London Business Demography Project

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Table of Contents

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Executive Summary

Introduction

- The aim of this report is to provide a comprehensive statistical analysis of firms and jobs in the Greater London area. The analysis covers a range of key indicators, to include headline numbers of firms and jobs in the private sector, and their pattern of change between 1997 and 2011; the firm size distribution; job creation and destruction; growth rates, and the incidence of high growth firms. The report analyses the pattern of firms and jobs by sector and borough and also discusses alternative measures of jobs in London using other data sources.

- In this report firms are defined as 'employer enterprises', that is, those businesses with at least one employee. The location of the firm is determined by the postcode address of its head office, and London is defined as the sum of its boroughs.

Headline Numbers

- Between 1997 and 2011 the number of firms in London rose by almost 30% from 220,000 to 280,000; over the same period the number of jobs increased by just 5%, from 4.1m to 4.3m. The slower growth in jobs than firms indicates that the number of jobs per firm has fallen, and indeed it has decreased from an average of around 19 in 1997 to just under 16 in 2011. Despite the drop, the number of jobs per firm in London remains around 25% higher than the UK average.

Size Distribution

- As is commonly found, both in the UK and elsewhere, most firms in London are small; more than two thirds have less than five employees. Whilst these small firms are important numbers-wise they account for just 7% of jobs. In contrast, just 5% of firms have 20 or more employees however they account for around 80% of all jobs. In fact, of all firms with 20 or more employees, those with 250 or more contribute around 60% of all jobs despite accounting for less than 1% of the total number of firms.

Firm Dynamics

- For most of the period up to 2008 the birth ratio in London (firm births as a ratio of the stock of firms at the beginning of the year) fluctuated between 17%-20%, before dropping sharply to 15% in 2008 and remaining at that level thereafter. The death rate varied little; averaging 16% over the entire 1998-2011 period. As a result, the net birth ratio (birth ratio minus the death rate) ranges from around 0 to 5% annually

- Whilst a share of around 15-20% of the existing stock of firms are born in London each year, these new firms can start to die within the first year of opening; in fact just 80% survive to age one. Survival rates decline steadily with age, and typically ten years after birth just 15% of the original birth cohort survives.

Job Dynamics

- The stock of firms at the beginning of a year can be divided into four components; deaths and three categories of survivors, namely expanding, contracting and firms where the number of jobs remain the same. In London, each year over the entire period, more than half of survivor firms (55%-65%) did not change the number of jobs; around 10%-15% expanded and between 7.5%-10% contracted.

- The components of job creation and destruction are derived from these survivor firms, along with births and deaths. Births and expanding firms contributing towards job creation, and deaths and contracting firms contributing towards job destruction. Each year in London the expansion of survivors was more important to job creation than births; expansions were also larger than contractions. Up until 2006 deaths made a bigger contribution to job destruction than contractions; thereafter contractions played a greater role.

Sectoral Analysis

- The sectoral share of firms is measured using 2-digit SIC92 classifications; in London business services dominates, accounting for 25% of firms in 1997 and increasing to around 35% in 2007, where it has remained. Just seven other sectors account for more than 5% of all firms, these are: computer services; retail distribution; real estate; construction; wholesale distribution; recreation and culture, and; hotels and restaurants. In 2011 these eight sectors accounted for more than 80% of all firms.

- Using location quotients once can compare the sectoral distribution of firms in London with that of the UK, and measure the degree of 'over-' or 'under-representedness'. There are eight sectors in London which have a 40%, or more, larger share of the stock of firms than those sectors have in the overall UK stock of firms. Unsurprisingly three of the top eight are financial sectors; the others include manufacturing apparel; publishing and printing; recreation and culture; real estate, and computer services. The 'under-represented' sectors are mainly in manufacturing. Importantly the business services sector, which accounted for around one third of all firms in London in 2011 has a location quotient of 1.2, indicating that whilst it is somewhat 'over-represented' compared to the rest of the UK, it is not exceptionally so, and in fact around one quarter of all firms in the UK are in this sector.

- The sectoral share of jobs is quite similar to the share of firms in that of the top nine sectors (with shares larger than 3% of total jobs) eight of them were the top in terms of share of firms; the additional sector here is financial intermediation. Together these top nine accounted for 76% of all jobs in 2011. Despite these similarities the location quotient distribution for jobs is different than it was for firms; there are three sectors in particular with considerably heavier concentrations than the UK average; air transport, financial intermediation and activities auxiliary to finance. Other sectors of note which are 'over-represented' in London in terms of jobs include activities auxiliary to transport and membership organisations.

Borough Analysis

- Firm dynamics, as measured across boroughs, reveals differences in birth ratios, ranging from 15% in Kensington and Chelsea to over 22% in Newham. There is a strong correlation between birth and death ratios, thus using the net birth ratio (birth-death ratio) Wandsworth and Newham have the highest rates of expansion, with the stock of firms in Wandsworth increasing by almost 60% between 1997-2011 and Newham's increasing by 50%, compared to a London average of 27%. The City of London was the only borough to have a contraction in its stock of firms whilst the stock increased by just 3% in Kensington and Chelsea.

- The distribution of firms in London is highly skewed with 12% of firms located in Westminster; a further five boroughs have shares of 4% or more, namely Camden, Barnet, Islington, Kensington and Wandsworth. These top six boroughs

have largely remained unchanged since 1997, and account for one third of all firms in 2011; interestingly, they are all neighbouring boroughs. The bottom end of the list consists of boroughs which are to the South and East of central London.

- The distribution of jobs across boroughs is also highly skewed, even more so than for firms; Westminster accounts for 18% of all jobs whilst the City of London, Camden and Southwark each have shares greater than 5%. These top four boroughs account for almost half of all jobs in London.

Growth Rate Distributions

- The growth rate distribution of jobs, expressed as annual rates, is computed across five growth categories (two negative, one unchanged, two positive) for each three year period between 1997-2011. In London most of the distribution is concentrated in the middle 'no growth' category indicating that each year between 40-50% of firms have no change in the number of jobs. Around 20% of firms have growth greater than or equal to 20% annually, known as 'fast growth' firms.

- Almost one fifth of the smallest firms (1-9 employees) are in the 'fast growth' (≥20%) category; in the other size-bands this top category share is about one tenth. The share of firms in the 'fast growth' category changes quite strikingly with age: at age one it is about one quarter, by age ten it has fallen to just above one tenth. The sectors with the greatest share of firms in the 'fast growth' category as typically service sector firms, with the communications sector at the top of the list with 22.7% of firms recording 'fast growth'. There is little variation across boroughs regarding the share of 'fast growth' firms; the highest is in Wandsworth, at 17.6% compared to the lowest in Sutton at 15.1% of firms.

High Growth Firms

- High growth firms (HGFs) are fast growth firms with ten or more employees in the first year of the three year growth period. There are typically around 2,000 HGFs per three year period in London; the incidence rate averages around 9%. The rate of HGFs in London is around 2-3 percentage points higher than the UK average over each three year period. Since 2002/05 the UK has recorded between 10,000 and 11,000 HGFs per period, so London accounts for about one fifth of all the HGFs in the UK.

- Firms in the 10-19 size-band account for half of all HGFs in most periods, with the other half split 30/20 between the medium (20-49) and large (50+) size-bands. Episodes of high growth are more likely amongst younger firms; with around 17.5% of age one firms in the 'high growth' category; by age 10 the share is typically just below 10%. HGF incidence rates by sector vary considerably. The top five, with HGF incidence rates of between 10 and 15% in 2008/11, are services; two of which are financial services, namely insurance and pensions; and activities auxiliary to finance. The incidence rate also varies by borough, ranging from Hammersmith with the highest rate, at 11.5% to Bexley at the bottom with a rate of just 6%.

- HGFs are disproportionately important as job creators: they account for about 1.5% of job creating firms but contribute 25% to 30% of jobs created. The figures for London are quite similar to those for the UK as a whole where in 2007/10 HGFs accounted for about 1.5% of job creating firms and just over 20% of jobs created.

Alternative Estimates

- An alternative measure of firms and jobs in London can be done based on establishment-level records, as opposed to firm-level which have been used here. To do this, we have used methods analogous to those used on the firm-level records to compile the establishment records into a longitudinal establishment-based dataset for the years 1997 to 2011, including all private sector establishments which have a postcode in a London's borough. We then compare establishment-level jobs data with the corresponding firm-level data for London and the boroughs. We also present comparisons between the establishment-level jobs figures and survey-based estimates of jobs for London and its boroughs published by the ONS and compiled by them from the Annual Business Inquiry (ABI, 1998 to 2008) and the Business Register Employment Survey (BRES, 2008 to 2011).

- The London firm-level figure fluctuates around four million over the 1997-2011 period; the corresponding establishment-level figure is about one million lower and fluctuates around three million. The ratio between the two series – (establishment ÷ firm) ranges from around two thirds to three quarters over the period.

- The establishment jobs figure and the ABI-BRES series are relatively similar, both recording between 2.5m and 3.0m jobs. At a lower level of disaggregation, the figures show more variation; the establishment/ABI-BRES ratio varies considerably across boroughs. The series ranges by a factor of two, from 1.2 to 0.67 – in Kensington and Chelsea there are 25% more establishment jobs than BRES-ABI jobs, in Sutton establishment jobs are only two thirds of ABI-BRES jobs. About half the boroughs have an establishment/ABI-BRES ratio larger than or equal to the London average of 0.95.

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Introduction

1. This report provides a comprehensive statistical picture of London's firms and jobs. It develops a framework for analysing them which draws on demography and pays careful attention to the (often implicit) accounting relationships which tie together firms, their growth and survival, and the evolution of job numbers. This framework, in turn, helps to organise the analysis and interpret a considerable volume of data.

2. The body of the report is organised into nine sections. We start with headline numbers of firms and jobs and summarise the pattern of change over the years 1997 to 2011, and the evolution of a key indicator: the number of jobs/firm. The first analytical chapter investigates the firm size distribution which serves to tie together the number of firms and the number of jobs and shows how jobs per firm can be used to make the pattern of change in firms and jobs more readily comprehensible. The next section involves stepping back to look in more detail at firm dynamics, after summarising the record on births and deaths it introduces the cohort approach (a borrowing from demography) which allows us to focus on the key role of age in tracking the stock of firms. The same cohort approach is used in the following section to illuminate the role of age in job dynamics, an analysis which provides the background to the presentation of a conventional set of job creation and destruction accounts. The sixth section describes the pattern of firms and jobs across two key dimensions: sectors and boroughs. This is followed by a pair of sections which deal with time series of job growth rates by size, age, sector and borough. The first summarises the growth rate distribution, the second the incidence of high growth firms. The final section discusses some alternative measures of jobs in London, one based on jobs in London establishments, the other ONS data from the Annual Business Inquiry and the Business Register Employment Survey. The report finishes with a section describing the data and its construction and an algebraic appendix.

3. There are a few methodological matters which should be mentioned at the outset. Firm is defined here as an "employer enterprise", in other words we count only those businesses which have at least one employee. The location of a firm it determined by the post code address of its head office. London is defined as the sum of its boroughs and the data is built up from the link between postcodes and the borough boundaries. Finally, we consider only private sector firms where private sector is defined by industrial sector (see Data sources section for more detail).

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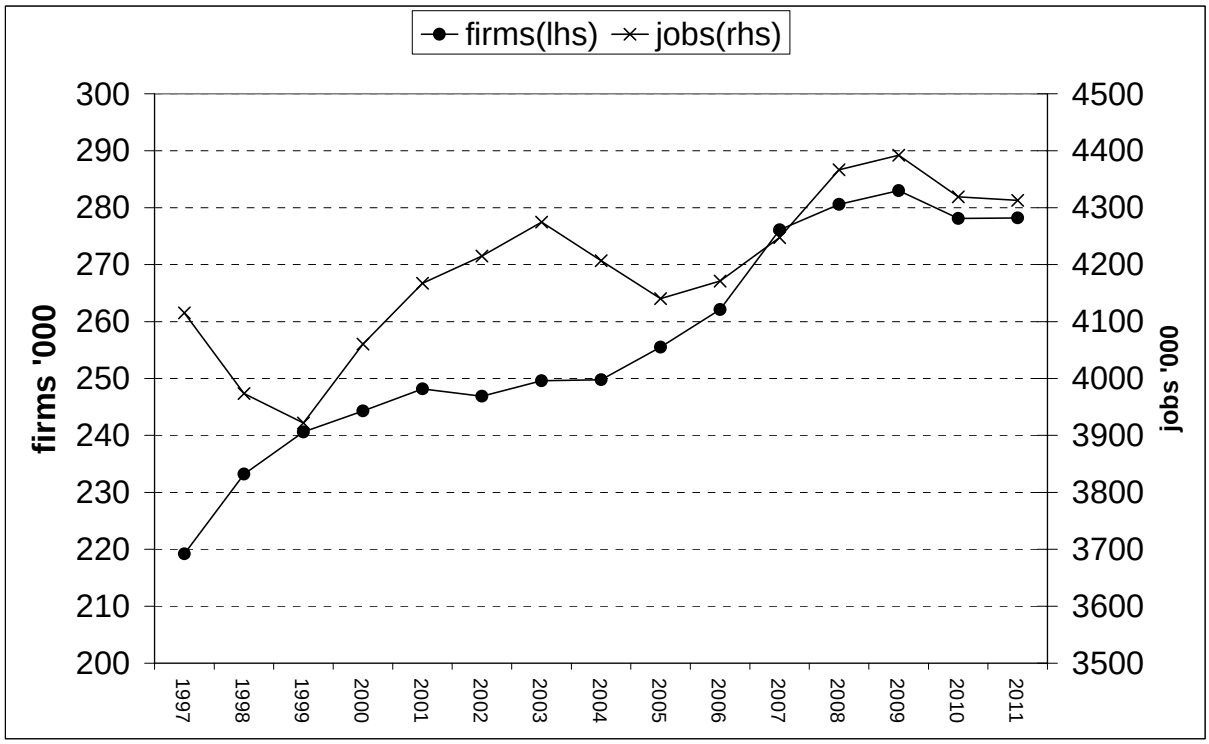
1 Headline numbers

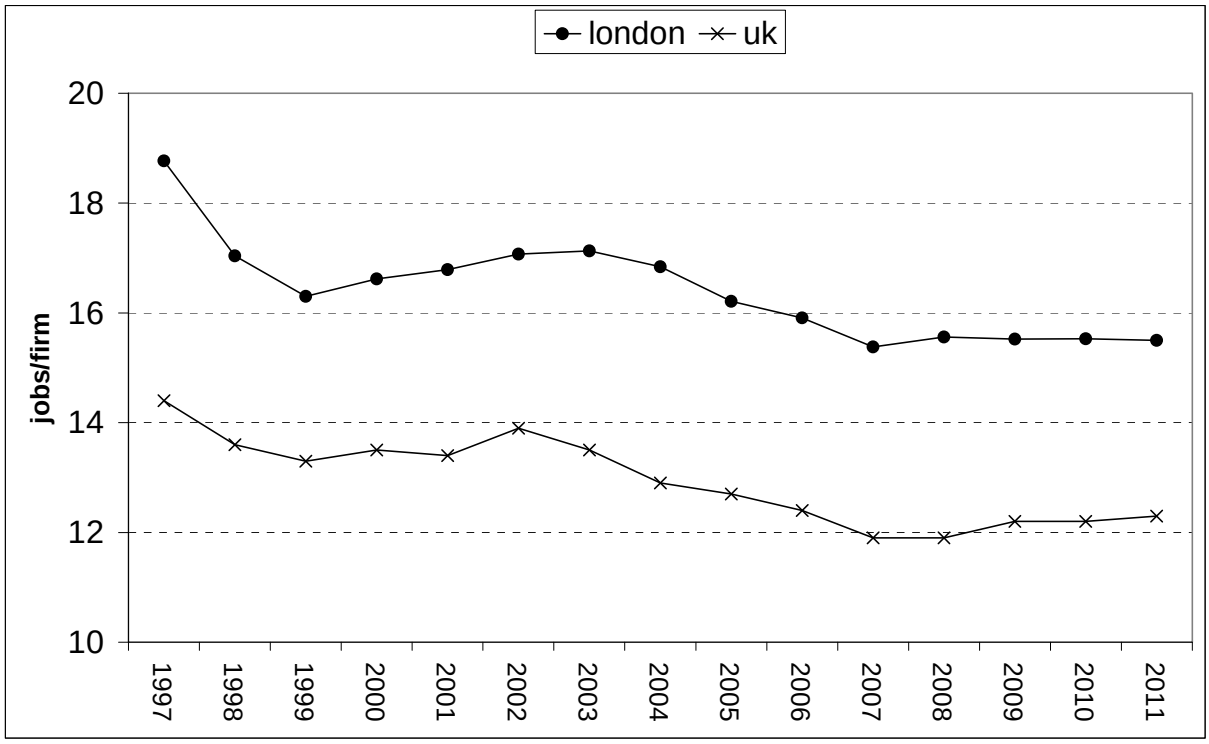
4. Over the decade and half covered by our data – from 1997 to 2011 – we can see from from Figure 1 that the number of firms (left hand scale) rose by almost 30% from 220,000 to 280,000. The number of jobs (right hand scale) increased rather less, by 5%. However the 1997 figure looks a little like an outlier so a more useful summary would measure growth from 1998 yielding an increase is 9%, with jobs up from 4.0 m to 4.3 m, and an increase in firms over the 1998 to 2011 period of about 20%. The slower growth in jobs than in firms implies that the number of jobs per firm has fallen. This can be confirmed from Figure 2, but we can see that the fall – at least between 1998 and 2000 – looks quite modest, and that the jobs/firm figure fluctuates within quite narrow bands. After almost a decade between 16 and 17, it drops to just below 16. The UK jobs/firm figure has also been included on the chart and it appears that the London ratio is about 25% larger, but has moved more or less in parallel.

Figure 1: London, Firms & jobs, 1997 – 2011, '000



Source: ONS/BSD

Figure 2: London & UK, jobs/firm, 1997 -- 2011



Source: ONS/BSD

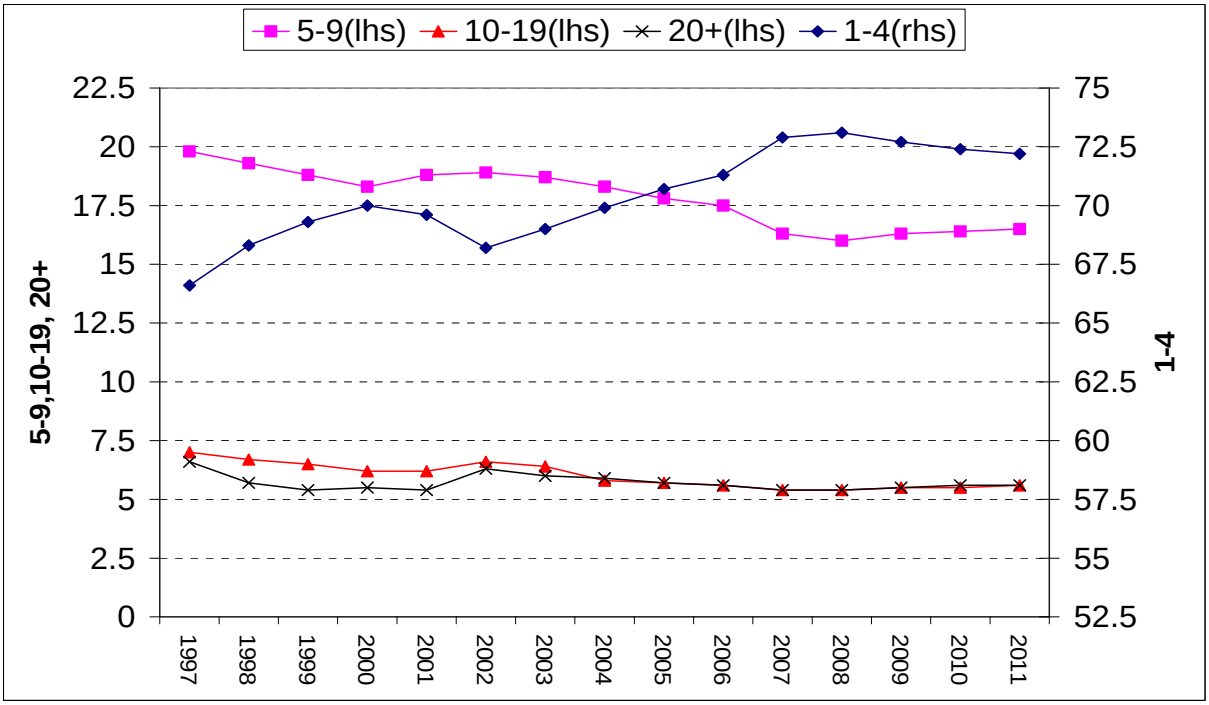
2 Firm size distribution

5. In London, as elsewhere in the UK (and in other countries) most firms are small, indeed very small. As we can see from Figure 3, in London more than two thirds of firms (right hand scale) have less than five employees (by our 'employer enterprise' definition of a firm they have at least one). Moreover, the share of these firms has risen. In the first decade it varied between 67.5% and 70%, after 2007 it moved up and settled at 72.5%. The larger size-bands are plotted against the left hand scale (but with the same five percentage point tick marks). Fluctuations in the 5 to 9 size-band broadly offset the increase in the 1 to 4 size-band, it declined from 20% to 15%, with the small shares of the larger firms remaining broadly unchanged at around 5% each.

6. The distribution of jobs across the firm size-band looks quite different. Around 80% of jobs are in the largest, 20+ size-band firms (right hand scale) – so 5% of firms account for about 80% of the jobs. At the other end of the size distribution, the

smallest firms in the 1 to 4 size-band (left hand scale), account for between 6% and 7% of jobs. The pattern we saw earlier, the increase in the 1 to 4 share in the stock of firms shows up here too: the share of jobs in the 1 to 4 size-band increases from about 6% to 7%, and this increase is matched by a decline in 5 to 9 and 10 to 19 size-bands (all left hand scale).

Figure 3: London, firm size distribution, 1997 – 2011, %

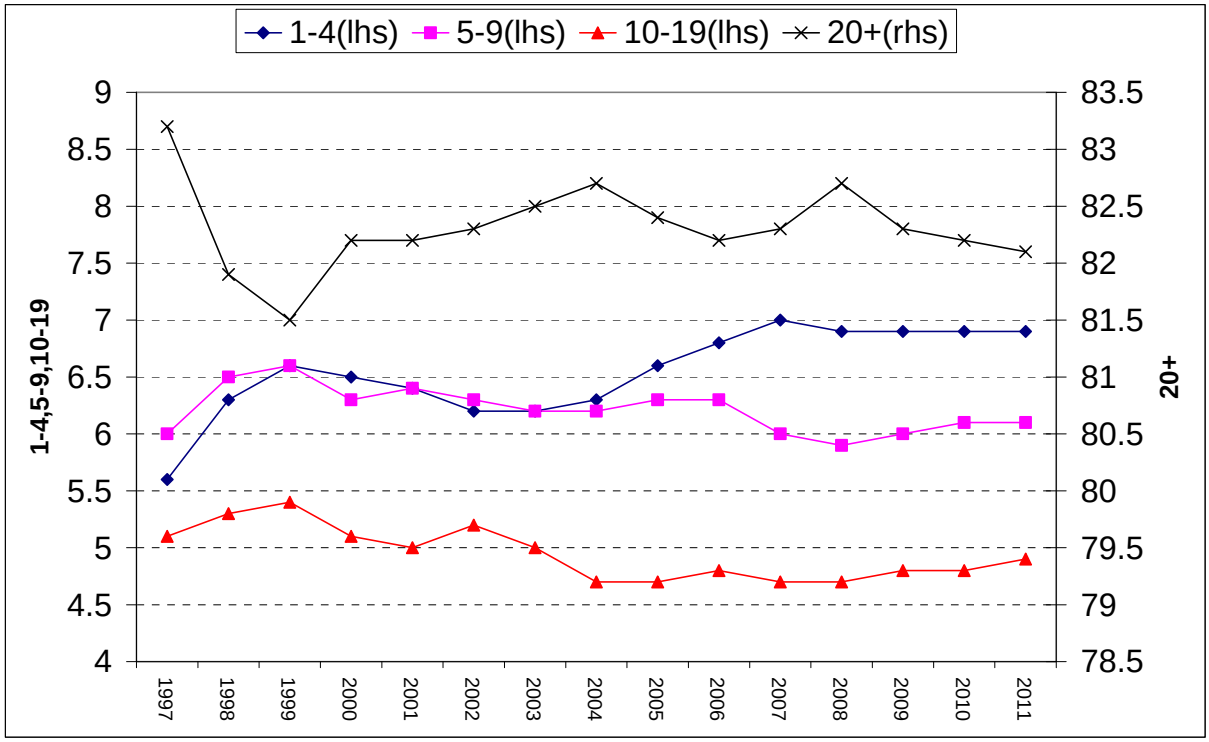


Source: ONS/BSD

7. It is also useful to notice the connection between average jobs per firm and the firm size distribution: we can express overall average jobs per firm as the sum of average jobs per firm in each size-band weighted by the share of the corresponding size-band in the stock of firms.[1] From Figure 2 we know that 1998 and 2007 mark different phases in the evolution of the jobs/firm figure for London and Table 1 records the data for them and for 2011, the most recent year. You will notice that for the three bounded size-bands – 1 to 4, 5 to 9 and 10 to 19 – the average jobs/firm (in column (1)) is virtually constant over the three years, only the average of the 20+ (unbounded size-band) varies very much. Moreover, although 20+ firms are only a very small proportion of the stock of firms as we can see from column (2) they are so large (with, on average, around 250 employees) that even when weighted by their share in the firm size distribution, recorded in column (3), they are the biggest contributors to the overall

jobs/firm figure, from column (4) we can see that the contribution is 82% in each of the three years. It is also worth noticing that the figures in column (4) which are calculated as the weighted contributions in column (3) divided by the overall jobs/firm figure are, in fact, the shares of job in each size-band displayed on Figure 4.

Figure 4: London, jobs, share by firm size, 1997 – 2011, %



Source: ONS/BSD

8. As we have just seen (and will see further below) the firm size distribution is used here as an analytical tool which helps make a connection between firms and jobs, and for that purpose, the four size-band classification is sufficiently detailed. However when the firm size distribution is being used descriptively (rather than analytically) it is conventional to provide a more fine-grained treatment of larger firms rather than consign them to a single 20+ size-band. Table 2 provides more detail for larger firms, splitting the 20+ size-band into four categories: 20 – 49; 50 – 99; 100 – 249; and 250+; and showing the distribution of firms and jobs over those size-bands. We know already from Figures 3 and 4 that there is no strong trend in the share of 20+ firms in either the stock of firms or the stock of jobs, so we present this more detailed size-band data for just 1997 and 2011.

9. As we can see from the 'firms' columns, most 20+ firms (almost two thirds) are in the 20-49 size-band, there are very few 250+ firms – less than 1% -- either in 1997 or 2011; in both years there were around 1,500 in this largest size-band. As might have been anticipated, though, the largest firms account for the bulk of jobs, over 60% of the total, about 2.7 million jobs in both 1997 and 2011. The 250+ size-band is unbounded, so the size could vary considerably, however the average number of jobs/firm is around 1,800 and is much the same in 1997 and 2011. The other three large firm size-bands contribute relatively little to the stock of jobs, indeed the job shares for all size-bands, from 1—4 up to 100 – 249, are all in the 5% to 7% range.

