The GLA's London Workforce Employment Series

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Abstract

This article describes the construction of the workforce employment data used by the Greater London Authority. It reproduces, in citable form and, for scholarly purposes, the report of the same name produced by the author for the Greater London Authority , which is available on http://www.london.gov.uk/mayor/economic_unit/docs/london_workforce_employment_series.pdf

This article describes the sources of this data and explains where they can be found. Workforce employment data is a vital resource for many cities, underpinning many city planning decisions Other important data about cities , such as estimates of its economic output, often depend on it. To build a reliable picture of London's economy, it is essential to understand where its estimates of workforce employment come from, what information they provide and how reliable they are.

The report explains what the term 'workforce employment' actually means, looks at the data sources that are used to obtain it, and discusses some of their limitations.

Appendix A, compiled by Peter Urwin of the University of Westminster, contains a study the GLA commissioned from Westminster University which analyses discrepancies between the UK's two main primary sources of employment data – the Labour Force Survey (LFS) and the Annual Business Inquiry (ABI). Finally, it explains how GLA Economics selects and compiles its workforce employment series. Appendix B, compiled by Experian Business Studies, explains the statistical methods used to construct the data from the primary sources.

Keywords: Labour Market; Minimum Wage; Living Wage

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Introduction: an authoritative employment dataset for London

GLA Economics maintains its own workforce employment data. It publishes these data in full for its clients and makes them available to the public on request, subject to disclosure restrictions required by the Chancellor's License. These data are fully compatible with the official data supplied by the Office of National Statistics (ONS), primarily through *Labour Market Trends*. They are derived from the same primary sources and are identical from 1998 onwards. However, the official data have a number of limitations, discussed in Section 5 and Appendix A, which make them insufficient for the GLA group's planning purposes.

For this reason, GLA Economics supplements the official regional statistics, as do a number of private providers of regional labour market data and other regional government agencies. GLA data cover a much longer time period (three business cycles from 1971), with breakdowns by borough and by sector based on the UK Standard Industrial Classification of Economic Activities (SIC(92)).[1] The data are compiled on a comparable basis so that long-term trends can be clearly identified.

GLA Economics is not an official statistical agency. However, it is responsible for the economic data and analyses used by the GLA group and ensuring the basis on which they are compiled is transparent and accessible, and to the highest possible standards. This report explains how, in light of this responsibility, it selects and maintains its workforce employment data for London.

1. Defining workforce jobs

In order to understand how the GLA's workforce figures are derived and used, it is important to understand the relationship between workforce and residential employment. This report deals with workforce employment figures, which measure the number of people who normally work in a specific geographic area. It does not cover residential employment, which measures the number of working people who live in an area. Consequently, it is not directly related to unemployment, which measures the proportion of residents who are available for work and searching for it, but have not yet found it.

There are two main differences between workforce and residential employment. Firstly, people working in an area must either live or travel there. The difference between residential and workplace employment is net commuting into that area. Workforce employment reports only on the number of jobs or filled posts in existence and provides no direct information about who fills these posts or where they come from.

A second less obvious difference is between employees and jobs. Residential employment refers to the number of individuals in work, regardless of how many jobs they hold. Workforce employment refers to the number of posts, some of which may be filled by the same individual if they have more than one job.

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[1] SIC(92) is used to categorise economic activities into a common structure. At the highest level there are seventeen classifications (A-Q) where activities such as Manufacturing (D) and Construction (F) are classified. These sections are further broken down into divisions, classes and sub-classes which are represented in a numbered system. See http://www.statistics.gov.uk/about/glossary/economic_terms.asp

Self-employment is an intermediate case. Most London jobs are employee jobs, about 4 million in 2000. Another 500,000 self-employed Londoners bring the total workforce jobs in the capital to around 4.5 million. A self-employed individual is treated as holding a single job at their place of residence, regardless of whether they actually travel or how many clients they work for.

These considerations give rise to the definition of workforce jobs:

Workforce jobs = employee jobs + self-employment

A final small correction is made for London-based members of the armed forces (about 20,000) and government trainees (about 10,000). The GLA includes these figures in its workforce employment total, but does not allocate them to boroughs or industrial sectors.

2. Employer-based and employee-based sources

Data on employment can be collected in two ways: from employers or employees. Both the ONS and the GLA use three current primary data sources to construct estimates of workforce jobs:

- the Annual Business Inquiry (ABI)
- the Short-term Employment Survey (STES)
- the Labour Force Survey (LFS).

The first two are employer based and are used to derive estimates of employee jobs. The third is employee based and is used to derive estimates of self-employment.

Employer surveys

The ABI is the largest UK employer survey and, as its name suggests, it is conducted every year. The STES is a smaller more frequent enquiry covering less employers and in less detail. ABI data are released up to two years later than the year to which they refer. The survey provides detailed information, including data broken down to 4-digit SIC industries and disaggregated further by gender and full or part-time employment. It also provides enterprise information such as firm size, turnover and capital intensity, which the GLA does not include in its workforce series.

The ABI has been conducted since 1998 and has two predecessors: the Annual Employment Survey from 1982 to 1998, and the Census of Employment from 1971 to 1982. Some historical time-series prior to 1998 are constructed using earlier sources that have been revised to be consistent with newer sources.

Employee surveys

The LFS is the main official employee survey and has appeared quarterly since 1992. Whereas the ABI and STES ask questions about jobs, the LFS asks about employment. However, the LFS contains a wealth of information. Although its primary use is as a source of information about residential employment, it also records employees' usual place of work. For this reason, commuting data is generally constructed from the LFS by counting the number of people who work in one region and live in another.

3. Breaking down the data: geography, sectors, gender and work type

As well as aggregate workforce employment for London, both the ONS and the GLA provide breakdowns of workforce employment by a variety of geographical areas, industrial sectors, type of work (part or full-time) and gender.

Geographical breakdowns correspond to administrative boundaries. Continuous series on both a London-wide and borough basis are available for a number of periods, but their length and currency depends on the level of disaggregation. Ward-based data is subject to disclosure restrictions and is available for selected years between 1989 and 2000.

Data are not currently supplied based on other areas such as Skills Council areas or transport categories that cross borough boundaries, such as the congestion charging zone.

The data distinguish between head office and local unit. For example, employees in a local bank in Camden but with a head office in the City are recorded as working in Camden, not the City.

Breakdowns by industrial sector convey the primary activity of a firm. They convey no information about the occupation of employees (which can be found from the LFS employee survey). For example, a cleaner and a director who work in the same bank are both recorded as working in the finance and business sector.

4. Keeping track of change: boundaries and industrial classifications

Administrative boundaries have altered, although slowly, over the period covered by the GLA's data. Between 1971 and 1982, extensive changes created 103 new wards, bringing the total to 782.[2] Borough boundaries changed between 1993 and 1996, affecting some wards and creating two new wards. Finally, major revisions in May 2002 transformed ward boundaries with a net loss of 135 wards.

Industrial classifications have also moved. The 1968 definition of the Standard Industrial Classification (SIC(68)) was revised in 1980 and 1992, and the ONS has been phasing in a new classification from January 2003.

If analysts want to draw meaningful conclusions about trends over time, they must compare like with like. To keep track of job growth, job totals must refer to geographical boundaries and industrial sectors that have not changed over the period being analysed.

For example, data show 84,364 employee jobs in Barnet in 1982, rising to 112,541 by 1999 – a 33.4 per cent increase. However, the definition of Barnet changed in 1993 when the northern part of Arkley ward was removed from Barnet and from London. If the resulting loss of jobs in Barnet was treated on the same basis as, for example, an office closure, then real economic movement would be confused with statistical adjustments.

For this reason, employment data refers to administrative boundaries frozen in 1991. It is valid to say that employment in Barnet has risen by a third between 1982 and 1999, because the two numbers cited above refer to the same geographical area (Barnet in 1991). However, the statement '112,541 people were employed in Barnet in 1999' has to be qualified by an understanding that Barnet refers to 1991 boundaries and not 1999 boundaries, as does London in this context.

5. What happens when data is revised: official releases and their shortcomings

The ONS workforce jobs series are released in two stages, mirrored in the GLA's releases. First Releases, both national and regional, are produced monthly and provide up-to-date data derived from the STES. However, they lack detail. The first regional release only contains breakdowns by gender and by broad industrial sector for employee jobs. The national first release contains a more

[2] Counting the City of London, with its 25 small wards, as a single ward.

detailed industrial breakdown. The regional and national first releases are subject to subsequent revision. The Historical Supplement is released up to three years later and is seasonally adjusted and benchmarked to the ABI. The Historical Supplement contains the most detailed breakdown at national and regional level (by industry at 4-digit SIC level and by gender, age and type of work).

Backcasting

The ONS has adapted figures derived from the earlier Annual Employment Survey to produce a continuous series from 1982 constructed on ABI principles. This process is called backcasting. The ONS's workforce jobs series in the Historical Supplement incorporates an AES series from 1982 to 1995 and an ABI series running from 1995 to 2001. The first three years of the ABI series are derived from primary AES data.

This data is insufficient for the GLA group in the following respects:

1. The historical supplement arrives very late.
2. The existing series does not provide data before 1982.
3. Before 1995, the workforce series does not provide the level of detail required by the GLA.
4. The ONS acknowledges statistical weaknesses in the backcasting, which may produce trends that are apparent rather than real, particularly between 1995 and 1997.

GLA Economics takes these issues into account and produces its own workforce series which aim to meet the best currently available standards.

6. How often does the data change?

All data, even historical data, is subject to change. Subsequent discoveries, or changes in statistical policies, may mean a figure can be improved on. However, when this happens policies and analysis derived from the old data cannot be altered retrospectively. Therefore, there must be an audit trail that leads back to the original, unchanged data.There are three basic reasons for data revision, which affect the GLA's workforce series:

1. First release data is always corrected retrospectively when ABI data becomes available because it can be benchmarked to it. Historical and first release data are maintained as separate datasets. The earlier years of the first release should always be the same as the historical datasets.
2. A more systematic revision is likely as the 2001 census results are analysed. LFS estimates are being regrossed in line with more accurate knowledge about the population. [3] The self-employment component of the workforce jobs estimate is particularly likely to change. In addition, the census will provide a benchmark of workforce employment that is independent of the ABI and LFS, providing a basis against which they can be judged. This may lead to revisions in the employee data component of the workforce jobs estimate.
3. GLA Economics seeks systematic improvements in the quality of the workforce data available from official sources. This may lead to revisions incorporating enhancements that arise from this process.

[3] Regrossing (see Appendix A.2) refers to the statistical procedure used by the LFS to ensure the data from its samples accurately reflect the composition of the population, taking into account new information from the 2001 census.

GLA Economics will classify revisions to its datasets as they occur. When data is changed, the old version will still be accessible. Most data users will only want the latest and most current datasets, which may change periodically as a result of improvements.

7. The GLA's London workforce employment series

The GLA uses and publishes several employment datasets, some of which may appear to overlap. They are intended to meet a variety of needs which cannot be met from a single dataset. For example, first release data is very current but does not report the same amount of detail as the historical series. Similarly, there is a long-run dataset going back to 1971 but without a breakdown by gender or type of work. In general, there is a trade-off between the amount of detail in the data, and its length and currency.

The GLA publishes four sets of data, two of which are available quarterly and annually.[4] Three datasets are available publicly:

- first release workforce employment figures (quarterly)
- long-run employment dataset (quarterly and annual)
- detailed workforce employment dataset (quarterly and annual).

The fourth dataset, the ward-based employment series, is used by the GLA for in-depth analysis. The results are published in GLA Economics reports such as *Spreading* Success: *How London is Changing*.

First release workforce employment figures provide totals for employee jobs in London broken down into ten sectors. They are benchmarked to the latest ABI, currently 2001. They are almost identical to the ONS first release, with minor corrections on the basis of local and sectoral information. They are published on the GLA Economics extranet when *London's Economy Today* is released on the third Tuesday of each month.

The *long-run employment dataset* provides employee jobs for every quarter between 1971 and 2000. It is benchmarked to the ABI for 2000 and provides a breakdown for all London boroughs into 29 SIC categories. However, no information about self-employment, gender or job type is available. The dataset is available on the GLA Economics extranet.

Table 1: The GLA's London workforce employment series

Dataset name	Frequency	Period covered	Currency	Geography	SIC detail	Other detail
First release workforce employment figures	Quarterly	1982-present	Current	London	10	None
Long-run employment dataset	Quarterly	1971-2000	Historical	Borough	28	None
	Annual	1971-2000	Historical	Borough	28	None
Detailed employment dataset	Quarterly	1982-2001	Historical	Borough	28	Gender, part/full-time
	Annual	1982-2001	Historical	Borough	58	Gender, part/full-time
Ward dataset	Specific years only	1989, 2000	Historical	Ward	10	None

[4] The annual employment figure is the annual average of the quarterly figures. Quarterly figures are seasonally adjusted.

	years only					

Note: The period covered by the historical datasets will extend as data becomes available. The GLA Economics extranet has the most up-to-date data.

The *detailed workforce employment dataset* runs from 1982 to 2001 and provides the most comprehensive breakdown – the full set of 57 SIC(92) 2-digit industries, part and full-time employment, and gender. It is benchmarked to the 2001 ABI. The main adjustments in this series deal with complications from changing definitions of industrial sectors and geographical boundaries. The detailed workforce employment dataset is the most reliable and authoritative GLA source. It is independently benchmarked both to the ABI and its predecessors, and it is the original source of most historical employee data in the quarterly series. Appendix B describes the statistical techniques used to construct the series.

The *quarterly detailed workforce employment series* contains the same information as the long-run quarterly series, but over a shorter time-span and in more detail. It provides breakdowns by gender and part and full-time employment. On this basis, it calculates a derived figure for full-time equivalent (FTE), defined by the formula:

FTE employment = full-time employees + self employed +0.4* (part-time employees)[5]

The quarterly detailed workforce employment series is available on the GLA Economics extranet.

8. Quality assurance: selecting the data

Regional data comes from a number of sources. GLA Economics confines itself to commissioning and using data that is supplied externally. Four criteria are used to ensure the quality of the data:

1. The data must provide enough information to make informed planning decisions at borough, London and sectoral level.
2. It should provide a long enough time series to make inferences about long-term trends and breaks in trend.
3. It should be as close as possible to official sources so that results derived from the two sources can be compared. Adjustments should be made only when recognised inaccuracies are brought to light, or to provide additional information not found in the official data.
4. The methods used to construct the data should be transparent so that alternative assumptions can be applied.

While these are not the only criteria possible, they reflect the GLA's requirement that the data must provide a practical and robust basis for planning decisions. Given this primary requirement, and the implications of planning for a city the size of London, the data must conform to the highest attainable statistical standards.

GLA Economics pursues an active programme of continuous improvement both in official regional statistics and in the data supplied to it by third parties on the basis of these official statistics.

Comparing GLA data with data from other providers

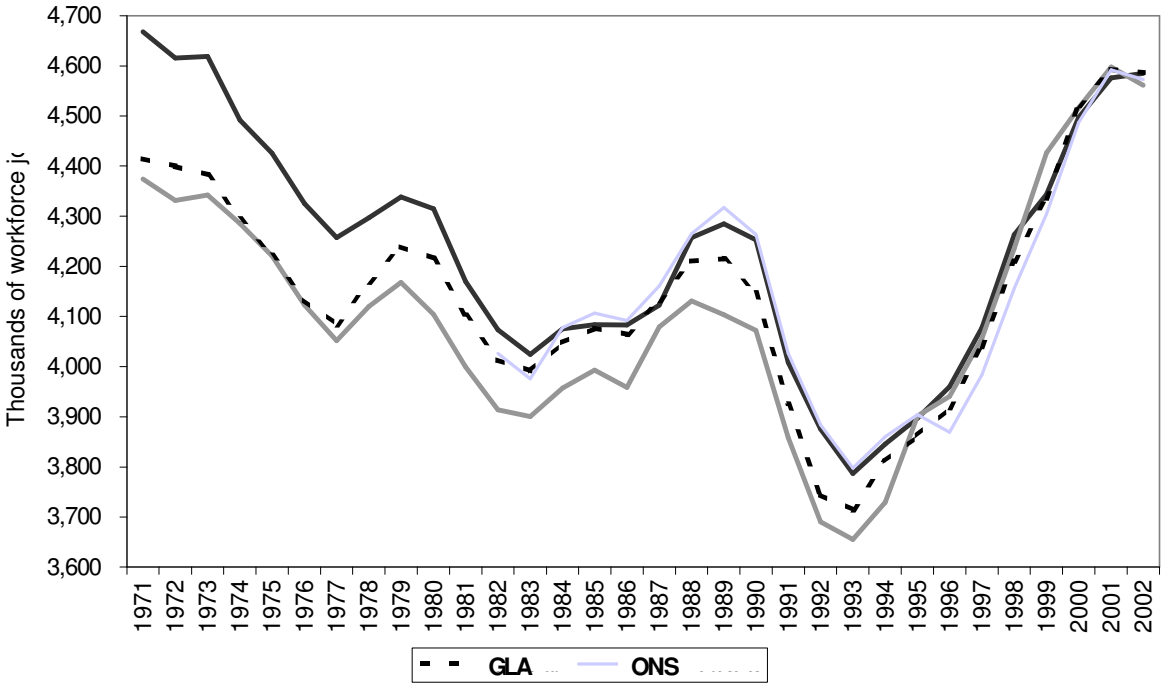
Chart 1 compares estimates of total London workforce jobs from the providers that currently supply this data. Chart 2 compares estimates of UK workforce jobs from the same providers.

