

## Session 4.1: **Structure of the UK Economic Statistics Infrastructure**

**Regional Course on Integrated Economic Statistics  
to Support 2008 SNA Implementation**

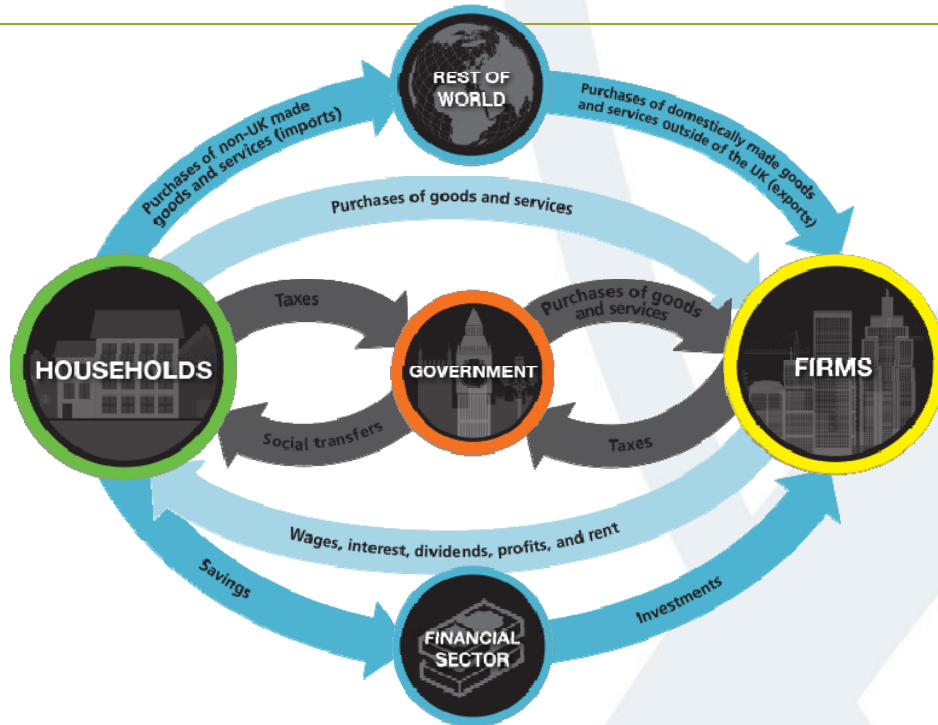
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### **Content**

1. Introduction
2. Quarterly Accounts
  - a) Short-term output indicators
  - b) Quarterly GDP statistics
  - c) Reliability of quarterly GDP
3. Annual Accounts
  - a) The measure of GDP and the 3 approaches
  - b) The role of Supply and Use Tables
  - c) Revision analysis

# 1. Introduction

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# 1. Introduction

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To measure the 'size' of the economy, what should we measure?

1. What businesses produce?
2. What people spend?
3. What 'factors' earn?  
Factors being people and capital

# 1. Introduction: The three measures of GDP

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In practice we measure all three:

- **GDP Production (or Output) measure**

The sum of value added from production of all goods and services

- **GDP Expenditure measure**

The total expenditures of all finished goods and services produced.

- **GDP Income measure**

The total income generated by producers of goods and services and income of employees.

[See more in session 3.1](#)



## 2. Quarterly Accounts

### a) Short Term Output Indicators

## 2.a) Short Term Output Indicators

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**GDP(O) = value added  $\pm$  taxes/subsidies**

*where value added = output – intermediate consumption*

- In the short-term output is assumed to be proportional to value added.
- Volume of gross output is calculated either by:  
gross turnover; or by:  
physical output measures (e.g. the number of letters contributes to postal activities)

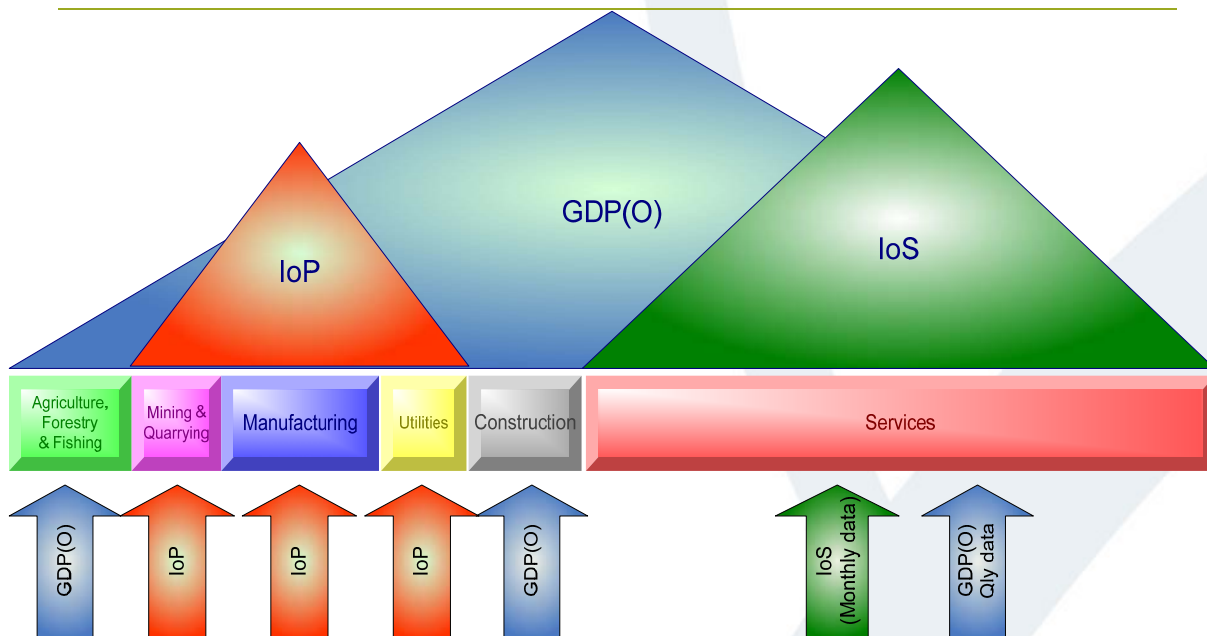
## 2.a) Short Term Output Indicators

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- The early estimates of GDP are actually based on short term indicators;
- These are the high frequency time series based largely on monthly and quarterly surveys of sales (or 'turnover') of businesses;
- This is the 'Output' approach to measuring GDP, and underpins the GDP 'Production' estimates;
- The difference being intermediate consumption.

## 2.a) Short Term Output Indicators

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### Overall structure of GDP (by industry)

## 2.a) Short Term Output Indicators

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- Output used as a proxy for GVA
- Assumes stable ratio between output and value added
- 400 industries weighted together using estimates of GVA based on balanced Supply & Use tables
- Early estimate ('Preliminary GDP') published after approximately 25 days
- Limited industry detail in Preliminary GDP release:
  - Whole Economy
  - Production
  - Services