Table 1: size-band decomposition jobs/firm, selected years

	jobs/firm (1)			firm size distribution % (2)			weighted jobs/firm (3)			weighted contrib share % (4)		
size-band	**1998**	**2007**	**2011**	**1998**	**2007**	**2011**	**1998**	**2007**	**2011**	**1998**	**2007**	**2011**
1-4	1.6	1.5	1.5	68.3	72.9	72.2	1.093	1.094	1.083	6.4	7.2	7.0
5-9	5.6	5.6	5.7	19.3	16.3	16.5	1.081	0.913	0.941	6.4	6.0	6.1
10-19	13.4	13.4	13.4	6.7	5.4	5.6	0.898	0.724	0.750	5.3	4.8	4.9
20+	244.2	231.1	222.2	5.7	5.4	5.7	13.919	12.479	12.665	81.9	82.1	82.2
all/sum	**16.9**	**15.2**	**15.4**	**100.0**	**100.0**	**100.0**	**17.0**	**15.2**	**15.4**	**100.0**	**100.0**	**100.0**

Source: ONS/BSD

Notes:

1. for definitions see text
2. column (3) = column (1) × column (2); column (4) = column (3) ÷ sum(column (3))

Table 2: London, jobs and firms by size-band, 1997 & 2011, %

	firms		jobs	
size-band	**1997**	**2011**	**1997**	**2011**
1-4	66.64	72.24	5.63	6.89
5-9	19.78	16.53	6.03	6.14
10-19	7.04	5.56	5.05	4.86
20-49	3.76	3.29	6.12	6.48
50-99	1.23	1.22	4.63	5.49
100-249	0.88	0.64	7.25	6.39
250+	0.67	0.53	65.3	63.74
All	**100**	**100**	**100**	**100**

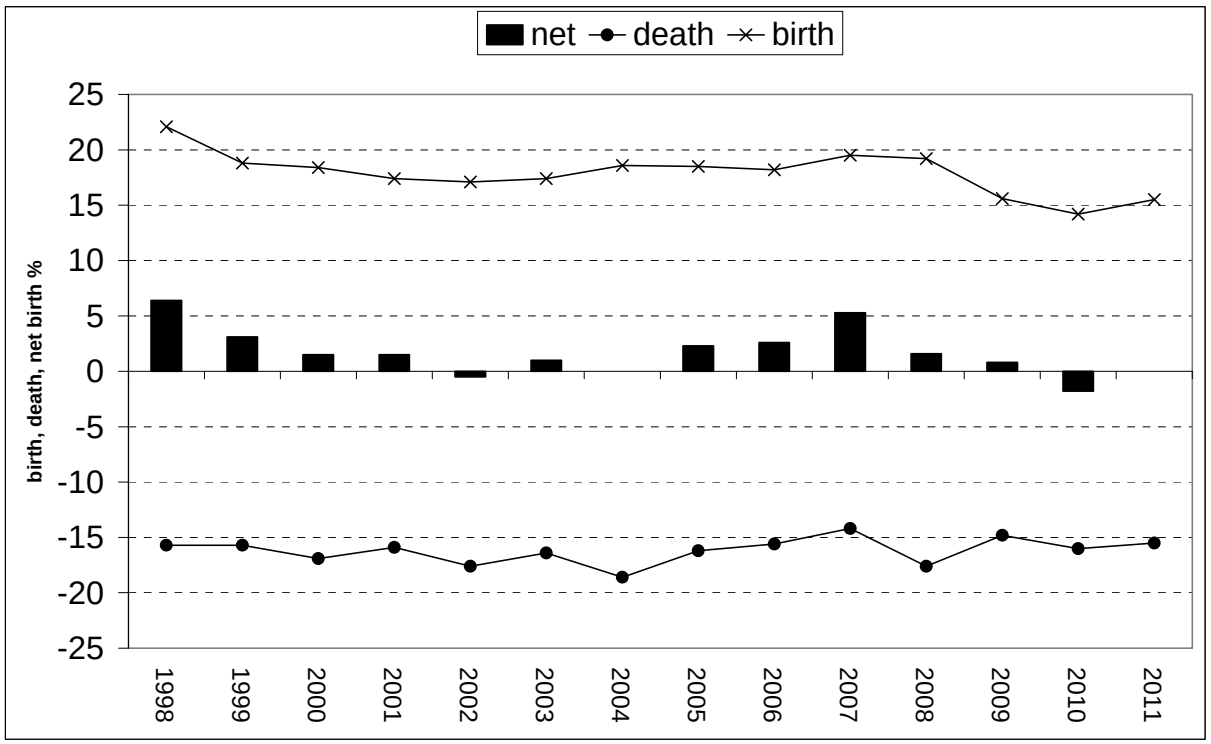
Source: ONS/BSD

3 Firm dynamics

3.1 Firms: birth & death summary

10. Each year new firms are born and some firms die: the membership of the population of firms is continually changing. The scale of this process of change is summarised by Figure 5 which displays data on firm births, deaths and *net* births (the difference between births and deaths) for each year from 1998 to 2011. Each series is expressed as a ratio to the stock of the firms at the beginning of the year. We can see that from 1999 onwards the birth ratio[2] fluctuates within a very narrow range – between 17% and 20% – until 2008, when it drops quite sharply to 15%. By contrast the death rate[3] shows very much less variation. It is mostly quite close to the period average of 16%. The net birth ratio (the birth ratio less the death rate) is typically in the zero to 5% range, but it does display marked fluctuations because, typically, movements in birth and deaths are not correlated. So, for example, in the most recent three years – 2009 to 2011 – when the birth ratio falls, the net birth ratio is, in successive years, small, negative and then zero.

Figure 5: London, firms, birth, death and net birth, 1998 – 2011, ratio to opening stock
%



Source: ONS/BSD

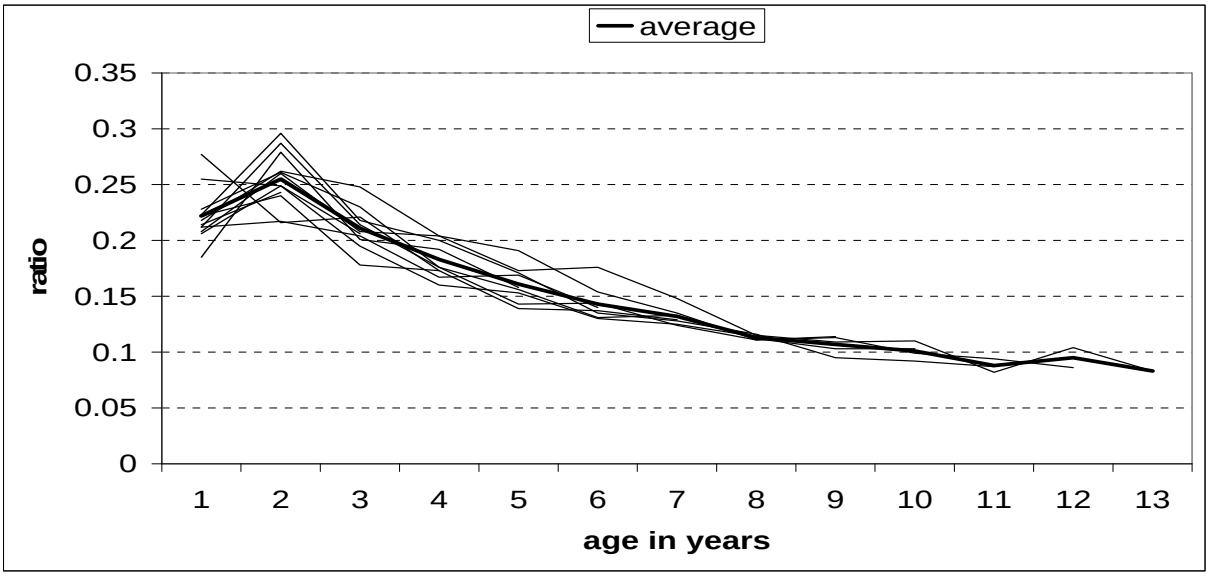
3.2 Age and the survival of firms: a cohort-based approach

11. We have just seen that each year a new cohort of firms – between 15% and 20% of the existing stock, in recent years about 45,000 – is added to the stock of survivors from the previous year. Following these 'birth cohorts' through time provides some important insights into the process of change in both the stock of firms and of jobs because two key processes – survival and growth – are very strongly age-related in firms, as indeed they are in human populations. Although our dataset begins in 1997, we cannot identify the birth date of the firms alive in the initial year, so our first birth cohort is born in 1998 – 'cohort98'. However, for convenience, we will refer to the firms alive in 1997 as cohort97, although they are not a true birth cohort (and as we will see this group of firms exhibits quite different behaviour).

12. Looking at death from a cohort perspective provides some insight into the evolution of the stock of firms because the death of firms – and its complement their survival – are strongly age-related. Firms start to die as soon as they are born (indeed some may be born and die within a year and, if so, they are not captured in our data).

As you can see from Figure 6 the chance of death rises quite sharply from age 1 to to age 2 but thereafter declines with age, and typically at a decreasing rate, although after age 6 the rate of decrease is low and not monotonically declining. By age 13 the hazard of death falls to about 8%.

Figure 6: London, firms, hazard of death, by cohort and age, cohort98 to cohort10, ratio



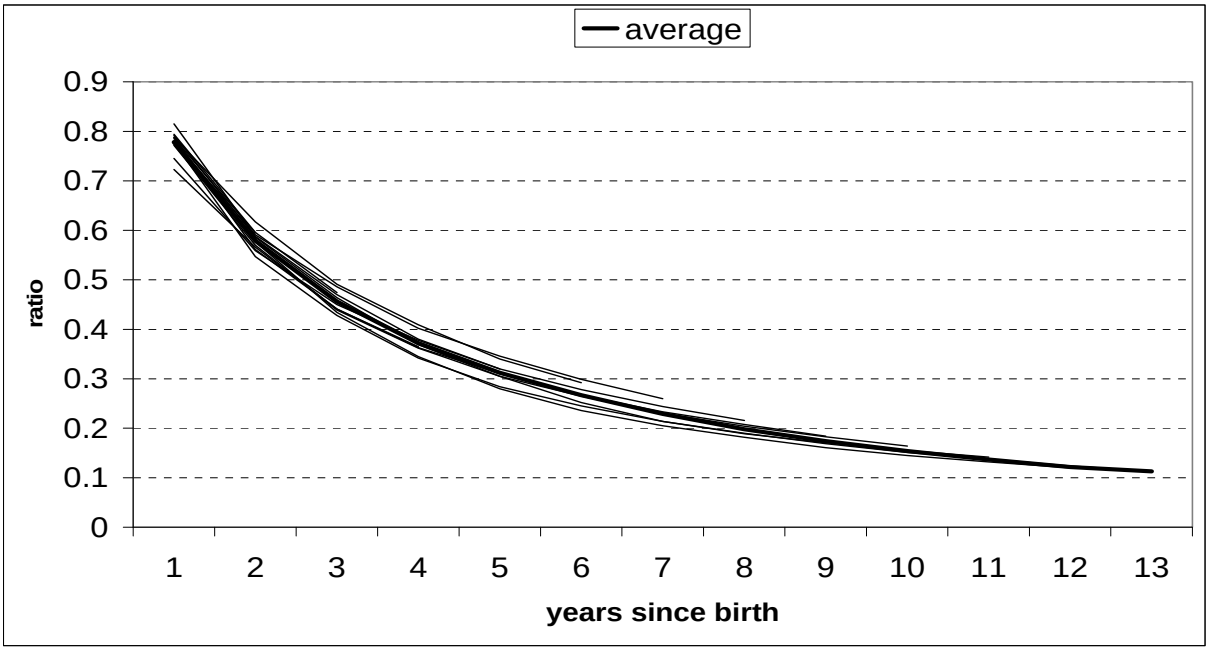
Source: ONS/BSD

13. Our focus here, though, is not hazard rates but on age-specific survival, as measured by survival ratios – the proportion of the cohort still alive.[4] The survival ratio by cohort is plotted against age on Figure 7. As we know from Figure 6, by age 1, almost 20% of firms have died – so on Figure 7 we see that 80% survive to age 1. The survival ratio declines steadily, and 10 years after birth about 85% are dead, just 15% of the cohort survive. There is of course some variation across cohorts, for example at age 5 the survival ratio for cohort99 is 0.28 whilst for cohort05 is 0.35, but there is no systematic shift over successive cohorts.

14. If we combine the data on the number of births and the survival ratios of the cohorts as they age, we can build up a picture of the evolution of the stock of firms over time. On Figure 8 we can see the cohort98 births of almost 50,000 recorded against 1998, by 1999 less than 40,000 (80%) of those firms survive. To arrive at the 1999 figure we have also to add in the 44,000 births born into cohort99. By the year 2000 we have less than 30,000 left of the cohort98 births, about 35,000 of cohort99 births and 45,000

cohort00 births. So the stock in each year is made up of that year's births and the ever shrinking 'slices' remaining from the birth cohorts of all preceding years.

Figure 7: London, firms, survival ratio by cohort and years since birth, cohort98 to cohort10, ratio

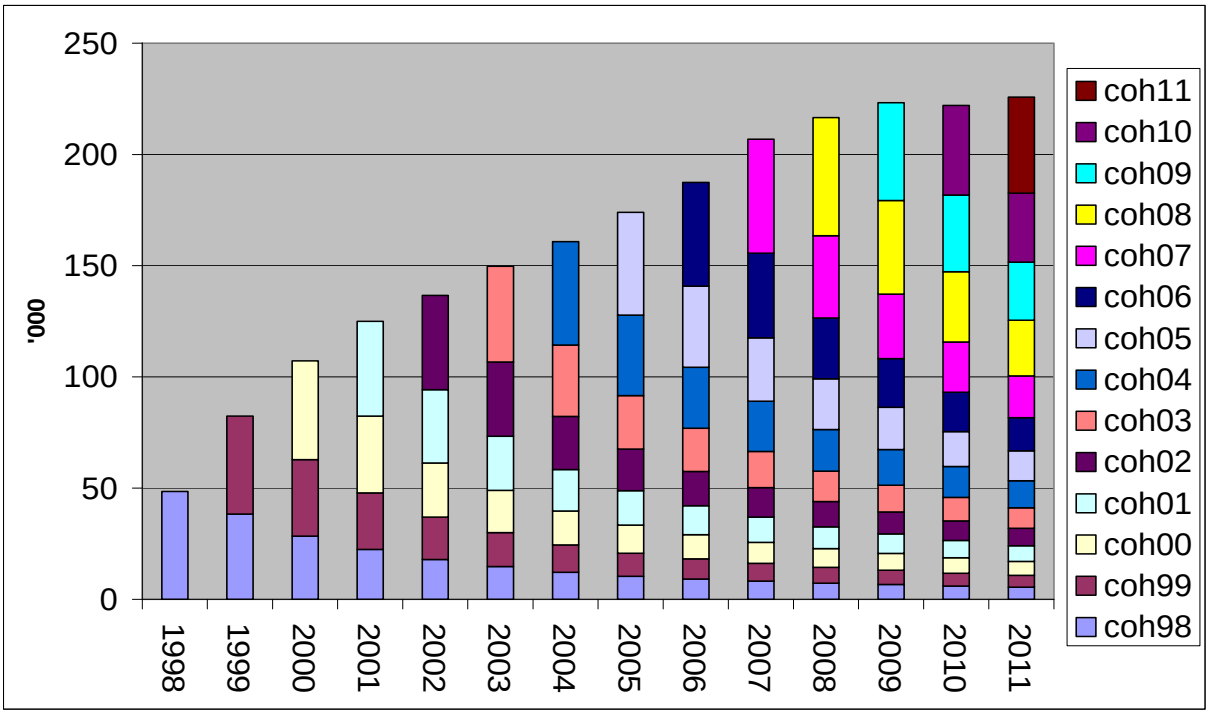


Source: ONS/BSD

15. Of course there is something missing from this picture. We know from Figure 1 that the stock of firms in 1998 is about 230,000. The 180,000 firms missing from Figure 8 are of course members of cohort97, the 1998 survivors of the firms alive in 1997. Whilst cohort97 also declines over time, because it is a mixture of firms of different ages (only some, probably less than 40,000, actually born in 1997) the survival ratios for the 'cohort' are a mixture of ratios for different ages (like those in Figure 7) but weighted by their share in cohort97. So for example, only 84% of those alive in 1997 survived to 1998, whereas the average survival rate for the first year of life is closer to 80%. To complete the picture, then, we need to include the 220,000 cohort97 firms, and Figure 9 displays the cohort composition of the overall stock of firms. In 1997, by definition, cohort97 accounts for 100% of the stock, in 1998 the cohort97 share shrinks to 80% because some firms have died and because 50,000 cohort98 firms have joined the stock (from Figure 1 we can see the net overall increase in size is from 220,000 to just over 230,000). In the next year, 1999, cohort97 share shrinks again, the cohort98 share shrinks too, due to death and the birth of about 45,000 firms into cohort99 – in 1999 the

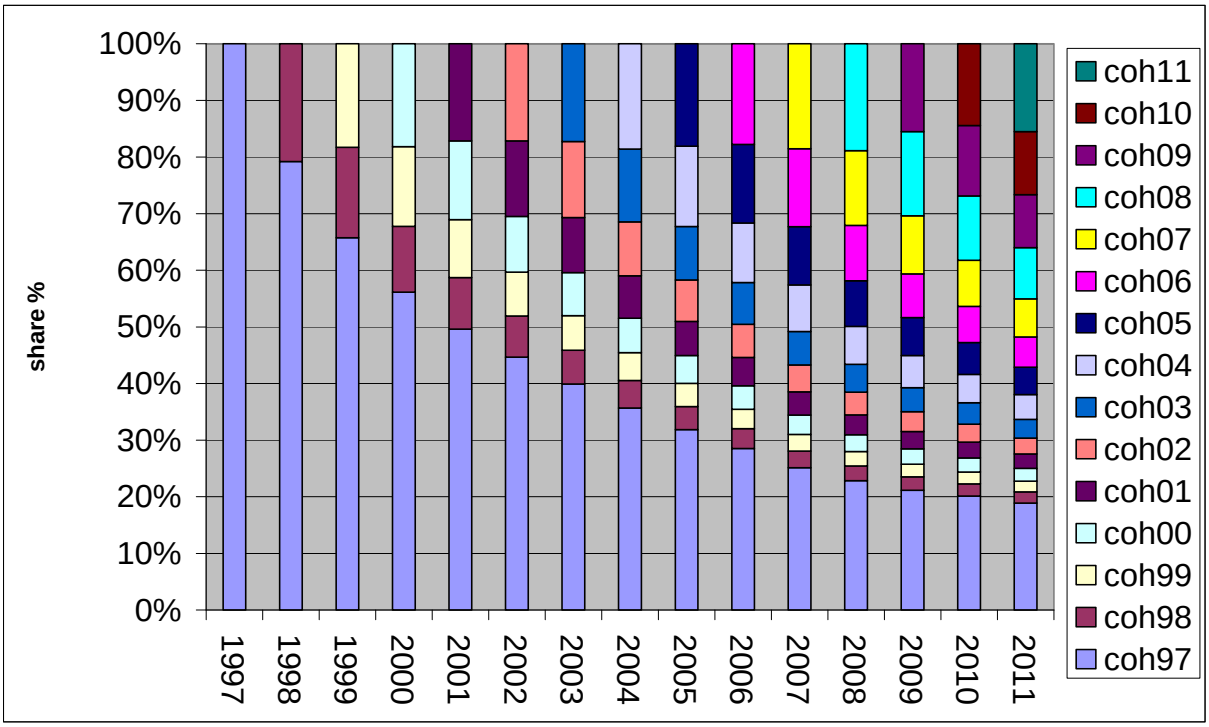
overall net increase takes the total stock to 240,000. Looking across the chart we can see that in most years, at least until 2009 (when as we know from Figure 5 that births dropped), each new year's births represent about 20% of the stock,[5] whilst the contributions of earlier cohorts shrink continuously. By 2011 cohort97 accounts for less than 20% of all firms, and cohort98 accounts for just 2%.

Figure 8: London, firms by cohort, 1998 – 2011, cohort98 to cohort11, '000



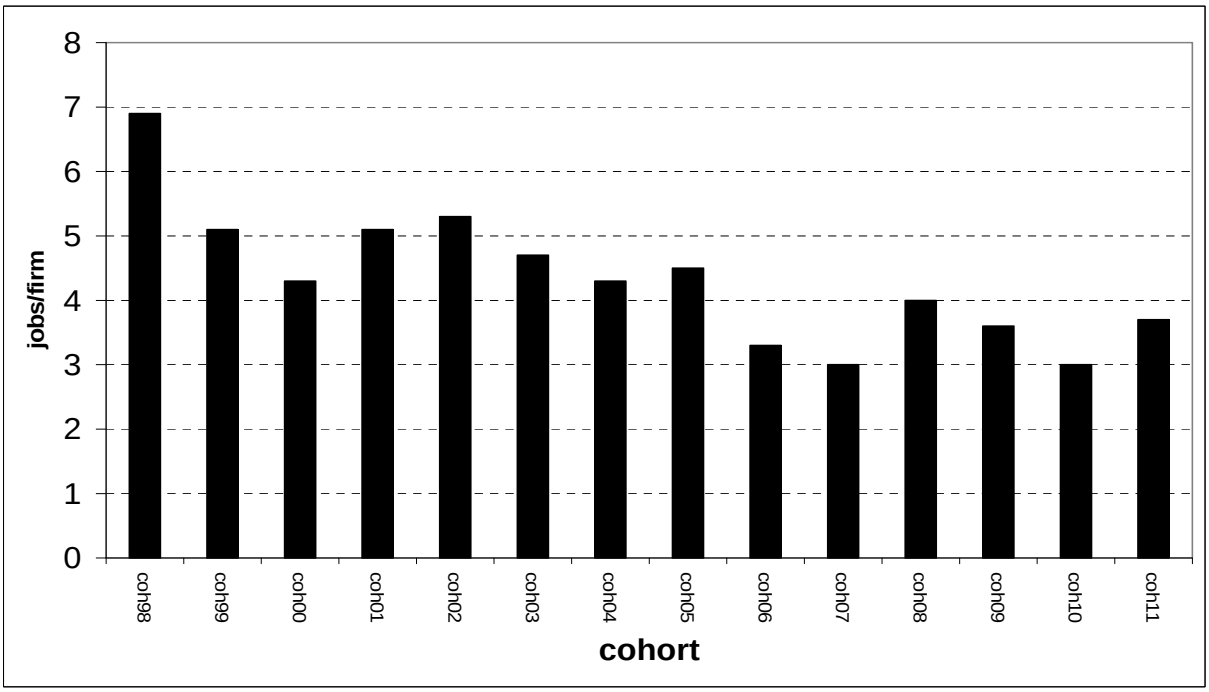
Source: ONS/BSD

Figure 9: London, firms by cohort, 1997 – 2011, cohort97 to cohort11, share, %



Source: ONS/BSD

Figure 10: London. Cohort98 to cohort11, jobs/firm at birth, ratio



Source: ONS/BSD

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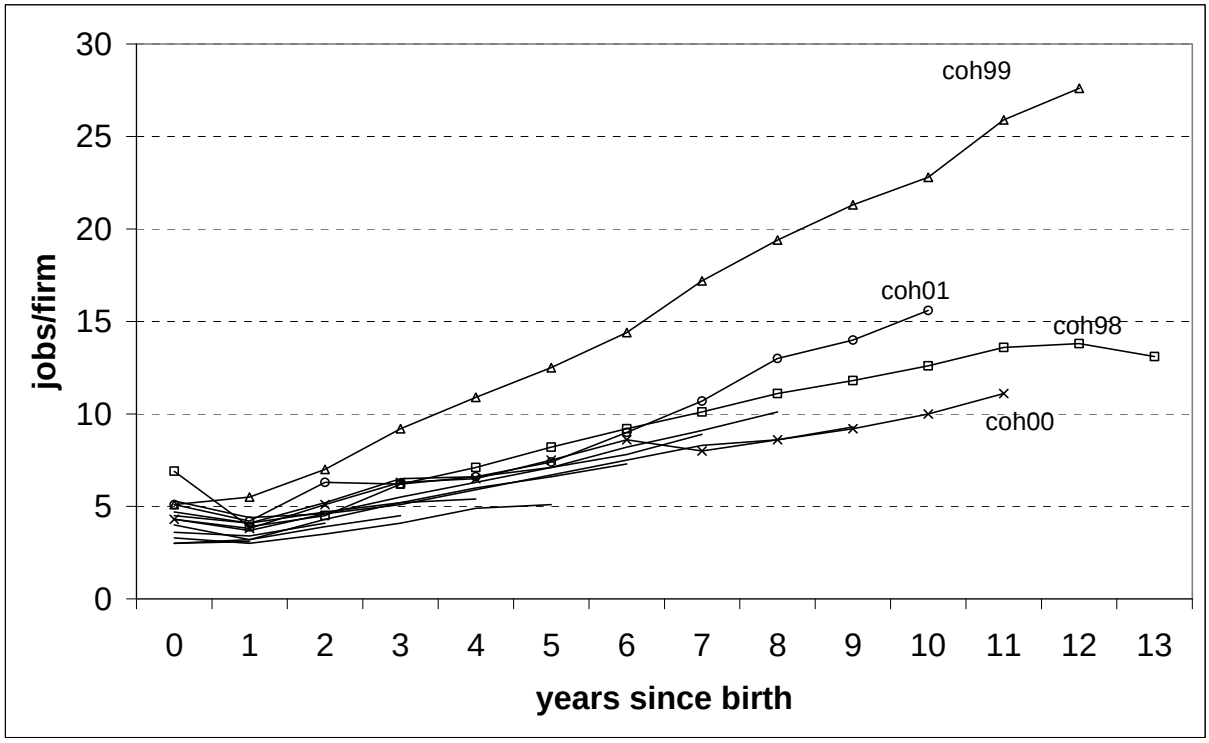
4 Job dynamics

4.1 Age and the growth of jobs: a cohort-based approach

16. Associated with each cohort are new additions to the stock of jobs. Cohort98 aside (as noted earlier it appears to have been somewhat of an outlier), from cohort99 to cohort05 the figure is about 200,000 jobs for each cohort at birth, after which it falls and is typically closer to 150,000. A more helpful measure, because it makes the link from firms to jobs, is the jobs/firm ratio at birth, and the data are displayed on Figure 10. Again leaving aside cohort98[6], the rest of the annual observations on jobs/firm can be divided into two: cohort99 to cohort05 with between four and five jobs per firm; and cohort06 to cohort11, a little smaller, with between three and four jobs per firm. The arithmetic connecting jobs/firm to the size of the birth cohort is quite straightforward: with a cohort of about 50,000 firms, an average size of four jobs per firm implies a cohort of 200,000 jobs, if average jobs/firm slips to three the cohort jobs figure falls to 150,000.

17. We saw earlier the immediate, and continuing, impact of mortality on a cohort of firms as it ages. Were the number of jobs/firm to remain fixed, the stock of jobs associated with each cohort would necessarily follow a similar declining path. However, in practice, growth in (at least some) surviving firms is sufficient to overcome the force of mortality, at least to some extent, for the cohort as a whole. So a natural way to measure survivor job growth is to use the jobs/firm ratio, and the data is recorded on Figure 11. Although (as we saw) there is some dispersion across cohorts in the average jobs/firm at birth, with the obvious exception of cohort99, cohorts do seem to share a similar growth trajectory over the first decade or so of life.[7] A clearer picture of growth – separating it from the initial size effect – emerges if we re-plot the data as natural logs of jobs/firm on Figure 12. On this scale the slope of each line measures the growth rate of jobs and we can see that the slopes are indeed rather similar over the first decade of life. The main differences between cohorts seem to be in their initial size, and the first year of life when, for most cohorts, the number of jobs per firm declines by between 10% and 20%. Another common feature, and this applies to all cohorts, is that although the number of jobs/firm continues to rise, year after year, the rate of increase typically slows – each cohort 'line' rises at a decreasing rate: average growth in jobs/firm slows with age.