[5] The coefficient 0.4 is employed by EBS and is based on the comparative hours worked by part-time and full-time employees.

The differences

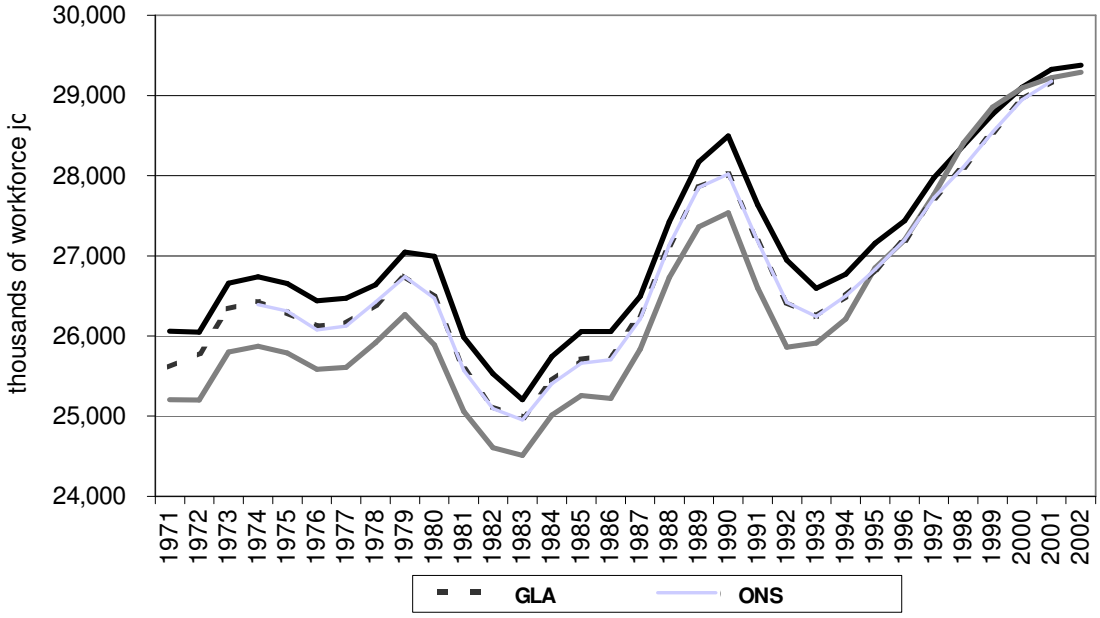
At UK level, the GLA series is identical to the ONS series. At a London level, the GLA series is significantly different from the ONS series between 1988 and 1996, but it still lies between the highest and lowest estimates. This is because of the differences between the backcasting methods used by the ONS and by the GLA to 'splice', or combine, series from the ABI and the AES. The ONS series contains a visible kink in 1996. No other data provider reproduces this kink, which GLA Economics believes is a statistical artefact arising from the ONS's splicing procedure. On these grounds, GLA Economics believes the data it provides most closely meets its selection criteria.

Chart 1: London workforce jobs



Note: Sources other than the GLA and ONS cannot be identified for copyright reasons. They are shown here to indicate where the GLA's figures lie in relation to the ONS and other existing providers.

Chart 2: UK workforce jobs



Note: Sources other than the GLA and ONS cannot be identified for copyright reasons. They are shown here to indicate where the GLA's figures lie in relation to the ONS and other existing providers.

9. Data accuracy

GLA Economics is responsible for maintaining economic data available to London's decision-makers and for raising its quality. Therefore, when data comes from a variety of sources it is critical to ask if the sources are consistent.

A simple test is possible for the LFS and the ABI, as they both provide independent estimates of workforce jobs. Although the LFS is primarily a source of data on residential employment, respondents are also asked to provide information on the place they work and its line of business.

This is relevant for a second independent reason. At present, estimates of commuting into and out of London are obtained from the LFS by counting the number of people who work in one region and live in another. Except for census years, there is no other source of this information.

The ONS published a national reconciliation exercise in 2002.[6] It found significant differences between estimates of workforce jobs in the two sources, but that differences between industry sectors broadly cancelled out. The ONS study concluded that the discrepancies were within acceptable limits of statistical error.

However, this is not true for London statistics. GLA Economics commissioned an independent study from Westminster University to examine the differences between the two surveys for London. The study compares official statistics for the number of London employee jobs in December 2000 from the LFS, which surveys employees, and the ABI, which surveys employers. It also compares how the two surveys report the growth rate in employee jobs between 1998 and 2000.

The conclusions are qualitatively significant and GLA Economics believes they limit the statistical reliability of economic analyses based on the available primary data. Notable differences between the two sources are:

- The ABI reports 589,500 more jobs in December 2000, a discrepancy of 14 per cent.

[6] H Ganson, 2002, 'Measuring jobs: levels, short-term changes and industry classification', Labour Market Trends, Technical Report.

- The ABI reports 679,800 more private sector service jobs,[7] a discrepancy of 36 per cent.
- Particularly large discrepancies occur in sectors such as Hotels, restaurants and catering.
- Labour and personnel recruitment shows a discrepancy of 127,400 jobs.

Moreover, significant problems exist at sector level for the national data. For example, at a national level, the error in private sector service jobs cancels out an opposite error in manufacturing. The error is not cancelled out in London because London has a much higher proportion of private sector service jobs and a much lower proportion of manufacturing jobs

The discrepancies in London – in total and in several sectors – are outside the limits of acceptable error.

[7] Comprising wholesale, retail, hotels, transport, communication, financial, real estate, renting and business services.

Table 2: Discrepancies between LFS and ABI estimates of London workforce jobs

	Difference (LFS – ABI)	Difference as % of LFS figure
London employee job total	-589,500	-14.0
Private sector service	-679,800	- 26.6
Public administration	+79,100	+7,5
Legal, accounting, auditing, tax	-60,000	-24.4
Wholesale	-69,800	-46.0
Retail trade	-53,500	14.2
(Memo: UK job total)	-311,000	-1.3

Growth trends also differ significantly, so it cannot be concluded that the surveys differ only by an absolute amount. Between 1998 and 2000, the gap between the two measures of London employee jobs increased by 56.6 per cent – from 375,000 to 570,400. Higher growth in private service sector employee jobs recorded by the ABI accounted for much of the difference. Overall, recorded growth rates between 1998 and 2000 were 2.3 per cent for the LFS and 7.2 per cent for the ABI. The differences are even greater in some sectors.

Table 3: Comparing ABI and LFS estimates of job growth

per cent change, 1998 – 2000

	LFS	ABI
Agriculture, hunting, forestry and fishing	82.1	0.0
Mining, quarrying, electricity, gas and water supply	-20.7	16.7
Manufacturing	-20.2	-1.1
Construction	13.0	20.6
Private sector services	4.6	10.7
Public sector service[8]	4.6	0.3
Total respondents	2.3	7.2

The following factors introduce differences but do not account for the discrepancy:

- People with more than one job: The study estimates double jobbing at 83,000 (2.2 per cent), an order of magnitude less than the discrepancy.
- Differences in definition (eg HM forces, youth training): This accounts for no more than 15,000 jobs.

[8] Comprising public administration, education, health and social work.

- Seasonal adjustment: the percentage adjustment at national level is no greater than 1 per cent.
- Job misallocation: employees may report their place of work differently than their employers. For example, agency workers may say they work where the agency sends them, but the agency may say they work at its office. The regional pattern in Table A4 (reproduced from Appendix B1 where this issue is discussed in more detail) shows this cannot account for the difference.

Table 4: LFS and ABI discrepancies in other regions

	ABI employee jobs	LFS[a] – ABI	Percentage error
East Midlands	1,741,500	-3,000	-0.2
East of England	2,241,700	33,200	1.5
London	4,060,700	-595,100	-14.7
North East	961,400	39,000	4.1
North West	2,846,000	51,800	1.8
Scotland	2,234,300	-34,400	-1.5
South East	3,663,500	-161,000	-4.4
South West	2,032,100	87,800	4.3
Wales	1,083,900	11,700	1.1
West Midlands	2,286,700	-6,900	-0.3
Yorkshire and the Humber	2,081,300	57,300	2.7
Total[b]	25,233,000	-519,600	-2.1

[a] *First Release*

[b] *Northern Ireland omitted*

10. Is the data reliable?

The University of Westminster study in Appendix A concludes that:

> The main focus of the report is on the London economy and the ½ million discrepancy between LFS and ABI estimates of employee jobs in the region. However, analysis of other regions suggests that the problems of measurement are similar across the country as a whole. Thus, while the capital, and to a lesser extent the South East region, have particularly pronounced negative LFS-ABI differentials, this would seem to reflect fundamental problems of comparability between the two survey's estimates of private service sector employee jobs – the capital simply has a greater concentration of these jobs, and therefore a more 'visible' problem.

In short, no single cause of the difference has been identified. The magnitude is so significant that further work is needed to find out where the weaknesses are and how they can be reduced or eliminated.

There is considerable room for improvement in certain data obtained from the ABI. GLA Economics will seek improvements in submissions to ONS quality reviews and the Allsopp review

on the quality of regional and other statistics. There is a strong case for additional or top-up surveys covering London and targeting the industries where the discrepancies are particularly significant. Moreover, the census results can provide a benchmark against which both sets of data can be checked.

Implications and recommendations

Regional and national authorities must make decisions and plans based on the best available data. GLA Economics has to make an interim judgement on which data should be used to estimate workforce employment, while at the same time attempting to estimate the risk associated with using it.

The ABI is used by most planning authorities as the principal source of national workplace job information. If the GLA group based its decisions – particularly those relating to London's spatial and transport strategies – on different sources of information, this would introduce a risk that its planning decisions would be inconsistent with those of other government and planning agencies.

Although the ABI is a relatively new survey, it has evolved from earlier surveys and incorporates statistical and survey procedures derived from previous experience and designed to overcome weaknesses in previous sources. For example, it distinguishes more rigorously between head offices and local units. It also includes procedures that crosscheck the ABI results against other sources such as the Inter-Departmental Business Register (IDBR).[9]

These are strong grounds to continue using the ABI as the standard source of data on workplace employment, and consequently to continue using the employee component of the workforce series derived from this source.

The primary function of the LFS is to provide information about the workforce on a residential basis. It is a high-quality survey that has developed over many years, and its quality assurance procedures are well developed in relation to its primary purpose. However, it does not apply checks on workplace information to the same degree of rigour as the ABI. For example, responses on place of employment are not cross-referenced against other sources of the same information such as the IDBR.

This suggests that until further information is available (in particular from the census), the ABI and not the LFS should be treated as the principal source of workplace employment information. Information from the LFS should be treated as supplementary.

Nevertheless, caution should be exercised when using ABI data. When the data are used to draw planning conclusions, the range of statistical error should be assessed. The assessments should take account of the discrepancies identified in this report. Particular care should be taken in sectors where the discrepancies are biggest:

- wholesale and retail trades
- restaurants, bars, canteens and catering
- legal, accounting, auditing and tax
- labour personnel recruitment
- industrial cleaning
- other business activities.

[9] It should be noted that the quality of the ABI results may be limited by the quality of the IDBR data, which is not subject to external scrutiny.

An exception: commuting

There are some cases in which LFS estimates of workforce employment can and must be used because of its structure, for example in determining the relationship between an industry and the occupational structure of its workforce.

For the GLA, figures on commuting are the most important as they can only be derived from the census and from the LFS. Since the census takes place every ten years, the LFS remains the primary source of information about commuting trends. Analysis of these trends suggests the LFS supplies stable and robust estimates of commuting and its trends.[10] However, because the absolute level of workforce employment from the LFS is so different from the ABI, a discrepancy arises between estimates of the supply of labour and the demand for it. It is not possible to say how much of this discrepancy reflects real underlying differences and how much is a product of statistical measurement error.

Statistics for workforce employment must be improved if governments and businesses are going to make consistent planning decisions which are robustly based and coordinate the decisions of adjoining regions.

[10] GLA (2003), *Working paper 1: Labour Market Balances and employment in the wider South East*, GLA, London

Appendix A: Reconciling differences between the estimates of London jobs gained from Employer Surveys and the Labour Force Survey[11]

by Dr Peter Urwin, Westminster Business School, University of Westminster
commissioned by GLA Economics

Executive summary

1. While a study carried out by ONS on a national level has identified no significant difference between the LFS and ABI estimates of UK employee jobs, this investigation identifies a large discrepancy for London, with the ABI recording approximately ½ million more jobs in the region than the LFS.

2. The sectors where this differential is most pronounced in London tend to be concentrated in the *Private Service Sector*. Specifically:

   i. Wholesale and retail trades

   ii. Restaurants, bars, canteens and catering

   iii. Legal, accounting, auditing and tax etc.

   iv. Labour recruitment and provision of personnel

   v. Industrial cleaning

   vi. Other business activities.

3. Between 1998 and 2000 the 'gap' between the two measures of London employee jobs increased by 52.1 per cent, from 375,027 to 570,417, with higher growth in *Private Service Sector* employee jobs, as recorded by the ABI, accounting for much of the difference.

4. Within this category of *Private Service Sector* jobs, no one sector seemed to be increasing its share of the differential, relative to others – though the more than doubling of the differential for the *Legal, Accounting, Auditing and Tax etc* sector was particularly pronounced.

5. While limitations of the data prevent detailed investigation, it would seem that many of the employee jobs that may be 'missing' from the LFS or spuriously added to the ABI could be characterised as low paid, more likely to be of a temporary nature and concentrated in smaller firms. Thus, the higher rates of turnover and 'casual' nature of these jobs may lead to discrepancies between the two surveys. In addition, there would seem to be some evidence that LFS-ABI differentials are particularly pronounced for female full-time employee jobs.

6. Finally, the observed differential in the capital, between ABI and LFS estimates of employee jobs, is larger than that seen in any other region of the country. However, analysis of other regions suggests that the problems of measurement are similar across the country as a whole.

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[11] Material from the Labour Force Survey (LFS) made available through the Office of National Statistics and the ESRC Data Archive has been used by permission of the Controller of HM Stationery Office. Access to the Annual Business Inquiry (ABI) was secured through the award of a Chancellor of the Exchequer's Notice.

Thus, while the capital, and to a lesser extent the South East region, have particularly pronounced negative LFS-ABI differentials, this reflects fundamental problems of comparability between the two survey's estimates of private service sector employee jobs – the capital simply has a greater concentration of these jobs, and therefore a more 'visible' problem.

A1. Background: measuring employment and jobs

The following discussion paper identifies a range of explanations that can possibly account for differences in the number of London (specifically employee) jobs estimated from the *Labour Force Survey (LFS)* and *Employer Surveys.*[12] The analysis follows a similar approach to the recent UK-level study carried out by the Office for National Statistics (ONS),[13] though the focus on regional differentials does necessitate some divergence from the original methodology. It is clear that one would expect employee job estimates from the two surveys to differ, as the Employer Surveys measure the number of jobs and the LFS, the number of people with jobs. However, the observed differences cannot be fully explained by factors such as double counting arising from the number of people with two or more jobs. Thus, in order to improve the accuracy of labour market statistics such as the Workforce Jobs (WFJ) Series, ONS has previously conducted studies that reconcile differences at the UK-level.[14] The project here carries out a similar reconciliation for the Greater London area.

Section A1.1 of this paper provides a general outline of the various sources of labour market data that are used to calculate employment estimates in the UK. Section A1.2 moves on to discuss the updating, regrossing and release dates of these datasets and provides a brief comment on two sources of WFJ Series estimates.

Section A2 begins with an outline of the process required to manipulate both the WFJ Series and LFS estimates of London employee jobs, so that the two measures can be compared. Having identified a large difference between the two estimates, Section A2.3 provides a detailed breakdown by industry group, in an attempt to isolate those sectors where the discrepancy between the two figures is greatest. Section A2.4 identifies the extent to which the concentration of this differential within certain sectors has changed over the period 1998 to 2000. Finally, Section A3 investigates a number of possible reasons for the variation in this differential amongst the capital's industry sectors.

A1.1 The workforce jobs series

The WFJ[15] Series is a measure of the total number of jobs in the UK, constructed by ONS using the following estimates:

- data on employee jobs taken from employer surveys

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[12] In line with the study carried out by ONS, we begin with a reconciliation of the estimated number of employee jobs in the Workforce Jobs Series, gained from the Annual Business Inquiry and the Short-Term Employer Surveys. However, we then move on to a more detailed analysis utilising ABI data.

[13] See, Ganson, H. (2002), 'Measuring jobs: levels, short-term changes and industry classification', Labour Market Trends, Technical Report, July; pp 355-365

[14] See also, Ganson, H. (2002), 'People and jobs: comparing sources of employment data, Labour Market Trends, Technical Report, January; pp29-32.

