

Profitability of small and medium-sized enterprises in Marshall's time: sector and spatial heterogeneity in the nineteenth century

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Abstract

New data on profit heterogeneity of small- and medium-sized firms for 1861–81 in England and Wales are used to reinterpret Marshall's contemporary insights. Profit level differences are chiefly explained by location, mainly urbanisation effects. But profitability (profit per worker) is mainly explained by sectors, at both 1-digit and 5-digit level. Sector market opportunities reflected barriers to market entry which limited substitutability for the services of the professions, some manufacturing and maker-dealing industries. Localisation mainly reflected urban/rural differences, accessibility to railways and to a lesser extent waterways. Differences in firm-level organisation (measured by portfolio diversification and partnerships) were less significant for explaining profit heterogeneity than sector or localisation. Demographic effects such as an entrepreneur's age had little significance. Marshall's insight of convergence to mean industry-sector profitability, with localisation as a secondary influence, is confirmed, but there remain unexplained elements of heterogeneity indicating important roles of entrepreneurial agency.

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1. Introduction

This paper examines profits and profitability for individual small and medium sized enterprises (SMEs) in the period of the historical past that was the primary focus for Alfred Marshall's early studies, but using data on a scale that was not available to Marshall at the time. The paper has two key objectives: estimating at firm level the relative importance of industry-specific and locational effects on heterogeneities of profitability; and using the new profits data to better understand Marshall's thinking and its relevance to the period in which he wrote. A core concept developed by Marshall was that industry profit rates tend towards the mean. He emphasised that any disequilibrium opportunities were limited by new entrants and that there were few major barriers to entry in most industries during the period he examined so that proprietors could 'make money even when they were not throwing themselves with energy' (Marshall, 1919, p.92). However, Marshall indicated important exceptions where firms could benefit from localised internal and external economies, and/or local monopolies, leading to higher profitability. He indicated this was particularly likely in sectors with barriers to entry, in towns with larger potential markets, and centres of transport access that offered lower freight rates.

Much modern literature has focused on Marshall's localisation economies within 'industrial districts' and 'clusters', with concentrations of firms in closely related activities (for example Becattini, 1990; Rosenthal and Strange, 2003; Porter, 1990; Dei Ottati, 2017). Indeed there is important evidence of the extent of Marshallian district effects in England for the period (e.g. Checkland, 1964; Wilson and Popp 2003; Wilson and Singleton 2003). However, this paper engages with the more generic Marshallian concepts of industry profit rates, and the role of localisation on heterogeneity, which have remained rather neglected in historical literature because of the absence of data available.

'Localisation economies' here refer to external benefits from the concentration of industries, or specific sectors. 'Urbanisation economies' refer to the external benefits from cities of increasing size; in urban areas these overlap with localisation, but are a separable in rural and small population centres (Marshall, 1920, 397-419; Rosenthal and Strange, 2003, 2004; Martin, 2006).

The focus of the paper recognises the opportunities offered by the new data on SMEs for the period, as well as their limitations that prevent district and non-district effects being compared. The paper thus seeks to fill an important gap in understanding of the determinants of profits in the contemporary firms that Marshall examined. As widely recognised accurate data on historical profits for a reasonable sample of firms has not been available, especially for SMEs. As Jeremy (1998, p. 331) observed small firms were not thought important enough for the gathering of specific government statistics; Payne (1988, p. 22) called them the 'regiments of the anonymous'. The paper exploits the

few surviving confidential firm-level records gathered on profits for the purposes of business taxation, and links these to data on workforce size collected in a question in the population census, extracted for each proprietor in the newly-available digital records of the historic censuses. This provides almost 3,000 linked proprietor records for three years 1861, 1871 and 1881.

The paper uses Alfred Marshall as a methodological starting point, as developed from his earliest major study co-authored with his wife Mary Paley Marshall (Marshall and Marshall, 1879), and in later studies including *Industry and Trade* and *Principles* (Marshall, 1919; 1920, 1961).¹ These studies are important for the empirical analysis in three ways: they define profits as it was understood at the time (which is essentially identical to the basic modern definitions); they focus on the role of localisation examined in the historical data; and they are based on invaluable economic perceptions of the contemporary reality of the many businesses that Alfred Marshall visited in the 1870s and 1880s, thus reflecting precisely on the period of time investigated.² The Marshalls' understanding is also invaluable because they positioned conceptual developments firmly in the relative position of different firms according to their competitive position within local and wider markets. This is critical for interpreting the empirical material on SMEs. However, the paper makes no attempt to position Marshall's work in the wider economic literature (for which see e.g. Belussi and Caldari, 2009); rather it uses modern methods and theory, and expectations about competition in varied local markets, to reinterpret Marshall's views of the past.

A key finding is that *profit levels* varied chiefly by location, and this depended profoundly on externalities, mainly deriving from the urbanisation economies of larger towns. In practice, almost all large firms needed an urban base to provide the range of their needs. However, for *profitability* (measured as profit per worker) sector markets were more significant, both at aggregate and detailed sector levels. The importance of heterogeneous sector market opportunities is an important finding of the paper. The analysis indicates that this reflected differences in barriers to market entry and access which limited the substitutability for the services of the professions, access to specialist skills in some manufacturing and maker-dealing industries, and different levels of capital requirements. Heterogeneous profitability had more limited localisation than sector effects, which is indicative of a level of market integration across England and Wales, and also the constraints of the sample data available. However, important spatial differences in profitability occurred: the size of the local market, its population density, the closeness to nearest town, distance to a rail station and the presence of a station or waterway were significant for profit opportunities. Systematic differences in firm-level organisation (measured by portfolios and partnership) were significant for some profit heterogeneity but generally at a lower level than sector and locational effects. Demographic effects such as age had almost no significance. Unexplained elements of heterogeneity indicate the important role of entrepreneurial agency.

The paper is organized as follows. Section 2 expands on the Marshalls' concepts in the light of modern interpretations of profits and profitability and the conditions under which sector and local differences may emerge. Section 3 describes how the unique dataset was assembled, how the variables are defined from the data, and gives a preliminary assessment of variance by industry and location. Section 4 presents robust regression estimates of profits and profitability controlling for industry-specific effects at the 1-digit and 5-digit levels, various measures of locational context, and controls for business form and demography. The conclusion interprets the main findings, and reflects on what the new analysis suggests about profitability and the Marshalls' insights for the period in which they wrote.

2. Profits: theoretical expectations

The Marshalls defined profits as residual income, or earnings net of expenses; what they called the 'earnings of management': what is now termed entrepreneurial remuneration (Marshall and Marshall, 1879, p. 117; Marshall, 1920, p. 614-5). However, they recognised that the exact profit position would only be known when a periodic calculation was made, as for making an annual tax return as used in this paper. Indeed the tax definition of profits as net income used in contemporary tax assessments (see Stamp, 1916, p. 256) was subsequently accepted by Keynes, acknowledging the soundness of Marshall's approach (Keynes, 1936, p. 53-8), and this now forms the basic definition of business profits in most economic analysis.

Marshall argued that there was a strong tendency towards industry mean rates of profit, with any disequilibrium opportunities for higher capital returns exploited by new entrants, bringing profits back towards the average industry rate: 'if there were no natural or artificial barriers against entering a trade, the supply would be adjusted to the demand' (Marshall and Marshall, 1879, p. 116). This would also tend to apply across industries (Marshall, 1920, p. 614-8, 318), although Marshall accepted that there would be variations as capital needs varied in different sectors, so that higher returns would occur in sectors with higher capital needs and/or higher risks.

The convergence to mean profit rates in this period, or what he called the 'general market' (Marshall, 1920, p. 363-80, 455-61; 1919, p. 182-3), was also supported by his observation that in the mid-nineteenth century 'the capital required to enable a business to command the most efficient and economical methods of production then known was relatively small'. ... 'Thus it was reasonable to attribute a great part of Britain's industrial strength to small growing businesses' (ibid., 1919, p. 581); i.e. market entry, and hence competition, was generally strong. This has been reiterated by Keynes (1936, p. 307-8), who noted that wages and prices were brought in line with returns and hence

profits: conditions in the nineteenth century were 'sufficient ... to establish a schedule of marginal efficiency of capital which allowed a reasonably satisfactory average level of employment.'

On the other hand, Marshall also recognised a contrary tendency for differentials. This was partly because of shortage of the combination of skills required; it was possible that 'such a rare combination of natural qualities, that the earnings and management got by it may be very high, without there being many men who can do the work and get these high earnings' (Marshall and Marshall, 1879, p. 116-7). This led to gaps in responses to opportunities in specific sectors and locations. It also resulted from barriers and monopolies, which Marshall argued were the main source of deviations from mean profit rates (Marshall, 1920, 477-99; Marchionatti, 2006, p. 618-9), within which locational effects were significant.

General localisation economies noted by Marshall are in many ways more fundamental than specific district effects that have been a centre for modern literature. As Martin (2006, p.398) indicates, localisation economies were probably more important in the nineteenth than the early twentieth century, and were emphasised more in Marshall's early work. They are now mainly recognised as more general aspects of returns to scale, and hence inter-area trade, as developed by Romer (1986) and Krugman (1991). Indeed Marshall (1920, pp. 272-3, 397) recognised that differences between localities remained key to understanding profit potential, particularly for small firms, in markets of different settlement sizes and relative accessibility to other settlements and markets. Localisation was also more likely for sectors lacking substitutability, and having high perishability, urgency of delivery, and low standardisation (*ibid.* pp. 404-5, 419-21, 706-8). In modern analyses this has been found particularly important for professions such as doctors and lawyers (e.g. Baumgardner, 1988; Garicano and Hubbard, 2009), and retailers and other industries directly serving local consumers, especially for differences between the smallest firms and larger or multiple businesses (see e.g. Bresnahan and Reiss, 1991; Campbell and Hopenhayn, 2005; Haltwinger et al., 2010).

