

Module8 Structure of the UK Economic Statistics Infrastructure

1. UK Economic Stat Infrastructure

1.1 Session 4.1:

Office for National Statistics

RPEIS
Regional Product and Economic Indicators System

UNITED NATIONS
SIAP
Statistical Institute for Asia and the Pacific

Module8: Structure of the UK Economic Statistics Infrastructure

Integrated Economic Statistics to Support 2008 SNA Implementation

Notes:

1.2 Content

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RPI

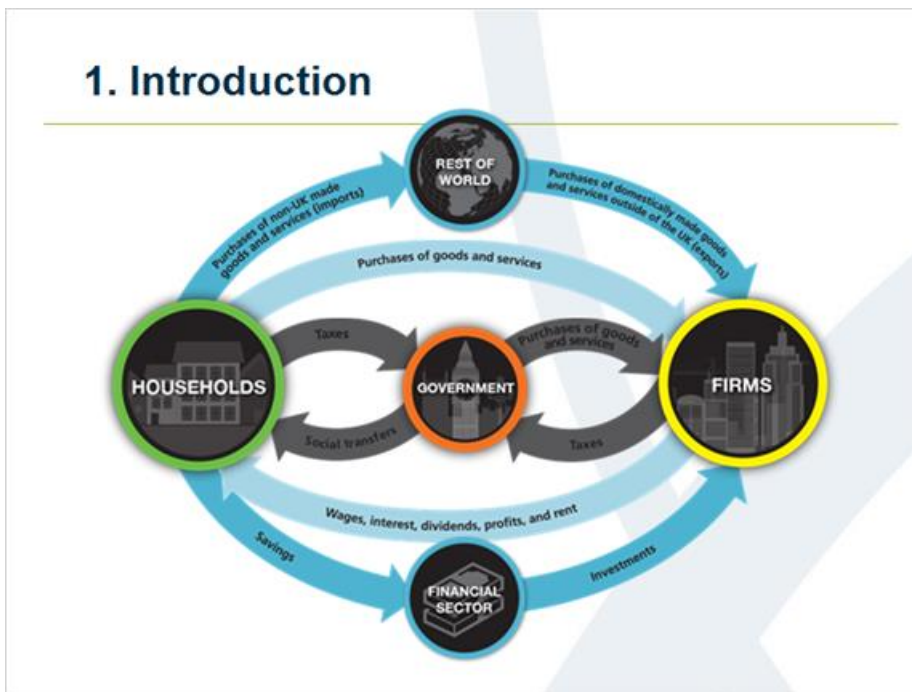
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Content

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

1.3 1. Introduction




1.4 1. Introduction

1. Introduction

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



1.5 1. Introduction: The three measures of GDP




1. Introduction: The three measures of GDP

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

1.6 Short Term Output Indicators



2. Quarterly Accounts

a) Short Term Output Indicators

1.7 2.a) Short Term Output Indicators

2. Quarterly Accounts

2.a) Short Term Output Indicators

GDP(O) = value added ± 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)

1.8 2.a) Short Term Output Indicators

2. Quarterly Accounts

2.a) Short Term Output Indicators

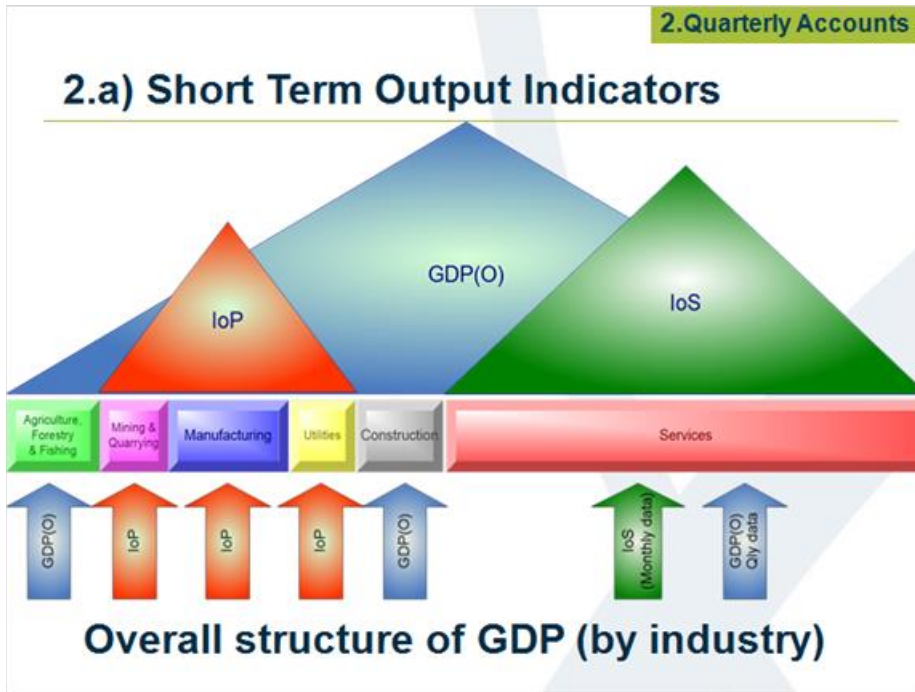
- The early estimates of GDP are actually based on short term indicators;
- These are the high frequency time series based largely on monthly and quarterly surveys of sales (or 'turnover') of businesses;
- This is the 'Output' approach to measuring GDP, and underpins the GDP 'Production' estimates;
-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

Notes:

: i.e.

$$\text{GDP(P)} = \text{GDP(O)} + \text{Changes in inventories}$$

1.9 Overall structure of GDP (by industry)



Notes:

See Current STOID systems.vsd for original

1.10 Short Term Output Indicators

2. Quarterly Accounts

2.a) Short Term Output Indicators

- 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

Notes:

I'm going to talk briefly about the output measure of GDP. I'll first giving you an overview of what it is, and then say something about the data content of the estimates. Lastly I'll look at some of the reasons why these estimates are revised.

Conceptually what we want to measure is the total value added within the UK economy. The output approach uses the change in the volume of output as proxy for the change in GDP. It is ONS policy that this is the best measure of short-term change. This is based on our experience over a number of years of the movements of output compared to the other measures of GDP.

The basic assumption here is that, in the short term, the relationship between output and Gross Value Added is stable.

The estimate of total GDP is compiled by combining indices for around 400 'industries' using weights based on the latest firm estimates of Gross Value Added. Currently this is 2000, although this will be updated to 2001 in June.

The output approach is used as the basis for ONS' Preliminary estimate of GDP. This is among the fastest estimates of its type in the world. The Preliminary release for Q1 2009, for example, was published just 23 days after the reference period, on 23rd April.

Of course, there's a trade-off between the speed with which this estimate is produced and the likelihood of it being revised (which I'll say more about shortly).

In the Preliminary GDP release, the detail available for publication is limited because of the uncertainty around individual components. The release therefore just presents total GDP, total production, and total services.

1.11 2.a) Short Term Output Indicators

2.Quarterly Accounts

2.a) Short Term Output Indicators

Data sources for the output measure of GDP

- 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

Notes:

We'll now take quick look at the data used to compile the output estimate of GDP.

As I mentioned, using this approach the volume of output is taken as a proxy for GVA, and the preferred method for measuring output volumes is to use deflated turnover.

In the manufacturing sector, ONS surveys the turnover of around 9,000 businesses each month. This is deflated using Producer Price Indices, based on prices collected from a further 9,000 businesses.

For Services, we collect turnover data from 34,000 businesses each month, and deflate using a variety of means. For example using Corporate Services Price Indices or Consumer Price Indices.

Where we can't collect turnover or price data we use direct volume measures. For example, we collect the number of passenger kilometres from the Strategic Rail Authority.

We also use some input proxies where we don't have turnover or direct volume measures. For example we use the change in the number of employees for some parts of central government.

Where we don't have any data, we use standard forecasting techniques to estimate output. For example, at the time of the Preliminary GDP release we have data for the first two months of the quarter for the Index of Production, but not for the third month. We therefore use a forecast for this month.

Of course, as data become available, the forecasts are replaced.

Overall, we estimate that around 45% of the Preliminary estimate of GDP is based on information. The missing components tend to be those which are less volatile, and therefore less likely to affect the quarterly estimates of growth.