## 2.a) Short Term Output Indicators

### Data sources for the output measure of GDP

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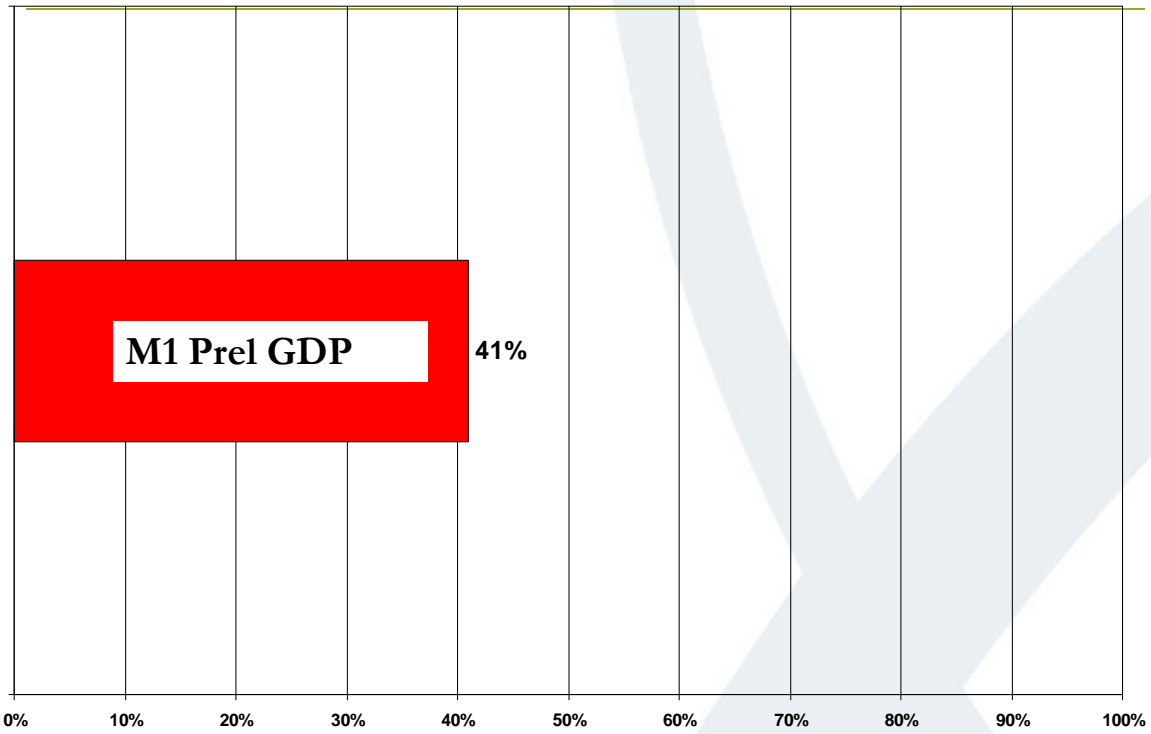
- Deflated turnover - preferred method
  - Manufacturing - sample of 9,000 businesses/month
  - Services - combined sample of 30,000 businesses/month
- Direct volume: e.g. gas and electricity production, rail passenger kilometres
- Input proxies: e.g. employment
- Forecasts: e.g. month 3 of the quarter for the Index of Production
- c.45% 'information' based - rest is forecast



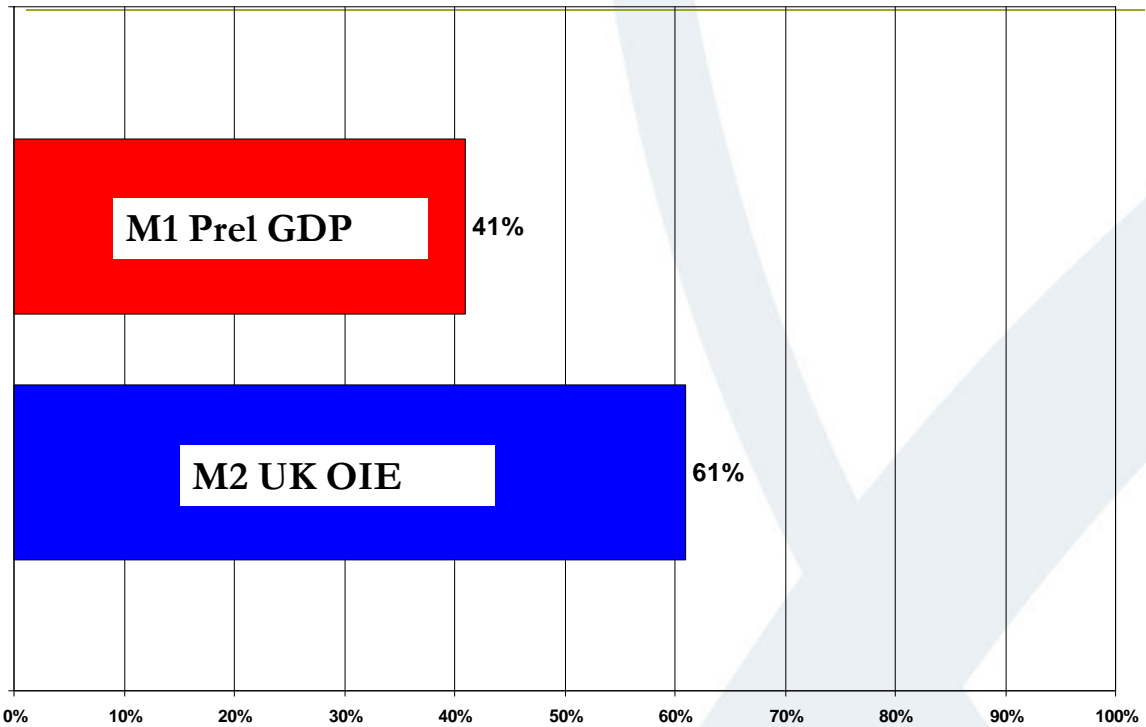
## 2. Quarterly Accounts

### b) Quarterly GDP statistics

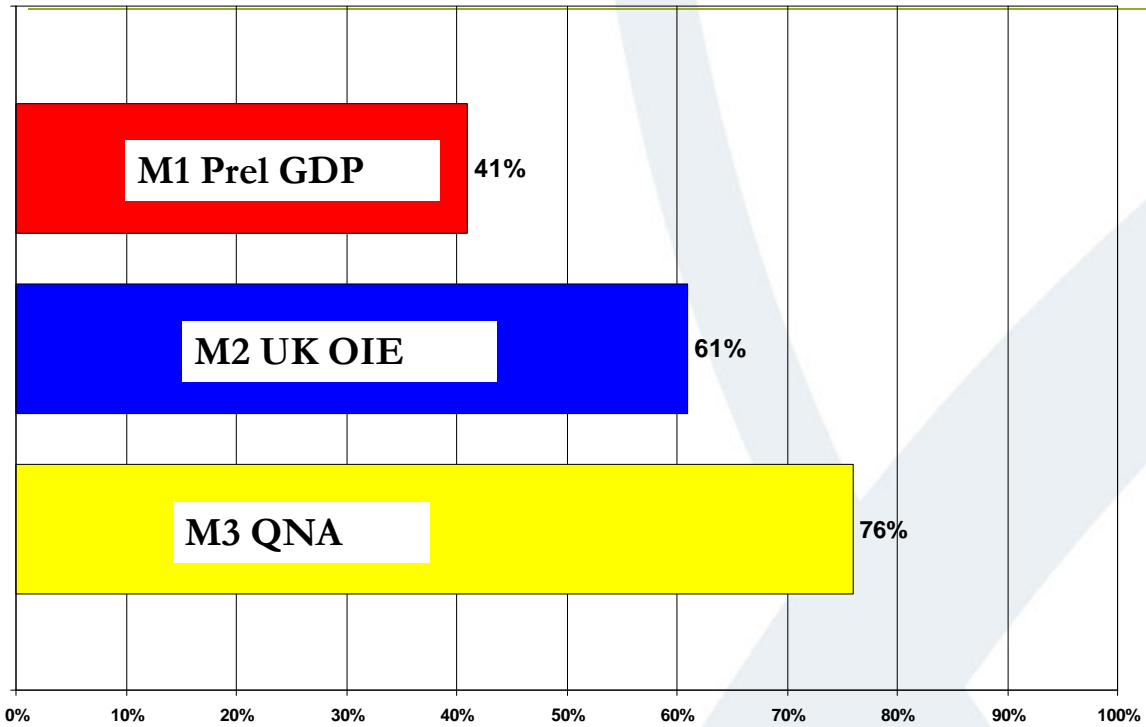
## GDP(O) data content: Preliminary GDP (M1)



