
Economic PERSPECTIVE

THE ANNUAL LABOUR FORCE SURVEY AND UNEMPLOYMENT RATES - CALCULATING WITH CONFIDENCE

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Introduction

The recent review by the Office for National Statistics (ONS) of the presentation and dissemination of labour market statistics has resulted in a greater prominence being given to the results of the Labour Force Survey (LFS) than was previously the case. In particular, in the official measurement of unemployment, a greater focus is now given to LFS results. There is an involved (and on-going) debate about the measurement of unemployment in the UK and a brief indication of some suggested references is appended to this paper.

One central issue in the debate on the measurement of unemployment in the UK has been the relative accuracy of estimates from the LFS. This short paper contributes to this debate by estimating the margins of error associated with unemployment rates sourced from the Annual LFS Local Authority database for 1996, using the Ayrshire area as an example.

The Labour Force Survey

The LFS is the largest regular household survey conducted in the UK, and conforms to international standards, such as those enshrined in European Union law. Some 60,000 households are surveyed each quarter, consisting of 5 waves of around 12,000 households. Each wave is interviewed for five successive quarters. In any quarter, wave 1 will be new to the LFS whereas wave 5 will be interviewed for the fifth (and final) time.

The Annual LFS database is constructed by selecting waves 1 and 5 from each of four consecutive quarterly LFS. This ensures that no respondent is 'double-counted' over the year. Averaging the LFS information in this manner achieves a reduction in the standard errors

associated with the estimates. The minimum suggested publication threshold for the Quarterly LFS is 10,000 compared to 6,000 for the Annual LFS. The 95% confidence interval for an estimate of 10,000 from the Quarterly LFS is $\pm 3,900$ compared to $\pm 3,000$ for an estimate of 10,000 from the Annual LFS. However, although the composition of the Annual LFS results in more accurate estimates, it removes the possibility of identifying any seasonal patterns in the information.

The LFS is a rich data source and provides information on a range of labour market indicators. The LFS can be used to calculate an unemployment measure which can be compared with rates in other European Union states, as it is consistent with the International Labour Organisation's definition of unemployment - "*A person who has no work or pay in kind in the reference week and who is able to start work in the next two weeks and who has been actively seeking work during the last four weeks or is waiting to start a job already obtained*"

The LFS is a sample survey, and, as such, the results are subject to sampling error. The issue arising therefore is the determination of the precision of any estimate from a particular sample. This is typically addressed by constructing confidence intervals (usually 95% or 99%).

The official 95% confidence intervals (see Table 1) for selected point estimates from the Annual LFS are given in the *LFS Manual Volume 6*. These confidence intervals are proportionately smaller the larger the value being estimated. This means that, in general, the LFS results are more accurate (and hence of more value) for larger geographical areas. For instance, an Annual LFS estimate of 1,000,000 has a 95% confidence interval of $\pm 30,100$, around 3% of the value of the estimate. An Annual LFS estimate of 10,000 has a 95% confidence interval of $\pm 3,000$, around 30% of the estimate.

As the LFS in its current form is designed for UK regional, national and international comparisons, the previous result should bring no great surprise. However, the LFS is not, nor more importantly has it ever claimed to be, 100% accurate at the sub-UK regional level. Indeed recent ONS guidelines suggest that the claimant count measure of unemployment is perhaps of more value at the sub-regional level, despite its inherent limitations (*Laux*).

Estimating Confidence Intervals

The ONS has outlined a method for approximating the standard errors of estimates

from the Quarterly LFS in the LFS user manuals. Our approach involved amending this method to calculate approximate standard errors of estimates from the Annual LFS. The ONS has been consulted on our approach, and raised no objections in principle to the method adopted. Comments made have been incorporated into our approach.

As an example, our formula produces an approximate standard error of 1480 for an estimate of 10,000 from the Annual LFS. The official ONS estimated standard error for such a value is 1500. Table 1 details the official estimates of standard errors produced by the ONS (from confidence intervals rounded to the nearest hundred) alongside our estimates (rounded to the nearest 10). No attempt was made to produce a formal least-squares estimate due to the rounding involved. Table 1 also outlines the goodness of fit between the standard errors produced using our formula and the official standard errors, for the point estimates given. This is graphically illustrated in Figure 1.

If we assume that the true standard error function is well-behaved (and this appears a reasonable assumption), then our formula for estimating standard errors can be used to construct confidence intervals for any estimate from the Annual LFS.