1.12 Quarterly GDP statistics

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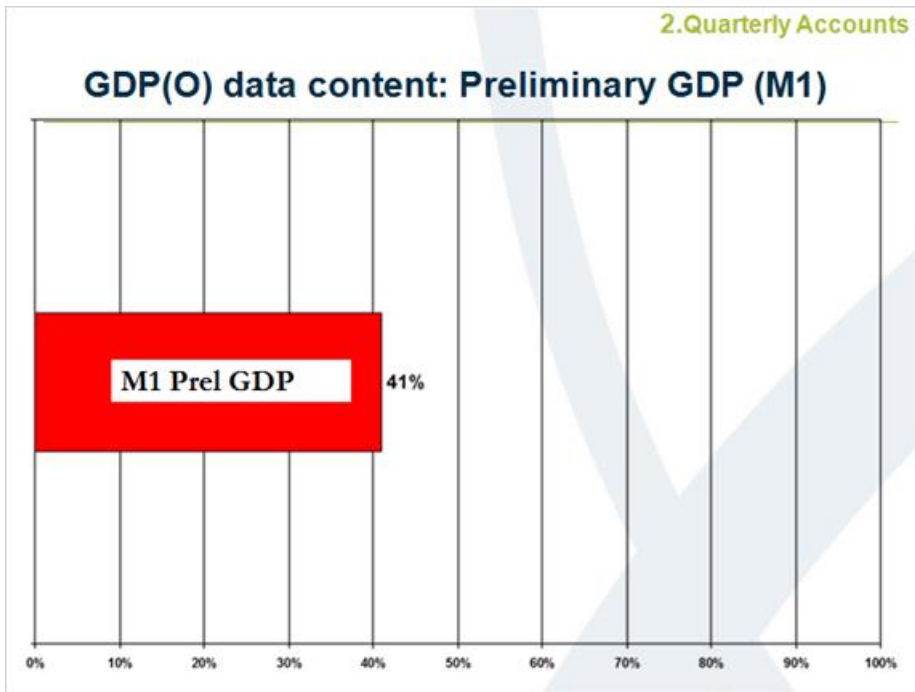
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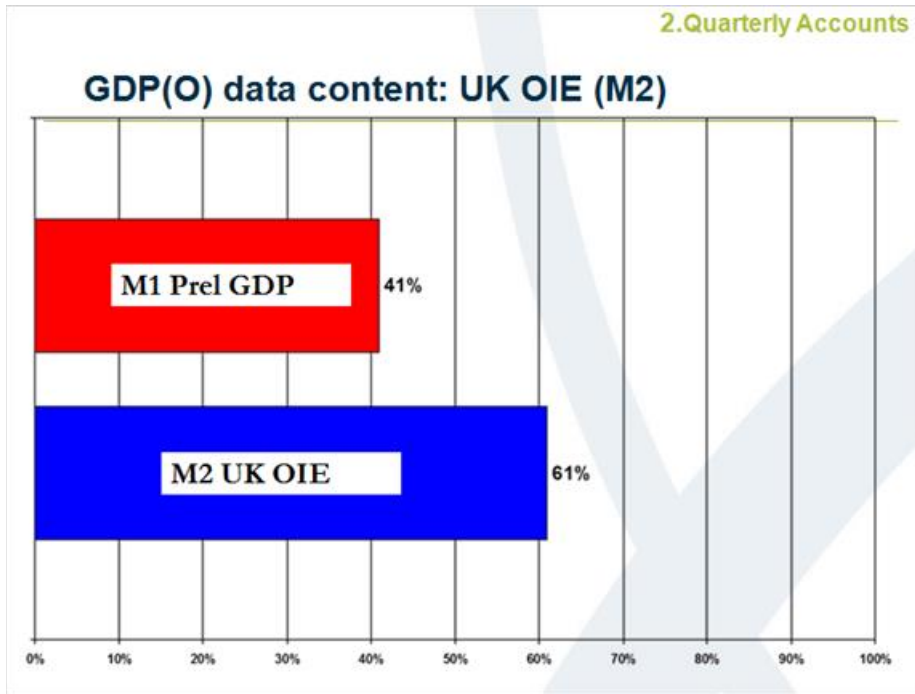
2. Quarterly Accounts

b) Quarterly GDP statistics

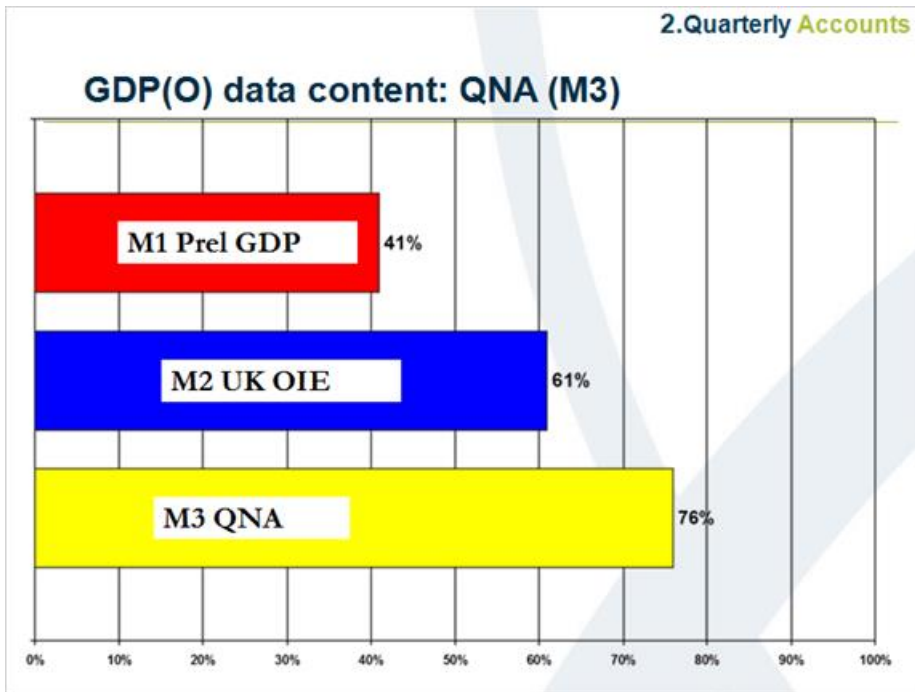
1.13 GDP(O) data content: Preliminary GDP (M1)



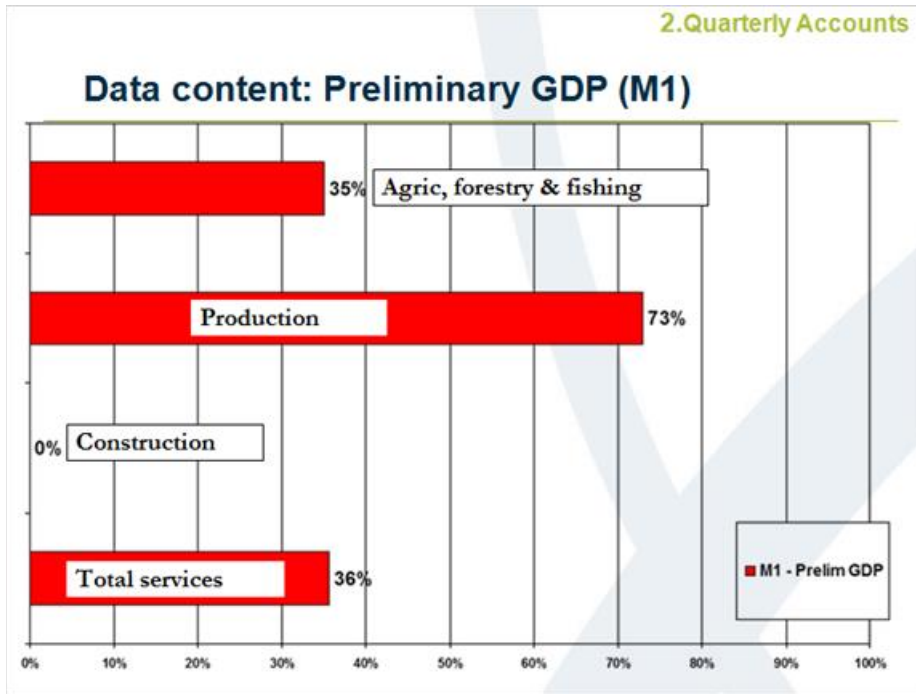
1.14 GDP(O) data content: UK OIE (M2)



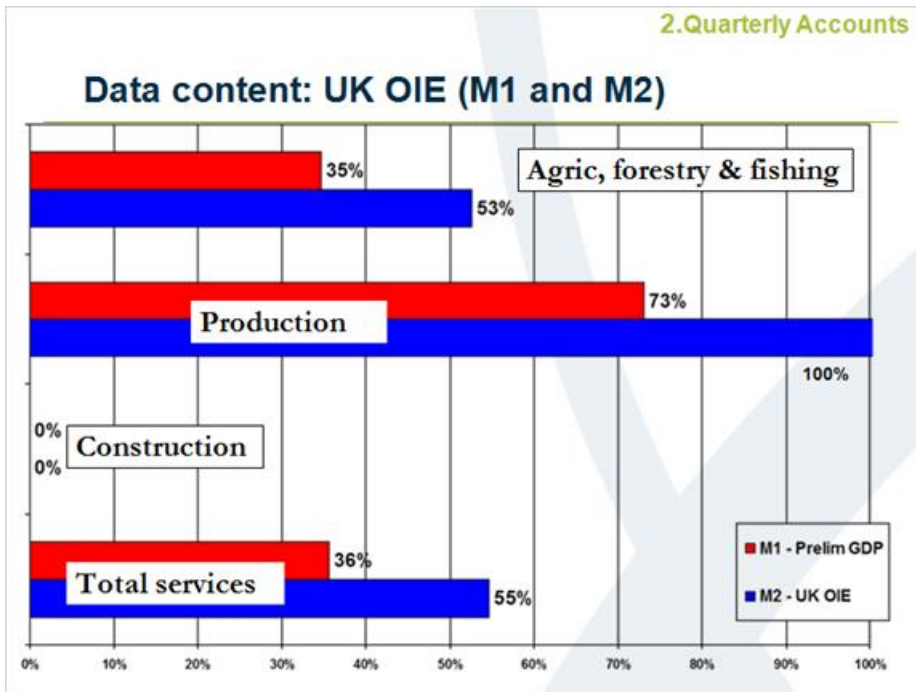
1.15 GDP(O) data content: QNA (M3)