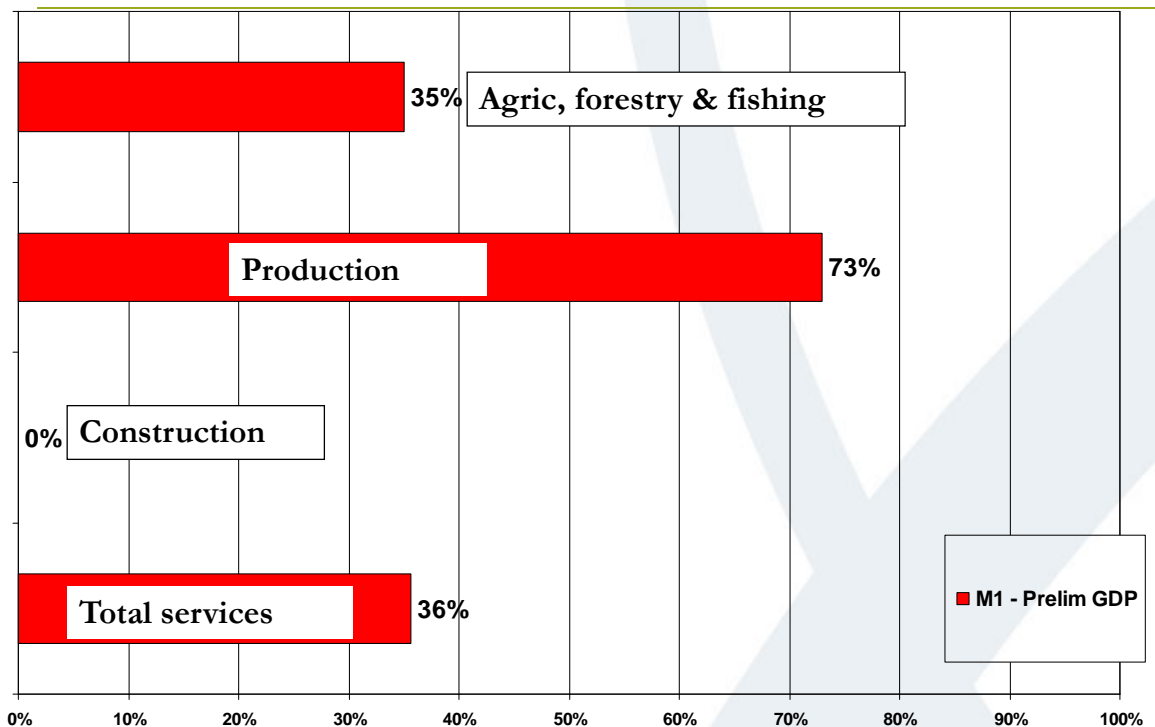
## GDP(O) data content: UK OIE (M2)