[15] The term 'Workforce jobs' is now used to describe these series, as the previous terminology, 'workforce in employment', was thought to be confusing.

- estimates of self-employment jobs taken from the LFS
- data on HM Forces gained from Ministry of Defence records
- estimates of Government-supported trainees, obtained from Department for Education and Skills administrative records.[16]

As can be seen, the LFS is the main source of figures for the estimation of self-employment jobs and numbers of self-employed individuals. Thus, the main 'conflict' in estimating total workforce jobs arises because of the differences between LFS and ABI estimates of employee jobs, even when reconciliation has been carried out. Therefore, as with previous surveys, while the LFS estimate of self-employment jobs is mentioned in this paper, the main focus is on the reconciliation of differences in the estimation of employee jobs. The following discussion in Sections A1.1.1 and A1.1.2 provides a brief description of the sources of data used to provide estimates of the employee and self-employed jobs components of the WFJ series.

A1.1.1 Employer surveys and estimates of employee jobs

In order to estimate the number of filled employee jobs, ONS conducts both the Annual Business Inquiry (ABI) and the Short Term Employer Surveys (STES). These surveys generate employee jobs estimates through a matching of the short-term movements seen in the range of Quarterly and Monthly STES to the annual 'Benchmark' gained from the ABI.

There are two types of STES. One set provides estimates of monthly changes in the number of employee jobs in production industries and the other, which is carried out quarterly, allows for the estimation of changes in the number of employee jobs in service industries. Approximately 28,000 service sector enterprises[17] are surveyed quarterly and 9,000 enterprises in the production industries are surveyed each month.

The ABI, first carried out in 1998, is conducted in two parts: one dealing with employment, the other with financial information. The employment inquiry covers more than two thirds of the UK economy, with UK Businesses sampled according to their employment size and industry sector. As an example of the typical sample size, during the 2000 Inquiry 69,600 businesses were surveyed. All employer surveys take a sample of businesses from the Inter-Departmental Business Register (IDBR). The IDBR holds details of all businesses that run a Pay-As-You-Earn (PAYE) tax system or register for Value Added Tax (VAT).

While the ABI now provides the relevant 'Benchmark' for the employee component of the WFJ series, this is a relatively recent development. For the years to 1993 the Census of Employment provided these figures, before the Annual Employment Survey, which provided the figures from 1995 to 1998. From 1999, a combination of data from the Annual Business Inquiry and the Annual Register Inquiry[18] have been used to generate estimates.

A1.1.2 The Labour Force Survey and estimates of self-employment jobs

As mentioned previously, the jobs measure of employment counts people with several jobs more than once. In contrast, the LFS is based on individual response and provides us with an estimate of the number of employees. The LFS can provide some information on the extent to which these two

[16] Those on Government-supported training programmes are included in the employee jobs estimate if they have a contract of employment. Those without a contract of employment are recorded as Government-supported trainees.

[17] Groups of local units under common ownership.

[18] The ONS Annual Register Inquiry is carried out to ensure the accuracy of the IDBR administrative record.

series differ[19] and this allows for the estimation of the number of self-employment jobs. It should be noted that this is not the same as the LFS estimate of self employment, as the self employment jobs total includes all those who record themselves as an employee in their first job, but as self-employed in their second job. In contrast, the LFS measure of self-employment records only those individuals whose main first job is as a self-employed person.

The LFS is based on replies from approximately 60,000 households (120,000 individuals) on a variety of socio-economic characteristics. The first LFS in the UK was conducted in 1973; it was carried out biennially until 1983; annually between 1984 and 1991 and quarterly from the spring of 1992. Statistics obtained from the LFS are weighted to reflect the situation in the UK as a whole, based predominantly on the findings of the most recent Census. Employment estimates gained from the LFS represent the number of individuals in the UK who have jobs.

A1.2 Series updating, regrossing and release dates

A1.2.1 ABI and the employee jobs component of the workforce jobs series

Following the 'official' launch of the ABI in April 2001 (publication and dissemination of data from 1998 and 1999) and subsequent consultation, revised ABI data were published in September 2002, and the employee component of the WJF series benchmarked to these new totals. Further to this, on 18 December 2002 ONS published 2001 ABI data for the first time, together with revised 'provisional' estimates for the 2000 inquiry, initially released the previous year. As a result of these releases, estimates of the employee jobs component of the WFJ series in December 2000 increased by 83,000, and the level at the end of 2001 by a further 70,000. Such benchmarking is carried out annually with the results released in December. Thus, the recently released ABI data for 2001 is provisional and will be subject to revision in December 2003, when the provisional 2002 ABI data will be released and the WFJ series benchmarked accordingly.

A1.2.2 LFS and the self-employed jobs component of the workforce jobs series

As mentioned previously, the LFS provides estimates of self-employment jobs in the workforce jobs series and these data are weighted according to the most recent estimates of the population from four different sources:

- the decennial Census of Population
- annual mid-year population estimates (MYEs)
- national population projections (produced every two years)
- subnational projections (produced every two years for each England and Wales).

The LFS uses a combination of these estimates and projections and, as a result, it is often necessary to regross the LFS in order that the data reflect the most up-to-date population estimates. The last LFS regrossing was completed in April 2000 and was based on 1998 MYEs and 1996-based population projections. However, the findings from the 2001 Census have necessitated a revision of these previous estimates.[20] A full reweighting of all Labour Force Survey (LFS) series and

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[19] The LFS records the number of individuals who have a second job, but does not collect information on the extent of third and subsequent jobs – a point that is discussed in more depth later in this report.

[20] The results of the 2001 Census indicate that recent UK population, and therefore employment, estimates have been approximately one million too high. The revised estimates suggest that 27.7 million people were employed in the UK in summer 2002, whereas previously the figure was believed to be 28.5 million. Thus, it is now thought that employment grew by 2.2 million between 1992 and 2002, compared to a previous estimate of 2.8 million (Source: ONS).

databases are scheduled to be completed in summer 2003 – significantly influencing the WFJ estimates of self-employment jobs gained from the LFS.

In the meantime, the current WFJ series are based on interim LFS estimates of self-employment jobs and the effect of these interim re-weightings has been to remove 130,000 jobs from the June 2002 estimates of the self-employed jobs component of the WFJ series, with a steady decline in the re-adjustment back to zero in June 1981.[21] These are, however, interim re-weighted figures and during the production of this paper, the process of regrossing continues. The interim revised LFS figures, which go back to 1984, were published in April 2003.

In addition to the impact of any regrossing, LFS estimates of self-employment jobs are also affected by the annual seasonal adjustment review of the LFS (though the 2002 review suggested no significant changes[22]). Furthermore, the introduction of a new Standard Occupational Classification (SOC) in 2000 has changed the way that the self-employed are dealt with and this is likely (in November 2003) to have a significant impact on the estimated figures.

A1.2.3 The first release and regional data

Clearly the above changes will have a significant impact on the current data-holdings of many institutions and also the findings of the present study. However, as mentioned in the original proposal to the GLA, while the exact figures produced in this report are liable to revision, the general findings are likely to remain relevant. Furthermore, it should be noted that, in addition to the above, there are other factors to consider when attempting to obtain the most accurate Regional Labour Market data. Here is a brief summary:

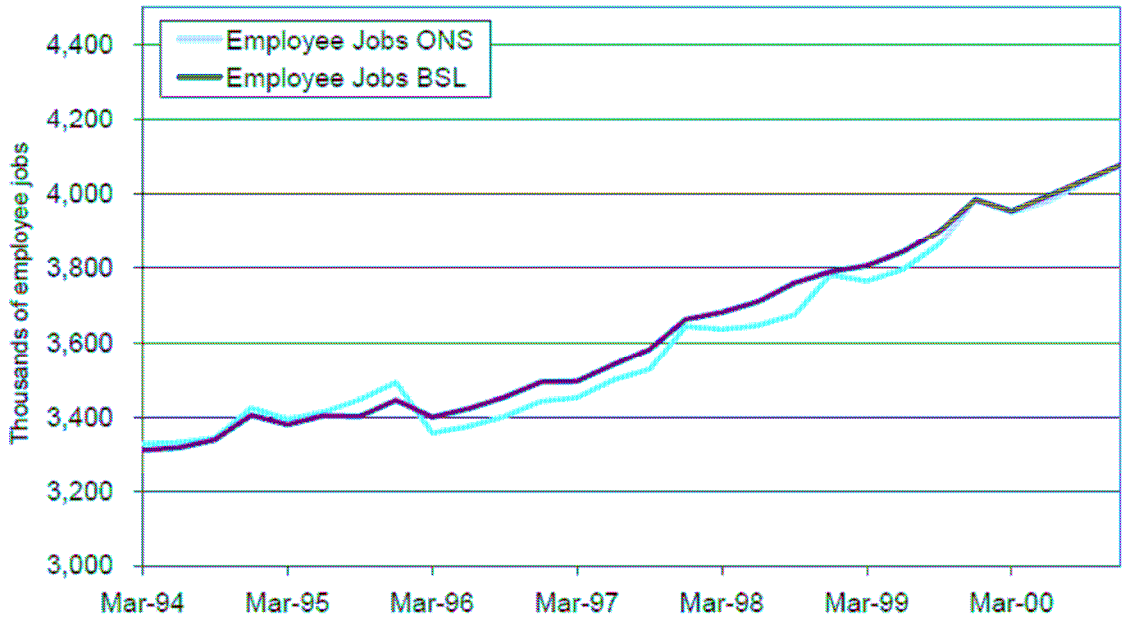
- Each month, ONS produce the Labour Market Statistics First Release (quarterly data). The re-benchmarking and regrossing described above has clear implications for the release of such data and estimates of the WFJ series. This is not so much of a problem for those interested in estimates at the national level, but presents significant problems when one wishes to gather a consistent historical series for the regions.
- Specifically, together with the Labour Market Statistics First Release, ONS produce an (annual) Historical Supplement (for data at a national level) which takes into account changes to the historical series resulting from the reviews described previously – changes to the calculation of grossing factors or seasonal components often have implications for previous estimates in a particular series.
- For the WFJ series, while the First Release (and Historical Supplement) contains WFJ by sex, industry etc it does not have a regional breakdown. This regional breakdown is provided in the Regional First Release that is, as with the national first release, produced each month. It is clear that, following any re-benchmarking, these regional data may need updating historically. However, there is no Regional Historical Supplement published (though revised data are usually released for the last two or three years) by ONS. Therefore, it is our understanding

[21] For more detail, see Richardson, I. and Ganson, H. (2002), 'Revisions to workforce jobs and comparison with Labour Force Survey jobs', article accompanying the December 2002 Labour Market Statistics First Release, ONS.

[22] The seasonal adjustment process identifies and removes the seasonal component from a time series and isolates the underlying trend. ONS currently use the X-11 ARIMA program for seasonal adjustment. In order to identify and remove variations associated with the time of year, the program decomposes the original series into trend, seasonal and irregular components. Additive, as opposed to multiplicative, models are utilised for all the seasonally adjusted LFS series as the magnitude of the seasonal factors is independent of the trend (Source: ONS)

that, in order to gain a fully updated and consistent series for the past three decades one would have to ask ONS to provide a tailored analysis following each review.

Chart A1: Estimates of London employee jobs



A1.2.4 Estimates of London employee jobs

In addition to the above considerations, we comment on the GLA's historical series and the discrepancy between Experian Business Strategies and ONS estimates of London Employee Jobs. The following chart sets out the figures supplied to the GLA by Experian Business Strategies[23] which differ slightly from the most recent estimates supplied by ONS.[24]

Given the preceding description of the various impending changes and those already taking place, there is likely to be some discrepancy between the estimates of London Jobs from various agencies. However, in addition, the switch from the use of the Annual Employment Survey (AES) to the ABI (described in Section A1.1.1) increased the estimate of total workforce jobs by around one million and necessitated a large degree of re-benchmarking. From our reading of the methodological literature, it would seem that Experian Business Strategies and ONS have differed slightly in their approaches to the inconsistencies arising from this discontinuity and this is likely to explain the differences during the period of transition from AES to ABI Benchmarking, covering the years 1995 to 1999.

However, further investigation is beyond the remit of this report and we would suggest that the GLA needs to commission additional work if they wish for a definitive answer.

Finally, it should be noted that the change from AES to ABI benchmarking also served to reduce the (unexplained) discrepancy between LFS and WFJ estimates. However following this, the results of the LFS interim re-weighting based on the 2001 Census, have reintroduced a large gap between the two series. Thus, before the introduction of the ABI, the WFJ estimate was approximately one million below the LFS estimate and the introduction of the ABI reduced the (unexplained discrepancy) to a figure which was seen to be (at a national level) statistically insignificant. The

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[23] The data used here are those supplied to WBS by the GLA on 25 October 2002.

[24] Supplied by the Earnings, Employment and Productivity Division, ONS, February 2003.

present study is carried out using LFS data, ABI data and WFJ figures which correspond to this situation where there exists an insignificant unexplained differential between the employee jobs measures at a national level.

Following the reweighting of the LFS in response to the findings of the 2001 Census, initial indications are that the workforce jobs estimate will be 600,000 to 800,000 higher than the LFS estimate of employee jobs at a national level. As discussed in Section A1.2.2, it is not possible at present to analyse LFS data which take into account the findings of the 2001 census. Thus, the present study is carried out at the point where the discrepancy between LFS and WFJ estimates is less than can be expected in the future. Thus, on release of the re-weighted LFS data some time after Summer 2003, it is suggested that the GLA consider an updating of the present report.[25]

A2. Differences between LFS and WFJ measures of London employee jobs

Having provided some background to the present analysis, this section of the report sets out the process involved in deriving estimates of London employee jobs, from both the LFS and the Employer Surveys, which can then be compared. In keeping with the analysis carried out on a national level by ONS, we begin the analysis using figures for all employees gained from the Labour Force Survey and the estimate of employee jobs in the Workforce Jobs Series. The latter of these is gained primarily from benchmarking to the ABI and matching to the short-term movements identified in the STES.

In attempting to reconcile the measures of London employee jobs from the LFS and WFJ Series, one has to first consider the regional frame for analysis. Both the WFJ (ABI) and LFS allow for the identification of Government Office Regions (GORs) and, therefore, the London GOR is our frame for analysis. However, it should be noted that the ABI method of sampling at the level of 'enterprise' may lead to misreporting of the number of employee jobs at a particular 'local unit' and this may complicate regional comparisons between the two series. This element of the investigation is discussed in Section A3, where an attempt is made to explain the differences in the two measures identified in Section A2.

Putting to one side the possibility of reporting inaccuracies, Section A2.1 sets out the process of deriving the LFS estimate of London employee jobs from a measure of the number of employees. Section A2.2 then takes the figure for London employee jobs reported in the WFJ Series and manipulates this to arrive at an estimate which can be compared to the LFS measure. Having identified a large difference between the two measures of London employee jobs, Section A2.3 identifies the industrial sectors where this differential is most pronounced. Finally, before undertaking a discussion of the possible reasons why the differential is particularly pronounced for certain sectors of the London economy, Section A2.4 identifies the extent to which concentration of this differential in certain sectors experienced change between 1998 and 2000.

[25] An ONS investigation into regional variability of ABI and LFS job estimate differentials (and the possible explanations for any observed variance) will most likely begin during Summer 2003, with results reported towards the end of 2003.

A2.1 Estimating London employee jobs from the LFS

In line with the analysis carried out at a national level by the ONS, we begin with a study of the Quarterly Labour Force Survey, December 2000 to February 2001 (Winter 2000/01).

Table A1: Calculation of LFS estimate of total London employee jobs

First job in London as an employee	3,396,652
(add) Second job in London as an employee	74,561
(subtract) HM forces working in London[26]	5,630
First estimate	3,465,583
(add) Estimate of third and subsequent jobs	9,037
(add) Estimate of those employees in communal establishments	9,489
Estimate of total employee civilian jobs (seasonally unadjusted)	3,484,109

Source: Labour Force Survey, Winter 2000/01

Table A1 sets out the process of calculation for the LFS estimate of employee jobs. The first figure presented is the (weighted) LFS estimate of all those who record that their first (or principle) form of employment is working in London as an employee. We then add to this the number of individuals who report that they have a second employee job in the capital. It is interesting to note that, as one might expect, this figure of 74,561 is mainly made up of those who have a first job in London (61,135), with a much smaller proportion (13,426) having a first job outside of the London area. Adding all individuals who record that they have a first or second job in the capital and subtracting the LFS estimate of London's HM forces employees, gives us our *First Estimate* of 3,465,583. However, this figure needs further refinement.

As mentioned previously, the LFS only asks individuals whether they have a second job and does not record the extent of third, fourth or subsequent jobs. Therefore, we need to add to our *First Estimate* if we wish the LFS figure to better reflect the number of employee jobs, rather than simply the number of first and second employee jobs. On the National level it is estimated (2000 Family Resources Survey) that this figure is somewhere in the region of 100,000 additional employee jobs. However, there is limited information on how this figure is estimated and no detailed regional analysis has been carried out. Therefore, in order to obtain an estimate for the London region, we adopt the following methodology.