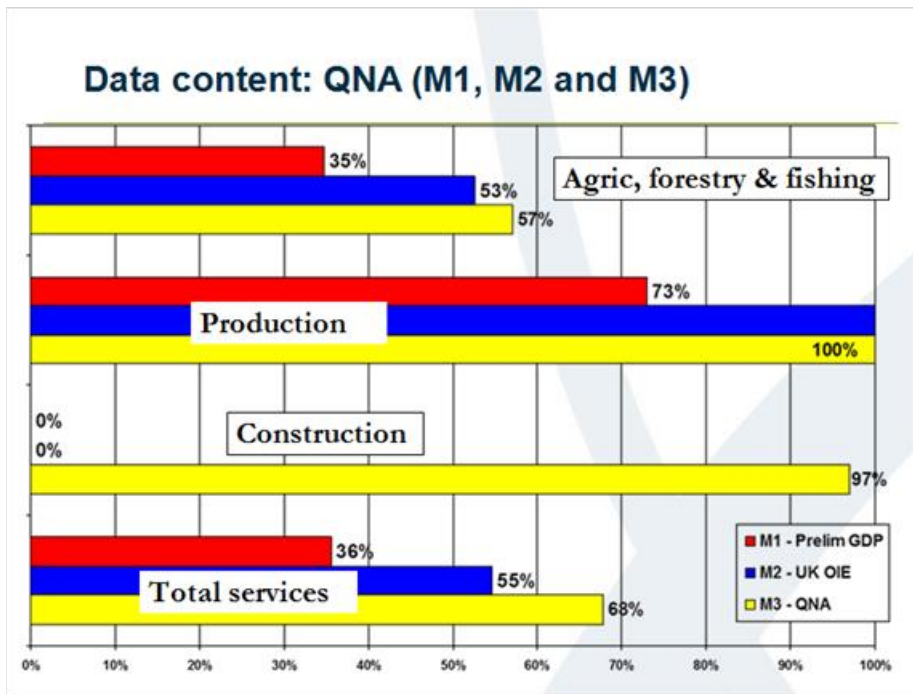
1.16 Data content: Preliminary GDP (M1)



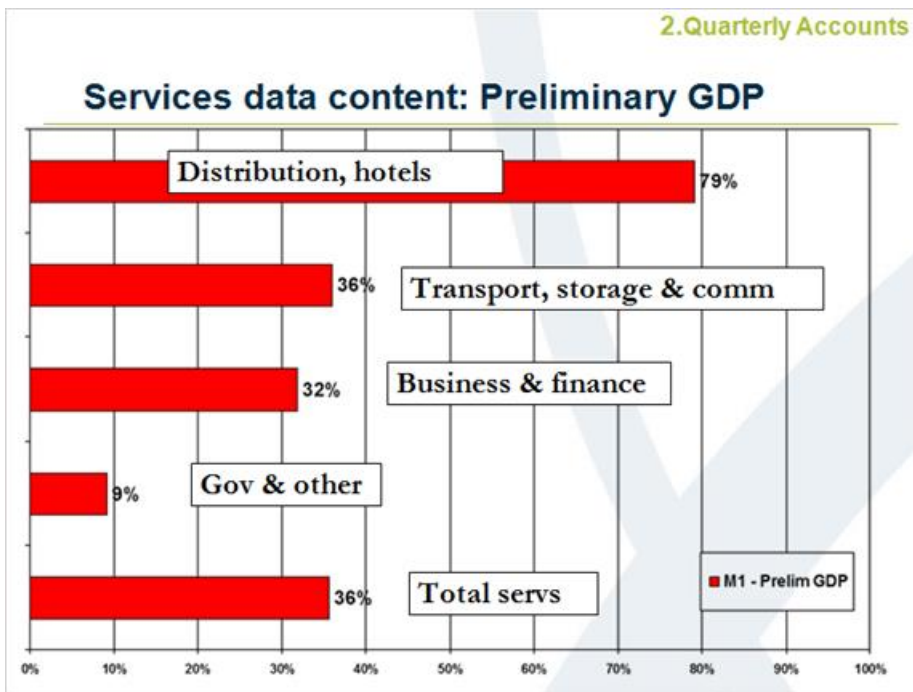
1.17 Data content: UK OIE (M1 and M2)



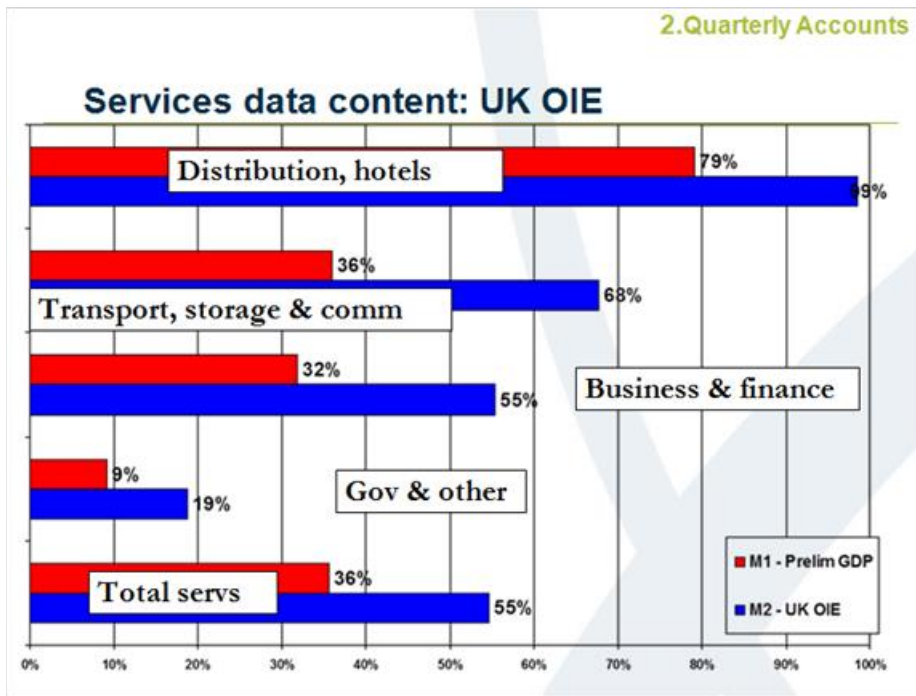
1.18 Data content: QNA (M1, M2 and M3)



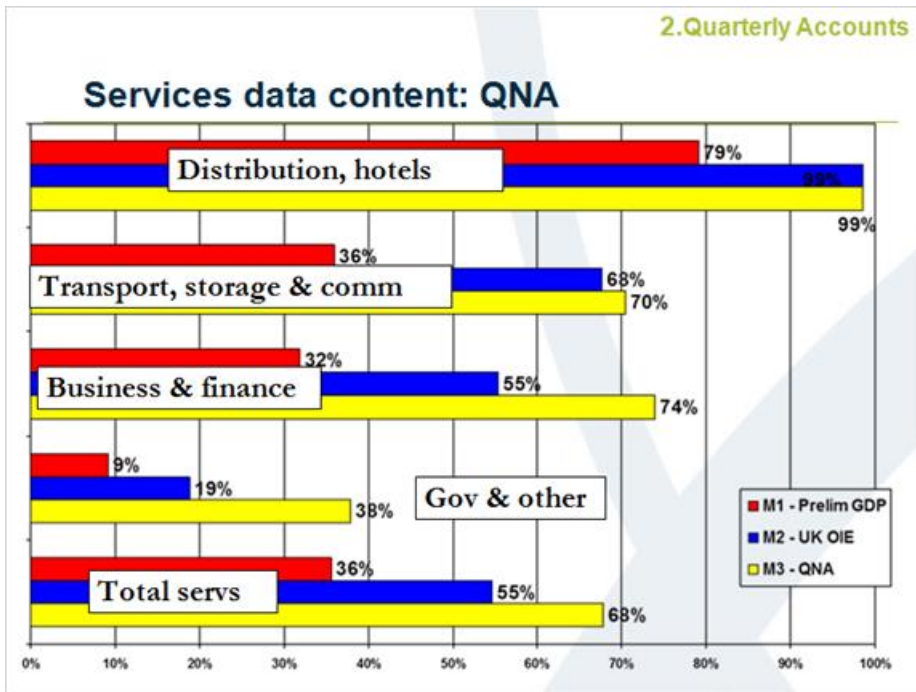
1.19 Services data content: Preliminary GDP



1.20 Services data content: UK OIE



1.21 Services data content: QNA



1.22 What determines GDP?

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.

