

## An investigation of Productivity by Size of Enterprise from 2009 to 2018

### Introduction

There has been a consistent concern about the lack of growth in productivity within the UK economy following from the worldwide financial crash of 2008/9.

In this paper we examine the ratio of turnover to employment as a surrogate for a more precise estimate of productivity and the comparatively weak growth in productivity in recent years is exemplified by the following table:

#### 1. Comparative data for 2001, 2009 and 2018 from SME reports, as provided by ONS and BIS<sup>1</sup>

<u>Year</u>	<u>2001</u>	<u>2009</u>	<u>2018</u>
Total Enterprises	3,746,340	4,834,045	5,667,510
Total Employment ('000 including self-employed)	22,622	22,819	27,027
Total Employees ('000)	19,726	18,876	22,384
Total Turnover (£m – exclusive of VAT)	£2,112,013	£3,240,329	£3,861,613
Ratio – Turnover to Employment ('000 £)	£93.4	£142.0	£142.9 <sup>2</sup>

It should be noted that this implies that the increase in productivity measured over the period 2001 to 2009 was primarily due to larger enterprises shedding staff, resulting in a substantial increase in enterprises with zero employees. In contrast, subsequent to 2009 the increase in the numbers of enterprises with zero staff has been less marked, particularly when compared with the growth in employment.

#### 2. Comparison of zero employee enterprises over the same time period

<u>Year</u>	<u>2001</u>	<u>2009</u>	<u>2018</u>
Total Enterprises	3,746,340	4,834,045	5,667,510
Total with zero staff <sup>3</sup>	2,596,214	3,613,975	4,278,225
Total with one or more employees	1,150,216	1,220,070	1,389,295
Total Employees ('000)	19,726	18,876	22,384
Ratio - Employees to Enterprises with employees	17.2	15.5	16.1

In summary the respective increases over the periods were:

	<u>2001 to 2009</u>	<u>2009 to 2018</u>
Total with Zero Staff	1,017,761	664,250
Total with one or more employees	69,854	169,225
Total Employees ('000)	-850	3,508
Net Increase in Employment (incl. self-employed)	167,761	4,172,250

The remainder of this paper explores the differences in the ratio of turnover to employment from 2009 to 2018 by employee size group and by main activity. Unfortunately we are unable to provide a comprehensive analysis because of changes in the definitions of the sectors introduced in the publication of the 2018 data.

<sup>1</sup> Data from 2001 is from CMR archive and is no longer available on the ONS website; 2009 is from ***SMEStats2009\_corrected\_version.xls*** and 2018 from ***OFFICIAL\_SENSITIVE\_-\_BPE\_2018\_-\_detailed\_tables.xls***

<sup>2</sup> The turnover figures are not indexed over the period

<sup>3</sup> Zero Staff includes self-employed persons and businesses with employed directors but with no staff.

### Comparison by employee size group

In general the following analyses show an increase in the ratio of turnover per employee as the number of employees per enterprise itself increases. There are, however, some notable exceptions to this rule and we are concerned that, in some instances, the data may be distorted by 'outliers' within the sample. In particular there may be some individual enterprises with an unusually high turnover which are not representative of their activity / size of enterprise.

The methodological descriptions of the samples lack sufficient explanation of the sample selection procedures employed in generating the data, particularly in respect of the data supplied to the ONS / BIS from HMRC. It is therefore difficult to comment further.