An important aspect for the empirical analysis presented here is how far the local historical context promoted or constrained profit heterogeneity. Britain was becoming an integrated market, but there was still scope for *de facto* local monopoly in supply, and/or monopsony in purchasing in remoter areas. Geographical isolation or other barriers to access in this period could prevent easy supply of substitute goods or services. Firms might set prices or prevent workers or suppliers from seeking alternatives allowing profits beyond levels achievable in fully competitive markets. These effects can be detected from profitability significantly beyond average industry rates. This is more characteristic of large firms where large-scale production gives economies of scale and market control advantages, including vertical integration through branch networks which were expanding at this time, which act as barriers to setting up or expanding other firms. But is also important for SMEs in smaller and remoter the markets. By 1851 the rail network had expanded to cover most of the country (Mitchell,

1964; Turnock 1998, p. 247-9), so that during the period of analysis there was less scope for isolated markets to allow excess profits. However, railways still relied on horse carriage to access and deliver to the network, as also did the network of waterways, so that rail accessibility for regular freight transport was limited to a de facto maximum of about 5 miles (Everitt, 1976, p.179; Barker and Gerhold, 1995, p.15-20).

The locations in the sample had a range of accessibility that interacted with opportunities for control in markets for some specific sectors, especially for services with low local substitutability, high perishability, urgency, low standardisation, with few or no alternative local suppliers or purchasers; for some manufacturing where bulk, weight, or product fragility and perishability led to high transport costs or limits on transportation capability; and for maker-dealing where some local hand crafts could hold out against more distant factories (Marshall, 1920, 396-9; Clapham, 1932). Investigation of the extent of profit heterogeneity at the spatial level is indicative of the extent to which the England and Wales markets were at this time integrated).

Many of the sector barriers to access and integration that caused heterogeneity were much modern economics would term rents. Marshall recognised rents, ‘scarcity rent, and ‘composite quasi-rent’ as an outcome of monopoly and other sources of market barriers, especially for agriculture and land values (e.g. Marshall, 1920, pp. 421-3, 428-52, 626-8). He devoted considerable space to such rents. But he extended and heavily amended this text after 1890-1, and in later articles (see extensive coverage in Marshall, 1961, pp. 434-528). It was also a concept on which Marshall and the Cambridge school made many theoretical shifts, and was notably criticised by historian John Clapham as moving away from the practical grounding that was Marshall’s strength (summarised in Marchionatti, 2006, p. 621-2). He used the term sparingly in most of his work, generally preferring to refer to the underlying causes of rents deriving from barriers and monopoly, including localisation. We have followed that preference here as best reflecting his grounding and the business concepts of the time. For example, in the sample used here the most numerous rent opportunities derived from professional qualifications and legal or reputational barriers to market access (as with lawyers and physicians), licensing regulations (for innkeepers and publicans), and access to specialist skills in some manufacturing. Marshall mainly used examples from manufacturing to illustrate abnormally high profits. He recognised the advantages enjoyed by the ‘professional classes’. These were ‘richer, have large reserve funds, more knowledge and resolution, and much greater power of concerted action with regard to the terms on which they sell their services, than ... their clients and customers’ and compared to most grades of labour (ibid 1920, p. 568). However, Marshall did not develop this further for professionals, other sole traders and micro-firms, treating them more as an aspect of employment than business strategy or rents. They can now be assessed more fully here.

The tendency for heterogeneity in firm performance, even within narrowly defined industries, is now widely recognised in modern literature (see reviews in Syverson, 2011; Landini et al., 2020). Moreover, Melitz and Ottaviano (2008) isolate the key significance of imperfect trade integration as an underpinning such heterogeneity. This is part of a wider misallocation explanation, that within-industry dispersion reflects a range of market rigidities and imperfections (see review by Hopenhayn, 2014; and analysis of various options and sectors by Duménil and Lévy, 1995, Bresnahan and Reiss, 1991 and Campbell and Hopenhayn, 2005). Crafts and Mulatu's (2005) finding that, in Britain up the 1940s within-region characteristics were more critical than between-region differentiation in explaining economic growth and competitiveness, confirms the continuing relevance in Marshall's Britain of localised conditions, variations in accessibility and important differences between sector rent opportunities that also varied by place. . These are key dimensions examined with the firm-level data in this paper.

The causes of heterogeneous performance of firms have also led to a wider range of organisational factors being investigated in modern interpretations that Marshall only partly acknowledged (e.g. Marshall, 1920, p.300, 626-7). Important among these are internal characteristics of business form and organisation, as developed by Penrose (1959), Porter (1990), Peteraf (1993), or Teece (2009). We investigate below differences between partnership and sole proprietor firms, size of partnerships, and extent of diversification through portfolios of activities. An example applying an organisational approach to firm-level profits data by Landini et al. (2020) suggests that heterogeneity can be explained by 'productive opportunity': the combination of responses from managerial strategy (as argued by Porter, 1990) and capabilities (as argued by Teece et al., 1997) to exogenous factors that define the opportunities and incentives that firms face. This leads to a potentially wide range of different profit levels deriving from the effects of agency: how firms observe and respond. As Landini et al. (2020, p. 3) argue 'The heterogeneous nature of resources and capabilities, as well as idiosyncratic readings of the outside context, imply that strategic profiles can be markedly different across firms'. Moreover they note a feature that may be important in the historical data used here, that small profit differentials will lead to firm-level heterogeneity being more persistent because the incentives to change existing practices may be too low to be perceived, or if perceived, are too small to be attractive. This is likely to be particularly an issue for SMEs with limited resources. For small firms there is usually restricted managerial structure and resource: resources and capability come down to the sole proprietor, or a small group of partners and/or senior managers. This suggests that individuality of responses, and different business forms and organisation, may be particularly significant for the SMEs investigated here.

3. The data

Profits data for individual SMEs are derived from contemporary tax records. These are Schedule D income tax on profits from ‘trades and professions’. They cover all non-farm businesses. Farms were taxed through a different tax Schedule and are not directly considered in this paper. The individual tax records used were supposed to have been destroyed, but some have survived, mostly now held at local Record Offices (ROs) in personal papers, derived either from copies of Commissioners’ Certificates of Assessments made by tax Assessors (the local assessors) or from personal tax returns. The remainder come from scattered records held at The National Archives (TNA). Extensive search of all catalogues and exhaustive contacts with ROs yielded about 4,400 profit records for three years 1861, 1871 and 1881, with a further 350 derived from TNA. Of these it was possible to link 2,985 with the proprietor’s census record (68%).

Employment data is derived from census records using the digital census for the nineteenth century in I-CeM (Schürer and Higgs, 2014). The census information on SMEs is extracted in the I-CeM-linked database used, which identifies all proprietors in the census and their workforce (blinded for review). When linked to the tax data these give a database of business profits and workforce with the added attributes of the proprietor(s), such as age, sex, occupation, and residential location. The British censuses for 1861-81 included a question that was unique to this period. This requested information on a proprietor’s business and its workforce. The key part of the question was: “In TRADES, MANUFACTURES, or other Business, the Employer must, in all cases, be distinguished. – *Example: ‘Carpenter – Master, employing 6 men and 2 boys;’* inserting always the number of persons of the trade in their employ, if any”.² Though not the best question design or phrasing by modern standards, this gives the alphanumeric data on workforce size and sector that has been extracted and coded in (blinded for review).

Proprietors who had profits recorded in the tax data included employers who had workforces, and those with no employees. The non-employers operated as both sole traders on their own, and as a group of proprietors in a partnership; though partnerships could also have employees. Workforce size was measured here as total personnel, including partners, thus putting all firms on a common measure of available personnel. A total of 759 firms had personnel; the remainder were proprietors without employees.

With these data, the profit rate, ‘profitability’, is measured as the total profit divided by total personnel; the more normal measures such as returns on capital are not available for these data, and may be less salient to proprietors of many SMEs that primarily used labour and had little capital. The data are normalised by using logged profits and profitability.

3.1 Data base characteristics

The final database is a combination of dispersed locations from all over England and Wales, and *all* taxed business in 19 localities, of which 8 are small villages, five are large towns (Brighton, Sussex; Devizes, Wiltshire; Faversham, Kent; Idle, Yorkshire West Riding; and Westminster, London), and six are clusters of rural locations (a Faversham rural area; Bourne, Deeping, and Candleshoe in Lincolnshire; and Highworth and Kinwardstone in Wiltshire). The dispersed locations are also a mix of primarily urban areas and small parishes. Overall, 54% of the sample is urban, 22% rural, and 24% mixed small town/rural. This approximates well to the population distribution which was 54% in urban and town areas in 1851, rising to 70% by 1881 (Law, 1967; Robson, 1973). The sample is also representative of the profit distribution of all SME firms. Compared to Inland Revenue data for England and Wales as a whole, the four income bands covering £100-100,000 contained in the sample have a Chi square goodness of fit for the dispersed sample of 2.56, and for the clustered sample 0.47; CR at $p=0.1$ is 6.25 with 3 df.; H_0 accepted in both cases at $p=0.1$.

