

Working Paper 20

Employment projections for London by sector and borough

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1 Introduction

This note details the updating of the Volterra London employment forecasts. The last forecasts were produced in 2005 with a start year of 2003. Forecasts were produced at the 12 sector level for London in total, and also at the total 33 London borough level. We now update these forecasts using the same techniques as before, including another year of recorded data. This takes our new start year to 2004.

The next section of this document details the data revisions which have been made since the previous forecasts in 2005. The third section then discusses the total London employment forecasts. Sections four and five then detail the sector and borough breakdowns of the employment forecasts respectively.

The economic theory that underpins our approach is described in detail in Appendix C. Essentially, it is based upon standard models of economic growth.

2 Data revisions

Forecasts are only as good as the data on which they are based. The data has been revised since Volterra's forecasts in 2005, which was in turn revised since Volterra's forecasts in 2004. Table 1 shows these revisions. All data was supplied to Volterra by the GLA, and in turn supplied to them by Experian Business Services (EBS). The only exceptions to this are the data points in bold which were the projections for employment in those years which were based upon the historic data at that time (the data in the table). They are included so that comparisons can be made.

Volterra use a trend based approach to forecasting; the exact methodology is described in Appendix C. Revisions to the most recent years of data therefore change the start point from which forecasts project, and revisions to more historic data alter the trends on which the forecasts are based. Describing data revisions is therefore of paramount importance in forecasting.

Table 1: Total London Employment – previous and revised data

Employment ('000s)	Previous EBS data (2004)	Previous EBS data (2005)	Current EBS data (2006)	2005 revision	2006 revision	% difference (2005-6)
1971	4,721	4,721	4,566	-	-155	-3.3%
1972	4,712	4,712	4,534	-	-178	-3.8%
1973	4,681	4,681	4,517	-	-164	-3.5%
1974	4,580	4,580	4,427	-	-153	-3.3%
1975	4,479	4,479	4,360	-	-119	-2.7%
1976	4,369	4,369	4,269	-	-100	-2.3%
1977	4,295	4,295	4,220	-	-75	-1.8%
1978	4,348	4,348	4,260	-	-88	-2.0%
1979	4,369	4,369	4,315	-	-54	-1.2%
1980	4,293	4,293	4,291	-	-3	-0.1%
1981	4,136	4,136	4,175	-	38	0.9%
1982	4,034	4,041	4,081	7	40	1.0%
1983	4,005	4,012	4,052	7	40	1.0%
1984	4,057	4,064	4,104	7	40	1.0%
1985	4,084	4,090	4,130	7	40	1.0%
1986	4,068	4,073	4,112	5	40	1.0%
1987	4,135	4,141	4,181	6	40	1.0%
1988	4,218	4,227	4,267	9	40	0.9%
1989	4,221	4,229	4,267	8	39	0.9%
1990	4,153	4,162	4,200	9	38	0.9%
1991	3,929	3,942	3,982	13	40	1.0%
1992	3,746	3,768	3,829	22	61	1.6%
1993	3,715	3,740	3,778	25	37	1.0%
1994	3,815	3,845	3,880	30	35	0.9%
1995	3,867	3,896	3,924	29	27	0.7%
1996	3,923	3,946	3,969	22	23	0.6%
1997	4,039	4,056	4,088	18	32	0.8%
1998	4,172	4,194	4,252	22	58	1.4%
1999	4,317	4,336	4,375	19	39	0.9%
2000	4,494	4,509	4,539	15	30	0.7%
2001	4,522	4,546	4,552	24	7	0.2%
2002	4,480	4,448	4,483	-32	34	0.8%
2003	4,518	4,480	4,516	-38	36	0.8%
2004	4,557	4,521	4,488	-36	-33	-0.7%

Table 1 shows that the latest revision of the data affects all of the years used in the forecasting. From 1971 to 1980 the new data represents a downward revision of the old data, suggesting there was less employment in London than previously believed. In all years from 1981 the data has been revised upwards, representing greater employment than previously believed. Employment in 2002 was revised downwards by 32,000 in 2005, but this figure was revised up by 34,000 in 2006 leaving the measure of employment in this year similar to that in the 2004 data set. These revisions, combined with an actual 2004 figure which was lower than anticipated, give us a lower start point for projections but a stronger overall positive trend.

It is interesting to note that the previous downward revision to 2002 employment had a predictable affect in that Volterra’s forecast of jobs in 2003 was 38,000 higher than the

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recorded figure. In the latest dataset the 2002 level has been revised back up, along with an upward revision to the 2003 level, making it close to what was initially forecast. In addition, there have been some significant changes to the current data set at the sectoral level. This reflects a number of changes, in particular ONS research into and consequent revisions to estimates of public sector employment. The details of these changes are set out in GLA Economics' Current Issues Note 11¹.

In addition to these data revisions at the London level, EBS have introduced a methodological change for the current data set at the borough level. Previously, the self-employment component of workforce employment was defined on a residential basis. That is self-employed people were assumed to work in the borough in which they lived. This was clearly a less than satisfactory assumption adopted because of the lack of workplace-based estimates of self-employment. This year EBS have judged that sufficient years of such data are available to allow them to backcast estimates of self-employment on a workplace basis at the borough level.

Table 2 sets out the growth rates obtained from the previous and revised data for London GVA, also supplied to us by the GLA and provided to them by EBS. We present growth rates so that they are directly comparable. We can see that these have been revised much less than the employment numbers. Most revisions are negative, with positive revisions in 1999, 2002 and 2003.

¹ Freeman, 'Historical revisions to the GLA workforce employment series', GLA Economics Current Issues Note 11, December 2006

Table 2: London GVA growth – previous and revised data

GVA (£bn)	Previous GVA growth (%) (2004)	Previous GVA growth (%) (2005)	Current GVA growth (%) (2006)	Absolute difference in growths (04-05)	Absolute difference in growths (05-06)
1983	3.5	3.5	3.5	0.0	0.0
1984	0.2	0.2	0.2	0.0	0.0
1985	2.9	2.9	2.9	0.0	0.0
1986	4.4	4.4	4.3	0.0	0.0
1987	4.1	4.1	4.1	0.0	0.0
1988	4.7	4.7	4.7	0.0	-0.1
1989	0.8	0.8	0.7	0.0	-0.1
1990	-0.1	-0.1	-0.2	0.0	-0.1
1991	-3.4	-3.4	-3.4	0.0	0.0
1992	-1.3	-1.3	-1.5	0.0	-0.1
1993	2.3	2.3	2.3	0.0	0.0
1994	5.5	5.5	5.1	0.0	-0.4
1995	2.7	2.7	2.6	0.0	-0.2
1996	2.1	2.3	2.1	0.2	-0.2
1997	3.5	3.5	3.2	0.0	-0.2
1998	5.7	5.6	5.6	0.0	0.0
1999	4.2	4.6	5.3	0.5	0.7
2000	5.2	6.0	5.6	0.8	-0.4
2001	2.5	1.7	1.4	-0.9	-0.3
2002	0.7	-0.8	-0.5	-1.5	0.3
2003		0.8	1.4		0.6
2004			2.8		
2005			2.8		
Average GVA growth 1983-2005 (%):			2.4		

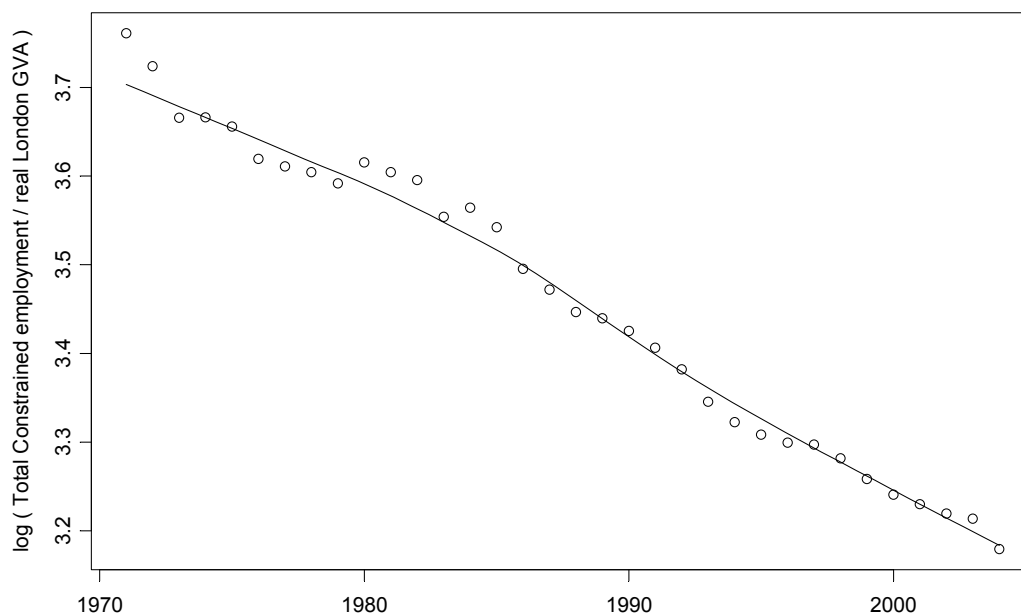
Data used in forecasts

As the most recently supplied employment data covers the years 1971-2004 we use the entire data set to give us the maximum number of data points on which to base our forecasts. For GVA we take the most recently supplied numbers from 1982 onwards and the previous numbers from 1971-1982, adjusting them accordingly for the correct prices. The GVA data is available up until 2005, one year later than the employment data. We use the actual 2005 reported value of GVA in our analysis.

3 Total London employment forecasts

We start by reviewing the overall London employment forecast. The technique used is to examine the ratio of total London employment to total London output. This is shown in Figure 1 as a logged ratio. On such a chart, the negative gradient is equal to output growth that would be required to maintain stable employment. That is to say, if the gradient is approximately -1.6 an output growth of 1.6 per cent would be required to maintain stable employment.

Figure 1: Log of total employment as a proportion of total output in London, 1982-2004



Overlaid on the chart is a fitted local regression curve, highlighting the historic trend. With the exception of 2003, which was a little above the trend, all the points since 1997 appear close to the trend.

The data on which the forecasts are based is frequently revised. Previously, it has been the case that the most recent years' data points were liable to have the largest revisions made to them. However this year the largest revisions were made to the data for the most historic period of 1971 to 1979. We understand from the GLA (who in turn understand from EBS) that these are products of ONS revisions back to 1982 which changes the point onto which the 1971-1981 data is spliced plus a new approach to specifying the 1971-1981 data. All revisions have been queried with EBS by the GLA and they concluded that they were happy for us to use this data on which to base the forecasts.

Maintaining consistency with the methodology, we use different trends for the medium-term (to 2016) forecasts than for the long-term (to 2026) forecasts. In the medium-term we put equal weight on the long (since 1971) and short (since 1994) term trends. In the longer-term however, we put higher weighting (70 per cent) on the long-term trend, and less weight (30 per cent) on the short-term trend.

In the medium-term, to 2016, the growth required for stable employment is equal to 1.56 per cent per annum. This is equal to half of the linear fitted trend from 1994 to 2004 and half of the longer-term trend from 1971 to 2004. This is therefore equal to the productivity growth of workers in London. Taking our long-term projected output

growth at 2.5 per cent, the implied medium-term employment growth is equal to 0.94 per cent per annum. This gives rise to a total employment increase of 230,000 in the five years between 2004 and 2009. Looking at the medium-term picture, this gives rise to total employment growth of 550,000 between 2004 and 2016.

In the long-term, the growth required for stable employment from 2016 to 2026 rises to 1.62 per cent per annum. Taking our long-term projected output growth of 2.5 per cent this gives rise to a total employment increase of 1,010,000 between 2004 and 2026, equal to 22.5 per cent of total employment in 2004.

These employment growths between 2004-2016 and 2004-2026 compare to previously forecast rises of 518,000 and 929,000 over the same periods. The reason for the difference between these absolute growths is partly due to the fact that the observed data for 2004 was lower than the previously forecast figure, by 33,000 jobs. Another important reason however is that the trends observed are stronger than in previous forecast runs as the historic data was revised downwards, and more recent data revised upwards, implying stronger employment growth in the long-term.

Total employment for London from 2001 to 2004 is now recorded at 4.55 million, 4.48 million, 4.52 million and 4.49 million. Given the volatility in employment in these years there is an argument for taking an average of several of the most recent years as the start point for employment growth; the most recently recorded year does not match our long-term expected trend. If we took an average of total employment between 2002 and 2004, we would have a theoretical start employment level of 4.50 million, which is only 7,000 higher than the 2004 recorded figure. We therefore choose to keep 2004 as the actual start point for the forecasts.

4 London sector employment forecasts

We adopt the same technique for forecasting employment, broken down at the 12 sector level, as we do for total employment, by looking at the historic ratio of employment to London output. We continue to use total London output instead of local sectoral growth rates, as these are partly estimated on the basis of employment, which would lead to a significant degree of circularity. The historic data used for the forecasts is supplied to us by the GLA, originally from Experian Business Strategies and based on ONS figures.

Taking each of the sectors in turn we identify breaks in the historic trend of log employment divided by output. The full set of charts can be found in Appendix A. Depending on the characteristics of the historic trend, we identify a year from which we feel the trend up until 2004 best represents the likely future trend. In several cases we take the average of two trends, where it is felt that future growth is more likely to be somewhere between a short and long-term historic trend.

Trend-based forecasting has been used here for all sectors with the exception of business services. If either the long-term trend (since 1971) or the shorter-term trend (1992) for business services were allowed to continue, the sector would grow by between 3.9 and 3.2 per cent per annum into the future. Taking the long-term trend forward, we would see the 2004 level of employment of 1.07 million increase to around 2.49 million in 2026, an increase of 1.42 million. This would account for around 40 per cent of London employment. We do not believe such a trend can continue. We therefore allow the 11 other employment sectors to grow at the trend-based rates, and constrain business services as the remainder against the total London employment forecasts.

By putting more weight on the long-term trend in the long-term forecasts, we project a slight slowing of employment growth to occur from 2016 onwards. As business services is a residual of the total employment less the other 11 sectors, if we allow the other 11 to continue completely with trend, then business services will effectively take this whole slowdown from 2016 onwards. We do not think this is realistic and therefore growth in all sectors is constrained to slow down in 2016 in line with the reversion to the long-term trend forecast to occur for total London employment.