For the UK as a whole, the *First Estimate* for total civilian workforce jobs taken from the LFS December to February 2001 is 25,441,120, with 834,963 of these being second employee jobs. Thus, on a national level, we can estimate that 3.3 per cent of civilian workforce employee jobs are second jobs – a much higher proportion than the 2.2 per cent of employee jobs in the capital. There are many reasons why we might expect to observe this lower figure for London but, given that this is the case, one may expect the number of third, fourth and subsequent employee jobs (recorded in the LFS) to be similarly lower for London.

Firstly, if we assume that across the country as a whole the distribution of third and subsequent jobs is the same as that for all jobs, we might expect to find 13,555 of these additional jobs to be filled by

[26] Cell-size unreliable.

those working as employees in the capital.[27] However, we also need to weight this to account for the fact that the LFS identifies fewer of the capitals employee jobs as being second jobs and, therefore by assumption, third and subsequent jobs are likely to be less extensive. Thus, the estimate would be 13,555 if London had a similar distribution of second jobs to that seen in the country as a whole, but accounting for the lower incidence of second jobs in the capital forces us to lower this figure to 9,037.[28]

In addition to this manipulation of our first target figure, we also need to account for the fact that the LFS only surveys those living in private households and NHS accommodation. Therefore, we require an estimate of the number of London employee jobs held by those who live in communal establishments. In a survey carried out by ONS in the autumn of 2000 it was estimated that, for the UK as a whole, this figure was 70,000.[29] However, no regional figures are supplied and therefore, we take a similar approach to that adopted to account for the number of third and subsequent jobs in London.

The ONS report does point out that individuals in communal establishments are, for instance, older than the LFS population and one could argue that such factors should be taken into consideration when calculating an estimate for the London region. However, given that the figure is relatively small, the costs of such an exercise would not seem to be worth the (very small) increase in accuracy. Therefore, we simply calculate the proportion of employee jobs held by those in communal establishments as a proportion of the total for the UK, assuming that the distribution follows a similar pattern to that for all civilian employee jobs.[30] This final calculation provides us with an approximate estimate of the number of total London civilian employee jobs, as recorded by the LFS.

A2.2 Estimating London employee jobs from the employer surveys

We now wish to compare the previous estimate of total civilian employee jobs gained from the LFS, with the estimate taken from the Workforce Jobs Series for March 2001, which has been benchmarked to the December 2000 ABI.[31]

Table A2 sets out the process of manipulation for our first headline figure for all civilian employee jobs. Firstly, we need to account for the fact that the IDBR does not record the extent of employee jobs in either private households or extra-territorial organisations and bodies. The figures quoted in the table for London are taken from the Labour Force Survey December 2000 to February 2001. In addition, we also need to account for the fact that the employer surveys only include homeworkers if they have a formal contract of employment. This excludes those individuals who are working from home and are on piece rates. However, further investigation identifies a negligible number of individuals who fit this description for the London area. Thus, while there are 28,522 individuals

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[27] London accounts for 3,465,583 of total national civilian employee jobs (25,441,120) or 13.555 per cent of the total. Assuming that third and subsequent jobs are similarly distributed, then one may expect London to account for 13.555 per cent of the 100,000 third and subsequent jobs.

[28] Weighting the 13,555 figure by (2.2/3.3) to account for the lower incidence of second jobs in the capital.

[29] Gatward, R., Lound, C. and Bowman, J. (2002), 'A pilot study of people living in communal establishments', *Labour Market Trends*, Technical Report, March; pp 141-149.

[30] 13.555 per cent of the estimated 70,000 employee jobs nationwide.

[31] As with the national survey, we use figures for WFJs from March 2001, which are benchmarked to the 2000 ABI employee jobs estimate for London of 4,014,939, as this figure is most appropriate for comparison with the LFS figure for the period to February 2001.

who record themselves as employees working from home in their first or second job, less than 1,000 of these are in occupations which are associated with piecework.

Table A2: Calculation of WFJ estimate of total London employee jobs

All Civilian employee jobs (as published)	4,036,000
Jobs omitted from the WFJ figure	
First or second jobs in private households	12,588
First or second job in non-UK organisation[32]	8092
Home-workers on piece rates	negligible
Estimate of total employee civilian jobs (seasonally unadjusted)	**4,056,680**

Source: Earnings, Employment and Productivity Division, ONS, February 2003

As can be seen from Tables A1 and A2, we have identified a difference of 572,571 between our (seasonally unadjusted) figures for the LFS and WFJ estimates of London employee jobs. This differential is particularly large when compared to the 311,000 difference identified on a national level by the previous study (for the seasonally unadjusted figures). Clearly, the methodology adopted to calculate our figures for individuals in communal establishments and the number of third and subsequent jobs is less than satisfactory. Furthermore, we need to take account of the differential seasonal adjustment process for these two series.

However, even if one were to assume a seasonal adjustment factor of one percent (approximately twice the percentage adjustment seen on a national level) for both the WFJ series and the LFS, the difference between the two series would still be approximately half a million jobs.[33] In contrast, on a national level, the accounting for seasonality reduces the 311,000 differential to a level which is statistically insignificant. In addition, if one were then to assume a large margin for error in our calculation of employees living in communal establishments and the number of third and subsequent jobs, we would still be faced with a discrepancy greater than 450,000 jobs. Before beginning a discussion of the possible reasons for such a large differential (Section A3) it is first necessary to identify those areas of the economy where this differential is concentrated. It should be noted that in all of the following tables, a cell size of less than 10,000 is unreliable, but all figures have been retained to aid transparency.

A2.3 Differences by industry for London, Winter 2000/01

Table A3 identifies the distribution of London employee jobs by broad industry sector for our *First Estimate* taken from the LFS, and compares this to the industry distribution of employees according to the WFJ Series. It is clear that the category of Wholesale, Retail etc, which can be characterised as the *Private Service Sector Industries*, accounts for the majority of the observed difference between our two measures of employee jobs. While this is in line with the findings of the study carried out by ONS, the magnitude of this effect, and the extent to which it dwarfs the differentials identified in other sectors, is particularly pronounced for London. Thus, on a national level, while the *Private Service Sector* exhibits a differential of approximately minus 2 million employee jobs,

[32] Cell-size unreliable.

[33] Adding 34,841 to the LFS figure of 3,484,109 and reducing the WFJ figure of 4,056,680 by 40,567 still leaves a difference of 497,163 jobs.

the positive figure for manufacturing is over half a million and for public sector employees plus quarter of a million.

Given the findings of Table A3, it would seem reasonable to focus further analysis on the private service sector industries, to obtain detailed information on exactly which sub-sectors exhibit the largest discrepancy. Thus, Table A4 sets out the distribution of employee jobs at a much more disaggregated level of industry classification. Readers will note that we have now moved from a focus on the WFJ figure to an analysis of the ABI in order to facilitate comparison with the LFS data at this much more disaggregated level.[34]

Table A3: Comparison of LFS and WFJ series estimates of London employee jobs by broad industry group[a]

	First estimate LFS employee jobs [b]	Employee jobs (WFJ)[c]	Difference (LFS-WFJ)
Agriculture, hunting, forestry and fishing	7,638	4,000	3,638
Mining, quarrying, electricity gas and water supply	16,696	14,000	2,696
Manufacturing	274,194	282,000	-7,806
Construction	145,933	129,000	16,933
Wholesale, retail, hotels, transport, communication, financial, real estate, renting and business activities	1,881,191	2,555,000	-673,809
Public administration, education, health, social work etc.	1,138,441	1,051,000	87,441
Total respondents	3,464,093	4,036,000	-571,907
No answer	1,490	0	1,490
Total civilian workforce jobs	3,465,583	4,036,000	-570,417

[a] *1992 Standard Industrial Classification*

[b] *First and second jobs, not in the armed forces*

[c] *Civilian employee jobs (as published)*

Clearly, Table A4 contains many categories that add little to our explanation of any difference and therefore the final two columns are included to provide a simple indicator. Before noting those sectors which add most to our explanation, it is useful to eliminate the more obvious differences which can be characterised as the result of employer and employee 'disagreement' as to the exact specification of their industry sector. Specifically, the middle sections of the table which identify the only positive differentials (ie the LFS estimate is actually larger than the ABI figure) are likely to simply represent small discrepancies between the employer and employee perception of the industry group. Thus any differences in Table A4 from *Scheduled Air Transport* down to *Letting*

[34] This introduces a small discrepancy between the total differential between LFS and WFJ figures for the private service sector in Table A1.3 (673,809) and the total LFS-ABI figure given in Table A1.4 (684,809).

Own Property are cancelled out, with an approximate 90,000 positive difference almost exactly offset by a 90,000 negative differential.

Table A4: Comparison of LFS and ABI estimates of London employee jobs by detailed private service industry group

Detailed industry group	Total LFS jobs, first estimate	ABI employees	Difference (LFS-ABI)	Positive effect	Negative effect
Sales of motor vehicles, parts, fuel	14,697	35,600	-20,903		**
Motor vehicle repair	15,158	17,000	-1,842		
Wholesale on fee or contract basis	10,500	12,700	-2,200		
Wholesale (not waste, scrap etc)	81,536	150,800	-69,264		*******
Wholesale waste, scrap etc	957	28,900	-27,943		***
Retail trade	321,881	375,300	-53,419		*****
Repair personal, household goods	3,454	2,700	754		
Hotels, motels	33,341	48,100	-14,759		*
Camping sites, short stay accommodation etc	1,652	2,100	-448		
Restaurants	59,848	112,500	-52,652		*****
Bars	15,639	52,400	-36,761		****
Canteens, catering	19,535	49,700	-30,165		***
Transport via railway	9,754	16,900	-7,146		
Other land transport	65,783	65,200	583		
Transport via pipelines	1,145	0	1,145		
Sea, coastal water transport	3,108	2,300	808		
Inland water transport	891	300	591		
Scheduled air transport	19,465	32,300	-12,835		*
Non-scheduled air transport	4,199	800	3,399		
Cargo handling, storage	12,851	10,400	2,451		
Other supporting transport activities	46,674	18,900	27,774	***	
Travel agencies, orgs, guides etc	27,817	34,700	-6,883		
Other transport agencies	21,296	19,300	1,996		
Post, courier activities	55,215	57,900	-2,685		
Telecommunications	51,892	59,000	-7,108		
Monetary intermediation	176,164	162,700	13,464	*	
Other financial intermediation	55,235	38,100	17,135	**	
Insurance, pension (not Social Security)	13,189	39,300	-26,111		***
Other financial (not insurance or pensions)	44,409	61,300	-16,891		**
Other insurance, pension activities	64,126	41,100	23,026	***	
Real estate activities (own property)	33,416	25,400	8,016		
Letting own property	6,929	35,600	-28,671		***
Real estate agency, management	36,621	36,100	521		

Detailed industry group	Total LFS jobs, first estimate	ABI employees	Difference (LFS-ABI)	Positive effect	Negative effect
Car rental	4,314	5,000	-686		
Other transport rental	469	1,700	-1,231		
Other machine, equipment rental	6,997	10,700	-3,703		
Personal, household equipment rental	2,034	4,600	-2,566		
Computer hardware consultancy	886	4,000	-3,114		
Computer software consultancy	67,089	62,500	4,589		
Data processing	1,071	16,000	-14,929		*
Data base activities	2,365	3,000	-635		
Repair of office, computer equipment	5,537	4,500	1,037		
Other computer activities	22,964	34,600	-11,636		*
Research, natural sciences, engineering	16,690	12,600	4,090		
Research, social sciences, humanities	1,946	1,200	746		
Legal, accounting, auditing, tax, etc	185,642	245,600	-59,958		******
Architecture, engineering, technical consultancy	56,625	59,100	-2,475		
Technical testing, analysis	3,969	3,800	169		
Advertising	35,513	38,200	-2,687		
Labour, personnel recruitment	53,908	180,300	-126,392		**********
Investigation, security activities	26,741	33,300	-6,559		
Industrial cleaning	23,612	92,600	-68,988		*******
Other misc business activities	34,442	107,400	-72,958		*******
Total	1,881,191	2,566,000	-684,809		

Source: Labour Force Survey, Winter 2000/01 and Annual Business Inquiry, 2000: 1992 Standard Industrial Classification

Having removed these sectors from consideration, we are left with the following areas that would seem to account for the majority of the divergence between our two measures of London employee jobs:

- Wholesale and retail trades
- Restaurants, bars, canteens and catering
- Legal, accounting, auditing and tax etc
- Labour personnel recruitment
- Industrial cleaning
- Other business activities.

Before moving on to provide a detailed discussion of the possible reasons for such differential reporting in these sectors, it is useful to gauge the extent to which these areas continued to constitute the main reason for the observed discrepancy between 1998 and 2000.

2.4 Differences by industry for London, 1998 – 2000

This section deals with change over the period 1998, 1999 and 2000.

Adopting a similar approach to that seen in the previous section, Tables A5 and A6 set out the difference between WFJ Series and LFS measures of London employee jobs, as recorded by broad industry group, from 1998 to 2000. Before beginning this discussion it is interesting to note that for the country as a whole, between 1998 and 2000 the WFJ measure increased by 3.3 per cent from 24,975,000 to 25,809,000. In contrast, during the same period the LFS figure[35] grew by only 2.9 per cent from 24,699,651 to 25,441,000.[36] This differential rate of increase served to widen the gap between the two measures from 275,349 to 368,000.

As we can see from Tables A5 and A6, London exhibits a similar difference in growth rates, but with a magnitude of effect that is much more pronounced. From Table A5 we identify a 7.2 per cent increase in the rate of growth of employee jobs as measured by the employer surveys, but only a 2.3 per cent increase in the LFS measure over the same period. Table A6 shows how this differential rate of growth has increased the gap between the two measures by 52.1 per cent, from 375,027 to 570,417.

There is clearly a worrying divergence in the two measures over the period of study, the majority of which can be attributed to the measurement of private service sector employees. Thus, while there are clear divergent trends in other sectors of the economy, the employer surveys identify an increase of 10.7 per cent in the estimated number of employee jobs in the private service sector, compared to an LFS figure of only 4.6 per cent. As a result, the most striking aspect of Table A6 is the increasing difference between the WFJ and LFS measures of private service sector employees, which between 1998 and 2000 increased by 32.3 per cent, or an addition to the differential of 164,314 employee jobs.

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[35] Counting first and second jobs of civilian employees.

[36] The industry groups for the LFS (in 2000/2001) for the original ONS study add up to 25,324,000, but this does not count non-respondents.

Table A5: Comparison of LFS and WFJ series estimates of London employee jobs by broad industry group+

Industry Division	LFS Dec 98 - Feb 99*	LFS Dec 99 - Feb 00*	LFS Dec 00 - Feb 01*	% change 98 - 00	WFJ March 99#	WFJ March 2000#	WFJ March 2001#	% change 1998 - 2000
Agriculture, hunting, forestry and fishing	4,194	7,507	7,638	82.1	4,000	3,000	4,000	0.0
Mining, quarrying, electricity gas and water supply	21,058	16,337	16,696	-20.7	12,000	13,000	14,000	16.7
Manufacturing	343,476	300,331	274,194	-20.2	285,000	292,000	282,000	-1.1
Construction	129,134	146,076	145,933	13.0	107,000	135,000	129,000	20.6
Wholesale, retail, hotels, transport, communication, financial, real estate, renting and business activities	1,798,505	1,844,892	1,881,191	4.6	2,308,000	2,460,000	2,555,000	10.7
Public administration, education, health, social work etc	1,088,608	1,117,067	1,138,441	4.6	1,048,000	1,048,000	1,051,000	0.3
Total respondents	3,384,974	3,432,210	3,464,093	2.3	3,764,000	3,951,000	4,036,000	7.2
No answer	3,999	1,681	1,490	-	-	-	-	-
Total civilian workforce jobs	3,388,973	3,433,891	3,465,583	2.3	3,764,000	3,950,000	4,036,000	7.2

+ *1992 Standard Industrial Classification.*
**First and second jobs, not in the armed forces: 'First Estimate'.*
#Civilian employee jobs (as published).
Source: Labour Force Survey, Winter 1998/99, 1999/2000 and 2000/01 and Workforce Jobs Series March, 1999, 2000 and 2001.

Table A6: Differences between LFS and WFJ estimates of London employee jobs by broad industry group (LFS-WFJ)*

Industry division	1998/99	1999/2000	2000/01	% change 1998 - 2000
Agriculture, hunting, forestry and fishing	194	4,507	3,638	1,771.2
Mining, quarrying, electricity gas and water supply	9,058	3,337	2,696	-70.2
Manufacturing	58,476	8,331	-7,806	-113.3
Construction	22,134	11,076	16,933	-23.5
Wholesale, retail, hotels, transport, communication, financial, real estate, renting and business activities	-509,495	-615,108	-673,809	32.3
Public administration, education, health, social work etc	40,608	69,067	87,441	115.3
Total respondents	-379,026	-518,790	-571,907	50.9
No answer	-	-	-	-

Total civilian workforce jobs	-375,027	-516,109	-570,417	52.1

Source: Labour Force Survey, Winter 1998/99, 1999/2000 and 2000/01 and Workforce Jobs Series March, 1999, 2000 and 2001. Using figures from Table A5.