### 3. Comparison 2009 with 2018 by employee size group – all industries

	<u>2009</u>				<u>2018</u>			
	Enterprises	Employment ( / 1,000)	Turnover <sup>1</sup> ( / £ million)	Ratio Turn/ Emp	Businesses	Employment <i>thousands</i>	Turnover <sup>1,3</sup> <i>£ millions</i>	Ratio Turn/ Emp
<b>All Industries</b>								
All enterprises	4,834,045	22,819	3,240,329	142	5,667,510	27,027	3,861,613	143
All employers	1,220,070	18,876	3,000,770	159	1,389,285	22,384	3,586,696	160
With no emps <sup>2</sup>	3,613,975	3,942	239,559	61	4,278,225	4,643	274,917	59
1	189,120	430	31,953	74	146,160	326	25,955	80
2-4	606,485	1,833	202,219	110	734,145	2,082	294,225	141
5-9	224,000	1,550	210,782	136	256,985	1,751	213,143	122
10-19	113,620	1,578	247,108	157	137,420	1,886	250,539	133
20-49	54,050	1,673	225,164	135	72,230	2,197	339,724	155
50-99	17,770	1,236	189,340	153	22,995	1,586	244,932	154
100-199	7,665	1,068	177,437	166	9,825	1,362	263,854	194
200-249	1,470	329	65,020	198	2,015	451	86,217	191
250-499	3,005	1,040	269,796	259	3,800	1,310	239,673	183
500 or more	2,885	8,139	1,381,952	170	3,710	9,433	1,628,433	173

The above table clearly evidences the increase in the ratio as described previously and we have highlighted in red two cases where there may be anomalous data. The corresponding data for Agriculture and associated activities shows an increase in productivity over the period:

#### **Agriculture, Hunting and Forestry; Fishing**

All enterprises	195,480	496	36,600	74	157,580	478	42,206	88
All employers	64,850	321	29,247	91	52,630	326	33,708	103
With no employees <sup>2</sup>	130,630	175	7,353	42	104,950	152	8,498	56
1	23,905	60	4,325	72	18,490	48	4,033	84
2-4	29,095	110	8,769	80	23,350	87	8,874	102
5-9	8,230	60	5,189	86	6,990	50	6,043	121
10-19	2,870	40	3,566	89	2,340	33	3,735	113
20-49	490	15	1,555	104	970	30	3,220	107
50-99	160	11	1,065	97	285	20	1,998	100
100-199	60	8	1,543	193	110	15	1,426	95
200-249	15	*	552	*	20	4	368	92
250-499	20	8	*	*	50	16	1,569	98
500 or more	5	*	*	*	25	22	2,441	111

Interpretation of the changes for this next category is made difficult by a change of definition from 2009 to 2018 – but it appears that there has been a massive loss of productivity over the period from within the normally productive mining industry.

**Mining and Quarrying Electricity, Gas and Water Supply (2009) - Sewerage, Waste Management and Remediation Activities added 2018**

	2,009				2,018			
	Enterprises	Employment	Turnover <sup>1</sup>	Ratio	Businesses	Employment	Turnover <sup>1,3</sup>	Ratio
	( / 1,000)	( / 1,000)	( / £ million)	Turn/ Emp	thousands	£ millions	Turn/ Emp	
All enterprises	15,165	235	178,493	760	34,275	388	178,855	461
All employers	1,210	218	174,740	802	8,290	359	175,245	488
With no employ	13,955	17	3,753	221	25,985	30	3,610	120
1	50	0	12		225	1	43	
2-4	440	1	732	732	3,675	10	4,651	465
5-9	260	2	890	445	1,895	13	6,497	500
10-19	165	2	1,660	830	1,215	16	3,080	193
20-49	115	4	3,237	809	750	23	7,043	306
50-99	55	4	2,785	696	245	17	5,054	297
100-199	40	6	6,670	1,112	115	16	4,757	297
200-249	15	4	9,220	2,305	25	6	4,386	731
250-499	20	8	6,358	795	60	20	8,985	449
500 or more	50	188	143,175	762	85	237	130,750	552

The composition of **Manufacturing** and **Construction** sectors remain unchanged from 2009 to 2018:

**Manufacturing**

All enterprises	303,245	2,903	564,125	194	290,100	2,660	552,725	208
All employers	102,120	2,675	553,293	207	88,770	2,436	542,801	223
With no employ	201,125	228	10,833	48	201,330	224	9,924	44
1	9,400	21	1,315	63	5,775	13	789	61
2-4	39,700	120	11,288	94	35,540	102	11,189	110
5-9	21,390	147	15,113	103	18,325	124	12,079	97
10-19	14,355	199	19,863	100	12,650	175	19,067	109
20-49	9,650	301	37,466	124	9,100	284	34,490	121
50-99	4,015	281	38,685	138	3,835	265	38,656	146
100-199	1,885	261	40,051	153	1,860	259	43,949	170
200-249	370	82	13,205	161	425	95	17,608	185
250-499	760	261	51,970	199	710	242	50,211	207
500 or more	595	1,002	324,335	324	550	877	314,764	359