## GDP(O) data content: QNA (M3)

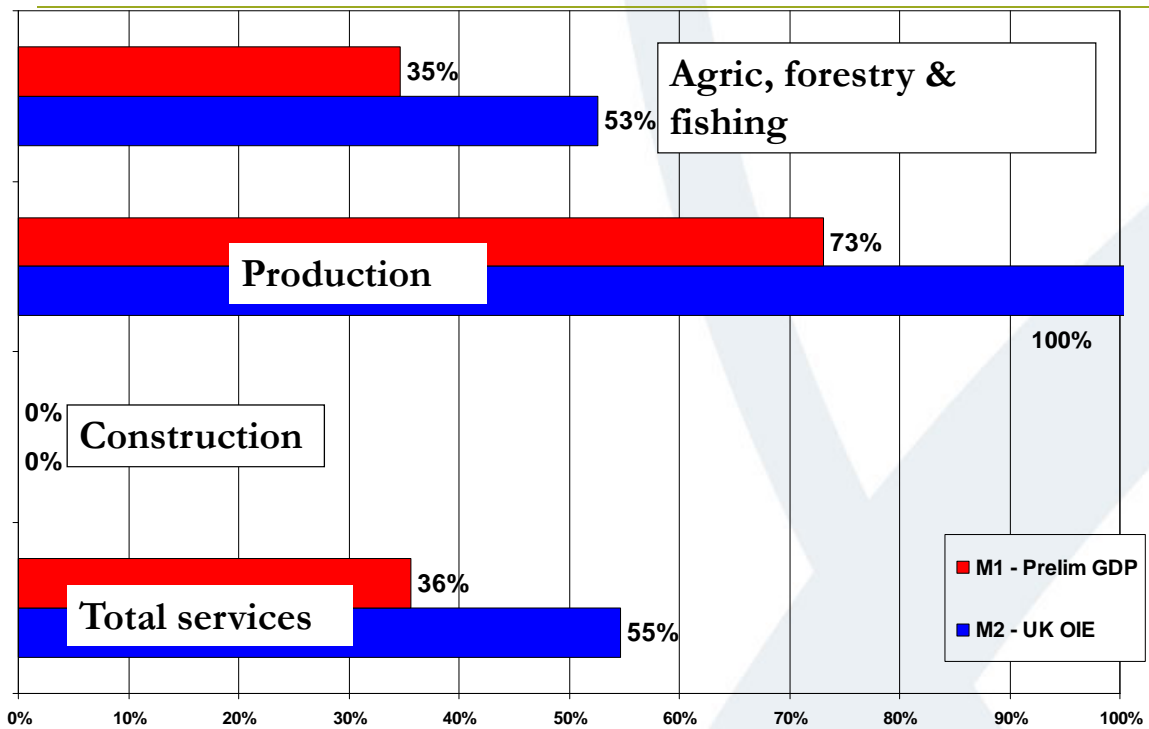


## Data content: Preliminary GDP (M1)

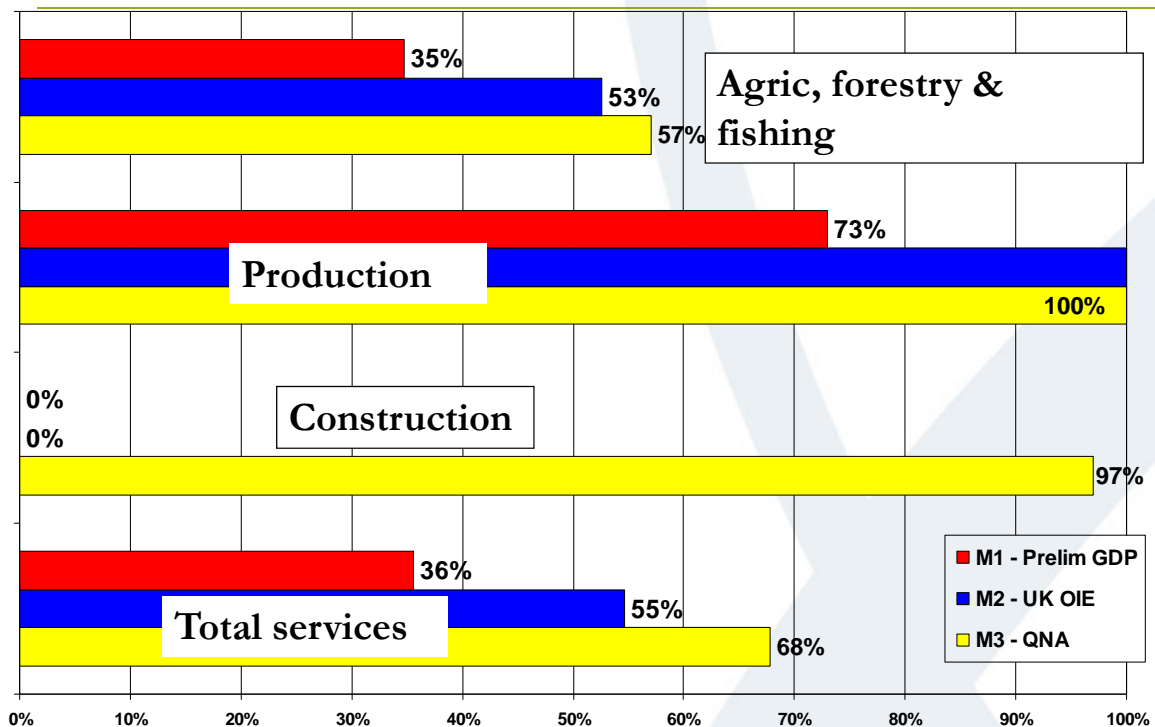




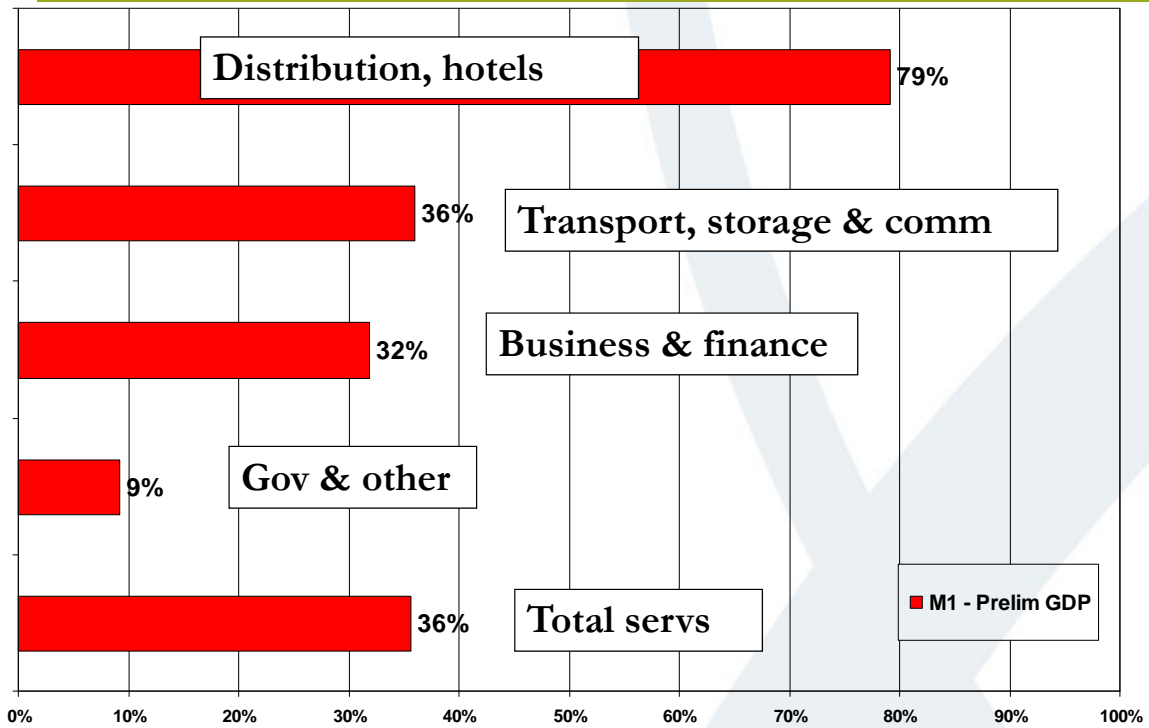
## Data content: UK OIE (M1 and M2)



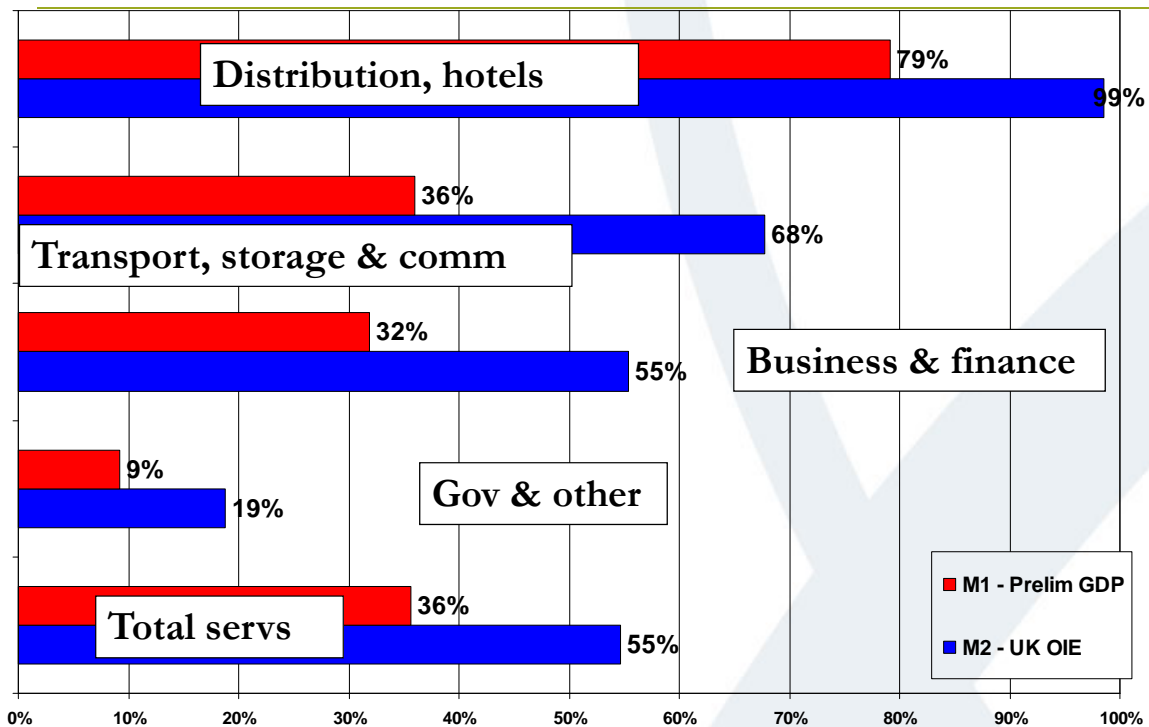
## Data content: QNA (M1, M2 and M3)



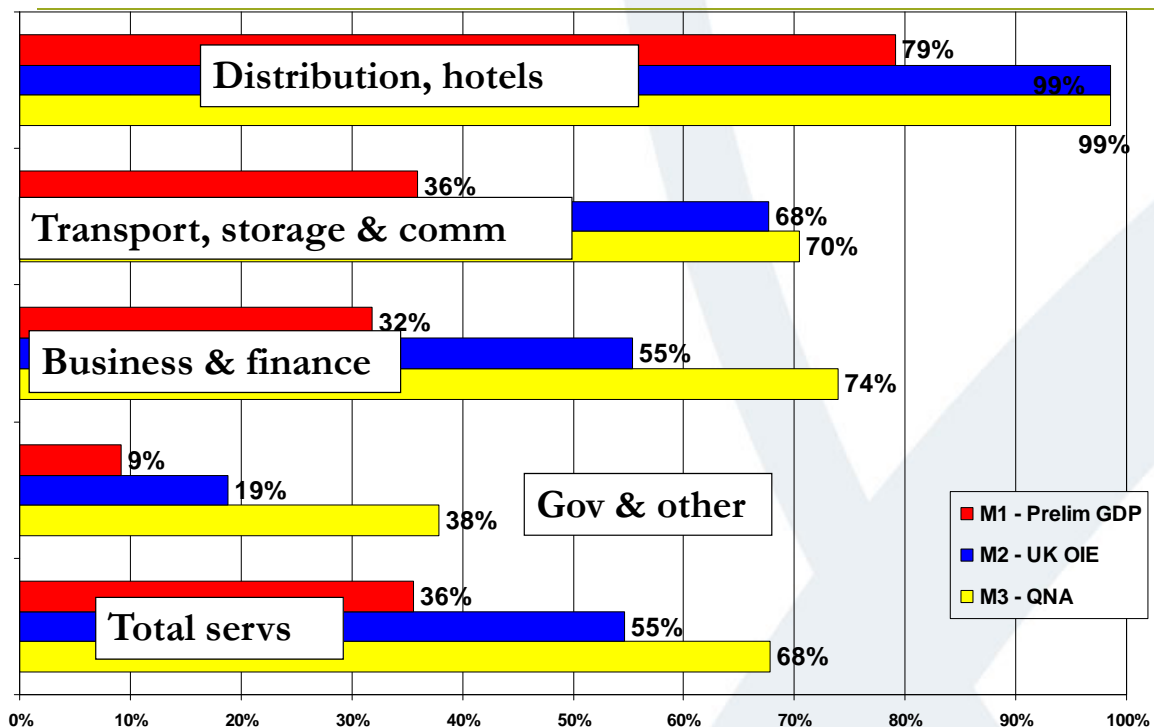
## Services data content: Preliminary GDP



## Services data content: UK OIE



## Services data content: QNA



## 2. Quarterly Accounts

### b) Quarterly GDP statistics

#### What determines GDP?

- Of the three measures **output** is considered the most reliable in the short-term and drives GDP.
- Expenditure and income are affected by volatile components (i.e. stocks for expenditure and company profits for income).
- Headline figure is ***quarterly seasonally adjusted GDP at market price in constant prices.***
- Growth rates and not levels are the prominent indicator used.