Before moving on to analyse this sector in more detail, it is interesting to note other characteristics of these tables. In contrast to the situation on a national level, we observe for London a large reduction in the differential for the manufacturing sector, a consequence of the fall in LFS and rise in WFJ series figures for the first two years being studied. Also, the extent to which the LFS estimate of employee jobs in the public sector is actually higher than the WFJ measure has increased quite significantly, by more than 100 per cent of the original differential. However, having commented briefly on these elements, it is clear that they add little to our overall explanation of any divergence and therefore, Tables A7, A8 and A9 set out the detailed activities of those employee jobs recorded as being in the private service sector between 1998 and 2000.

In a similar approach to that taken in the previous section, Tables A7, A8 and A9 have two final columns, which are there to remind readers of those sectors that add most to our explanation of the differential between LFS and ABI figures for Winter 2000/01. Given that much of the increase in divergence between the two series results from lower recorded rates of LFS growth, it is to be expected that Table A7 identifies little change in the figures for those groups that contribute significantly to our explanation. The exception would seem to be the Labour Recruitment and Provision of Personnel sector, which the LFS records as having experienced a 41.8 per cent increase in employee jobs. However, this adds only approximately 15,000 jobs and, as Table A8 shows, the 26.3 per cent growth recorded by the employer surveys increases the number of jobs in this sector by approximately 37,000, raising the differential identified in Table A9 by 20.6 per cent.

More importantly, over the three-year period under study, the LFS identifies an actual fall in the figures for many of our sectors. Thus, Table A7 shows that the number of employee jobs recorded by the LFS in the areas of industrial cleaning, wholesale, restaurants, canteens and other miscellaneous business activities actually fell during this period. In contrast, Table A8 identifies an increase in recorded employee jobs in the areas of industrial cleaning, restaurants, canteens and other miscellaneous business activities.

Having identified a number of sectors and noted their differential rates of change, the conclusion that must be drawn from Table A9 is that no one sector can account for the increasing differential over the years studied. Thus, it would seem that, while there are variations in the rates of growth of the differential across each sector, no one area would seem to be increasing its share relative to the others – though the more than doubling of the differential for the legal and accounting services is particularly pronounced. Finally, the GLA may wish to note that, given differences in the short-term changes identified in the two series, it is 'usually'[37] advisable to give more weight to LFS employment data. This is because the LFS data are subject to fewer revisions (under normal circumstances) and therefore seen as more accurate indicators of short-term change.

[37] Clearly such advice must be considered within the context of the ongoing regrossing exercise.

Table A7: LFS estimates of London employee jobs by detailed private service industry group, 1998 – 2000

Detailed industry group	LFS Dec 1998 - Feb 1999*	LFS Dec 1999 - Feb 2000*	LFS Dec 2000 - Feb 2001*	% change 1998 - 2000	Positive differential	Negative differential
Sales of motor vehicles, parts, fuel	19,930	18,380	14,697	26.3		**
Motor vehicle repair	16,851	16,745	15,158	10.0		
Wholesale on fee or contract basis	5,095	6,030	10,500	106.1		
Wholesale (not waste, scrap etc)	85,595	86,407	81,536	4.7		*******
Wholesale waste, scrap etc	373	418	957	156.3		***
Retail trade	311,155	339,166	321,881	3.4		*****
Repair personal, household goods	4,299	3,948	3,454	19.6		
Hotels, motels	33,324	28,403	33,341	0.1		*
Camping sites, short stay accommodation etc	1,771	442	1,652	6.7		
Restaurants	62,759	67,724	59,848	4.6		*****
Bars	14,164	23,282	15,639	10.4		****
Canteens, catering	26,852	28,071	19,535	27.3		***
Transport via railway	6,290	14,790	9,754	55.1		
Other land transport	54,843	63,415	65,783	19.9		
Transport via pipelines	1,283	482	1,145	10.8		
Sea, coastal water transport	5,161	4,065	3,108	39.8		
Inland water transport	0	0	891	-		
Scheduled air transport	22,694	30,294	19,465	14.2		*
Non-scheduled air transport	2,606	2,385	4,199	61.1		
Cargo handling, storage	17,757	10,622	12,851	27.6		
Other supporting transport activities	34,591	41,019	46,674	34.9	***	
Travel agencies, orgs, guides etc	20,366	24,302	27,817	36.6		
Other transport agencies	18,426	17,383	21,296	15.6		
Post, courier activities	56,830	48,669	55,215	2.8		
Telecommunications	52,354	53,971	51,892	0.9		
Monetary intermediation	172,822	172,356	176,164	1.9	*	
Other financial intermediation	52,231	48,814	55,235	5.8	**	
Insurance, pension. (not Social Security)	10,783	11,478	13,189	22.3		***
Other financial (not insurance or pensions)	33,112	33,201	44,409	34.1		**
Other insurance, pension activities	72,294	70,754	64,126	11.3	***	
Real estate activities (own property)	31,570	37,279	33,416	5.8		
Letting own property	3,494	4,793	6,929	98.3		***
Real estate agency, management	42,780	39,037	36,621	14.4		
Car rental	3,467	4,581	4,314	24.4		
Other transport rental	3,717	3,571	469	87.4		
Other machine, equipment	6,652	5,883	6,997	5.2		

Detailed industry group	LFS Dec 1998 - Feb 1999*	LFS Dec 1999 - Feb 2000*	LFS Dec 2000 - Feb 2001*	% change 1998 - 2000	Positive differential	Negative differential
rental						
Personal, household equipment rental	2,843	4,884	2,034	28.5		
Computer hardware consultancy	1,020	0	886	13.1		
Computer software consultancy	51,772	63,756	67,089	29.6		
Data processing	408	942	1,071	162.4		*
Data base activities	2,699	1,050	2,365	12.4		
Repair of office, computer equipment	2,732	3,385	5,537	102.7		
Other computer activities	18,145	21,455	22,964	26.6		*
Research, natural sciences, engineering	14,492	12,440	16,690	15.2		
Research, social sciences, humanities	1,295	547	1,946	50.3		
Legal, accounting, auditing, tax, etc	182,359	169,011	185,642	1.8		******
Architecture, engineering, technical consultancy	51,120	42,967	56,625	10.8		
Technical testing, analysis	3,080	506	3,969	28.8		
Advertising	27,556	24,708	35,513	28.9		
Labour, personnel recruitment	38,025	43,127	53,908	41.8		**********
Investigation, security activities	26,608	31,736	26,741	0.5		
Industrial cleaning	26,846	28,184	23,612	12.0		*******
Other misc business activities	39,215	34,034	34,442	12.2		*******
Total	1,798,505	1,844,892	1,881,191	4.6		

**First and second employee jobs, not in the armed forces (First Estimate)*

Source: Labour Force Survey, Winter 1998/99, 1999/2000 and 2000/01: 1992 Standard Industrial Classification

Table A8: ABI estimates of London employee jobs by detailed private service industry group, 1998 - 2000

Detailed industry group	1998	1999	2000	% change -
Sales of motor vehicles, parts, fuel	40,700	39,700	35,600	
Motor vehicle repair	14,900	16,400	17,000	
Wholesale on fee or contract basis	10,400	11,300	12,700	
Wholesale (not waste, scrap etc)	151,800	162,100	150,800	
Wholesale waste, scrap etc	20,500	18,700	28,900	
Retail trade	348,500	380,100	375,300	
Repair personal, household goods	2,200	2,400	2,700	
Hotels, motels	45,600	47,700	48,100	
Camping sites, short stay accommodation etc	1,300	2,100	2,100	
Restaurants	106,800	116,400	112,500	
Bars	49,800	62,300	52,400	
Canteens, catering	41,600	44,200	49,700	
Transport via railway	17,800	20,400	16,900	
Other land transport	63,200	64,100	65,200	
Transport via pipelines	0	0	0	
Sea, coastal water transport	4,100	2,900	2,300	
Inland water transport	300	300	300	
Scheduled air transport	30,700	30,500	32,300	
Non-scheduled air transport	700	800	800	
Cargo handling, storage	10,800	11,100	10,400	
Other supporting transport activities	17,800	18,700	18,900	
Travel agencies, orgs, guides etc	30,600	32,200	34,700	
Other transport agencies	18,300	19,500	19,300	
Post, courier activities	55,300	53,600	57,900	
Telecommunications	53,500	54,300	59,000	
Monetary intermediation	147,000	164,900	162,700	
Other financial intermediation	45,000	38,000	38,100	
Insurance, pension (not Social Security)	41,900	37,300	39,300	
Other financial (not insurance or pensions)	40,600	53,600	61,300	
Other insurance, pension activities	39,100	46,500	41,100	
Real estate activities (own property)	23,400	23,500	25,400	
Letting own property	23,500	30,500	35,600	
Real estate agency, management	30,800	32,000	36,100	
Car rental	4,600	5,400	5,000	
Other transport rental	1,600	1,500	1,700	
Other machine, equipment rental	7,900	8,800	10,700	
Personal, household equipment rental	7,100	6,800	4,600	
Computer hardware consultancy	2,500	3,200	4,000	
Computer software consultancy	47,100	51,700	62,500	
Data processing	11,200	11,000	16,000	
Data base activities	2,500	2,900	3,000	
Repair of office, computer equipment	7,500	4,300	4,500	
Other computer activities	19,700	26,600	34,600	
Research, natural sciences, engineering	14,100	11,400	12,600	
Research, social sciences, humanities	1,200	1,300	1,200	

Detailed industry group	1998	1999	2000	% change -
Legal, accounting, auditing, tax, etc	208,800	221,500	245,600	
Architecture, engineering, technical consultancy	56,200	55,300	59,100	
Technical testing, analysis	3,600	2,700	3,800	
Advertising	35,800	34,400	38,200	
Labour, personnel recruitment	142,800	152,000	180,300	
Investigation, security activities	31,200	34,100	33,300	
Industrial cleaning	88,000	87,800	92,600	
Other misc business activities	100,300	101,700	107,400	
Total	2,322,200	2,462,600	2,566,000	

Source: Annual Business Inquiry, 1998, 1999 and 2000: Standard Industrial Classification (92).

Table A9: Differences between LFS and ABI estimates of London employee jobs by detailed industry group (LFS-ABI), 1998 - 2000*

Industry sector	1998	1999	2000	% change different 1998 - 20
Sales of motor vehicles, parts, fuel	-20,770	-21,320	-20,903	
Motor vehicle repair	1,951	345	-1,842	19
Wholesale on fee or contract basis	-5,305	-5,270	-2,200	5
Wholesale (not waste, scrap etc)	-66,205	-75,693	-69,264	
Wholesale waste, scrap etc	-20,127	-18,282	-27,943	3
Retail trade	-37,345	-40,934	-53,419	4
Repair personal, household goods	2,099	1,548	754	6
Hotels, motels	-12,276	-19,297	-14,759	2
Camping sites, short stay accommodation etc	471	-1,658	-448	19
Restaurants	-44,041	-48,676	-52,652	1
Bars	-35,636	-39,018	-36,761	
Canteens, catering	-14,748	-16,129	-30,165	10
Transport via railway	-11,510	-5,610	-7,146	3
Other land transport	-8,357	-685	583	10
Transport via pipelines	1,283	482	1,145	1
Sea, coastal water transport	1,061	1,165	808	2
Inland water transport	-300	-300	591	29
Scheduled air transport	-8,006	-206	-12,835	6
Non-scheduled air transport	1,906	1,585	3,399	7
Cargo handling, storage	6,957	-478	2,451	6
Other supporting transport activities	16,791	22,319	27,774	6
Travel agencies, orgs, guides etc	-10,234	-7,898	-6,883	3
Other transport agencies	126	-2,117	1,996	1,48
Post, courier activities	1,530	-4,931	-2,685	27
Telecommunications	-1,146	-329	-7,108	52
Monetary intermediation	25,822	7,456	13,464	4
Other financial intermediation	7,231	10,814	17,135	13
Insurance, pension (not Social Security)	-31,117	-25,822	-26,111	1
Other financial (not insurance or pensions)	-7,488	-20,399	-16,891	12
Other insurance, pension activities	33,194	24,254	23,026	3
Real estate activities (own property)	8,170	13,779	8,016	
Letting own property	-20,006	-25,707	-28,671	4
Real estate agency, management	11,980	7,037	521	9
Car rental	-1,133	-819	-686	3
Other transport rental	2,117	2,071	-1,231	15
Other machine, equipment rental	-1,248	-2,917	-3,703	19
Personal, household equipment rental	-4,257	-1,916	-2,566	3
Computer hardware consultancy	-1,480	-3,200	-3,114	11
Computer software consultancy	4,672	12,056	4,589	
Data processing	-10,792	-10,058	-14,929	3
Data base activities	199	-1,850	-635	41
Repair of office, computer equipment	-4,768	-915	1,037	12
Other computer activities	-1,555	-5,145	-11,636	64

Industry sector	1998	1999	2000	% change different 1998 - 20
Research, natural sciences, engineering	392	1,040	4,090	944
Research, social sciences, humanities	95	-753	746	688
Legal, accounting, auditing, tax, etc	-26,441	-52,489	-59,958	126
Architecture, engineering, technical consultancy	-5,080	-12,333	-2,475	51
Technical testing, analysis	-520	-2,194	169	132
Advertising	-8,244	-9,692	-2,687	67
Labour, personnel recruitment	-104,775	-108,873	-126,392	20
Investigation, security activities	-4,592	-2,364	-6,559	42
Industrial cleaning	-61,154	-59,616	-68,988	12
Other misc business activities	-61,085	-67,666	-72,958	19
Total	-523,695	-617,708	-684,809	30

Note: Using figures from Tables A7 and A8.

A3. Explanations of the difference between employee jobs estimates

To summarise the results of the previous section, for London there would seem to be a particularly large difference between LFS and Employer Survey estimates of total employee jobs, with the following sectors accounting for the majority of the difference:

- Wholesale and retail trades
- Restaurants, bars, canteens and catering
- Legal, accounting, auditing and tax etc
- Labour personnel recruitment
- Industrial cleaning
- Other business activities.

Furthermore, the difference between the total figures recorded by the two surveys increased significantly between the winter of 1998/99 and 2000/01, with each one of these sectors showing some increase in divergence (though this was particularly pronounced for the legal, accounting, auditing and tax sector in London). As suggested previously, while the differences between individual industry sectors are in line with those seen on a national level, the *relative* magnitude of effect for our broad group of *Private Service Sector* employee jobs would seem to be more pronounced in London. This is perhaps to be expected given that, in contrast to the study carried out on a national level, we identify a large discrepancy between LFS and WFJ estimates of total employee jobs for our geographical area of study.

It is important to note this difference between the present study and the one carried out by ONS, as it has implications for the approach adopted in the remainder of the report. Thus, while the ONS study also finds differences between the LFS and WFJ data for each industry group, the explanations they suggest are greatly influenced by their success in reconciling the aggregate LFS and WFJ figures. Specifically, on a national level, the investigation carried out by ONS identified, in the equivalents of Section A2.1 and A2.2, a statistically insignificant unexplained discrepancy between the two measures of employee jobs. Therefore, when undertaking a detailed discussion of any differences between industries their underlying assumption was that the LFS and ABI had successfully measured the supply and demand sides of the job market.

In contrast, our figures suggest that there is a large discrepancy between the two measures of London's total employee jobs, *as well as* a large variation within industry groups. Thus, we are faced with two possible scenarios when attempting to explain the discrepancy for London employee jobs figures:

1. Firstly, we may assume that the reconciliation of national-level figures from the two surveys reflects the fact that they represent accurate measures of the demand and supply sides of the employment relationship. In this case, our findings for London would imply that the difference between employee jobs figures stem from differences between the reported region of work in the LFS and the region recorded for the company. In other words, we are assuming that the two surveys are both recording a sample which is reflective of the employee jobs situation in the UK and, therefore, the 'missing' London employee jobs are recorded 'somewhere' in the LFS. This would seem to imply that employers who are, according to the IDBR, registered in London, have nearly ½ million employees who do not consider themselves to be working in London.
2. In contrast, our findings for London may also be interpreted as a sign that the sample frames of the two surveys are not as closely compatible as the ONS study would imply and, therefore, the finding that the two surveys (on a national level) can be reconciled was a result

of differing sample[38] and non-sample[39] variability which, serendipitously, cancelled out. This hypothesis would seem to be supported by the more recent findings which suggest that incorporating the results of the 2001 Census re-introduces a large differential (see final paragraph, Section A1.2.4). If we adopt this approach, we are less inclined to assume that the missing employee jobs are actually 'somewhere' in the LFS and more likely to try and find reasons why certain jobs may or may not be included in one or other of the surveys.

A3.1 Regional disparities: London and the rest of Great Britain

In order to place our findings for London within context, Table A10 gives some idea of the extent to which measures of employee jobs from the two surveys differ within each region of the country. As we can see, no other region exhibits such a pronounced negative differential between the two measures of employee jobs. However, it is interesting to note that, in contrast to other regions, the South East also exhibits a large negative differential. If one considers the two regions together, they would seem to account for the majority of the negative differential observed on a national level.

Table A10 also suggests that the previous ONS reconciliation of LFS and ABI measures of employee jobs on a national level was mainly a result of the positive differentials observed in the East of England, North East, North West, Yorkshire and Humberside, the South West and Wales, cancelling out nearly 300,000 of the negative differential observed in London and the South East (and to some extent Scotland). In order for this approach to have some validity, we would have to envisage a situation where employers are recording a large number of employees as being located in the capital, in contrast to their employees who consider their region of work to be in another (far removed) region of the UK.

Table A10: Comparison of ABI and LFS employee jobs figures for all regions of Great Britain

	LFS*	ABI	LFS-ABI	% error
East Midlands	1,738,509	1,741,500	-2,991	-0.2
East of England	2,274,847	2,241,700	33,147	1.5
London	3,465,583	4,060,700	-595,117	-17.2
North East	1,000,412	961,400	39,012	3.9
North West	2,897,788	2,846,000	51,788	1.8
Scotland	2,199,850	2,234,300	-34,450	-1.6
South East	3,502,529	3,663,500	-160,971	-4.6
South West	2,119,953	2,032,100	87,853	4.1
Wales	1,095,574	1,083,900	11,674	1.1
West Midlands	2,279,783	2,286,700	-6,917	-0.3
Yorkshire and the Humber	2,138,645	2,081,300	57,345	2.7
Total[+]	24,713,473	25,233,000	-519,527	-2.1

[+] *Northern Ireland omitted.*
**First Estimate.*
Source: ABI, 2000 and LFS Winter 2000/01.

Such an approach may have some validity, but it is unlikely to account for a significant proportion of the differentials involved. Firstly, it is important to note that the coverage of local units (sites or workplaces within larger businesses) by the ABI enterprise-level survey questionnaire is considered

[38] Sample variability reflects the extent of variation in estimates that can be expected in the face of repeated sampling from the same population.

[39] Non-sample variability arises because of a range of other factors including the miscoding of responses by interviewers, misreporting etc.

to be a significant improvement on the previous AES. In fact, two-thirds of the discrepancy which arose when the ABI replaced the AES was attributed to improved coverage of local units.[40] However, it is still the case that the details of many local units are provided by, what might be termed, head offices and this may explain some of the discrepancy between the negative differentials observed for London and the South East, and the compensating positive differentials in the rest of the country.

Table A11: Difference between LFS and ABI employee jobs estimates by industry group[+] for all regions of Great Britain

	Agriculture and fishing	Energy and water	Manufact-uring	Construct-ion	Distribution, hotels and restaurants	Transport and commu nica-tions	Banking, finance, insurance and business services	Public administ-rat-ion, education and health	Other services	Total
East Midlands	2,869	-4,967	39,223	3,187	-63,477	33,339	-38,109	24,430	471	-3,034
East of England	468	-703	87,459	23,403	-107,419	22,348	-101,522	93,726	12,737	33,196
London	6,667	-870	-11,646	15,349	-309,642	2,166	-377,339	66,465	3,508	-595,079
North East	6,106	-473	37,648	2,881	-32,965	21,508	-21,816	21,576	3,385	39,031
North West	-4,459	9,550	69,999	11,548	-113,208	33,748	-96,969	129,581	10,977	51,778
Scotland	22,114	-14,851	50,932	12,530	-95,920	25,099	-102,362	63,277	4,251	-34,449
South East	7,694	9,341	94,775	28,410	-208,968	26,579	-227,241	99,227	5,631	-160,956
South West	4,083	-754	49,658	8,156	-50,976	10,324	-24,483	77,049	13,910	87,825
Wales	-3,004	2,949	2,247	3,536	-40,275	10,184	-28,288	51,372	12,364	11,689
West Midlands	323	-2,752	70,290	22,161	-78,089	20,484	-97,661	56,581	-455	-6,890
Yorkshire and the Humber	16,120	-2,055	45,761	26,122	-73,791	12,481	-40,177	66,317	6,064	57,320
Total	58,982	-5,585	536,347	157,284	-1,174,730	218,259	-1,155,967	749,600	72,845	-519,566

[40] For more details see, Partington, J. (2001), 'The launch of the Annual Business Inquiry', *Labour Market Trends*, Technical Report, May; pp259-268.

[+] *1992 Standard Industrial Classification: LFS minus ABI.*

Source: ABI, 2000 and LFS Winter 2000/01.

In this instance, one could imagine a situation where enterprise-level questionnaires sent to larger companies in London, as part of the ABI, are recording all employee jobs as being in the London area, when many are, for whatever reason, on secondment in other parts of the country. In contrast, as part of the LFS, the relevant employees are recording that their job is based in the region to which they have been seconded. This explanation would seem reasonable and may explain some of the compensating negative and positive differentials observed in the capital and rest of the country respectively. However, the numbers involved in such misreporting of region of residence would have to be large and there is no reason to suggest that the same effect should apply particularly to the South East region.

Furthermore, if we now consider Table A11, which sets out the difference between LFS and ABI estimates of employee jobs within each industry sector across eleven regions of Great Britain, we are again inclined to question the reconciliation of ABI and LFS figures on a national level. As we can see, there is a consistent negative differential in both the financial and business services sectors and the hotel, catering and restaurant sectors (our previously noted *private service sector*) with the other sectors of the economy in each region being more likely to exhibit a positive differential. Thus the 'pattern' of over and under-reporting identified for the capital would not seem to be particularly unique.

In the previous ONS study of the national-level LFS-ABI differential it was noted that the employer surveys are likely to record agency staff as being in the category of *Real Estate, Renting and Business Service* activities (*Labour recruitment and the provision of Personnel* and *Industrial cleaning* sectors from the previous sections are specific examples) as they are considered to be agency employees. In contrast the LFS assigns these individuals to the particular industry in which the agency has placed them. Under this scenario it would seem reasonable to assume that a number of firms in, for instance, the industrial cleaning sectors are recorded as such in the ABI. In contrast, their employees are recorded in the LFS as being in a different industry sector.

If one considers this phenomena then we can undertake a reconciliation of the industry differentials and suggest that many of the negative differentials in the service sector are 'offset' by the positive differentials in the manufacturing and public sectors. However, this approach would only seem to work when one considers the aggregate nationwide figures, or those associated with regions other than London and the South East, as the positive and negative differentials tend to cancel out. In contrast, when considering London and the South East we are forced to conclude that there is a significant over- or under-reporting of jobs in one of the two surveys. In addition, Table A11 also implies that the pattern of misreporting of employee jobs in the capital is reflected in other parts of the country. In this instance, we are encouraged to view the large discrepancy in the capital as not so much a result of problems specific to London, rather it is a common problem across the country, but simply more acute in London because the private service sector is a much larger component of the local economy.

Table A12: Regional distribution of industry group[a] and correlation with percentage error from Table A10

	Agriculture and fishing	Energy and water	Manufact-uring	Construct-ion	Distribution, hotels and restaurants	Transport and communic-ations	Banking, finance, insurance and business services	Public administrat-ion, education and health	Other services	Total frequency
East Midlands	1.4	1.1	22.0	4.6	23.5	5.4	14.2	23.6	4.2	1,741,500
East of England	1.5	0.7	14.9	4.6	25.8	6.8	19.5	21.8	4.4	2,241,700
London	0.1	0.3	7.0	3.2	21.9	7.8	33.5	19.7	6.4	4,060,700
North East	0.5	1.1	17.6	5.8	22.4	4.9	12.6	29.6	5.5	961,400
North West	0.6	0.6	17.5	4.7	24.7	5.8	15.9	25.6	4.6	2,846,000
Scotland	1.7	1.7	13.5	5.8	23.0	5.3	16.6	26.8	5.4	2,234,300
South East	1.1	0.5	11.8	4.3	25.8	6.6	22.8	22.1	4.9	3,663,500
South West	1.5	0.9	14.9	4.3	26.3	5.0	16.2	26.5	4.5	2,032,100
Wales	1.2	1.0	18.5	5.2	22.6	4.2	12.0	30.1	5.2	1,083,900
West Midlands	0.9	1.0	21.6	4.0	23.5	5.6	15.4	23.5	4.5	2,286,700
Yorkshire and the Humber	0.9	0.8	18.4	4.7	24.1	6.0	15.0	25.6	4.5	2,081,300
Total	1.0	0.8	15.0	4.5	24.1	6.1	19.6	24.0	5.0	25,233,000
Correlation between industry sector and percentage error	0.4	0.4	0.7	0.6	0.4	-0.7	-0.9	0.7	-0.7	
Correlation between industry sector and percentage error, excluding London	-0.2	0.0	0.3	0.2	0.0	-0.4	-0.6	0.5	-0.2	

Source: ABI, 2000

[a] *SIC92 and Rows sum to 100 per cent*

Table A12 would seem to provide additional support for this conclusion by setting out the industry distribution within each region of the country according to the ABI, and correlating this with the proportionate differential within each region identified in Table A10. Clearly Table A12 has some limitations and the correlation coefficients should only be taken as a rough indicator (significance is not quoted). However, we would seem to have some confirmation for our suggestion that the size of the *banking, finance, insurance and business services* sector within a particular local economy is closely associated with the size of the LFS-ABI differential – even when we drop the 'outlier' of London this relationship holds. In contrast to our findings in Section A2.3, this would not seem to be the case for the *distribution, hotels and restaurant* sector.

Thus, it would seem that some of the factors driving the LFS-ABI differential are similar across all regions, with London (and to a lesser extent, the South East) simply having larger errors in measurement because of the sector concentrations within the local economy – in this case, the existence of a large *banking, finance, insurance and business services* sector. Given these results, we are being pushed towards two distinct conclusions.

Firstly, it would seem to be the case that the two surveys do not accurately measure the demand and supply sides of the labour market and, therefore, the 'missing' jobs are not 'somewhere' in the LFS. In this instance we are inclined to view the reconciliation of the LFS and ABI/WFJ figures on a national level as being due to serendipity, rather than a correct measuring of the two sides of the labour market. Even if we were to assume that the two surveys were comparable, the methodology adopted to reconcile the national-level measures would seem inappropriate, once one has an idea of the extent to which the error in measurement is concentrated within two regions.[41]

Secondly, we are increasingly drawn to the idea that London is experiencing a phenomena which is common to all regions. Thus, while some of the negative LFS-ABI differential for the private service sector industries may be explained by misreporting of industry sector among agency workers, taking a regional, rather than a national view, suggests that such misreporting can only explain a limited amount of the difference. Within this approach, we seem to have some evidence that the problems associated with the measurement of employee jobs within firms in the private service sector are similar across Great Britain, with London (and to some extent the South East) simply having a larger discrepancy because they have more of these jobs.

A3.2 Firm size, gender and part-time working

The conclusions of the previous section suggest that London may be experiencing similar problems to those seen in the rest of the country, but to a much greater extent. There would seem to be some evidence that the larger the proportion of the local economy which can be described as operating in the private service sector, the larger the discrepancy between LFS and ABI measures of employee jobs. Given these findings, it is useful to investigate two additional factors to see if they are in any way correlated with the LFS-ABI differential within regions.

Firstly, using the ABI and LFS we are able gain some idea of the extent to which the differences between ABI and LFS employee jobs figures are more or less pronounced in large and small firms. In a similar analysis to that presented in Table A11, Table A13 sets out the differences between ABI and LFS estimates of employees who are recorded in large, medium or small firms. As we can see from Table A13, there would seem to be some evidence that, across the board, the discrepancy between employee jobs is particularly pronounced when one considers the reporting within the

[41] If one ignores the regional concentration of the discrepancy between the two measures, larger (nationally representative) values will be utilised during any reconciliation of the two measures (such as the number of second jobs, the seasonal component, numbers living in communal establishments etc) when really one should only be applying factors which apply to London and, to a lesser extent, the South East.

larger and smaller firms. However, we must read these tables with care, as the LFS contains two categories of response which limit our confidence in the figures presented.

Table A13: Difference[a] between LFS and ABI employee jobs estimates by size of firm for all regions of Great Britain

	1-10 employees	11-49 employees	50 and above	Missing	Total
East Midlands	-62,644	30,275	32,518	-3,184	-3,035
Eastern	-94,979	113,222	22,723	-7,770	33,196
London	-340,359	33,404	-327,651	39,527	-595,079
North East	-2,417	17,766	17,513	6,171	39,033
North West	-106,857	81,172	66,057	11,409	51,781
Scotland	-13,569	21,125	-27,681	-14,324	-34,449
South East	-126,977	119,220	-169,481	16,283	-160,955
South West	-3,417	89,517	6,897	-5,172	87,825
Wales	4,296	19,924	-5,933	-6,598	11,689
West Midlands	-62,820	102,907	-54,790	7,813	-6,890
Yorkshire and The Humber	-8,596	81,934	-25,267	9,249	57,320
Total	-818,338	710,466	-465,096	53,404	-519,564

Source: ABI, 2000 and LFS Winter 2000/01.

[a] *LFS minus ABI*

Specifically, within the range of possible LFS responses to the question which asks for the number of employees at the workplace, the following are included: *Don't know but under 25* and *Don't know but over 24*. In Table A13, these respondents have been included in the category of between 11 and 49 employees and therefore, we must be careful when interpreting the results. Where we have relatively small differentials between the under or over-reporting between firms of different sizes within a region, we are inclined to ignore these findings as they could simply be the result of this response error.

Thus, while we would seem to have some support from the correlations in the penultimate row of Table A14, suggesting that higher proportions of small and large firms are associated with higher errors between the two measures of workforce employee jobs, removing London from the correlations suggests that the effect for large firms is rather specific to London. This, combined with the possible response error arising from the classification of firm size in the LFS, means that we can only conclude from this analysis that London and the South East may have a particular problem of differential reporting in small and large firms.

Table A14: Regional distribution of large, medium and small firms and correlation with percentage error from Table A10

	Number of employees at workplace				
	1 to 10	11 to 49	50 or more	missing	total frequency
East Midlands	21.1	25.6	52.3	1.0	1,741,500
East of England	23.6	25.1	50.2	1.1	2,241,700
London	22.1	20.3	57.6	0.0	4,060,700
North East	18.5	25.5	55.6	0.4	961,400
North West	20.5	25.4	53.7	0.4	2,846,000
Scotland	20.1	25.2	53.6	1.1	2,234,300

South East	23.1	24.0	52.2	0.7	3,663,500
South West	23.3	25.9	49.6	1.2	2,032,100
Wales	21.1	25.9	51.9	1.0	1,083,900
West Midlands	20.3	25.1	53.9	0.7	2,286,700
Yorkshire and the Humber	20.4	25.5	53.5	0.6	2,081,300
Total	21.5	24.4	53.4	0.7	25,233,000
Correlation between industry sector and percentage error	-0.26	0.96	-0.59		
Correlation between industry sector and percentage error, excluding London	-0.23	0.82	-0.07		

Source: ABI, 2000

Table A15: Difference[a] between LFS and ABI employee jobs estimates by gender and part-time working for all regions of Great Britain

	Male full-time	Male part-time	Female full-time	Female part-time	Total
East Midlands	47,923	-35,879	14,675	-29,750	-3,031
Eastern	41,542	-37,567	11,280	17,110	32,365
London	-118,298	-104,687	-222,740	-151,666	-597,391
North East	41,979	-1,643	2,101	-3,404	39,033
North West	88,668	-21,650	46,910	-62,648	51,280
Scotland	33,069	-34,556	15,800	-49,249	-34,936
South East	-2,175	-63,752	-30,611	-65,980	-162,518
South West	87,307	-30,818	23,667	7,675	87,831
Wales	30,531	-19,013	16,433	-16,769	11,182
West Midlands	45,598	-18,579	-12,081	-21,824	-6,886
Yorkshire and The Humber	75,049	-20,022	-1,921	3,772	56,878
Total	371,194	-388,166	-136,487	-372,733	-526,192

Source: ABI, 2000 and LFS Winter 2000/01

[a] *LFS minus ABI*

Table A16: Regional distribution of male and female, full-time and part-time working and correlation with percentage error from Table A10

	Male Full-time	Male part-time	Female full-time	Female part-time	Total frequency
East Midlands	47.1	5.0	24.4	23.4	1,738,500
Eastern	45.1	5.3	24.3	25.3	2,274,000
London	49.3	5.5	29.9	15.2	3,463,300
North East	46.4	5.4	24.6	23.6	1,000,400
North West	46.6	5.6	26.4	21.5	2,897,300
Scotland	45.2	5.0	27.6	22.3	2,199,400
South East	44.4	6.2	25.8	23.6	3,501,000
South West	44.0	6.3	23.6	26.1	2,120,000
Wales	45.2	5.0	26.0	23.8	1,095,100
West Midlands	48.0	5.4	24.3	22.3	2,279,800

Yorkshire and The Humber	45.7	5.6	23.1	25.6	2,138,200
Total	46.2	5.5	25.8	22.5	24,706,800
Correlation between industry sector and percentage error	-0.6	0.0	-0.8	0.9	
Correlation between industry sector and percentage error, excluding London	0.0	0.1	-0.6	0.5	

Source: ABI, 2000

Finally, Tables A15 and A16 set out the remaining characteristics where we are able to draw comparisons between the LFS and ABI. Thus, Table A15 sets out the extent of differential reporting within each region for male and female, full-time and part-time working. From this table there would seem to be little that adds to our explanation, with no clearly discernable patterns in the extent of over or under-reporting between the different genders and working patterns. However, if we now consider Table A16 there would seem to be a tendency for larger proportions of female full-time employment within a region to be associated with a larger negative differential. There is also some evidence that the effect works in the opposite direction for female part-time working – both effects persist even when we drop London from the calculation of the correlation coefficient.

A3.3 Possible reasons for the observed disparities

Up to this point we have identified a range of factors which are closely associated with the extent to which LFS and ABI measures of employee jobs diverge. However, we have not suggested why such correspondence may occur and whether this provides any real insight into the possible reasons for differential reporting of employee jobs in the LFS and ABI. In this section of the report we speculate on these aspects of our study.

It should be noted that we are adopting an approach which assumes that jobs are actually missing from, or being spuriously added to, one or more of the surveys, rather than simply misreported within different sectors and amongst firms of different sizes. This is more in line with the approach of previous studies which focused on the difference between AES and LFS figures.[42] Furthermore, it would not seem too ridiculous to adopt this approach, given our previous findings and the fact that the reweighting of the LFS in response to the findings of the 2001 census suggest that the employee jobs figures from employer surveys are now 600-800 thousand higher than those from the LFS.

Firstly, in Section A2.3 our detailed analysis of the London economy identified the following sectors which seem to explain the majority of any negative differential for the capital:

- Wholesale and retail trades
- Restaurants, bars, canteens and catering
- Legal, accounting, auditing and tax etc
- Labour personnel recruitment
- Industrial cleaning
- Other business activities.

[42] In a similar way to the approach taken by, Pease, P. (1997), Comparison of sources of employment data', Labour Market Trends, December; pp511-516, though this study had to reconcile a difference between the two series which stemmed from an LFS figure which was one million higher than the WFJ Series.

Furthermore, from the analysis in Section A2.4, the importance of these sectors as an explanation of the differential between the two measures of employee jobs would seem to have increased significantly in recent years. In addition, from our analysis in Section A3.1 it would seem that the relative predominance of these *private service sector* industries within a particular region is closely related to the size of the negative LFS-ABI differential for that area – though the results for the retail and hotel trades are less pronounced. Thus, our findings would seem to hold for a number of regions of the UK, with London experiencing a particularly acute problem due to the predominance of these sectors within the local economy.

In addition there would seem to be some evidence from Section A3.2 that the negative ABI-LFS differential is particularly pronounced when we consider the smaller and larger firms and, also, when we consider female full-time working – though it should be noted that there are problems of comparison when we analyse the reporting of the number of employees in the LFS. It is clearly rather difficult to carry out an investigation into factors which may be missing from one or more of the surveys. However, it would seem from a summary of these findings that we can broadly define the possible areas associated with a negative LFS-ABI differential as:

1. low median earnings[43]
2. a higher proportion of temporary employment contracts[44]
3. a concentration of full-time female employees
4. some indication that for London and the South East, the problem is more pronounced in small and large firms.

From points 1 and 2 we may consider the more casual nature, and higher rates of turnover, associated with low paid and temporary employment as possible reasons for the LFS/ABI differential, though the exact nature of such an effect is hard to identify. For instance, one could imagine a situation where individuals, in contrast to employers, are less likely to consider lower paid or casual jobs as being 'employee jobs'. This may be particularly pronounced for small firms, where employment arrangements may be perceived as rather informal. In London many of these positions may be filled by students working part-time who are, perhaps, less inclined to record themselves as having either a first or second employee job. In contrast employers are likely to consider such posts when reporting the number of employee jobs as part of the ABI. As regards agency workers, the situation could be exacerbated by double counting in the ABI, with both the temp agency and the firm in which a temporary worker has been placed, counting the individual as an employee.

As regards point 3 there would not seem to be, at first, an obvious way to explain the apparent correlation between the extent of female full-time employment and the negative LFS-ABI differential. However, if we combine this with point 4, where reporting of employee jobs amongst small firms seems to be correlated with a negative LFS-ABI differential, we seem to have some support for an explanation put forward by ONS, though we would suggest a slightly different approach.

Specifically, a recent ONS paper[45] suggests that there are 1.7 million small firms in the UK that are not registered for PAYE or VAT and therefore are not recorded on the IDBR. The ONS paper

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[43] See *New Earnings Survey 2001* for more details.

[44] This is particularly pronounced for the restaurants and bars, labour recruitment, and provision of personnel sectors, with 13.4 per cent, 10 per cent and 23.7 per cent of employees working under temporary contracts respectively, according to the Winter 2000 LFS.

suggests that there are 300,000 employees below the income tax threshold in these firms. In this instance, we would expect the omission of these individuals from the IBDR and therefore the ABI to add to the negative LFS-ABI differential, rather than bringing the two estimates closer. However, this line of reasoning does suggest another possibility.

Though figures are hard to come by, it is relatively common practice for many individuals who are self-employed and have a registered company to pay there spouse a wage just below the tax threshold. Therefore, in surveys such as the ABI we would expect these individuals to be registered as employees (if the company is PAYE or VAT registered). However, it is quite possible that when these individuals are faced with a survey questionnaire such as the LFS, they do not record themselves as an employee, as the payments are simply made as a way of reducing the household's tax burden. In addition, the same reasoning may apply to family members working in the retail trade, who do receive some form of remuneration, but do not consider themselves to be an employee.

While such a proposition may have some validity, it is hard to pursue this further and such explanations are suggested as *examples* of the problems we face when trying to get a clear picture of the employee jobs situation. To give an example of the limitations placed on the pursuit of such avenues of enquiry, it is useful to consider the following example:

The one exception to our statements 1 and 2 would seem to be employee jobs in the *Legal, Accounting, Auditing and Tax* sector, where LFS data suggest that 66 per cent of the jobs in this area are in the top three occupational categories. Such occupations are rarely associated with low paid or temporary forms of employment and this would seem to contradict our propositions. However, this comment serves to underline the inherent methodological difficulty we face in this section of the analysis.

In attempting to find out whether it is wrong to consider employee jobs in the *Legal, Accounting, Auditing and Tax* sector as low paid, we turn to LFS data which suggest that these jobs are filled by individuals in the higher occupational categories. However, this approach is flawed, as it is quite possible that the reason for the ABI/LFS differential in this sector is a result of insufficient LFS coverage of these lower occupational categories within this industry group. Given that we are unable to compare the occupational distribution of employee jobs in the two surveys (eg or the extent of temporary working, earnings), we are unable to further investigate the extent to which the characteristics identified in points 1 and 2 can be considered to be contributing to the LFS/ABI differential and exactly how such an effect may manifest itself. Thus, we are constrained in the extent to which the above propositions can be pursued further.

However, before concluding this report, there are two additional factors which should be considered. Firstly, as stated in Section A1.2.2 the LFS is the main source of data on self-employed individuals and is used to calculate the self-employed jobs component of the WFJ Series. It is quite possible that this could be a source of differential reporting in the two surveys. Thus, we may have a situation where many contractors record themselves as self-employed in the LFS, but their 'employers' consider them to be employees. This would lead to a double counting of these employee jobs in the WFJ series (they would be entered as both an employee job in the ABI and a self-employed job in the LFS). Though ONS do have a consistency checking mechanism between

[45] Ganson, H. (2003), 'Work in Progress to Compare Measures of Employment and Jobs', Labour Market Division, Office or National Statistics.

occupation and self-employment status, this is a proxy test and does not provide firm evidence that such double counting does not take place (the practice will be discontinued by the end of 2003[46]).

Secondly, while the hidden economy is likely to be omitted from both series, one may expect some difference in the extent to which unofficial activities are recorded by the two surveys. In a situation where the employee is unaware of their questionable job status and the employer is fully aware, we may expect the LFS to identify more of these jobs. In contrast, if the reverse is true (perhaps an employee is 'moonlighting') we may consider the ABI to be more accurate. Given the problems associated with estimation of the extent of informal activity in the economy we do not take this point any further, but it has been suggested that any differential reporting would be particularly pronounced for the capital.[47]

Finally, it should be noted that while Sections A3.2 and A3.3 of the report have given some indication of possible additional explanations for the LFS/ABI employee jobs differential in the capital, it should be remembered that there is very little opportunity to prove or disprove such suggestions. In order to gain an idea of the full range of findings from this study, readers should consult the executive summary at the beginning of this report.

[46] See Gibbins, C. and Laux, R. (2002), 'Effect of the introduction of SOC2000 on employment estimates', *Labour Market Trends*, September.

[47] For more detail see, Lord Grabiner QC (2000), 'The informal economy', HM Treasury, March.

Appendix B: Technical report on the construction of the series *Making Sense of the ABI*

by Experian Business Strategies

B1. The service deliverables and data quality

The employment data described in this appendix is supplied by Experian Business Strategies (EBS) under the trade name *Making Sense of the ABI*. It is the third in a series of products corresponding to the different primary sources available from the Office of National Statistics (ONS). The first, *Making Sense of the Census* was based on the Census of Employment. The second, *Making Sense of the AES*, was introduced when the Annual Employment Survey (AES) replaced the annual census.

Following the release of the new Annual Business Inquiry (ABI) dataset, Experian Business Strategies' previous work on the AES – *Making Sense of the AES* – has been extended to include the latest data, and offer a consistent time series going back to 1981 at the local authority/London borough level.

With the release of the revised 1995 AES and the 1996 AES results in July 1998, the employee estimates from the AES now comprise information on people who work at both value-added tax (VAT) and non-VAT registered businesses. Consequently, the official Great Britain level employee estimates for 1995 have been revised upwards by about 450,000.

The change from the AES to the ABI meant that the 1998 estimate for employee jobs was around 900,000 higher. Research undertaken by the ONS showed that the primary reason for the differences between the AES and ABI lay in the raw data provided by the contributors. The research showed that both surveys could be affected by contributor reporting problems, but the AES was much harder hit. In particular, significant cases of under-reporting within the AES were found.

Transition to the ABI

In order to create a consistent time series, the under-reporting inherent in the AES had to be taken into account in the historical numbers. The ONS released rescaled AES data from 1995 to 1998, using scaling factors for each of the standard industrial classifications (SIC) divisions at the Great Britain level.

The ONS disaggregated numbers by gender and worker type were created by splicing on at the total employees level as mentioned above, and then constraining the old AES based disaggregated data to the new totals. This approach, however, caused a number of problems with jumps in the data at the full and part time levels between September and December 1998. In order to counter this, we have carried out our own splicing at the disaggregated level for Great Britain, the same splicing process is then carried out at the regional and local authority level. Some of the results are summarised in Table B1 and Charts B1 and B2.

Table B1: Employee numbers in Great Britain (per cent change)

	ONS		EBS	
	1998	1999	1998	1999
Male full-time	2.8	0.5	3.1	0.8
Male part-time	2.3	7.0	0.7	4.5
Female full-time	3.2	-2.8	4.7	1.4
Female part-time	0.4	6.6	-1.0	1.7
Total	2.3	1.4	2.3	1.4

Chart B1: Jumps in ONS workforce data

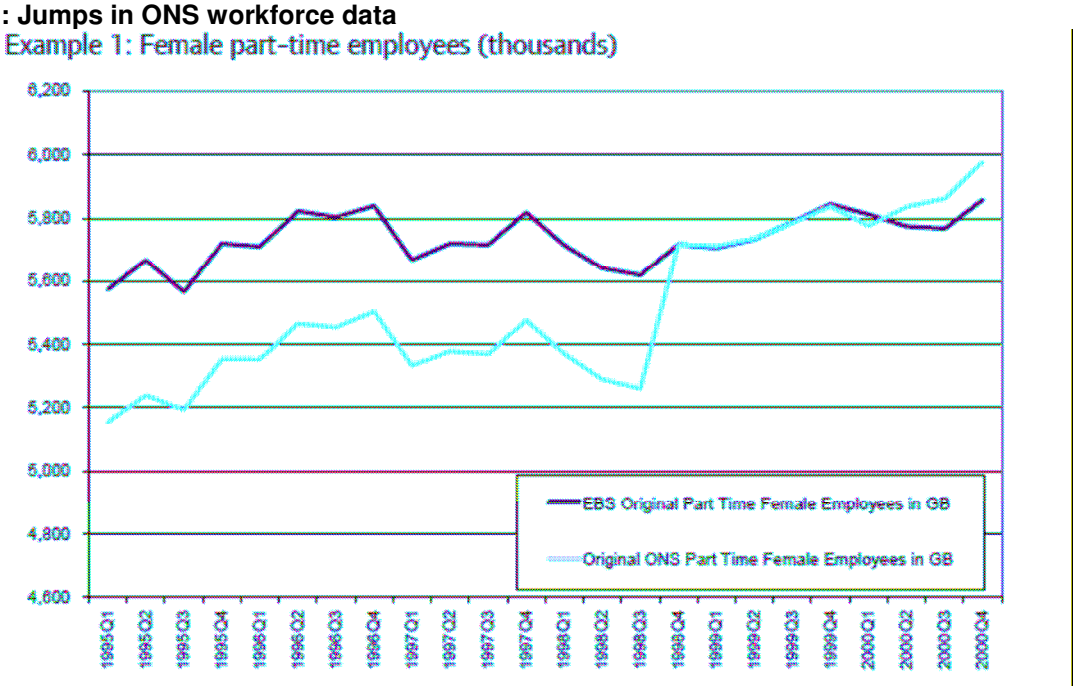
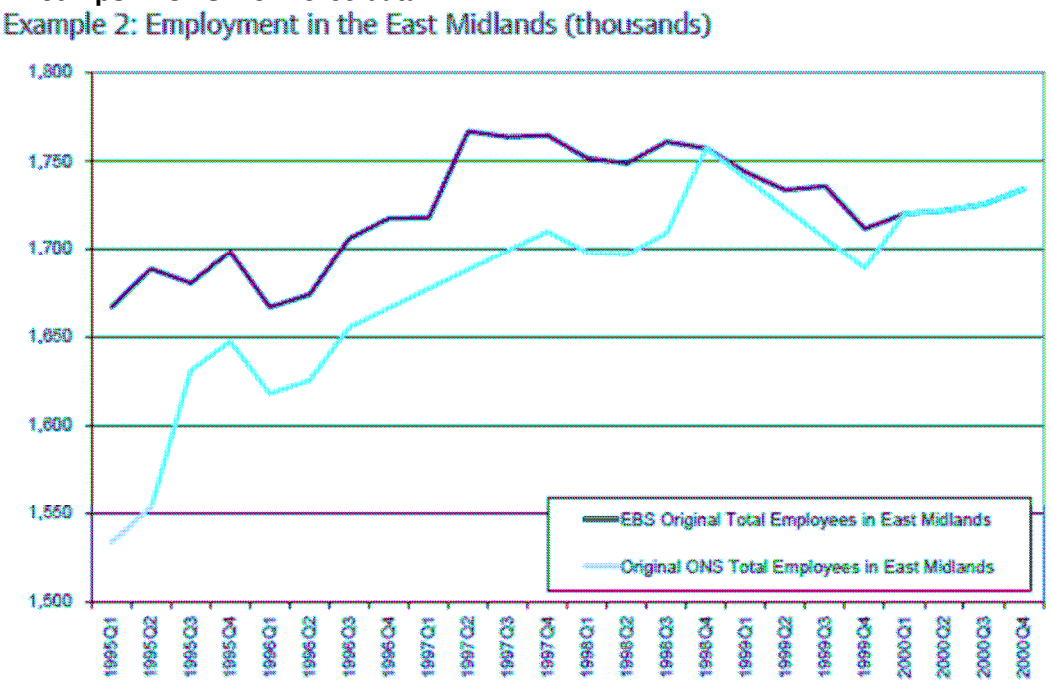


Chart B2: Jumps in ONS workforce data



Deliverables

Making Sense of the ABI builds on the success of its predecessors by including the results from the new ABI.

The main deliverable from this service is a set of spreadsheets comprising a consistent set of employee in employment estimates for:

- each year over the period 1982 to 2001
- the 58 SIC(92) divisions which are covered by this service (see Section B5 for details)
- national, regional, unitary authority, local authority or client specified areas
- worker type – that is, split by full-time female, full-time male, part-time female and part-time male employees.

Data quality

The local authority district data which comprises or underpins the datasets described above has been 'forced' or 'constrained' to be consistent with a number of series from official sources. As a result of this the datasets are consistent at the Great Britain level with the constraints detailed in Section B6.

It should also be noted that the local authority district level data which is available on an industry, gender and worker type basis from EBS is consistent with the relevant census observations made in 1981, 1991 and 2001. Please note, however, that errors due to rounding may be present in some of the datasets.