**Construction**

All enterprises	1,017,210	2,184	248,271	114	991,620	2,128	318,170	150
All employers	151,465	1,285	194,818	152	170,175	1,283	253,309	197
With no employ	865,745	898	53,453	60	821,445	845	64,861	77
1	28,665	63	4,599	73	21,040	45	3,691	82
2-4	78,550	228	24,015	105	104,115	278	45,599	164
5-9	25,280	168	18,237	109	26,165	172	29,345	171
10-19	11,505	155	19,164	124	11,580	156	26,334	169
20-49	5,140	156	22,455	144	4,920	149	27,759	186
50-99	1,445	100	16,035	160	1,450	98	20,638	211
100-199	495	69	12,886	187	500	69	16,017	232
200-249	90	20	3,635	182	100	22	4,831	220
250-499	160	56	12,250	219	160	54	13,443	249
500 or more	135	271	61,541	227	145	240	65,653	274

Both of these sectors show a small decline from 2009 to 2018 in the numbers of operating enterprises, but nevertheless they each indicate an increase in productivity as measured by the ratio of turnover to employment, with **Construction** demonstrating faster growth than **Manufacturing** over the period.

A similar pattern is observed within the **Wholesale** and **Retail trades**, although the gain in productivity over the period is yet more modest<sup>4</sup>:

	2009				2018			
	Enterprises	Employment	Turnover <sup>1</sup>	Ratio	Businesses	Employment	Turnover <sup>1,3</sup>	Ratio
	( / 1,000)	( / 1,000)	( / £ million)	Turn/ Emp	thousands	£ millions	Turn/ Emp	
<b>Wholesale and Retail Trade, Repairs</b>								
All enterprises	562,815	4,853	1,195,570	246	555,810	5,075	1,295,613	255
All employers	243,115	4,478	1,154,385	258	241,860	4,715	1,262,696	268
With no employ	319,700	375	41,185	110	313,950	360	32,917	91
1	39,570	92	9,481	103	25,150	57	5,564	98
2-4	115,645	374	66,525	178	118,565	365	101,977	279
5-9	50,480	348	99,907	287	54,630	371	68,868	186
10-19	22,240	303	127,837	422	25,435	344	103,773	302
20-49	9,725	296	81,843	276	11,920	358	131,079	366
50-99	2,935	203	63,035	311	3,380	232	85,399	368
100-199	1,250	174	64,266	369	1,380	191	102,414	536
200-249	255	57	23,273	408	275	62	27,721	447
250-499	475	166	146,339	882	540	185	76,658	414
500 or more	540	2,464	471,878	192	585	2,551	559,243	219

By contrast there appears to have been no change in productivity within the **Accommodation** and **Food Service** industries. Moreover there is no significant change observable due to the increased size of the organisation.

#### Hotels and Restaurants (now Accomodation and Food Services)

All enterprises	156,470	1,702	74,463	44	185,955	2,355	102,828	44
All employers	115,410	1,650	71,531	43	133,250	2,283	99,511	44
With no employ	41,060	52	2,932	56	52,705	72	3,317	46
1	22,825	53	2,870	54	10,430	24	1,116	47
2-4	49,295	176	8,780	50	55,875	189	8,649	46
5-9	23,895	173	7,231	42	32,615	229	8,435	37
10-19	12,180	170	6,553	39	20,010	277	9,345	34
20-49	4,730	144	5,475	38	10,525	305	11,340	37
50-99	1,410	98	4,183	43	2,230	151	6,670	44
100-199	590	81	3,860	48	800	108	5,269	49
200-249	85	19	906	48	150	34	1,759	52
250-499	210	72	2,812	39	310	109	5,353	49
500 or more	190	665	28,861	43	305	858	41,576	48

There have been a number of changes in the structure of the 2018 SME report as it relates to the industrial classification of businesses. It is beyond the scope of this paper to comment upon these changes, which we understand have been introduced primarily through the need to more effectively track the influence of technology within the economy, but the result is that we are unable to investigate changes in the ratio of turnover to employment for the following principal sectors:

<sup>4</sup> The Wholesale and Retail sector highlights the weakness of using the ratio of turnover to employment as a surrogate for productivity across sectors. The turnover will always be relatively high for this sector when compared with the value added figure used for the genuine productivity.