The years for which tax data are available were determined by archival chance so that the match to the census year date had to be treated flexibly. Most non-corporate traders were taxed on the average profits of the previous three years. Thus the target tax year, if there was a choice, was the mid-year of the following three years; e.g. for the 1881 census year this is the 1882-3 tax year. But any of the three years could be used. However, for some land-based enterprises such as iron works and quarries, taxation was on the previous-year profit, and for mines the average of the preceding five years (see Stamp, 1916, p. 221-31). This means that there was not only an approximation to the target year because of record survival, but also different types of enterprise have a range of tax years that are most appropriate. The actual data used is for the nearest fit to the target year, with alternatives limited to be within three tax years of the census year. Most are within one year of the target.

3.2 Sector characteristics 1-digit level

Sector markets are expected to be critical contributors to heterogeneity. Sectors were coded to 1-digit and 5-digit levels. The 1-digit level derives from the census database (blinded for review). This is approximately equivalent to modern SIC. However, many manufacturers are not distinguishable from dealers in the census or tax records as they made and directly retailed articles: e.g. shoe makers, clothiers, or milliners. Such complexities are inevitable in historical data, and it is preferable to handle them adaptably rather than impose codes that are not supported by the underlying records. Maker-dealers are also valuable to use as a base sector in the analysis because they reflect many traditional industries against which to gauge the impact of differences in profitability in other sectors. Moreover, this reflects Marshall's view (1919, p. 246-7; see also Clapham, 1932), that small makers and sellers

were the main proprietors where mechanisation was challenging their existence, but there were still many opportunities for business ‘still done in the old way’ at a scale that ‘can be advantageously produced by a man of moderate means ... [who], though the small producer is constantly threatened with extinction; though he has in fact been driven from some branches of many industries, and is in the process of being driven from others; yet he survives’.

The distribution of profit and employment by sector is shown in Table 1 at the 1-digit sector level, pooled across years. The 1-digit sector frequencies are almost identical between years, and the pooled cross-sectional sample is representative of the sectors of proprietors in the whole population; Chi square goodness of fit between the sample and aggregate sectors for all 1.5m proprietors (employers and own account) for England and Wales 1881: Chi 9.4; CR is 14.7 at $p=0.1$ with 9 df; H_0 accepted at $p=0.1$. As in the national data, the largest sectors in the sample are food sales, refreshments (mainly innkeepers and lodginghouse keepers), personal services (mainly physicians and school proprietors), retail, and manufacturing. Mining and quarrying is a very small part of the sample, entirely composed of quarries. Also relatively small is transport (mainly carriers). Note that farm profits are excluded in this paper; the agriculture sector is composed of cattle and sheep dealers, horse and stable proprietors, job masters, and nursery and seedsmen.

1-digit sector	N of firms with profits	Mean profits (all N) (£)	Mean profits (£): with zero workforce	N of firms with workforce	Mean employment	Mean profit rate (profit per employee)
1. Agriculture	69	192.99	175.05	18	4.94	94.65
2. Mining & quarrying	7	1,183.57	1,848.33	4	27.00	30.22
3. Construction	196	198.03	150.60	87	13.80	60.31
4. Manufacturing	304	423.03	201.63	106	24.59	74.34
5. Maker-dealer	283	219.53	169.70	90	7.63	89.86
6. Retail	311	299.57	261.40	96	4.82	159.13
7. Transport	47	175.50	186.86	7	6.71	56.33
8. Prof services	154	493.33	394.57	25	5.24	445.00
9. Personal services	333	275.16	253.15	18	2.72	341.40
10. Agric processing	191	361.20	224.14	88	8.06	128.86
11. Food sales	554	175.85	160.48	160	3.85	73.72
12. Refreshment	487	216.23	197.09	50	5.24	141.31
13. Finance	51	372.52	295.74	10	4.50	223.36
<i>N / average</i>	2,985	271.44	216.45	759	9.24	116.49

Table 1. Sector mean profits, number of employees, and profit rates for 1-digit sectors; those above the mean in bold. Mean calculated for individuals in that sector, with the final row being the mean for individuals in all sectors.

These sector data have never been available before; they make clear that mean profit levels have strong differentiation by sector, highest in quarrying, followed by well above average in professional services (chiefly solicitors, accountants and auctioneers), manufacturing and finance. Transport, agriculture, construction, refreshments and maker-dealers have profits well below average. However, mean profit levels are strongly affected by firm size, as clear from the final column. This shows that all the sectors with high mean workforce size also have the highest mean profit levels. The comparison of the two measures, as profitability per worker, shows that high profitability businesses are markedly concentrated in only two sectors: professional and personal services, with most other sectors clustered close to the overall mean. Only mining and quarrying, agriculture and construction have well below average profitability.

The table also includes the mean profits for those firms that had no reported employees (column 4). The contrasts between sectors and the average remain broadly the same as for all firms. However, all but two sectors had lower average profits for these zero-employee businesses, and the differences are generally large. This reflects the disincentives against taking on partners in a profitable sole-proprietor business unless it was essential. A physician or land agent could act effectively alone, and this yielded very generous profits in many cases. Zero-employee transport proprietors had slightly higher profits, and in mining they were much higher. Mining may reflect unreported workforces and must be treated with caution, but it also included major entrepreneurs with no employees who received large profits or royalties through sub-contracting.

The summary data make clear the contrast between sectors with high turnover and profits, usually associated with large firms with many workers in manufactures and quarries, and the predominantly small- and medium-sized firms in finance, food sales, and retail. Maker-dealers, the base for estimation, are close to average profitability.

The sample covers primarily small and very small firms. The five largest employers had workforces of 425, 300, 190, 184, and 160, and the data range down to firms with only one or no employees. The five largest annual profits were £29,000, £19,625, £10,000, £9,567, and £9,000, and range down to only £40: equivalent to modern profit levels (2019) from the Bank of England historical inflation calculator ranging from approximately £3.5m to £4,800.

3.3 Sector characteristics 5-digit level

A 5-digit sector classification is defined in the I-CeM census source data (Higgs et al. (2015, p. 163-83). These are primarily occupational descriptors with imperfect matching to sectors, as criticised by contemporaries (e.g. Booth, 1886) and by modern researchers (e.g. Armstrong, 1974). However, this proves to be unproblematic for the sectors in this analysis. There are 257 sectors in the sample data at 5-digit level.

It is recognised at the outset that profit was more likely to be determined at detailed industry rather than broad aggregate level. The profits for the most frequent 5-digit sectors are shown in Table 2, with composite textiles at the foot. The most frequent six sectors cover 35% of the observations, the top 18 cover 56%, and the 29 sectors listed in the table include 65% of observations from only 11% of sectors; 80% of 5-digit sectors have 5 or fewer observations. It is notable that only one manufacturing sector is included with high frequency: saddle & harness makers. Manufacturing is differentiated into 5-digit sub-sectors to a much higher degree than other sectors. Whilst saddle & harness making was a frequent localised industry widely distributed across the country; the most concentrated sector in the sample was 13 wool and worsted manufacturers in Idle, which made up 68% of manufacturing businesses in the area, as typical of the West Riding textiles districts. In contrast, the other urban areas in the sample were diversified with no prominent sector concentrations, even though they had some large firms that might have attracted interrelated industries.

5-digit sector code	N of firms with workforce	N with profits	Mean profits (all N) (£)	Mean employment	Mean profit rate (profit per employee)
713. Inns, hotels, publicans	12	330	194.5	5.7	62.8
697. Grocers & tea dealers	11	213	175.8	4.1	71.8
682. Butchers	6	148	188.6	3.1	84.1
52. School proprietors	9	147	210.9	2.0	138.7
712. Lodginghouse keepers	12	109	196.7	2.0	52.5
628. Drapers, linen	6	108	292.5	3.6	94.5
42. Physicians, surgeons	9	82	436.7	2.1	608.8
691. Bakers	11	82	147.6	3.6	71.4
686. Corn millers	10	77	213.7	6.0	66.9
405. Builders	3	57	200.3	27.4	16.3
482. Chemists druggists	6	50	224.7	2.2	198.2

653. Tailors	5	46	219.5	11.5	39.1
709. Brewers	10	39	726.4	12.3	217.1
663. Shoe and boot makers	5	37	125.7	8.6	52.2
39. Solicitors	8	37	585.8	2.0	540.6
464. Brick makers	3	36	295.7	19.1	51.0
409. Carpenter, joiner	3	33	105.0	4.5	43.6
235. Coal merchants	6	33	230.9	8.4	46.8
425. Plumbers	3	32	145.0	7.3	29.2
687. Corn & flour merchants	10	31	373.1	4.8	281.4
116. Auctioneers valuers	8	29	378.6	4.6	186.1
722. Wine and spirit merchants	12	28	554.1	4.4	340.1
655. Clothiers	5	27	187.7	6.0	55.5
708. Maltsters	10	25	311.7	7.5	135.6
369. Ironmongers & dealers	6	23	287.0	6.3	146.6
112. Brokers, agents	13	22	263.0	4.7	244.2
650/652. Milliners	5	18	159.5	3.1	53.2
733. Cattle & sheep salesmen	1	18	129.3	2.1	40.6
510. Saddle & harness makers	4	17	139.6	2.7	45.2
550-622 All textiles	7	30	400.2	71.6	95.8
Overall mean	-	-	271.4	9.2	121.1

Table 2. The 29 most frequent 5-digit sectors (with profits $N \geq 17$), plus composite textiles: mean profit rate, profitability and mean employee numbers; those above the mean in bold.