## 2. Quarterly Accounts

### b) Quarterly GDP statistics

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#### Current and constant prices

- Growth rates are more meaningful when the effect of inflation is removed, done by comparing data in constant prices.
- Output is produced at constant prices only.
- Expenditure is given at both constant and current prices.
- Income is produced at current prices only.

## 2. Quarterly Accounts

### b) Quarterly GDP statistics

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#### GDP balancing process

- GDP (O)utput measure / indicator provides the timely measure of GDP growth and for the quarterly path on an ongoing basis  
Exhaustive, relatively straightforward to measure and interpret  
GDP (E) and GDP (I) are more unreliable, with weak components, and incomplete coverage

## 2. Quarterly Accounts

### b) Quarterly GDP statistics

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#### GDP balancing process

- Growth of Expenditure and Income brought into line with growth of Output
- [modest differences GVA/GDP]
  - Quality adjustments (bottom-up)
  - 'buffers' / 'coherence adjustments' (top-down)
  - Statistical discrepancy
  - Alignment adjustments
- Iterative process

## 2. Quarterly Accounts

### c) Reliability of quarterly GDP

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### c) Reliability of quarterly GDP

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#### Buffers analysis

- Made to individual components
- *Quality*: reflect quality of survey data (by compilers)
- *Balancing*: imposed by coordinators
- Some carried forward from Supply and Use balancing

## 2. Quarterly Accounts

### c) Reliability of quarterly GDP

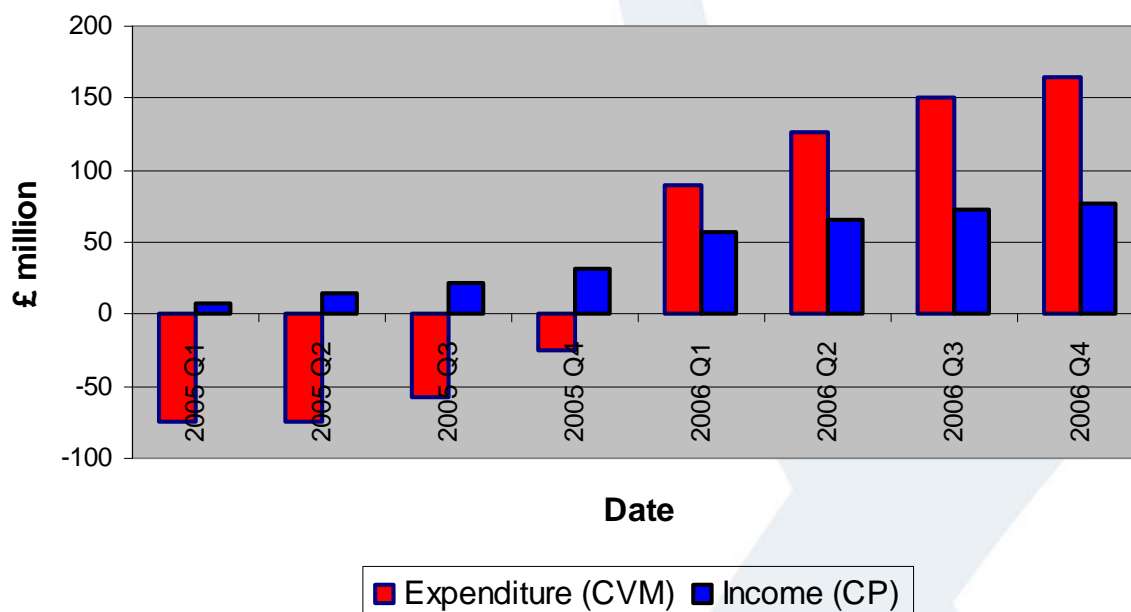
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#### Statistical discrepancy between GDP's

- Unallocated divergence between measures
- Summing provides a measure of dispersion of the three measures
- Rules: Statistical discrepancies should be kept to within £2bn for the current year and £1bn for the current quarter (internal guidelines)

## Statistical Discrepancies

Expenditure & Income: 2006Q4 published



## 2. Quarterly Accounts

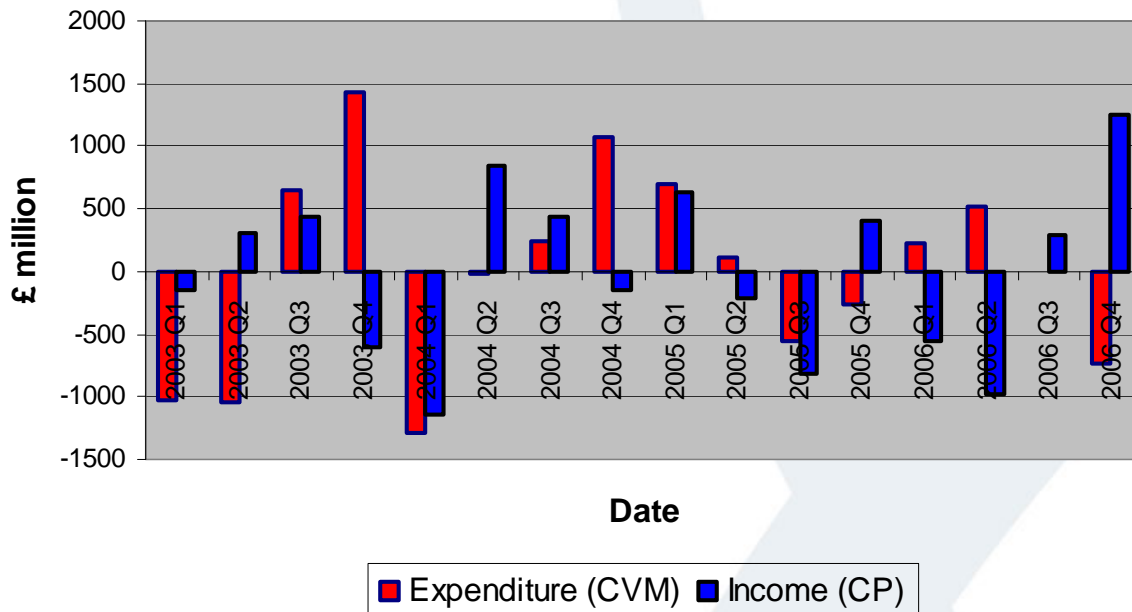
### c) Reliability of quarterly GDP

#### Alignment adjustments

- Change in inventories and private non-financial companies gross operating surplus
- Sum to zero across year
- Rule: Alignment adjustments should not exceed £1bn in any given quarter (internal guideline)