Figure 11: London, cohort98 to cohort11, jobs/firm by cohort, years since birth, ratio

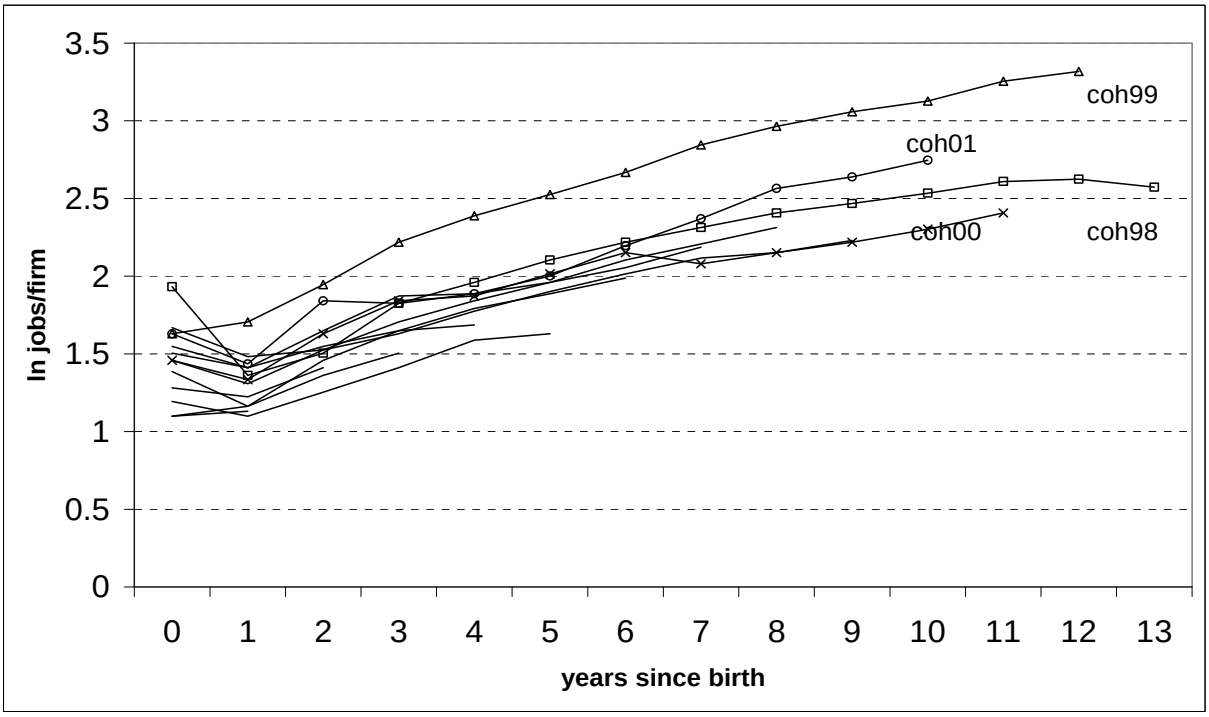


Source: ONS/BSD

18. The stock of jobs in each cohort depends on the balance between the declining firm survival ratio and the growth in jobs/firm. Indeed just by comparing, cohort by cohort, the survival ratios from Figure 7 with the job/firm ratios of Figure 11, we can readily infer that firms are dying faster than survivors are growing. So the stock of jobs associated with each cohort is contracting as the cohort ages (this also applies to the composite cohort97 not plotted here). This visual impression is confirmed by Figure 13 which compiles a time series for jobs by 'layering' the slices of cohort data for jobs as we did for firms (on Figure 8). We can now see clearly how the contribution of each cohort shrinks over time. Notice we have included cohort97 here too which accounts for the bulk of the jobs throughout. The scale has been adapted to aid the visualisation of the more recent cohorts – it starts from 2 million not zero – by 2011 cohort97 still accounts for two thirds of all jobs. By contrast the contribution of cohort98 shrinks from 300,000 (about 10%) in 1998 to 72,000 (about 1.5%) in 2011, cohort99 from 220,000 in

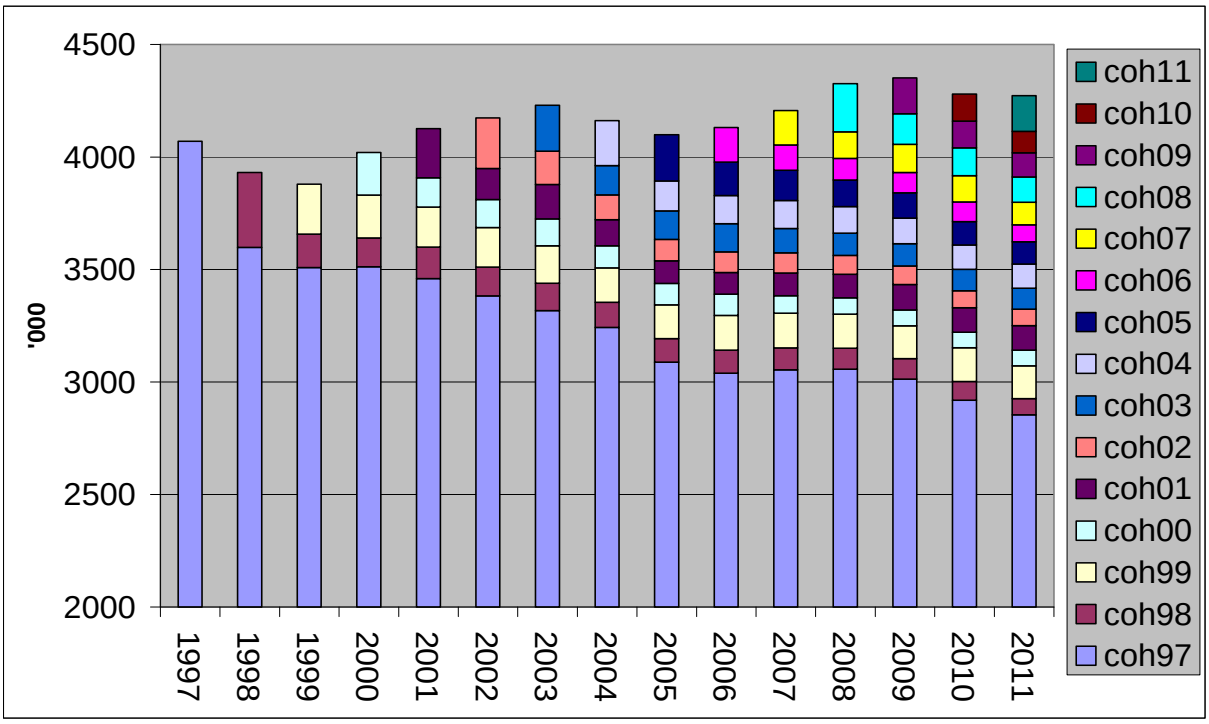
1999 to less than 150,000 in 2011 (about 3%), and so on.

Figure 12: London, cohort98 to cohort11, jobs/firm by cohort, years since birth, natural logs



Source: ONS/BSD

Figure 13: London, jobs by cohort, 1997 – 2011, '000



Source: ONS/BSD

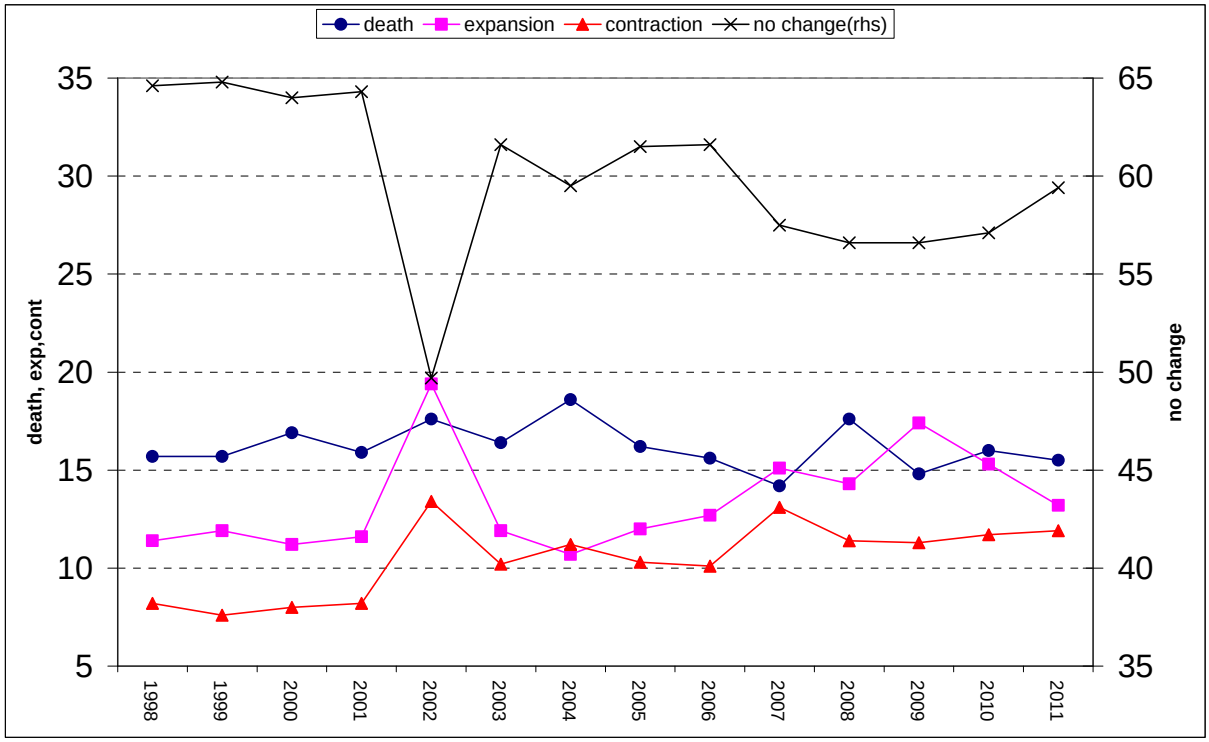
4.2 Job creation and destruction

19. A cohort-based discussion of firm survival and job growth is not the conventional approach to summarising data on firm demography and job creation and destruction, it is more usual to make use of the framework provided by job creation and destruction accounts. Here they are used as a summary measure, and to make easier comparisons between London and the UK [8]and other places. We have already seen the components of the change in the stock of firms (Figure 5), but before moving on to discuss jobs it is worth looking at a slightly different decomposition of the stock of firms.

20. On Figure 14 the stock of firms at the beginning of a year is divided into four components: deaths; and three categories of survivors which are distinguished by their contribution to job creation and destruction – expanding, contracting, and firms where the number of jobs remains the same.[9] The most striking feature of the data is that in each year (except 2002) more than half of firms (between 55% and 65% (right

hand scale), did not change their number of jobs. The proportion of expanding firms (left hand scale) is about 10% between 1998 and 2005, and then moving up closer to 15%, whilst the proportion of contracting firms started around 7.5% but moved closer to 10% and above from 2003 onwards. The combined effect of changes in expansion and contraction more or less match the evolution of no change because (and as we saw earlier) the death rate remained close to 15% throughout. Evidently there is a greater degree of 'churn' in job creation and destruction from 2003 onwards, looked at as either the sum of expansion and contraction or as the reduction of the proportion of firms in the no change category.

Figure 14: London, firms, job creation and destruction components, ratio to opening stock, 1998 – 2011, %

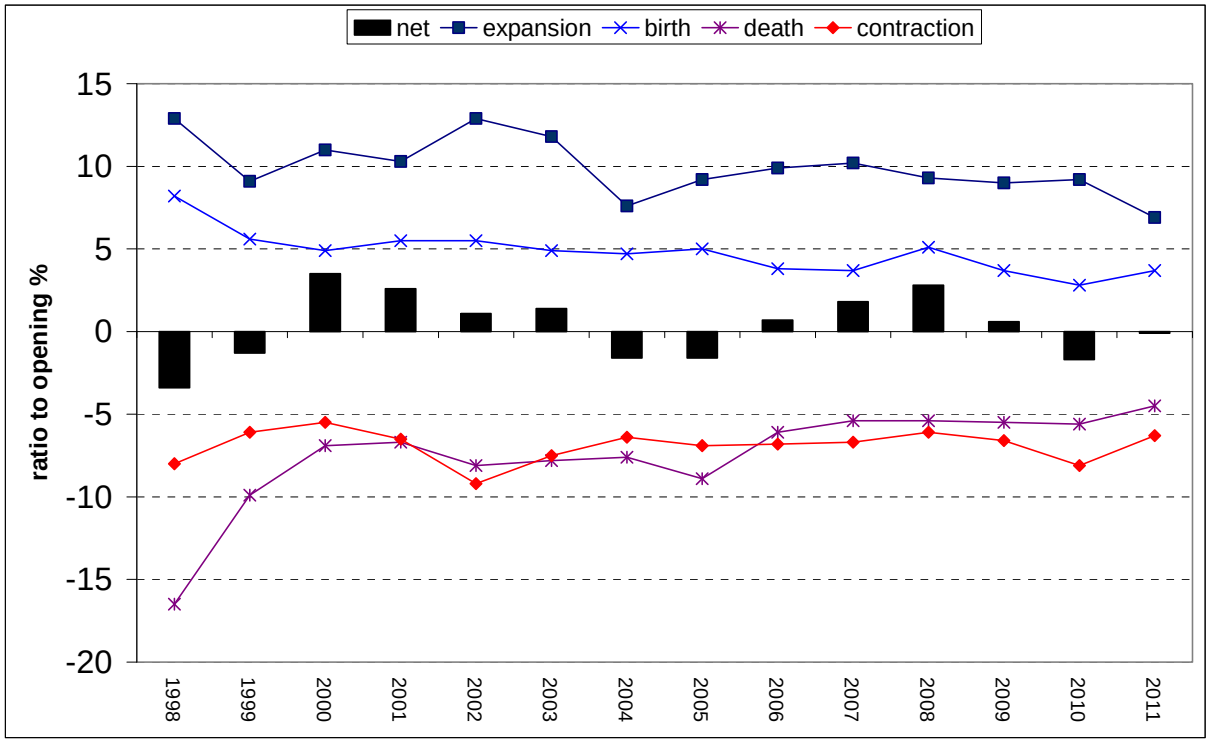


Source: ONS/BSD

21. The change in the stock of jobs, the components of job creation and destruction itself, are displayed on Figure 15. As with the components of change in the stock of firms, the numbers of jobs have been expressed as a ratio to the opening stock. Births and deaths create and destroy jobs, and of course the firms which expand and contract create and destroy jobs too. The net change in jobs – the bars in the middle of

the chart – are the difference between gross job creation (births plus expansions) and gross job destruction (deaths plus contractions). In each year expansions are not only more important to job creation than births, they are typically larger than (the absolute value of) contractions: up to 2003 expansions are in the 10% to 15% range, but after that between 5% and 10%; whilst contractions typically remain between 5% and 10% throughout. Up until about 2006 deaths make a more important contribution to job destruction than contractions, after 2006 the death ratio hovered closer to 5%. The principal (proximate) contributor to the recent (2010) decline is a one percentage point fall in births and a 1.5 percentage point increase in contractions.

Figure 15: London jobs, job creation and destruction components, ratio to opening stock, 1998 – 2011, %



Source: ONS/BSD

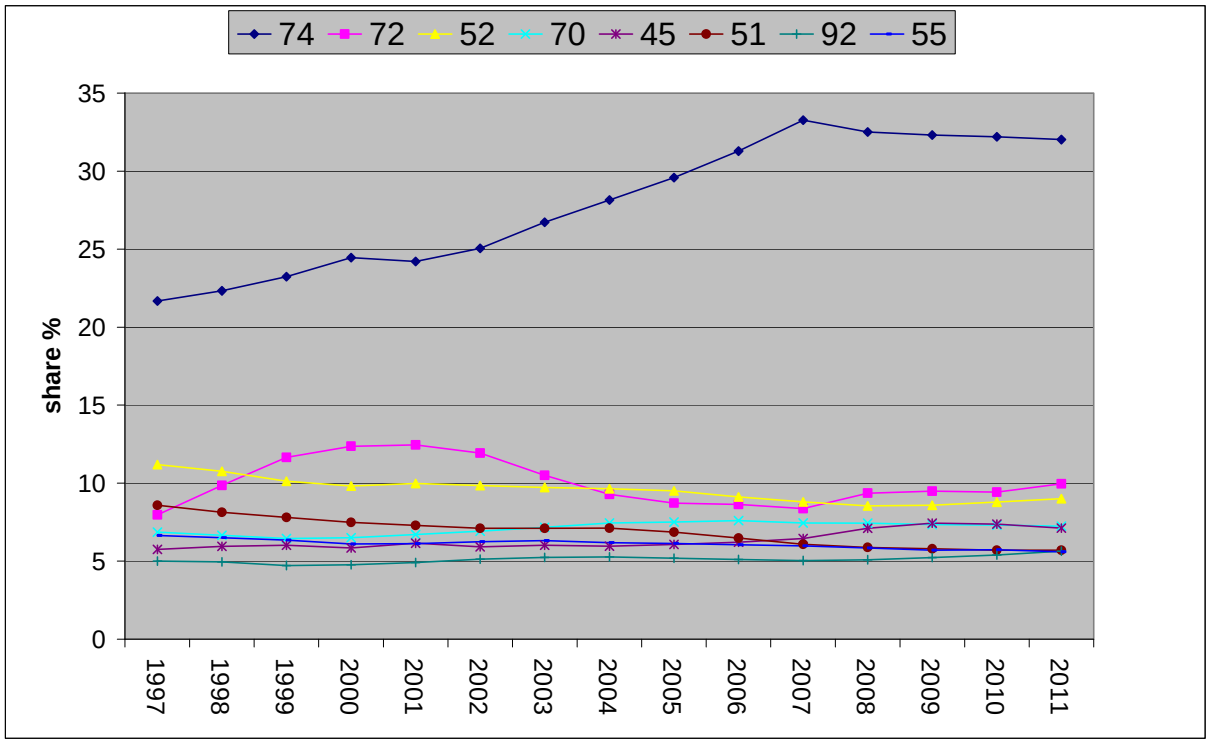
5 Firms and jobs

5.1 Firms and jobs by sector

22. We can look at firms and jobs by sector in two different ways. The first is importance in London: measured by sector shares; the other is relative importance: measured by sector shares in London relative to the corresponding sector shares elsewhere (here the UK as a whole). It is important to stress at the outset that, to keep matters relatively simple, the analysis here *defines* sectors as the 2-digit (division level) of the SIC92 indiustrial classification.[10]

23. Figure 16 displays sector shares for firms. The dominance of business services (sic74) is clear, moreover the share increased by 10 percentage points from around 25% between 1997 and 2002 to almost 35% in 2007 where it remained. Otherwise, only seven other sectors ever have shares greater than 5%, and those sectors have shares larger than 5% in every year (the converse is also true: no other sectors ever have shares greater than 5%). These other 'major' sectors are listed in descending order (by 2011 share) in the legend to Figure 16: they are computer services (sic72); retail distribution (sic52); real estate(sic70); construction (sic45); wholesale distribution (sic51); recreation and culture (sic92); and hotels and restaurants (sic55). In 2011, taken together, these sectors accounted for more than 80% of all London firms.

Figure 16: London firms, sector shares, top eight (2011 order) 1997 – 2011, %



Source: ONS/BSD

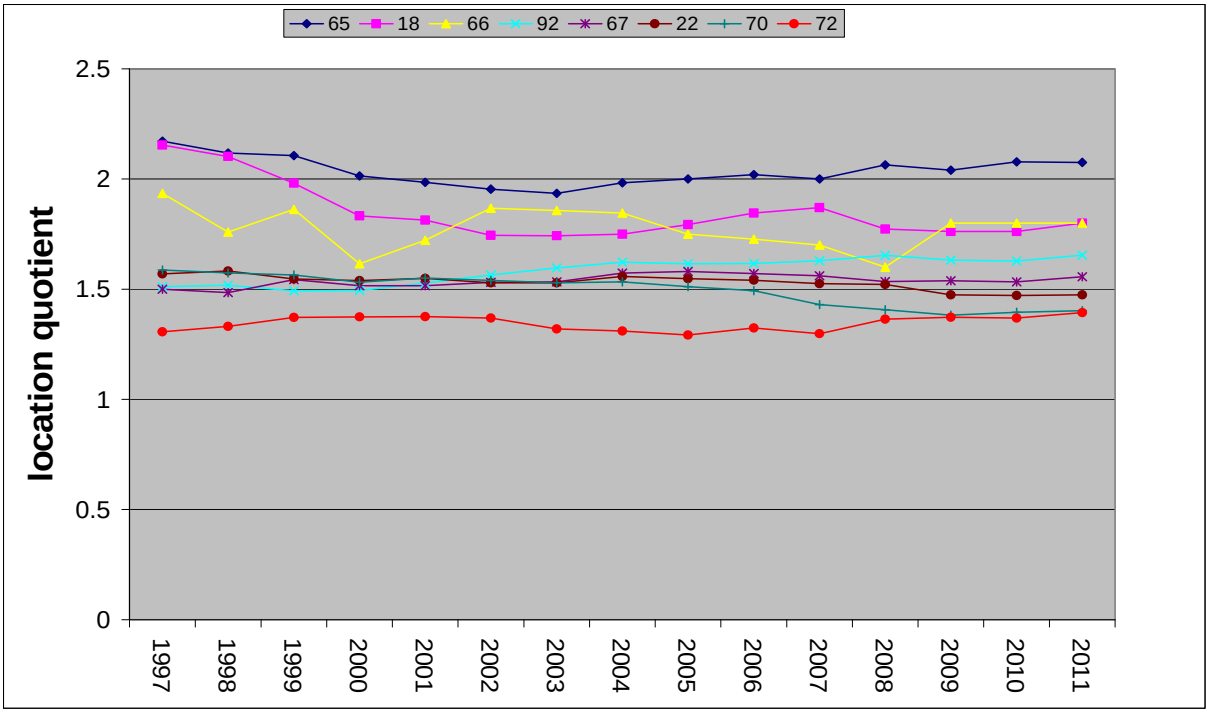
Key to sectors: 74, business services; 72 computer services; 52, retail distribution ; 70, real estate; 45, construction; 51, wholesale distribution; 92, recreation and culture; 55, hotels and restaurants.

24. The location quotient (LQ) is a tool which can be used to simplify the comparison of London's sectoral distribution with that of the UK. It is defined here as the ratio of a sector's share in London to the same sector's share in the UK. So for example the 2011 LQ for computer services is 1.4 (the London share is 10%, the UK share is 7.2%). The top eight sectors by LQ ranking for London are plotted on Figure 17. All eight sectors have an LQ of 1.4 or greater in 2011, so they have a 40% (or more) larger share of the stock of firms than do those sectors in the overall UK stock of firms. Three of the top eight *relatively* important sectors in London are financial: financial intermediation (sic65); insurance (sic66); and auxiliary financial activities (sic67); and a further two are manufacturing: apparel (sic18); and publishing and printing (sic22). Necessarily there are also sectors in which London is 'under-represented'.[11] Indeed, there are a dozen manufacturing sectors whose LQ is 0.5 or less. Moreover, the choice of

1.4 as a cut-off is for convenience, to make the data on 45 sectors manageable and there are, for example, three transport sectors (water (sic61), air (sic62), and 'auxiliary' (sic63)) with LQs which are just under 1.4 in 2011 and above it in some earlier years. Nonetheless it is worth remarking that the list of over-represented sectors does not correspond especially well with the top eight sector list from Figure 16. Indeed there are only three sectors in common: recreation and culture (1.7); real estate (1.4); and, as mentioned earlier, computer services. By implication then, other sectors which are important in London are not so *distinctively* important.[12]

25. Of the 'not so distinctively London sectors' business services is worthy of specific comment. It has an LQ of 1.2 in 2011, so this sector is somewhat more important than elsewhere but not *exceptionally* so. This finding is striking more for what it says about the UK as a whole than what it says about London: if the London business services share in 2011 is about 30%, then an LQ of 1.2 implies that the UK average share is 25% -- a quarter of all UK firms are in business services. The LQs for the other four major (but not 'distinctive') sectors are less than 1.0 (construction is 0.6).

Figure 17: London, firms, location quotients by sector (top eight 2011 order), 1997-2011



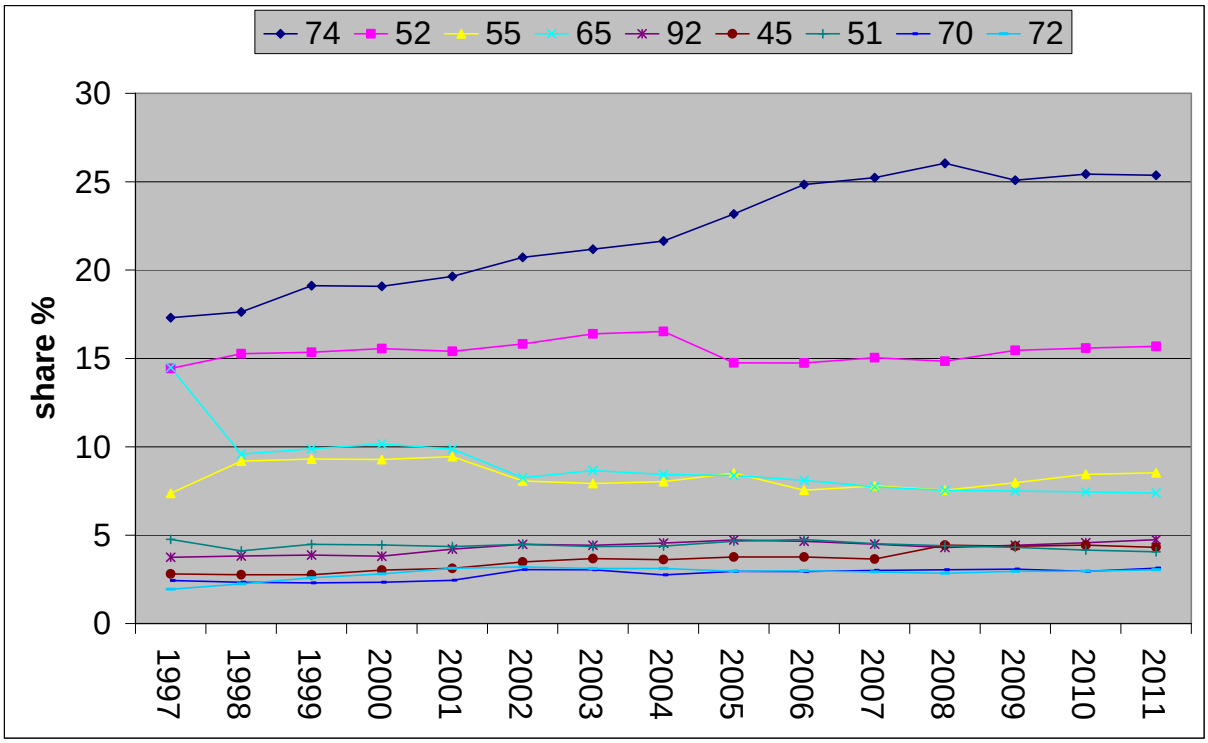
Source: ONS/BSD

Key to sectors: 65 financial intermediation; 18 apparel; 66, insurance; 92, recreation and culture; 67,

auxiliary financial activities; 22, publishing and printing; 70, real estate; 72 computer services.

26. The distribution of jobs across sectors is almost as concentrated as the distribution of firms. The top nine sectors – all sectors with a share larger than 3% – are plotted on Figure 18. Together the top nine account for 76% of all jobs and, as you will notice, the top eight from the firm sector list are also on the job sector list. The extra sector on Figure 18 is financial intermediation (sic65). Notwithstanding the overall similarity in the lists of top sectors, there are important differences too. Whilst the share of jobs in business services broadly matches (in magnitude and evolution) its share of firms, this is not true of the other sectors on the jobs list. For example, the jobs share of retail distribution is reasonably stable at around 15%, whilst its share of the stock of firms is typically less than 10%. So we can infer that the jobs/firm ratio for business services is close to the overall London average, whilst for retail it is about one third larger (15% ÷ 10%) than the London average.[13] Two other sectors are worth specific mention: for computer services the job share figure is around 3%, whilst that for firms is close to 10% – evidently computer service firms are about one third the average London firm size. Financial intermediation accounts for around 7% of jobs (since the early 2000s), but its firm share, at just 1%, is well outside the top eight (in fact, 14th on the firm share list) implying a jobs/firm figure firm share seven times the London average.

Figure 18: London, jobs, sector shares, top nine (2011 order), 1997 – 2011, %

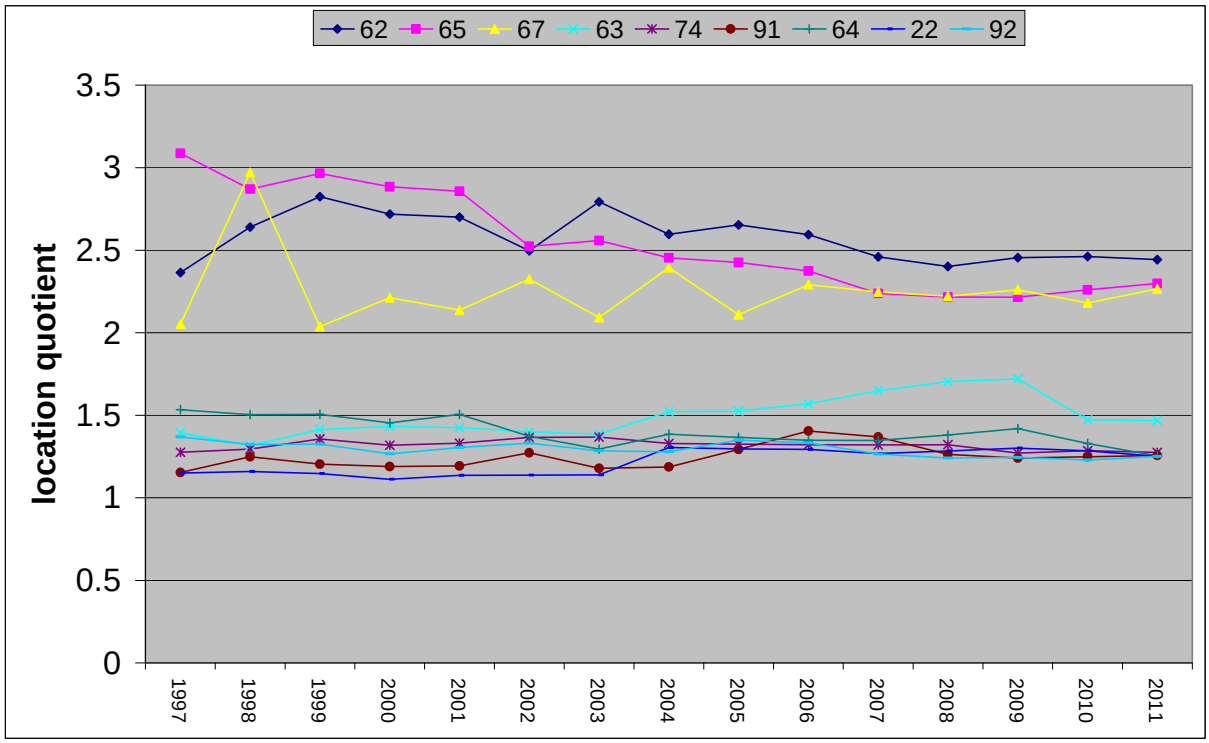


Source: ONS/BSD

Key to sectors: 74, business services; 52, retail distribution; 55, hotels and restaurants; 65 financial intermediation; 92, recreation and culture; 45, construction; 51, wholesale distribution; 70, real estate ; 72 computer services.