The 5-digit level brings out the very high profit levels for brewers, solicitors, wine and spirit merchants, and physicians. However, the highest profitability rate is for businesses with few employees: physicians, solicitors, wine and spirit merchants, and corn and flour merchants followed by brokers, brewers, chemists, and auctioneers. The most common maker-dealer sectors of shoe makers, clothiers, milliners had among the lowest profit levels, with profitability less than half the average, and tailors one third of the mean. Other low profitability rates were plumbers, builders, and cattle and sheep dealers. The data on these sector contrasts are fuzzy, but have never been available to

analyse in this detail before. They expose the challenges for profitability of the maker-dealer sector, but also for some construction operatives and non-farming sectors in agriculture.

Some of the highest personal incomes could be obtained in the smallest firms. Physicians, solicitors, and various local merchants and brokers often had no or few partners or employees and hence profits approximated the direct earnings of a sole proprietor. They had a good standard of living, as previously recognised with less data to draw on (Routh 1965; Digby 1994; Cain and Hopkins 1993). It is clear that these businesses were protected by various barriers (in law and medicine). These professions have been subject to modern analysis by Baumgardner (1988), Bresnahan and Reiss (1991) and Garicano and Hubbard (2009) who found similarly high profit levels in protected situations. Other sectors also gained from protected licensing regulations (wine and spirits merchants), and brokers were in highly profitable financial markets with access usually limited by social networks or apprenticeship and high training costs. Some way behind these were larger scale manufacturing firms such as brewers and maltsters who gained higher profitability primarily from higher capital intensity and economies of scale. The sector comparisons indicate that the two dimensions of market barriers and capital intensity are the primary differentiators between 5-digit sector profits and profitability. Skill levels may interact with these. The sector best reflecting low capital and market barriers but relatively high and skills was school proprietors. They had above average profitability. Private day schools offered some attractive business opportunity in this period, even as waged work as school teachers expanded (Gardner, 1984; Copelman, 1996). The sector was dominated by women who were often unmarried. The tax data make clear that schools offered attractive incomes compared to most other sectors to which women had ready access. In comparison milliners, where women were also a very large proportion, had almost zero entry costs, capital needs, and low and widespread skills, had very low profitability, as expected.

3.4 Heterogeneity

Profit heterogeneity is primarily expected from sector markets and localisation effects. It is valuable to investigate in a preliminary way how far these two dimensions account for the variance in the data. Table 3 summarises the results of an analysis of the variance between sector and locations (using 1-digit and 5-digit sector levels, for the eleven locations having sufficient sample size to allow robust estimation). The ANOVA compares the relative between-category and residual within-category variance. For example, for the first ANOVA for profits at 1-digit level at the top of Table 3, both sector and location between-category differences account for significant parts of the total variance of profit levels, with the combined and separate F statistics all significant.

1-digit sectors

PROFITS Number of obs = 2,985 R-squared = 0.166
 Root MSE = .733 Adj R-squared = 0.159

Source	Partial SS	df	MS	F	Prob>F
Between categories	318.983	28	11.392	21.15	0.000
1-digit sectors	83.462	12	6.955	12.91	0.000
Locations	233.433	16	14.589	27.09	0.000
Within categories	1592.127	2,956	0.538		
Total	1911.110	2,984	0.640		

PROFIT RATE Number of obs = 758 R-squared = 0.213
 Root MSE = 1.042 Adj R-squared = 0.184

Source	Partial SS	df	MS	F	Prob>F
Between categories	215.067	27	7.965	7.33	0.000
1-digit sectors	137.614	12	11.467	10.55	0.000
Locations	68.020	15	4.534	4.17	0.000
Within categories	793.800	730	1.087		
Total	1008.868	757	1.332		

5-digit sectors

PROFITS Number of obs = 2,985 R-squared = 0.346
 Root MSE = .678 Adj R-squared = 0.280

Source	Partial SS	df	MS	F	Prob>F
Between categories	661.4399	273	2.422	5.26	0.000
5-digit sectors	425.9189	257	1.657	3.60	0.000
Locations	158.0434	16	9.877	21.43	0.000
Within categories	1249.670	2,711	0.460		
Total	1911.110	2,984	0.640		

PROFIT RATE Number of obs = 758 R-squared = 0.603

	Root MSE	=	.816	Adj R-squared	=	0.500
Source	Partial		df	MS	F	Prob>F
	SS					
Between categories	608.449		156	3.900	5.85	0.000
5-digit sectors	530.996		141	3.765	5.65	0.000
Locations	41.986		15	2.799	4.20	0.000
Within categories	400.418		601	0.666		
Total	1008.860		757	1.332		

Table 3. ANOVA results of contribution to the variance of log profits and log profitability, by sector and location.

The value of the ANOVA is to indicate that more systematic profit variance is explained by location than sector, but profit rate variance is explained more by sector; though for both, the residual individual firm variability within-category remains critical. This is true for both 1- and 5-digit sectors, though the contrast is smaller at 5-digit level as the greater variance within aggregate sectors is now more fully controlled. This contrast in *relative* contributions gives important insights into SME behaviour at this time.

Table 3 is also useful for showing the relative contribution of sector detail. Moving from 1- to 5-digit categories explains approximately five times more of the profit variance (increasing the sector partial sum of squares explained from 83 to 425), and four times the variance in profitability (from 68 to 531), and this also absorbs some locational differences that arising from sector differences between areas. The analysis confirms Marshall's expectation that profits and profitability were the product of local and sector market conditions, and that this was more within specialist sectors, than within aggregate industries.

Another key feature of the preliminary analysis is that within-category variance (the residual) is high, meaning that individual firm variability is greater than can be explained by sector or location effects alone, at both 1- and 5-digit level. This is indicative of substantial variability in profit behaviour at the level of the individual entrepreneur, and is in accord with Marshall's understanding of differences in 'business power' or what we would now term entrepreneurial ability or energy. It may also be due to differences in business organisation, managerial resources and perceptions, or demographic factors, as examined below. But it is clear from the ANOVA that individual entrepreneurial differences are large, and hence that behavioural or agency effects are important in this historical period.

4. Estimation

More detailed analysis is developed using pooled cross-section estimates. The sample sizes in the three sample years are too small to allow reliable times series estimation, and by pooling the data any sample distortions are reduced. Nevertheless, since the data derive from profit years where the year definitions are unavoidably slightly fuzzy (as outlined above), it is an important aspect of estimation to demonstrate that year effects are generally not significant.

The chance survival of the data means that they fully cover *all* taxable SMEs in 18 areas which are towns, or clusters of small rural parishes. As noted, eleven of these have sufficient data to allow a separate estimation. Other records give an additional dispersed sample from across the whole country. Thus the sample has a mixed structure of dispersed (N=894, 30%), and for 18 areas clustered data (N=2,093, 70%). As noted, tests of the data show that the total profits distribution closely matches that of the national records as a whole, and the spatial distribution is close to the share of the national population by urban/rural areas. Hence, estimation with clustering can be used, without the need to weight for possible sample biases.

4.1 Definition of variables

Profits are defined as noted earlier, as income after expenses. Profit rate (profitability) is defined as profits divided by workforce numbers. Control variables allow estimation of the effects of: sector, location, business organisation (portfolios, partnerships), and proprietor age. A primary focus is on *sector market conditions*. We expect broad competitive conditions to be captured at 1-digit level, and specific market for goods or services at the 5-digit level. In general, after taking in all the controls, we expect SMEs to be more prominent and profits to be lower in sectors with low market entry barriers, limited requirements for prior qualifications and skills, and low capital needs especially where only variable capital was required. Conversely, profits will be higher where market entry had barriers and needed higher skills, fixed capital and durable plant (Marshall, 1920, p.612). However, profitability per worker also reflects the different sector labour ratios required, which might generate high profit volumes for proprietors but low rates of profit per worker. The two different measures allow interrogation of the different incentives that operated.

The assessment of sectors is through the 1- and 5-digit classification categories for which maker-dealers are a valuable base sector for comparison. Their products were predominantly made and sold locally, market entry barriers were usually low, capital requirement low, with mainly variable capital involved. These were the group that Marshall noted were most affected by widening spatial

competition from the expansion of larger firms facilitated by improved transport access that undermined localisation economies. They were also the traditional trades that Marshall recognised as most likely to be in some sort of previous equilibrium between medium-term local demand and supply conditions. They were affected by the emergence of capital intensification using machines in factories, and innovations of managerial control associated with local branches and mass marketing by large firms in sectors such as retailing, and shoe and clothing manufacture. The largest categories of maker-dealers, accounting for 45% of the sample (tailors, shoe and boot makers, clothiers, and milliners) were all medium skill sectors subject to the new competition from factory machinery. However, some maker-dealer sectors had high skill and trade barriers to market entry, which initially insulated them from large-firm competition, such as clock and watchmakers, jewellers, and instrument makers.