Results for Selected Geographies

The results of our approach for selected Ayrshire geographies and for the West of Scotland in 1996 are shown in Table 2 and graphically illustrated in Figure 2. The average workforce-based claimant-count unemployment measure for the selected geographies in 1996 is also included in Table 2.

Although the claimant-count and the ILO definition measure different things, there is a degree of overlap which has recently been estimated (Pease). Concerns do exist as to whether or not this overlap is stable over time (Bartholomew *et al*). The relative merits of the claimant-count measure and the LFS measure of unemployment have been widely discussed (e.g. Greene, Gregg, Bartholomew *et al*). Our results illustrate that it is possible to get very different unemployment rates dependent on which source is used. Although the claimant-count is an accurate measure of what it attempts to measure (being a by-product of an administrative system), it is not a true measure of unemployment. Conversely, the ILO definition has the advantage of being an international standard and is considered by some a reasonable definition of unemployment, although there have been calls for extended measures (Beatty *et al*,

Bartholomew *et al*). What our approach has highlighted is the very large errors associated with the LFS measurement of ILO unemployment at smaller geographic levels. In particular, the claimant-count rates for the Ayrshire sub-areas are all contained within the 95% confidence intervals for the LFS measure.

Conclusion

The ILO definition of unemployment may be more intuitively appealing than using the claimant-count based measure, with the added advantage of being independent of the benefits system. This paper suggests, however, that for many sub-regional areas the relatively large standard errors associated with ILO estimates of unemployment from the LFS make the information largely unsuitable for policy purposes. This could have repercussions in forthcoming major policy areas such as the UK Assisted Areas Review and the Review of European Union Structural Funds, where unemployment is likely to be a key criterion.

An implication of decisions made on this basis is that policy may be misdirected, not leading to support being delivered appropriately. Indeed policy first delivered then assessed on this basis may be inappropriately characterised as failing. The Assisted Areas Review and the Review of European Structural Funds are critical areas for policy makers, where the policy cycle and its impact are quite long lived. Decisions on these and other policy areas should be based on defensible analysis.

In terms of strategic policy decisions, where accurate information is paramount, the confidence intervals associated with ILO point estimates must be taken into account. As such, taking the point estimate ILO rate (the midpoint of the confidence interval) is potentially misleading when such large confidence intervals are involved, and it is difficult to make a statistically valid justification for this approach. Perhaps a 3-year or even a 5-year average from the LFS may be necessary to achieve a sufficient level of accuracy at which to draw policy distinctions. This raises other issues though such as how to make allowances for rapidly changing trends in the recent past.

The ONS is aware of the issues concerning the definition of unemployment and the accuracy of its measurement at local levels. In the medium term, the ONS has indicated that it will investigate a hybrid method to produce unemployment rates at the local level, based on the claimant count data and the LFS data. The results of such a study should begin to address some of the concerns about the use and misuse of

Quarterly Economic Commentary

the Annual LFS at smaller geographic levels. Perhaps the main issue for labour market practitioners and those with a strong interest in related policy areas is to ensure that the current LFS estimates of ILO unemployment at local levels are not misrepresented nor misused in major policy debates.