1.23 Current and constant prices

2. Quarterly Accounts

b) Quarterly GDP statistics

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.
-

1.24 GDP balancing process

2. Quarterly Accounts

b) Quarterly GDP statistics

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

1.25 GDP balancing process

2. Quarterly Accounts

b) Quarterly GDP statistics

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

1.26 Reliability of quarterly GDP



2. Quarterly Accounts

c) Reliability of quarterly GDP

1.27 Buffers analysis

2. Quarterly Accounts

c) Reliability of quarterly GDP

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

1.28 Statistical discrepancy between GDP's

2. Quarterly Accounts

c) Reliability of quarterly GDP

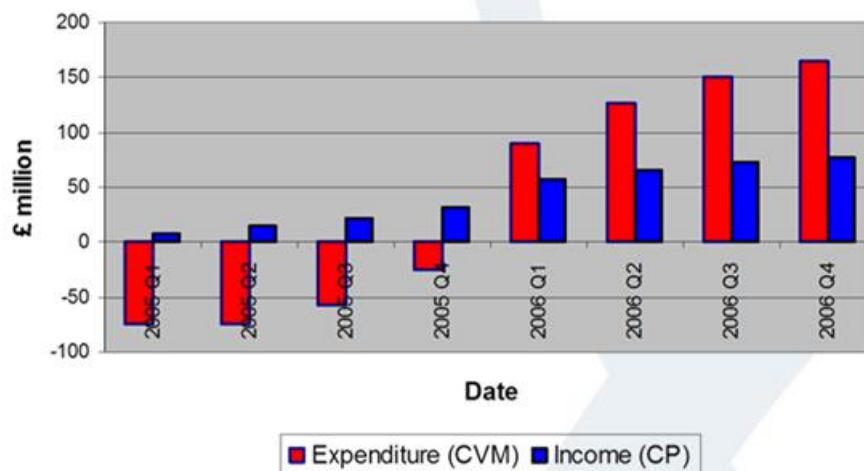
Statistical discrepancy between GDP's

- 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)

1.29 Statistical Discrepancies

Statistical Discrepancies

Expenditure & Income: 2006Q4 published



1.30 Alignment adjustments

2. Quarterly Accounts

c) Reliability of quarterly GDP

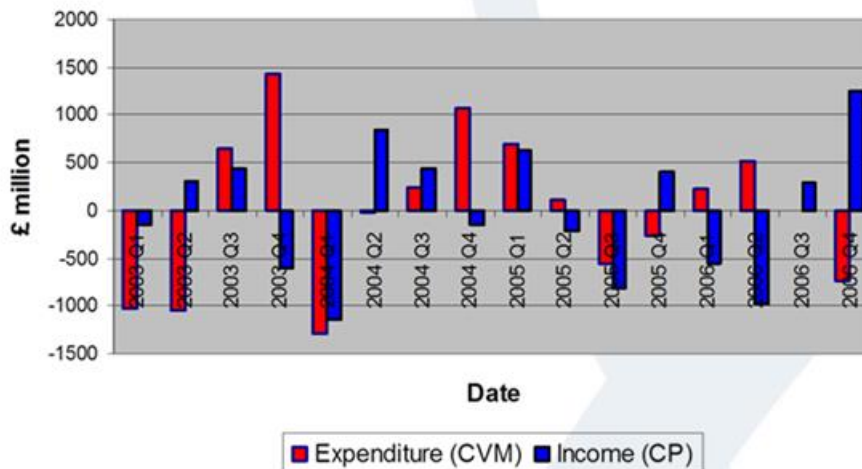
Alignment adjustments

- 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)

1.31 Alignment adjustments

Alignment adjustments

Expenditure & Income: 2006Q4 published



1.32 3. Annual Accounts

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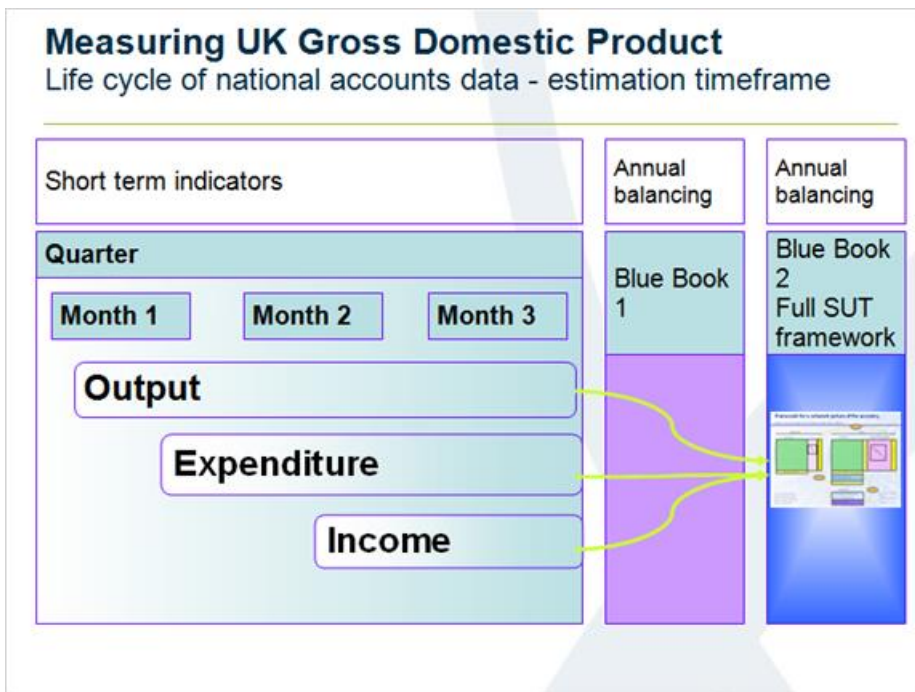
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3. Annual Accounts

a) The measure of GDP and the 3 approaches

1.33 Measuring UK Gross Domestic Product



Notes:

ONS have a strategy, that we follow when balancing annual GDP and when balancing the most recent quarters.

Annual level of GDP at current prices is best generated through the I-O Supply and Use Tables process of balancing information on production, income and expenditure.

Quarterly growth is best estimated using the output measure of GDP.

Expenditure and income are brought into line with output through alignment adjustments to change in inventories and PNFC operating surplus.

Mixture of scientific, judgmental and automatic balancing.

1.34 The GDP “rules”

3. Annual Accounts

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”




1.35 Annual coherence adjustments

3. Annual Accounts

Annual coherence adjustments

- 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

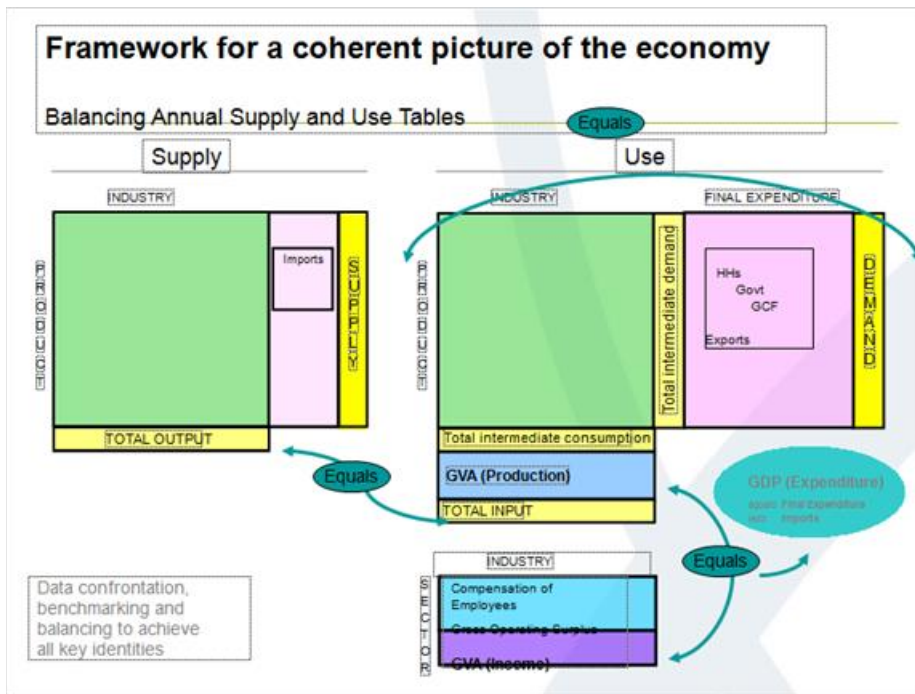
1.36 3. Annual Accounts

3. Annual Accounts

b) Supply and Use Tables

1.37 Framework for a coherent picture of the economy



Notes:

For each industry: Inputs = Outputs

For each product: Supply = Demand

For GVA: Production measure = Income measure

When complete: GDP (Production = Income = Expenditure)

1.38 Dimensions of the matrices

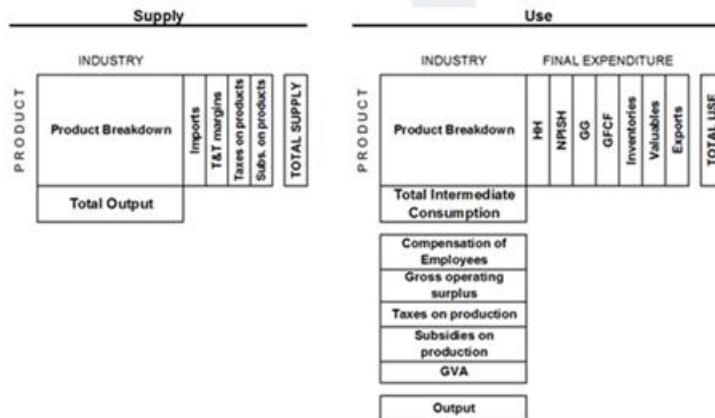
3. Annual Accounts

Dimensions of the matrices

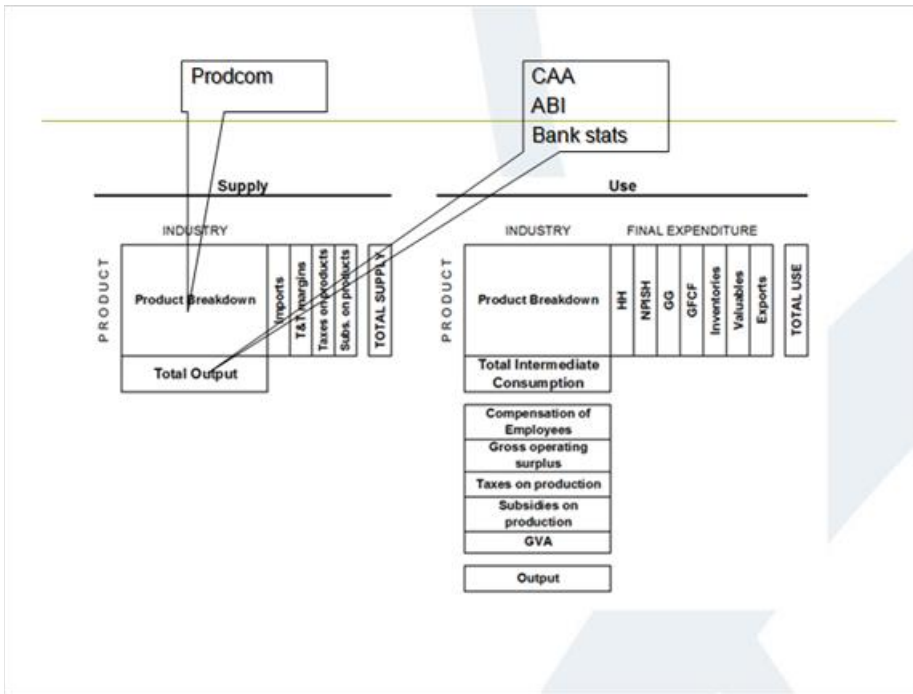
- Originally:
123 industries by 123 products
- Since the introduction of CORD systems:
108 industries by 123 products
- From BB11 onwards (SIC07, CPA08):
114 industries by 114 products

1.39 Populating the framework with source data

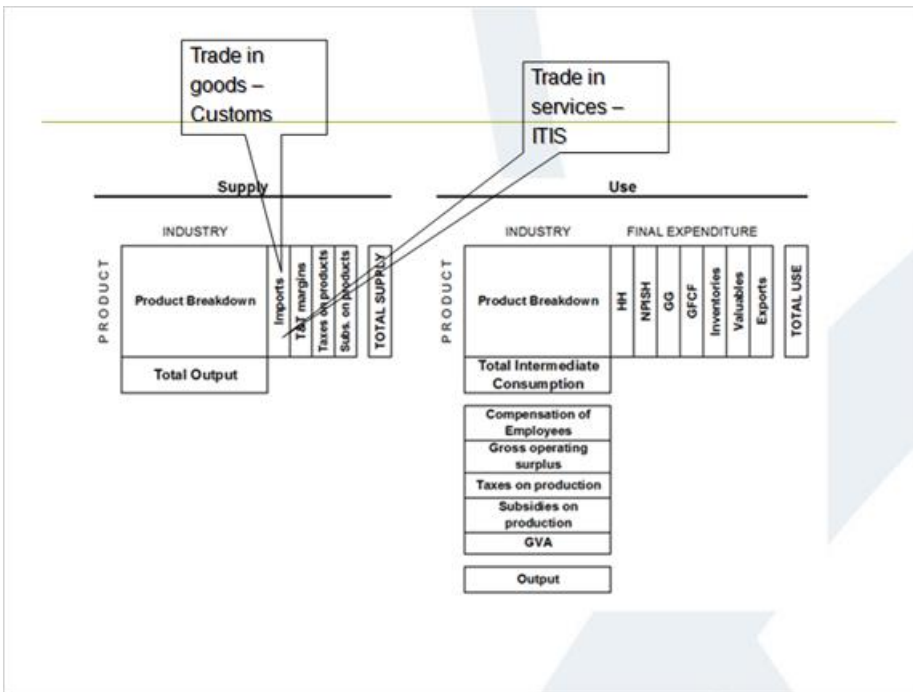
Populating the framework with source data



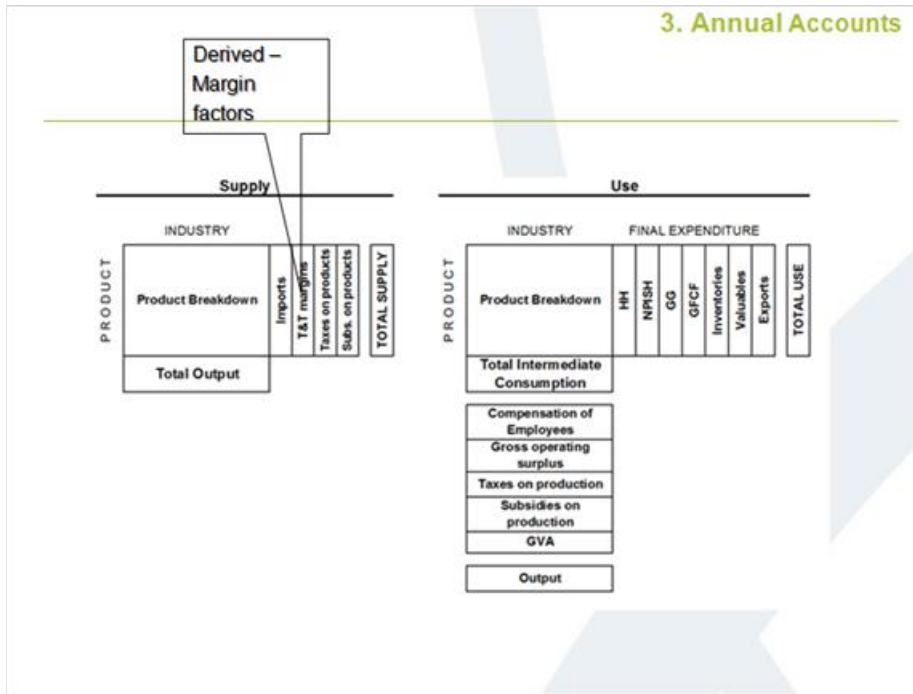
1.40 Populating the framework with source data