In addition, each business was coded to five *sector market measures*. All are categorical codings based on the 5-digit sector's general characteristics. First, each firm was coded as to the level of *Specificity* or generality of its sector compared to all businesses in that area, derived from the (blinded for review) distribution. A sector that is represented by less than 1% of businesses in that area is highly specific, by 1-5% moderately specific, 5.1-10% low specificity, those over 10% were coded as locally or nationally generic (widespread in that area, or in the country as a whole). A second coding was the level of *Barriers* to market entry: little or none, low, medium, and high; this is derived from discussions by Marshall (1920, pp. 535-9; 1961, pp. 665, 693), Clapham (1932), and modern literature (e.g. More, 1980; Crossick and Haupt, 1995; Nicholas, 2004; Hatton, 2014). A third coding was to level of *Capital* generally required in that sector: little or none, small, medium, and large; again based on previous literature (particularly Cottrell, 1980; Marshall, 1920, pp. 516-22). The fourth coding was to the generic industrial structure of the area to indicate how far different types of economy influence profits. This classification was derived from a factor analysis of the sector distribution of all employers and own account proprietors in Registration Sub-Districts (RSDs) (reported in, blinded for review, Fig 17). This provides eight *Local Factor* spatial codings. Businesses are coded to whether they are *Atypical* or typical compared to the top 70 locally dominant 5-digit sectors. The atypical may of course be an aberrant marginal or struggling enterprise, but they may be the firms most able to exploit their differences from the local context to achieve monopoly profits. Almost all firms are within the dominant sectors, as to be expected; 2.6% qualify as atypical. These variables are often intercorrelated; for example, high barriers are often similar to high capital and high specificity. Although each gives a different emphasis, they have to be estimated separately.

The second main dimension of analysis is *localisation effects* and *urbanisation effects*. Accessibility of the locality was measured for rail and waterway networks, coded to parish level (Satchell et al., 2019). These were critical parts of the nineteenth century transport infrastructure. The controls used were *Distance to the nearest Rail Station*, (kilometres), presence of *Rail Station*, and presence of

Waterway Access (as dummy variables). We expect profitability to be higher as distance to a station decreases, and higher where stations and waterways are immediately present. Note that all locations had good road access at this date so this is not included.

Urbanisation effects were assessed by a series of spatial covariates and controls. Aggregate local market potential was assessed through an *Urban/Rural Coding*. Five categories were developed from long-established definitions by Law (1967) and Robson (1973); see (blinded for review): Urban - a population of $\geq 10,000$; Urban transition – urban fringe areas where the remainder of a RSD had at least one urban parish in a Law-Robson town; Transition – higher density semi-rural parishes in RSDs with no Law-Robson towns but population density ≥ 0.3 persons per acre; Rural - RSDs with parish density < 0.3 ; London Metropolitan area. We expect urban areas to have higher profit and profitability, ranging down to the lowest in rural areas.

Three alternatives to the urban/rural coding are also used. First, *Distance to Town* (kilometres) measures the extent of accessible local market potential to the nearest Law-Robson town of over 2,500 population. Second, *Population Density* measures local market concentration. Third, *Settlement population Size* measures total size of the local market. These variables are alternative ways of measuring local market potential and are often strongly intercorrelated so that they are estimated separately.

A key element to control for is different *business forms*. The alternatives examined are (i) diversification towards portfolios of more than one business activity, and (ii) operation as a sole proprietor or through partnership with others. *Portfolio Status* (dummy) variable reflects Marshall (1919, p. 216), that although there were advantages of industrial specialisation, portfolios were one form of business expansion ‘extending its operations horizontally’, as opposed to vertical expansion above or below to take control of inputs or marketing. The choice might depend on the kind of products or processes (Belussi and Caldari, 2008, p. 342 n.1), but we expect, as unrecognised by Marshall, it might be mainly driven by necessity as a result of the main business activity yielding inadequate income. Necessity entrepreneurship as a driver of portfolios has become an important theme in modern entrepreneurship studies, for both farm-to-non-farm diversification important during the nineteenth century, but also between non-farm sectors (e.g. Carter. and Ram, 2003; Radicic et al., 2017). Moreover, we expect diverse portfolio responses to occur in localities with different transport opportunities. Portfolios were fully indicated in census and tax responses and coded to 1-digit and 5-digit levels.

Partnership Status (dummy variable) and *Partnership Size* (N of partners) were used to compare with the base case of sole proprietorship. The important development of using the corporate form unfortunately cannot be examined within the data. Most companies made their tax returns through their registered offices, mainly in London, and are not part of the available surviving records. To

check status, the largest firms in the sample, and those recorded as ‘& Co.’ or similar, were searched in other records but none were incorporated at the relevant date. Partnership status was therefore used as the available indicator of business form compared to sole proprietors. Although giving a lot of attention to the emergence of competition from limited companies, Marshall (1919, p. 314-5) also recognised private partnership as ‘the representative firm in most industries and trades’ in the period examined here, offering some scope for ‘its own (internal) economies [although these] were not great’, and could offer ‘composite quasi-rent’ (Marshall (1920, pp. 626-7). This is accepted by modern historians, with Hannah (2014, p. 867; see also Clapham, 1932; Payne, 1984; Guinnane, et al., 2007) arguing that English common law partnerships in this period gave most of the advantages of ‘corporate-ness’ without becoming companies. We expect partnerships, and partnership size, to be associated with higher profits, but to vary as to profitability depending on required labour ratios. 1 .

A key contribution of this paper is linkage to the census. This is most important for providing the workforce data, but it also opens avenues to assess proprietor personal characteristics. There is an important literature that suggests that age and other demographic factors positively affect firm performance (e.g. Westhead and Wright, 1998; Carter et al., 2004), sometimes as a surrogate for firm age, but also indicating proprietors’ experience, skills and life cycle. *Age* was the only demographic variable found to have significant relation to profits and profitability in preliminary analysis.

However, when included in the final estimates, age was rarely significant. Various preliminary estimates with sex, marital status and relationships within households showed no significant effects, mainly because over 90% of the proprietors with taxable profits were male, married and heads of household.

4.2 Profit levels

Pooled cross-sectional estimates for profit level are shown in Table 4. The left-hand columns show the estimates for 1-digit aggregate sectors, with the five alternative sector market measures estimated separately. The majority of sectors have higher profits compared to the maker-dealer base, but in almost all cases only five were significantly higher: retail, professions, personal services, agricultural processing, and finance. Except for mining and quarrying, and manufactures, this includes all the sectors with higher profits than maker-dealers in Table 1. The results almost fully accord with the assessment of the relative variances in Table 3, but allow for a wider set of external controls.

Variables	1-digit sectors					5-digit sectors
	Sector concentration	Market access	Capital intensity	Local factor	Factor fit	

1.Agriculture	0.04	0.05	0.12*	0.05	0.05	
2.Mining & quarrying	0.24	0.23	0.36	0.27	0.40	
3.Construction	-0.06	-0.05	-0.03	-0.04	-0.04	
4.Manufacture	0.06	0.05	0.08	0.11	0.13	
6.Retail	0.13***	0.17***	0.16***	0.15***	0.16***	
7.Transport	-0.23**	-0.20*	-0.22*	-0.19*	-0.19*	
8.Prof services	0.347***	0.22***	0.46***	0.41***	0.41***	
9.Personal services	0.29***	0.21***	0.31***	0.29***	0.28***	
10.Agric processing	0.37***	0.42***	0.32***	0.40***	0.41***	
11.Food sales	0.05	0.13***	0.06*	0.05	0.05	
12.Refreshment	-0.01	0.11	-0.02	-0.03	-0.03	
13.Finance	0.22	0.29**	0.48***	0.39***	0.40***	
1.Highly specific	0.46**					
2.Moderate specific	0.21**					
3.Low specific	0.46***					
4.Locally generic	0.11***					
2.Low barriers		0.08***				
3.Medium barriers		0.29*				
4.High barriers		0.50***				
2.Small capital			0.13***			
3.Medium capital			0.26***			
4.Large capital			0.92***			
1.Commercial & professional				-0.16		
3.Clothing & agricultural produce				-0.03		
4.Retail & merchanting				0.10		
5.Heavy manufacturing				1.37***		
6.General mf & ports				-0.12		
7.Textiles				0.36**		
8.Average				0.08		
Atypical sector					0.14	
2.Urban transition	0.06	0.07	0.07	-0.03	0.10	0.01
3.Transition	-0.04	-0.04	-0.03	-0.07	-0.02	-0.09
4.Rural	-0.39***	-0.39***	-0.37***	-0.43***	-0.37***	-0.41***
5.London	0.63***	0.71***	0.68***	0.91***	0.69***	0.66***

Distance to rail station	0.001	0.001	0.001	0.001	0.001	0.008
Rail station presence	0.19***	0.17***	0.18***	0.22***	0.18***	0.15***
Waterway presence	0.10*	0.09	0.09*	-0.01	0.10*	0.08*
Portfolio	-0.12***	-0.10***	-0.12***	-0.12***	-0.12***	-0.07**
Partnership	-0.06	-0.06	-0.06	0.19	-0.06	0.26
Partnership size	0.44	0.43*	0.44*	0.33	0.46*	0.20
Age	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000
Source Year 1871	0.09**	0.08*	0.07	0.05	0.07	0.09**
Source Year 1881	0.03	0.02	0.02	-0.06	0.02	0.00
Cons	4.82***	4.69***	4.70***	4.95***	4.84***	4.90***
R2	0.248***	0.258***	0.247***	0.249***	0.235***	0.379***

Table 4. Regression coefficient estimates of log profit levels, with alternative sector classifications at 1-digit sectors, and aggregate estimates for 5-digit sectors; N=2,985. Base: 5-maker-dealer, urban location, no rail station, no portfolio, not partnership, source 186, sector concentration generic, market access no barriers, low capital intensity, local factor 2.Agricultural & small manufacturing trades, and typical of area; ***, ** and *are statistically significant at $p \geq 0.01$, 0.05, and 0.1 level, respectively

The alternative sector measures are mostly strongly significant, and indicate little variation between most categories. This is indicative of high profit levels being achievable in all types of business. As Marshall concluded, high profits were achievable in most sector categories, irrespective of specificity, market barriers and capital requirements. A notable exception was the level of atypicality, which was not significant. This probably reflects the locally atypical businesses in the sample were mostly competing in wider regional or national markets unrelated to local sector markets. This is apparent for the main atypical cases, such as textile businesses in a non-textile area, or heavy manufacturing in commercial, retail or merchanting centres. The Victorian economy was highly diversified across space, with even the most specialised locations having examples of businesses more typical of other areas. The factor analysis coding perhaps provides the most valuable insight. Profit levels were not significantly related to most differences in local industrial structure; again confirming that good profits could be made by most sectors in most places. However, heavy manufacturing and textiles areas were locations where higher profits were achieved through capital intensification and economies of scale, requiring significant local infrastructure and related industries to support them. This is indicative of possible Marshallian district effects although, as stated at the outset, data limitations prevent detailed comparison of districts and non-districts. Overall, however, the alternative sector

controls give little difference in aggregate R2, and only marginal improvement over excluding them all (see Table 6, discussed below).