Table 3 shows which trends have been used for each of the 12 sectors up to 2016, along with the associated growth figures. Taking long-term output growth to be equal to 2.5 per cent, we can see that other services is the fastest growing sector, at 3.3 per cent, actually being one of only two sectors that does not require overall output growth in order for employment to grow. This is closely matched by business services at 2.8 per cent and hotel, bars and restaurants employment, at 2.6 per cent.

The worst performing London sectors are primary and utilities and manufacturing, falling at 4.1 per cent and 3.6 per cent respectively.

Table 3: Summary of trends used to 2016 for sector based forecasts

Sector	Trend for forecast to 2016	Output growth required for stable employment	Long-term employment growth with output growth at 2.5% PA
Primary and Utilities	from 1971 to 2004	6.6%	-4.1%
Manufacturing	from 1971 to 2004	6.1%	-3.6%
Construction	from 1989 to 2004	4.1%	-1.6%
Wholesale	½ trend from 1971 to 2004	2.2%	0.3%
	½ trend from 1992 to 2004		
Retail	½ trend from 1984 to 2004	1.7%	0.8%
	½ trend from 1991 to 2004		
Hotels & Restaurants	from 1971 to 2004	-0.1%	2.6%
Transport & Comms	from 1971 to 2004	2.9%	-0.4%
Financial services	from 1988 to 2004	1.8%	0.7%
Business services	NA (residual of total employment)	-0.3%	2.8%
Public administration	½ trend from 1971 to 2004	3.5%	-1.0%
	½ trend from 1991 to 2004		
Health & Education	½ trend from 1982 to 2004	2.2%	0.3%
	½ trend from 1991 to 2004		
Other services	from 1991 to 2004	-0.8%	3.3%
Total employment	½ trend from 1971 to 2004	1.6%	0.9%
	½ trend from 1994 to 2004		

With these growth rates calculated, we can produce the revised sectoral employment forecasts, as presented in Table 4. The changes to employment remain broadly in line with previous forecasts. For five of the sectors, the projected employment change between 2004 and 2016 has altered by more than 10,000 compared to our previous projections.

Manufacturing sees the decrease for this period change from 78,000 to 90,000 reflecting the decision to use the long-term trend growth in the forecasts, and the downward revision to the historic data.

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Public Administration sees the decrease for this period fall from 44,000 to 27,000 reflecting an upward revision in the historical data, and greater use of the long-term trend.

Health and Education sees the increase for this period change from 40,000 to 24,000. This is due to revisions of the historic data leading to a smaller trend being forecast from a greater initial starting value.

Other Services has an increase of 130,000 compared to 140,000, this is 10,000 less than previously estimated. The historic data for this sector has been uplifted slightly, flattening the trend.

Finally, the change in Business Services employment increases from 332,000 to 383,000. As Business Services is a residual, this change has occurred as a result of changes in the projections of the other sectors.

Table 4: London sectoral employment: history 2002-2004; forecasts 2005-2026, assuming output growth of 2.5 per cent per annum

GVA Growth = 2.5% pa (000s)													Total
	Primary & utilities	Manufacturing	Construction	Wholesale	Retail	Hotels & restaurants	Transport & comms	Financial services	Business services	Public admin	Health & Education	Other services	
2002	19	273	208	250	396	297	354	346	1,070	241	654	375	4,483
2003	17	267	218	240	397	308	356	344	1,076	249	677	367	4,516
2004	16	254	222	233	398	310	342	326	1,070	248	704	364	4,488
2005	15	246	219	234	403	319	341	329	1,108	247	708	375	4,545
2006	15	237	216	235	406	327	340	331	1,142	244	710	384	4,587
2007	14	228	212	236	409	335	339	333	1,176	242	712	394	4,631
2008	13	220	209	237	412	344	338	336	1,209	239	714	404	4,674
2009	13	212	205	238	416	353	336	338	1,241	237	715	414	4,718
2010	12	205	202	238	419	362	335	340	1,273	235	717	425	4,763
2011	12	197	199	239	422	371	334	342	1,304	233	719	436	4,808
2012	11	190	195	240	426	381	332	345	1,335	230	721	447	4,853
2013	11	183	192	241	429	390	331	347	1,365	228	723	458	4,899
2014	10	177	189	242	432	400	330	349	1,395	226	725	470	4,945
2015	10	170	186	242	436	411	329	352	1,424	224	726	482	4,991
2016	10	164	183	243	439	421	327	354	1,453	222	728	494	5,038
2017	9	158	180	244	443	432	326	356	1,480	219	730	506	5,083
2018	9	152	177	245	446	442	325	358	1,507	217	731	519	5,127
2019	8	147	174	245	449	454	323	360	1,534	215	732	531	5,172
2020	8	141	171	246	452	465	322	363	1,559	213	734	545	5,218
2021	8	136	168	247	456	476	320	365	1,585	210	735	558	5,264
2022	7	131	165	247	459	488	319	367	1,609	208	736	572	5,310
2023	7	126	162	248	462	501	318	369	1,633	206	738	586	5,357
2024	7	122	159	249	466	513	316	371	1,657	204	739	601	5,404
2025	7	117	157	249	469	526	315	374	1,680	202	741	615	5,451
2026	6	113	154	250	473	539	313	376	1,702	200	742	631	5,499

5 London borough employment forecasts

This section sets out our updated trend-based borough employment forecasts. These feed into the 'triangulated' or unified borough-level employment projections produced by GLA Economics which are used by the GLA Group. They are **not** in themselves an update of the GLA Economics borough-level employment projections. The next set of GLA Economics borough-level employment projections are due out in February 2007. For the borough forecasts we initially carry out a data screening exercise by examining employment trends at the 30 sector level of aggregation. We transform each observation by dividing it by total London employment for that year. This allows us to see how employment within each sector and borough has been moving relative to the overall pattern in London.

For each borough we then focus on employment sectors which have historically accounted for 10 per cent or more of that borough's total employment. We then also construct a series 'Rest' that sums the remaining employment in the borough. For example, in Barnet, on average, 13 per cent of employment has been in Retailing, another 15 per cent of the employment has been in Business Services² and 14 per cent of the employment has been in the Health sector. We analyse the time series of these three sectors, as well as the remaining employment in Barnet.

To help decide on total borough employment growth projections, we calculate a short, medium and long-term trend for each time-series examined. The short-term historic trend is calculated as the gradient of a local linear fitted to the period 1999–2004, multiplied by the average proportion that the sector accounted for over the same period. This adjusts the growth rate for the size of the sector and so gives an annual growth rate which can be applied to the whole borough.

For example, in Barnet, Business Services has historically accounted for 15 per cent of the employment in Barnet. Over the last six years, the proportion of total London employment that this borough sector combination accounted for has experienced an annual average drop of around 4 per cent per year. This drop contributed to an overall drop in the proportion of London employment that Barnet accounted for of –0.6 per cent per annum over the period (= 15 per cent of –4 per cent). Health and Retailing in Barnet were flatter, accounting for only a 0.1 per cent drop and The rest of employment in Barnet declined at the same rate as Business Services, accounting for a drop of 0.6 per cent. Therefore the proportion of total London employment that Barnet accounted for over the last five years has fallen by on average 1.4 per cent per annum.

The ten-year (medium-term) trend is calculated similarly over the period 1994–2004 and the long-term trend over the period 1982–2004. So, the sum of the long-term growth rates will give an annual growth rate for the proportion of total London employment that each borough accounted for, based on the long-term trend.

As previously mentioned we calculate trends over three time periods for each identified sector for each borough. We then use these three trends, accompanied by judgment, to estimate a short-term and a long-term trend, aggregating over each borough. We use

² Here we refer to the EBS 30 sector definition of Business Services. This sector, and the other Financial and Business Service Sector make up the 12 sector definition of Business Services

the short-term trend to project forwards to 2009 and the long-term trends to project on further to 2026.

At the borough level of disaggregation some sectors have been particularly volatile or have suffered significant upturns or downturns over the period for which we have data. We therefore take care that the judgements applied in determining the forecasts do not involve making unwarranted extrapolations from observed trends.

Finally, we calculate the actual forecast employment levels by rescaling each forecast year so that the proportions summed over the boroughs total one. We then multiply each borough's share by the forecast total London employment for these same two years in the future (2009 and 2026) to arrive at the forecast employment levels by borough.

We now describe in detail the construction of the short and long-term forecast growth of proportions within each borough. Plots of time-series referred to can be found in Appendix B. All references to employment growth refer to employment growth relative to the rest of London.

Barking

Barking experienced significant drops in Transport Equipment employment over the last ten years, with the short-term historic growth rate being equal to -3.7 per cent. We consider this experience to have been a one off, and not sustainable into the future. We therefore forecast flat growth over the whole forecast horizon for this sector. Wholesaling employment fell sharply in the period 1991-1995, but has experienced a small recent upturn. As the small recent upturn has been sustained over the last few years, we take the short-term trend for the short-term forecast. However in the long-term we forecast flat growth, due to what appears to be a large one off fall in Wholesaling noted above. The Rest of employment has also been falling sharply, with the short and medium-term trends being equal to -1.1 per cent and -2 per cent respectively. We do not think that such strong negative growth can continue, even in the short-term. We therefore take the long-term historic fall of -0.6 per cent for all forecast periods.

Barnet

Barnet has experienced recent dips in Retailing and Business Services employment, although the dip in Retailing employment was largely reversed last year. It has experienced erratic Health employment levels and trends in the immediate short-term in the Rest of the sectors which are hard to interpret. Due to the unpredictability of Barnet's employment in all sectors, we forecast zero growth for the short-term. The long-term trends in Retailing, Business Services, Health and The Rest of employment are 0.1 per cent, 0.5 per cent, -0.1 per cent and 0.1 per cent respectively, and we combine these to give a total long-term forecast for the borough of 0.6 per cent.

Bexley

Retail has been declining slightly in the last five years, at -0.2 per cent. Business Services had previously been declining in line with Retail, however the last data point

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reverses this recent decline. The Rest of employment has been declining since 1984, although the series is more volatile with little decline in the last few years. The Rest of employment has short, medium and long-term trends of -0.2 per cent, -1.1 per cent and -0.5 per cent respectively. We average the short and medium-term trends for all sectors and combine these to generate a short-term forecast of -0.55 per cent. In the long-term Retail and Business employment have been rising, with trends of 0.1 per cent and 0.3 per cent respectively. Due to uncertainty about the long-term trajectory of Business Services, we combine the long and medium-term trends to produce a long-term forecast for this sector of 0.1 per cent. We then combine this with the long-term forecast of 0.1 per cent for Retailing, -0.65 per cent for The Rest of employment, and flat growth for Construction on account of its volatility to obtain a total long-term forecast of -0.55 per cent.

Brent

Brent Health employment was in steady decline throughout the 1990s. From 2000 to 2004 the trend reversed. We therefore forecast flat growth in this sector in the short-term, whilst predicting the long-term trend of -0.1 per cent for the long-term. Business Services has also been fairly erratic. It has been declining since 2000 although this sharp trend of -0.5 per cent in the short-term seems unlikely to continue. We therefore also forecast flat growth in this sector in the short-term, and again take the long-term trend of 0.1 per cent for the long-term. Wholesaling employment in Brent has on average accounted for around 11 per cent of the borough's employment but history has seen erratic swings. Therefore this sector is forecast to remain flat over all periods. The remaining sectors have been in decline since 1982 apart from a brief recovery in the late 1990s. The absolute levels of decline seem unsustainable and so for the short-term we take the medium-term trend of -0.5 per cent and in the long-term we take half the long-term trend, at -0.45 per cent. This yields total short and long-term forecasts of -0.5 per cent and -0.45 per cent respectively.

Bromley

Within individual sectors, Bromley's history of employment has been fairly erratic. We project zero growth for Health employment along with Business Services and The Rest of employment, in the absence of strong evidence of trends moving in either direction. Retail showed reasonable growth from 1982 to 1995, but like Business Services has been declining in the last five to ten years. For short-term growth we take a combination of Retail's medium and short-term trends, at -0.4 per cent. We combine the medium and long-term trends of this sector for a long-term forecast of -0.1 per cent.

Camden

Camden saw a rise in overall employment in the late 1990s, slowing in the last few years. Business Services has shown strong growth over the whole period with long and medium-term trends of 0.4 per cent and 0.3 per cent respectively. This sector has slowed in the last three years, giving it a negative short-term trend, at -0.4 per cent. At the total London level the trend in the Business Services sector is strong, suggesting that the decline of this sector within Camden may come to a halt. We therefore take an average of the short and medium-term trends for our short-term forecast, at 0 per cent.

We also take the average of the short and medium-term trends for The Rest of employment due to volatility in this sector, and combine this with the short-term forecast for Business Services to yield a total short-term forecast of 0.2 per cent. For the long-term forecast of Business Services we take the medium-term trend of 0.3 per cent in order to allow for the apparent recent slowing in this sector, whereas for The Rest of employment we take the average of the medium and long-term trends due to uncertainty about the long-term trajectory of this sector. We obtain a total long-term forecast of 0.55 per cent for this borough.

City

Employment in the Banking and Insurance sector has not moved smoothly historically. However the long-term trend has been flat. We therefore choose the forecasts for this sector to be flat. The Rest of employment in the City saw rapid drops in the 1980s but then levelled off since 1990, so we also adopt flat forecasts for this sector. Changes in employment therefore come from the remaining Business Services sector, which accounts for 25 per cent of employment. Business Services has seen long and medium-term trends of 0.6 per cent, but the short-term trend has levelled off at -0.1 per cent. We forecast short-term growth to be an average of the medium and short-term trends at 0.25 per cent, with this picking up in line with the long-term trend at 0.6 per cent in the long-term horizon.

Croydon

Retail in Croydon has been slightly erratic with a large fall around 1994. The trends show steady declines of -0.1 per cent and -0.2 per cent in the medium and short-terms. We average these to forecast a short-term trend of -0.15 per cent and due to the sharp fall around 1994 we use the medium-term trend of -0.1 per cent for our long-term forecast. Business Services rose sharply in the late 1980s and largely levelled off during the 1990s, so we use the medium-term trend of 0.1 per cent for the long-term forecast and the short-term trend of -0.1 per cent for our short-term forecast. The Rest of employment has been in general decline over the sample period, although there was a slight rise in the years around 1990. We forecast the short-term trend of -0.3 per cent over the short-term horizon and the average of the medium and long-term trends, -0.95 per cent, over the long-term horizon. This gives us a short-term outlook of -0.55 per cent and a long-term outlook of -0.95 per cent in Croydon as a whole.

Ealing

Construction employment in Ealing has been in decline in the long-term, although it has picked up slightly in recent years. We forecast the short-term trend of 0.1 per cent in the short-term and zero growth in the long-term. Business Services employment saw a large rise in the late 1990s but has begun to decline in recent years. We forecast the average of short and long-term trends in the short-term at -0.1 per cent, and the average of the medium and long-term trends at 0.35 per cent in the longer horizon. The Rest of employment has done the opposite to Business Services, increasing in recent years against a backdrop of long-term decline. Our short-term trend comes from The Rest of employment, at -0.1 per cent. We calculate short and long-term forecasts in the same way as for Business Services, generating forecasts of -0.05 per cent and -0.7 per cent for this sector.

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Enfield

Health employment has bounced around since 1988, with flat medium and long-term trends. Employment in Health has risen in the short-term, with a very positive growth of 0.5 per cent. We view this as unsustainable and therefore forecast zero growth in the long-term and 0.25 per cent in the short-term (the average of short and long-term trends) for this sector. The Rest of employment has declined at -0.8 per cent in the short-term, which we feel is also unsustainable. We obtain the short-term forecast in the same way as for Health yielding a figure of -0.8 per cent, and take the long-term trend of -0.4 per cent for the longer horizon. This yields total forecasts of -0.55 per cent and -0.4 per cent in the short and long-term for Enfield.

Greenwich

With a positive short-term trend and a negative long-term trend, there is no strong evidence of the long-term direction of future employment levels for Education & Health so we forecast flat growth for the long-term. In the short-term we average the short and medium-term trends yielding a forecast of 0.3 per cent. The Health sector also shows high variability in the long-term. We therefore forecast 0.1 per cent short-term growth, reverting to a flat trend in the long-term. The Rest of employment sector shows high variability with zero growth in the long-term. We therefore forecast zero short and long-term growth in this remaining sector.

Hackney

The short-term trend for Business Services has been very strong in Hackney, at 1.1 per cent, although the last data point shows a slight decline. We do not think the short-term trend is sustainable so we take the medium-term trend of 0.7 per cent for our short-term forecast. Due to high volatility around 1984 we take the average of the medium long-term trends for our long-term forecast, yielding 0.45 per cent. The Rest of employment has bobbed up and down since 1989. For the short-term forecast we take the medium-term trend at 0.3 per cent. We calculate the long-term forecast for rest in the same way as for Business Services, yielding a long-term forecast of -0.4 per cent. The total short and long-term forecast growths are therefore 0.4 per cent and 0.05 per cent in this borough.

Hammersmith

Hammersmith has seen some large jumps in employment in the last five to ten years. Business Services has been growing steadily. We take the short-term trend of 0.3 per cent and an average of the medium and long-term trends of 0.7 per cent and 1 per cent to give us a long-term trend of 0.9 per cent for the sector. Health has shown significant growth in the last five years, following large falls in the previous seven years. We therefore take the average of the short and medium trends of 0.8 per cent and -0.4 per cent to give us a short-term forecast of 0.2 per cent and an average of the long and medium trends resulting in a fall of 0.3 per cent in the long-term. Other Services has been rising steadily. We follow the same procedure as for Health, yielding short and long-term projections of 0.1 per cent and 0.4 per cent respectively. The remaining sectors make up the Rest of employment which has been rising in the short/medium-

term but fell in the 1980s to early 1990s. We therefore predict the long-term to be flat and take the medium-term trend of 1 per cent for the short-term forecast. These trends aggregated give us a short-term forecast of 1.6 per cent and a long-term growth of 0.95 per cent.

Haringey

Retailing in Haringey has been erratic, with the long and medium-term trends being flat. We therefore project this flat trend forwards in both the short and long-terms. Apart from a peak in 1993, which is difficult to interpret, Business Services has shown sustained growth over all time periods. In the short-term it has levelled off slightly and we predict the medium-term trend of 0.3 per cent in both the short and long-term. Education & Health employment in Haringey has shown growth of 0.1 per cent in the medium and short-terms but suffered a significant fall in the late 1980s. We do not view this as likely to occur again and therefore forecast flat growth in this sector in all time periods. The Rest of employment has levelled in recent years but showed large declines in the medium and longer-terms. We project -0.3 per cent growth (an average of the long and short-term trends) in the short-term, reverting to the larger long-term trend of -0.8 per cent in the longer horizon. This gives Haringey a flat short-term forecast, reverting to -0.7 per cent in the long-term.

Harrow

The Retailing and Education and Health Sectors in Harrow have both exhibited high volatility. We therefore predict zero growth in both the short-term for both sectors, and predict the long-term trends of 0 per cent and -0.1 per cent respectively in the long-term. In the short-term we take a combined forecast of all of the short-term trends of the remaining sectors, giving us a net flat short-term growth overall (Business Services has been rising whereas The Rest of employment has been falling). In the longer-term we predict the long-term trends of 0.4 per cent and -0.2 per cent respectively in Business Services and The Rest of employment. This yields a net rise of 0.1 per cent in the long-term.

Havering

All sectors in Havering have shown high volatility over the sample period, so it is difficult to determine the likely sign of short-term growth. We therefore project flat growth in all sectors. Retailing has a long-term trend of -0.1 per cent and Health has a long-term trend of zero. The Rest of employment has shown a general increase over the sample period, with a long-term trend of 0.2 per cent. We combine the long-term trends to obtain a long-term forecast for Havering of 0.1 per cent.

Hillingdon

Twenty-six per cent of Hillingdon's employment is in Transport, a large part of which will be due to Heathrow airport. Heathrow's employment is set to stay flat and rise with the building of Terminal 5 in the medium to long-term. Transport employment has fallen very slightly in the short-term but in view of Heathrow we average the medium and short-term trends and project short-term growth of 0.1 per cent. We project that this will rise to 0.7 per cent in the long-term, an average of the medium and long-term

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trends. Business Services are consistently growing, but at a somewhat erratic rate. We therefore project the short-term growth to continue at the average of the short and medium-term trends, 0.3 per cent and the long-term growth to continue at the average of the medium and long-term trends, 0.55 per cent. For the Rest of the employment, we view the recent sharp declines as unsustainable and therefore use an average of long and short-term histories for our short-term forecast, to give a growth of -0.4 per cent. The longer-term forecast reverts to the medium-term growth of -0.8 per cent. For total employment in Hillingdon, we have short and long-term growths of 0 per cent and 0.45 per cent respectively.

Hounslow

The three largest employment sectors in Hounslow are Wholesaling, Transport and Business Services. For all of these, and The Rest of employment, we project the short-term at the average of the short and medium-term growths, giving a net growth of -0.65 per cent. In the long-term we take the long-term trend for Business Services, and the average of the medium and long-term trends for the other sectors. This is because Wholesaling, Transport and The Rest of employment have all exhibited a substantial fall in the data around 1990, so it is not clear whether these sectors will follow the long or medium-term trends in the longer-term. This gives us zero growth for Hounslow in the long-term.

Islington

Business Services in Islington has been consistently growing for the last 20 years. Both the short and medium-term trends are 0.9 per cent, so we predict this level of growth in the short-term. In the long-term, we take the long-term trend of 1 per cent. For The Rest of employment, which has been slightly more erratic, we take the average of the short and long-term histories giving a projection of 0.35 per cent in the short-term, and we take the long-term trend of -0.1 per cent in the long-term. This puts total Islington employment growth at 1.25 per cent and 0.9 per cent in the short and long-terms.

Kensington

Four of the thirty sectors make up approximately half of Kensington's employment. Retailing, Hotels and Catering, Business Services and Other Services have all been increasing over the data period. However, they have recently all seen falls in the last two years. For this reason we average the short-term trend with either the medium or long-term trend in these sectors when generating the short-term projections, with the exception of Business Services where we opt instead for the medium-term trend. The Rest of employment has been very volatile, so we project flat growth in the short-term, giving a total short-term employment projection of 0.4 per cent. For the longer horizon, we take the long-term trend for all sectors with the exception of Hotels and Catering, which saw a large jump in the data around 1997. For this sector we take an average of the medium and long-term trends, yielding a growth of 0.35 per cent. This gives an overall long-term forecast of 1.25 per cent.

Kingston

The Retailing, Health and The Rest of employment sectors in Kingston have been erratic in recent years, so we predict flat growth in these sectors in the short-term. Business Services has risen historically but has fallen in recent years, so we take the medium-term trend of zero growth for the short-term forecast. This gives a flat short-term outlook for the borough overall. In the long-term we take the long-term trends for all sectors except Retailing where we take an average of the medium and long-term trends due to a sharp rise in the data in the early 1990s. This yields an overall long-term forecast of 0.3 per cent.

Lambeth

Health Employment fell sharply around 1998 but has recovered in the last couple of years. For this reason we project flat growth for Health in the short and long-terms. Business Services have steadily increased since 1987. We adopt the short-term trend of 0.6 per cent for the short-term forecast and the long-term trend of 0.7 per cent for the long-term forecast. Public Administration and Defence has generally been in decline, but it has had its ups and downs and has generally risen in the last few years. We take the average of the short and long-term trends, 0.3 per cent, for the short-term forecast, and the average of the medium and long-term trends, 0.15 per cent, for the long-term forecasts. We adopt the medium-term trend for The Rest of employment for both the short and long-term horizon, giving overall growth for Lambeth of 0.3 per cent in the short-term and 0.05 per cent in the long-term.

Lewisham

The Retailing and Health sectors both have erratic histories and zero trends in the long-term. We forecast both of these sectors to have flat growths in the short and long-term. Education & Health fell sharply around 1990 but has since partially recovered in recent years. We adopt the short-term trend of 0.1 per cent for the short-term forecast but project zero growth for the long-term horizon due to the volatility in this sector. The Rest of employment series has also been volatile but has been generally rising in recent years. We take the average of the short and medium-term trends for the short-term projection, giving 0.4 per cent, and again project flat growth for the long-term. This gives us a total effect of 0.5 per cent growth in the short-term and zero growth in the long-term.

Merton

Business Services has seen a recent drop in employment, and saw sharp rise in 1989 to 1991. The sector then rose more gradually until 2001 but fell again in the last few years. We take the average of the medium and short-term trends to obtain a short-term forecast of -0.1 per cent growth, and the average of the medium and long-term trends to obtain a long-term forecast of 0.5 per cent growth. The Rest of employment saw a large decline in 1993 to 1999 but has since recovered slightly. We take the short-term trend to give a short-term projection of 0.1 per cent growth. Due to the steep fall in The Rest of employment we average the long-term and short-term trends to obtain the long-term forecast at -0.45 per cent growth. The total effect for Merton is zero growth in the short-term and 0.05 per cent growth in the long-term.

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Newham

Public Administration and Defence employment in Newham was in decline for the whole of the 1980s and into the early 1990s. This trend has levelled off and slightly reversed in recent years. Due to the sharp change in the behaviour of the sector around 1994 we average the short and long-term trends for the short-term forecast and average the medium and long-term trend to obtain for the long-term forecast. This yields growths of -0.2 per cent and -0.35 per cent respectively. Retailing was fairly flat until 1991, grew sharply for a couple of years, suffered a severe decline in the following two years, and has since grown at a healthy rate. Due to the sharp changes in the data we average the short and long-term trends to obtain the short-term forecast of -0.2 per cent, and take the long-term trend of zero growth for the longer-term. The Rest of employment has been very erratic so we predict flat growth for this sector in the short and long-terms. This therefore gives Newham zero growth in the short-term and -0.35 per cent growth in the long-term.

Redbridge

Retailing has experienced a general upward trend but has been very volatile in recent years. As a result, we forecast the medium-term trend of zero growth in the short-term, and the long-term trend of 0.1 per cent in the long-term. Business Services has seen relatively steady growth over the last 20 years, with long, medium and short-term trends of 0.6 per cent, 0.6 per cent and 0.7 per cent respectively. We project 0.6 per cent for the short-term and 0.7 per cent for the long-term. Health employment has been erratic and so we project flat growth in the short-term and forecast the long-term trend of -0.1 per cent in the long-term. The Rest of employment has been declining over the long-term horizon but fell and rose sharply in the late 1980s. We project the short-term trend of -0.2 per cent growth in the short-term, and the medium-term trend of -0.4 per cent growth in the long-term. This leads to short and long-term forecasts of 0.4 per cent and 0.3 per cent respectively.

Richmond

Business Services employment showed continual growth over most of the sample period, but has since levelled off. We project zero growth in the short-term, consistent with the short-term trend. In the long-term we do not feel that the long-term trend of 1 per cent growth is sustainable. We therefore adopt the medium-term trend of 0.5 per cent as our long-term forecast. Retailing also showed good growth until the early 1990s and then crashed. This decline has begun to turn around over the last six years, but the short and long-term trends still show no growth. We therefore project zero growth over the whole forecast horizon. Other Services has generally grown over the sample period. We follow the short and long-term trends, predicting growth of 0.1 per cent and 0.3 per cent in the short and long-terms. The Rest of employment has been somewhat erratic in recent years following a sharp fall around 1994. We take an average of the short and medium-term trends to project flat growth in the short-term, and project the medium-term trend of 0.4 per cent growth in the long-term. This leads to short and long-term forecasts of 0.1 per cent and 0.4 per cent respectively.

Southwark

Business Services saw steady growth over the 1980s and 1990s but has levelled in recent years; it has short, medium and long-term histories of flat, 0.5 per cent and 0.6 per cent respectively. We think this sector will pick up again and therefore, with the trends in mind, we project short and long-term growth of 0.5 per cent and 0.6 per cent in this sector. Health saw a large drop between 1989 and 1993. Some of this decline has been reversed, and the sector has bounced up and down over the last few years. We average the short and long-term trends to project flat growth in the short-term, and we take the long-term trend of -0.1 per cent for the long-term forecast. The Rest of employment has had an erratic history but all trends are negative for this sector. We average the short and medium-term trends to obtain the short-term forecast and average the medium and long-term trends to obtain the long-term forecast, yielding -0.35 per cent over the whole horizon. We therefore obtain short and long-term forecasts of 0.15 per cent growth for Southwark as a whole.

Sutton

Construction employment in Sutton appears to have peaked in 1991 after which it fell over the following two years but has seen steady growth in the recent history. We take an average of the short and medium trends to give a short-term forecast of 0.35 per cent and we use the medium trend of 0.3 per cent for the long-term forecast. Retailing has seen steady growth over most of the sample, but has declined substantially in recent years. We use the medium-term trend for the short-term forecast, giving -0.2 per cent, and average the medium and long-term trends for the long-term forecasts, giving 0 per cent growth. Business Services rose sharply around 1988, but has remained fairly flat in recent years. We take the short-term trend to give flat growth in the short-term. In the longer-term we take the average of the medium and long-term trends, which gives slightly stronger growth of 0.1 per cent. Health was in steady decline in Sutton since 1984, with an upturn in the last four years of history. We take averages of the short and medium-term trends to give a short-term forecast of 0.25 per cent. In the longer-term we predict flat growth due to uncertainty in this sector, consistent with the medium-term trend. The Rest of employment has been in steady decline since 1988. We use the short-term trend of -0.3 per cent for the short-term forecast and the long-term trend of -0.2 per cent for the long-term forecast. The short and long-term employment forecasts are therefore 0.1 per cent and 0.2 per cent for Sutton.

Tower Hamlets

Tower Hamlets has experienced strong growth in recent years. Banking & Insurance grew particularly strongly with short, medium and long-term trends of 1.7 per cent, 1 per cent and 1 per cent respectively. We do not feel that these trends can continue so we take the medium-term trend for our short-term forecast and three quarters of the long-term trend for our long-term forecast. Business Services has also been growing sharply. We again take the medium-term trend of 0.7 per cent for the short-term forecast. For the long-term forecast we opt to average the medium and long-term trends, obtaining projected growth of 0.8 per cent. The rest of employment in Tower Hamlets has also seen steady growth, although there was a significant dip in 1994. We take an average of the short and long-term trends to give a short-term forecast of 0.65 per cent, and the long-term trend of 0.5 per cent for the long-term forecast. These

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combined projections give Tower Hamlets very healthy forecasts of 2.35 per cent and 2.05 per cent for short and long-term growth.

Waltham Forest

Retailing peaked in 1994 but apart from this has been fairly flat over the whole period. We take the short and long-term trends for this sector, projecting flat growth over the whole horizon. The Construction and Health sectors have both fallen in recent years. We take the short-term trends for the short-term projections and the long-term trends for the long-term projections. The Rest of employment declined sharply in the late 1990s, but has since levelled off. We follow the short-term trend of flat growth for the short-term forecast. Due to uncertainty about the future direction of growth in this sector, we average the short and long-term trends to obtain a long-term forecast of -0.4 per cent. This leads to negative trends in Waltham Forest in both the short and long-term. These are -0.6 per cent and -1 per cent respectively.

Wandsworth

Business Services has seen strong growth in the long-term which has become more steady though still positive in the short and medium-terms. We use the short-term trend of 0.2 per cent for the short-term forecast. Due to uncertainty about the future direction of this sector, we use an average of the short and long-term trends over the longer horizon, giving a long-term forecast of 0.45 per cent. Health has been fairly erratic over the period but has been growing strongly in the short-term. We use the long-term flat trend for the long-term forecast and take an average of the short and medium-term trends to give a short-term forecast of 0.65 per cent. The Rest of employment has been erratic in the short and medium-term so we forecast flat growth in the short-term (the average of the short and medium-term trends), and revert to the long-term trend of -0.1 per cent for the long-term forecast. This gives Wandsworth short and long-term growth rates of 0.85 per cent and 0.35 per cent respectively.

Westminster

Retailing, Public Administration and The Rest of employment have seen fluctuating historic employment trends. We have flat forecasts for these sectors over the whole horizon. Business Services has been growing throughout the 1990s but has fallen slightly in the last three years. We average short and medium-term trends to obtain a short-term forecast of 0.05 per cent, and take the long-term trend of 0.3 per cent for the long-term forecast.

Table 5: London borough employment forecasts: history 2002-2004; forecast 2005-2026

GVA Growth = 2.5% pa (000s)																	
	Barking	Barnet	Bexley	Brent	Bromley	Camden	City	Croydon	Ealing	Enfield	Greenwich	Hackney	Hammersmith	Haringey	Harrow	Havering	Hillingdon
2002	52	135	76	111	114	290	345	151	133	107	69	98	120	71	79	88	180
2003	51	133	75	109	119	285	347	149	136	107	73	104	122	76	81	90	182
2004	52	131	79	112	120	273	333	149	135	108	75	101	121	75	80	92	186
2005	52	133	80	112	120	276	337	150	136	108	76	102	125	75	81	92	188
2006	52	134	80	112	121	279	341	150	137	108	77	103	128	76	81	93	189
2007	53	135	80	113	121	282	344	151	138	109	78	104	130	76	82	94	191
2008	53	136	80	113	122	284	347	151	139	109	79	106	133	77	83	95	192
2009	53	137	80	113	122	287	351	151	140	109	80	107	136	78	83	95	193
2010	53	138	80	113	123	290	355	151	140	109	80	107	139	78	84	96	196
2011	53	140	81	114	123	294	360	150	141	109	81	108	141	78	84	97	198
2012	53	142	81	114	124	297	364	150	141	110	81	109	143	78	85	97	200
2013	53	144	81	114	125	301	369	149	141	110	82	110	146	78	86	98	202
2014	53	145	81	114	125	305	374	149	142	110	82	110	148	78	86	99	204
2015	53	147	82	114	126	308	378	148	142	110	83	111	150	78	87	99	207
2016	53	149	82	114	126	312	383	147	142	110	83	112	153	78	88	100	209
2017	53	151	82	114	127	315	387	147	143	111	84	112	155	78	88	101	211
2018	53	153	82	115	128	319	392	146	143	111	84	113	157	78	89	101	213
2019	53	154	83	115	128	322	396	146	143	111	85	114	160	78	89	102	215
2020	53	156	83	115	129	326	401	145	144	111	85	115	162	78	90	103	217
2021	53	158	83	115	129	329	406	145	144	111	86	115	165	78	90	103	220
2022	53	160	83	115	130	333	410	144	144	112	86	116	167	79	91	104	222
2023	53	162	84	115	131	337	415	144	145	112	87	117	169	79	92	105	224
2024	53	163	84	116	131	340	420	143	145	112	87	117	172	79	92	106	226
2025	53	165	84	116	132	344	424	143	145	112	88	118	174	79	93	106	228
2026	53	167	84	116	133	348	429	142	146	113	88	119	177	79	94	107	231

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Table 5 (cont.): London borough employment forecasts: history 2002-2004; forecast 2005-2026

GVA Growth = 2.5% pa (000s)																	Total
	Hounslow	Islington	Kensington	Kingston	Lambeth	Lewisham	Merton	Newham	Redbridge	Richmond	Southwark	Sutton	Tower Hamlets	Waltham Forest	Wandsworth	Westminster	
2002	140	167	147	79	128	77	77	76	81	82	174	73	160	67	124	609	4,483
2003	136	172	139	80	135	82	78	77	83	84	170	72	165	68	127	608	4,516
2004	129	175	132	79	135	80	79	80	83	82	177	71	174	66	125	600	4,488
2005	129	180	134	79	137	81	80	81	84	83	179	72	181	66	127	607	4,545
2006	129	184	135	80	138	82	80	81	85	84	181	72	187	66	129	611	4,587
2007	129	187	137	80	139	83	81	82	86	85	182	73	192	66	131	616	4,631
2008	130	191	138	81	141	84	81	82	87	85	184	74	198	67	133	621	4,674
2009	130	194	140	82	142	85	82	83	88	86	186	74	203	67	135	626	4,718
2010	131	197	143	82	143	86	82	83	89	87	187	75	210	66	137	632	4,763
2011	131	201	145	83	144	86	83	83	90	88	189	75	216	66	138	638	4,808
2012	132	204	148	84	145	87	84	84	91	89	190	76	223	66	139	644	4,853
2013	133	207	151	85	146	87	84	84	91	90	191	77	230	66	141	649	4,899
2014	134	210	154	86	147	88	85	84	92	91	193	77	236	65	142	656	4,945
2015	135	214	157	86	148	88	85	84	93	92	194	78	243	65	144	662	4,991
2016	135	217	161	87	149	89	86	84	94	93	196	79	250	65	145	668	5,038
2017	136	220	163	88	150	89	86	85	95	94	197	79	256	65	146	674	5,083
2018	137	223	166	89	151	90	87	85	96	94	199	80	263	64	148	679	5,127
2019	138	227	169	89	152	90	87	85	96	95	200	80	270	64	149	685	5,172
2020	138	230	172	90	153	91	88	85	97	96	202	81	276	64	150	691	5,218
2021	139	233	175	91	154	92	89	85	98	97	203	82	283	64	152	697	5,264
2022	140	236	178	92	155	92	89	86	99	98	204	82	290	63	153	703	5,310
2023	141	240	181	93	155	93	90	86	100	99	206	83	296	63	154	709	5,357
2024	142	243	184	93	156	93	90	86	101	100	207	84	303	63	156	715	5,404
2025	143	247	187	94	157	94	91	86	102	101	209	84	310	62	157	722	5,451
2026	143	250	191	95	158	94	91	86	102	102	210	85	317	62	159	728	5,499

6 Appendix A: Historic sectoral employment charts

Figure A1: Log of primary and utilities employment as a proportion of total output in London, 1971–2004

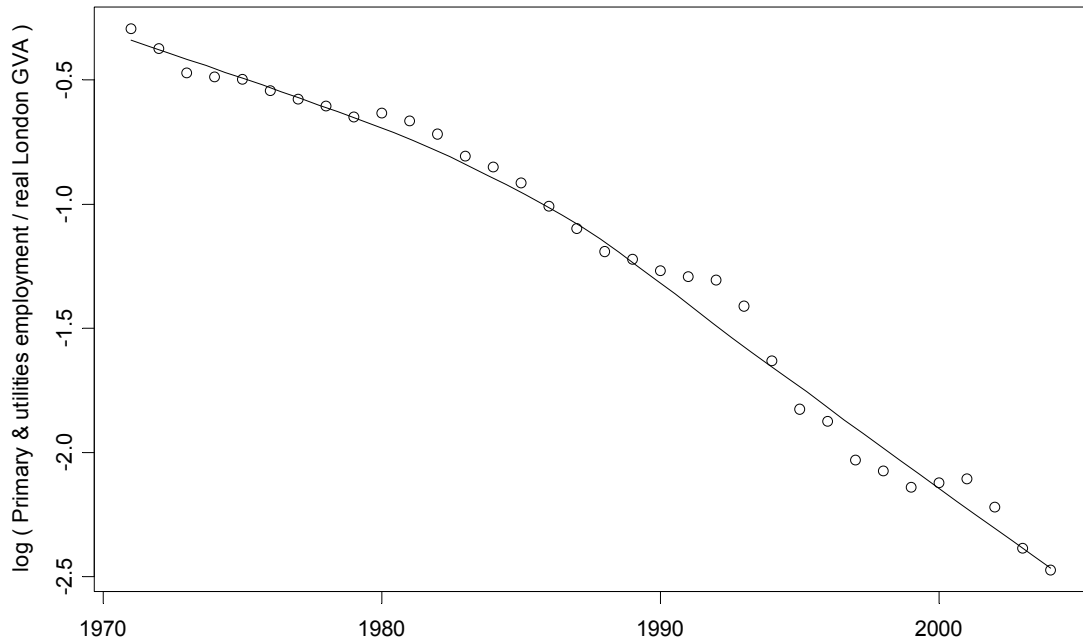


Figure A2: Log of manufacturing employment as a proportion of total output in London, 1971–2004

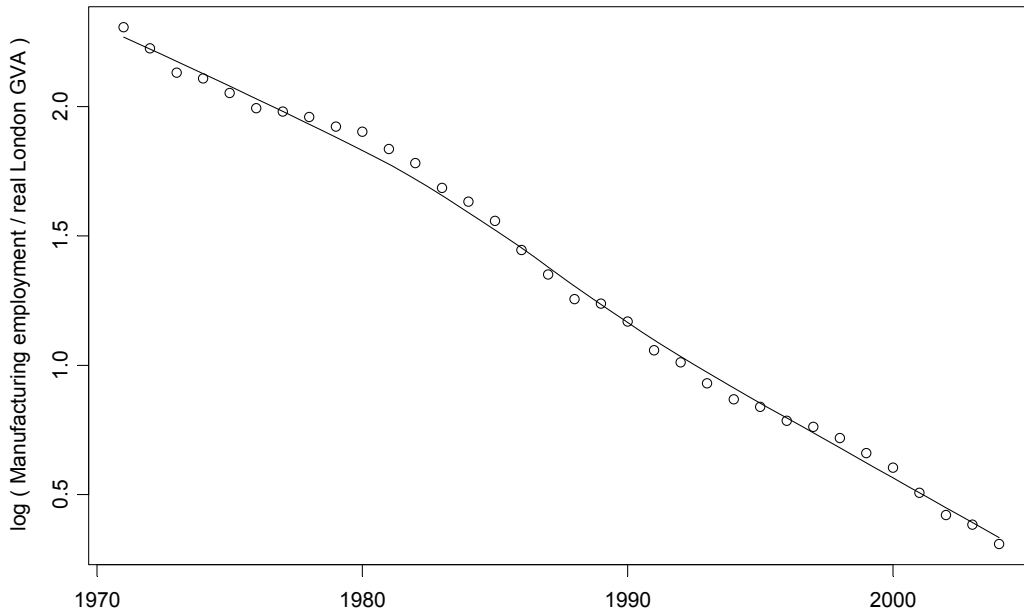


Figure A3: Log of construction employment as a proportion of total output in London, 1971–2004