27. The distribution of the LQ by sector for jobs displayed on Figure 19 looks rather different from the LQ by sector for firms. First of all it has three sectors where jobs are very much more concentrated than in the UK – air transport (sic62), financial intermediation (sic65), and activities auxiliary to finance (sic67) – with LQs close to 2.5. Most of the next six in the rankings, all with LQs greater than 1.5 and listed in the legend, are familiar from previous lists: aside from business services (sic74) we have recreation and culture (sic92), posts and telecommunications (sic64), and publishing and printing (sic22). Two sectors, though, are much less familiar, activities auxiliary to transport (sic63, storage and travel agencies), or never previously mentioned, membership organisations (sic91).

Figure 19: London, jobs, location quotient by sector, top nine (2011 order), 1997 – 2011, ratio

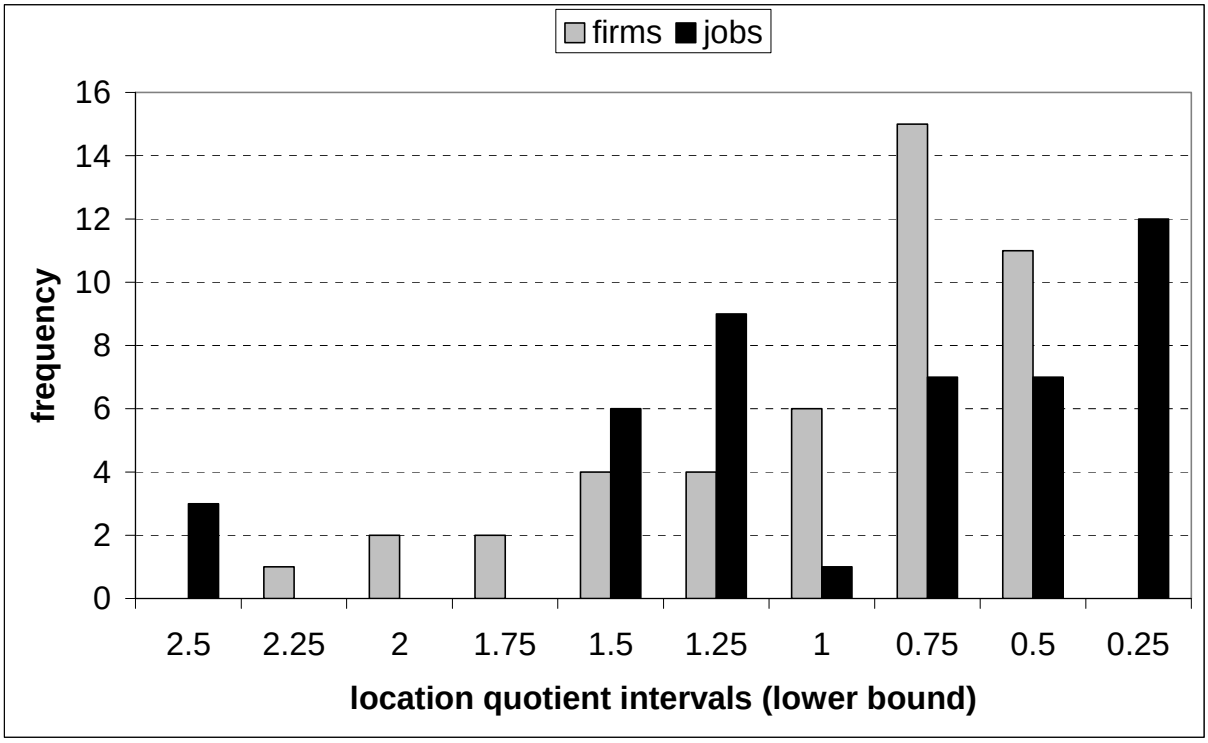


Source: ONS/BSD

Key to sectors: 62, air transport**;** 65 financial intermediation; 67, auxiliary to financial intermediation; 74 business services; 91, community, social and personal services; 64, posts and telecommunication; 22, publishing and printing; 92, recreation and culture.

28. A second feature which differentiates the distribution of job-based LQs from that of firms is that it appears distinctly bi-modal: many more sectors are concentrated just above the middle, between 1.0 and 1.5, and at the bottom end, particularly below 0.5. This is illustrated on Figure 20, a plot of the frequency distributions of the LQs for firms and jobs. In cases where the LQ for jobs is much larger than the LQ for firms we can infer that the jobs/firm ratio for those sectors in London is much larger than that in the UK as a whole. For example, in air transport the London jobs/firm ratio is twice that of the UK as a whole.[14]

Figure 20: London, distribution of location quotients by sector, firms and jobs, 2011



Source: ONS/BSD

5.2 Firms and jobs by borough

29. Whilst complete accounting for firm and job dynamics at the borough level is beyond the scope of this report, we do provide a summary account. The treatment is divided into two parts, first we deal with firm dynamics and then, second, with the distribution of jobs across boroughs. In both cases the analytical framework turns on the key role of the firm size distribution. We will see that, typically, the stock of firms in boroughs with a large proportion of larger firms tends to grow more slowly than the stock of firms in boroughs with a large proportion of smaller firms. Then, taking the stock of firms by borough as given, we illustrate the extent to which the

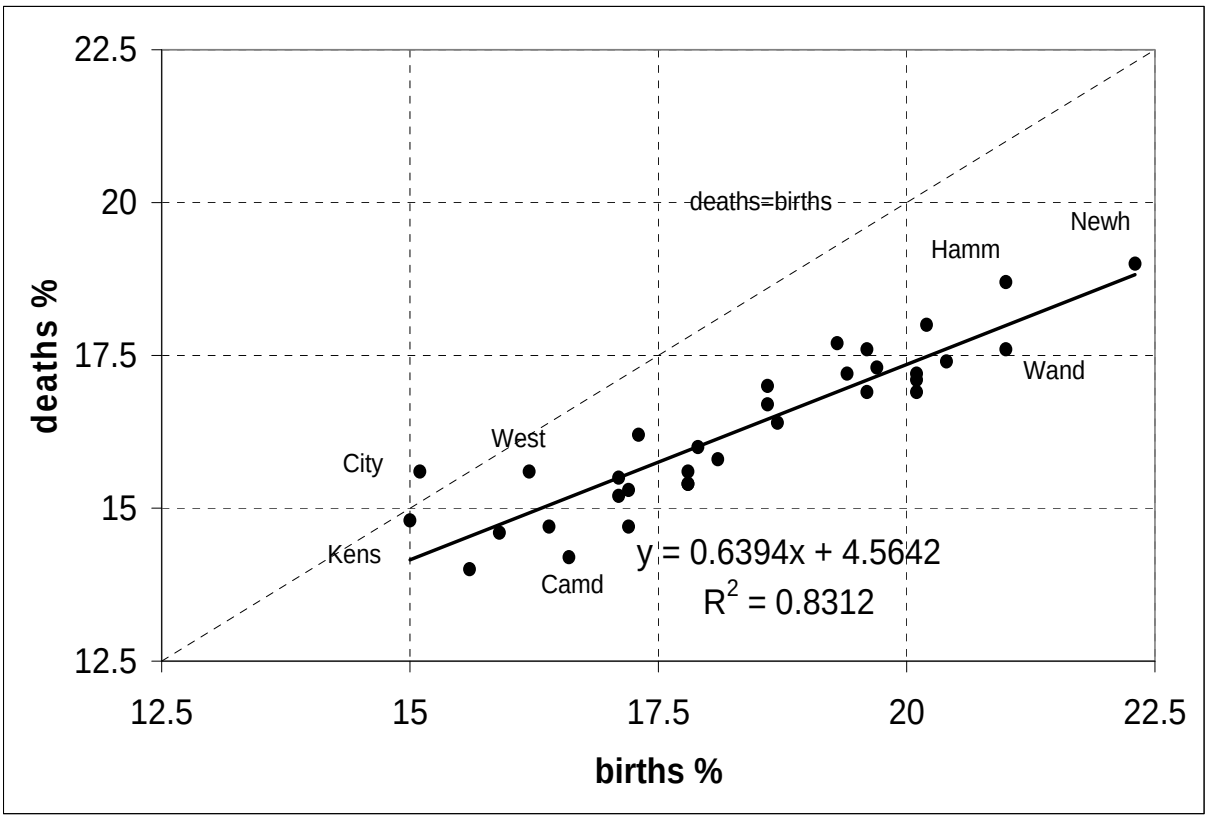
borough distribution of jobs can be inferred from the relative importance of larger firms in a borough.

5.2.1 Firm dynamics by borough

30. We know from Figure 5 that, measured as a ratio to the opening stock of firms, births average about 18%, whilst the corresponding ratio for deaths is about 16%. The average (1998 to 2011) of both these ratios varies considerably across the boroughs. The data are displayed on Figure 21, with the death ratio plotted against the birth ratio. You can see that the birth ratio ranges from 15% (Kensington and Chelsea, with the City of London close by) and with Newham at the other end of the scale with a birth ratio above 22%. What is also noticeable is the very strong positive correlation between deaths and births – the R^2 of the linear fit displayed on the chart is over 0.8 – so, for example, Newham has a death ratio of 19%, and Kensington and Chelsea a death ratio of 15%.[15] If we define the *net* birth ratio as the difference between the birth ratio and the death ratio, then boroughs above the 45 degree (deaths = births) line have a negative net birth ratio. Here just one borough, the City of London, has a (small) negative net birth ratio (which implies that its stock of firms is (on average) contracting, albeit very slightly).

Figure 21: London boroughs, firm deaths vs births, ratio to opening stock, average 1998-2011, %

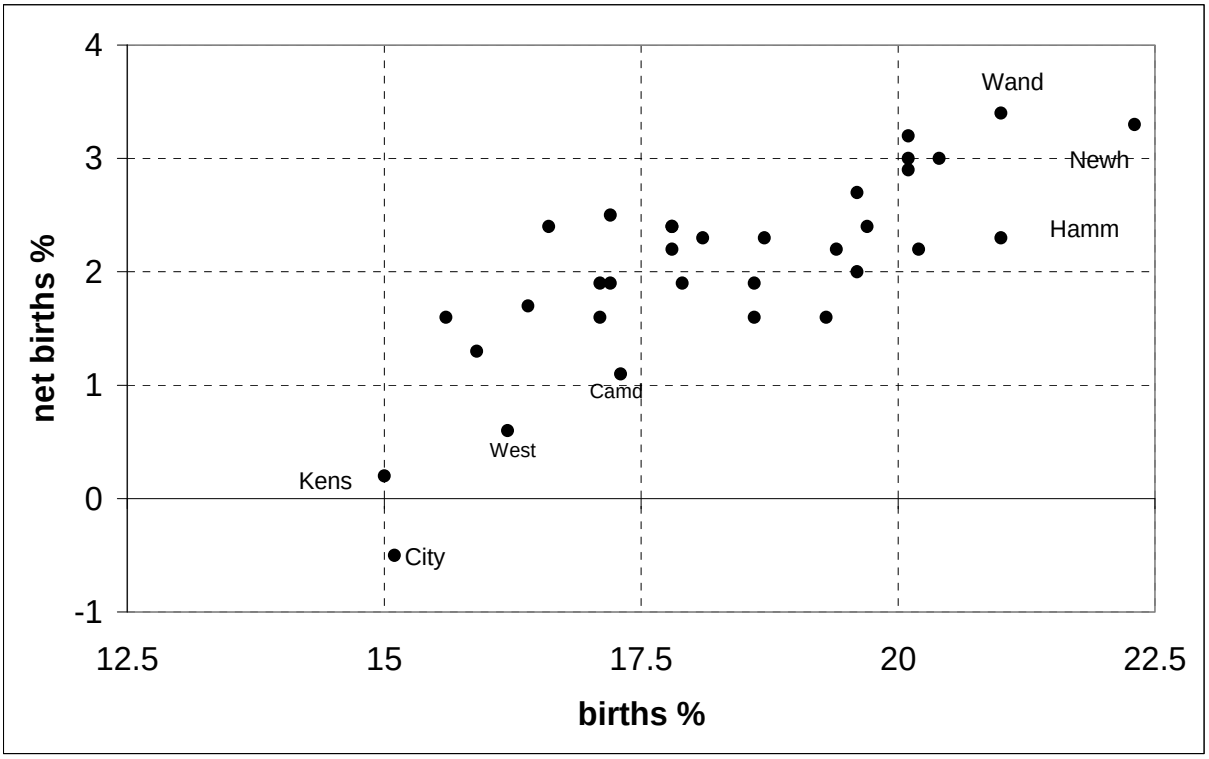
Source: ONS/BSD



31. We can also see from Figure 21 that the average relationship between the birth and death ratios has a slope of less than unity (as displayed on the chart, the slope is 0.64) from which can be inferred that the net birth ratio will be positively related to the birth ratio. This becomes clear if we re-plot the data with the net birth ratio replacing the death ratio on the vertical axis, this yields Figure 22. Focusing on the labeled points at the high birth rate end first, we can see that the borough with the highest net birth ratio is Wandsworth, although Newham is quite close by.[16] These relatively large net birth ratios imply, of course, relatively large rates of expansion in the stock of firms: over the period 1997 to 2011 the stock of firms in Wandsworth expanded by almost 60%, for Newham the rate was just over 50% – rates which are about twice the London average of 27%. At the other end of the birth ratio scale, we know the stock of firms in the City of London contracted (the figure is about -7%), whilst in Kensington and Chelsea it expanded by only 3% and just 10% in Westminster. Of course, any borough with a less than average rate of expansion (or a net birth ratio less than the

London average) will record a decline in its *share* of the stock of firms, whilst any borough with a greater than average rate of expansion will increase its share.

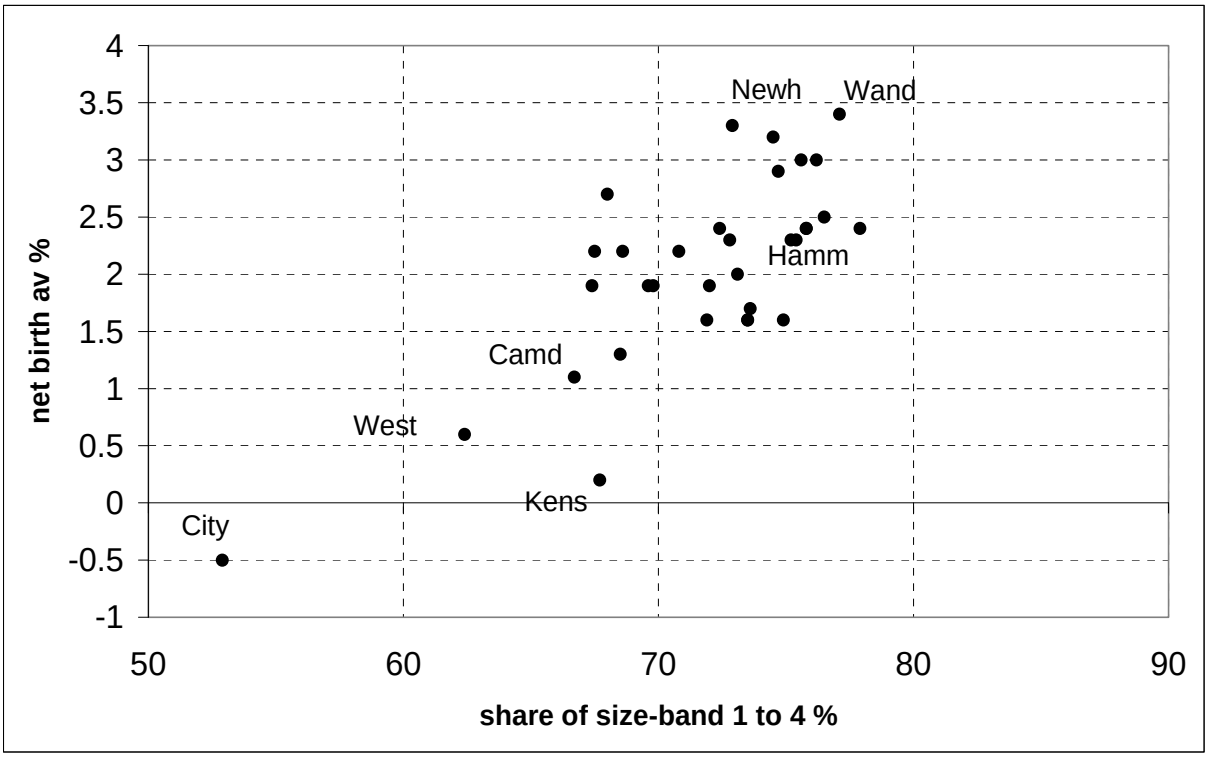
Figure 22: London boroughs, firm net births vs births, ratio to opening stock, average 1998 – 2011, %



Source: ONS/BSD

32. By digging a little below the surface we can also connect the inter-borough variation in net birth ratios to inter-borough differences in the firm size distribution. In particular, the size of the net birth ratio is positively associated with the share of the smallest firms in the firm size distribution. The data are plotted on Figure 23, on the vertical axis we have the net birth ratio which is plotted against the share of firms in the size-band 1 to 4 (the share data is an average over the period 1997- 2011). We can see that Wandsworth and Newham, with large net birth rates, also have amongst the largest shares of the smallest firms. Conversely, the boroughs which have the smallest small firm shares – City of London, Westminster and Kensington and Chelsea -- have lower net birth ratios. Of course, whilst there is evidently a connection between spatial variations in the net birth ratio and the character of the local firm size distribution[17], there are likely to be a wide range of other factors which also contribute (albeit indirectly) by shaping the birth ratio and the firm size distribution.[18]

Figure 23: London boroughs, net birth, ratio to open stock, av 1998 – 2011 vs share of size-band 1 – 4 in firm stock, av 1997 – 2011, %



Source: ONS/BSD

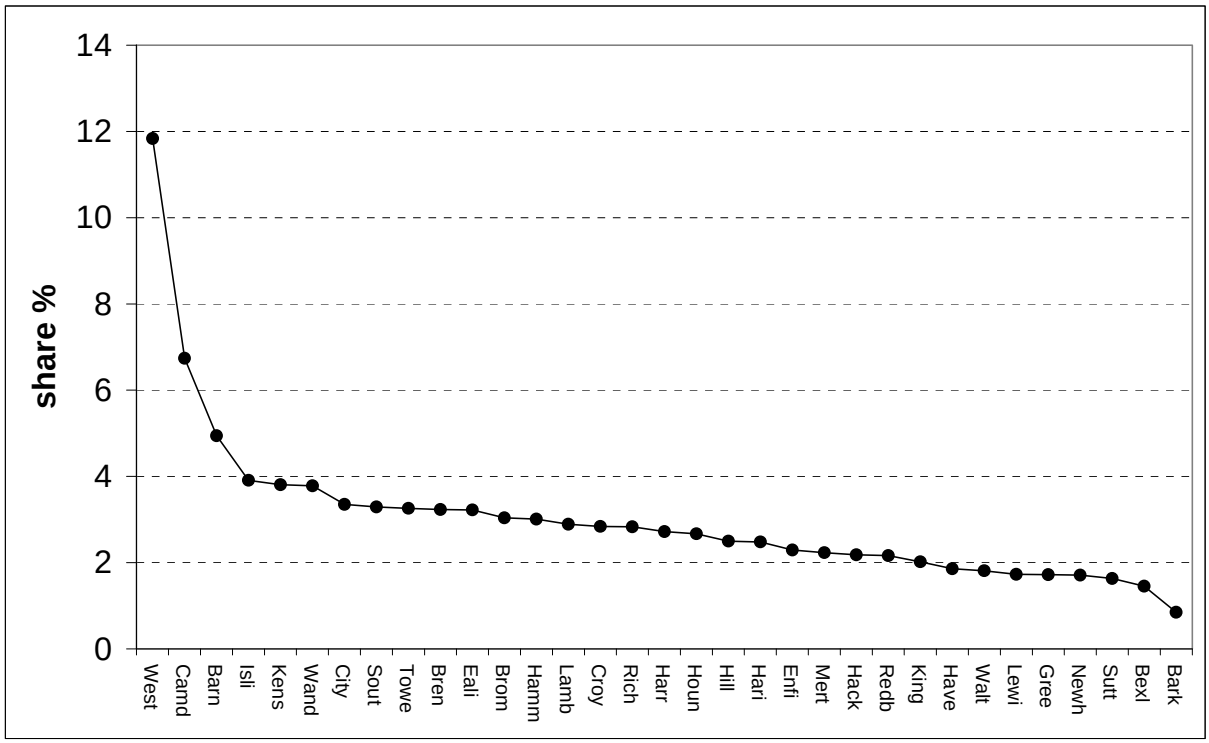
5.2.2 Jobs by borough

33. We start with the distribution of firms across boroughs in 2011 displayed on Figure 24. Evidently the distribution is quite highly skewed: 12% of all firms are in the top-ranked borough, Westminster. Only five other boroughs have shares of 4% or more and these are, in decreasing order: Camden; Barnet; Islington; Kensington; and Wandsworth. Taking these top six together accounts for a third of all firms. Notice, too, the top six boroughs are neighbours and, as we run further down the ranks, left to right across the horizontal axis of the plot – as far as number 11: Ealing – we simply expand the size of the 'cluster' of neighbouring places which, by the time we reach Ealing, accounts for 50% of all firms. Not until number 12 in the list, Bromley which has a three

percent share, do we move towards the outskirts of London. By contrast, the bottom end of the list consists of places to the south and east of central London: the bottom five are, in increasing order: Barking; Bexley; Sutton; Newham; and Greenwich.

34. Moreover, although the shares do change somewhat over time (for boroughs with a larger than average positive net birth ratio, as noted above) these changes are relatively small and the rankings, for example, remain virtually unchanged. If we compare the 2011 shares to those in 1997 there is only one large change in share – Westminster – which lost almost two percentage points. There are three other large-ish 'losers' near the top of the list – Camden, Kensington and Chelsea – each lost about one percentage point each, but nonetheless (as we can see) remain close to the top.

Figure 24: London boroughs, share in stock of firms, 2011 (descending order) %

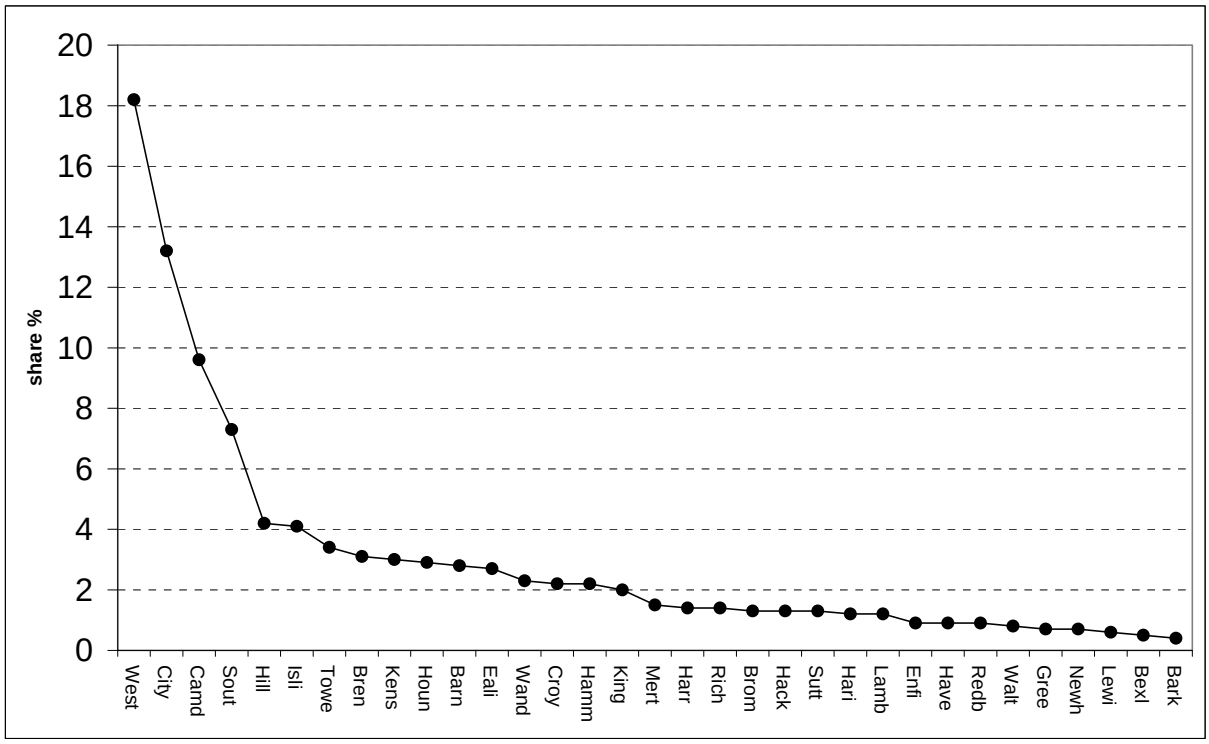


Source: ONS/BSD

35. The distribution of jobs across boroughs is even more skewed than that of firms, as we can see from Figure 25. Westminster is again at the top with 18% of all jobs and three other boroughs – City of London, Camden and Southwark each have shares greater than 5%. The top four alone account for almost half of London jobs. Whilst there

is is a broad similarity in rankings between the two distributions at the top end (though the City of London has a much larger share of jobs than of firms), there is one very noticeable exception: Hillingdon. It is quite close to the top of the jobs list (it is sixth); but is very much further down the firm share list (it is 18th). Wandsworth is the borough displaced from the top ten of the job share list (down to 15th) though it was in sixth place on the firm share list. Let us now see what light the decomposition can shed on the (proximate) factors which have produced this pattern of change.

Figure 25: London boroughs, share in stock of jobs, 2011 (descending order) %

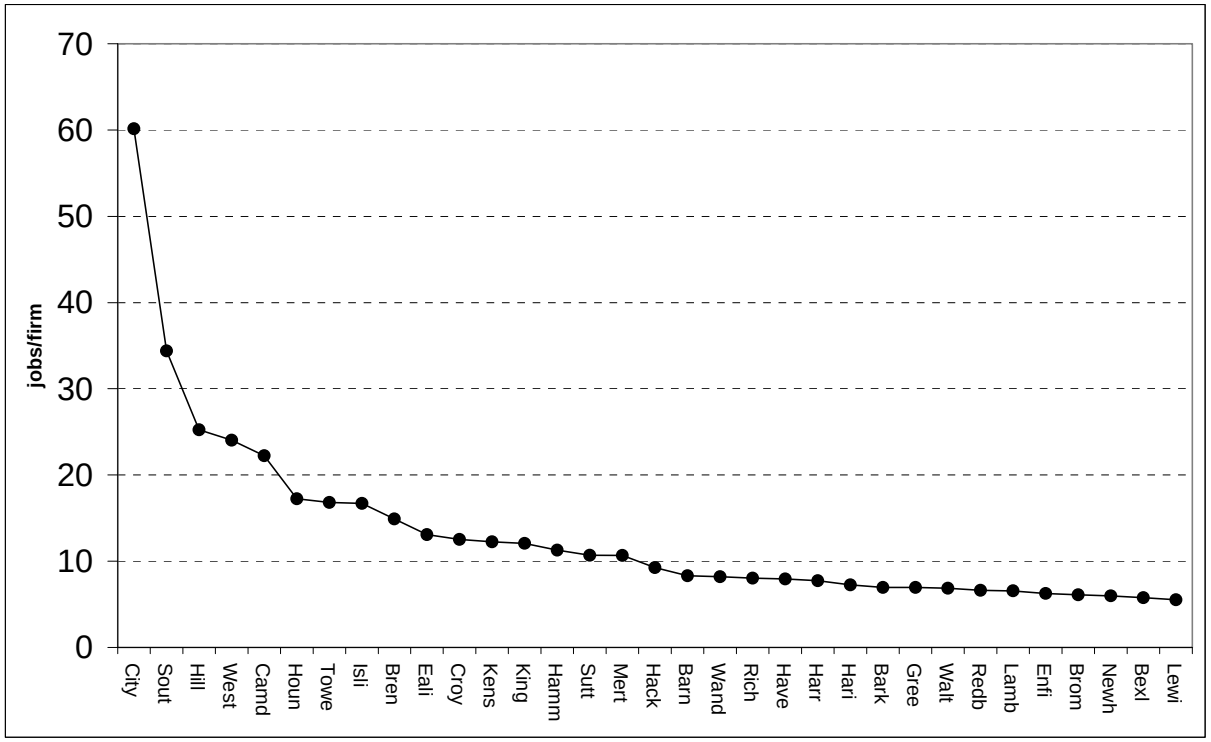


Source: ONS/BSD

36. The first step is the data on jobs/firm. Figure 26 confirms what we know from the algebraic relationship between the firm share and the job share: the disproportion between the firm share and job share for City of London, for example, is accounted for by a very large figure for jobs/firm: at 60 jobs/firm it is almost twice the size of the next borough in the list. Hillingdon has the third largest jobs/firm figure, 25, which 'turns' a firm share of 2% into a job share of 4%. Equally, the Wandsworth firm share of 4% combined with a jobs/firm figure of 8, in the middle of the rankings, shifts it from close to the top of the firm share rankings to more than half way down the job share list. Like most of the other borough distributions, it appears that the jobs/firm

distribution is also highly skewed. You will remember the London average is just under 16, more than two thirds of the boroughs record jobs/firm figures less than that average, one third are less than half the London average.