More detailed insights into sector differences are available from estimating with 5-digit sectors as an attempt to control for within-sector heterogeneity. The base used is the largest sector (713: Inns, hotels, publicans) which, as shown in Table 2, has relatively low profit levels. The 257 sectors in the sample are too numerous to be fully reported in Table 4, but the estimates in the right-hand column are fully consistent with the 1-digit estimates. In more detail, the main sectors which have the greatest differences from the base and are significant at $p \geq 0.01$, are shown in Table 5. They fall into three groups. First, the main sub-sectors driving the aggregate positive significance within the professions : solicitors, physicians, auctioneers, and bankers. These had the highest market barriers and skills training, as well as low capital needs. They contrast with professionals such as civil engineers that had not yet attained strong regulation to control market entry. Second, there are a number of relatively specialised sectors of manufacturers with high profits compared to the manufacturing average which derive from high capital intensity and scope for economies of scale. The sample size in many of these sectors is small, so they must be interpreted cautiously. However, the results are clear. The high capital manufacturing sectors are mainly in cement, bottles, bricks, paper, textiles, brewing, distilling and ice/ice cream. These contrasted with the negative coefficients and low profit levels for relatively low capital manufacturing and construction trades such as (non-iron/steel) metal refining, bone manufacturer, and carpenters and bricklayers. The third group includes some of the retailers and food sellers with higher profit levels which probably reflects their higher use of low-cost family labour, and buoyancy of a local market underpinned by high population growth. However, overall there are few sectors which diverge significantly from the mean. This confirms Marshall's observation that scope to exceed the average occurred only in sectors with special trading conditions. In this sample chiefly these occur where there are limits to market entry in professional services, personal services and finance, and in specialist manufacturing with high capital requirements.

+	39. Solicitors	+	465. Plaster, cement mf
+	42. Physicians, surgeons	+	469. Glass bottle mf
-	65. Civil engineers	+	471. Brick dealers
-	75. Photographers	+	482. Chemists & druggists
+	116. Auctioneers	+	498. Oil and colourmen
+	120. Bankers	+	519. Paper manufacture
+	122. Brokers	+	550/555 Cotton mf
+	139. Horsekeepers	+	560/561/571. Worsted mf
-	183. Nursery & seedsmen	+	618. Woollen mf
+	202. Mine owner/manager	+	628. Drapers

-	261/2 Farriers & blacksmiths	-	653. Tailors
+	279. Domestic machine mf	+	679. Cheesemongers
+	280. Agricultural machine mf	+	682. Butchers
-	320. Metal refiners	+	686. Corn millers
-	330. Iron fence mf	+	705. Ice & ice cream makers
-	393. Piano, organ mf	+	709. Brewers
-	395. Toy makers	+	710. Distillers
-	409. Carpenter, joiner	-	712. Lodginghouse keepers
-	412. Bricklayers	+	722. Wine and spirit merchants
-	426. Gasfitters	-	739. Bone, horn mf & dealers

Table 5. Main 5-digit sectors identified as having significantly different profitability (exceeding $p \geq 0.01$) from base sector (713. Inns and publicans). Derived from regression estimates for profit levels, replacing 1-digit with 5-digit sectors in Table 4.

Returning to Table 4, the rest of the controls give insights into influences on profits beyond sector markets. They are almost entirely consistent between the 1-digit estimates in the left-hand four columns and 5-digit estimates in the right-hand column. They are also consistent across the separate estimates for alternative sector controls. For the key urbanisation variable the extremes stand out: rural areas have significantly lower profits than the urban base, and London has significantly higher profits than other urban areas. These are both in the expected directions. Though the distance to a rail station is not significant, the presence of a railway station has a strong positive significance and the presence of waterways a weaker positive significance on profit levels, indicating the larger-scale market opportunities these modes of access gave for some trades. Business organisation has strong negative effects on profits from portfolios, but little effect from partnership status or partnership size. Business diversification thus appears to be associated more with efforts to develop alternative out of necessity from low profit levels rather than a way to significantly expand profits: necessity more than opportunity entrepreneurship Proprietor age is not significant.

An important result in Table 4 is that source year is generally not significant. This confirms that pooled cross-section estimation is robust; differences between profits for different years and some inevitable fuzziness of the year dates of data available do not undermine the estimation. Although the 1871 year is significant in one estimate, this reflects inevitable differences in micro sector concentrations between the sample data available by year; this does not undermine the main results.

A further test of the robustness is shown in Table 6. This excludes the alternative sector controls and tests the alternative urbanisation measures. The results for all the sector variables and other spatial controls are almost identical to Table 4. The alternative urbanisation measures confirm the extremes of rural areas and London standing out with significantly lower and higher profits, respectively, than other areas. This result is again consistent between 1- and 5-digit levels. The alternative urbanisation measures confirm the expected effects of distance to a town (profits fall as distance increases), profits rise with increasing population concentration, and settlement size increases profits. However, the overall R2 from these alternatives is generally lower and they give confirmatory rather than additional insight to that available from the urban/rural classification. Year effects are significant at $p \geq 0.05$ for two urbanisation measures, reflecting spatial concentrations of the sample data by year. This confirms preference for pooled cross-section estimation, and the robustness of estimates based on the most generic urbanisation measure (urban/rural classification).

Variables	1-digit sectors				5-digit sectors
	Urban status	Distance to town	Pop density	Settlement size (log)	
1.Agriculture	0.05	-0.04	-0.06	0.003	
2.Mining & quarrying	0.43	0.36	0.37	0.47	
3.Construction	-0.04	-0.08*	-0.07	-0.05	
4.Manufacture	0.14	0.11	0.13	0.14	
6.Retail	0.15***	0.15***	0.16***	0.16***	
7.Transport	-0.19*	-0.17*	-0.16	-0.15	
8.Prof services	0.41***	0.40***	0.41***	0.42***	
9.Personal services	0.28***	0.26***	0.27***	0.27***	
10.Agric processing	0.41***	0.35***	0.35***	0.437***	
11.Food sales	0.04	-0.001	0.01	0.03	
12.Refreshment	-0.03	-0.05	-0.04	-0.03	
13.Finance	0.40***	0.36***	0.38***	0.39*	
2.Urban transition	0.10				0.01
3.Transition	-0.02				-0.09
4.Rural	-0.38***				-0.41***
5.London	0.70***				0.66***
Distance to town		-0.19**			
Population density			0.002***		
Settlement size (log)				0.09***	
Distance to rail station	0.008	0.008	-0.005	0.014*	0.008

Rail station presence	0.18***	0.35***	0.36***	0.15**	0.15***
Waterway presence	0.10*	0.19**	0.16**	0.11**	0.08*
Portfolio	-0.12**	-0.16***	-0.16***	-0.12***	-0.07**
Partnership	-0.10	0.06	0.09	-0.12	0.26
Partnership size	0.47*	0.42*	0.41	0.49*	0.20
Age	-0.002	-0.001	-0.001	-0.001	-0.000
Source Year 1871	0.08	0.04	0.05	0.17***	0.09**
Source Year 1881	0.02	0.11*	-0.13*	0.20***	0.00
Cons	4.84***	4.71***	4.68***	3.80***	4.90***
R2	0.235***	0.190***	0.189***	0.221***	0.379

Table 6. Regression coefficient estimates of log profit levels, with alternative location measures; estimates for the 257 occodes not reported in last column. Base categories and definitions as Table 4.

4.4 Profit rate

Estimates of the covariates influencing profitability are shown in Table 7, for firms with employees, including partners as personnel. Taking the 1-digit level in the left-hand columns, sector profitability is closely in line with profit levels in Table 4, except that more sectors have significantly lower profitability than profit levels; notably mining & quarrying and construction. Profitability as measured here reflects the labour ratios of different industries. Table 7 shows that although profits could be high in most labour-intensive industries, mining, construction and manufacturing often had low profitability because of their very high labour ratios. In contrast most sectors with higher profitability such as retail, professions and services, were characterised by small firms with few workers, many often from the family.

