induced if Type II multipliers are used) employment change to the direct output change due to a unit increase in final demand.
Income Multipliers	These measure the change in income (compensation of employees) which occurs throughout the economy as a result of a change in final demand. They show the ratio of direct plus indirect (plus induced if Type II multipliers are used) income changes to the direct income change.
Income Effects	These show the direct plus indirect (plus induced if Type II multipliers are used) income change to the direct output change due to a unit increase in final demand.
GVA Multipliers	The GVA multiplier is expressed as the ratio of the direct and indirect (and induced if Type II multipliers are used) GVA changes to the direct GVA change, due to a unit increase in final demand. In other words, if you have the change in GVA for the industry the GVA multiplier can be used to calculate the change in GVA for the economy as a whole.
GVA Effects	The GVA effect is expressed as the direct and indirect (and induced if Type II multipliers are used) GVA changes to the direct output change, due to a unit increase in final demand. In other words, if you have the change in output (or turnover) for the industry the GVA effect can be used to calculate the change in GVA for the economy as a whole.

Source: The Scottish Government, Input-Output web site guide