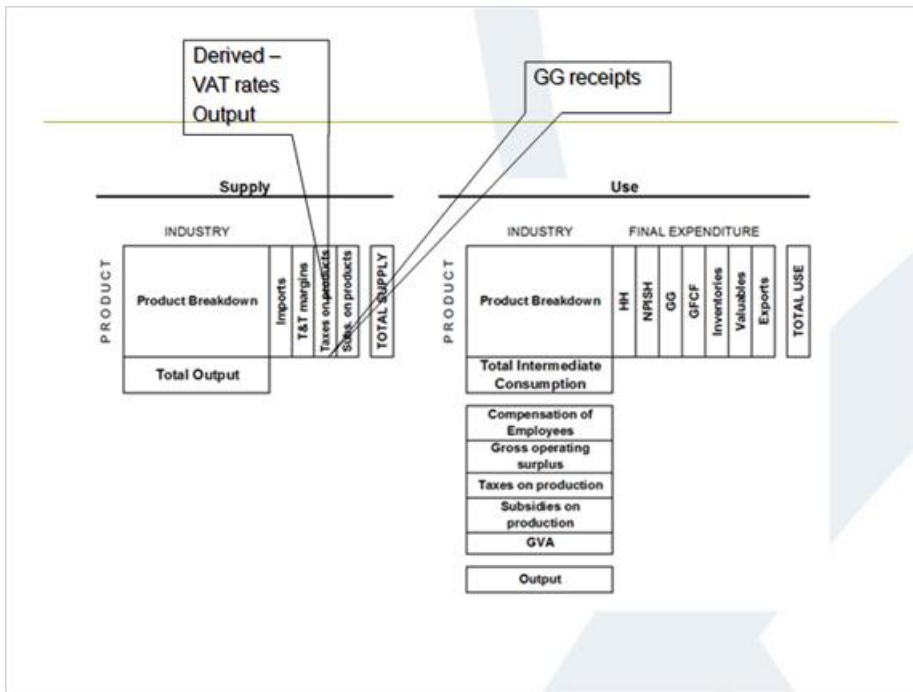
1.41 Populating the framework with source data



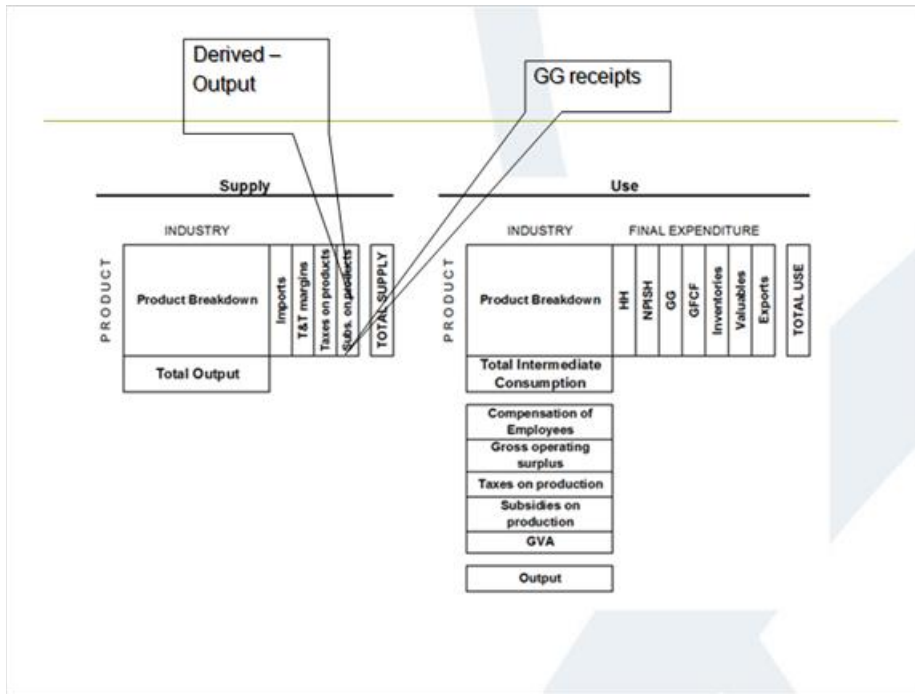
1.42 Populating the framework with source data



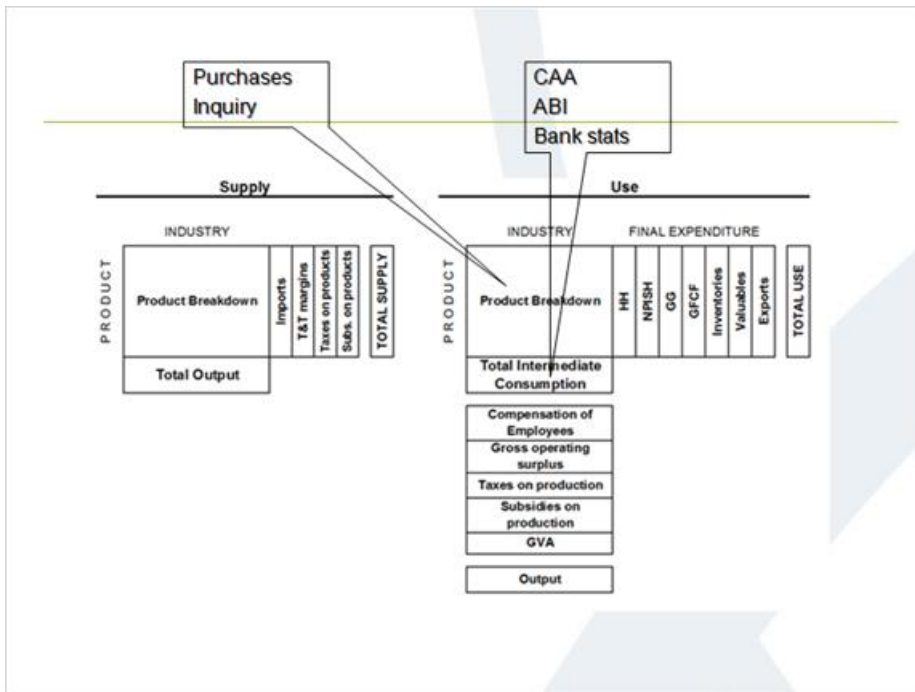
1.43 Populating the framework with source data



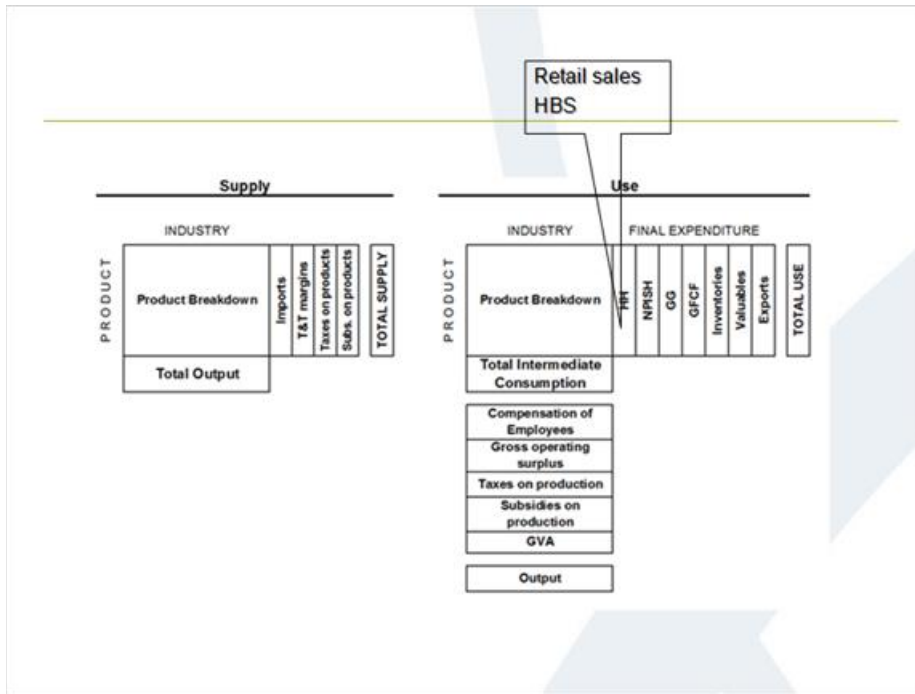
1.44 Populating the framework with source data



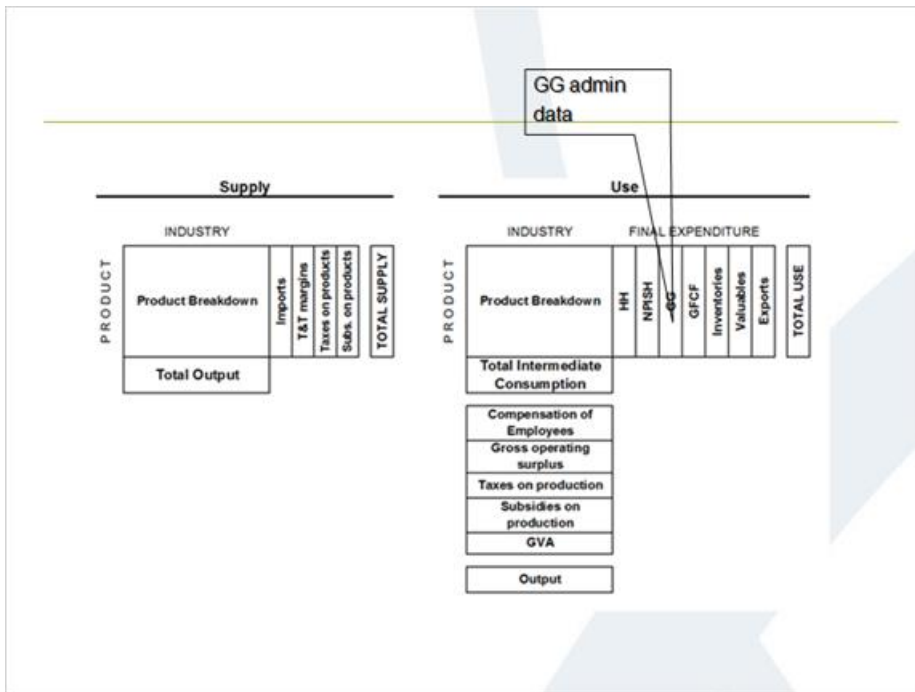
1.45 Populating the framework with source data