Variables	1-digit sectors					5-digit sectors
	Sector concentration	Market access	Capital intensity	Local factor	Factor fit	
1.Agriculture	-0.01	0.01	-0.08	-0.06	-0.04	
2.Mining & quarrying	-1.49***	-1.46***	-0.88***	-1.04***	-1.22***	
3.Construction	-0.53***	-0.51***	-0.40**	-0.50***	-0.55***	
4.Manufacture	-0.32*	-0.36**	-0.18	-0.23	-0.26	
6.Retail	0.29**	0.30**	0.29**	0.28**	0.28**	
7.Transport	-0.75	-0.76	-0.61	-0.92**	-0.82*	

8.Prof services	0.63***	0.56**	0.69***	0.73***	0.70***	
9.Personal services	0.81***	0.50***	0.77***	0.80***	0.78***	
10.Agric processing	0.46***	0.48***	0.88***	0.49***	0.46***	
11.Food sales	0.45**	0.43***	0.42***	0.44***	0.44***	
12.Refreshment	0.34	0.44*	0.30*	0.34**	0.31**	
13.Finance	0.24	0.24	0.47	0.42	0.35	
1.Highly specific	0.28					
2.Moderate specific	0.29					
3.Low specific	0.42**					
4.Locally generic	-0.02					
2.Low barriers		0.14**				
3.Medium barriers		0.05				
4.High barriers		0.65				
2.Small capital			-0.06			
3.Medium capital			-0.58***			
4.Large capital			-0.04			
1.Commercial & professional				-0.14		
3.Clothing & agricultural produce				0.48**		
4.Retail & merchanting				0.28*		
5.Heavy manufacturing				0.09		
6.General mf & ports				0.35		
7.Textiles				-0.10		
8.Average				0.65***		
Atypical sector					-0.07	
2.Urban transition	0.16	0.17	0.19	0.09	0.18	0.10
3.Transition	-0.27*	-0.26	-0.23	-0.46***	-0.25*	-0.19
4.Rural	-0.36**	-0.34**	-0.33***	-0.54***	-0.34**	-0.19*
5.London	0.44**	0.46**	0.52**	0.76***	0.51**	-0.01
Distance to rail station	0.001	0.001	0.0001	0.001	0.001	-0.003
Rail station presence	-0.07	-0.07	-0.10	-0.01	-0.06	-0.07
Waterway presence	0.01	0.04	0.03	0.01	0.04	0.07
Portfolio	-0.10	-0.08	-0.08	-0.10	-0.09	-0.13
Partnership	0.82	0.78	0.44	0.59	0.67	0.34
Partnership size	0.08	0.10	0.27	0.21	0.17	0.21

Age	-0.001	-0.001	-0.001	-0.001	-0.001	0.001
Source Year 1871	-0.16	-0.16	-0.21	-0.12	-0.17	-0.18
Source Year 1881	-0.14	-0.13	-0.16	-0.42***	-0.14	-0.04
Cons	3.84***	3.71***	3.93***	3.87***	3.82***	3.86***
R2	0.323***	0.329***	0.333***	0.326***	0.316***	0.620***

Table 7. Regression coefficient estimates of log profitability; N=758; definitions and base as Table 4.

The alternative sector controls have mostly minor significance, indicating that profitability was little affected by specificity, access barriers, and capital levels, and not at all by atypicality of a sector locally. Hence, generic sectors, and those with no market barriers and small capital requirements were as profitable as most other firms. The interpretations are constrained by the sample sectors and locations available. Perhaps most robust is that higher capital levels than ‘little or none’ are all negative to profitability, although only significant for medium capital levels. This reflects the different measure of profitability based on capital intensity used by Marshall to that used here based on employees. The local factor codes suggest that areas closest to the national average returned the significantly highest profitability, with areas dominated by Clothing & agricultural produce, and to a lesser extent Retail & merchanting locations also significantly more profitable compared to the base of Agricultural & small manufacturing trades which had the highest concentration of traditional maker-dealer sectors. However, the limitations of both the sample and the mode of coding the sector controls suggest that these results should not be over-interpreted.

Few other covariates are significant; the estimates are dominated by sector differences, as already suggested in the Table 3 ANOVA. The main effects are for the urbanisation covariate, which is in the same expected directions as Table 4. The 5-digit sector estimates in the right hand column are fully consistent with this. No localisation variables are significant, indicating that different labour input ratios are already controlled in the other variable..

The urbanisation variable is again tested for robustness against alternative measures, shown in Table 8. The results are almost identical to Table 7, confirming again the extremes of rural areas and London as contributing to the highest R2, though only the rural aspect significant for the 5-digit analysis. The 5-digit sector estimates in the right hand column are fully consistent with the 1-digit estimates, and there are no year effects.

Variables	1-digit sectors				5-digit sectors
	Urban	Distance	Pop	Settlement	

	status	to town	density	size (log)	
1.Agriculture	-0.04	-0.04	-0.05	-0.05	
2.Mining & quarrying	-1.25***	-1.26***	-1.24***	-1.16***	
3.Construction	-0.54***	-0.55***	-0.52***	-0.54***	
4.Manufacture	-0.27	-0.26	-0.24	-0.24	
6.Retail	0.28**	0.29**	0.30**	0.28**	
7.Transport	-0.82*	-0.64	-0.72*	-0.64	
8.Prof services	0.70***	0.69**	0.72***	0.71***	
9.Personal services	0.78***	0.78***	0.82***	0.77***	
10.Agric processing	0.46***	0.45***	0.49***	0.49***	
11.Food sales	0.44***	0.43***	0.46***	0.44**	
12.Refreshment	0.31**	0.32**	0.36**	0.35	
13.Finance	0.36	0.40	0.39	0.39	
2.Urban transition	0.18				0.10
3.Transition	-0.25*				-0.19
4.Rural	-0.37**				-0.19*
5.London	0.50**				-0.01
Distance to town		-0.14*			
Population density			0.005***		
Settlement size (log)				0.06***	
Distance to rail station	-0.003	0.001	-0.0001	0.001	-0.003
Rail station presence	-0.07	0.16	0.17	-0.01	-0.07
Waterway presence	0.04	0.05	0.01	-0.01	0.07
Portfolio	-0.10	-0.13	-0.13	-0.09	-0.13
Partnership	0.69	0.75	0.81	0.63	0.34
Partnership size	0.16	0.14	0.12	0.18	0.21
Age	-0.001	-0.001	-0.001	-0.001	0.001
Source Year 1871	-0.17	-0.22	-0.19	-0.12	-0.18
Source Year 1881	-0.14	-0.06	-0.02	-0.001	-0.04
Cons	3.82***	3.63***	3.58***	2.97***	3.86***
R2	0.316***	0.302***	0.307***	0.309***	0.620

Table 8. Regression estimates of log profitability; definitions and base as Table 4.

More detailed results at 5-digit level are shown in Table 9 for the main sectors significant at $p \geq 0.01$ or greater: on the left for employers, and on the right for sole proprietors. Only ten of the 5-digit significant sectors are among the most frequent sectors (accounting for 20% of the database): solicitors, physicians, lodging houses, butchers, carpenters, auctioneers, chemists, tailors, clothiers and shoemakers. Most of the significant 5-digit differences are for small and specialist sectors ranging between high and low labour/capital ratios. This explains the lack of clear messages from the alternative sector controls in Table 7. In most manufacturing sectors and quarrying profitability per worker was low and here were few exceptional opportunities for higher profitability: mainly domestic machinery, tool, cement, and glass manufacturers. Horsekeeping was a surprising exception in the agricultural sector with high profitability, mainly reflecting its association with urban areas where it was the crucial mode of transport.

sign	Employers	sign	Sole proprietors
+	39. Solicitor	+	39. Solicitor
+	42. Physician, surgeon	+	42. Physician, surgeon
+	44. Veterinary surgeons		
		+	64. Mining Engineers
-	65. Civil engineers	+	65. Civil engineers
			111. Merchant undefined
			116. Auctioneers
+	117. Surveyors, land valuers		
+	139. Horsekeeper	+	139. Horsekeeper
+	141. Carmen, carriers		
-	183. Nurseryman, seedsman		
-	184. Market Gardener	-	184. Market Gardener
		-	186. Agricultural machine proprietor
		-	220 Stone quarries
-	222. Sand & flint quarries		
-	237. Stone dealers	+	237. Stone dealers
-	259. Ironfounder		
		-	261/2. Farriers & blacksmiths
		+	279. Domestic machinery mf
		+	290. Toolmakers
-	320. Metal Refiners		
-	330. Iron fence mf		

		-	393. Piano, organ mf
		-	395. Toy makers
		-	409. Carpenter, joiner
-	412. Bricklayer		
		-	414. Mason
		-	426. Gasfitter
		+	465. Plaster, cement mf
+	468. Glass mf	-	468. Glass mf
		+	471. Brick dealers
+	482. Chemists & druggists		
+	498. Oil and colourmen		
		-	512. Brush mf
		+	550/555. Cotton mf
-	560/561/571. Worsted mf	+	560/561/571. Worsted mf
-	618. Woollen mf		
-	653. Tailors		
		-	663. Shoe & bootmakers
		-	679. Cheesemongers
+	682. Butchers		
+	684. Poulterers		
+	705. Ice & ice cream makers		
-	739. Bone, horn mf & dealers		
		-	712. Lodginghouse keepers
		+	722. Wine & spirit merchants

Table 9. Main 5-digit sectors identified as having significantly different profitability (exceeding $p \geq 0.01$) from base sector (713.Inns and publicans). Derived from regression estimates for profitability, excluding 1-digit sectors as used in last column of Table 8.