Figure 26: London boroughs, jobs/firm, 2011 (2011 descending order) ratio



Source: ONS/BSD

37. We can now use the decomposition which underpins Table 2 to explore the jobs/firm figure in a few of the cases where the size and/or rank in the jobs share distribution differs from the rank in the firm share distribution: City of London; Hillingdon; and Wandsworth. Table 3 sets out the data. There are a pair of important contrasts here. Whilst the City of London and Hillingdon both have an extraordinarily large average firm size in the 20+ category – 386.5 in City of London and 361.9 in Hillingdon – the City of London has a much larger share of its firms in the 20+ size-band, 14.7% compared to 6.3% in Hillingdon. Clearly it is the difference in the firm size distribution which accounts for virtually all the difference in jobs/firm. Comparing Wandsworth to Hillingdon, we can see that Wandsworth has both a much smaller share of firms in the 20+ size-band (just 3.5%) and and an average jobs/firm figure in the 20+ category (191.2) half that of Hillingdon.

38. It is the combination of the 20+ weight in the firm size distribution and average jobs/firm in the 20+ category which seem to drive the differences between boroughs in the overall jobs/firm figure. Figure 27 summarises this relationship. It is a scatter plot of overall jobs/firm against the product of the 20+ share in the size distribution and the average jobs/firm in the 20+ size-band – the weight contributed of 20+ jobs/firm to the total. The relationship is very close to a straight line, even if we drop the two – potentially distorting – largest values the slope remains close to 1.0 and the multiple correlation 0.98. The five largest values have been labelled and these are, necessarily, the five largest values of the weighted contribution of 20+ as well as the five boroughs at the top of the average jobs/firm list on Figure 26.

Table 3: London:size-band decomposition of jobs/firm, selected boroughs, 2011

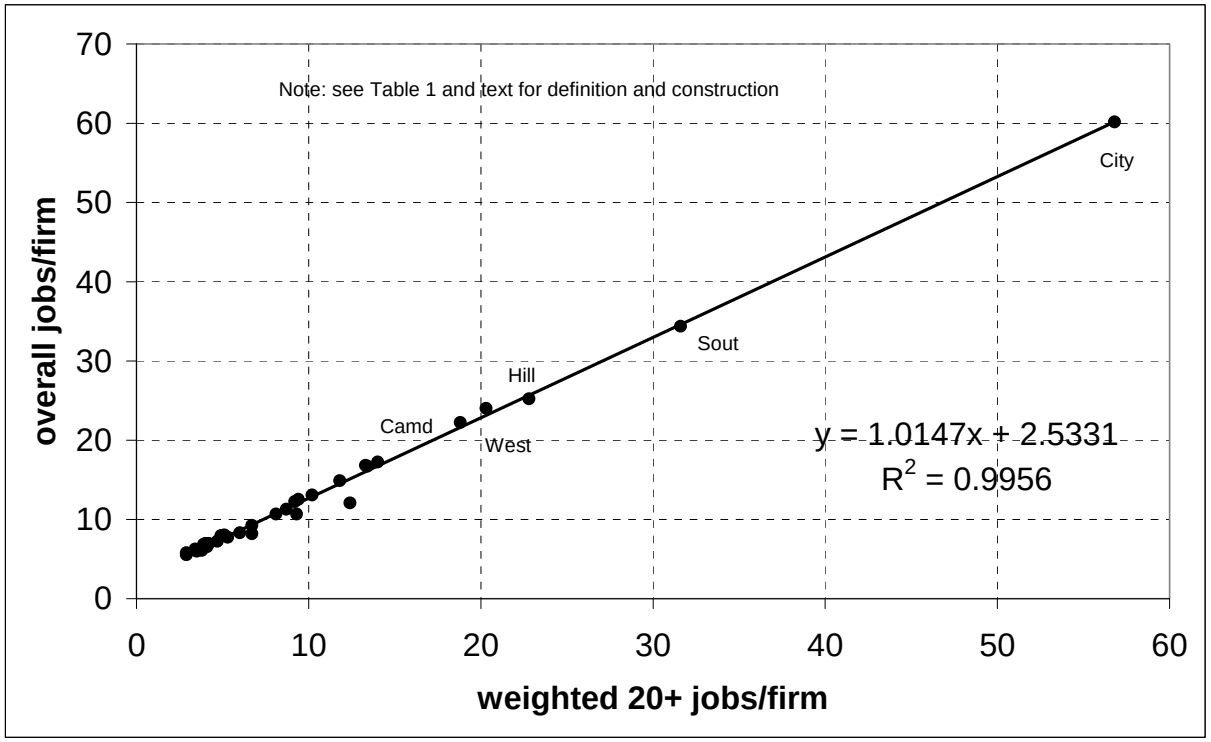
	City of London			Hillingdon			Wandsworth		
size-band	**firm size distribution**	**jobs/firm**	**weighted jobs/firm**	**firm size distribution**	**jobs/firm**	**weighted jobs/firm**	**firm size distribution**	**jobs/firm**	**weighted jobs/firm**
1-4	52.1	1.5	0.782	72.5	1.5	1.088	79.0	1.4	1.106
5-9	22.5	5.9	1.328	16.1	5.7	0.918	12.9	5.7	0.735
10-19	10.7	13.5	1.445	5.1	13.3	0.678	4.6	13.4	0.616
20+	14.7	386.5	56.816	6.3	361.9	22.8	3.5	191.2	6.692
sum			**60.371**			**25.484**			**9.149**

Source: ONS/BSD

Note: for definitions see Table 1 and associated text.

39. So far we have focused on a handful of extreme values of jobs/firm to motivate the discussion of the distribution of jobs, but it is worth looking separately at the two proximate determinants – the firm size distribution and the average of jobs/firm in the 20+ size-band. We see immediately from Figure 28, which displays the firm size distribution in 2011, that large shares for large firms are relatively rare. The corollary is also true: that small shares are relatively common, indeed two thirds of the London boroughs have 20+ shares in a narrow band between 2.5% and 5%. Unsurprisingly, the boroughs with smaller shares of large firms tend have the largest shares of firms in the smallest (1 to 4) size-band, on average about 80% (with 15% 5 to 9, and around 5% 10-19).

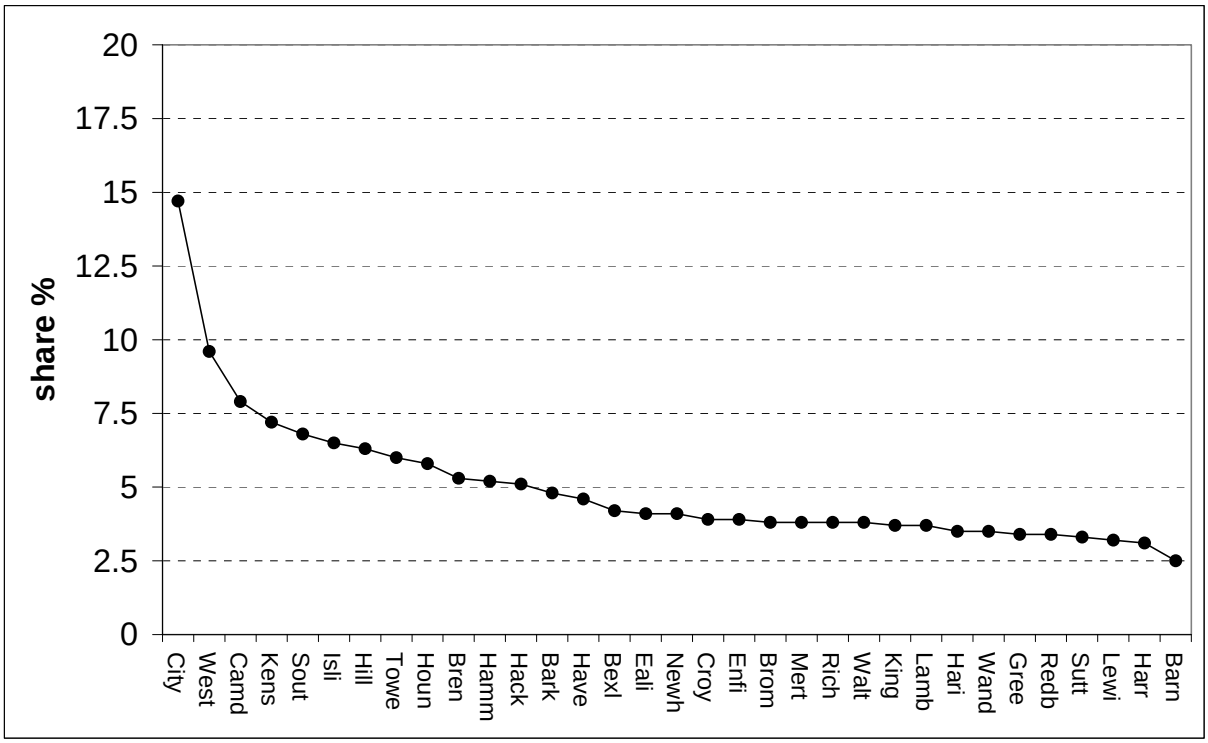
Figure 27: London boroughs, overall jobs/firm vs weighted 20+ jobs/firm, 2011



Source: ONS/BSD

Figure 28: London boroughs, share of firms in 20+ size-band, 2011 (descending order)

%

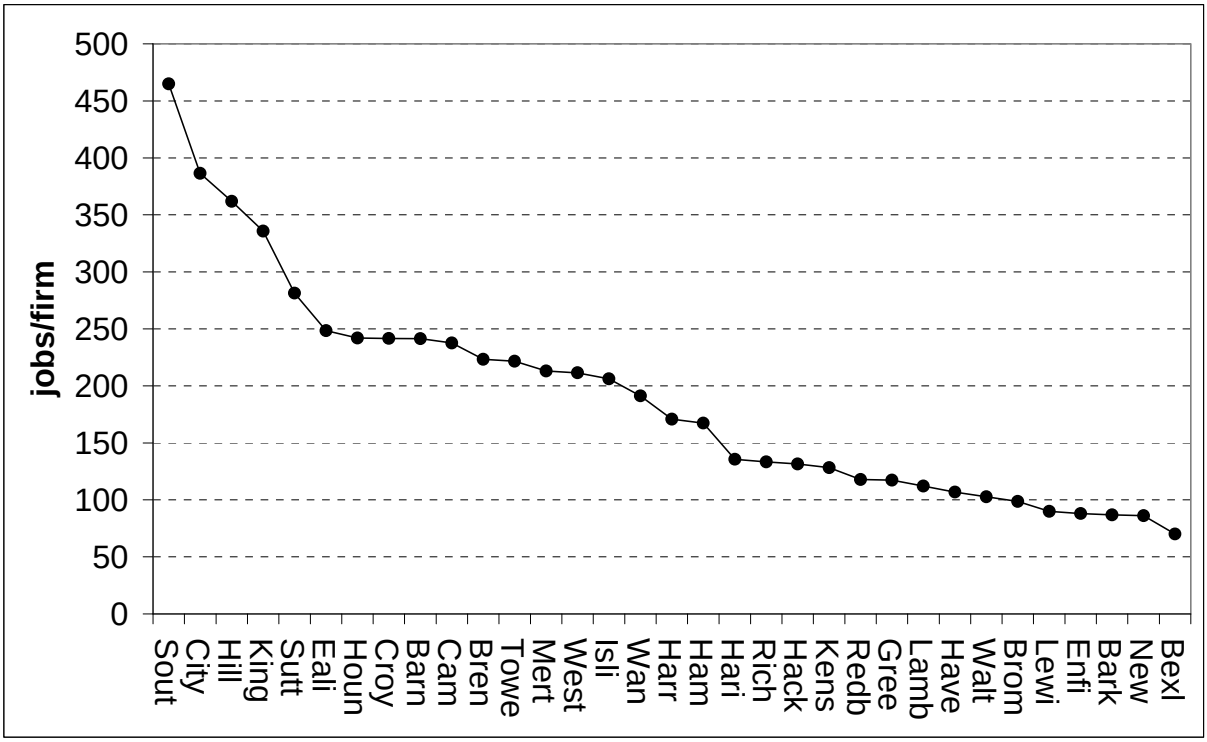


Source: ONS/BSD

40. The average jobs/firm in the 20+ size-band in 2011 – the second factor in our account of the distribution of jobs – is displayed on Figure 29. Again, there are just a handful of boroughs at the very top end of the distribution, five with more than 250 jobs in their 20+ firms. However two of the boroughs in this group – Kingston upon Thames and Sutton – have not previously shown up close to the top of any of our lists. Looking back to Figure 25 we can see that these two are in the bottom third of the distribution of 20+ shares. Even though the 20+ firms in these two boroughs are relatively large, there are relatively few of these large firms. It follows that they are towards the middle of the average jobs/firm distribution, as we can confirm from Figure 26. Outside the top five, the rest of the boroughs appear to fall into two groups: the first, from Ealing to Hammersmith, with values in the 150 to 250 jobs/firm; the second, from Haringey to Bexley, with jobs/firm in the 50 to 150 range. What is notable here is the members of the list at the bottom end: just above Bexley we have Newham, then Barking. The bottom

end of this distribution constitutes much of the bottom end of the overall jobs/firm distribution (hardly surprising since as we saw the share of 20+ firms is quite uniform towards the bottom) – since many of these boroughs are close to the bottom the firm share list, it follows as well (given their jobs/firm) that they are close to the bottom of the jobs share list too.

Figure 29: London boroughs, jobs/firm 20+ firms ,2011 (descending order), ratio



Source: ONS/BSD

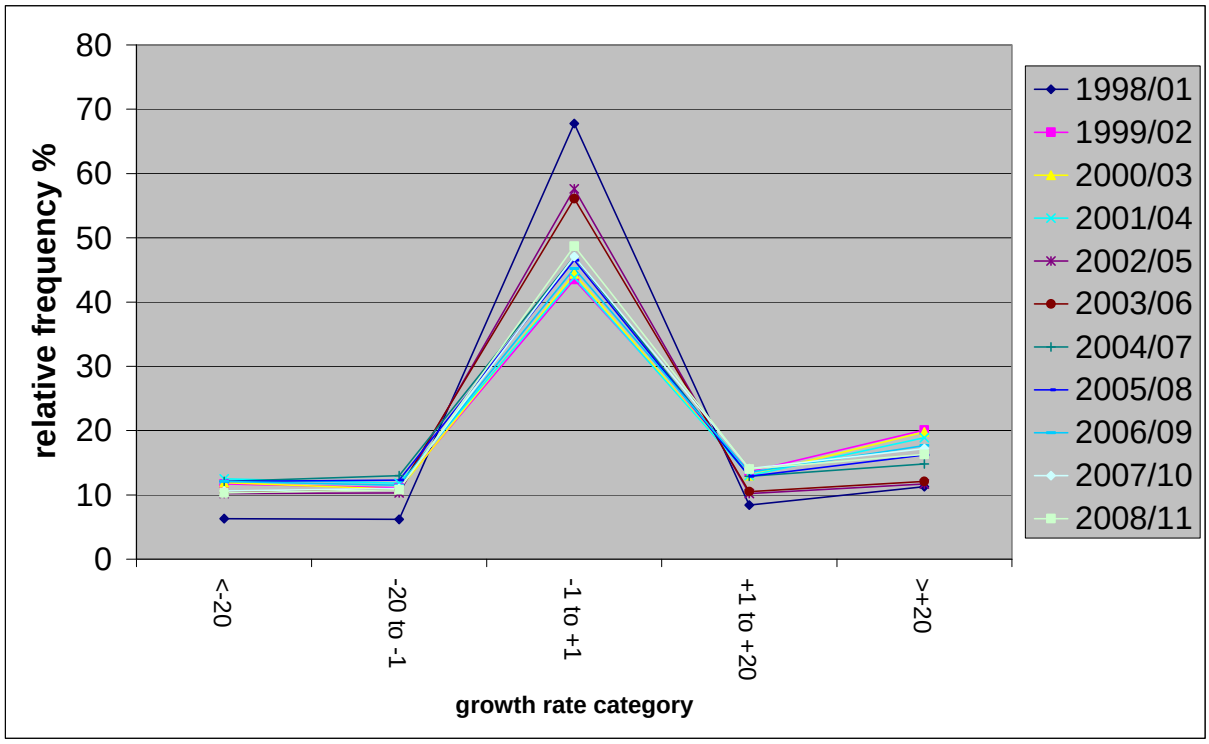
6 Growth rate distributions

41. Although the literature on firm growth rate distributions seems to be quite limited, there has been some recent interest, largely as a by-product of some international comparison work on high growth firms sponsored by FORA (a Danish enterprise promotion agency). We prepared a report NESTA in 2009 which covered this subject, and there is a more recent report by Albert Bravo-Biosca.[19] The 'convention' in this recent work is to compute the frequency distribution of average firm-level growth in the number of jobs at annual rates over a three year period using 11 'categories'. However, in the UK case this often yields an uninformative display. In particular, the bulk of the all firms distribution – typically 50% to 60% of it – is concentrated in the 'no

growth' category (greater than -1% less than or equal to 1%); with about 10% in each of the extreme 'wings' (less than or equal to -20% and greater than or equal to 20%); leaving about 20% distributed across the eight remaining bins, four 'shoulder' categories either side of 'no growth'.

42. A more revealing plot amalgamates the four shoulder categories either side of 'no growth', leaving just five categories: ≤ -20; -20 to -1; -1 to 1; 1 to 20; ≥ 20.[20] The frequency distributions of three year growth rates in jobs (expressed at annual rates) have been computed for the 11 three year periods between 1998/01 and 2008/11 and are displayed in Figure 30. Most of the distribution is concentrated in the middle 'no growth' category [21] and for most of the periods 'no growth' is between 40% to 50%. But 1998/01 does seem to be an outlier with almost 70% in that category. The share in the 'fast growth' category, ≥20%, is typically around 20%, although in a few years the share does fall as low as 10%.

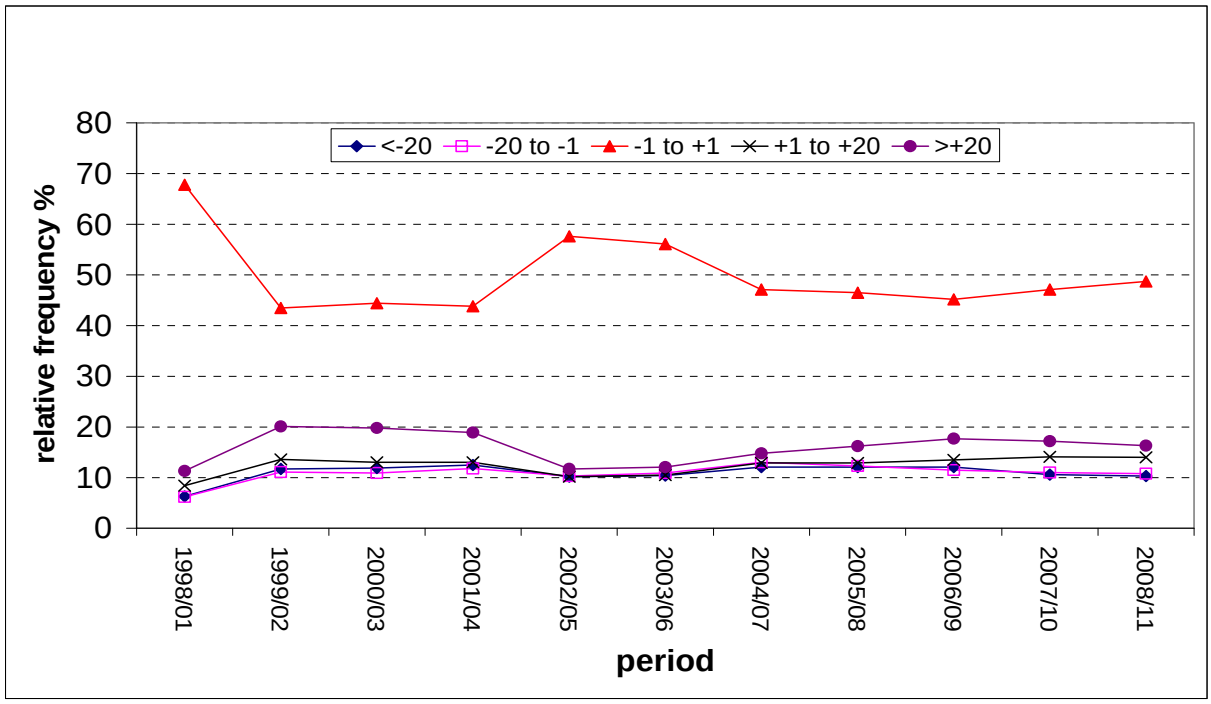
Figure 30: London, five category job growth rate classification, relative frequency distributions, 3-year periods, 1998/01 to 2008/11, %



Source: ONS/BSD

43. Clearly, though, the extreme concentration of the mass of the distribution in the middle 'bin' does make it difficult to judge at all readily the proportions in the other growth categories. Visualisation can be improved considerably by re-arranging the plot: putting the 'period' on the horizontal axis and displaying the growth categories against it. This re-arrangement changes Figure 30 into Figure 31. We can now see more clearly the relative importance of the smaller growth rate categories and their variation over time. In particular, it strongly reinforces the conclusion that the first period 1998/01 is an outlier. Two other periods, 2002/05 and 2003/06, also have larger shares in the 'no growth' category but the compensating variations in the other growth categories are spread more widely.

Figure 31: London, five category job growth rate classification, relative frequency distributions, 3-year periods, 1998/01 to 2008/11, by period



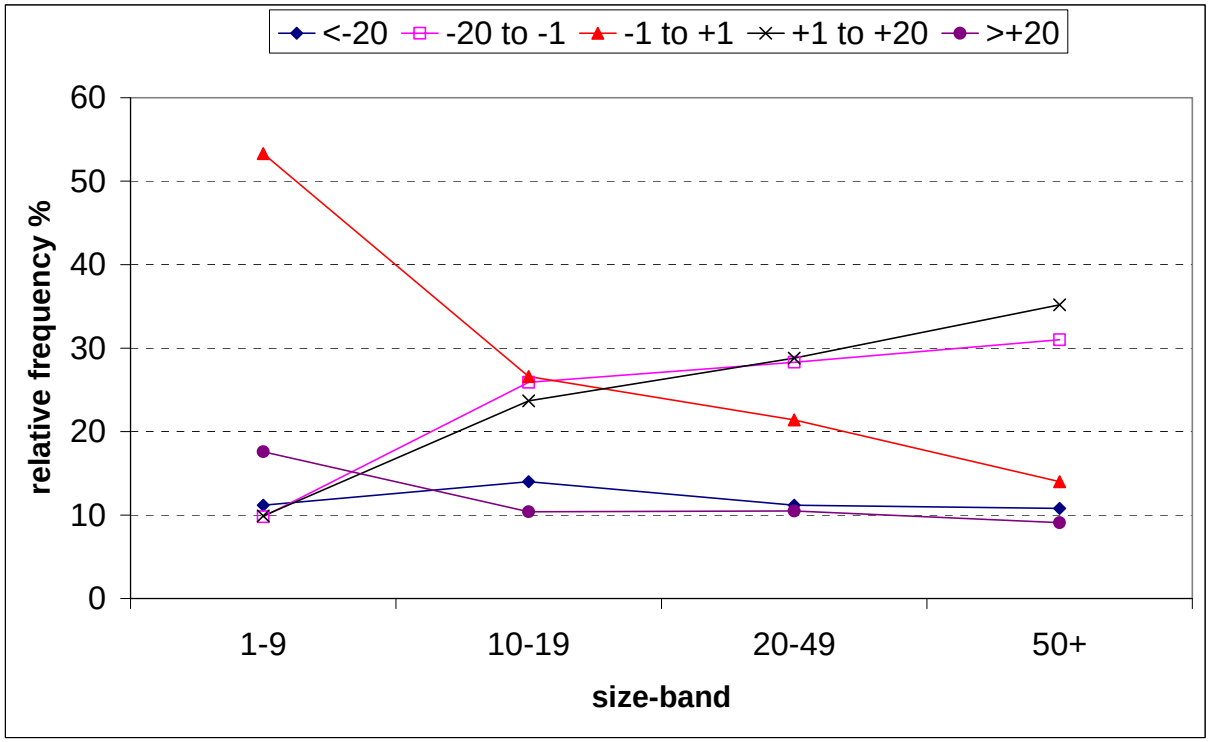
Source: ONS/BSD

44. There are four different dimensions of the growth rate distribution of particular interest here: size; age; sector; and borough. For each dimension we use averages of the five category growth rate distribution excluding the 'outlying' 1998/01 period.

6.1 Size

45. Using job numbers in the initial year of the growth period to allocate firms into size-bands, we compute growth rate distributions for four size-bands: 1 to 9; 10 to 19; 20 to 49; 50+. The difference in the distributions across size-bands is striking as we can see from Figure 32. Over half the smallest (1 to 9) firms are in the 'no growth' category (and remember from Figure 3 this size-band covers around 90% of firms), but this proportion declines steeply with increasing size, and for the largest firms (50+ size-band) about 10% are in this category. A rather larger proportion of the smallest firms – almost one fifth – are in the top, 20%+, growth category too, in the other size-bands the top category share is about one tenth. The bulk of firms in the larger size-bands are in the two 'intermediate' growth categories, either side of 'no growth'.

Figure 32: London, five category job growth rate classification, relative frequency distributions, average 1999/02 to 2008/11, by size-band %

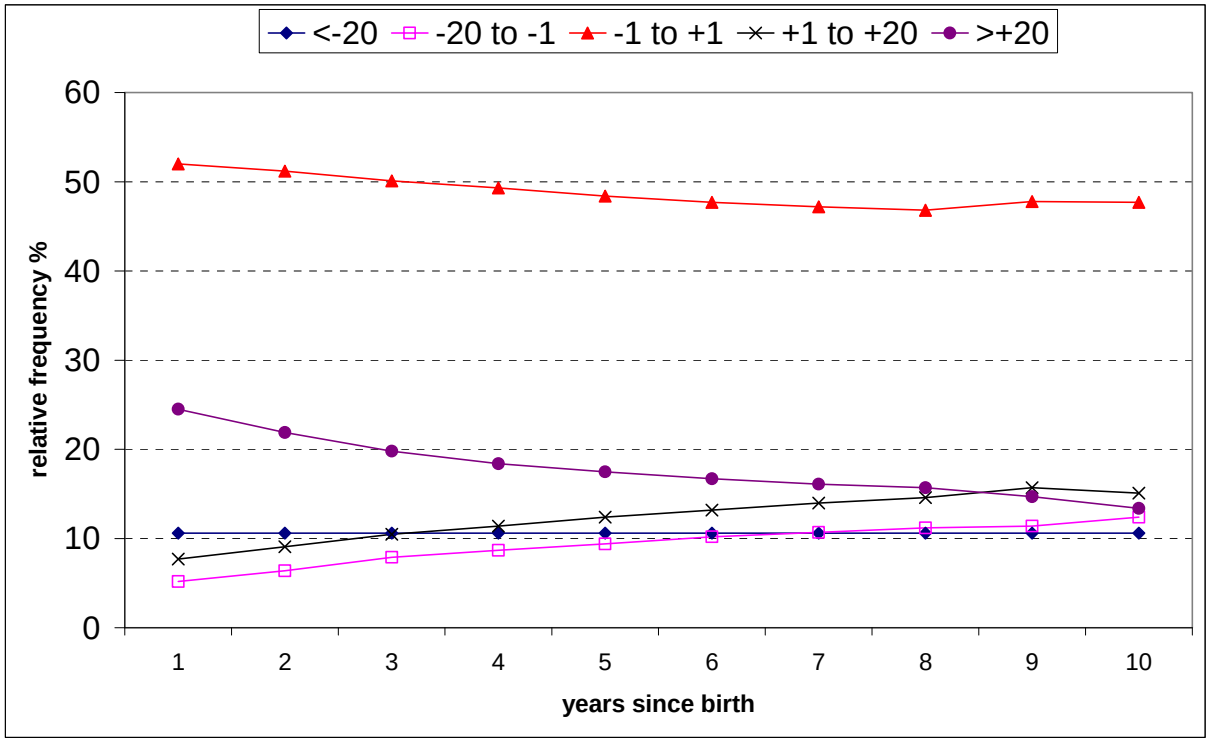


Source: ONS/BSD

6.2 Age

46. Figure 33 reveals a reasonably clear pattern in the distribution across growth rate categories by age. The no growth proportion is essentially independent of age, always quite close to one half: a little above at young ages, a little below for older ages. By contrast the share of firms in the fast growth (≥20%) category changes quite strikingly with age: at age 1 it is about one quarter, by age 10 it has fallen to just above one tenth. As the fast growth share contracts, all three of the remaining categories – the two intermediates and extreme negative growth – expand at a broadly similar rates, to roughly equal shares. This picture reinforces that from Figure 12 where we saw that jobs/firm grow with age, but at a declining rate.