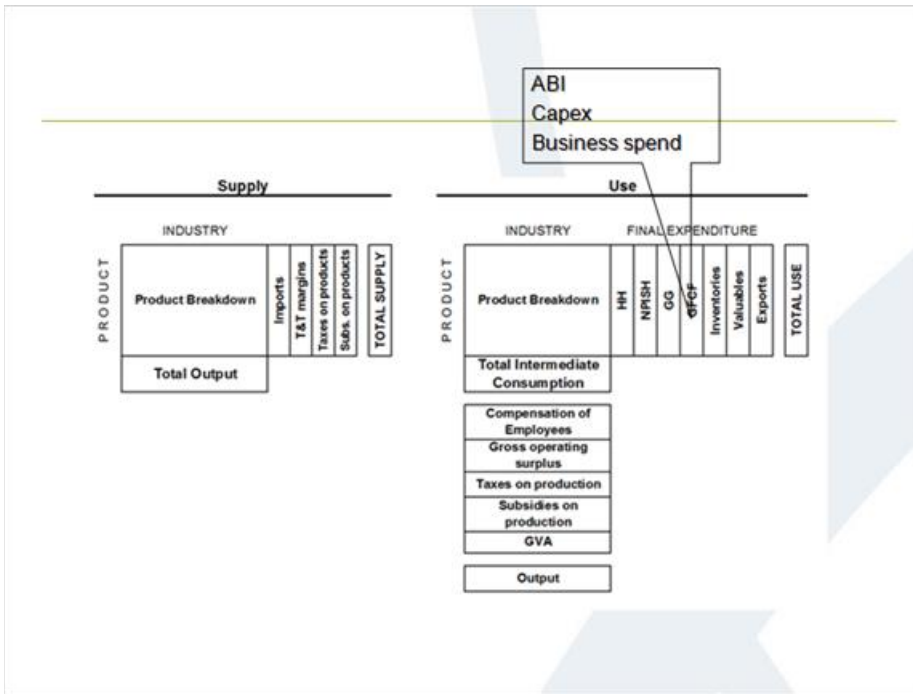
1.46 Populating the framework with source data



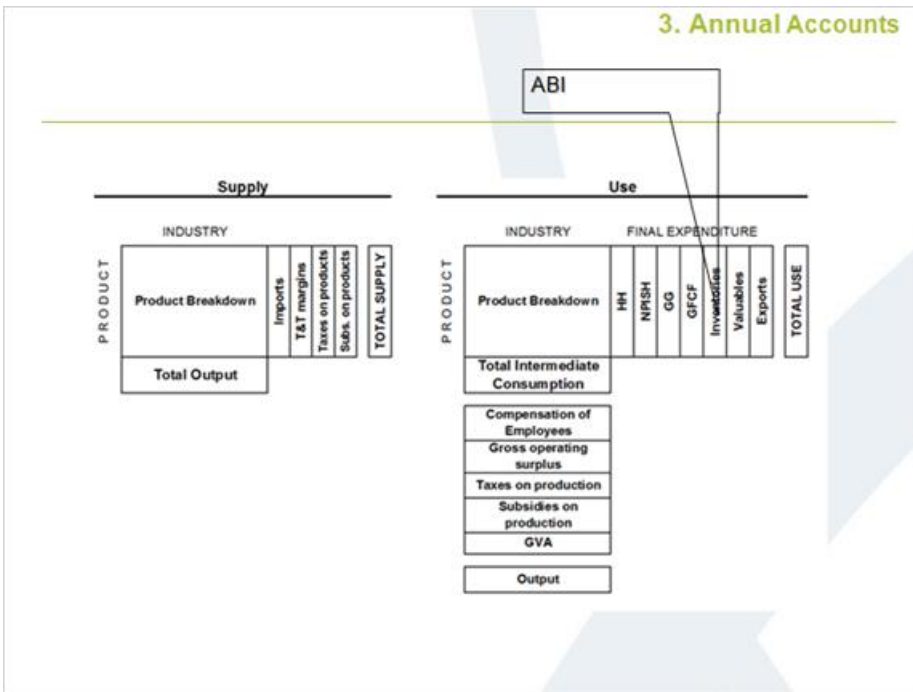
1.47 Populating the framework with source data



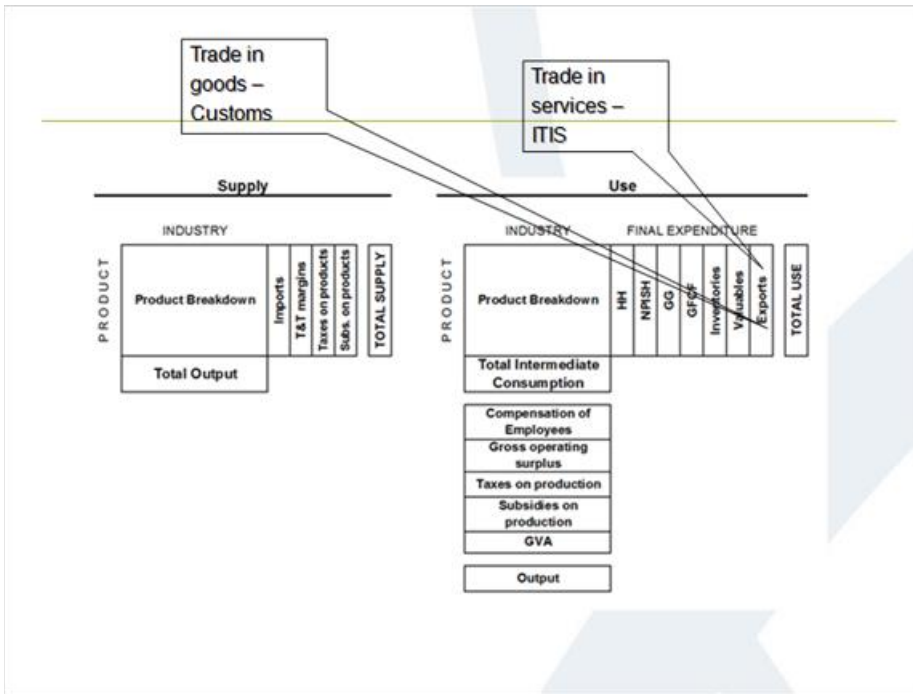
1.48 Populating the framework with source data



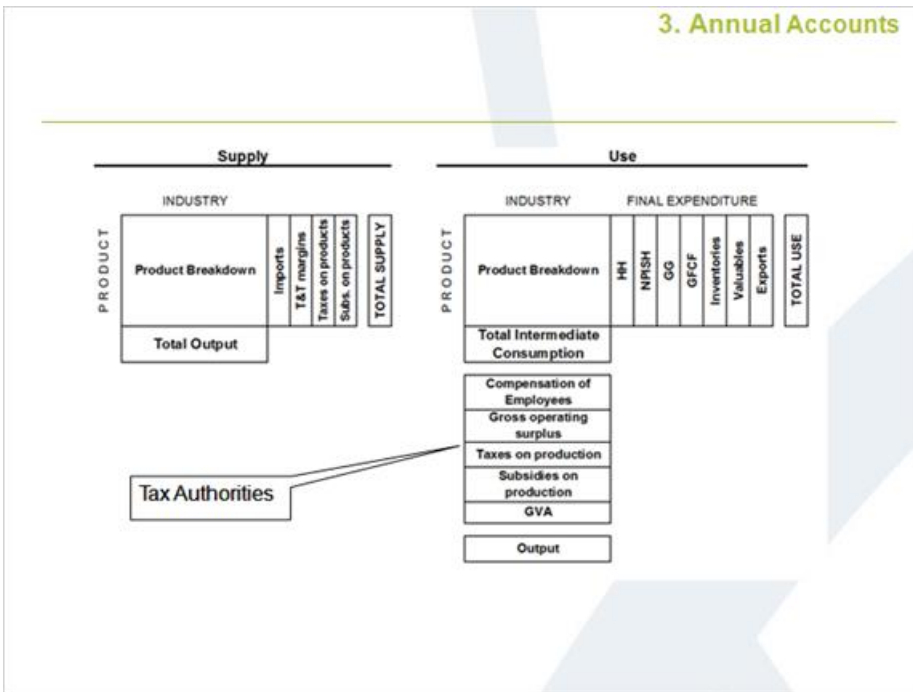
1.49 Populating the framework with source data