Acknowledgements

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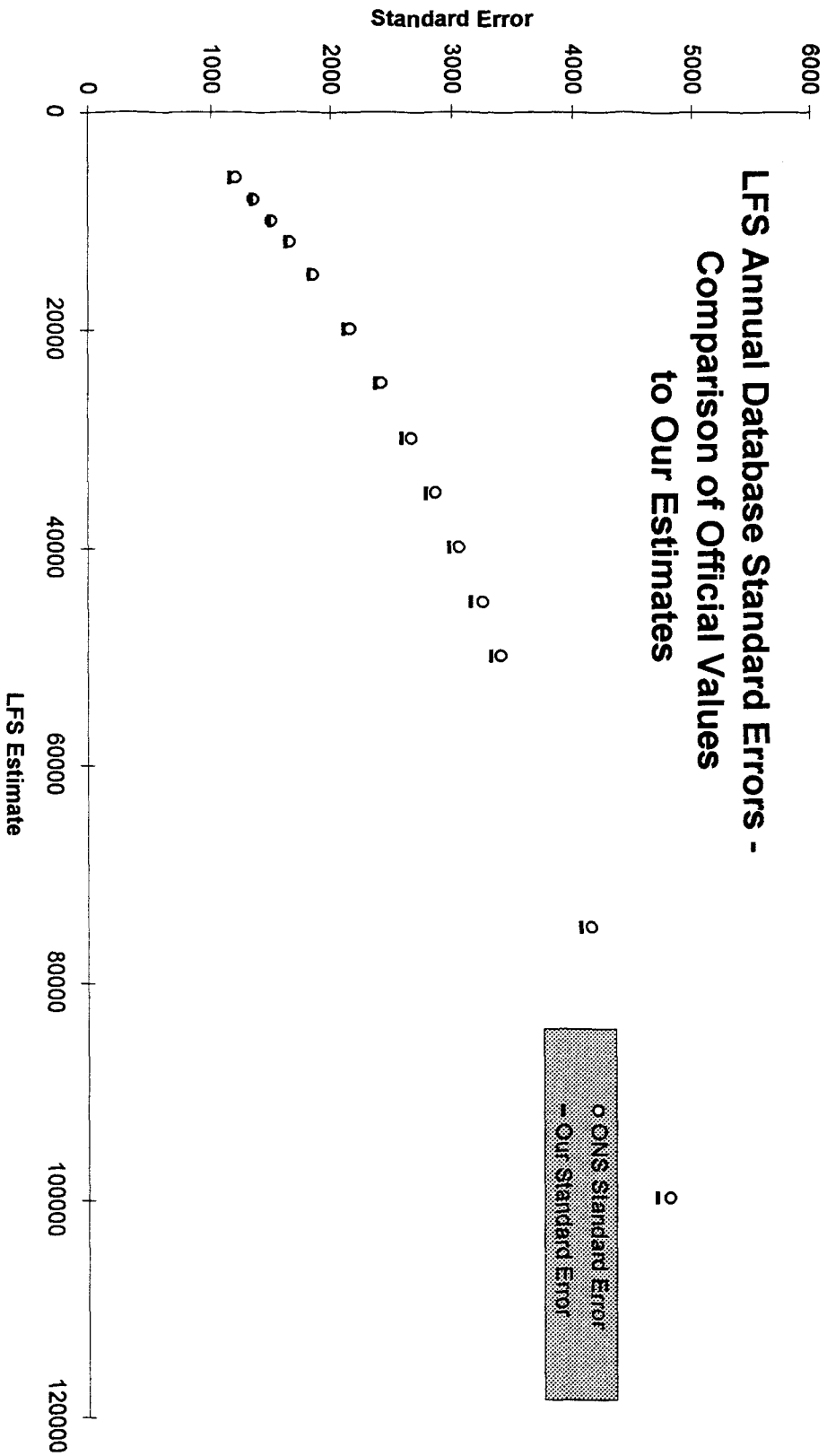
Table 1 - Comparison of Official LFS Standard Errors and our estimates

Annual LFS Estimate	95% confidence interval +/-	ONS official standard error	Estimated standard error	% difference between official and our estimated standard error
6000	2400	1200	1150	-4.3%
8000	2700	1350	1330	-1.5%
10000	3000	1500	1480	-1.4%
12000	3300	1650	1620	-1.9%
15000	3700	1850	1820	-1.6%
20000	4300	2150	2100	-2.4%
25000	4800	2400	2350	-2.1%
30000	5300	2650	2570	-3.1%
35000	5700	2850	2770	-2.9%
40000	6100	3050	2970	-2.7%
45000	6500	3250	3150	-3.2%
50000	6800	3400	3320	-2.4%
75000	8300	4150	4060	-2.2%
100000	9600	4800	4690	-2.3%
150000	11800	5900	5740	-2.8%
200000	13600	6800	6630	-2.6%
250000	15200	7600	7420	-2.4%
500000	21400	10700	10490	-2.0%
1000000	30100	15050	14830	-1.5%