- Transport; Storage; Communications; Business Services; Financial Services and Real Estate.

Meanwhile, the components of the more personal service sectors of the economy have remained unchanged from 2009 to 2018. During that period these sectors have seen significant growth in numbers of enterprises, particularly enterprises with no employees:

	2009				2018			
	Enterprises	Employment ( / 1,000)	Turnover <sup>1</sup> ( / £ million)	Ratio Turn/ Emp	Businesses	Employment <i>thousands</i>	Turnover <sup>1,3</sup> <i>£ millions</i>	Ratio Turn/ Emp
<b>Education</b>								
All enterprises	180,825	380	15,307	40	283,470	553	23,447	42
All employers	14,450	205	10,663	52	19,755	277	16,218	59
With no employ	166,375	174	4,644	27	263,715	275	7,229	26
1	1,110	2	136	68	895	2	102	51
2-4	6,970	20	1,361	68	9,635	26	1,892	73
5-9	3,295	23	1,466	64	4,345	31	1,922	62
10-19	1,625	22	1,190	54	2,820	39	2,122	54
20-49	905	27	1,490	55	1,295	39	2,262	58
50-99	285	20	1,052	53	415	29	1,634	56
100-199	135	19	905	48	190	26	1,376	53
200-249	25	*	194	*	40	10	490	49
250-499	55	18	*	*	75	26	1,232	47
500 or more	45	*	*	*	45	49	3,184	65
<b>Health and Social Work</b>								
All enterprises	279,560	1,401	61,290	44	360,140	1,782	79,202	44
All employers	55,145	1,152	52,768	46	60,820	1,468	69,192	47
With no employ	224,415	249	8,522	34	299,320	315	10,010	32
1	5,930	12	762	64	4,520	9	502	56
2-4	14,965	52	3,177	61	19,640	58	3,367	58
5-9	12,305	95	5,548	58	12,245	92	4,812	52
10-19	11,080	171	9,769	57	11,955	179	9,194	51
20-49	8,060	255	13,472	53	8,395	269	14,145	53
50-99	1,825	124	5,661	46	2,555	175	8,435	48
100-199	595	82	3,121	38	870	118	5,235	44
200-249	80	18	660	37	155	34	1,373	40
250-499	180	60	1,768	29	270	92	3,372	37
500 or more	125	283	8,830	31	215	441	18,759	43

Evidently there has been no substantive change in the levels of turnover to employment for either of these service sectors during this period. It is, however, notable that the estimated turnover figure for the zero employee categories of both **Education** and **Health** is significantly below turnover levels for the zero employee groups in other sectors of the economy. We assume that these figures are derived from HMRC's self-assessment returns although there is little information provided by the BIS or the ONS on the sample processes applied for the estimation of this data.

Our final sectorial comparison for 2009 /2018 is for the category of **Other Community, social and personal services** – as described in 2009. This is another growth area of the economy and, accordingly, for 2018 this group has been divided into two divisions - **Arts, Entertainment and Recreation** and **Other Service Activities**. We have therefore combined these for the purpose of this comparison.

As can be observed below the increased activity in these sectors of the economy has been associated with a decline in the ratio of turnover to employment with the notable exception of enterprises with 500 or more employees. For those larger enterprises the decline in numbers has not been associated with a similar decline in the turnover derived from that group.