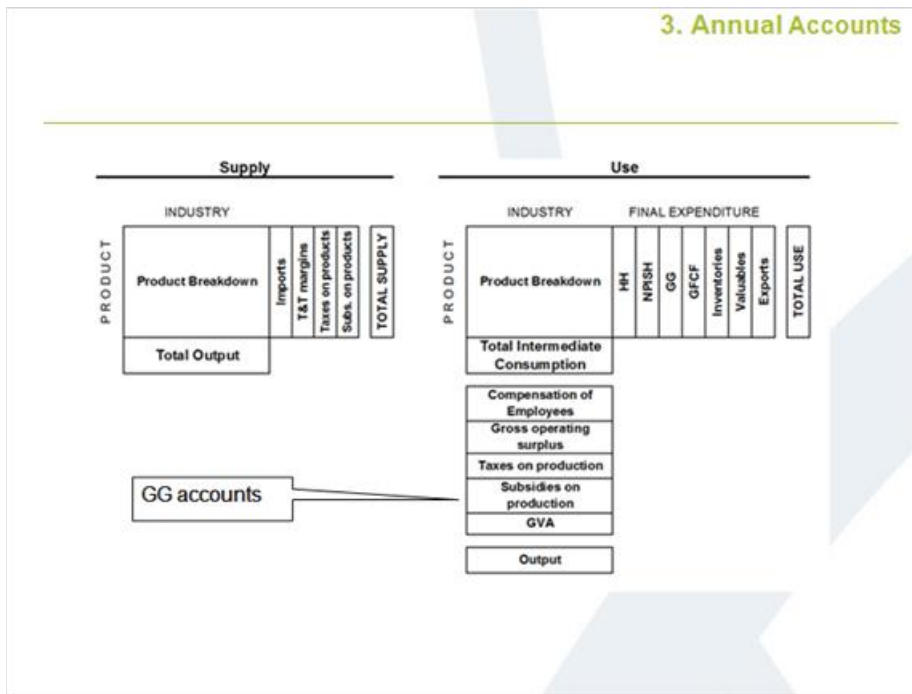
1.50 Populating the framework with source data



1.51 Populating the framework with source data



1.52 Populating the framework with source data



1.53 Balancing

Balancing

- 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

1.54 3. Annual Accounts



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3. Annual Accounts

c) Revisions analysis from GDP M1 to ...


1.55 Revisions: good or bad?

3. Annual Accounts

3.c) Revisions analysis

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



1.56 Why do revisions occur?


3. Annual Accounts

3.c) Revisions analysis

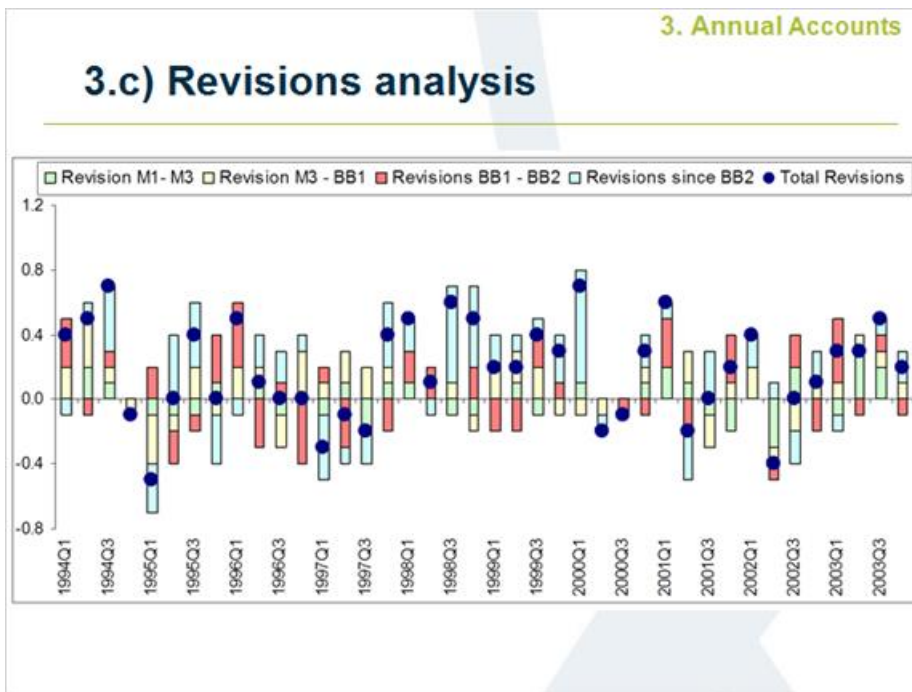
Why do revisions occur?

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)



1.57 Revisions analysis



1.58 Should ONS adjust early estimates for potential bias?

3. Annual Accounts

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

1.59 Revisions analysis

3. Annual Accounts

3.c) Revisions analysis

- 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

1.60 Process Table – based on Year 2000

Data Sources and adjustments Process Table – based on Year 2000

Compilation of GDP	Basis for NA Figures				Adjustments			Final Estimate
	Survey	Adm. Data	Extrap. Models & Other	Total	Data Validation	Exhaustiven. & Conceptual	Balancing	
Production Approach	67%	22%	10%	99%	-3.1%	4.8%	-0.4%	100%
Expenditure Approach	59%	23%	17%	98%	0.3%	0.5%	0.9%	100%
Income Approach	54%	30%	13%	97%	-2.3%	5.6%	0.1%	100%

Source: Akritidis L. 'Accuracy assessment of National Accounts statistics', Economic Trends, 2002

1.61 Process Table – GDP production

Data Sources and adjustments Process Table – GDP production

- Cut-off adjustments are made to fill the gap of data below a threshold level. For example, some SBS type surveys do not cover small enterprises below 20 employees, or tax records do not contain information for enterprises below the legally imposed level of turnover tax threshold.

N3	Producer is not obliged to register
N4	Registered legal person is not included in statistics
N5	Registered entrepreneur is not included in statistics

1.62 Process Table – GDP production

Data Sources and adjustments Process Table – GDP production

- Explicit exhaustiveness adjustments are all adjustments explicitly made to ensure exhaustiveness of the accounts in line with the criteria laid down in the Commission Decisions 94/168 on exhaustiveness and 98/527 on VAT fraud.

N1	Producer should have registered (underground producer)
N2	Illegal producer that fails to register
N6	Mis-reporting by the producer
N7	Statistical deficiencies in the data

1.63 Process Table, examples of exhaust

Data Sources and adjustments Process Table, examples of exhaust. Adj.,

- N1 – From 1994 this Off-trade smuggled Alcoholic beverages and Tobacco estimates are calculated using HMRC volume and prices information.;
- N2 - illegal drugs and for prostitution services;
- N3 - This corresponds to own account production for final use by non-market producers;
- N5 - not registered partnership in order to avoid taxes thus not in ABS
- N4 - This is to take account of contractors not on the IDBR (mostly self-employed below the IDBR threshold) carrying out improvement activity, W+S below tax threshold, Juveniles non-insured;
- N6 – undeclared employment income in the PAYE system;
- N7 – Remuneration in Kind (like: ESO, meals, rent of dwellings, cars); Tips sourced from HMRC.

1.64 Prostitution in the UK

Data Sources and adjustments Prostitution in the UK

Demand Side method

1. Number of prostitutes in UK

- A study in 2004 by Eaves (a charity helping prostitutes) estimated that there were approx .7000 off-street prostitutes in London; this was done by calling numbers advertised in various media ;
- In the same year the Metropolitan Police estimated 115 prostitutes on the street at any one time in London (Home Office (2004)).
- Adding these and scaling up by UK population gives c. 58,000 prostitutes in the UK

2. Number of clients per week

We also have to estimate the number of clients seen by each prostitute per week. Following a Netherlands assumption with some research support, quoted in Smekens and Verbruggen (2005

3 . Prices (the payment to prostitutes per client).

This was estimated based on research on Punternet

Notes:

N1 - From 1994 this Off-trade smuggled Alcoholic beverages and Tobacco estimates are calculated using HMRC volume and prices information.

N2 illegal drugs.

1.65 Drug in the UK

Data Sources and adjustments Drug in the UK

The method is demand side.

- Use 2003 level to extrapolate
- **Volume** = Number of Users in Eng & Wal scaled up to UK population (Eng & Wales Crime Survey) x Average Amount Consumed Per Person Purity Adjusted (Home Office Data)
- Current **Price** from UN World Report on Drugs
- Method broken down by type of drug
- Estimates for home grown production of cannabis included
- current **price** and **volume** estimates

Source: Abramsky J., Drew S., 'Changes to National Accounts: Inclusion of Illegal Drugs and Prostitution in the UK National Accounts', ONS, 29 May 2014

Notes:

N1 - From 1994 this Off-trade smuggled Alcoholic beverages and Tobacco estimates are calculated using HMRC volume and prices information.

N2 illegal drugs.

1.66 Thank you



Notes:
