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Entry, Exit, and Labor Productivity in U. K. Retailing
Evidence from Micro Data

Jonathan Haskel and Raffaella Sadun

Introduction

The retail sector has gradually become one of the most prominent industries of the U.K. economy, absorbing approximatively 20 percent of total employment in 2004 and experiencing average annual employment growth rates of about 1 percent per annum over the last decade (EUKLEMS 2008). The expansion of the sector does not seem to be matched by an equally impressive productivity performance. As documented by Basu et al. (2003), while retail trade, hotels, and catering account for about three-quarters of the U. S. Total Factor Productivity (TFP) *acceleration* between 1995 and 2003 (Domar-weighted industry TFP growth), the same sector seems to account for about a third of the U. K. TFP *deceleration*. These stylized facts have made the retail industry an area of both policy and academic interest.

The purpose of this chapter is to inform the recent debate surrounding the productivity of the U. K. retail sector with new evidence arising from

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previously unexplored micro data sources. The chapter investigates the U.K. retail sector using store- and firm-level data between 1998 and 2003. First, we present the first—to the best of our knowledge—exhaustive description of the U. K. retail sector using micro data sources.[1] Second, in the spirit of Foster, Haltiwanger, and Krizan (2006), we look at the contributions of firm entry and exit for the productivity growth of the sector. Third, we provide some new evidence of the recent shift of large U. K. retailers toward smaller retail formats (also documented by Griffith and Harmgart [2005]), which followed the introduction of new and more restrictive planning constraints for the opening of large retail stores. Based on a companion work (Haskel and Sadun 2007), we suggest that this change in the store configurations of the major U. K. retailers might be one of the factors behind the recent TFP slowdown experienced by the industry in the United Kingdom.[2]

The plan of the chapter is as follows. In section 7.2 we document the data sources, then describe, in section 7.3, entry and exit. Section 7.4 looks at productivity levels and growth and regulations that might have affected it, and section 7.5 concludes.

7.2 Data

7.2.1 Time Period and Industries

The data in this chapter comes from the Annual Respondents Database (ARD). This is a comprehensive business database that is based on the Annual Business Inquiry (ABI) performed by the Office for National Statistics (ONS). Regarding time period, the data available to us is annual from 1997. As we shall see, however, the 1997 data is not accurate, therefore in practice our analysis starts in 1998. At the time of writing the 2003 data was the final period available.[3] As for industries, the ARD database covers almost all firms with Standard Industrial Classification (SIC) codes from 2010 to 93050. The retailing sector is covered by SIC92 codes from 52111 to 52740 (i.e., all codes beginning with 52). Retailing is then split into seven broad categories, as listed in table 7.1.

1. With the exception of Haskel and Khawaja (2003), an early version of this chapter. The main difference between this chapter and the previous version is that this one uses an extra year of data, and computes numbers using a different employment measure. The latter turns out to make a substantial difference since the earlier employment measure was available only for a subset of firms, causing many firms to be dropped. This affects the productivity decompositions.

2. See Haskel and Sadun (2007), and Haskel et al. (2007).

3. We particularly thank Felix Ritchie for helping in the timely provision of the 2002 and 2003 data.

Table 7.1 **Industries covered in UK ARD retailing data**

SIC code	Industry	Notes
521	Retail sales in nonspecialized covering food, beverages, or tobacco (for example)	Includes supermarkets and department stores
522	Food, beverages, tobacco in specialized stores	
523	Pharmaceutical and medical goods, cosmetic, and toilet articles	Includes chemists
524	Other retail sales of new goods in specialized stores	Includes sales of textiles, clothing, shoes, furniture, electrical appliances, hardware, books, newspapers and stationary, cameras, office supplies, computers. Clothing is the biggest area
525	Secondhand	Mostly secondhand books, secondhand goods, and antiques
526	Not in stores	Mostly mail order and stalls and markets
527	Repair	Repair of personal goods, boots and shoes, watches and clocks

7.2.2 Units of Analysis

A crucial issue in what follows will be whether the analysis is by store, chain of stores, or chain of chain of stores. This section sets out in some detail what data are available to us.[4] To summarize:

1. Employment, entry, and exit data are available at the store level. The store is defined as a Local Unit (LU).
2. Productivity data are available at the firm level. The firm is defined as a Reporting Unit (RU).

Business Structure: Enterprises, Enterprise groups, and Local Units

The fundamental business data set in the United Kingdom is the Interdepartmental Business Register (IDBR). This business register is compiled using a combination of tax records on Value Added Tax (VAT) and Pay-As-You-Earn (PAYE), information lodged at Companies House, Dun and Bradstreet data, and data from other surveys. The IDBR has been operating since 1994 (before that the IDBR register information was rather uncoordinated across different government departments). The IDBR tries to

4. It follows closely Criscuolo, Haskel, and Martin (2003).

capture the structure of ownership and control of firms and plants or business sites that make up the U. K. economy using three aggregation categories: local units, enterprises, and enterprise groups.

Their meaning is best illustrated by means of an example set out in figure 7.1. Consider the left hand panel. Suppose that *Brown* is a single business, operating in a single location, producing goods for a single industry. Now consider the right side of the panel. *Smith and Jones Holdings* are a holding company, registered in London. In turn, they own two businesses, *Smith* and *Jones*, who are involved in separate industrial activities. Smith has four shops (or more generally plants/business sites, that is, a particular geographic location where trade occurs): *Smith North, Smith South, Smith East,* and *Smith West. Jones* has a shop, *Jones North* and a Research and Development lab, *Jones R&D*. *Brown*, being responsible for a single business activity, is an enterprise. *Smith and Jones Holdings*, owing businesses with distinct business activities, is called an enterprise group.[5] *Smith* and *Jones* are two enterprises. All business sites, a business entity at a single mailing address, are called local units. Consequently, if *Jones R&D* is located at a different site than *Jones North* the enterprise *Jones* would consist of two local units. If *Jones R&D* was located at the same site as *Jones* North the two would form one local unit for the IDBR.[6] (The diagram also refers to reporting units; this will be explained later.)

Maintaining Information on Business Structure: Enterprise Groups, Enterprises and Local Units

The Annual Register Inquiry (ARI) is designed to maintain the business structure information on the IDBR (Jones 2000). It began operation in July 1999 and is sent to large enterprises (over 100 employees) every year, to enterprises with twenty to ninety-nine employees every four years, and to smaller enterprises on an ad hoc basis. The ARI currently covers around 68,000 enterprises, consisting of about 400,000 local units. It asks each enterprise for employment, industry activity, and the structure of the enterprise. This is straightforward for the *Brown* enterprise in our example. A multisite enterprise such as *Smith* receives a form and is asked to report on its overall activity and employment. It will also be sent four extra forms to report the same for each local unit. If *Smith* has closed a local unit it must report this on the form. If a local unit has opened it has to fill out extra forms, which are obtained from ONS by an automated procedure. Returns from the ARI update the IDBR in the summer of each year.

5. A holding company responsible for a number of enterprise groups is called an apex enterprise.

6. The two could nevertheless be separate local units depending on the survey. If, for example, an R&D survey which collects data just for the R&D part of the business was undertaken, this would identify them as distinct. Thus, some care has to be taken in matching business using different surveys.

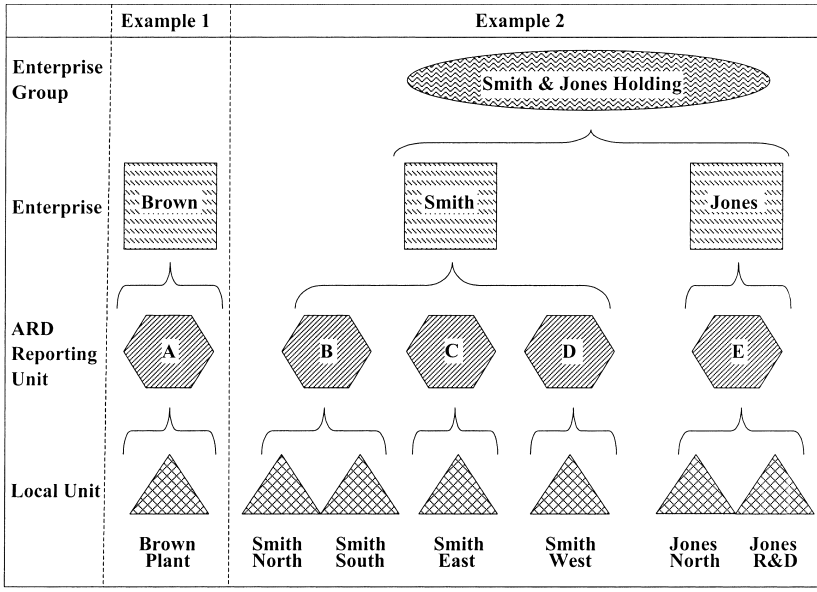

Fig. 7.1 Plants and firms in the IDBR

Maintaining Information on Employment, Turnover and Other Data

As well as the structure of business information, the IDBR holds other data, such as address and SIC code. However, since the IDBR is based mostly on tax data (plus old records from previous inquiries), it also sometimes contains other data. Output information on the IDBR comes from VAT records if the original source of business information was VAT data. Employment information comes from PAYE data if that is the source of the original inclusion. Thus, as long as the single-local unit enterprise *Brown* is large enough to pay VAT (the threshold was £52,000 in 2000/01), it would have turnover information at the enterprise and local unit level. On the other hand, if *Brown* does not operate a PAYE scheme, it will have no employment information. However, employment data is required to construct sampling frames and hence is interpolated from turnover data. For the multi-local unit enterprise *Smith*, no turnover information will be available for *Smith's* local units, since most multi-local unit enterprises do not pay VAT at the local unit level. If the PAYE scheme is operated at the local unit level, it would have independent employment data.

7.2.3 The ABI and the ARD

While the IDBR holds much useful information, more data is required on outputs and other inputs in order to calculate GDP. Thus, the ONS con-

ducts a business survey based on the IDBR called the Annual Business Inquiry (ABI). The ABI covers production, construction, and some service sectors, but not public services, defense, and agriculture.[7] The ARD consists of the panel micro-level information obtained from successive cross-sections of the ABI.

The questions asked on the ABI for retailing vary somewhat. They are required to provide details on turnover (total and broken down in retail and nonretail components, and by commodity sold), expenditures (employment costs, total materials, and taxes), items defined as work in progress, and capital expenditures (separately for acquisitions and disposals). They also have to answer sections related to import or export of services and on the use of e-commerce and employment, with further data on part-timers. However, the survey form can be sent in a long or in a short format. The main difference between the two types of formats is that in long format firms are required to provide a finer detail of the broad sections defined previously. For instance, in the long format firms break down their disposals and acquisitions information about twenty different items, whereas in the short format they only report the aggregate values. Also, in the long format, firms answer on questions such as the total number of sites and the amount of squared meters they consist of.

Reporting Units, Selected and Nonselected Data

The ABI is covered by the Statistics of Trade Act (1947); therefore, the firms are obliged by law to provide data if they get a form.[8] To reduce compliance costs, however, the ABI is not a census of all local units. This is in two regards: aggregation and partial sampling. Regarding aggregation, en-

7. The ABI replaces Annual Employment Survey, Annual Census of Production and Construction (ACOP/ACOC), and the six following Annual Inquiries: wholesale, retail, motor trades, catering, property, service trades. In Catering and Allied Trades, between 1960 and 1979 there was a benchmark inquiry into catering roughly every four years or so, but from 1979 the inquiry became annual. There has been a property inquiry since the mid-1950s, but until 1994 data was only collected on capital expenditure. From 1995, the range of data was extended to bring the inquiry in line with the other DS inquiries. The first major inquiry into Wholesaling and Dealing was carried out in respect of 1950, as part of the Census of Distribution. Subsequently, periodic large-scale detailed inquiries were conducted in respect of 1959, 1965, 1974, and 1990, but simpler annual inquiries were conducted for most intervening years and for all years since 1991. The first major inquiry into motor trades was carried out in 1950 as part of the Census of Distribution. Subsequently, periodic large-scale inquiries were conducted in respect of 1962, 1967, and 1972, although simple annual inquiries were carried out in most intervening years. By 1977 the annual inquiry was collecting detailed information on turnover and purchases.

Regarding retailing, from 1950 periodic Censuses of Distribution were conducted, the last of which was in 1971. Full-scale inquiries covering every retail business and every retail outlet were taken for 1950, 1961, and 1971, with large-scale inquiries for 1957 and 1966. The first annual retailing inquiry was conducted in respect of 1976 with a sample of 30,000 units. Throughout the late 1970s and 1980s the inquiry varied from year to year in terms of both sample size and the amount of information collected. From 1991 to 1997 the sample remained reasonably constant at around 12,000.

8. Companies who have to fill out a form can refer to http://www.statistics.gov.uk/about/business_surveys/abi/default.asp for help and information.

terprises normally report on all their local units jointly. There are two major exceptions. First, if the enterprise has local units in both Britain and Northern Ireland, there is a legal requirement for the ONS to keep data for these two areas separate, and therefore enterprises are required to report data separately in this case. Second, there is separate reporting on LUs if a business explicitly requests such a split. So, for example, Smith may decide to report on North and South combined and East and West separately.

Returned data is at what is called the reporting unit (RU) level. Some examples of the possible RU structures are shown for our example at the bottom of figure 7.1. *Brown* forms one RU (A) only, whereas *Smith* has two RUs (comprising of *Smith North* and *Smith South*, and *Smith East* and *Smith West*). *Jones* has one RU, comprising *Jones North* and *Jones R&D*.[9] Thus, these RUs are the fundamental unit for reported data on the ARD. It is worth noting at this point that the RU and LU distinction is crucial for our analysis. For example, entry and exit at the LU level might look very different to that at the RU level. Regional issues are also important here; looking at RU data when an RU reports on a number of LUs where the LUs are based in different regions may give a very different picture to looking at LUs.

Regarding sampling, to reduce costs, only reporting units above a certain employment threshold (currently 250[10]) are all sent an ABI form every year. Smaller reporting units are sampled by size-region-industry bands.[11] In the ARD, all data returned from reporting units is held on what is called the selected file. Other data is held on the nonselected file. Since the nonselected RUs are not sent a form, the nonselected data is of course the IDBR data.

7.2.4 Firms (RU) and Stores (LU) in UK Retailing

We now document some basic facts regarding the number of retail firms (RU) and stores (LU) operating in the United Kingdom. Table 7.2 sets out some of the relevant data for 2003, the most recent period available. First, in column 1, top panel, there were 196,286 RUs in all retailing in 2003 and 285,291 LUs. Recall that RUs can report on one or more LUs, so the higher number of LUs is to be expected. Many of these RUs and LUs, by number, are in "Other Retail," "Food, Beverages, Tobacco," and "Nonspecialized Stores." The remainder of the top panel shows data on the numbers of LUs that RUs report on. Column 3 shows that 10,745 RUs report on more than

9. On other surveys the RU structure might be slightly different, for example, on the R&D survey Jones might report on Jones R&D only that would be its RU for that survey. This matters when matching surveys.

10. The threshold was lower in the past. See Barnes and Martin (2002) for more details.

11. The employment size bands are 1–9, 10–19, 20–49, 50–99, and 100–249; the regions are England and Wales combined, Scotland, and Northern Ireland (NI). Within England and Wales industries are stratified at 4-digit level, NI is at two-digit level, and Scotland is at a hybrid 2/3/4-digit level (oversampling in Scotland and NI is by arrangement with local executives). See Partington (2001).

one LU. Thus, as column 4 shows, 185,541 RUs, the bulk of the LUs, just report on one LU (i.e., these are stand-alone firms). The remaining columns sum up to 10,745 in column 3. So, for example, the final column shows that only 171 RUs report on more than 100 LUs. In sum, approximately two-thirds of retailing outlets were accounted for by stand-alone businesses (185,541/285,291). Looking at the individual sectors, the distribution of units is the same in all seven.

These data are just numbers of RUs and LUs. The lower panel shows the average employment that these units account for. Here the picture, not surprisingly, is rather different. Columns 1 and 2 of the lower panel show mean employment in RU and LU (headcount, not FTE) is 14.14 and 9.73 in all retailing, respectively. Mean employment for Reporting Units with a single Local Unit is 3.66. But looking at the last column, the RU who reports on more than 100 LUs has average employment per RU of over 9,000. This figure suggests a very high concentration of employment across few retail firms, especially in Nonspecialized Retail.

Table 7.2 suggests there are many LUs and RUs by number and considerable concentration of employment. Table 7.3 gives some more details on this. Consider the top left panel, which shows data for all industries. The first number, 185,541, is the same as in table 7.2, column 4, top cell, namely, the number of RUs who are stand-alone. As the second column shows, this group accounts for 94.4 percent of the total number of RUs. Reading further across the table, however, total employment in these LUs is 678,496, which accounts for 24.4 percent of all employment. By contrast, looking at the bottom row of the top left panel, those reporting on more than 100 local units (171 RUs, just 0.1 percent of total numbers of RUs), account for 56.7 percent of employment in all retailing. For "Nonspecialized Stores" (mostly supermarkets), 77.2 percent of employment is accounted for by just 37 RUs, who are below 1 percent of the total number of RUs. Likewise in "Pharmaceuticals" and "Other," the largest group accounts for a very small number of RUs by number, but 47.5 and 47.9 percent of total employment. By contrast, secondhand stores are concentrated by both number and size in small groups, and so is, to a lesser extent, "Food, Beverages, and Tobacco."[12] The concentration of employment is also shown in table 7.4, which reports the percentage of the sector's employment in the top 5 and 10 RUs and LUs. Looking at the RU data, in nonspecialized stores just ten stores account for over half of total employment.[13]

12. One issue for us is whether significant RUs change industry over time (e.g., for many retailers are wholesalers as well and could be classified in different industries over time). To check this, we looked at the six largest supermarkets in the data set and found that they were consistently classified to one industry (SIC52119). Evidently, we do not have this problem in the data set for these companies.

13. The previous data has shown the relation between RUs and LUs. Above RUs are of course enterprise groups; in unreported tables we computed that most enterprise groups consist of one RU (i.e., the mean number of RUs that each enterprise group consists of is 1.01 in all sectors).

Table 7.2 **Reporting Unit and Local Unit numbers (Year 2003)**

Sectors	Total # of RU (1)	Total # of LU (2)	# of RU with more than 1 LU (3)	RU with 1 LU (4)	RU with 2 to 5 LU (5)	RU with 6 to 10 LU (6)	RU with 11 to 100 LU (7)	RU with more than 100 LU (8)
	Frequencies							
52. All sectors	196,286	285,291	10,745	185,541	9,425	610	539	171
521. Nonspecialized	35,418	54,678	915	34,503	749	61	68	37
522. Food, beverages, tobacco	35,145	45,219	1,653	33,492	1,478	98	<100	<20
523. Pharmaceutical	6,173	12,556	768	5,405	667	<60	<50	<10
524. Other retail	94,497	143,932	6,841	87,656	6,020	375	340	106
525. Secondhand	5,550	6,987	161	5,389	<150	<10	<10	<10
526. Not in stores	12,877	13,759	266	12,611	239	<20	<20	<20
527. Repair	6,626	8,160	141	6,485	<150	<10	<10	<10
	Mean employment							
	Mean RU employment	Mean LU employment		RU with 1 LU	RU with 2 to 5 LU	RU with 6 to 10 LU	RU with 11 to 100 LU	RU with more than 100 LU
52. All sectors	14.14	9.73		3.66	17.93	83.03	564.61	9,201.63
521. Nonspecialized	34.26	22.15		3.75	36.14	171.30	1,610.22	25,332.27
522. Food, beverages, tobacco	5.64	4.34		3.36	15.42	49.78	334.52	2,653.00
523. Pharmaceutical	15.56	7.58		5.08	16.25	60.02	<250	<5000
524. Other retail	12.06	7.64		3.87	14.64	69.19	<450	<5000
525. Secondhand	3.33	2.62		2.57	10.17	23.00	70.08	1,090.50
526. Not in stores	6.09	6.05		2.99	<80	<500	<1500	1,414.00
527. Repair	4.71	3.61		2.91	10.76	<50	<1500	<2000

Source: Authors' calculations from ARD.

Note: Some of the cells have been suppressed for disclosure reasons. Columns 4, 5, 6, 7, and 8 add up to column 1. Columns 5, 6, 7 and 8 add to column 3.

Table 7.3 Employment in largest firms, by sector, 2003

Sector	# of LU belonging to RU	Freq.	% of total # of RU	Total emp.	% of . total emp.	Mean emp.
52. All sectors	0–	185,541	94.5	678,496	24.4	3.7
	2–	9,425	4.8	169,037	6.1	17.9
	6–	610	0.3	50,649	1.8	83.0
	11–	539	0.3	304,326	11.0	564.6
	101–	171	0.1	1,573,478	56.7	9,201.6
521. Nonspecialized	0–	34,503	97.4	129,234	10.6	3.7
	2–	749	2.1	27,067	2.2	36.1
	6–	61	0.2	10,449	0.9	171.3
	11–	68	0.2	109,495	9.0	1,610.2
	101–	37	0.1	937,294	77.2	25,332.3
522. Food, beverages, tobacco	0–	33,492	95.3	112,507	56.7	3.4
	2–	1,478	4.2	22,791	11.5	15.4
	6–	98	0.3	4,878	2.5	49.8
	11–	63	0.2	21,075	10.6	334.5
	101–	14	0.0	37,142	18.7	2,653.0
523. Pharmaceutical	0–	5,405	87.6	27,468	28.6	5.1
	2–	667	10.8	10,836	11.3	16.2
	6–	<60		3,181		60.0
	11–	<50		8,917		228.6
	101–	<10		45,677	47.5	5,075.2
524. Other retail	0–	87,656	92.8	338,828	29.7	3.9
	2–	6,020	6.4	88,105	7.7	14.6
	6–	375	0.4	25,948	2.3	69.2
	11–	340	0.4	141,017	12.4	414.8
	101–	106	0.1	545,993	47.9	5,150.9
525. Secondhand	0–	5,389	97.1	13,873	75.0	2.6
	2–	<150	2.5	1,413		10.2
	6–	<10		184		23.0
	11–	<10		841		70.1
	101–	<10		2,181	11.8	1,090.5
526. Not in stores	0–	12,611	97.9	48.07	36.5	3.0
	2–	239	1.9	22.19	12.6	72.8
	6–	<20		7.60		425.4
	11–	<20		20.34		1,329.1
	101–	<10		1.80		1,414.0
527. Repair	0–	6,485	97.9	60.59	66.5	2.9
	2–	133		4.59		10.8
	6–	<10		0.17		53.0
	11–	<10		22.54		1,406.4
	101–	<10		12.11		1,888.5

Source: Authors' calculations from ARD.
Note: Some of the cells have been suppressed for disclosure reasons.

Table 7.4 **Firm concentration of employment by industry 5 and 10 firm concentration ratios, 2003**

Reporting Units industry	cr5	cr10	Number of RU
52. All sectors	22.03	29.67	196,286
521. Nonspecialized	49.60	65.20	35,418
522. Food, beverages, tobacco	13.05	17.04	35,145
523. Pharmaceutical	42.14	48.62	6,173
524. Other retail	15.08	23.04	94,497
525. Secondhand	14.97	18.09	5,550
526. Not in stores	25.63	33.76	12,877
527. Repair	35.04	36.96	6,626

Source: Authors' calculations from ARD.
Note: cr = concentration ratios.

Table 7.5 **Mean employment, by region, 2003, all industries**

Region	Employment per Reporting Unit	Employment per Local Unit (using RU regional identifier)	Employment per Local Unit (using LU regional identifier)	RU Frequency
South East (G)	22.38	12.95	10.31	65,518
East Anglia (F)	6.27	5.33	9.87	7,380
South West (J)	9.80	7.40	9.61	18,029
West Midlands (E)	6.50	5.07	9.01	17,368
East Midlands (C)	8.05	6.30	9.66	14,118
Yorkshire and Humberside (C)	10.60	8.13	9.44	17,516
North West (B)	17.25	11.75	9.69	21,276
North (A)	6.39	5.06	9.64	9,011
Wales (W)	5.98	4.91	9.20	9,426
Scotland (X)	11.61	8.69	9.16	16,644

Source: Authors' calculations from ARD.

Thus far we have looked at employment by industry. Table 7.5 shows mean employment by region. Consider first the average employment per RU in column 1. This is 22 in the Southeast, larger than elsewhere. There are two issues here. First, an RU might actually consist of multiple LUs and hence column 2 shows employment per LU; this number is a bit smaller. Second, RUs might report on a number of LUs, and if the RU is the head office (located in London, for example), this might be a misleading number for the average size of the actual store. Thus, column 3 shows average size by LU using the regional identifier by the LU rather than by the RU. This shows smaller numbers than in columns 1 and 2 and the numbers are now much closer together.

7.2.5 Section Summary

We find that:

1. In 2003 there were 285,291 stores in U.K. retailing and 196,286 firms/chains.
2. Average store employment is 9.73 employees (not FTEs).
3. 171 chains accounted for 56.7 percent of total employment.

7.3 Entry and Exit

This section looks at exit and entry defined as:

1. Entrant: Present in t and not present in t – 1.
2. Exitor: Present in t and not present in t + 1.
3. 1-year: Present in t and not present in either t – 1 or t + 1.
4. Stayer: None of the above three.

We look separately at RUs and LUs to provide as full as information as possible. Using these definitions, the basic data for the whole retailing sector covering the period 1998 to 2001 is set out in table 7.6. The total numbers of RUs and LUs are as shown in the total column, and the numbers in the left-hand four columns add up to this number. As it shows, the bulk of the RUs and LUs are stayers with entry and exit rates (i.e., entry and exit numbers as shares of the total number of LUs that year) of around 10 to 20 percent, depending a bit on RU or LU status. Note the apparently high entry rate in 1998 by LU and RU, which might have to do with register problems in 1997.

Table 7.7 shows data on entry and exit rates by industry (regional entry and exit rates were quite similar). By industry, entry and exit rates for LUs (lower panel of table 7.5) look quite similar, with 19.8 percent in "Not in Stores" and 7.55 percent in "Pharmaceutical" being the maximum and minimum exit rates, and 14.26 and 7.26 being likewise the maximum and minimum exit rates.[14]

7.3.1 Section Summary

We find that:

1. Entry/exit/one-year/stayers are fairly stable fractions of all stores, being about 11 percent,11 percent, 5 percent, and 63 percent.
2. Entry and exit rates are lowest in "Pharmaceuticals" and highest in "Not in Stores."

14. We looked at whether entry and exit differed statistically significantly by region and/or industry, using an analysis of variance approach. We found, however, (results available on request) that it did not differ significantly by region, but did do so by industry. Note that the Competition Commission (2000) states that planning policy is national, so the extent that entry and exit rates might be affected by planning might not expect them to differ by industry.

Table 7.6 **Entry and exit**

	Frequencies					Rates			
Year	Stayers	Entrants	Exitors	1 year	Total	Entry rate	Exit rate	Stay rate	1 year rate
				Reporting Units, All sectors					
1998	144,314	39,947	18,316	6,855	209,432	19.07	8.75	68.91	3.27
1999	163,399	21,531	20,862	4,774	210,566	10.23	9.91	77.60	2.27
2000	164,055	20,217	20,875	4,436	209,583	9.65	9.96	78.28	2.12
2001	162,989	17,337	21,283	3,593	205,202	8.45	10.37	79.43	1.75
2002	154,971	17,253	25,355	4,033	201,612	8.56	12.58	76.87	2.00
				Local Units					
1998	203,585	53,038	28,469	10,076	295,168	17.97	9.65	68.97	3.41
1999	223,803	31,687	32,820	7,510	295,820	10.71	11.09	75.66	2.54
2000	212,879	32,392	42,611	8,980	296,862	10.91	14.35	71.71	3.02
2001	208,524	34,177	36,747	14,017	293,465	11.65	12.52	71.06	4.78
2002	208,374	35,177	34,327	13,151	291,029	12.09	11.80	71.60	4.52

Source: Authors' calculations from ARD.

Table 7.7 **Entry and exit rates by industry**

Sectors	Frequencies					Rates			
	Stayers	Entrants	Exitors	1 year	Total	Entry rate	Exit rate	Stay rate	1 year rate
				Reporting Units (Year 2002)					
52. All sectors	154,971	17,253	25,355	4,033	201,612	8.56	12.58	76.87	2.00
521. Nonspecialized	27,162	3,582	5,010	732	36,486	9.82	13.73	74.44	2.01
522. Food, beverages, tobacco	30,075	2,294	5,318	629	38,316	5.99	13.88	78.49	1.64
523. Pharmaceutical	5,285	366	651	68	6,370	5.75	10.22	82.97	1.07
524. Other retail	74,241	8,397	10,265	1,819	94,722	8.86	10.84	78.38	1.92
525. Secondhand	4,729	339	702	139	5,909	5.74	11.88	80.03	2.35
526. Not in stores	9,114	1,409	2,591	374	13,488	10.45	19.21	67.57	2.77
527. Repair	4,365	866	818	272	6,321	13.70	12.94	69.06	4.30
				Local Units (Year 2001)					
52. All sectors	208,374	35,177	34,327	13,151	291,029	12.09	11.80	71.60	4.52
521. Nonspecialized	36,387	8,010	7,083	3,160	54,640	14.66	12.96	66.59	5.78
522. Food, beverages, tobacco	34,585	5,960	6,549	910	48,004	12.42	13.64	72.05	1.90
523. Pharmaceutical	9,649	915	952	1,087	12,603	7.26	7.55	76.56	8.62
524. Other retail	104,813	16,467	14,629	6,334	142,243	11.58	10.28	73.69	4.45
525. Secondhand	5,210	960	922	181	7,273	13.20	12.68	71.63	2.49
526. Not in stores	9,293	1,620	2,808	464	14,185	11.42	19.80	65.51	3.27
527. Repair	4,687	924	918	698	7,227	12.79	12.70	64.85	9.66

Source: Authors' calculations from ARD.

7.4 Productivity

7.4.1 What Productivity Data is Available?

As discussed in the previous section, data is at essentially two levels, RU and LU. Reporting Unit (RU) data is returned data (i.e., it relies on data actually reported by firms). Local Unit (LU) data is a mix of data that is from the ARI, and so is reported by firms and from other sources (e.g., taxes, which is inferred). Given that the LUs correspond to stores, this would seem to be the most desirable for a number of cases, especially since a number of retailers consist of many stores. Unfortunately, there are some issues surrounding the use of productivity data at the store level, especially for stores that belong to retail chains (i.e., that are not stand-alone), which force us to use firm-level (instead of store-level) productivity data.[15]

7.4.2 Data Available on Outputs and Inputs

As described previously, the only reliable input and output data is that available for RUs. Table 7.8 sets out some of the basic data available for all retailing sectors. Each observation in the data represents one RU. The top rows show data on sales, gross value added, and gross output. Following the ONS, gross value added at factor cost is calculated as equal to Turnover (exc. VAT) + Net addition to stocks + + Work of Capital Nature by Own Staff + Insurance Claims Received – Purchases. Gross output, on the other hand, is equal to Turnover (exc. VAT) + Work in Progress + Stocks Bought for Resale + Work of Capital Nature by Own Staff. The main difference between the two is the purchases figure, which is deducted in the calculation of gross value added.

The rest of the table shows some summary statistics for each variable; not surprisingly, purchases are the largest element after sales. One interesting point is that we have data on employment and the fraction of employees

15. The productivity data for LUs that do not correspond to single-unit RUs comes from the IDBR database, which is derived either from the IDBR administrative sources (i.e., the VAT or PAYE), or other data that brought the business onto the register in the first place, or the ARI. First, as discussed in section 7.3, some of the input data is interpolated from sales data, and vice versa. An additional problem arises from the fact that—according to ONS (2001)—when a business first arrives on the register, its employment, if present, is frozen at its first reported point until updated, and the updating process seems to be particularly slow. Updating is done from the results of the ARI, or before the ARI was introduced, if the firm was in one of the Annual Employment Surveys (AES). According to Partington (2001), in 2000 8.5 percent of total employment had not been updated since 1993, the year when there was last a Census of Employment. The updating problem seems to be concentrated in the smallest enterprises. In enterprises of size 0–9 28.7 percent of employment and 40.2 percent of employment in enterprises of size 10–19 had not been updated since 1993. Of enterprises of size 0–9 and 10–19, 56.9 and 21.8 have never been sent an ARI form or included in the AES. By contrast, larger enterprises are updated more frequently. An additional problem is that the ONS (2001) also state that even larger enterprises in the ARI or AES may not have fully reported on their local units.

Table 7.8 Basic data available for selected firms (year = 2003)

	Nonmissing observations	Mean	Median	Standard deviation
Sales	6,071	24,697.01	330.00	395,078.80
Gross value added	6,042	5,758.63	83.00	84,984.59
Gross output	6,042	24,903.89	335.83	396,577.00
Net addition to stocks	6,071	78.64	0.00	2,095.73
Work of capital nature by own staff	6,042	9.41	0.00	277.86
Insurance claims received	6,042	5.10	0.00	134.73
Purchases of materials and fuel	6,071	19,058.97	227.00	313,330.65
Employment	5,725	326.03	5.00	4,332.64
Part-timers	6,074	186.36	2.00	2,646.73

Source: Authors' calculations from ARD.

who are part-time. We do not know, however, what proportion of the full week such employees work, so we allocated them to 50 percent of the work week to calculate FTEs. In what follows, we present productivity data by employment and by FTE employment.

7.4.3 Deflators

We use price deflators provided by ONS for four-digit industries, which, for retailing, are mostly disaggregated indices from the retail price index. Therefore, they are consumer price indices. No deflators are available for retailing for materials and fuel purchased, and so value added is single deflated.

7.4.4 Productivity in Retailing: Definitions

An important problem of measuring retailing productivity surrounds the difficulty of defining what output a retailer provides. This is important in considering the argument that, for example, retailers have raised their productivity by simply shifting costs to either consumers (the growth of self-service stores) or onto producers (the allegation that Wal-Mart gets it suppliers to do more of the work in delivering the item to the shelf, for example, by supplying in shelf-ready packets, Bosworth and Triplett [2003]). It is also important in considering that measured sales of electronic stores have risen by 15 percent per year from 1987 to 2001 in the United States (Bosworth and Triplett 2003).

Oi (1993) emphasizes that the output of a retail firm is a bundle of services surrounding the product sold. Betancourt and Gautschi (1993) suggest they can be put into five categories: convenience, assortment, assurance of delivery in the desired form at the desired time, information, and ambience. Consider, then, a self-service supermarket selling fruit and packed meat as against a grocer selling fruit and a butcher selling fresh meat. By

making consumers serve themselves, the supermarket has shifted costs to consumers and so this should be deducted from retail output. Against this, the supermarket is providing the service of convenience to consumers (having the food available under one roof), which should be added to retail output. Betancourt and Malanoski (1999) thus model retailer's transformation function as consisting of both the output of retail items and also the output of distribution services (in this case the convenience of items under one roof and the input of the shopper's time). In turn, the output of distribution services is an input into the household production function, which then determines the demand for the supermarket's physical goods. Thus, growth of self-service stores represents the increasing provision of distribution services (all items under one roof, that is, increased service provision) along with substitution between in-store labor (who used to serve every customer) to consumer labor (i.e., reduced service provision). Therefore, to measure retail output we should have to subtract from measured sales values the net valuation of these changes in services, which is of course a very hard task.

What about shifting to suppliers? Here is a case of substitution not between final consumers and in-store labor, but between bought-in materials and in-store labor. This cautions against using margins (sales less costs of bought-in goods) as a measure of output since this is only valid if there is no substitution between bought-in materials and other inputs (just as in the literature on raw materials and productivity, see Bruno [1978]). Instead, it would seem to be more appropriate to use double-deflated value added. Finally, the increase in real sales in electronic stores is surely due to the fall in prices of underlying goods, and not the increased efforts of the staff in electronic stores. Thus, it would not seem appropriate to use sales per person as a productivity measure.

In conclusion, the argument is essentially one of interpretation. Just as in conventional production functions output per person might be very high in capital-intensive industries, so it is that output per person might be very high in retailing sectors where customers do all the work and/or input prices are very low. The important contribution of this theory is that it helps list the key inputs that account for measured sales per person. In the case of retailing, this is the important insight that retailers produce both sales of physical goods but also distribution services; some of the latter can be shifted onto consumers. Given the problems of measuring consumer services, in what follows we use productivity with the numerator measured using both sales and value added. Thus, it should be emphasized that cross-section comparisons might not be a good guide to the bundle of sales and distribution services that are more appropriate measures of retail output.

There are at least two other issues that might or might not be more important than the failure to adjust for distribution services in making cross-section comparisons. First, different stores sell different baskets of goods. Second, retailing employs many part-time workers. To deal with the latter,

we use both employees and full-time equivalent employees in the denominator of the productivity calculation.

7.4.5 Weights

Since we use the selected file, we deal not with the whole industry, but a sample. Thus, we need to develop weights to use where appropriate. To do this we use both the selected and nonselected file, but with a robustness check as follows. We combined both files to make a grand file of selected RUs and nonselected LUs. We then split the sample into six sizebands (0–9, 10–20, 21–50, 51–100, 101–250, and 250+). We then calculated weights as the sum of selected and nonselected employment divided by selected employment in each sizeband. So for example, if a firm falls into sizeband 50 to 99 and total selected employment was 1,000, but total selected and nonselected employment was 2,000, the weight for that sizeband would be 2. For robustness, we checked to see that no weight was abnormally large.

7.4.6 Productivity Findings

Table 7.9 looks at productivity levels by size of RU, with productivity measured by log GVA per full-time equivalent, with the left panel showing all sectors and the right the nonspecialized industry (supermarkets). As the table shows, productivity levels rise by size of RU. It is interesting that the size advantage of the largest firms is 34 percent (2.99 to 2.65) when using FTEs but 21 percent when using all employees, suggesting that part-timers are more heavily represented in larger RUs. Note, too, that the productivity advantage is 48 percent in nonspecialized stores. The lower panels of table 7.9 show growth rates by size. It is notable that the smaller reporting units have grown faster than the larger ones, thus narrowing the gap be-

Table 7.9 **Log GVA per full-time equivalent, by employment size, 2003**

	All retailing				Nonspecialized (521)			
Sizeband	0–9	10–100	100–500	500+	0–9	10–100	100–500	500+
Employment	2.45	2.67	2.69	2.66	2.16	2.14	2.42	2.49
FTE	2.65	2.92	2.94	2.99	2.39	2.55	2.76	2.87
Frequency	3,088	1,599	330	283	497	209	67	75
Log growth rates (1998–2003)	5.67	6.16	3.03	4.31	8.19	5.64	1.71	1.36
Log growth rates (1998–2002)	5.38	6.33	3.81	4.32	8.75	4.76	1.92	0.43
Log growth rates (1998–2001)	6.87	5.95	2.59	4.46	12.16	5.19	–0.03	–0.53

Source: Authors' calculations from ARD.

tween large and small RUs. This is particularly marked in the nonspecialized sector.

Table 7.10 contains data on productivity spreads. Foster, Haltiwanger, and Krizan (2006) for the United States, using data on stores, quote a standard deviation and interquartile range of 0.5 for hours-weighted log gross output per head in after taking deviations from four-digit means. We use data on log gross output per FTE in after taking deviations from three-digit means. As the table shows, we find a slightly higher standard deviation and interquartile range than they do. Note the spreads are not too much affected by whether FTE or not.

7.5 The Sources of Productivity Growth

What is the contribution of entry and exit to productivity growth in services? We employ the decomposition of Foster, Haltiwanger, and Krizan (FHK 2006). We start by writing manufacturing-wide productivity in year t, P_t as:

$$P_t = \sum_i \theta_{it} p_{it} \tag{1}$$

where θ_i is the share of establishment i (employment share) and p_{it} is ln productivity. Foster, Haltiwanger, and Krizan (2006) (FHK) suggest a decomposition to the change in manufacturing-wide labor productivity or ln TFP between $t-k$ and t, ΔP_t as

$$\begin{aligned}\Delta P_t = &\sum_{i\in S} \theta_{i,t-k}\Delta p_{it} + \sum_{i\in S}\Delta\theta_{it}(p_{i,t-k} - P_{t-k}) + \sum_{i\in S}\Delta\theta_{it}\Delta p_{it} \\ &+ \sum_{i\in N}\theta_{it}(p_{it} - P_{t-k}) - \sum_{i\in X}\theta_{i,t-k}(p_{i,t-k} - P_{t-k})\end{aligned} \tag{2}$$

FHK

where S, N, and X denotes the establishments that survive, enter, and exit respectively between t and $t-k$. The first term in (2) shows the contribu-

Table 7.10 **Productivity spread, 2003**

Variable	Standard deviation	IQR
GVA per head	0.91	0.95
GVA per FTE	0.90	0.88
GO per head	0.74	0.85
GO per FTE	0.73	0.81
Frequency	5,300	

Note: All data are transformed first into deviations from three-digit industry means. GVA means gross value added, GO gross output. IQR means interquartile range.

Source: Authors' calculations from ARD.

tion to productivity growth of growth within the surviving establishments; the second term shows the contribution of changes in shares of the survivors weighted by start period productivity relative to the average; the third term is an additional covariance term that is positive when market share increases (falls) for establishments with growing (falling) productivity; the fourth and fifth terms show the contribution of entry and exit.[16] They are positive when there is entry (exit) of above- (below) average productivity establishments.

To calculate this we proceed as follows. First, we performed the decomposition 1998 to 2001, 2 and 3. It is quite plausible that over different year spans there might be different fractions of productivity growth accounted for by different components of the decomposition. Second, we undertake this investigation by RU and so drop all LUs since we have no productivity information for them (but recall there are many, by number, single LU and RUs who we retain since they have productivity information). Recall that RUs can exit and enter from the selected file if they are not sampled. In this case, they have moved to the nonselected file and so we use the selected and nonselected data to identify true exitors and entrants.[17] But we drop an RU if it exited from the selected data into the nonselected data (or entered from nonselected into selected) since although they are a stayer, we have no productivity data for them in at least one period. Fourth, we calculate two sets of weights: employment (FTE) weights for θ_i in (1) and (2) and also employment (FTE) weights taking into account sampling.[18] Fifth, we perform these calculations by three-digit industry, that is, the P in (2) is the three-digit average industry productivity level and the θ is the share of each RU in three-digit industry employment. Thus, the number for all industries is constructed as a weighted sum of the numbers for the individual industries, where, following Foster, Haltiwanger, and Krizan (2006) the weights are the share of gross value added (since we use value added as our productivity measure in the decomposition) in each industry averaged over the start and end period. Sixth, the data are deflated by prices from the Retail Sales Inquiry values.

The results are shown in table 7.11. The table takes up three main issues. First, the decomposition is for different years. Second, we use both simple weights and stratified weights. The latter should upweight the smaller firms (who are more likely to enter and exit and so increase this category). Third, panel B drops the top five companies (i.e., those with the largest weights).

16. With industry data one can decompose ΔPt into the within and between terms, but cannot account for net entry.

17. An RU might disappear via a takeover if the taking over firm amalgamates its RUs into one or more existing RU structures. It might not disappear if it keeps the RU number. Practice on this seems to vary across firms.

18. The former are straightforward, being employment for unit *i* divided by employment in all *i* units in the industry. The latter is employment in plant *i* times the weight that plant has, divided by the sum of thus weighted employment in the industry.

Table 7.11 FHK decomposition, all retailing sectors gross value added per FTE

Year	Weights	Productivity growth	Stayers' share	Entry/exit share
		A. All RUs		
1998–2003	Simple	0.14	0.92	0.08
	Stratification	0.19	0.65	0.35
1998–2002	Simple	0.02	1.04	–0.04
	Stratification	0.06	0.24	0.76
1998–2001	Simple	0.04	0.71	0.29
	Stratification	0.06	0.42	0.58
		B. Dropping top 5 RUs by weight		
1998–2003	Simple	0.23	0.76	0.24
	Stratification	0.28	0.56	0.44
1998–2002	Simple	0.10	0.54	0.46
	Stratification	0.14	0.32	0.68
1998–2001	Simple	0.06	0.74	0.26
	Stratification	0.08	0.46	0.54

Source: Authors' calculations from ARD.

Note: Productivity is calculated as gross value added per FTE. Numbers in "Stayers" and "Entry/Exit" columns are shares of total productivity growth in the "Productivity growth" columns. These shares are the shares for each three-digit industry, the weights are the share of gross value added in each three-digit industry averaged over the start and end period.

As we have seen, retailing is very concentrated and thus a few large RUs dominate the market. It therefore seems sensible to examine the decompositions with and without their contributions as a matter of robustness.

Table 7.11 uses gross value added per FTE as the productivity measure. The first row shows that between 1998 and 2003, productivity growth was 0.14 percent over the whole period, with 92 percent accounted for by stayers (the sum of the first three terms of [2]) and the remaining 8 percent accounted for by net entry (the last two terms of [2]). The second row shows that taking account of stratification via the weights changes the proportion to 65 percent and 35 percent. The other rows in panel A do the same, but for different time periods. The stayers' share is generally in the majority with the exception of the stratified results for 1998 to 2002, where it is much smaller. Before drawing some overall conclusions, consider panel B, which removes the top five firms by weight. Here the picture is a little less volatile, although differences still do occur due to stratification.

Using the stratification weights generally raises the contribution of entrants and exitors, as would be expected. Dropping the top five RUs lowers overall productivity growth and, in 1998 to 2003 and 1998 to 2002 the contribution of stayers (the 1998 to 2001 data are little affected one way or another). Upon further investigation, this turned out to be due to one large RU with the third largest weight, who had a very large fall in productivity growth and in market share. The fall in productivity growth was sufficient to reduce average productivity growth as shown in panels A and B. The

stayers' contribution rose, however, since this firm had a large and positive covariance term (productivity growth was falling but market share was falling too). Finally, both aggregate productivity growth and the share of entrants looks somewhat different in 1998 to 2003, there appearing to be a burst of productivity growth over that year accounted for by entrants.

So which results are the most reliable? First, regarding stratification, the sampling weights that we use are designed to take account of the fact that the large firms are sampled always and the small firms only with a certain probability (around 50 percent, depending on sizeband). However, by ONS rules, firms with less than ten employees are excluded from business surveys for three years after filling in a form. Hence these firms are, by definition, dropped from the decomposition since even if they would have been on the selected sample they cannot be so sampled. Thus, a weight of the inverse of the sizeband sampling probability will not allow for this since the weight has also to be time dependent. Assuming that these firms are likely to exit this means that exitors in the sample we use are likely to be too large relative to the underlying population of exitors (since they have to be observed in the base year) and so might be more productive than would otherwise be the case, making it seem as if good firms exit, thus lowering the exit contribution. Since a small RU observed in 1998 cannot appear until at least 2002, this cautions against using the shorter decompositions.

A second point about stratification relates to continuers bias (Martin 2004). Recall we are using a sample of firms rather than taking a census. Consider, then, a group of firms observed in the base year. Firms who are truly stayers are more likely to be dropped since they are not likely to be observed in the final year, whereas exitors will be recorded as exitors. Thus, the weight on stayers is too low and hence their contribution is too small. There is an additional complication, however; sampling is in fact by sizeband, with firms over 250 employees subject to 100 percent sampling and under 250 subject to partial sampling. Thus, we have to drop initially large stayers who migrate to smaller sizebands (since we observe them in the base period but possibly not in the final period) and also have to drop initially small stayers who migrate to larger sizebands (since we observe them in the final period but not necessarily in the base period). The effect on the contribution of the remaining stayers depends on whether transitions across sizebands are symmetrically related to productivity growth; one hopes either that the productivity growth of the firms who do not migrate across sizebands is representative of stayers as a whole, and/or that the dropping of firms who migrate down to a smaller sizeband is outweighed by the dropping of those who migrate up to a larger sizeband.[19]

19. Consider, then, an initially large firm. Let us suppose they have above-average productivity, which large firms tend to do. A transition to a lower sizeband means they have lost market share, so the second term in the decomposition is negative. If they have had falling productivity with falling market share then the cross term is positive (although downsizing might

Third, we should note that the 1998 to 2002 results in the top panel for nonstratified weighting are based on an overall productivity growth of 2 percent. Thus, the shares of stayers' and net entry are formed by dividing the values of the contributions by 2 percent, which is a small number. These shares might then not be so reliable, although of course, since they are accounting decompositions they are exact descriptions of how the 2 percent growth is accounted for. Overall then, the 1998 to 2003 numbers might be regarded as the most reliable for all these reasons, and they suggest that stayers account for most of the productivity growth over that period.

What, then, can we say about the possible impact of planning on productivity growth over the period? This depends upon what one would have expected the shares to be without planning restrictions. One way to look at this is using the pre-1996 data, but that is not available to us at the moment. Another way is to use the United States as a yardstick. These show that, using stores and not firms as we do here, almost 100 percent of productivity growth between 1987 and 1997 (and subperiods) to be due to entry and exit.[20] However, table 7.13 of FHK also provides data on the fraction of entry and exit due to expansion and closure of stores within existing firms. This shows that 40 percent of all productivity growth is due to this source. Thus, a U.S. decomposition using firms would show that 40 percent of productivity growth is due to within-firm effects and 60 percent is due to entry and exit. This seems to give a larger effect for entrants than the effect here.

7.5.1 Section Summary

We find that:

1. Productivity is best measured at the RU level.
2. The variation in labor productivity across retailers is somewhat larger than in the U.S.
3. If anything, the contribution of entry and exit to productivity growth is somewhat smaller than in the U.S.

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have meant falling employment and so market share and rising productivity). The results for the initially smaller firm are the opposite. Note, however, there is a fundamental asymmetry since large firms are always sampled. Hence, of the firms moving up the size distribution, one is always more likely to drop the initially smaller since the initially larger who get larger are included both in the initial and final period. But of the firms moving down, one is likely to drop even numbers of them as they move to lower sizebands. Hence, relative to the full census, one is always being forced to drop from stayers more small firms who get larger. Overall, then, uneven sampling by size understates the role of small firms who get bigger. If they are initially low productivity and their productivity grows as they get bigger, then the effect on the decomposition of their omission is that the first term is understated, the second term is overstated, and the third term understated. If their productivity falls as they get bigger, the first term is overstated, the second term is overstated still, and the third term overstated. Therefore, which way the bias goes depends on the particular industry at the time.

20. Our data is a shorter subperiod than the five years that FHK use, but the subperiods they use still show the same fraction of productivity growth due to entry and exit in the longer period.

7.6 Planning, Store Size, and the U. K. Retail Productivity Performance

As discussed in the previous section, U.K. retailing productivity growth has lagged behind that of the United States. A widespread hypothesis is that the United Kingdom slowdown is somehow linked to the introduction of regulations constraining the entry of large retail formats (e.g., planning), which is generally dated to 1996. In this section we review data on U.K. regulations and planning.

Building a new supermarket in the United Kingdom requires planning permission from local authorities.[21] An application is made public to allow objections to be tabled. The local authority decides the application in the light of national planning rules (see the following for a description of these). In some cases the secretary of state is required to be notified; in retailing this is for things such as large proposals (more than 5,000 square meters of gross retail floor space) or substantial changes of use. If the secretary of state decides to call in an inquiry then a public inquiry is held. In the case of a refusal of planning permission an appeal can be lodged, with appeals regarding large retail sites as the subject of a public inquiry. Otherwise the decision is made by a local inspector at a hearing, but in certain cases (e.g., retail development over 9,280 square meters of gross floor space) the inspector makes his recommendation in his report to the minister and the decision is made at this level.

What are the broad parameters of planning policy? This is nicely summarized in the Competition Commission (CC 2000, paragraphs 2.162ff and appendix 12.4). They begin by summarizing the position before 1996. "Over recent years there has been a marked change in emphasis of the policy on land use planning for retail development. The planning guidance for England is set out in Planning Policy Note PPG6: *Town Centres and Retail Developments*. The first version of PPG6, issued in January 1988, did not contain advice on specific locations for retail development. A proliferation of large superstores followed, often on Greenfield sites, and sometimes as part of a far larger mixed retail park development" (paragraph 2.162).

In 1996, however, this changed when a sequential approach to planning was adopted. The details of such a change are set out in the CC (2000, Appendix 12.3). The PPG6, issued in 1996, states that that city, town, and district centers should be the preferred locations for all developments that attract many trips; that is, for leisure and commercial and public office

21. The Competition Commission (2000, Appendix 12.2) reviews the rules: "Before any development is carried out it must have planning permission (in the case of some forms of development it is not necessary to apply for planning permission because permission is granted automatically by virtue of 'permitted development' arrangements). A development is defined as either the carrying out of specified 'operations' or a material change of use. One of the specified 'operations' is the erection of a building. Generally, a change of use will not be material unless it is of such a character that it is significant with regard to the objectives of planning control."

development as well as retail development. However, there was a particular focus on supermarkets, who were viewed acting as an anchor for smaller city centers in particular. The PPG6 outlined a sequential approach to identifying additional sites for both retail development and other key town center uses that attract many people, including commercial and public offices, entertainment, and leisure. This gives first preference for town center sites, followed by edge-of-center sites, and only then out-of-center sites. Developers proposing new supermarkets outside town, district, or local centers should demonstrate that: ". . . there is a 'need' for the retail floor space proposed and no more central sites that are suitable or available for developing such a store, after having been flexible about format, scale, design and amount of car parking required, tailoring these to fit the local circumstances." (CC 2000).

The issue of need was also taken up in a document issued in February 1999 by the planning minister (CC 2000): "Need should not be regarded as being fulfilled simply by showing that there is capacity (in physical terms) or demand (in terms of available expenditure in the catchment area) for the proposed development." It stated that, while the existence of capacity or demand may form part of the demonstration of need, the significance in any particular case of the factors that may show need will be a matter for the decision-maker. The CC suggests that this document, which was designed to clarify need, served mostly to obscure it.

Overall, the costs of planning regulation for businesses are nonnegligible. The U.K. Competition Commission (CC 2000) documents that it takes on average eleven to twenty-four months to obtain a planning decision for a large retail store. Moreover, the average cost per project of getting planning permission was £50,000 (approximately $90,000).

7.6.1 Impact

What has been the impact of the planning policy? The CC draws some conclusions with respect to supermarkets: "The policy change, with its emphasis on revitalising town centres, has had a major impact on the store development plans of some of the larger multiples, in particular Asda and Morrison (CC 2000, paragraph 2.168). They continued (paragraph 2.203): "Multiple retailers such as Asda and Morrison, whose existing store formats are at the upper end of the size range, will have been most affected by the restrictions imposed by the new planning guidelines because sites for such stores will rarely be available in town centres. Because Asda and Morrison in particular have maintained their policy of building only very large stores, they will also be the least well placed to adapt to smaller formats. . . . Tesco has also already diversified into smaller town centre formats."

In a recent paper Griffith and Harmgart (2005) study this further. They use data from the Institute of Grocery Distribution (IGD), which provides store-level data for all large grocery chains, all co-ops, and around 80 per-

cent of grocery retailers. What they show is a very substantial move by the big four supermarkets (who dominate the supermarket sector)[22] towards opening small store formats, often in the centers of towns and often via takeover of existing small store retailers. Their figure 3, for example, shows that in 1996 the big four supermarkets opened around twenty-five high street/neighborhood stores, out of ninety total new openings. By 2004 they were opening 125 high street or neighborhood stores out of 160 total openings. Strategy also varies by supermarket. Tesco, in 2003, opened around 120 out of 140 local stores (local Tesco stores are around 2,000 square feet, a Tesco supermarket is around 27,000 square feet or Tesco Extra hypermarket of 69,000 square feet). But Asda (who were taken over by Wal-Mart in 1999 and had a strategy of building big-box stores) have tended to stick to this strategy and not open smaller stores.

What does our ONS data set show? We do not have, at time of writing, data pre-1996. Thus, we cannot do a before/after comparison in this chapter. But we can document some changes from 1997. Consider first, as background, the move from independents to chains, as documented in the United States by Jarmin, Klimek, and Miranda. Table 7.12 shows the business shares of chain stores versus independents, with chains split up into regional chains (who are in one region) and national chains (who are in two or more regions). The top panel shows the data for all retailing and the bottom for SIC 521 nonspecialized stores (supermarkets), with the data showing the shares of numbers of stores on the left and shares of employment on the right. As the data show, there has been a shift in all, not so much away from independents, but away from regional to national chains (see columns 2 and 3 in the top panel). The lower panel suggests that supermarkets have seen a decline in both regional chains and in stand-alone shops with an accompanying growth in national chains.

How has this occurred? It is often said that planning makes entry difficult in U.K. retailing and hence the only way to expand is by merger. Table 7.13 gives some information on this, showing, again for all retailing (top panel) and supermarkets (bottom panel) the share of entrants and share of employment accounted for by entry and takeovers. The takeover data are quite volatile, reflecting the fact that a single large takeover can affect the data substantially, but overall takeover and entry shares do match each other in at least some years.

Table 7.14 gives a further perspective on this, by computing the shares of the stores of all entrants and exitors due to stand-alone (independent shops), regional, chains and national chains. As the top two rows show, in 1998 stand-alone shops accounted for 75 percent of entry and exit, but by

22. They are Tesco, Sainsbury, Morrisons, and ASDA. The first three are long-established U.K. companies, with Morrisons predominant in the north of England. Morrisons took over Safeway in 2004. The ASDA chain was taken over by Wal-Mart in 1999.

Table 7.12 **Business share of chains and independents**

	Frequency shares			Employment shares		
	Stand-alone shops	Regional chains (1 region)	National chains (> 2 regions)	Stand-alone shops	Regional chains (1 region)	National chains (> 2 regions)
			All retailing			
1997	67.83	10.57	21.60	28.34	8.81	62.85
2003	66.43	8.56	25.01	25.82	6.56	67.61
			SIC521—Nonspecialized			
1997	74.40	5.19	20.41	13.90	4.74	81.36
2003	64.93	4.59	30.48	11.41	2.89	85.71

Source: Authors' calculations from ARD.

Table 7.13 **Takeovers versus entry**

Year	Frequency share of entry	Frequency share of takeovers	Employment share of entry	Employment share of takeovers
		All retailing		
1998	0.18	0.02	0.11	0.06
1999	0.11	0.03	0.08	0.05
2000	0.11	0.02	0.09	0.04
2001	0.12	0.01	0.18	0.04
2002	0.12	0.01	0.14	0.02
2003	—	0.02	—	0.04
		SIC 521—Nonspecialized		
1998	0.09	0.11	0.05	0.11
1999	0.08	0.09	0.06	0.04
2000	0.09	0.08	0.05	0.03
2001	0.14	0.05	0.28	0.05
2002	0.23	0.00	0.18	0.00
2003	—	0.10	—	0.07

Source: Authors' calculations from ARD.

2002 this was down to 56 percent of entry. The difference was made up by national chains, whose share of entry was 17 percent in 1998 but 42 percent in 2002 (see rows 5 and 6). Similar data show up for the supermarket sector.

So far we have seen a tendency towards dominance by national chains. What has this done to their store profile? Table 7.15 sets out some evidence for this. First, we rank all firms by their size and split them into quantiles. Note we choose firms here so that small stand-alone shops are a firm, but a large chain is one firm. Thus, the large chains are at the top of this distribution. Then we calculate, for each quantile, the fraction of shops in that

Table 7.14 **Shares by number of stores of entry and exit accounted for by stand-alone, regional, and national chains**

	Type	All retailers entrants (%)	All retailers exitors (%)	Nonspecialized entrants (%)	Nonspecialized exitors (%)
1998	Stand-alone shops	74.10	70.84	71.12	68.15
2002	Stand-alone shops	56.13	82.61	51.42	80.54
1998	Regional chains	8.66	8.62	3.88	2.81
2002	Regional chains	2.38	6.98	1.84	3.24
1998	National chains	17.25	20.54	25.00	29.04
2002	National chains	41.48	10.41	46.74	16.21

Source: Authors' calculations from ARD.

quantile who are small, where small is defined as the shops below the 1997 median of three-digit industry employment of the shop (or local unit). Thus, the top cell of table 7.15, 93.12, says that 93.12 percent of firm employment of firms in the 1st (lowest) quantile in 1997 is in shops who are small. Looking down the table at the 3rd quantile, who are the biggest firms, the fraction of shops in their firms who are small is 48 percent in 1997 and 47 percent in 2003. The last rows in the panel show averages for firms in the 75th to 94th and 95th to 100th percentile of the distribution, and again, these changes are small.

This seems like a small change in the light of the changes that we saw previously in the focus on small stores. Thus, we explored this further by looking at SIC521, the results of which are set out in the lower panel. The results for the 3rd quantile are most interesting. In 1997, 70.69 percent of employment in the largest quantile by firm was in small shops, whereas in 2003, 80.3 percent of employment was. Both mean and median employment have dropped only slightly, but recall that since many of the smaller shops are so small relative to the large scale stores the difference in average employment is not likely to show up very dramatically. Looking at the lower panel, lower two rows, we can see that the move to large firms taking over small shops is apparent in the 95th to 100th percentile, where mean and media shop employment have fallen and the standard deviation of employment has risen. Thus, we can see in these data an increase in the fraction of small shops in large chains, in agreement with the data in Griffith and Harmgart (2005).

We have seen, then, a rise in the proportion of small stores in larger firms. What possible impact on productivity levels might this have? First, consider the gap to be explained. Figure 10 of Baily (1993) estimates the 1987 productivity levels gap at 18 percent for the United Kingdom versus the United States, using value added per employee, at Purchasing Power Parity (PPP). But Baily points out that the productivity difference in like

Table 7.15 Share of small shops

Year	Position in the distribution	Employment share	Frequency share	Mean shop employment	Median shop employment	Sd of shop employment
			All retail			
1997	1st quantile	93.12	93.77	2.71	2.69	1.01
2003	1st quantile	94.68	95.73	2.65	2.63	1.01
1997	2nd quantile	76.27	83.75	4.39	4.32	1.76
2003	2nd quantile	78.33	85.55	4.30	4.24	1.73
1997	3nd quantile	48.07	60.69	6.10	5.93	2.68
2003	3rd quantile	47.24	60.31	6.11	5.94	2.76
1997	75th–94th percentile	32.98	48.62	9.59	8.70	5.64
2003	75th–94th percentile	30.65	45.80	9.92	8.98	5.69
1997	95th–100th percentile	25.66	38.64	30.64	25.62	22.94
2003	95th–100th percentile	21.01	32.98	30.71	26.25	23.93
			521—Nonspecialized			
1997	1st quantile	97.02	96.52	3.90	3.90	1.01
2003	1st quantile	98.01	96.83	3.82	3.80	1.04
1997	2nd quantile	95.02	94.69	7.15	7.12	2.04
2003	2nd quantile	97.41	96.77	6.64	6.62	2.24
1997	3nd quantile	70.69	76.40	13.52	13.42	4.43
2003	3nd quantile	80.30	85.36	12.46	12.25	3.79
1997	75th–94th percentile	32.78	47.81	38.94	33.82	27.64
2003	75th–94th percentile	38.79	52.58	39.87	36.49	27.98
1997	95th–100th percentile	15.16	29.21	195.26	176.23	195.38
2003	95th–100th percentile	27.54	39.32	121.84	102.82	99.26

Notes: The table is constructed by ranking all firms (reporting units) into size quantiles and then calculating for each quantile the fraction of shops (local units) in that quantile who are small, where small is defined as the shops below the 1997 median of three-digit industry employment of the shop.

Source: Authors' calculations from ARD.

stores is much less (i.e., when control for the store mix of products productivity is similar), suggesting that a lot of this is different mixes of stores. Department stores are about the same productivity (the United States lead about 5 percent in multicategory stores) but lead is 25 percent in single category stores (e.g., Home Depot). The value added per hour worked gap was from Griffith and Harmgart (2005), citing the EUKLEMS study, 46 percent in 2001.

Second, there are two potential impacts of size on productivity. The first is simply the impact of total size of shops, which changes productivity via economies of scale. The second is the impact of the sizes of shops within a chain, which has an economy of scale effect, but also an economy of scope effect if the organizational capital required to run hitherto large stores cannot be perfectly substituted to running small stores. On the first effect, the average size of stores is 14.42 from Jarmin, Klimek, and Miranda (2005), comparable with 9.73 from us for 2003, a log difference with the United States of 39 percent. How much of the productivity gap can this ac-

count for? It depends on the returns to scale, if any, in shop size. Table 7.10 shows that larger stores have a higher value added per full-time employee. To explore this further we regressed, for all reporting units, 1998 to 2003, log value added per FTE on log FTEs, plus dummies for regions, and year and four-digit industry interacted. We obtained a coefficient on log FTE employment of 0.061 (t = 20.80, 38, 910 observations, R2 = 0.10). When we ran the same regression for only single-unit reporting units we obtained a coefficient on log FTE employment of 0.039 (t = 6.74, 29,390 observations, R2 = 0.10). This, then, is consistent with increasing returns to scale (although we stress that we have not controlled, due to data availability, for other inputs such as capital) with a 1 percent increase in employment, raising productivity by 4 to 6 percent (so that a 100 percent increase in employment raises output by 107 percent). Thus, a 39 percent difference in employment would give a $0.39 \times 0.05 = 1.95$ percent increase in productivity (taking a 5 percent returns to scale figure). This is 4 percent of the 46 percent productivity gap, which seems rather small, although this gap estimate is the largest.

The second (within-chain) effect is analyzed in Haskel and Sadun (2007), where we document that average store size within a chain has, indeed, an important role on chain-level TFP. According to our firm-level estimates, the fall in within-chain shop sizes lowered annual TFP growth in U.K. retailing by 0.2 percent. This is about 20 percent of the post-1995 slowdown in U.K. retail TFP growth of about 1 percent, documented by Basu et al. (2003).

7.7 Conclusions

We have used a new micro-level data set to study productivity in U.K. retailing, 1997 to 2003. We have used store-level data to look at concentration and entry and exit, but, due to data limitations, chain of store-level data to look at productivity and productivity growth. Among our findings are:

1. In 2003, there were 285,291 stores in U.K. retailing and 196,286 firms/chains. But just 171 chains accounted for 60 percent of total retail employment.
2. Entry/exit/stayers are fairly stable fractions of all stores, being about 12 percent, 12 percent and 70 percent (the rest are stores who survive one year).
3. Productivity levels are strongly affected by whether productivity is measured by heads or full-time equivalents.
4. Labor productivity is higher in larger stores, especially so in supermarkets.
5. The variation in labor productivity across retailers is rather larger than in the United States.

6. Data differences with the United Kingdom make comparisons hard, but the contribution of entry and exit to productivity growth is somewhat smaller than in the United States.

7. There was a change in planning regulations in 1996 that greatly stopped retailers developing out-of-town shops. This has little discernible effect on the retailing stores as a whole but a noticeable effect on supermarkets, where the average size of stores in the largest chains has fallen as large chains operate an increasingly large fraction of small stores.

8. U.S. stores are on average 39 percent larger than U.K. stores (in terms of employment) and so the increases in preponderance of small stores might be expected to lower the productivity of U.K. retailing if there are increasing returns to scale in retailing. Recent research suggests that this seems indeed to be the case.

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