Figure 33: London, five category job growth rate classification, relative frequency distributions, average 1999/02 to 2008/11, by age %

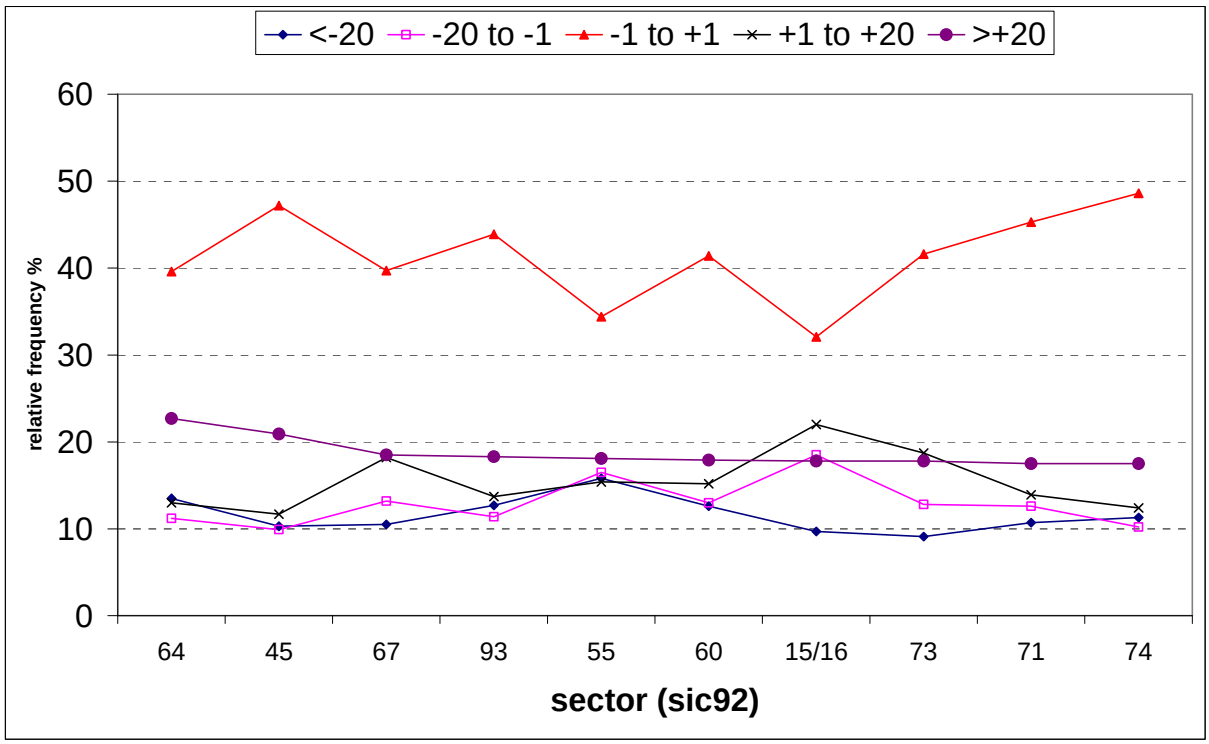


Source: ONS/BSD

6.3 Sector

47. The sectoral classification here is, in part, conditioned by the rules of disclosure: a cell (a pair of sector and growth category) must have a count of ten firms or more to be disclosed. We started with a full set of 45 SIC92 two digit sectors which were then combined with close neighbours (in the classification) if counts were small. Again we have plotted the distribution averaged over the periods 1998/07 to 2008/11 and, to improve visualisation, they have been ordered by by descending values of the 20%+ share and we have included just the top ten. The communications sector (sic64) is at the top of the list on Figure 34, with 22.7% of firms recording fast growth. The fast growth proportion changes relatively little across the top 10, by the 10th, business services (sic74) the share is still 17.5%. Virtually all the sectors in this list are services, the only manufacturing sector is food, drink and tobacco (sic15/16).[22] The bottom ten of the list of 2-digit sectors are all manufacturing, with a fast growth share between 13% and 10%.

Figure 34: London, five category job growth rate classification, relative frequency distributions, average 1999/02 to 2008/11, top ten sectors (descending by fast growth share) %



Source: ONS/BSD

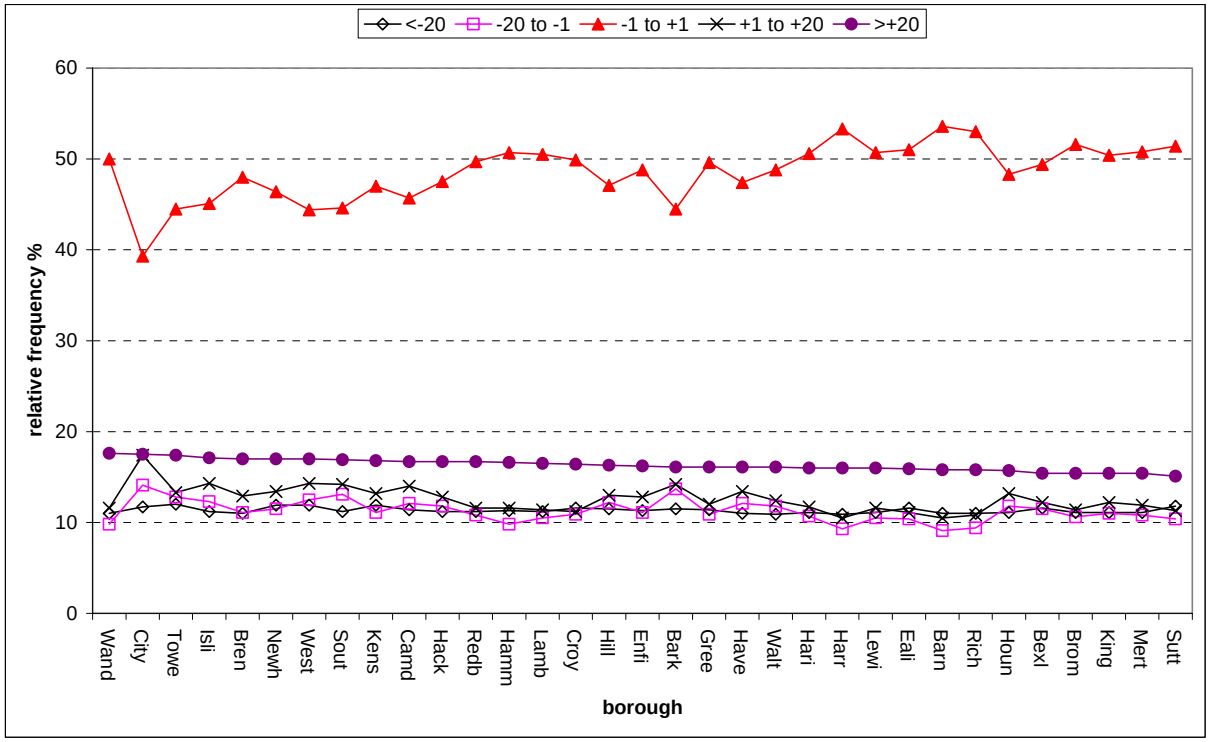
Key to sectors: 64, posts and telecommunications**;** 45, construction; 67, auxiliary to financial intermediation; 93, other service activities ; 55, hotels and restaurants; 60, land transport; 15/16, food, drink and tobacco; 73, research and development; 71, renting (not housing); 74, business services.

6.4 Borough

48. By comparison with the other dimensions, the distribution of growth categories across boroughs is almost entirely featureless. Because our principal interest is the fast growth category its share has been used to order the boroughs in the data display on Figure 35. The fast growth share in Wandsworth – the top (left hand) end of the plot is 17.6% – in Sutton – the bottom (right hand) end of the plot, the fast growth share is 15.1%, so there is just a 1.5 percentage point difference spread across 33 boroughs.

Figure 35: London, five category job growth rate classification, relative frequency distributions, average 1999/02 to 2008/11,boroughs (descending by fast growth share)

%



Source: ONS/BSD

7 High growth firms

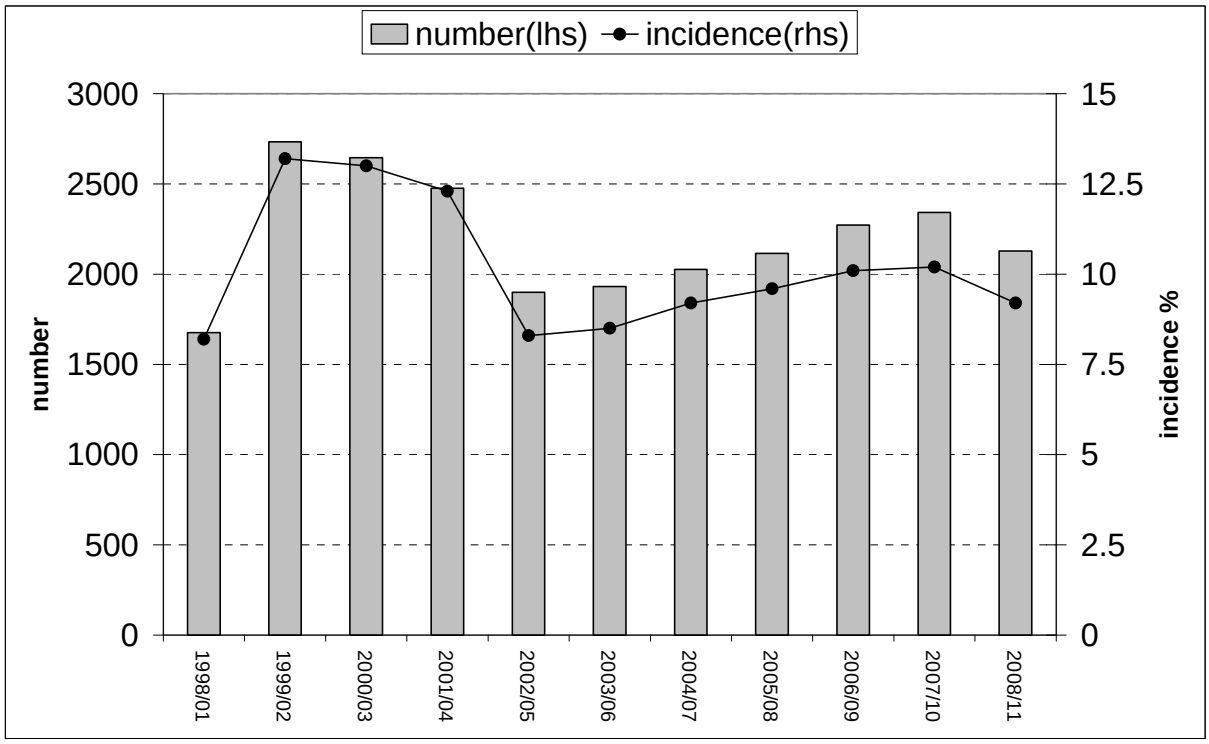
49. It is but a short step from discussing fast growth firms to considering high growth firms (HGFs): HGFs are fast growth firms with ten or more employees in the first year of the three year growth period. We are interested in both the numbers of HGFs and the HGF incidence rate – the ratio of the number of fast growth firms with ten or more employees to the overall number of firms with ten or more employees (see Data sources and definitions). As with the discussion of the distribution of growth rates, we are also interested in the characteristics of HGFs: size; age; sector; and borough. With HGFs though we ask two different questions about characteristics. Take size, for example. There is an incidence rate question: how does the HGF incidence rate vary by

size-band? There is an importance question as well: what proportion of HGFs are in each size-band?

7.1 Some headline data

50. From Figure 36 we can see that London seems to have, typically, about 2,000 HGFs per period (scale on left hand side), although between 1999/02 and 2001/04 there is a perceptible bulge where are numbers are closer to 2,500. The incidence rate (scale on right hand side) displays a similar pattern over time, during the bulge it was closer to 12.5%, after 2002/05 it averaged about 9%. In the discussion of characteristics we will typically use averages based on the post-'bulge' 2002/05 to 2008/11 period.

Figure 36: London, HGF numbers and incidence rate, 1998/01 – 2008/11

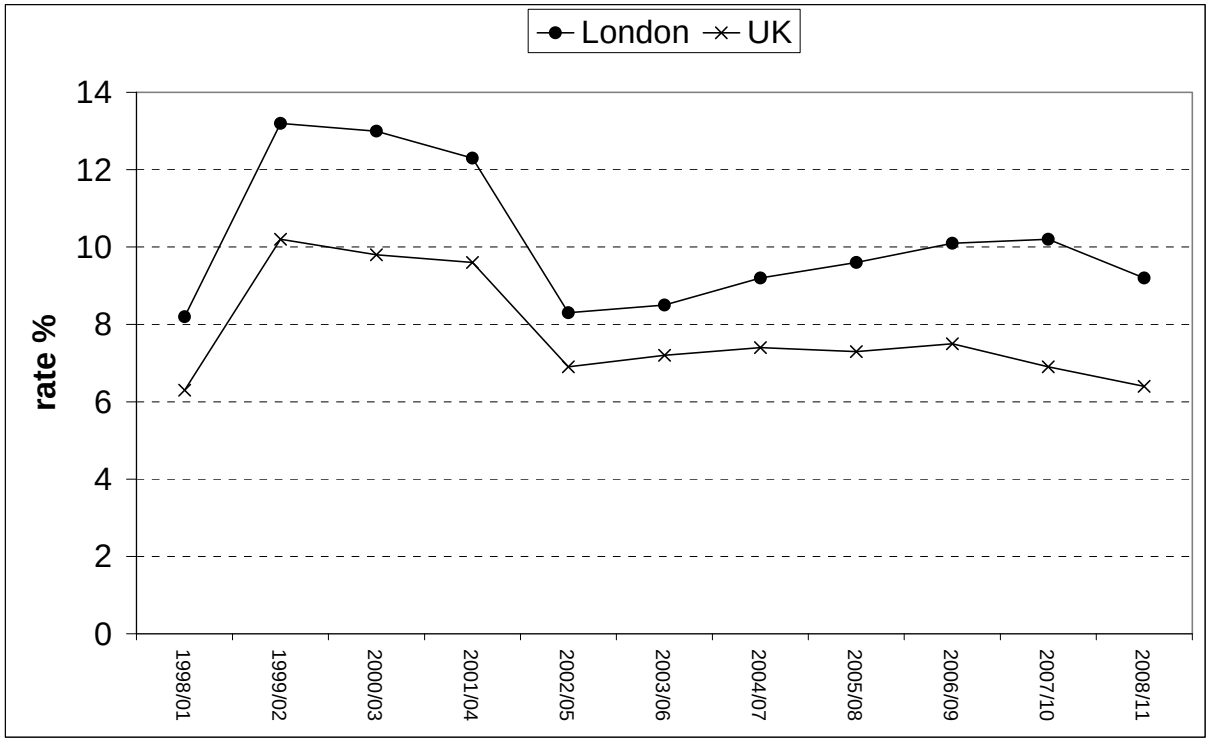


Source: ONS/BSD

51. Figure 37 puts the evolution of London's incidence rate in context by comparing it to that of the UK as a whole. We can see that the rate in London is typically between two and three percentage points larger and that the gap, which was at it's narrowest in 2002/05 has since then been steadily widening. Since 2002/05 the UK

has recorded between 10,000 and 11,000 HGFs per period, so London accounts for about one fifth of all the HGFs in the UK.

Figure 37: London and UK, HGF incidence rate, 1998/01 to 2008/11, %

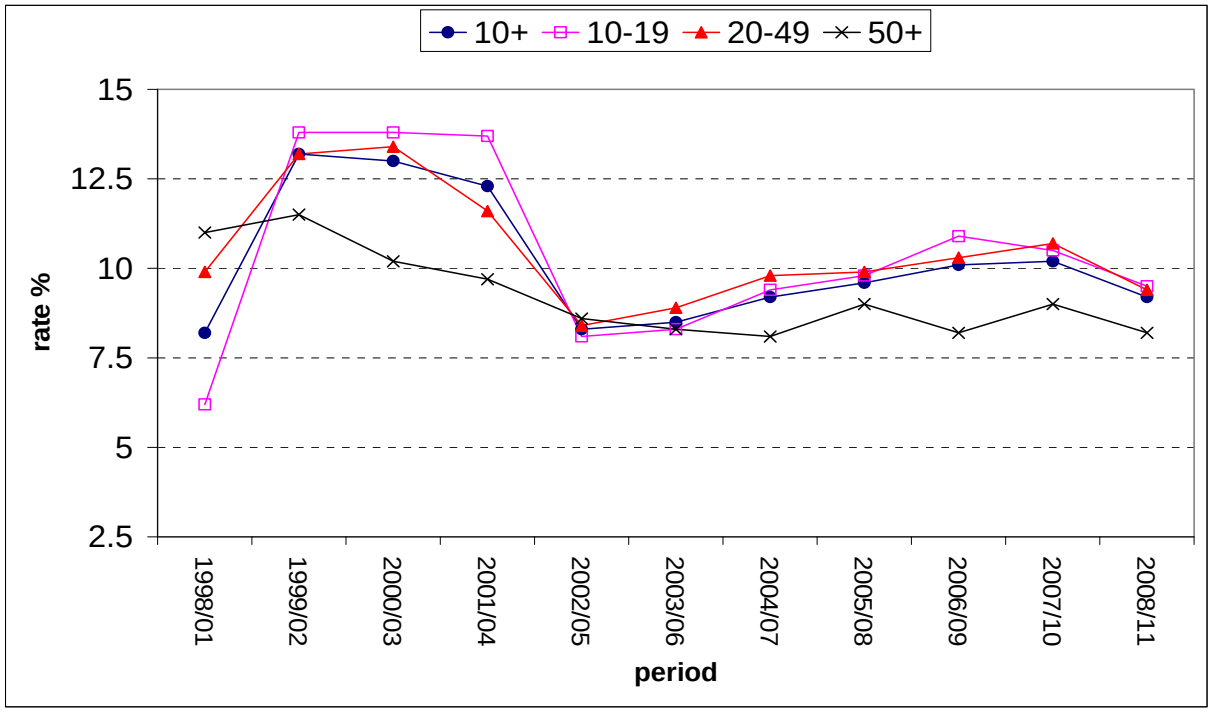


Source: ONS/BSD

7.2 Size

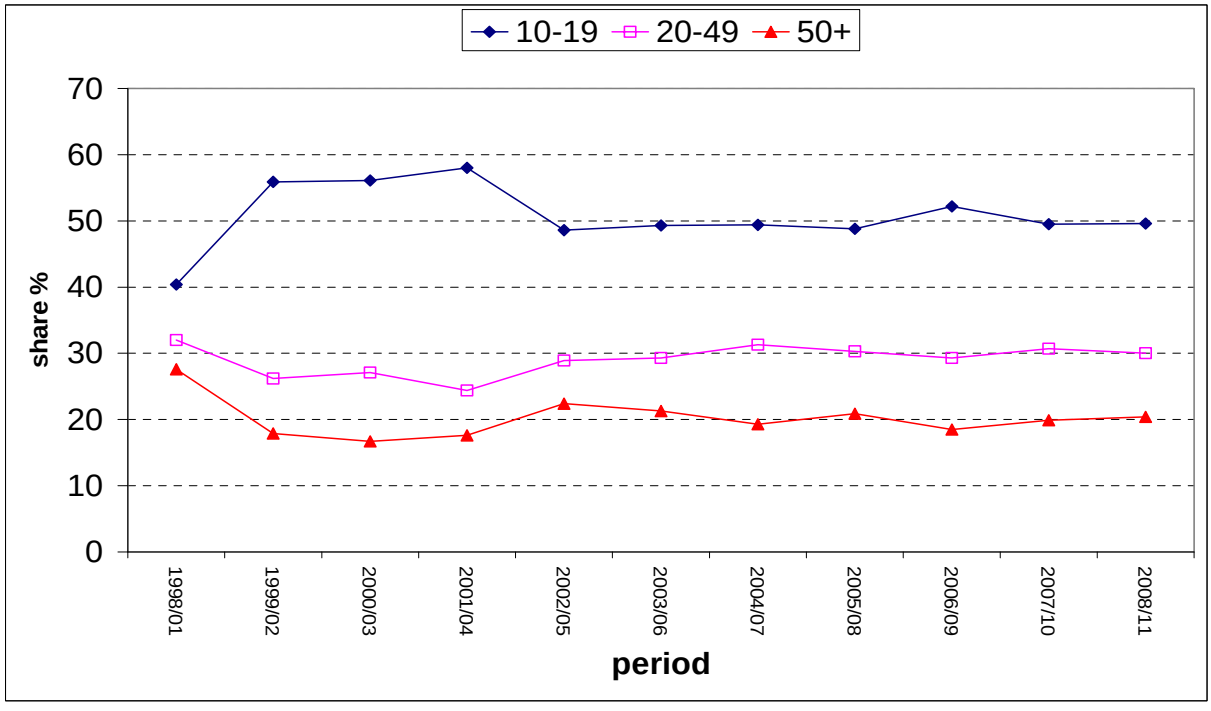
52. From Figure 38 we see that incidence rates for smaller (10 to 19 employee) and medium sized (20 to 49 employee) firms are very similar. Only for the larger firms (50+ employees) does the incidence rate record very different, usually lower and relatively constant, values. Moreover, it is important to notice that the population of HGFs is unevenly distributed across the three size-bands and Figure 36 records the data. The 10 to 19 size-band accounts for half of all HGFs in most periods, with the other half split 30/20 between the medium and large size-bands. Evidently, the 'bulge' – 1999/02 to 2001/04 – was connected with an increased in the numbers in the 10 to 19 size-band, and since 2002/05 the shares have been virtually constant.

Figure 38: London, HGF incidence rate 1998/01 – 2008/11, by size-band, %



Source: ONS/BSD

Figure 39: London, HGF incidence rate, 1998/01 – 2008/11, shares by size-band, %



Source: ONS/BSD

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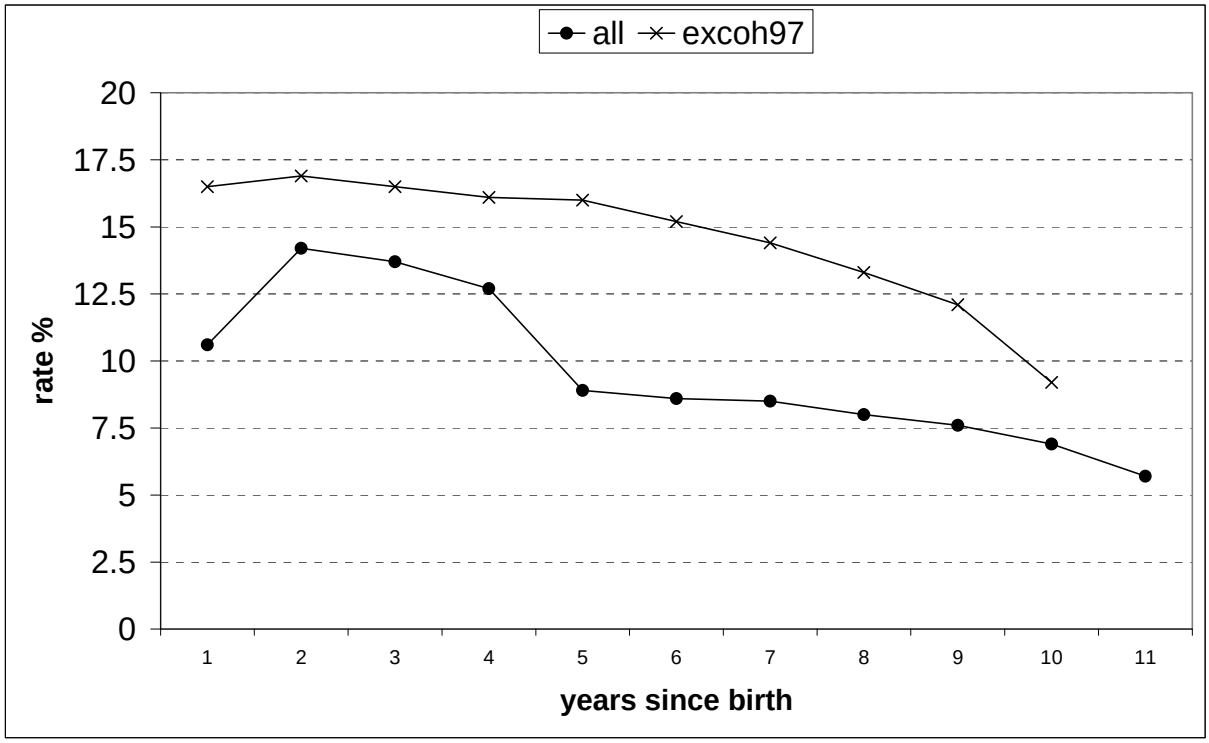
7.3 Age

53. The plot of HGF incidence against age reveals a distinctive pattern. Taking first the 'all cohort' series – the lower line on Figure 40 – we see that from age 2 onwards the incidence rate declines with age. Remember though that the age of cohort97 firms is not known, this cohort is in fact a mixture of large number of different-aged firms. If we exclude cohort97 from the calculations and limit the incidence rate measure to those firms whose age we do know, the upper curve (labelled 'excoh97') is the result. Evidently the bulge at age 1 was largely an artefact produced by the inclusion of cohort97. The relationship between incidence and age is now even clearer: it rises marginally between age 1 and age 2 and then declines quite steadily, beginning at 17.5% (almost twice the overall HGF incidence rate) and by age 10 it has fallen to just below 10%. Evidently, episodes of high growth are more likely amongst younger firms – a finding which reinforces our earlier findings about age and growth using cohort data, and the growth rate distributions by age.

Figure 40: London, HGF incidence rate, 1998/01 – 2008/11, by years since birth, %



Source: ONS/BSD

54. Table 4 answers the question about the distribution of HGFs across age groups. Looking at the age structure of the 2,129 firms which were HGFs in 2008/11 we find that the distribution across the ages from one year old to eight years old is quite uniform – each of them has a share around 7%, beyond age 8 it falls off. The bulk of HGFs though are in the age 11+ category: the members of cohort97 which account for almost 40% of all HGFs.

Table 4: London: HGF numbers by age, 2008/11

age years	number	share %
1	150	7.0
2	146	6.9
3	172	8.1
4	143	6.7
5	142	6.7
6	127	6.0
7	143	6.7
8	133	6.2
9	97	4.6
10	81	3.8
11+	795	37.3
all	**2,129**	**100.0**

Source: ONS/BSD

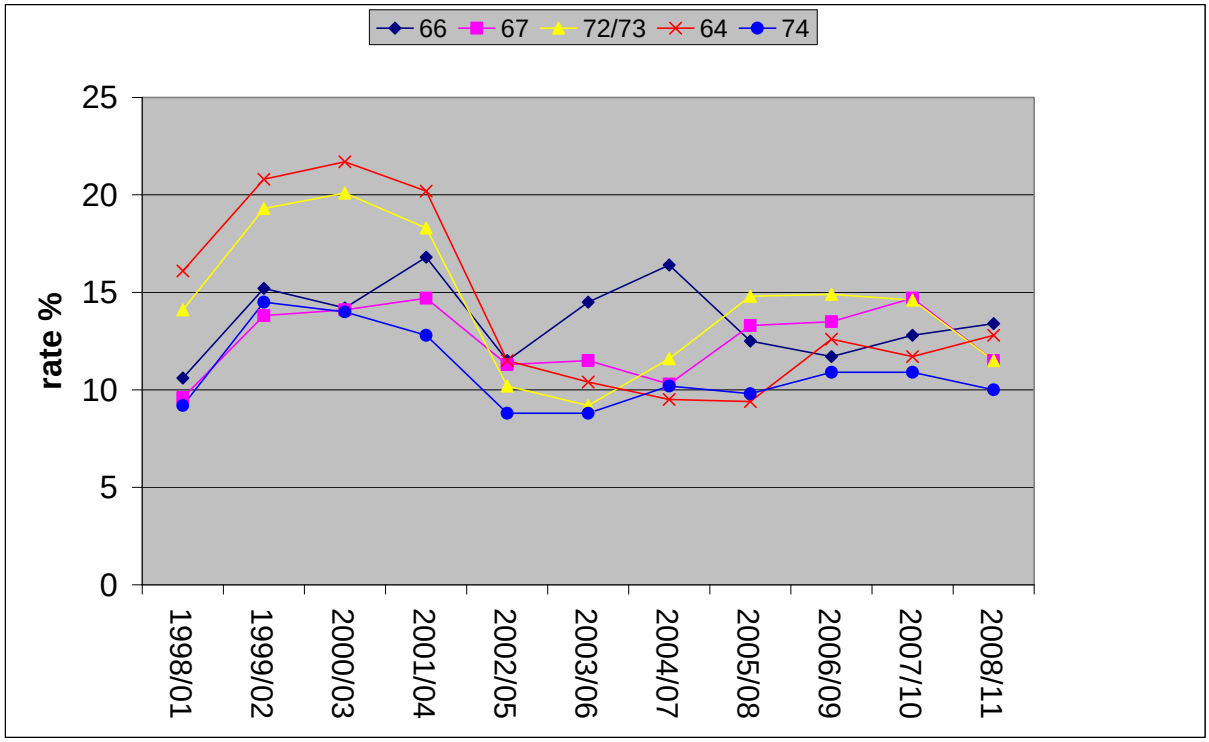
7.4 Sector

55. Incidence rates by sector vary considerably. The top five by average rank over 2002/05 – 2008/11 are plotted on Figure 41. All are services. Two of the five are financial services: insurance and pensions (sic66); and activities auxiliary to finance (sic67); one combines R & D and computer services (sic72/73); then posts and telecommunications (sic64); and business services (sic74). Although rankings do change over time, these five share between them the top five rankings over virtually all the periods.

56. The average ranks approach also proves an effective means of

summarising the share of HGFs. The top six, plotted on Figure 42, are also the only sectors with shares which are consistently at least 5%. The most striking feature of the plot is the relative importance of business services: around one third of HGFs are found in this sector (but remember about one third of all London firms are in business services, see Figure 16). Another third are accounted for by the next five: hotels and restaurants (sic55), retail distribution (sic52), R & D and computer services (sic72/73), recreational and cultural activities (sic92), and wholesale distribution (sic51).

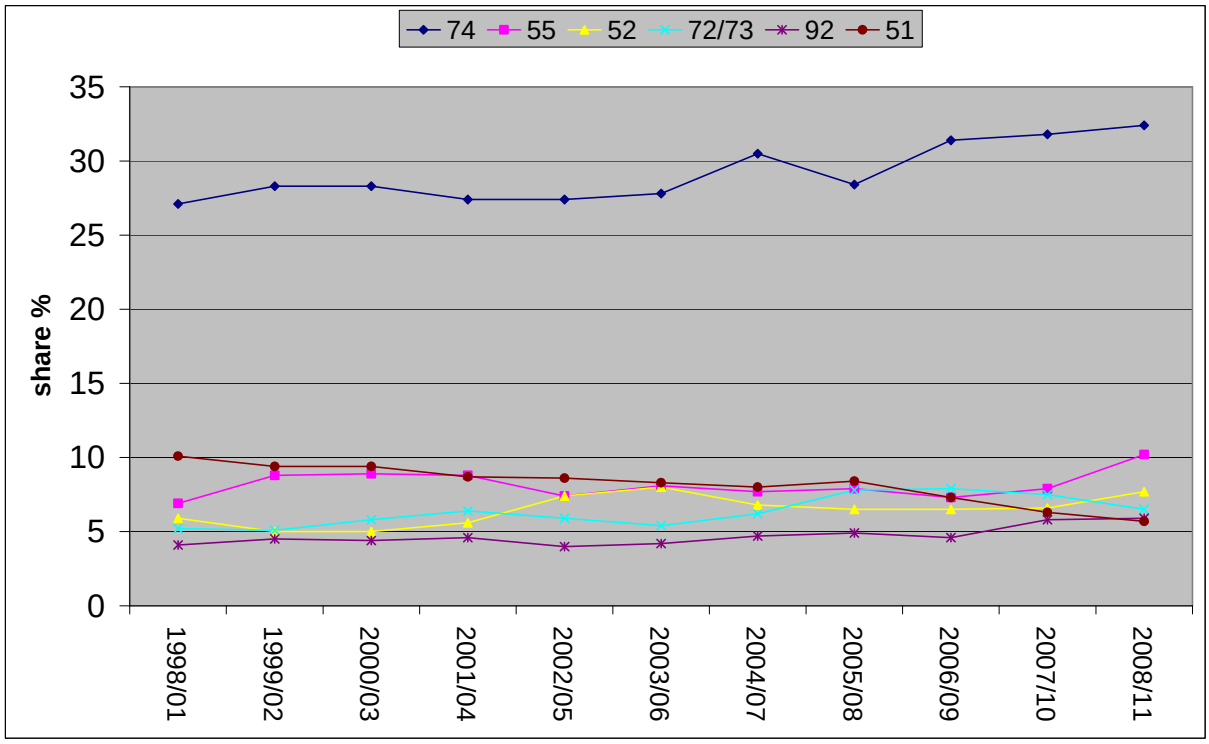
Figure 41: London, HGF incidence rate 1998/01 – 2008/11, top six sectors (2011), %



Source: ONS/BSD

Key to sectors: 66, insurance and pension funds; 67, auxiliary to financial intermediation**;** 72/73 computer services and research and development; 64, post and telecommunication; 74, business services;

Figure 42: London HGF share by sector, 1998/01 – 2008/11, top seven (2011), %



Source: ONS/BSD

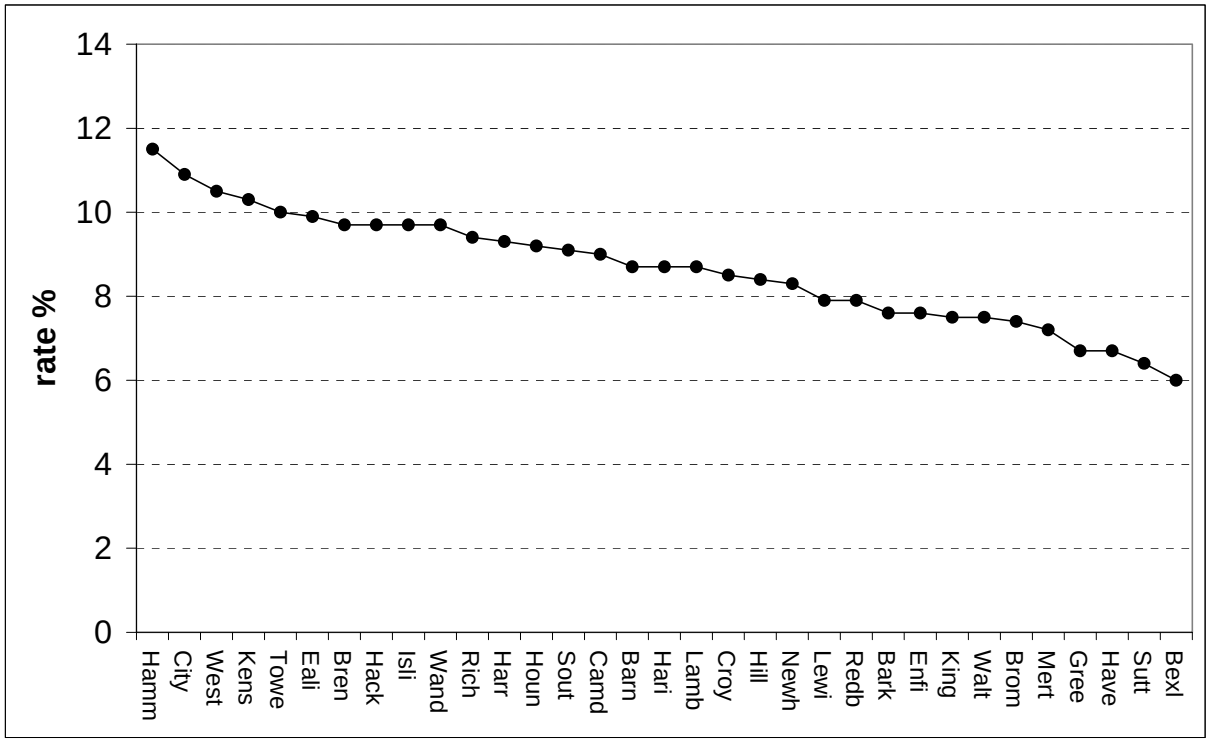
Key to sectors: 74, business services ; 55, hotels and restaurants; 52, retail distribution ; 72/73 computer services and research and development ; 92, recreation and culture; 51, wholesale distribution

7.5 Borough

57. There is some variation in the HGF incidence rate across boroughs, as we can see from Figure 43 which displays the incidence rate averaged over the relatively stationary periods (2002/05 to 2008/11). The boroughs have been plotted in decreasing order, ranging from Hammersmith, the top of the list at 11.5%, to Bexley with an incidence rate of 6% at the bottom of the list. So there are just 5.5 percentage points separating the top from the bottom, and half of the difference is concentrated in handful of points at the top and the bottom. The difference between Hammersmith and Tower Hamlets (ranked five) is 1.5 percentage points, whilst at the bottom, from Merton (ranked 29) to Bexley is 1.2 percentage points. So the 23 ranks between Tower Hamlets and Merton cover just 2.8 percentage points. Clearly it would not be wise to draw any strong conclusions about the detail of this distribution (certainly not its middle).

However it is striking that the five boroughs at the top of the list are neighbours and located in central and west London, whilst the five at the bottom, though not all neighbours consist of a pair of neighbours in the south, and three neighbouring boroughs to the east.[23]

Figure 43: London boroughs, HGF incidence rate, average 1999/02 – 2008/11 (descending order), %

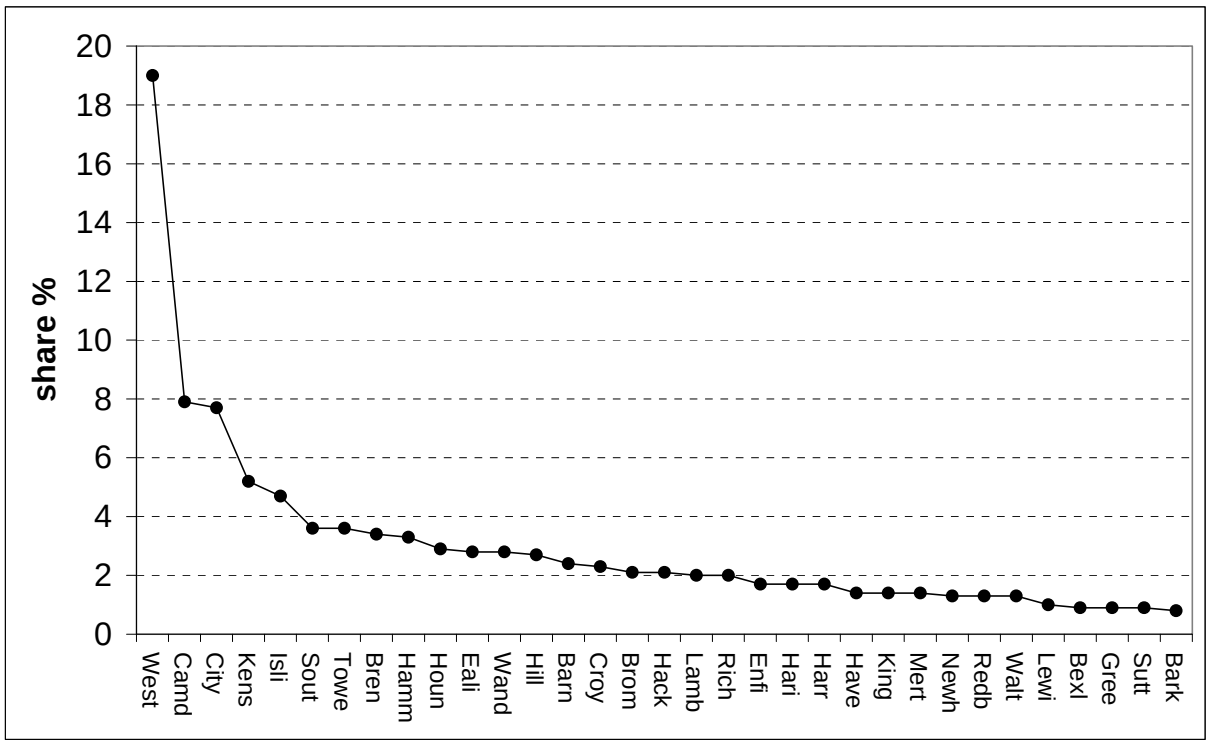


Source: ONS/BSD

58. The distribution of HGFs across the boroughs is highly skewed, as we can see from Figure 44, which ranks them based on their shares averaged over the periods 2002/05 to to 2008/11. Almost 20% are in Westminister, and if we add in the next four in the list: Camden; City of London; Kensington and Chelsea; and Islington; we have accounted for another 26%. But if taken in isolation this finding could be a little misleading. We know that incidence rates vary relatively little, so the apparent concentration of HGFs largely reflects the skew in the distribution of firms with more than 10 employees: indeed the top 5 on the HGF list account together for 42% of 10+ firms in London.

59. The remaining boroughs (by implication) share slightly more than half the HGFs between them, with the boroughs at the bottom: Bexley; Greenwich; Sutton; and Barking and Dagenham; with less than 1% each.[24] In absolute terms, on average (based on the numbers between 2002/05 an 2008/11), Westminster records about 400 HGFs per period, Barking and Dagenham around 20.

Figure 44: London boroughs, share of HGFs, average 2002/05 – 2008/11



Source: ONS/BSD

7.6 High growth firms and job creation

60. The recent interest in defining and identifying HGFs is motivated by a conjecture (of 30 years standing) that a relatively small proportion of firms (typically smaller firms) were responsible for creating a disproportionately large proportion of jobs.[25] Before setting out the London evidence on this conjecture, we need to describe the measurement framework. Working with a definition of HGFs which uses a 3-year growth period commits us to 3-year comparisons for other categories of firms as well and that, in turn, implies that we compare the jobs created over the preceding 3 years by firms which are alive *at the end* of a the period (so for example, alive in 2001 for the

1998/2001 growth period). However, focusing on the end of the period, means that we will include firms which are born *during* the period, that is firms which are not alive at the *beginning* of the period.[26]

61. Here we distinguish four categories of firms, some (at least) in each will be job creating firms. The first two follow from the OECD definition of HGFs: remember that to be classified as an HGF (or not HGF) a firm has be at least one year old at the beginning of the growth period and, of course, alive at the end. We also need to include firms which are born in the first year of the growth period and survive to the end; we refer to these as 'young'. Finally we have firms which are born *during* the growth period (including in the final year of the growth period) and are still alive at the end, we refer to these as 'new'. To summarise, denoting the first year of the growth period as 't' and the final year as 't+3', we have,

a. HGF, born before t, alive in t+3, more than 10 jobs at t, and 20% annual average growth in jobs from t to t+3

b. NHGF, born before t, alive in t+3, but not HGF (failing either the size test or the growth test, or both)

c. 'young', born in t, alive in t+3

d. 'new', born after t, alive in t+3

62. Table 4 displays the data on London's job creating firms for the growth periods 1998/01 to 2008/11. Column (1) records the stock of firms in the final year of the period which, in the first period was about 250,000 and we can see that just 134,000 were job creators. The stock of firms rises, albeit quite slowly and unevenly, up to 2006/09 and then flattens. The number of job creating firms follows a similar trajectory although, as we can see from the ratio of job creators to total in column (3), the shares of job creators fluctuates between 50% and 60%. Next we have the numbers in different categories of job creators. We have seen the HGF series before (see Figure 33), the number ranges between 1,500 and 2,000; there are very many more NHGF job creators, typically between 30,000 and 40,000. Finally, in columns (5) and (6) we have the 'young', of which there relatively few (remember these are a proportion of the 3-year survivors of a single birth cohort: all born in year t); and the very much more numerous 'new', around 100,000 per period. So, as we can see from column (11), between two thirds and

three quarters of all job creating firms are in the new category, NHGF add another quarter with the remaining 5% shared between the young and the HGFs.

63. We have looked before at the headline numbers for jobs in London, so the data displayed by the first two columns of Table 5 is quite familiar from Figure 1 (although the numbers are arranged rather differently). Column (3) of the table simply records the difference between the first two columns: the change in jobs over the 3-year period, a series which resembles (of course) the net job change from Figure 15. The other three columns refer to the jobs in job creating firms. As might have been anticpated, these numbers look quite different. Evidently, job creating firms account for about 1.5m jobs in the initial year of the growth period (considerably less than half the all firms figure) and between 2.5m and 3m in the end year. The difference between column (6) the jobs added by the job creating firms, and column (3) the overall change in jobs is striking: job creating firms are adding between 1.0m and 1.5m jobs per period.

64. Now we come to the conjecture. We know the numbers in the different job creating categories: what about the jobs? The answer is provided by the data plotted on Figure 45. The largest share of job creation, pretty consistenctly, is accounted for by the 'new' firms, which we saw earlier account for the largest of our four categories of job creating fims. For the 'new' category, then, two thirds of job creating firms account for one third of the jobs. The least important category is 'young': they comprise about 5% of the job creating firms and account for about 5% of the jobs created. From 1998/01 to 2005/08, HGFs and NHGFs each account for about 30% of job creation, then the two diverge. The HGF share declines and by 2008/11 shrinks to about 25%; there is matching expansion in NHGFs to about 35%. NHGFs account for rather similar shares of firms and jobs: about one quarter of job creating firms and one third of jobs created. But, despite the recent decline in share, HGFs are still disproportionately important as job creators: about 1.5% of job creating firms but accounting for 25% to 30% of jobs created. The figures for London are quite similar to those for the UK as a whole where in 2007/10 HGFs accounted for about 1.5% of job creating firms and just over 20% of jobs created.[27]

Table 4: London, firms, job creation categories over 3-year periods, 1998/01 to 2008/11

	total end-period	job creators	ratio, job creators total	job creators, components '000				shares of job creators %			
	'000	'000	%	HGF	NHGF	young	new	HGF	nonHGF	young	new
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1998/01	248.2	134.3	54.1	1.7	22.7	7.4	102.5	1.2	16.9	5.5	76.3
1999/02	246.9	149.5	60.6	2.7	40.7	6.6	99.5	1.8	27.2	4.4	66.6
2000/03	249.6	150.2	60.2	2.6	40.1	6.6	100.9	1.8	26.7	4.4	67.2
2001/04	249.8	149.8	60.0	2.5	38.9	6.1	102.4	1.6	25.9	4.1	68.3
2002/05	255.5	141.0	55.2	1.9	26.8	5.8	106.5	1.3	19.0	4.1	75.5
2003/06	262.1	146.7	56.0	1.9	28.2	6.2	110.4	1.3	19.2	4.2	75.3
2004/07	276.1	162.7	58.9	2.0	35.9	7.0	117.7	1.2	22.1	4.3	72.4
2005/08	280.6	165.6	59.0	2.1	39.0	7.2	117.3	1.3	23.6	4.3	70.8
2006/09	283.0	167.9	59.3	2.3	43.6	7.2	114.9	1.3	25.9	4.3	68.4
2007/10	278.1	160.6	57.8	2.3	44.5	7.4	106.4	1.5	27.7	4.6	66.3
2008/11	278.2	154.1	55.4	2.1	44.4	7.3	100.3	1.4	28.8	4.8	65.1

Source: ONS/BSD

Notes:

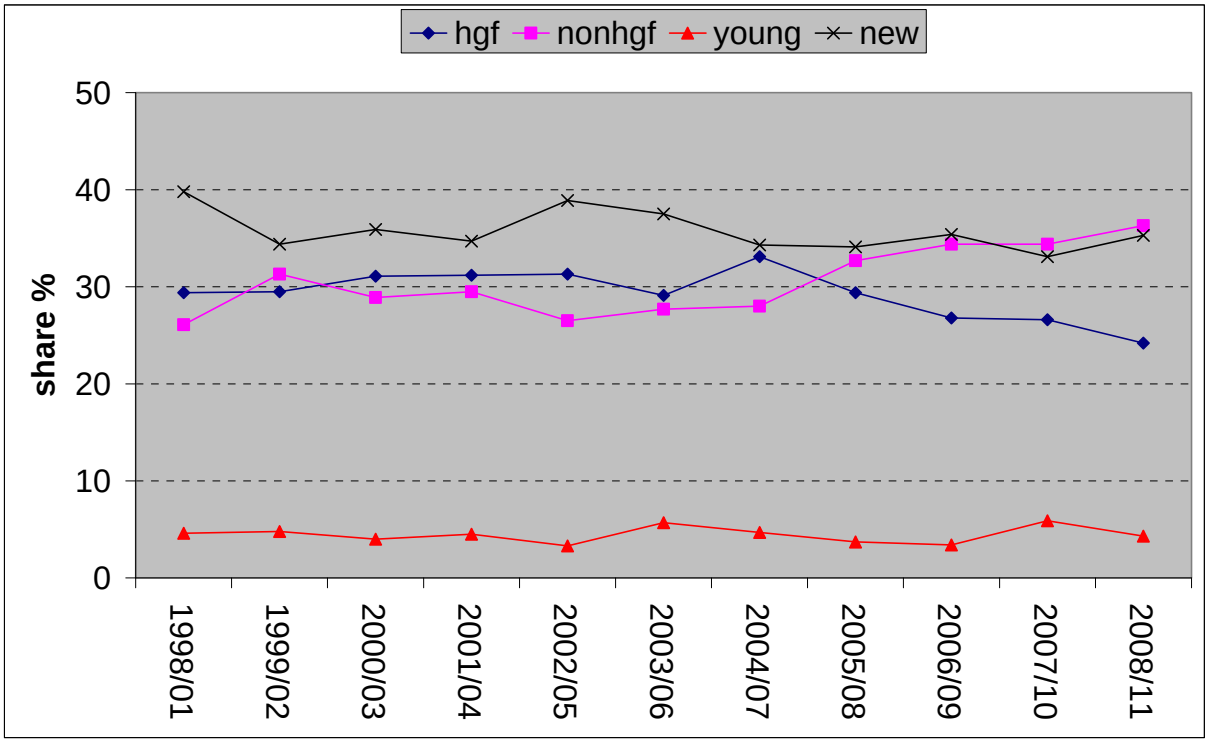
1. col(1), firms at end-period (eg 2001 in 1998/01); col (2), job creating firms; col (3), ratio col (2)/col(1); col (4) to col (7), categories of job creating firms, see text for definitions; col(8) to col(10), col (4) to col (7) ratio to col (2)
2. for definitions of categories see text

Table 5: London, jobs by category of firm, 3-year periods, 1998/01 to 2008/11, '000

	all firms '000			job creating firms '000		
	beg-period	end-period	diff	beg-period	end-period	diff
1998/01	3,930.9	4,125.9	195.0	1,612.8	2,934.8	1,322.0
1999/02	3,879.4	4,173.7	294.3	1,620.8	3,039.7	1,418.9
2000/03	4,020.0	4,229.9	209.9	1,648.8	3,053.2	1,404.4
2001/04	4,125.9	4,162.2	36.3	1,521.9	2,791.9	1,270.0
2002/05	4,173.7	4,099.6	-74.1	1,476.9	2,673.5	1,196.6
2003/06	4,229.9	4,130.8	-99.1	1,344.6	2,485.4	1,140.8
2004/07	4,162.2	4,206.4	44.2	1,236.4	2,402.9	1,166.5
2005/08	4,099.6	4,326.0	226.4	1,510.9	2,765.4	1,254.5
2006/09	4,130.8	4,351.5	220.7	1,660.6	2,851.0	1,190.4
2007/10	4,206.4	4,279.4	73.0	1,663.2	2,755.3	1,092.1
2008/11	4,326.0	4,272.7	-53.3	1,646.7	2,671.9	1,025.2

Source: ONS/BSD

Figure 45: London, shares of job creation by categories of firm, 1998/01 – 2008/11, %



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Source: ONS/BSD

8 Alternative estimates of jobs

8.1 Background

65. The geography of jobs in firm-level data is based on the address of the firm, so the jobs are located at that address. However not all jobs in multi-establishment firms are necessarily (or indeed likely) to be located at the headquarters address. There is, inside the ONS Virtual Microdata Laboratory a Business Structure Database with a series of annual snapshots of establishment-level records from the Inter-Departmental Business Register which parallel the firm-level records. In practice, it combines establishment-level data from multi-establishment firms and firm-level records for single establishment firms, but we will refer to it here as the 'establishment-level dataset'. We have used methods analogous to those used on the firm-level records to compile them into a longitudinal establishment-based dataset for the years 1997 to 2011, including all private sector establishments which have a postcode in a London's borough.[28] This is an *entirely* new dataset and must be regarded as 'experimental' since its properties are still relatively untested: it will take some time before it can be regarded as robust as our longitudinal firm-level dataset which is now almost five years old.

66. It is important to emphasise that an establishment-based dataset is conceptually quite different from its firm-level analogue. Most discussion of economic performance incorporate ideas about decision-making by firms, little is said about decision-making by establishments. Equally, the discussion of business support policy is typically carried out at firm level, even if its practical implementation involves establishments (as for example in the case of 'inward' investors).[29] Whilst it may seem natural to focus on firms, and so to pay attention to firm-level data, when the discussion turns to jobs it is equally natural to focus on establishment-level data, since it is this data which can capture changes in a particular locality. For example, it would necessarily be establishment-level data which was required for an evaluation of the effectiveness of area-based business support policy. Ultimately, of course, the practical significance of the difference between the picture drawn using firm-level data and that provided by establishment-level data is an empirical matter which will be affected by the structure of the local economy. Firstly, it will depend on how many firms with their

headquarters in London are multi-establishment firms and on what proportion of those extra-headquarters establishments (and their associated jobs) are located outside the London. Secondly, it will depend as well on how many establishments (with associated jobs) there are in London which have their headquarters outside London.

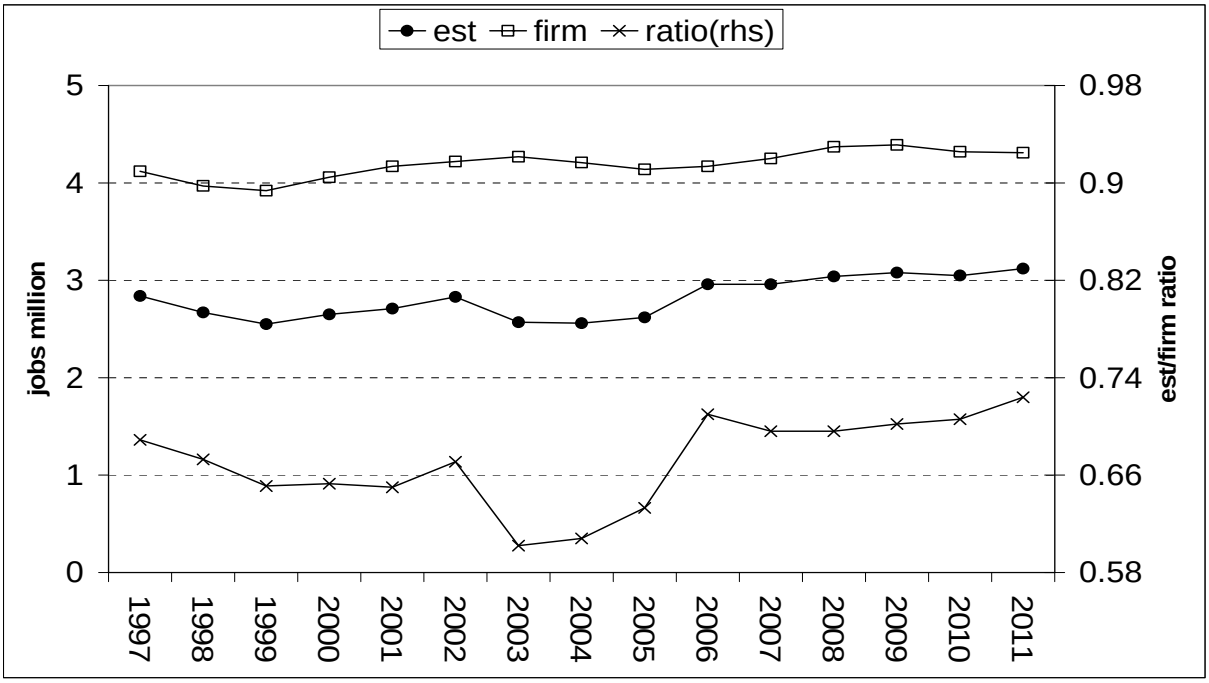
67. Here we compare establishment-level jobs data with the corresponding firm-level data for London and the boroughs. We also present comparisons between the establishment-level jobs figures and survey-based estimates of jobs for London and its boroughs published by the ONS and compiled by them from the Annual Business Inquiry (ABI, 1998 to 2008) and the Business Register Employment Survey (BRES, 2008 to 2011).

68. The ABI-BRES data is different in character from both the BSD-derived datasets we have constructed. Notably it is based on a survey of firms, not a census (complete count) of either firms or establishments. The sample size for the BRES in Great Britain is about 80,000. It includes: all firm with more than 100 employees; and for firms with between 20 and 100 employees it includes all that operate in more than one region, and one third of those which operate in only one; finally there is a small sample of firms with less than 20 employees.[30] What this means in practice is that area-based statistics from ABI-BRES – like those for London -- are likely to be very largely derived from the numbers of employees in large (100+) multi-establishment firms. Nonetheless the ABI-BRES data is closer to our establishment-level dataset sinces its coverage is area-based and its estimates cover firms all of whose establishments are in London together with London-located establishments of multi-site firms.

8.2 Firm, establishment and ABI-BRES data

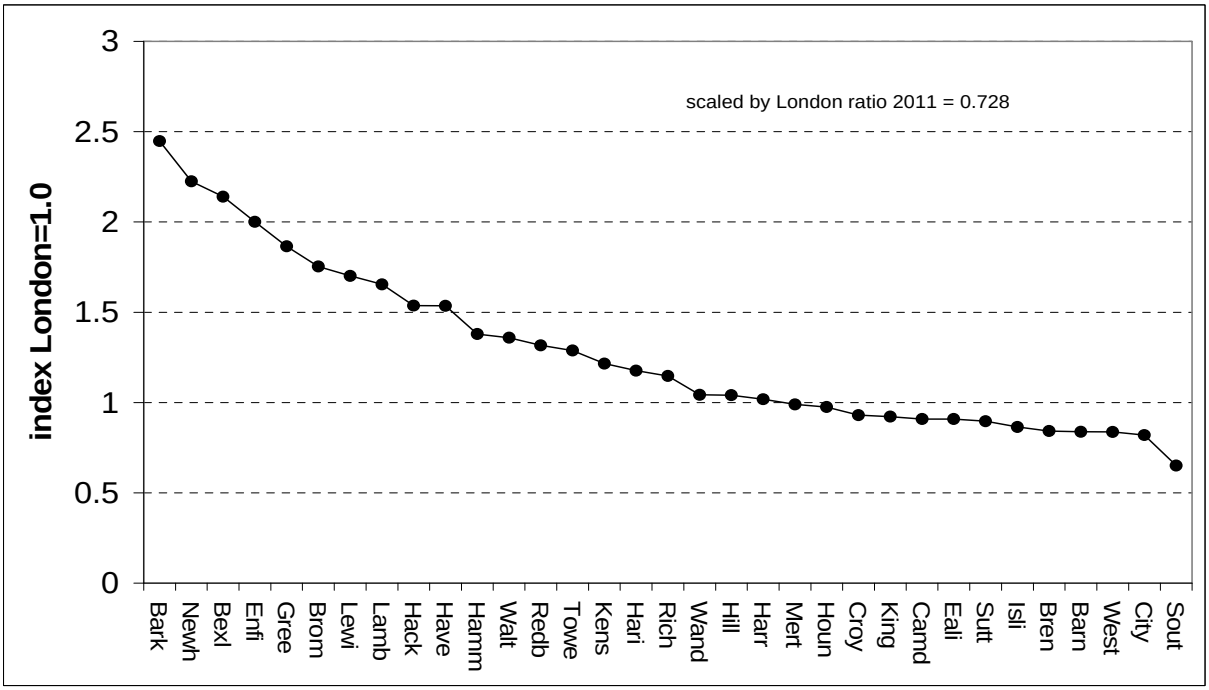
69. Figure 46 displays the time series of firm jobs and establishment jobs for London in millions (left hand scale) for 1997 to 2011. The London firm-level figure (as we saw in Figure 1) fluctuates around four million, the corresponding establishment-level figure is about one million lower and fluctuates around three million. The ratio between the two series – establishment ÷ firm (est/firm) – is plotted against the right hand scale. Its evolution can be divided into two periods, from 1997 to 2002 it is around two thirds, and from 2006 to 2011 is close to three quarters (in between it dipped to about 0.6).[31]

Figure 46: London, establishment jobs and firm jobs, 1997 -- 2011



Source: ONS/BSD

Figure 47: London boroughs, ratio of establishment jobs to firm jobs, 2011, index (London =1.0), descending order



Source: ONS/BSD

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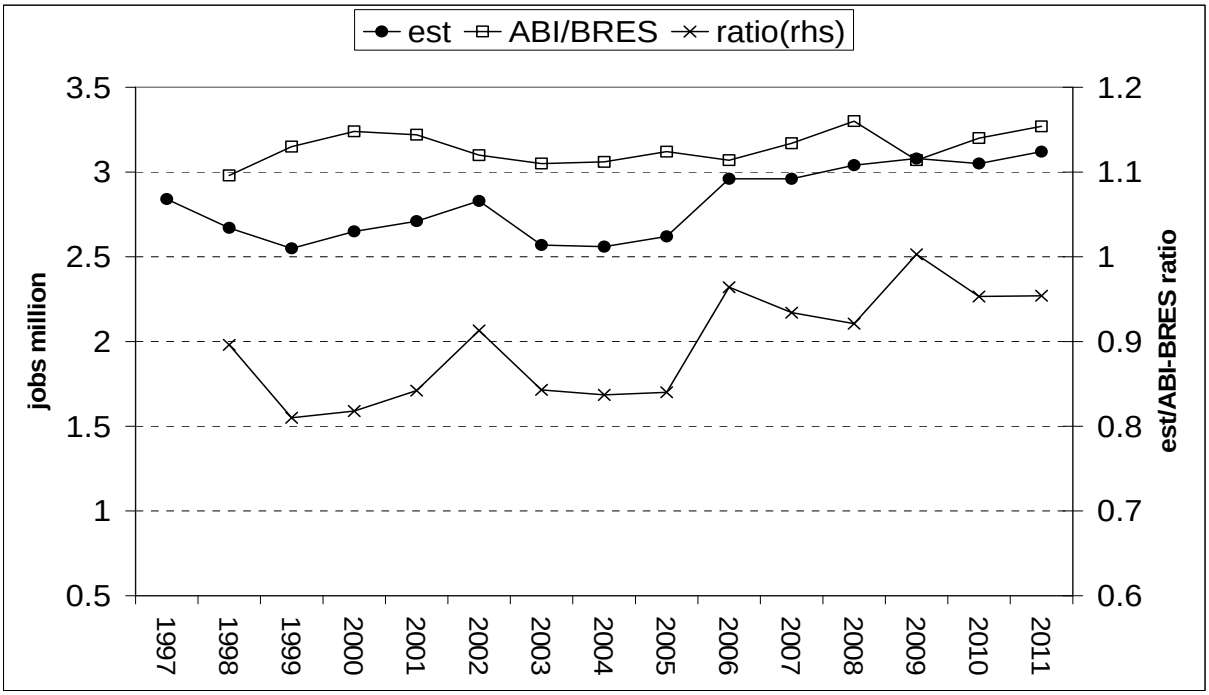
70. The establishment/firm ratio varies much more across London's boroughs than it does over time. Figure 47 records the data for 2011, and the boroughs have been ranked in decreasing order and the ratios scaled by the London average ratio of 0.728. At the top of the range is Barking and Dagenham with an est/firm ratio of 2.5 times the London average: evidently Barking and Dagenham has almost twice as many jobs as there are jobs in the firms located there. Indeed there are 11 boroughs with an est/firm ratio of 1.0 or above – in descending order from Barking and Dagenham to Hammersmith. Most of the collection of boroughs at the bottom end of the ranking, with ratios around 0.6 or less, are familiar from other lists, being close to the top of the job share list (and of course the firm share list). Clearly many of the jobs in firms located in these boroughs are not themselves located in the borough.

71. Figure 48 records data for London on establishment jobs (again) together with an ABI-BRES[32] series, both measured in millions (on the left and scale), and the ratio of establishment to ABI-BRES (on the right hand scale). The establishment jobs and the ABI-BRES series are relatively similar, both recording between 2.5m and 3.0m jobs. As we can see more clearly from the establishment/ABI-BRES ratio series establishment jobs were around 90% of the ABI-BRES numbers in 1998 and, over the period, moved up to about 95% in 2011 over a series of swings. Between 1998 and 2005 it was typically in the 80% to 90% range, from 2006 in the 90% to 100% range.[33]

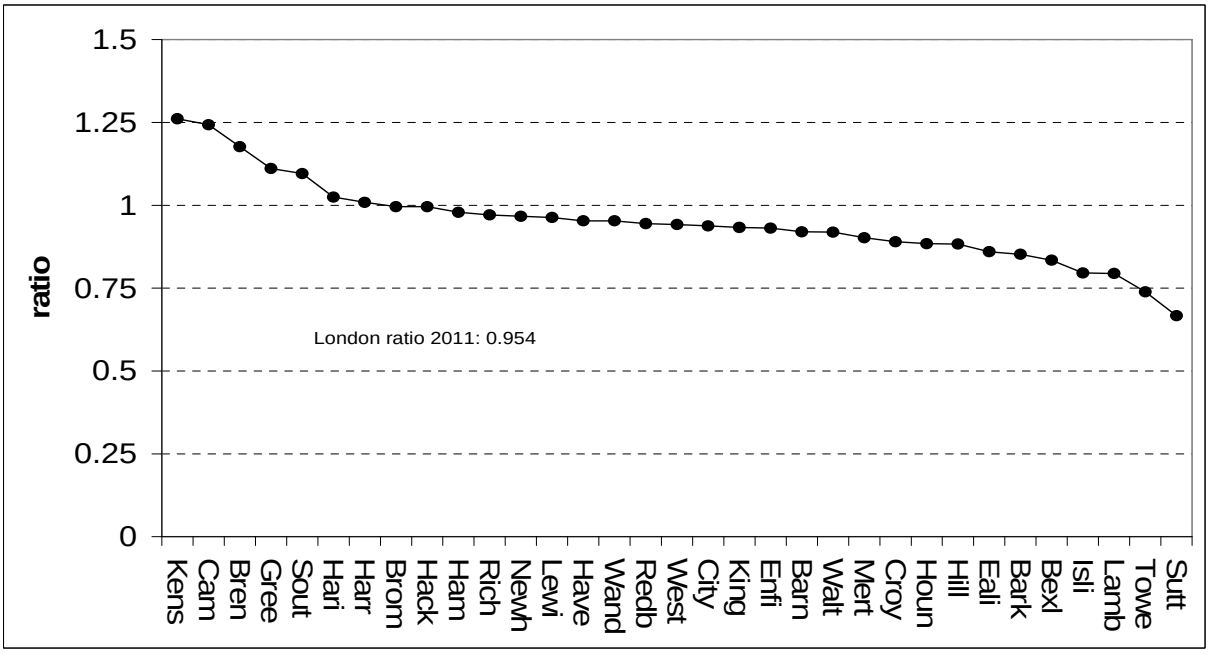
72. As with the establishment/firm jobs ratio, the establishment/ABI-BRES ratio varies considerably across boroughs. The data on boroughs for 2011 are plotted in descending order on Figure 49. The series ranges by a factor of two 1.2 to 0.67 – in Kensington and Chelsea there are 25% more establishment than BRES-ABI jobs, in Sutton establishment jobs are only two thirds of ABI-BRES jobs. About half the boroughs have an establishment/ABI-BRES ratio larger than or equal to the London average of 0.95 (from Kensington and Chelsea to Redbridge) and the majority of them (from Harrow to Redbridge) are within 5% of the London average. However, rather fewer of the boroughs are within 5% on the lower side of the average (from Westminster to Waltham Forest). The groups of boroughs at either end of the distribution are not easy to characterise, in both cases they are mixtures of boroughs from different part of the job share distribution (at the top end, Camden and Greenwich, at the bottom end, Barking and Dagenham and Islington).

Figure 48: London, establishment jobs and ABI-BRES jobs, 1997 -- 2011



Source: ONS/BSD

Figure 49: London boroughs, ratio of establishment jobs to ABI-BRES, 2011 (descending order)



Source: ONS/BSD

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8.3 Choice of data

73. We have discussed three different datasets here: firm-level data; establishment-level data; and ABI-BRES data. As we have seen each has different strengths and weaknesses. Firm-level data provides a useful guide to the size and characteristics of the stock of firms which is located in a particular area and so, for example, might be of interest to policy-makers for that reason. However, it may not be so useful in understanding the evolution of the stock of jobs and its changing sectoral composition. The establishment-level data has complementary strengths: establishments may not be the locus of decision-making if a firm's headquarters is elsewhere, but it is the unit of analysis which connects directly with jobs in the local area and with job creation and destruction dynamics.

74. One solution to these problems would be to construct area-based datasets which integrated firm-level and establishment-level records – firms with establishments in an area could be identified even if the headquarters was elsewhere. Whilst this would not overcome the area-based policy-makers' difficulty in addressing the 'locus of control' it would at least give them a more realistic guide to the likely reach of their policies: certainly it could provide a measure of the extent to which local establishment jobs are (or are not) being generated by local firms. Such integrated datasets are exceptionally rare – one became available for the United States in 2009[34] – but more typically, countries which have unit-level databases (and not every country does), tend to have one or the other (Germany, for example, has an official establishment-level dataset but not one at the firm-level).

75. The ABI-BRES data has, of course, a special status because it provides 'official' estimates of jobs at the local level, but of course unit-level information is not available (in any event it is a sample), so it is not possible to track either the dynamics of job creation and destruction or the evolution of the stock of firms.

9 Data sources & definitions

9.1 Datasets

76. We use the recently released UK Business Structure Database[35] (compiled

by the Office for National Statistics)[36] which records annual data on employees for the entire population of firms in the UK. This data is compiled from a series of annual 'snapshots' of the Inter-Departmental Business Register, an administrative database which captures information from a range of sources, amongst them VAT returns and employer Pay As You Earn (PAYE) tax and social security records. The unit of analysis is an "employer enterprise" – a business with at least one employee[37] – which we refer to as a firm.

77. We have linked together the annual 'snapshots' from the BSD using firm-level identifiers to form a longitudinal firm-level database (LFLD) for the UK and have devised algorithms to produce firm-level demographic markers for 'birth' and 'death'. The birth of a firm is dated by the first appearance of non-zero employment and its death is treated symmetrically and dated by the disappearance of the last employee. The data do not distinguish between *de novo* births and those which result from the break-up of an existing firm, similarly the data do not distinguish between the closure of a firm and its disappearance due to merger. Although the data start in 1997, firms alive in 1997 could have been born in any previous year, so the first birth year we can identify with certainty is 1998.

78. A longitudinal establishment-level data was constructed specially for this project. The methods used parallel those used for firms. This dataset should be regarded as 'experimental' until further checks have been carried out. For example, an exercise in 'embedding' is required in which establishment-level data is integrated with the firm-level records of the corresponding multi-establishment firms. This embedding will check both the consistency of the demographic markers (to ensure that establishments are not born before the firm nor survive after the firm has died) and the numbers of job (i.e. a multi-establishment firm's jobs are the sum of its establishment's jobs.)

79. Firms and establishments are classified as either 'private' or 'public' sectors and we make this split using the classification by industrial sector. All employees in – public administration and defence; education; and health and social work – as public sector (SIC92the UK version of the EU NACE rev.1 sections L, M, N) – are classified as public sector. Of course, some firms in these sectors (in health and/or education for example) are private, and some firms in our private sector are public, but ours is a reasonable approximation and ensures that most typically longer lived public entities (like schools and hospitals) do not distort our calculations.

80. We use SIC92 here because, although more recent classifications are available (e.g.. SIC07), only the most recent few years have the new classification but they also have a parallel set of older sector codes which allows us to re-code new firms into SIC92. Re-classifying more than ten years of historic firm-level data to, for example, SIC07, would be a major undertaking because the SIC92 to SIC07 translation is not possible at the 2-digit level, it requires much more detailed work.

9.2 High growth firms

81. The first stage in the OECD metric for identifying an HGF (see OECD-EUROSTAT, ***Manual of Business Demography*** OECD, Paris, 2007, Chapter 8) requires that we consider only firms which,

a. are born before the beginning of the period

b. are alive at the end of the period

82. These two requirements imply that in each period we will have a 'balanced panel' of firms – the same firms are always present throughout the period (often referred to as 'continuing firms'). An HGF is a firm in the balanced panel which,

a. has at least 10 employees at the beginning of the period

b. ***records an annual average growth of 20% in employment,[38]over the period***

83. Finally, we define HGF incidence. We use the term 'incidence' here by analogy with epidemiology, to serve as a reminder that HGF status is time-dependent – in the present framework a firm which is an HGF in one three year period may, or may not, be an HGF in some other period. and the 'incidence rate' as the number of HGFs divided by the number of firms (in the balanced panel) with 10+ employees. We use three years as our 'period': so, starting with 1998, there are 11 3-year periods: from 1998/2001 to 2007/2011.

10 Algebraic Appendix

AA1 The relationship between jobs/firm and the firm size distribution

If firms are denoted by $firm$, and jobs by job, so average firm size (measured by jobs per firm), $avjob$, can be defined as,

$$avjob = \frac{job}{firm} \qquad (1)$$

and we can denote average firm size for each of the four size-bands by $avjob_i$ where i runs from 1 to 4. Let us also define a set of shares, $firmsh_i$, where:

$$firmsh_i = \frac{firm_i}{firm} \qquad (2)$$

(and, of course, $\sum_{i=1}^{4} firmsh_i = 1$). We can now use the expression for shares to expand the definition of $avjob$,

$$avjob = \sum_{i=1}^{4} (firmsh_i \times avjob_i) \qquad (3)$$

AA2 The relationship between the distribution of jobs by firm size-band and firm size distribution

Using the same notation, but extending it slightly, we define a set of job shares $jobsh_i$ for each of the i size-bands, where:

$$jobsh_i = \frac{job_i}{job} \qquad (4)$$

which we can re-write as,

$$jobsh_i = \frac{job_i}{firm_i} \times \frac{firm_i}{job} \qquad (5)$$

and then entering the stock of firms $firm$,

$$jobsh_i = \frac{job_i}{firm_i} \times \frac{firm_i}{firm} \times \frac{firm}{job} \tag{6}$$

now substituting for the definitions of average jobs per firm,

$$jobsh_i = (avjob_i \times \frac{firm_i}{firm}) \div avjob \tag{7}$$

simplifying and re-arranging,

$$jobsh_i = \frac{avjob_i}{avjob} \times firmsh_i \tag{8}$$

Q.E.D.

AA3 The relationship between location quotients and jobs/firm

Using the same notation as before, and denoting using uppercase letter to denote UK firms as F, UK jobs as J, and UK average jobs/firm as AVJOB, we can write the LQ for firms in sector j as,

$$LQf_j = \frac{firmsh_j}{FIRMSH_j} \tag{9}$$

and similarly the LQ for jobs,

$$LQj_j = \frac{jobsh_j}{JOBSH_j} \tag{10}$$

So the ratio of the LQs is,

$$\frac{LQj_j}{LQf_j} = \frac{jobsh_j}{JOBSH_j} \div \frac{firmsh_j}{FIRMSH_j} \tag{11}$$

which can be re-written as,

$$\frac{LQj_j}{LQf_j} = \frac{jobsh_j}{firmsh_j} \div \frac{JOBSH_j}{FIRMSH_j} \qquad (12)$$

which we know from equation (8) of footnote 2 can be re-written as,

$$\frac{LQj_j}{LQf_j} = \frac{avjob_j}{avjob} \div \frac{AVJOB_j}{AVJOB} \qquad (13)$$

Q.E.D.

[1] For a formal demonstration see Algebraic Appendix, result AA1.
[2] The term birth *ratio* is used to emphasise that this is not, in conventional demographic terms, a birth *rate* because the denominator is the existing stock of firms not a 'population *at risk*' of giving birth.
[3] This is a conventionally defined rate: the number of deaths as a ratio to the population at risk (the opening stock of firms).
[4] Again the term 'ratio' is used to distinguish this calculation from a survival *rate* which would be the ratio of survivors to the number alive at the *beginning of the period*, not the ratio to the number in the cohort at birth.
[5] This is similar, but not identical, to the birth ratio in Figure 5 which is computed as a ratio to the opening stock (i.e. the previous year's closing) stock, not the current year's stock.
[6] A detailed investigation revealed that a number of exceptionally large firms were born in 1998, see also note 8.
[7] Notice too the initial decline in cohort98 where average size shrunk by one third between birth and age 1, following the death of about half of the firms born into the 250+ size-band
[8] For the UK see Michael Anyadike-Danes, Karen Bonner and Mark Hart, ***Job Creation and Destruction in the UK: 1998 – 2010***, Report for Department for Business Innovation a& Skills, October 2011.
[9] This classification is based on year to year comparisons so firms which, for example, added jobs and then shed the same number within a year would be classified as 'no change'.
[10] For a discussion of the choice of SIC92 see the section on Data definitions and sources. However, it should be noted that the principal difference between SIC92 and SIC07, the more recent classification, is that the newer classification provides at the 2-digit level a finer-grained treatment of services.
[11] It should be emphasised that the terms 'over' and 'under' represented here mean relative to the UK as a whole. Other benchmarks may produce quite different results. The choice of a benchmark depends on the question being asked. For example, it may be more appropriate to compare London to another major English city (e.g. Birmingham) or another with a 'capital city' role (e.g. Edinburgh).
[12] Of course, the list of 'distinctive' sectors will depend on both the SIC used and the level of classification (for example, using 4-digit sectors may give a slightly different picture). Ultimately, the choice depends on the question to be answered.
[13] This follows from a re-arrangement of equation (8) in see Algebraic Appendix, result AA2: the ratio of a sector's job share to its firm share is equal to the ratio of the sector's jobs/firm to the all-sector jobs/firm ratio.
[14] For a formal demonstration see Algebraic Appendix, result AA3.
[15] The strong positive correlation between births and death in local areas is discussed in Michael Anyadike-Danes, Mark Hart and Maureen O'Reilly ''Watch that Space! The County Hierarchy in Firm Births and Deaths in the UK, 1980–1999'', ***Small Business Economics,*** 2005, vol. 25, pp. 273–292.

[16] Whilst Newham has a larger birth ratio than Wandsworth (22.3 vs 21.0), Wandsworth has lower than average death ratio, given its birth ratio. This in fact shows up – graphically – on Figure xx1: Newham is on the fitted line, Wandsworth is below it.
[17] Indeed it is possible to write the net birth ratio as the weighted sum of the net birth ratios for each size-

band with the size-band shares as the weights (along the lines set out for the jobs/firm ratio in Algebraic appendix AA1). For an illustration of the extent of variation in birth, death and net birth ratios by size-band see Figure 8 (p. 22) in Anyadike-Danes et al (2011), reference at footnote 9.

[18] For example, see Michael Anyadike-Danes and Mark Hart, "The impact of sector, specialisation, and space on business birth rates in the United Kingdom: a challenge for policy**?", *Environment and Planning C: Government and Policy***, 2006, vol 24, pp 815 – 826, who find evidence for a connection between variations in the sectoral composition of the stock of firms and the business birth rate using data for UK local authorities.

[19] Michael Anyadike-Danes, Karen Bonner, Colin Mason and Mark Hart, ***Measuring Business Growth***, NESTA Research Report, London, NESTA, October 2009; Albert Bravo-Biosca, ***Growth Dynamics***, NESTA Research Report, London, NESTA, November 2010.

[20] Each of these bins is closed on the left, so for example -20 to -1 is read as: greater than -20 and less than or equal to -1.

[21] Recall from the job creation and destruction components for firms in Figure 14 about 60% of firms recorded 'no change' – literally zero growth – in each year.

[22] The only other manufacturing sector with a relatively large fast growth share is apparel, 11 th on the list with 16.9% fast growth firms.

[23] For a discussion which displays the geography of HGF incidence in London on a broader, national, canvas, see Chapter 2 in Michael Anyadike-Danes, Karen Bonner and Mark Hart, ***Exploring the incidence and spatial distribution of high growth firms in the UK and their contribution to job creation***, draft report for NESTA, mimeo, December 2012.

[24] You will recall though that many of these boroughs also have very small shares of the stock of firms, Barking's share, for example is less than 1%, see Figure 21.

[25] For a brief account of the background see chapter 1 in Anyadike-Danes et al (2012), reference at footnote 20.

[26] Of course, we could narrow the definition to include only firms which are alive at the beginning as well as the end of the period, what might be called a 'balanced panel'.

[27] see Anyadike-Danes et al (2012), Figures 5.19 and 5.21, full reference in footnote 20.

[28] For a discussion of data definitions and construction see the section: Data sources and definitions.

[29] 'Branch plants' and the problems associated with them are, of course, a staple of the regional economic development literature.

[30] Although the ONS does not publish the size-band distribution of the sample, it is possible to infer (using numbers from our BSD-based dataset) that very few small (less than 20 employee) firms are likely to be included. In 2010 there were about 15,000 firms in the 100+ size-band and 75,000 in the 20 to 99 employee range from a total of around 1.5 million..

[31] However, there is evidence to suggest that the dip in establishment-level jobs in 2003 -- which shows up more dramatically as a 10% drop in the establishment/firm ratio (from 0.67 to 0.60) -- might be a due to 'missing' records in the source dataset. Examination of the raw BSD files reveals that a larger than usual number of establishments are missing employee numbers for 2003whilst having employees numbers in 2002 and 2004 (and subsequent years). This 'missing' data reduces the employee count for 2003. However, it has also a continuing impact because the affected establishments are classified as dead in 2003 (by definition an establishment is only 'alive' if it has employees) and so the 2004 employees will be excluded from the 2004 employee count (and in subsequent years). Of course, even had these establishments been treated as continuing they would have eventually died and so, over time, the depressing effect on the

overall level of employment of premature death would have worn off. It is reasonable to interpret the 'recovery' of the establishment/firm ratio over the next couple of years as evidence of this process. The assessment alternative methods for treating the missing data will be the subject of future research.

[32] ABI data is available for 1998 to 2008, BRES data for 2008 to 2011. We have simply combined the two series figure for 2008, the overlap year.

[33] The establishment/ABI-BRES ratio for 2003 and the next few years may be affected by 'missing' data in 2003, for a discussion see note 31.

[34] The US Census Bureau's Business Dynamics Statistics provide a longitudinal dataset which integrates firm-level and establishment-level data, see John Haltiwanger, Ron Jarmin and Javier Miranda, "Business Dynamics Statistics: An Overview", ***Report,*** Kauffman Foundation, 2009. For an early (but very brief) discussion which uses this data to differentiate between firms creating by expanding existing establishments and opening new establishments see John Haltiwanger, Ron Jarmin and Javier Miranda, "Historically Large Decline in Job Creation from Startup and Existing Firms in the 2008/2009 Recession", ***Business Dynamics Statistics Briefing,*** Number 5, Kauffman Foundation, 2011.

[35] The statistical data used here is from the Office of National Statistics (ONS) and is Crown copyright and reproduced with the permission of the controller of HMSO and Queen's Printer for Scotland.The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. The analysis upon which this report is based uses research datasets which may not exactly reproduce National Statistics aggregates.

[36] For a full, official, account of the Business Structures Database and its compilation see Peter Evans and Richard Welpton (2009), "Methods explained - Business Structure Database", ***Economic and Labour Market Review***, Vol. 3, No. 6, pp. 71-75.

[37] Since an employee can work for more than one firm summing over firms produces an estimate of jobs rather than employment, we ignore this distinction here and use the terms employment and jobs interchangeably.

[38] Alternatively, an annual average growth of 20% in turnover over the period can be used as the criterion, but only employment is used here.