	2,009				2,018			
	Enterprises	Employment	Turnover <sup>1</sup>	Ratio	Businesses	Employment	Turnover <sup>1,3</sup>	Ratio
	( / 1,000)	( / 1,000)	( / £ million)	Turn/ Emp	thousands	£ millions	Turn/ Emp	
<b>Other Community, Social and Personal Service Activities</b>								
All enterprises	528,540	1,386	148,815	107	609,740	1,458	140,943	97
All employers	92,040	923	130,264	141	94,810	910	121,863	134
With no employ	436,500	464	18,551	40	514,930	548	19,081	35
1	18,340	40	1,956	49	14,835	31	1,585	51
2-4	47,160	148	10,675	72	50,420	156	9,388	60
5-9	16,145	111	8,360	75	17,550	119	7,009	59
10-19	6,620	90	6,995	78	7,475	100	6,058	61
20-49	2,340	71	6,065	85	3,025	89	5,620	63
50-99	760	52	6,398	123	785	54	3,674	68
100-199	310	42	3,780	90	360	50	5,167	103
200-249	65	15	1,031	69	80	18	1,377	77
250-499	155	53	5,835	110	155	54	4,463	83
500 or more	145	301	79,168	263	125	240	77,521	323
<b>All sectors as analysed above</b>								
All enterprises	3239310	15540	2522934	162	3,468,690	16,877	2,733,989	162
All employers	839805	12907	2371709	184	870,360	14,057	2,574,543	183
With no employ	2399505	2632	151226	57	2,598,330	2,821	159,447	57
1	149795	343	25456	74	101,360	230	17,425	76
2-4	381820	1229	135322	110	420,815	1,271	195,586	154
5-9	161280	1127	161941	144	174,760	1,201	145,010	121
10-19	82640	1152	196597	171	95,480	1,319	182,708	139
20-49	41155	1269	173058	136	50,900	1,546	236,958	153
50-99	12890	893	138899	156	15,180	1,041	172,158	165
100-199	5360	742	137082	185	6,185	852	185,610	218
200-249	1000	260	52676	203	1,270	285	59,913	2
250-499	2035	702	145401.97	207	2,330	798	165,286	207
500 or more	1830	4852.1394	1067990.6	220	2,080	5,515	1,213,891	220

Summarising the analysis for all the above sectors we see that there has been no change in the ratio over the period from 2009 to 2018. Gains achieved in Agriculture, Manufacturing, Construction and Retail, Wholesale and Repairs have been cancelled by declines in Health, Social and Community services. In the meantime, the additional numbers of enterprises within Education, Accommodation and Food Services from 2009 to 2018 have resulted in much the same ratio of turnover to employment over the period.

The largest difference is the decline associated with the mining and quarrying sector which we would attribute to be largely due to a decline in the production of North Sea Oil.

Finally we compare the total of those sectors not covered by the above analyses:

	2009				2018			
	Enterprises	Employment ( / 1,000)	Turnover <sup>1</sup> ( / £ million)	Ratio Turn/ Emp	Businesses	Employment thousands	Turnover <sup>1,3</sup> £ millions	Ratio Turn/ Emp
<b>Remaining Sectors</b>								
All enterprises	1,594,735	7,279	717,395	99	2,198,820	10,150	1,127,624	111
All employers	380,265	5,969	629,061	105	518,925	8,327	1,012,153	122
With no emps	1,214,470	1,310	88,333	67	1,679,895	1,822	115,470	63
1	39,325	87	6,497	75	44,800	96	8,530	89
2-4	224,665	604	66,897	111	313,330	811	98,639	122
5-9	62,720	423	48,841	115	82,225	550	68,133	124
10-19	30,980	426	50,511	119	41,940	567	67,831	120
20-49	12,895	404	52,106	129	21,330	651	102,766	158
50-99	4,880	343	50,441	147	7,815	545	72,774	134
100-199	2,305	326	40,355	124	3,640	510	78,244	153
200-249	470	69	12,344	179	745	166	26,304	158
250-499	970	338	124,394	368	1,470	512	74,387	145
500 or more	1,055	3,287	313,961	96	1,630	3,918	414,542	106

Thus enterprises from the Transport; Storage; Communications; Business Services; Financial Services and Real Estate sectors show a relatively high average increase in the ratio turnover to employment.