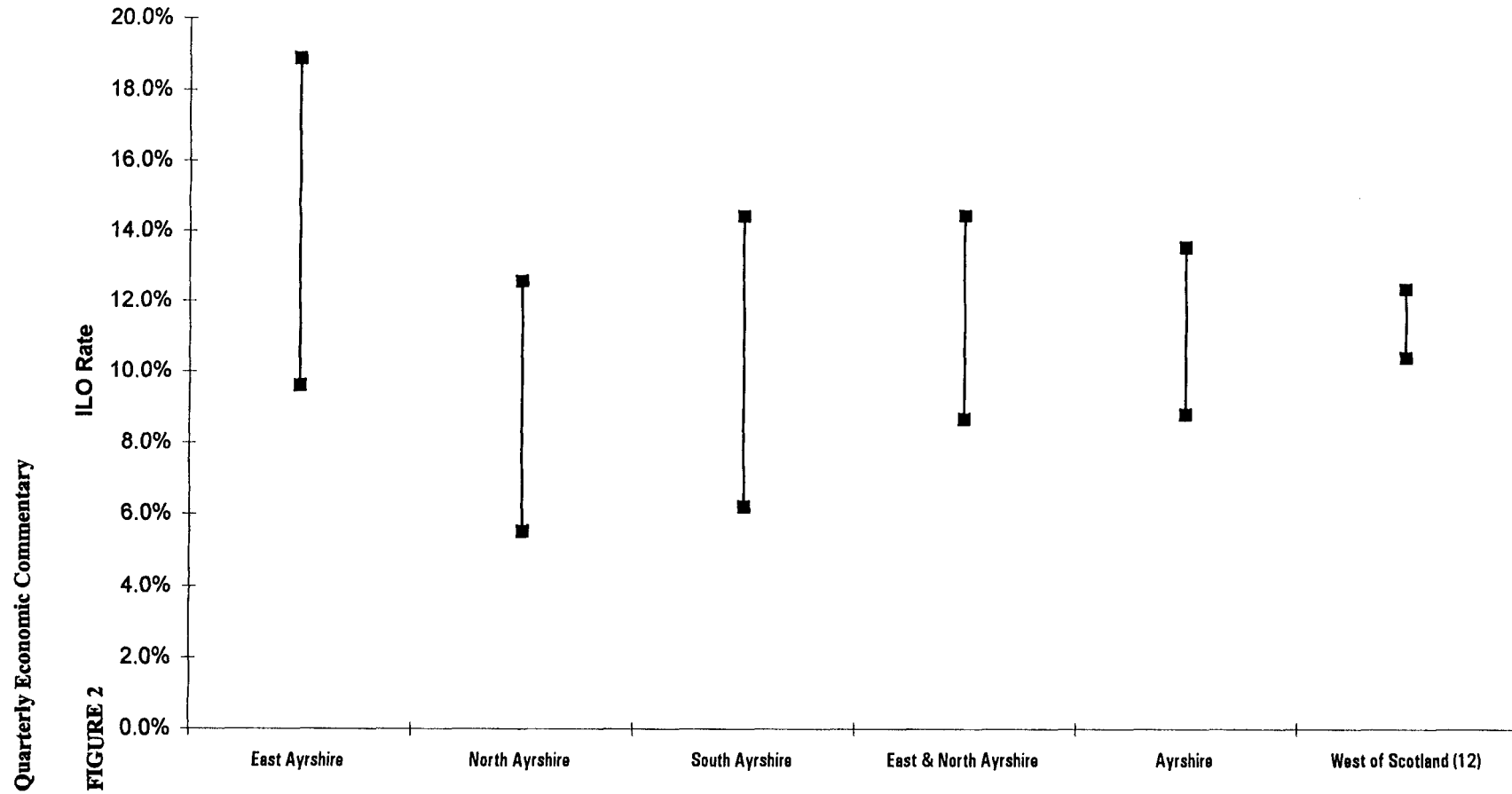
Table 2 - 95% Confidence Intervals for ILO Unemployed from 1996 Annual LFS and Average Workforce based claimant-count rate for 1996

	Lower Limit	Estimated ILO unemployed	Upper Limit	CC Rate (1996)	Lower limit ILO Rate	Estimated ILO Rate	Upper limit ILO Rate
AREA							
East Ayrshire	6000	8000	11000	11.8%	9.6%	14.2%	18.9%
North Ayrshire	3000	6000	8000	12.6%	5.5%	9.1%	12.6%
South Ayrshire	3000	6000	8000	8.4%	6.2%	10.3%	14.4%
East & North Ayrshire	11000	14000	18000	11.9%	8.7%	11.5%	14.4%
Ayrshire	15000	20000	24000	10.7%	8.8%	11.2%	13.5%
West of Scotland (12)	110000	120000	131000	9.5%	10.4%	11.4%	12.4%

(LFS estimates rounded to nearest thousand for publication on advice of ONS. Claimant-count rate sourced from NOMIS)



1996 Annual LFS - 95% c.i.s for ILO unemployment rates



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FIGURE 2

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