## Alignment adjustments

Expenditure & Income: 2006Q4 published



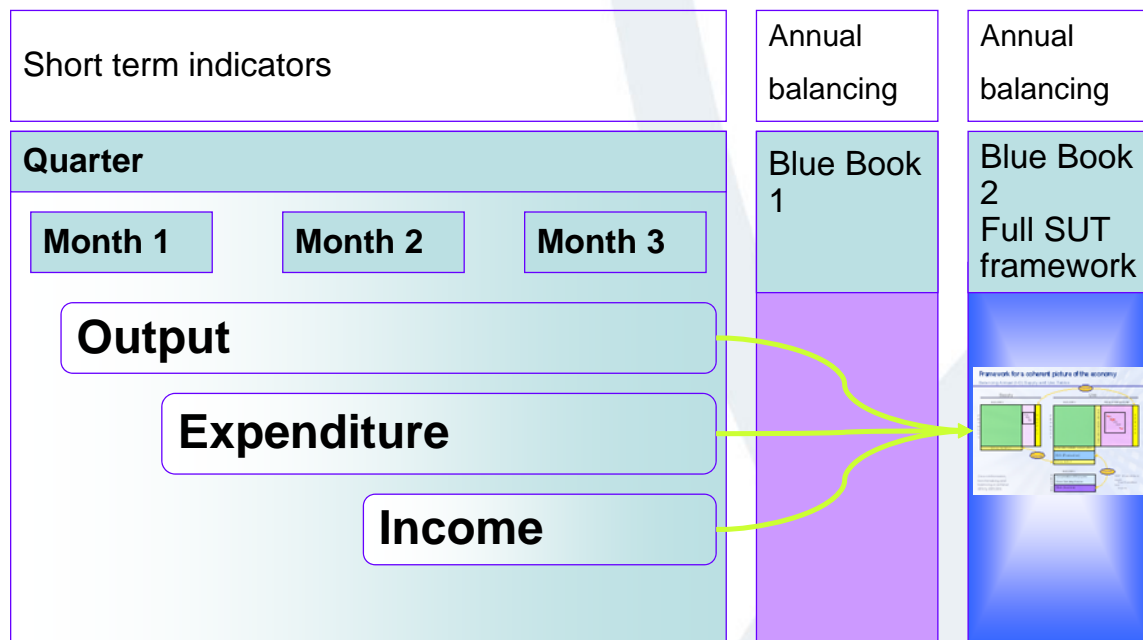
### 3. Annual Accounts

a) The measure of GDP and  
the 3 approaches



# Measuring UK Gross Domestic Product

Life cycle of national accounts data - estimation timeframe



## The GDP “rules”

- Annual Current Price levels are based on Supply and Use Tables
- Production measure is the best short-term measure of growth
  - Most stable, best early coverage, best (short-term) revisions history
  - In the short-term production is assumed to be proportional to value added.
- GDP brought into line with GVA growth
- Present a single estimate of growth (O=E=I)
- Annual balancing v Quarterly “reconciliation”

## Annual coherence adjustments

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- Bring GDP(O) in line with balanced GVA  
Annual growth within +/- 0.2%
- Now attempts to use automatic process  
Least squares algorithm  
Minimises distortion to quarterly path
- More evenly spread across industries  
But with reference to implied deflators

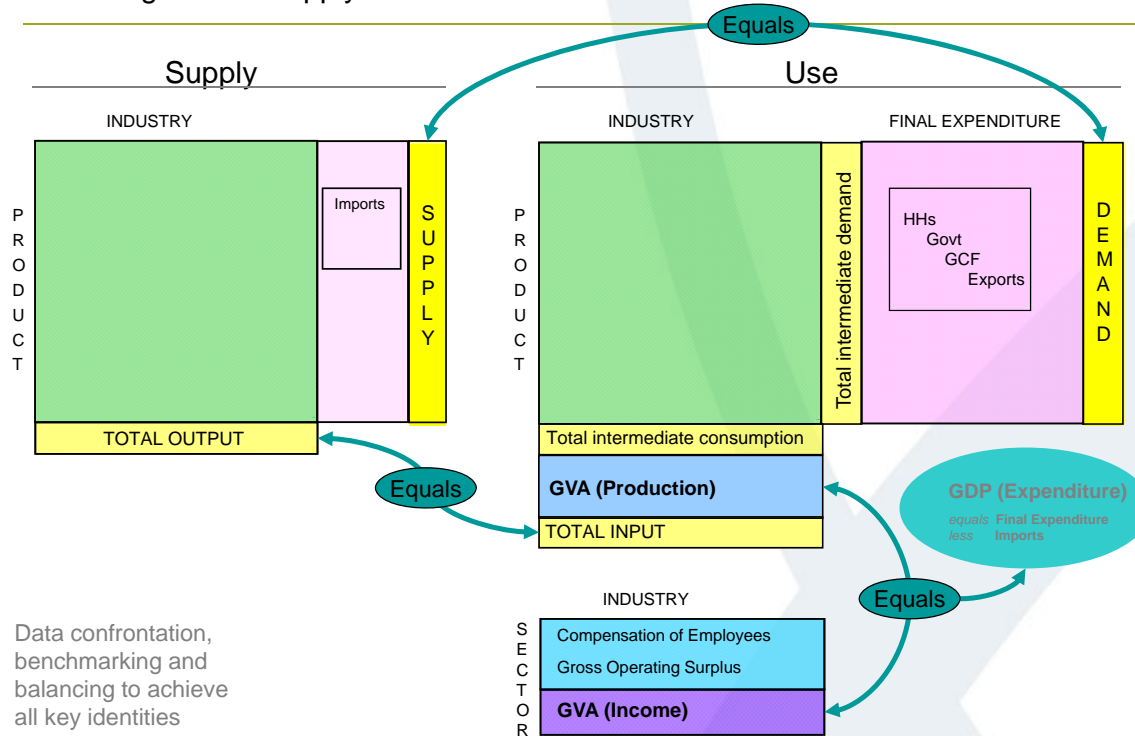


### 3. Annual Accounts

#### b) Supply and Use Tables

# Framework for a coherent picture of the economy

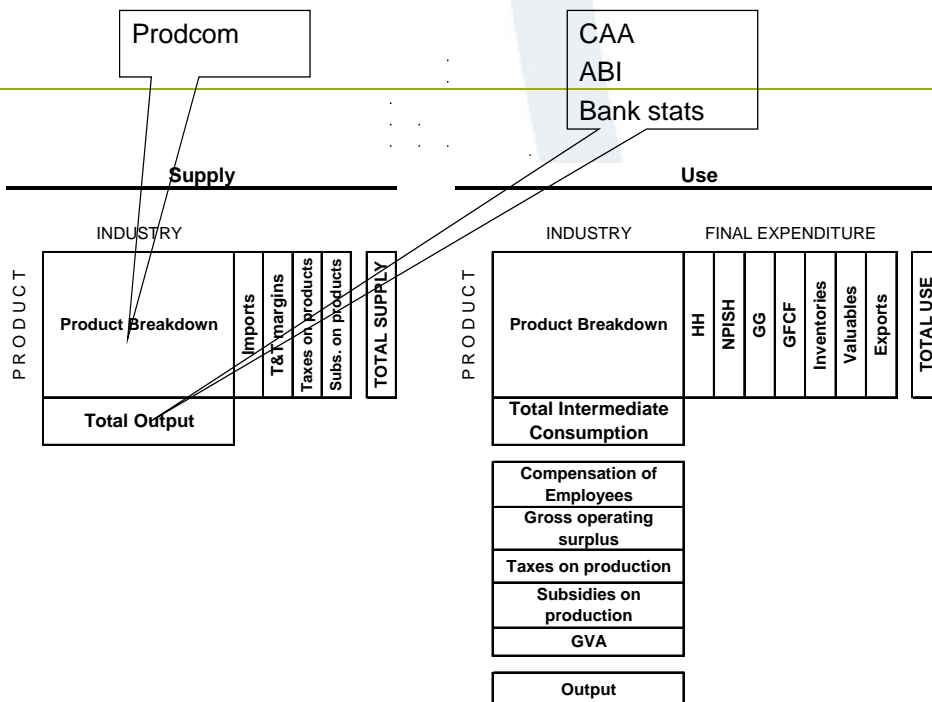
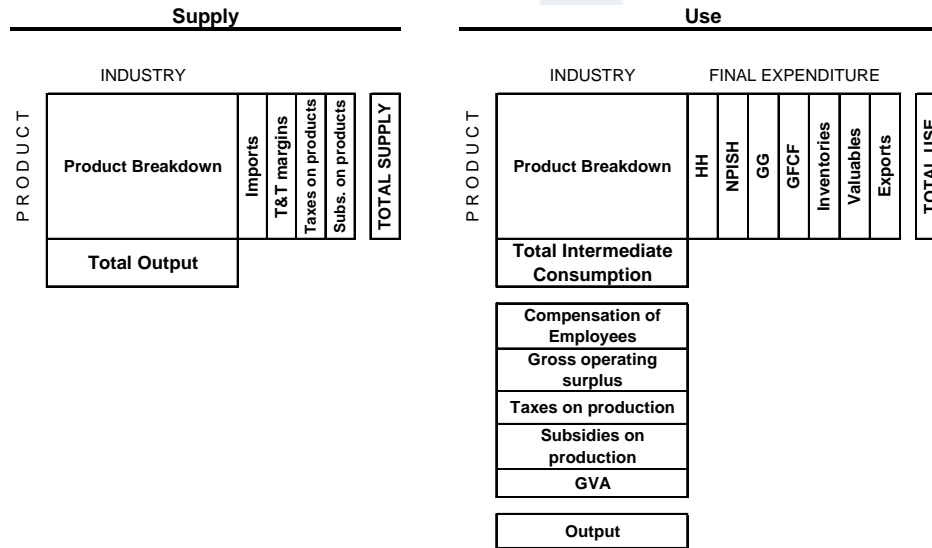
## Balancing Annual Supply and Use Tables