Sector Comparisons – for zero employees and 1 or more employees:

	2009				2018			
	Enterprises	Employment ( / 1,000)	Turnover <sup>1</sup> ( / £ million)	Ratio Turn/ Emp	Businesses	Employment thousands	Turnover <sup>1,3</sup> £ millions	Ratio Turn/ Emp
<b><u>Zero Employees</u></b>								
Agriculture	130,630	175	7,353	42	104,950	152	8,498	56
Mining + Utilities (2018)	13,955	17	3,753	221	25,985	30	3,610	120
Manufacturing	201,125	228	10,833	48	201,330	224	9,924	44
Construction	865,745	898	53,453	60	821,445	845	64,861	77
Wholesale & Retail	319,700	375	41,185	110	313,950	360	32,917	91
Hotels and Restaurants	41,060	52	2,932	56	52,705	72	3,317	46
Education	166,375	174	4,644	27	263,715	275	7,229	26
Health & Social Work	224,415	249	8,522	34	299,320	315	10,010	32
Other Community etc.	436,500	464	18,551	40	514,930	548	19,081	35
Total above sectors	2,399,505	2,632	151,226	57	2,598,330	2,821	159,447	57
Remaining Activities	1,214,470	1,310	88,333	67	1,679,895	1,822	115,470	63
Total all Industries	3,613,975	3,942	239,559	61	4,278,225	4,643	274,917	59
<b><u>1+ Employees</u></b>								
Agriculture	64,850	321	29,247	91	52,630	326	33,708	103
Mining + Utilities (2018)	1,210	218	174,740	802	8,290	359	175,245	488
Manufacturing	102,120	2,675	553,293	207	88,770	2,436	542,801	223
Construction	151,465	1,285	194,818	152	170,175	1,283	253,309	197
Wholesale & Retail	243,115	4,478	1,154,385	258	241,860	4,715	1,262,696	268
Hotels and Restaurants	115,410	1,650	71,531	43	133,250	2,283	99,511	44
Education	14,450	205	10,663	52	19,755	277	16,218	59
Health & Social Work	55,145	1,152	52,768	46	60,820	1,468	69,192	47
Other Community etc.	92,040	923	130,264	141	94,810	910	121,863	134
Total above sectors	839,805	12,907	2,371,709	184	870,360	14,057	2,574,543	183
Remaining Activities	380,265	5,969	629,061	105	518,925	8,327	1,012,153	122
Total all Industries	1,220,070	18,876	3,000,770	159	1,389,285	22,384	3,586,696	160

The encouraging conclusion from the above table is that over the past 9 years productivity has improved within the ‘remaining’ sectors of the economy. It is these growth areas that are being examined more closely by the ONS in future – hence the changes from 2009 to 2018 which has placed a more complete analysis of the changes beyond the scope of this paper.

Nevertheless the lack of growth in productivity in many sectors of the economy is further evidenced by this analysis and the reasons remain obscure. But there are many possible contributory factors. Could it be due to increased compliance such as the introduction of compulsory pension schemes, financial regulations, health and safety issues and GDPR? Or is it simply a reflection of the growth of social media taking personal attention away from work, particularly when associated with the increasing penetration of smart phones? Or maybe it’s both!

## Addendum

Further examination of the data from 2012 has evidenced that the ratio of turnover per employee declined markedly for all sizes of business from 2009 to 2012 but climbed since then, as follows:

	2012			2012 Ratio Turn/ Emp	2009 Ratio Turn/ Emp	2018 Ratio Turn/ Emp
	Enterprises	Employment ( / 1,000)	Turnover <sup>1</sup> ( / £ million)			
<b>All Industries</b>						
All enterprises	4,794,105	23,893	3,131,549	131	142	143
All employers	1,236,850	19,991	2,923,744	146	159	160
With no emps <sup>2</sup>	3,557,255	3,902	207,805	53	61	59
1 - 9	1,022,695	3,948	416,162	105	117	128
10 to 49	177,950	3,471	454,327	131	145	145
50-249	29,750	2,909	450,384	155	164	175
250+	6,455	9,763	1,602,870	164	180	174

**- By Tony Dent, CMR Group**