B2. The method: an overview

Dealing with the increase in the employee numbers from 1995

EBS offers its clients the opportunity to access a set of local employee number estimates which:

- reflect the revised estimates of Great Britain and regional level employee numbers which ONS have produced
- reflect information from all census points from 1981 to 1993, and from our own rescaled employee jobs estimates for 1995 to 1998
- line up with the local results from the ABI in 1998 to 2001.

Changing classification in 1993

At first sight it may appear that despite the recent changes in the SIC it is quite a simple task to construct a set of census based employee number estimates for the period 1982 to 1995. It may appear that all that has to be done is to define each new SIC(92) division in terms of one or a group of the old SIC(80) activity headings. The reasoning behind this approach is that since there are many hundreds of the old SIC(80) activity headings which may be used to define the 58 SIC(92) divisions it should be possible to get a close match or cross mapping between the two SICs. Unfortunately our research (and that carried out by the ONS) shows that it is not possible to define a cross mapping of an appropriate accuracy. Indeed, our results show that errors of over 50 per cent may occur if this simplistic approach is used to construct employee series over the period 1982 to 1995.

The key reason why the simple cross mapping method does not work well is that many employees which under SIC(80) were allocated to manufacturing headings have now been grouped under one of the newly created SIC(92) service sector headings or reclassified to existing service sector headings. As a result of this the same SIC(80) activity heading may be associated with several of the new SIC(92) divisions. Some researchers have attempted to get round this difficulty by assuming that a proportion of employees under a given SIC(80) activity heading may be associated with specific SIC(92) divisions. Our research shows however, that this assumption is also inappropriate as the proportion of a given SIC(80) activity heading which should be associated with specific SIC(92) divisions varies markedly across the country.

The methodology Experian Business Strategies has used to construct the employee number estimates provided by *Making Sense of the AES* is not based on this simple assumption that a cross mapping provides an accurate means of constructing employee number estimates. Instead we have adopted a two-staged approach. The first stage involves using a complex cross mapping (see Section B7) for details) to obtain 'first cut' estimates of employee numbers by local authority district, industry, gender and worker type. The second stage of the approach involves constraining these 'first cut' estimates to a series of Great Britain, regional and local authority district level constraints (see Section B6) for details of these constraints). To make these constraints 'bind' we have had to develop a quite complex series of iterative computer programs. These programs have taken a considerable time to develop and also take a long time 'to run'. This is because these programs need to simultaneously estimate series which relate to all the periods, industries, worker types, genders and local authority districts which are covered by the Service. The following section provides a guide to how these programs operate.

B3. The method: a step-by step guide

Brief method

There are three main reasons why the completion of the *Making Sense of the AES* dataset is a time-consuming process:

- The large number of inputs which need to be considered – the methodology we have used to construct the dataset utilises well over half a million separate pieces of information.
- The large number of outputs which are provided by the dataset – the standard outputs from *Making Sense of the Census* comprise almost two million separate pieces of information.
- The complex series of Great Britain, regional and local level constraints which need to be reflected in the dataset – this means that a large proportion of the Service's two million dataset values need to be computed simultaneously. This in turn means that a very complex series of programs have had to be developed to construct and quality check the required dataset.

Details

The remainder of this section provides a step-by-step guide to the approach which was taken in order to construct the dataset.

1. Establish a cross mapping which defines the SIC(92) divisions in terms of SIC(80) activity headings (see Section B7 for details).
2. Use this cross mapping to construct 'first cut' employee number estimates (for the census points over the period 1981 to 1991) which are disaggregated by local authority district, industry type (SIC(92) divisions), gender and worker type.
3. Use linear interpolation techniques to obtain quarterly values for the period 1981 Q3 to 1998 Q3.
4. Calculate for differences between 1981 and 1991 frozen wards definitions in 1991 Q3 (where both definitions are available for total number of employees) and apply results to data obtained in stage 3 for the period 1981 Q3 to 1991 Q2.
5. Calculate for differences between SIC(80) and SIC(92) definitions in 1991 Q3 (where both SIC definitions are available by industry, gender and worker type) and apply results to data obtained in stage 4.
6. For the period prior to 1991 Q3, constrain the values obtained at stage 5 to the total number of employees in census years.
7. Constrain the values obtained at stage 6 to the regional level constraints which are detailed in Section B6.
8. Constrain the values obtained at stage 7 to the Great Britain level constraints which are detailed in Section B6.
9. Splice the new ABI data onto the dataset obtained at stage 8, for all levels of disaggregation.
10. Constrain the values obtained at stage 9 to the total number of employees by local authority district, gender and worker type estimates which are available for the Censuses carried out over the period 1981 to 1999.
11. Repeat steps 7, 8, 9 and 10 until all the data are consistent, within reasonable tolerance limits, with each of the specified constraints (please see Section B1 for how to check the quality of the datasets).
12. Constrain the values obtained at stage 11 to the regional level constraints which are detailed in Section B6.
13. Constrain the values obtained at stage 12 to the Great Britain level constraints which are detailed Section B6.
14. Repeat stages 12 and 13 until all the data are consistent, within reasonable tolerance limits, with each of the specified constraints (please see Section B1 of this report of how to check the quality of the *Making Sense of the ABI* datasets).
15. Round the data to whole numbers.

B4. The data sources

Overview

Two basic types of data have been used to construct the employee number estimates which are provided by the predecessor to this report. These are as follows:

- The employee number estimates (disaggregated by industry, gender and worker type) which are available from the Censuses of Employment for 1981, 1984, 1987, 1989, 1991, 1993 and the AES for 1995 to 1998, and the ABI for 1998 to 2001
- The Great Britain and regional level employee number estimates (disaggregated by industry, gender and worker type) which are available from the ONS for each year over the period 1981 to 2001.

What census data was used in the project?

The source for all the census data which has been used in this project was NOMIS. The geographical building block which has been used to construct this census data is the local authority district. The NOMIS reference for the datasets we used were as follows:

- for 1981 to 1991, the LAD81 reference
- for 1991, 1993, 1995 to 2001, the LAD91 reference.

For the period from 1981 to 1991 the 1981 'frozen ward' boundaries were used to define each local authority district (referred to by NOMIS as LAD81). For the period 1991 to 1999, the 1991 'frozen ward' boundaries were used to define each local authority district (referred to by NOMIS as LAD91).

Over the period from 1981 to 2001, there were some small local authority district level boundary changes. The 'geographical building block' used to construct the data for the period 1981 to 1991 and the period 1991 to 1998 are not therefore an exact match. The differences between the two sets of 'geographical building blocks' can be assessed, however, at the 1991 census point, where both the 1981 and 1991 'frozen ward' definitions are available. These differences were applied to the period 1981 to 1991 so that consistent 'geographical building blocks' could be used over the period 1981 to 2001.

For the period from 1981 to 1991 census data for the SIC(80) activity headings specified in Section B7 was used for the first cut. These are then substantially refined (see Section B3). For 1993, census information relating to the 58 SIC(92) divisions was utilised. Census data which enabled the project team to further disaggregate this industrial information by both gender and on a part time/full time basis was also obtained for the period 1981 to 1993.

Agriculture data

Experience from the first rounds of the predecessor to this report showed that we needed to be particularly careful with agricultural employment data.

Agricultural employment in the local authority districts had been consistently under-recorded when compared to the regional-level agricultural employment data, mainly because of disclosure restrictions which the Ministry of Agriculture, Fisheries and Food have followed at the local area level.

The data is thus constrained to be consistent with our regional level numbers over the whole period.

While carrying out checking procedures on agricultural employment, we discovered inconsistencies between county level data and regional and Great Britain level data published by the ONS.

The ONS have been informed of our concern and have confirmed that there is a problem with regional and Great Britain level agricultural employment data. Consequently we have constructed new regional and Great Britain level agricultural employment data using county level data.

Service sector data

Due to volatility in the service sector data we have imposed restrictions on the percentage changes in the service sector over each year of the ABI.

What other ONS data was used in the project?

For the reasons detailed in the methodology section of this report (Section B3), the employee number estimates provided by Making Sense of the Census do not rely on the single assumption that it is possible to construct a cross mapping which defines the SIC(92) divisions in terms of the old SIC(80) industry activity headings. Rather we devoted considerable time to obtaining the ONS data which is needed to construct Great Britain and SIC(92) division level series of employee numbers over the period 1981 Q3 to 1995 Q4. Moreover, we 'dug deep' at the ONS and obtained the data we needed to construct SIC(92) division level based series of employee numbers in each Great Britain region. Consequently, we were able to construct a unique and comprehensive set of series which could then be used to ensure that the sub-regional level employee series which are provided by are consistent with those used in official sources. Section B7 provides details of the industries and areas for which we were able to construct 'constraining' data series.

B5. The SIC(92) divisions

The SIC(92) codes used to classify the GLA's workforce series are listed in Table B2. The second column provides the classifications for those data series broken down at the 58-sector (2-digit) level. The third column provides the 28 sector classifications and the last column provides the broad categories used to classify the first release. The fourth column describes the make-up of the five summary sectors for which GLA Economics supplies medium-term forecasts of employment and gross value added (GVA).

Table B2: SIC(92) codes

SIC(92) division	Description	SIC(92) category description	SIC(92) sector description	Broad sectors for which GLA provides forecasts
01	Agriculture, Hunting and Related Service Activities	Agriculture, Forestry and Fishing	**Agriculture**	***Not included in the forecast***
02	Forestry, Logging and Related Service Activities			
05	Fishing			
11	Extraction of Crude Petroleum and Natural Gas; Service Activities Incidental to Oil and Gas Extract.	Oil and Gas Extraction	**Mining and Utilities**	***Not included in the forecast***
10	Mining of Coal and Lignite; Extraction of Peat	Other mining		
12	Mining of Uranium and Thorium Ores			
13	Mining of Metal Ores			
14	Other Mining and Quarrying			
40	Electricity, Gas, Steam and Hot Water Supply	Gas, Electricity and Water		
41	Collection and Purification and Distribution of Water			
15	Manufacture of Food Products and Beverages	Food, Drink and Tobacco	**Other Manufacturing**	**Manufacturing Output**
16	Manufacture of Tobacco Products			
17	Manufacture of Textiles	Textiles and Clothing		
18	Manufacture of Wearing Apparel; Dressing and Dyeing of Fur			
19	Tanning and Dressing of Leather and Leather Products			
20	Manufacture of Wood and Wood Products	Wood and Wood Products		
21	Manufacture of Pulp, Paper and Paper Products	Paper, Printing and Publishing		
22	Publishing, Printing and Reproduction of Recorded Media			
25	Manufacture of Rubber and Rubber Products	Rubber and Plastics		
36	Manufacture of Furniture, Manufacturing Not Elsewhere Specified	Other manufacturing		

SIC(92) division	Description	SIC(92) category description	SIC(92) sector description	Broad sectors for which GLA provides forecasts
37	Recycling			
23	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Fuel Refining	**Metals, Minerals and Chemicals**	
24	Manufacture of Chemicals and Chemical Products	Chemicals		
26	Manufacture of Other Non-Metallic Products	Minerals		
27	Manufacture of Basic Metals	Metals		
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipment			
29	Manufacture of Machinery and Equipment Not Elsewhere Specified	Machinery and Equipment	**Engineering**	
30	Manufacture of Office Machinery and Computers	Electrical and Optical Equipment		
31	Manufacture of Electrical Machinery and Apparatus Not Elsewhere Specified		**Engineering** *continued*	**Manufacturing Output** *continued*
32	Manufacture of Radio, Television and Communications Equipment and Apparatus			
33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks			
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Transport Equipment		
35	Manufacture of Other Transport Equipment			
45	Construction	Construction	**Construction**	***Not included in the forecast***
50	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Automotive Fuel	Wholesaling	**Distribution, Hotels and Catering**	**Distribution, Hotels and Catering**
51	Wholesale Trade and Commission Trade, Except Motor Vehicles and Motorcycles			
52	Retail Trade, Except of Motor Vehicles and Motorcycles, Repair of Personal and Household Goods	Retailing		
55	Hotels and Restaurants	Hotels and Catering		
60	Land Transport; Transport Via Pipelines	Transport	**Transport and**	**Transport and**

SIC(92) division	Description	SIC(92) category description	SIC(92) sector description	Broad sectors for which GLA provides forecasts
61	Water Transport		**Communications**	**Communications**
62	Air Transport			
63	Supporting and Auxiliary Transport Activities of Travel Agents			
64	Post and Telecommunications	Communications		
65	Financial Intermediation, Except Insurance and Pension Funding	Banking and Insurance	**Financial and Business Services**	**Financial and Business Services**
66	Insurance and Pension Funding, Except Compulsory Social Security			
67	Activities Auxiliary to Financial Intermediation			
70	Real Estate Activities	Other Financial and Business Services		
71	Renting of Machinery and Equipment Without Operator and of Personal and Household Goods			
73	Research and Development			
72	Computer and Related Activities	Business Services		
74	Other Business Activities			
75	Public Administration and Defence; Compulsory Social Security	Public Admin and Defence	**Other (mainly public) Services**	**Other (mainly public) Services**
80	Education	Education		
85	Health and Social Work	Health		
90	Sewage and Refuse Disposal, Sanitation and Similar Activities	Other Services		
91	Activities of Membership Organisations Not Elsewhere Classified			
92	Recreational, Cultural and Sporting Activities			
93	Other Service Activities			

B6. Great Britain, regional and industry level constraints

The 'Constraining' Series

1. For Great Britain and the period 1982 to 1998 data series were available for nearly all of the 58 SIC(92) divisions (see Section B5). The exception being that for the following groups of divisions only aggregated data were available:

   Divisions 13 and 14

   Divisions 15 and 16

   Divisions 36 and 37

2. For the regions and the period 1982 to 1993 data series were available for the following groups of divisions:

   01 to 05

   10 to 14, 40 and 41

   15 to 37

   45

   50 to 52

   55

   60 to 64

   65 to 67

   70 to 74

   75

   80

   85

   90 to 99

3. For the regions and the period 1993 to 1998 data series were available for the following groups of divisions:

   01 to 05

   10 to 14

   15 and 16

   30 to 33

   23, 24, 26 to 28

   29, 34 and 35

   17 to 22, 25, 36 and 37

   40 and 41

   45

   50

   51

   52

55

60

62

61 and 63

64

65

70 to 73

74

75

80

85

90

91 to 93

4. Data series for divisions 01, 02 and 05 for Great Britain and the regions were found to be erroneous for September 1995. Consequently, we constructed new regional and Great Britain level agricultural employment data using county level data.

The 'first cut' estimates of employee numbers by local authority district, industry, gender and worker type obtained by using the cross mapping matrix described in Section B6 have been constrained to equal a series of ONS derived employee number estimates. These 'constraining' series are defined below. Please note that with the exception of data relating to part time male employees these 'constraining' series cover the period 1981 Q3 to 1999 Q4 and are disaggregated on a gender and worker type basis. For male part time workers these 'constraining' series were only available at the Great Britain level from 1989 and at the regional level from 1991.

B7. SIC(80) to SIC(92) cross mapping guide

The SIC(80) classes and activity headings which have been used to define the first cut for each of the new SIC(92) divisions are detailed in Table B3. Section B5 comprises a list which defines the industries which make up each of these SIC(92) divisions. Her Majesty's Stationery Office (HMSO) has published books which describe the precise make up of each SIC(92) division and SIC(80) class and activity heading.

Table B3: SIC(80) and SIC(92) cross mapping

SIC(92) Division	SIC(80) Class	Activity headings
01	01	
02	02	
05	03	
10	11	
11	13	
12	-	
13	21	
14	23	
15	41	-4290
16	-	+4290
17	43	+4831 + 4555 + 4556 + 4557
18	45	- 4555 - 4556 - 4510 - 4557

19	44	+ 4510
20	46	- 4663 - 4671 - 4672
21	47	- 4751 - 4752 - 4753 - 4754
22	-	+ 3452 + 4751 + 4752 + 4753 + 4754
23	12 + 14 + 15	
24	25+26	- 2569
25	48	+ 2569 -4831
26	24	
27	22	+ 3111 + 3112
28	31	- 3111 - 3112 - 3165 - 3166 + 3222 + 3204 + 3205
29	32	- 3222 - 3204 - 3205 - 3246 + 3165 + 3460
30	33	
31	34	- 3441 - 3443 - 3444 - 3453 - 3454 - 3442 - 3460 - 3452
32	-	+ 3441 + 3443 + 3444 + 3453 + 3454
33	37	+ 3442
34	35	
35	36	
36	49	+ 3166 + 4663 + 4671 + 4672 - 4930
37	-	6210
40	16	
41	17	
45	50	
50		+ 6510 + 6520 + 6710 + 6148
51	61 + 62 + 63	- 6148 – 6210
52	64 + 65	6510 - 6520 – 6710
55	66	
60	72	
61	74	
62	75	
63	76 + 77	
64	79	
65	81	
66	82	
67		8310
70	185	8340
71	84	
72	-	8394
73	94	
74	183	+ 4930 + 3246 - 8310 - 8320 - 8340 - 8394 + 9230
75	91	
50	93	
85	95	9611
90	92	- 9230
91	96	- 9611
92	97	
93	98	

Source: Experian Business Strategies

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