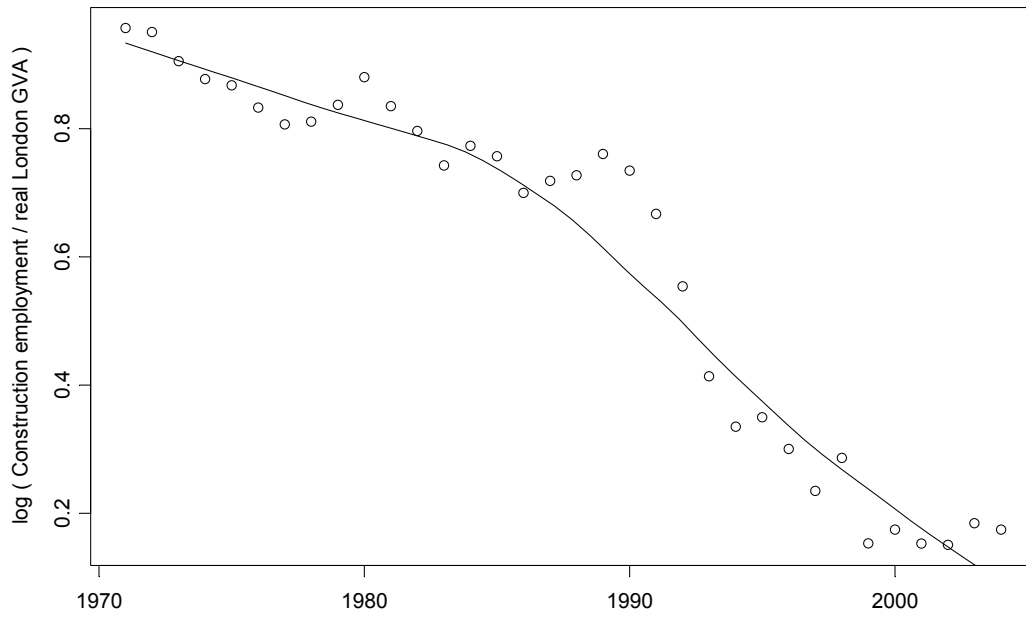


Figure A4: Log of wholesale employment as a proportion of total output in London, 1971–2004

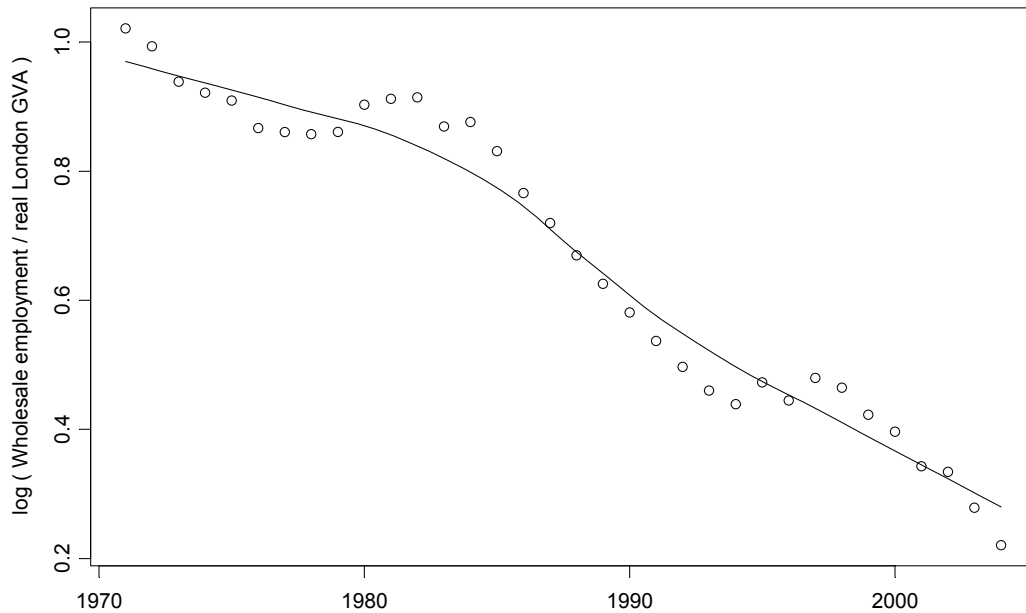


Figure A5: Log of retail employment as a proportion of total output in London, 1971–2004

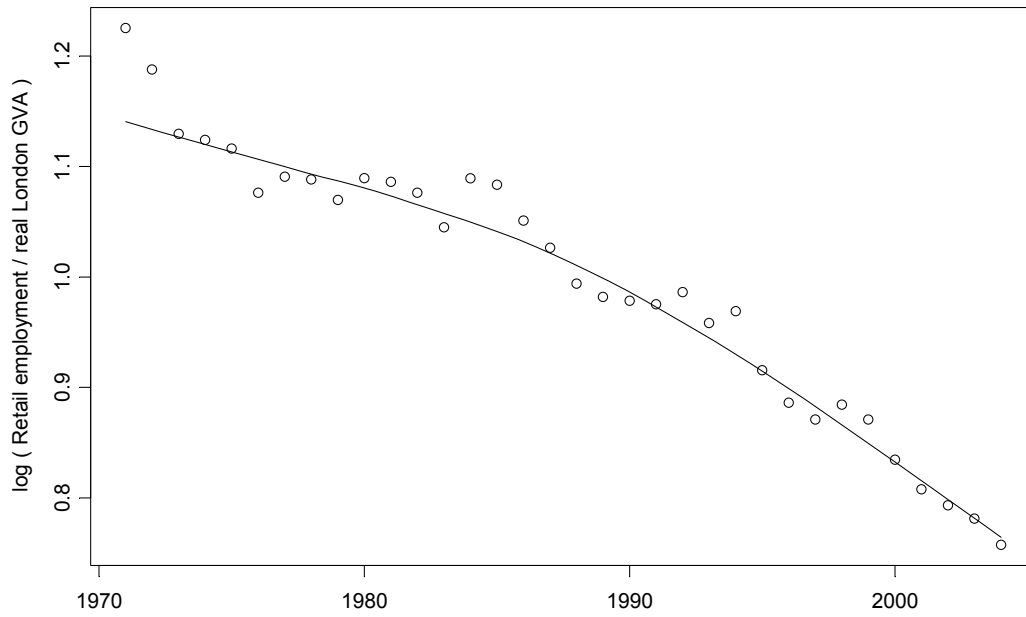


Figure A6: Log of hotels and restaurant employment as a proportion of total output in London, 1971–2004

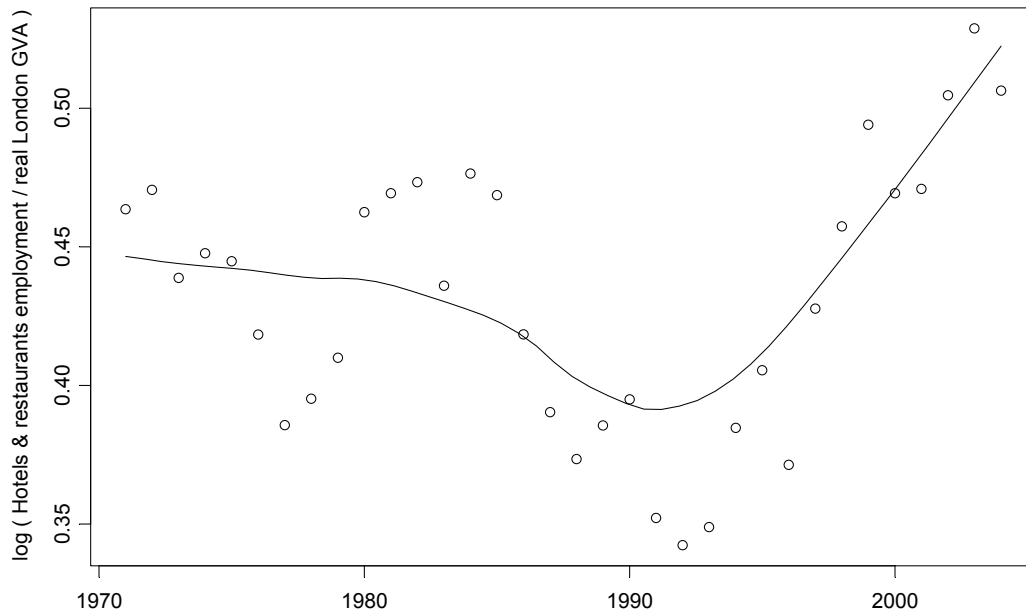


Figure A7: Log of transport and communication employment as a proportion of total output in London, 1971–2004

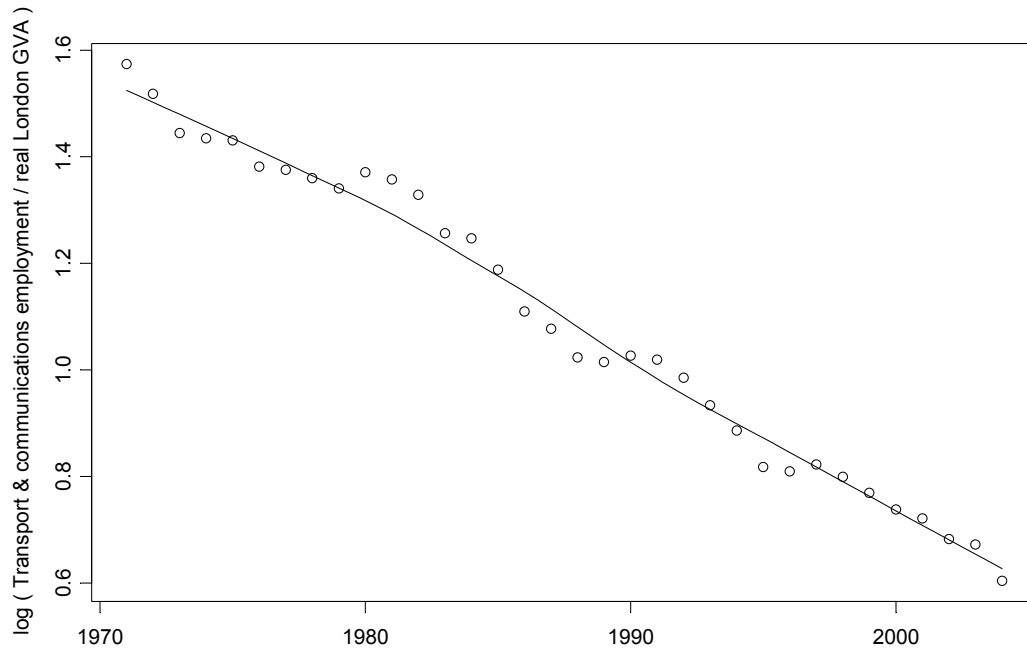


Figure A8: Log of financial employment as a proportion of total output in London, 1971–2004



Figure A9: Log of business service employment as a proportion of total output in London, 1971–2004

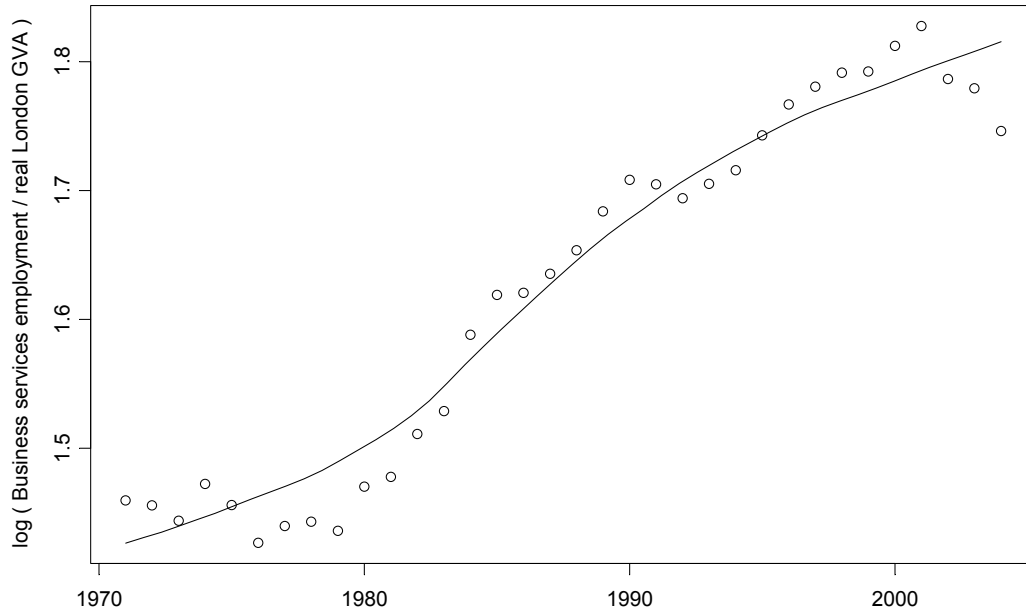


Figure A10: Log of public administration employment as a proportion of total output in London, 1971–2004

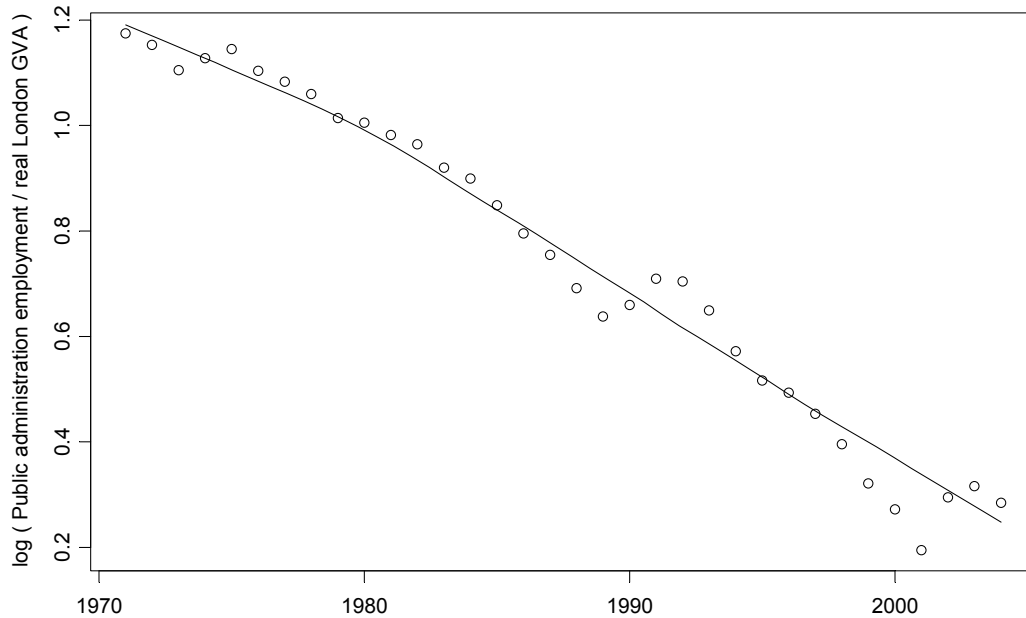


Figure A11: Log of health and education employment as a proportion of total output in London, 1971–2004

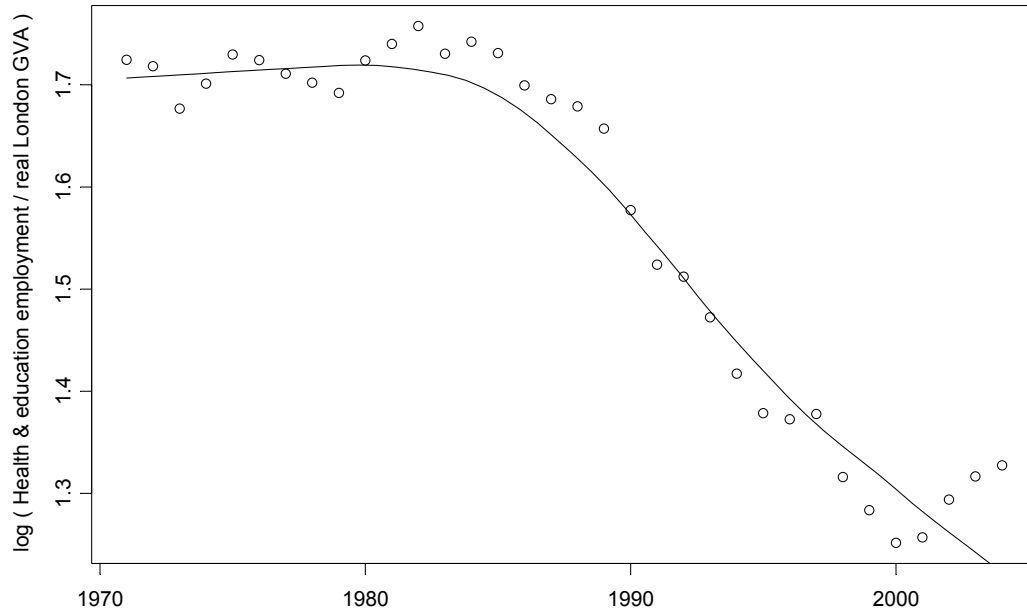
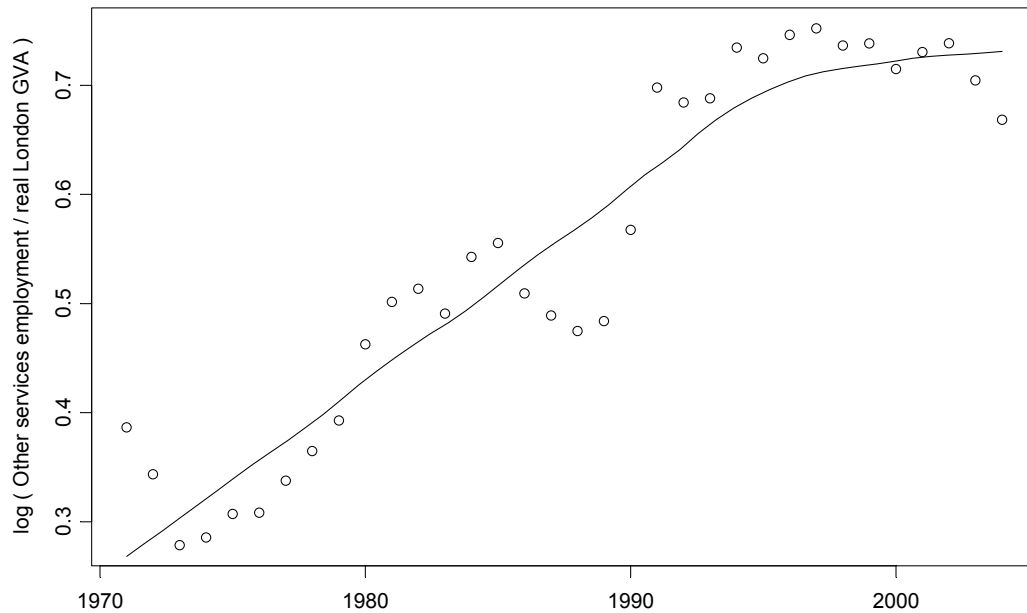


Figure A12: Log of other services employment as a proportion of total output in London, 1971–2004

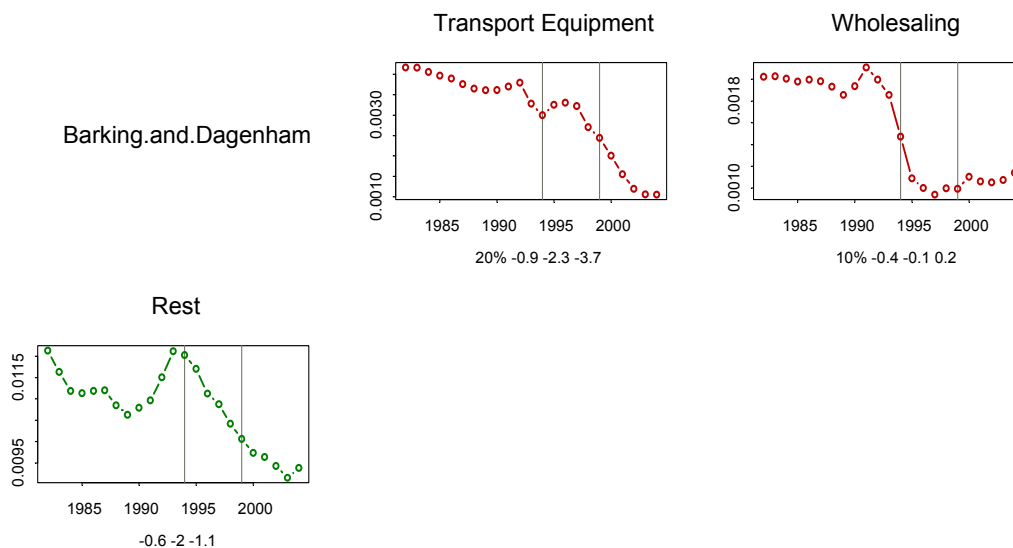


7 Appendix B: Historic employment trends by borough

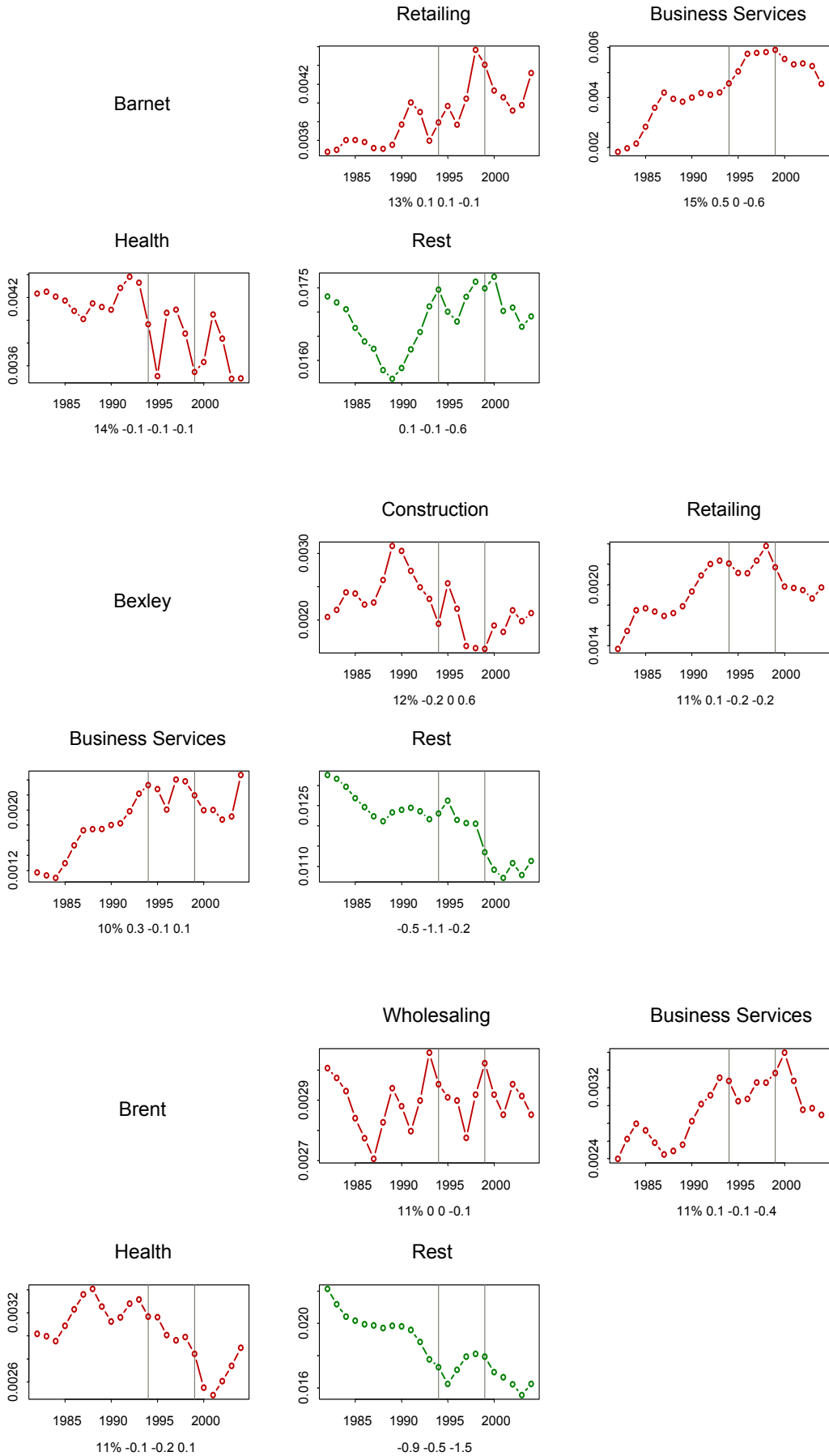
The plots below show the historic proportions of total London employment that key sectors within each of the boroughs account for. Below each sector plot there is a percentage, showing the average historic proportion of employment that the sector accounts for within the borough, followed by the long, medium and short-term historic trends of the data (rescaled by the proportion of employment). The grey lines show what we define to be the short, medium and long-terms. The short-term is from 1999-2004, the medium-term is 1994-2004 and the long-term is 1982-2004.

For example, Business Services has historically accounted for 15 per cent of the employment in Barnet. Over the last 6 years, the proportion of total London employment that this sector in Barnet has accounted for has experienced an annual average drop in of around 4 per cent per year. This drop contributed to an overall drop in the proportion of London employment that Barnet accounted for of -0.6 per cent per annum over the period (= 15 per cent of 4 per cent). The trends for Retailing and Health in Barnet were flatter, each accounting for only a 0.1 per cent drop. The Rest of employment in Barnet declined more strongly, accounting for a drop of 0.6 per cent. Therefore the proportion of total London employment that Barnet accounted for over the last five years has fallen by on average 1.4 per cent per annum.

To calculate the overall employment trend, we can simply add the values of the rescaled trends. For example, in Barking, the short-term trend value for Transport Equipment was -3.7 per cent, for Wholesaling it was 0.2 per cent and for the rest of the sectors it was -1.1 per cent. The overall short-term trend was therefore -4.6 per cent.



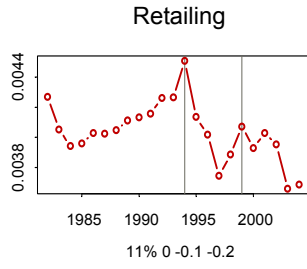
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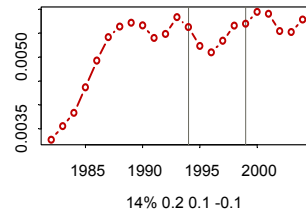


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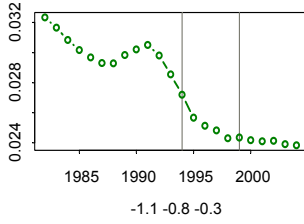
Croydon



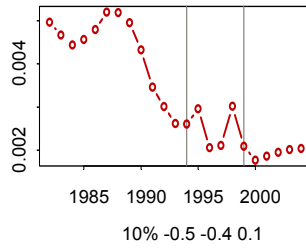
Business Services



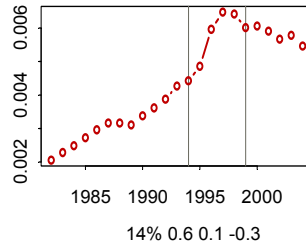
Rest



Construction

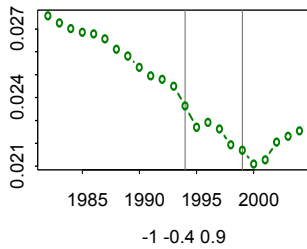


Business Services

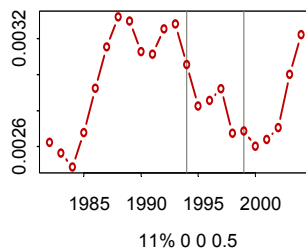


Ealing

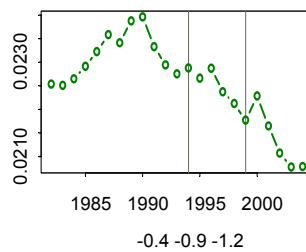
Rest



Health



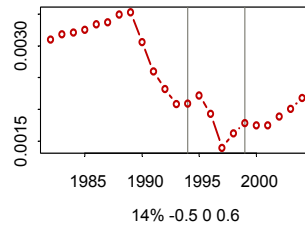
Rest



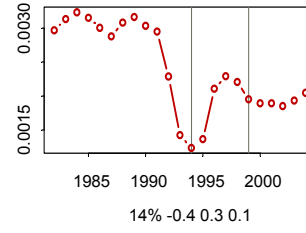
Enfield

Greenwich

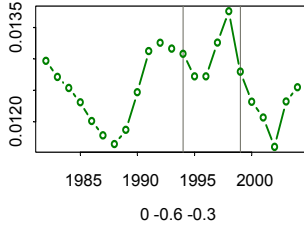
Education & Health



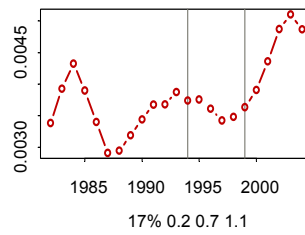
Health



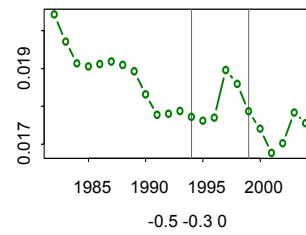
Rest



Business Services

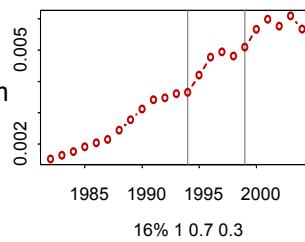


Rest

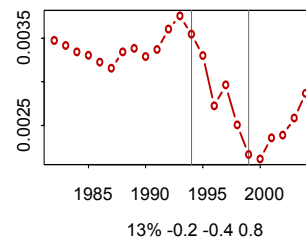


Hackney

Business Services

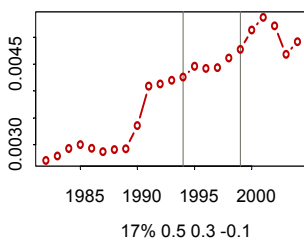


Health

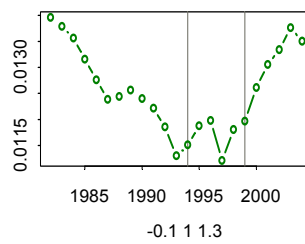


Hammersmith and Fulham

Other Services

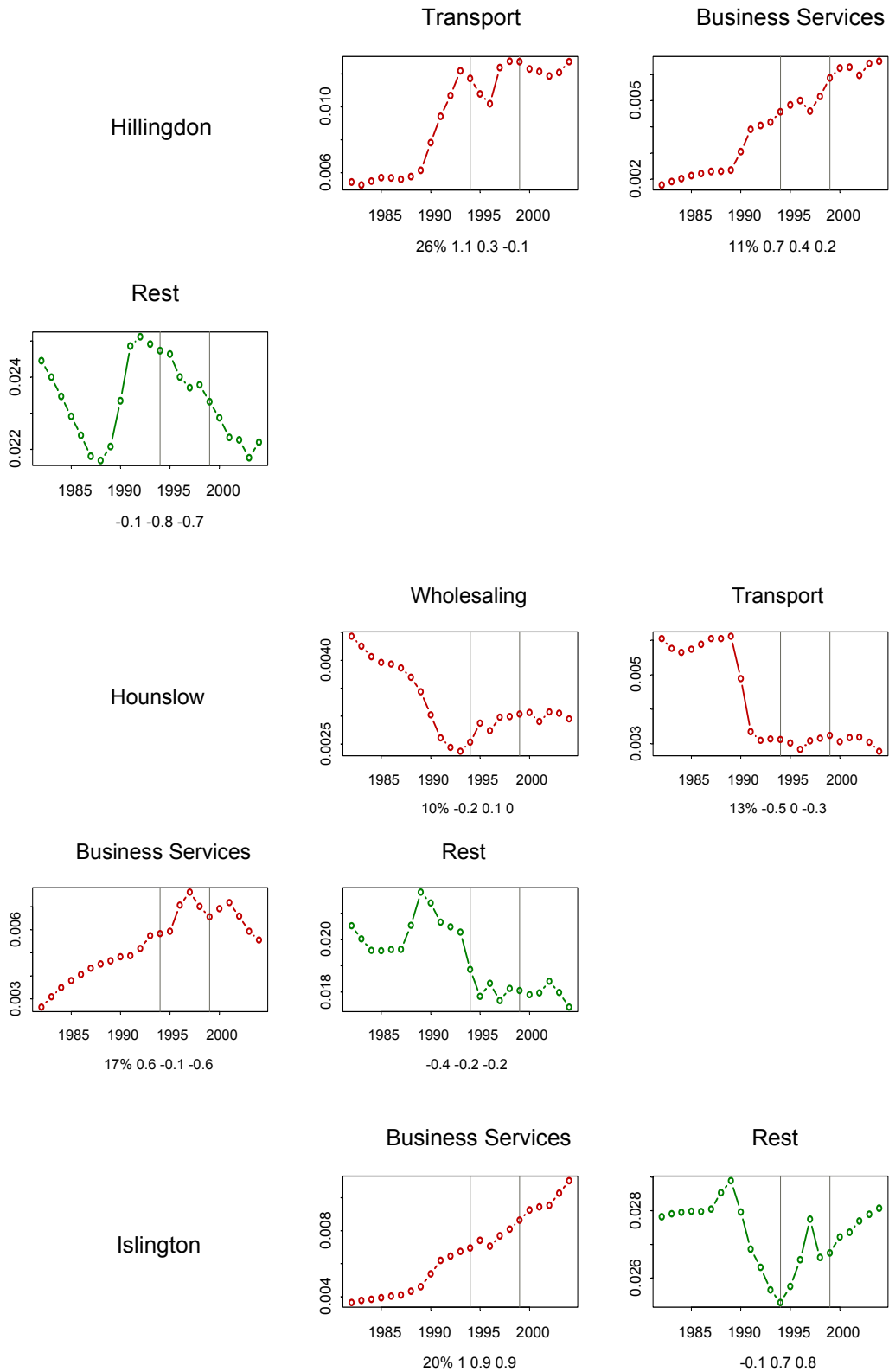


Rest

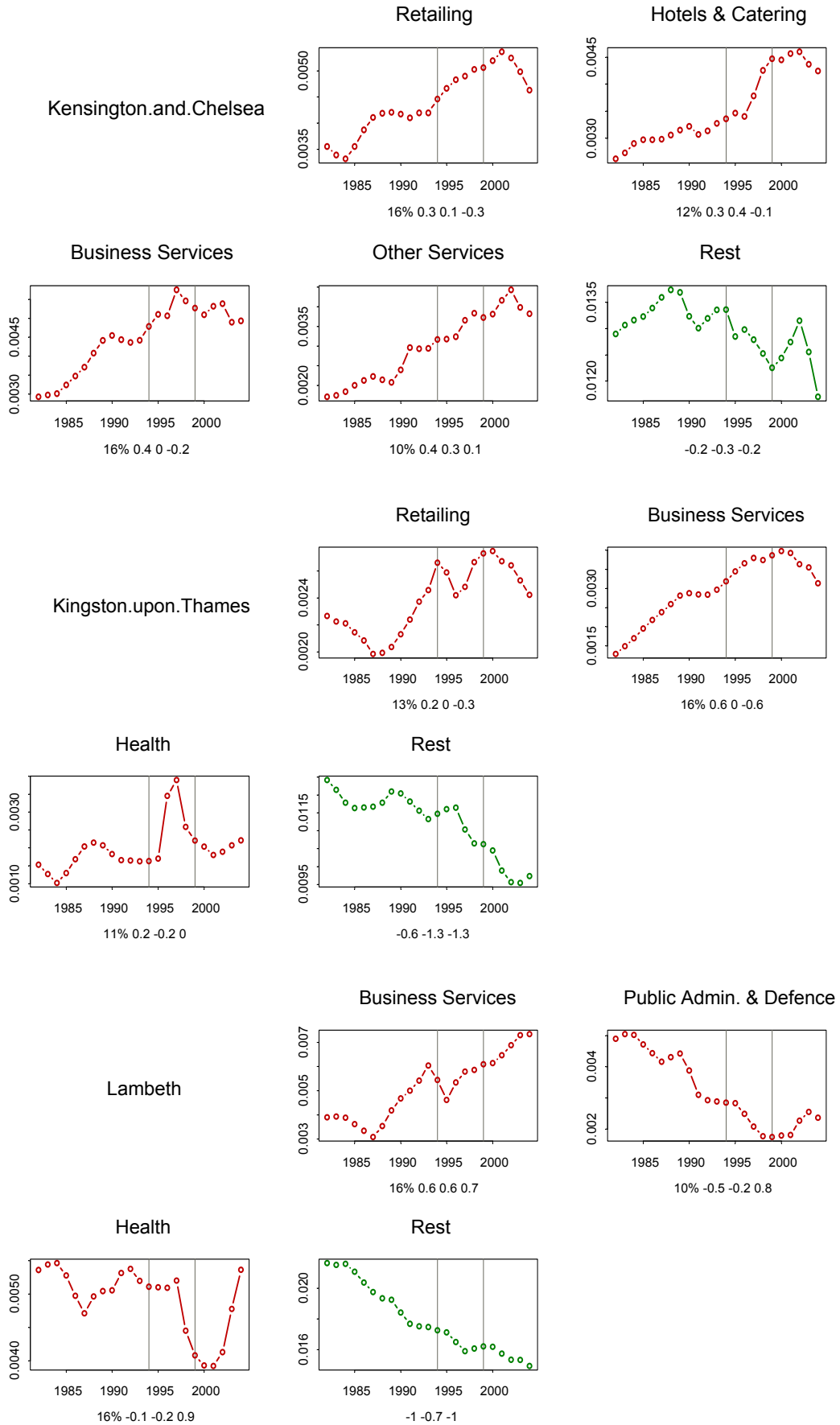


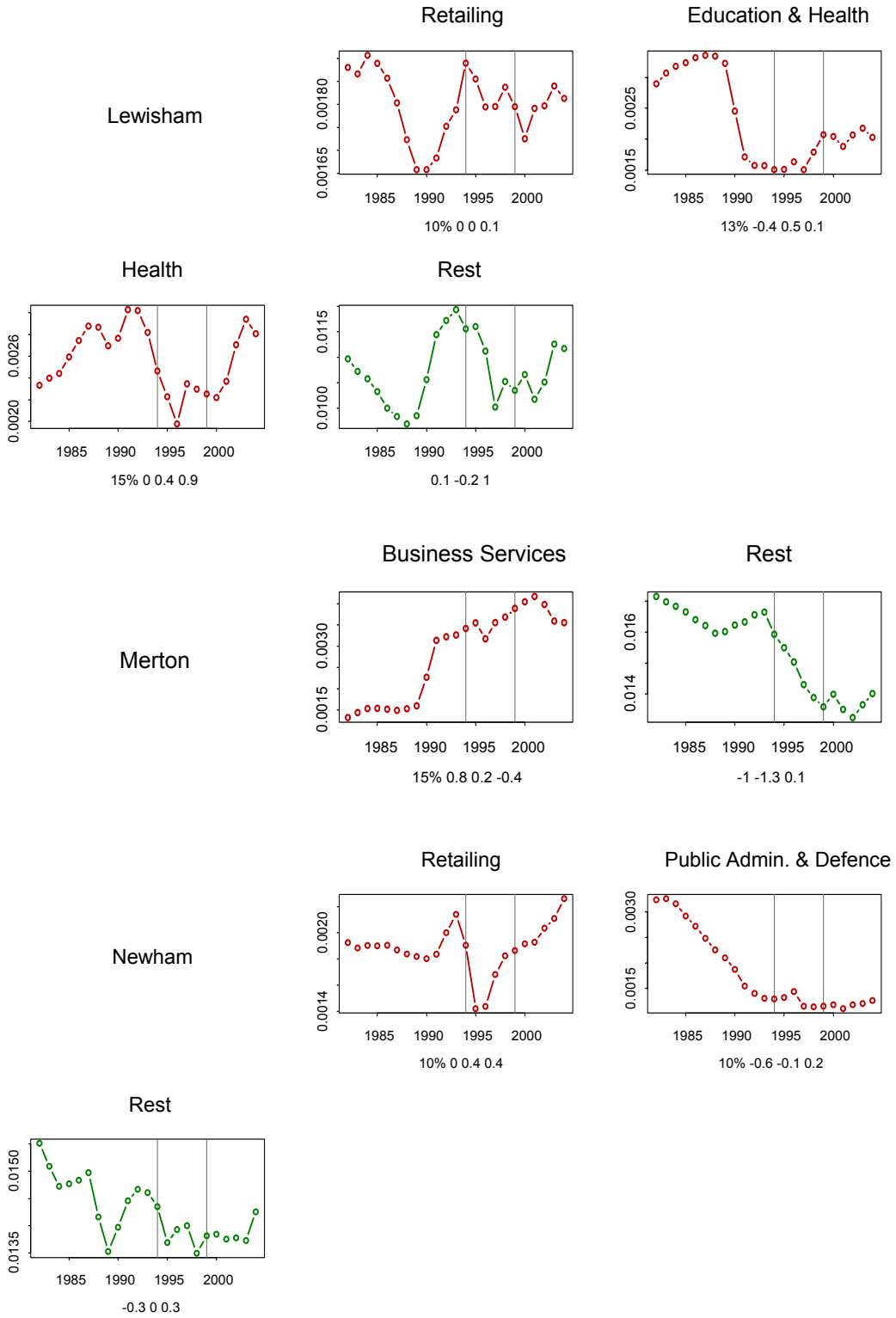
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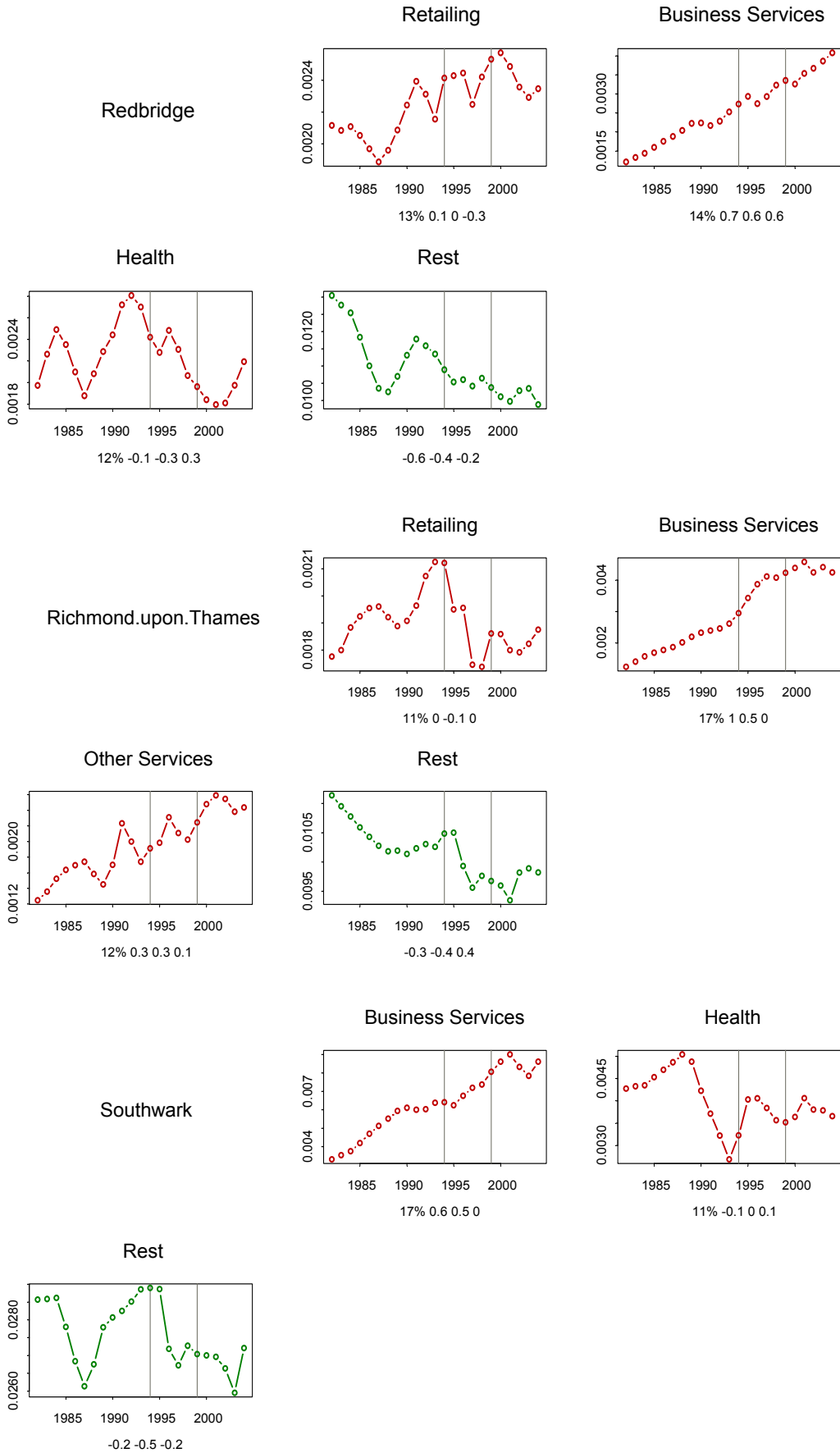


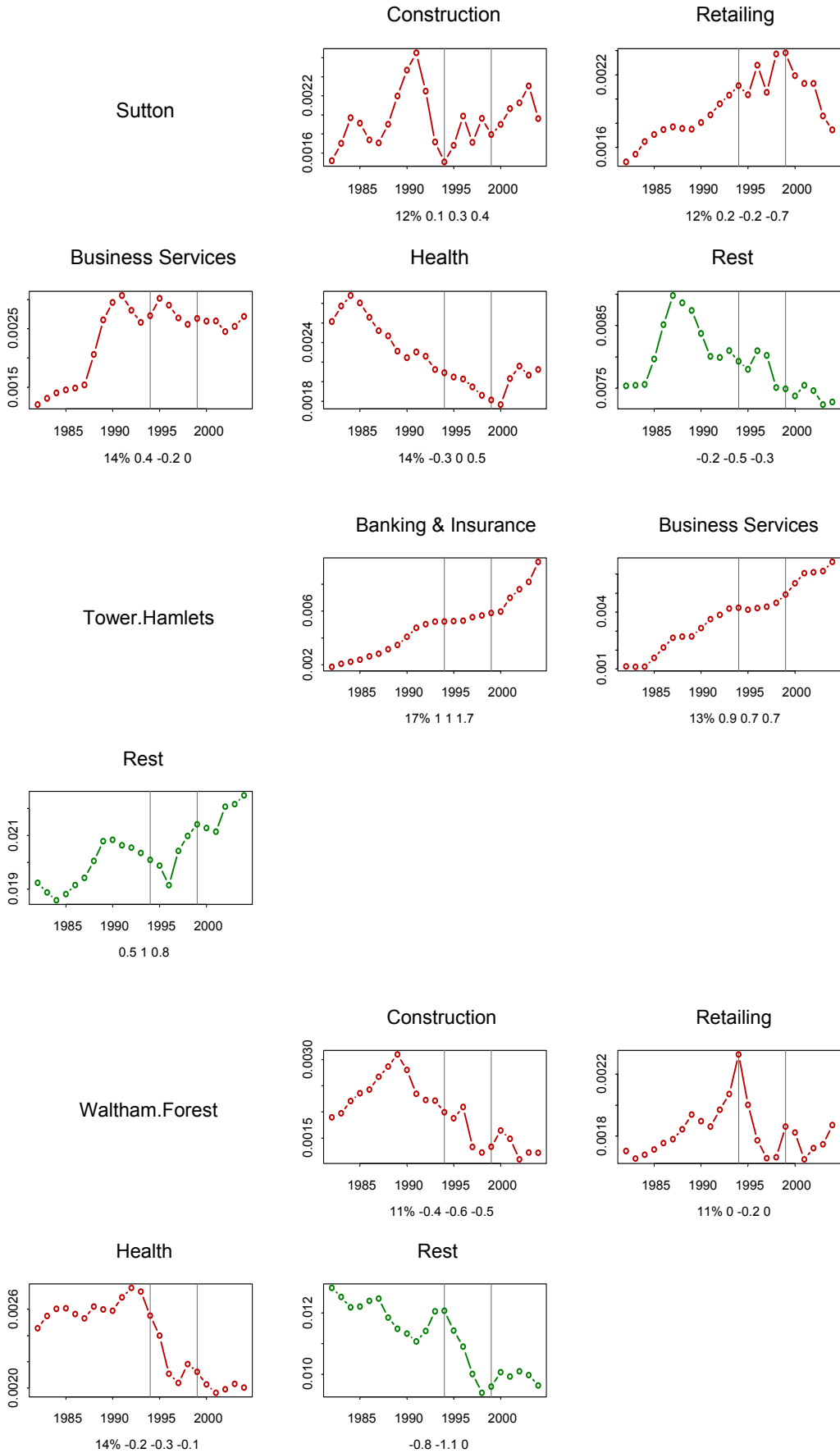
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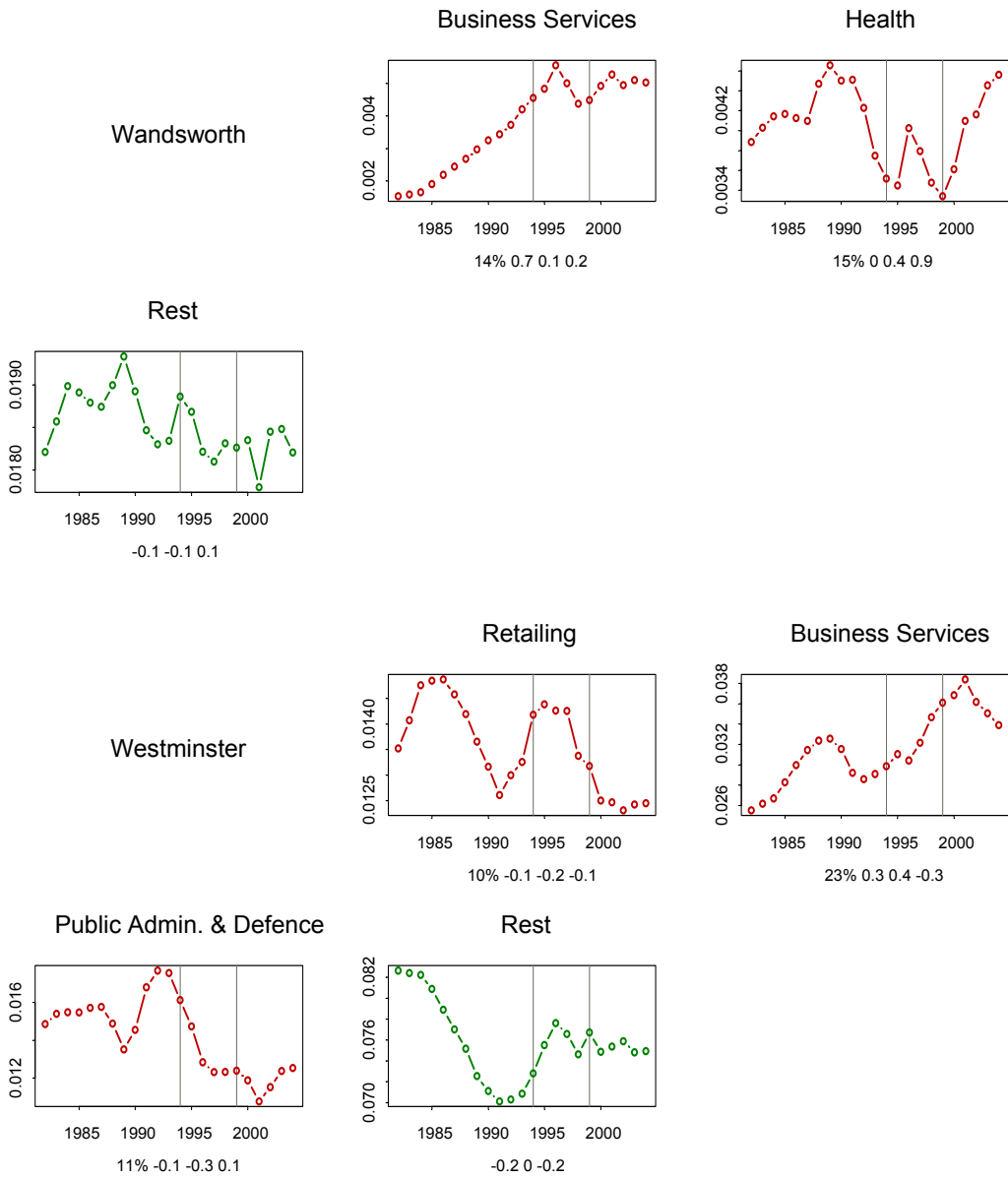


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8 Appendix C: Economic theory underpinning forecasts

1. The outline of the model is as follows:

- We make an assumption about the sustainable long-term growth rate of the London economy.
- We project trends in the level of employment per unit of output.
- This gives us the level of demand for labour that would be associated with the level of output implied by the growth rate, in the absence of any constraints³.
- Note that the absence of constraints implies that the level of employment which workers are willing to supply equals the potential demand.
- We project trends in the level of employment in London. This gives us the unconstrained employment. In other words, the employment which would be associated with the demand for labour, in the absence of any constraints.

2. We can start with a simple production function:

$$Y = ALe^{\beta t} \quad (1)$$

where Y is output and L is employment.

We assume that in the long-term the rate of growth of potential output is given by:

$$Y_{\text{trend}} = Y(0)e^{\gamma t} \quad (2)$$

Adopting a relatively cautious assumption for average long-run output growth in London we assume that $\gamma = 0.025$

In the absence of constraints, in the long-term actual output is assumed to be equal to potential. So we can re-write (1) as:

$$Y(0)e^{\gamma t} = ALe^{\beta t} \quad (4)$$

and solve for the potential level of demand for employment, subsuming the constant terms Y(0) and A as appropriate into a single term, k_1 .

$$L_{\text{trend}} = k_1 e^{(\gamma - \beta)t} \quad (4)$$

This is the level of employment which would enable the trend rate of growth to be sustained.

The parameter β is not in fact time-invariant in our model. We use a non-linear statistical approach on historical data to inform us on how to calibrate a piece-wise linear function for β , and use this as a basis for projecting β into the future.

³ strictly speaking, we assume implicitly that whatever constraints might have existed in the past continue into the future. It is therefore any *additional* constraints which are relevant

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Clearly, the choice of β and γ are crucial to the long-term assessment of the potential demand for employment, but this much is obvious from the first three bullet points in (1) above.

If no constraints exist on meeting the potential trend demand for employment, then the supply of labour must grow at the same rate.

Suppose we assume that the supply of employment depends positively on the real wage. It is not clear theoretically even what sign the elasticity should be. Further, the elasticity of labour supply with respect to the real wage is one of the least well understood issues in applied economics.

Assuming that

$$L_{\text{supply}} = L(0)W^{\theta t} \quad (5)$$

where W is the real wage and we would like $\theta > 0$.

The sustainable growth rate in the real wage can reasonably be assumed to be equal to the rate of growth of productivity i.e.

$$W_{\text{trend}} = W(0)e^{\beta t} \quad (6)$$

So, again subsuming constants in a term k_2 ,

$$L_{\text{supply}} = k_2 e^{\beta \theta t} \quad (7)$$

But to sustain the potential growth rate, supply must grow at the same rate as demand, so that

$$k_2 e^{\beta \theta t} = k_1 e^{(\gamma - \beta)t} \quad (8)$$

So $\beta \theta = \gamma - \beta$, and we have:

$$\theta = \gamma/\beta - 1 \quad (9)$$

For plausible values of γ and β , $\gamma/\beta > 1$, so θ is positive. If we take the assumption that $\gamma = 0.025$ and $\beta = 0.017$, then the elasticity of labour supply with respect to the real wage is approximately 0.5.

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Greek

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Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

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