## Dimensions of the matrices

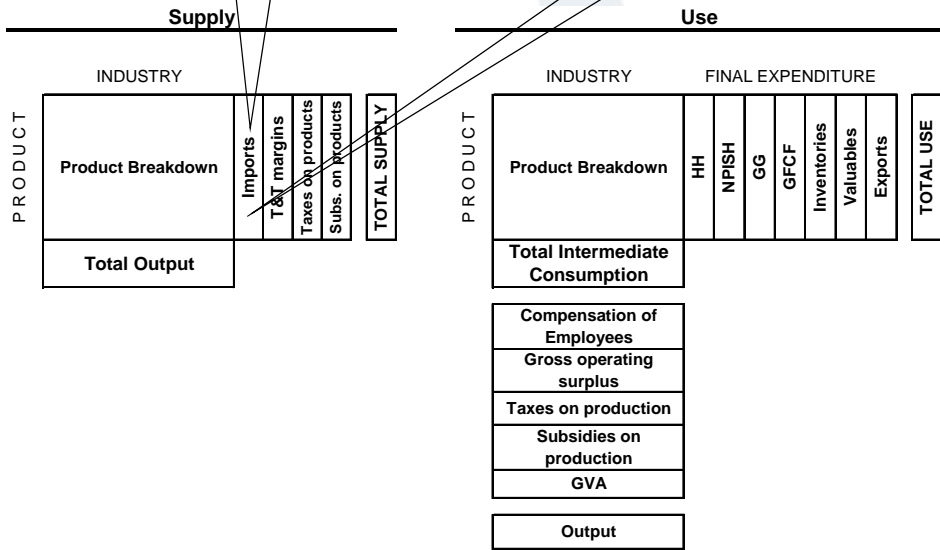
- Originally:
  - 123 industries by 123 products
- Since the introduction of CORD systems:
  - 108 industries by 123 products
- From BB11 onwards (SIC07, CPA08):
  - 114 industries by 114 products

# Populating the framework with source data

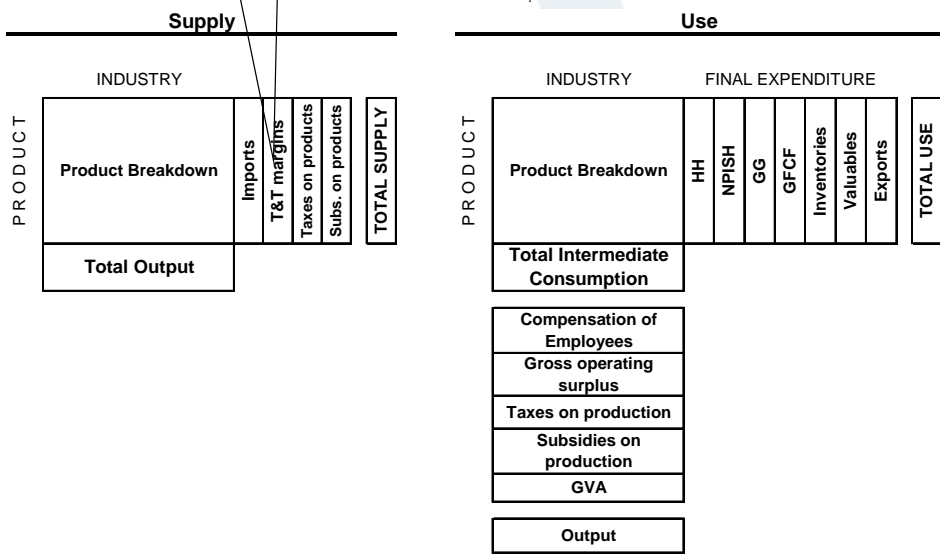


Trade in goods – Customs

Trade in services – ITIS

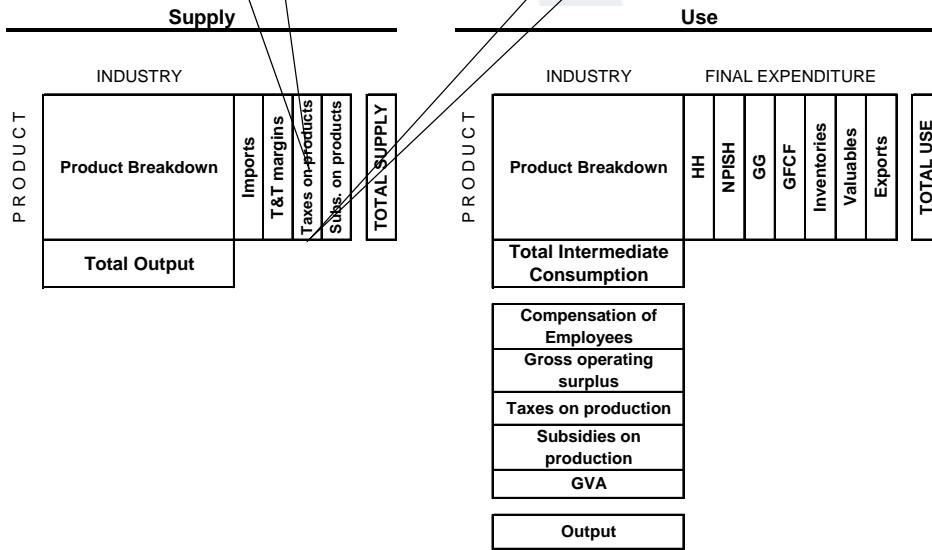


Derived – Margin factors



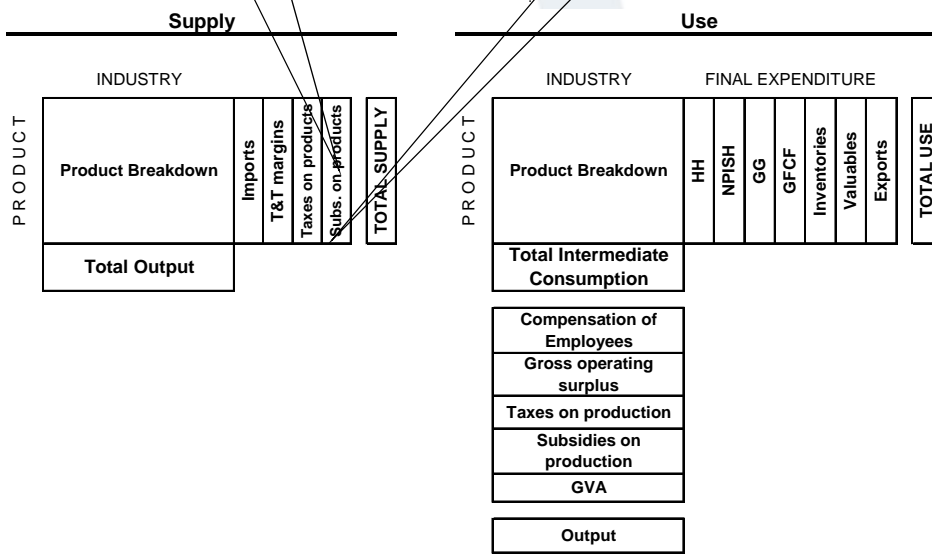
Derived –  
VAT rates  
Output

GG receipts



Derived –  
Output

GG receipts



Purchases Inquiry

CAA  
ABI  
Bank stats

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
	Subs. on products
TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE							
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports	TOTAL USE
	Total Intermediate Consumption								
	Compensation of Employees								
	Gross operating surplus								
	Taxes on production								
	Subsidies on production								
	GVA								
	Output								

Retail sales  
HBS

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
	Subs. on products
TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE							
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports	TOTAL USE
	Total Intermediate Consumption								
	Compensation of Employees								
	Gross operating surplus								
	Taxes on production								
	Subsidies on production								
	GVA								
	Output								

GG admin data

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
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TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE								
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports	TOTAL USE	
	Total Intermediate Consumption									
	Compensation of Employees									
	Gross operating surplus									
	Taxes on production									
Subsidies on production										
GVA										
Output										

ABI  
Capex  
Business spend

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
	Subs. on products
TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE								
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports	TOTAL USE	
	Total Intermediate Consumption									
	Compensation of Employees									
	Gross operating surplus									
	Taxes on production									
Subsidies on production										
GVA										
Output										



ABI

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
	Subs. on products
TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE						
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports
	Total Intermediate Consumption							
	Compensation of Employees							
	Gross operating surplus							
Taxes on production								
Subsidies on production								
GVA								
Output								
							TOTAL USE	

Trade in goods – Customs

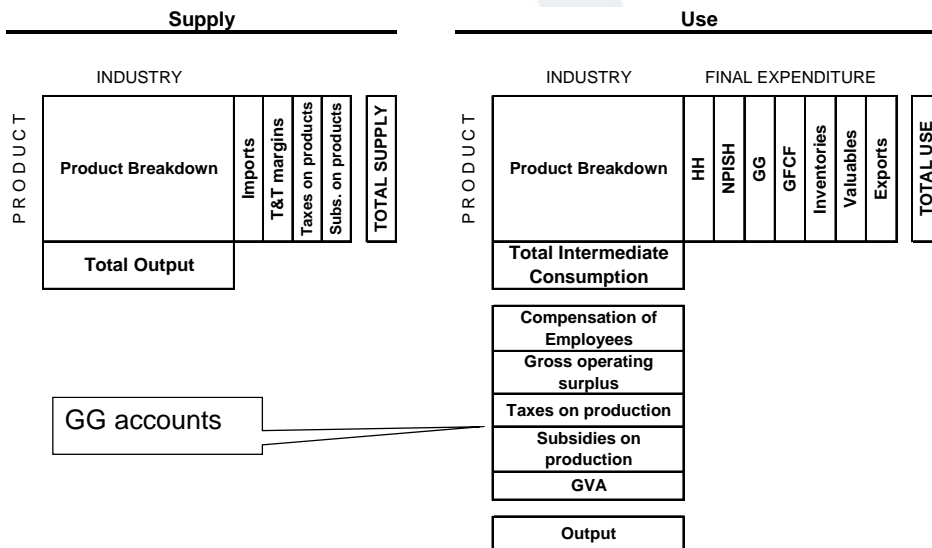
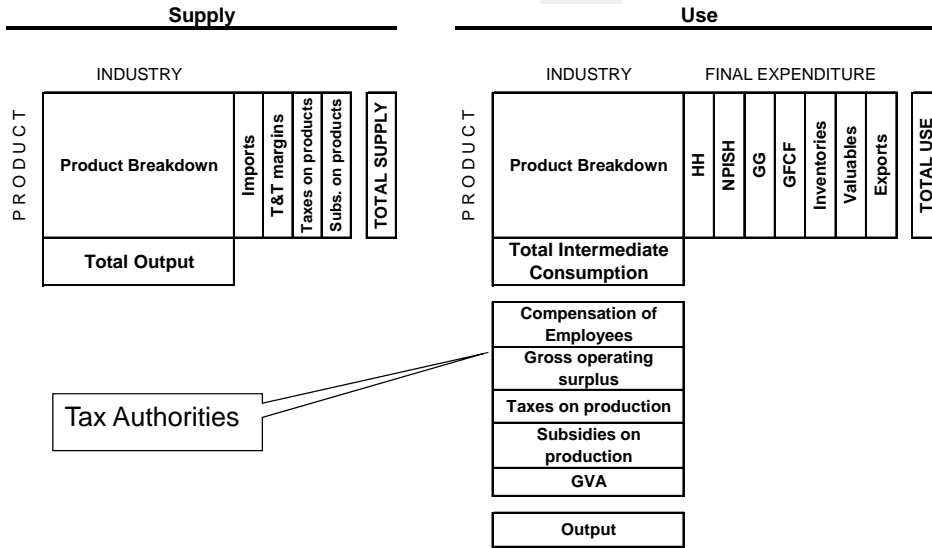
Trade in services – ITIS

**Supply**

INDUSTRY	
PRODUCT	Product Breakdown
	Imports
	T&T margins
	Taxes on products
	Subs. on products
TOTAL SUPPLY	
Total Output	

**Use**

INDUSTRY		FINAL EXPENDITURE						
PRODUCT	Product Breakdown	HH	NPISH	GG	GFCF	Inventories	Valuables	Exports
	Total Intermediate Consumption							
	Compensation of Employees							
	Gross operating surplus							
Taxes on production								
Subsidies on production								
GVA								
Output								
							TOTAL USE	



# Balancing

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- Manual as opposed to automatic (subjective as opposed to objective)
- Decentralised in the sense that individual rows and columns are allocated to balancers across National Accounts
- There is iterative balancing of rows, columns, rows, columns...etc

## 3. Annual Accounts

### c) Revisions analysis from GDP M1 to ...

## 3.c) Revisions analysis

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### Revisions: good or bad?

- Trade-off between timeliness and reliability
- Revisions are an expected part of the statistical process
- Timeliness of the preliminary release is consistent with the stated needs of main users

## 3.c) Revisions analysis

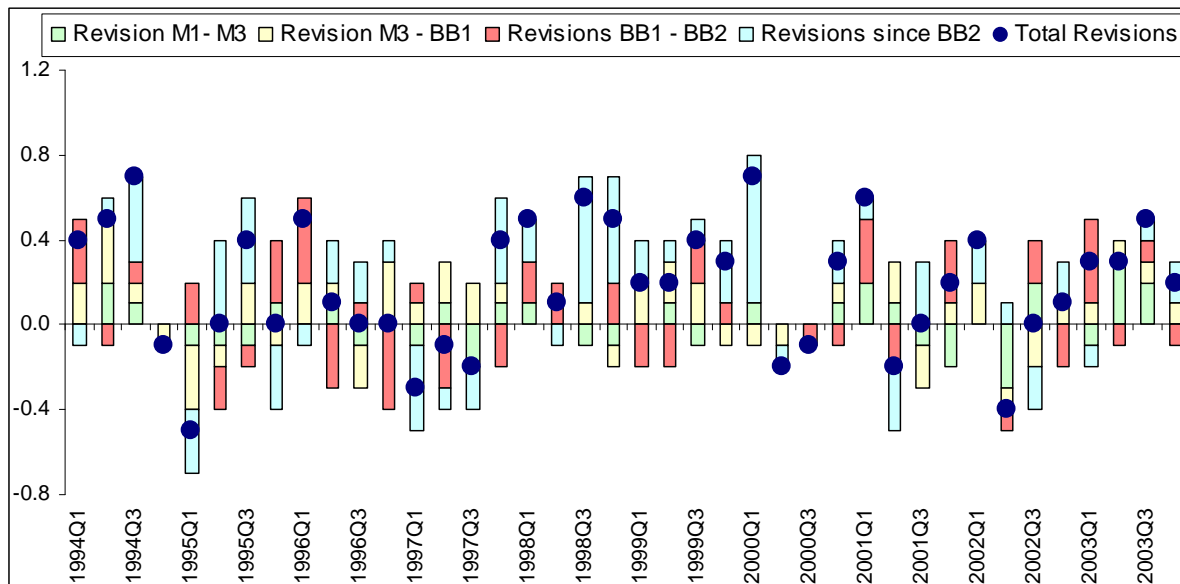
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### Why do revisions occur?

Estimates are revised because:

- Data replace forecasts
- Annual 'benchmark' data become available
- Methodological changes, including:
  - Improvements from on-going research
  - Changes in International frameworks (e.g. ESA2010/2008 SNA, SIC07)

### 3.c) Revisions analysis



### 3.c) Revisions analysis

#### Should ONS adjust early estimates for potential bias?

- Bias is defined as the Mean Revision
- ONS monitors this continually
- If persistent and significant - early estimates would be suboptimal – and revisions predictable
- Feasibility of such adjustments depends upon the bias being **non-zero, persistent** and **stable**
- Revisions are often idiosyncratic – and therefore unpredictable

## 3.c) Revisions analysis

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- Revisions are a fact of (statistical) life
- ONS makes detailed information available on revisions – including the ‘real time’ datasets
- Comparison of the first estimates with those published around 2 years later provides a reasonable basis for making like-for-like comparisons
  - and is helpful in understanding the underlying revisions process