Table 9 also compares the estimates between employers and sole proprietors. Most sectors have similar patterns, but civil engineers, stone dealers and worsted manufactures had significantly lower profitability for employers than sole proprietors. In these sectors higher profitability could be obtained as a sole operator, whereas in contrast in glass manufacture economies of scale favoured large employers. There is some reflection of skills and capital intensity in these results, but the pattern is

complex reflecting the specific trading conditions of each sector and, because the samples are very small in most sectors, there are major effects from the individuality of specific firms and their particular markets.

5. Implications and conclusion

This paper has estimated the extent of heterogeneous profits and profitability at firm level for historical data in the period when Marshall primarily formed his views. Although the sample data are limited in various ways, the results are sufficiently clear to allow conclusions to be drawn that give new insights into the incentives for different types of SME in the 19th century. They generally confirm Marshall's contemporary insights. *Profits* varied profoundly by location and chiefly reflected contrasts of large-scale urbanisation economies available in towns compared to rural areas. Larger profits generally needed a larger urban base to support businesses' needs. Alternative urbanisation measures show the same results: for proximity to towns, higher population density, and larger settlements which all favoured higher profits. Localisation effects were significant for the presence of a station, and to a lesser extent for presence of a waterway. In comparison, *profitability*, measured here as profits per worker, was usually more influenced by sector market conditions than locality at both aggregate and detailed sector levels. Urbanisation economies were still highly significant, but the overall explanatory power was less than for sector differences.

The historical context of 1861-81 for SMEs promoted profit heterogeneity between localities, but primarily at the sector level. Moreover, the largest differences in sector market opportunities for SMEs reflected the constraints to market entry and barriers to access that chiefly benefited the professions, a point recognised by Marshall but not developed in the way that the data here has allowed. Capital requirements, sector specificity and the industrial structure of localities also influenced profit levels but, as far as these data have been able to show, were less consequential for profitability per worker. Although Marshall was discussing profitability in relation to capital whereas the data here are profit per worker, the results are fully consistent with one of his most fundamental insights: that profitability tended to converge across sectors, at least for the SMEs examined here. The level of 'typicality' of the sector of a business within its locality also does not seem to have offered systematic advantages; such firms appear to have had profits determined by regional or national rather than local competitive conditions. This is to be expected as almost all atypical firms in the sample were medium to large manufacturers which traded outside as well as inside their localities.

Some of the highest of all profit and profitability levels were led by professions such as physicians and solicitors befitting from strong market barriers, though lower profits occurred in newer professions such as engineers and accountants where barriers were then less developed. Other high

profitability reflects the measure used (profits per worker): for personal services, agricultural processing, retail and refreshments could significantly above-average profitability because of their low labour ratios (often supplemented at low cost by family labour). This result is rather a contrast to many dominant narratives of the nineteenth century which laud the high profits to be made in large textile mills and London financial markets (Checkland, 1964; Cain and Hopkins, 1993; Jeremy, 1998; Hannah, 2014). These narratives have been developed predominantly using the data on the largest firms. Few of these are contained in the data. However, enough high profit manufacturing and finance in medium-sized firms are included to indicate that the professions were able more consistently to gain high personal incomes on a broader scale across the country than the small and medium-sized proprietors in finance and manufacturing contained in this sample. This begins to open a new window on the different incentives to entrepreneurs for smaller firms, the 'regiments of the anonymous' as Payne (1988) termed them. They have necessarily been neglected in much previous research because of the lack of data, but they composed over 98% of all firms. The relative numbers of these proprietors gives a feel for the incentives and distribution issues involved. There were at least 23,500 employers and sole-proprietor professionals as physicians and solicitors in England and Wales in 1881. In manufacturing in 1881 there were less than 500 large-scale manufacturing employers with over 1,000 employees, and only 22,000 firms in manufacturing that employed over 20 workers. Hence, at the level of individuals, the physicians and solicitors vastly outnumbered the largest manufacturers, and roughly equalled those with over 20 workers. These professions generally offered many more high personal profit opportunities with far fewer risks and challenges than managing large workforces. Similar profit opportunities for professionals and retailers among small businesses in localised markets are found in modern research (e.g. Baumgardner, 1988; Bresnahan and Reiss, 1991; Garicano and Hubbard, 2009).

Higher skill and capital requirements in some manufacturing and maker-dealing industries in the sample are associated with limits to market entry. This was associated with significantly higher profitability in some specialist sectors, like cement and glass manufacture, and also in some 'traditional' industries like manufacture of domestic machinery and tools where large workshop production was developing. But generally manufacturers and maker-dealers required high labour inputs to make substantial profits (as typified by the Idle wool and worsted manufacturers in the sample). This usually kept profitability per worker low, though of course returns on capital, which we cannot measure, was often much higher.

The more limited extent of heterogeneous profitability between localities than between sectors is indicative of increasing market integration. However, important urbanisation effects occurred in the expected direction: rural areas generally offered significantly lowest scope for profit and profitability; transitional rural areas were also low; with urban areas and especially London significantly higher. Similar effects favoured larger settlements, higher densities, and closeness to towns. Accessibility was

also important for profit levels. There were also some localisation effects for profits in relation to closeness to a rail station and the presence of a station or waterway. However, profitability was generally not influenced by localisation measures, indicating that although access was essential to achieve high profits, this was now generally available and profit per worker did not vary much between areas. This is a further confirmation of Marshall's assessment that profitability tended to the mean (though he spoke of profit in relation to capital, rather than profit per worker used here).

Similarly, differences in firm-level organisation (measured by portfolios and partnership) explain some profit heterogeneity, but not profitability. It appears that in this period portfolio diversification to capture the 'productive opportunities' of managerial strategy and capabilities was mainly associated with lower levels of profits, driven more by necessity to maintain a living income than opportunity entrepreneurship. Partnership business organisation had low but positive significance in explaining profit levels, indicating some effect of the benefits of expanding business organisation to achieve scale, but partnerships were not significant for profitability. Similarly, demographic characteristics of the entrepreneur (age, gender, etc.) generally offer little explanatory power to interpret heterogeneous profits or profitability.

Beyond the specific effects examined, a significant level of residual heterogeneity remains unexplained. The evidence is constrained by the data available, but both the ANOVA and regression estimates indicate a large residual beyond sector, location, and other covariate effects. This must be mainly accounted for by agency and individual entrepreneurial characteristics, what Marshall called differences in 'business power', that differ in a way that it has not been possible to examine in the historical data. Alternative measures of sector market characteristics also show similarly high residuals indicative of agency for all alternatives estimated.

These conclusions enable us to comment on how Marshall's thinking related to the period in which he wrote in a way that has not been previously possible. Marshall (1919, p.92-3, 248) argued that the mid-nineteenth century had 'an unprecedented combination of advantages [that] enabled businessmen to make money even when they were not throwing themselves with energy' into their business, so that 'the number of small businesses is constantly growing'. This supports the idea that agency and individual entrepreneurial characteristics account for the unexplained heterogeneity: a rising tide lifted all ships, but some could rise much faster if they had more active and alert entrepreneurs, greater skills of 'business power', or 'backbone' (Marshall, 1920, p. 596ff.). His view that routine manufacturing earnings were limited without active and innovative managers remained unchanged from 1890-1 in the first and second editions of *Principles* (Marshall, 1961, pp. 645-8). However, we should not overstate the role of agency. The dominant sources of differentiation of profitability were firstly sectors, and secondly urbanisation. Marshall did not give such an explicit statement, but the ranking of these effects is implicit in his writing. The concept of convergence to industry profit rates,

and perhaps convergence of cross-industry rates, was one of his major insights, which underpinned his view that equilibrium rates were established. This became fundamental to his later thinking after 1890 in *Principles*. Moreover Marshall saw urbanisation and locality effects as primarily benefits for smaller firms rather than larger ones. This is now demonstrated to hold for this sample at this date, which covers SMEs in particular. Although it has not been possible with the data and localities available to examine Marshall's wider ideas about industrial district effects, it is clear that Marshall's thinking was closely grounded in the world he observed and which we can now observe through the new tax data.

The analysis is also able to make some comparisons between firms with personnel of more than one, and sole proprietors on their own. Indeed many sectors of building, carriage, services and the financial sector were almost entirely composed of own-account proprietors. Marshall did not fully recognise the role of these proprietors. Yet recent analysis of the digital census records indicates they were numerically by far the largest part of the business population, increasing from 60% to 65% of all businesses 1851-1881 (blinded for review). These own-account proprietors were characterised by fewer high profitability sectors, but some (such as physicians and lawyers) had scope for high profits, and none in the sample had low profitability.

Further research can be developed with these data, not least because they are not anonymised and hence offer potential for further record linkage at local level, and perhaps to combine with other data on larger enterprises and corporates to give a broader picture across the firm-size range. But the sample has proved sufficient to open up new insights into business profits for the period, and confirm the strong grounding of many of Marshall's contemporary insights.

References

- Armstrong, W. A. 1972. The Use of Information about Occupations, pp. 191-210 in E. A. Wrigley (ed.) *Nineteenth-Century Society: Essays in the Use of Quantitative Methods for the Study of Social Data*, Cambridge University Press
- Barker, T. and Gerhold, D. 1993. *The rise and rise of road transport, 1700-1990*, Cambridge University Press
- Baumgardner, J. R. 1988. Physicians' Services and the Division of Labor across Local Markets, *Journal of Political Economy*, vol. 96, no. 5, 948–82.
- Becattini, G. 1990. The Marshallian industrial district as a socio-economic notion, p. 37– 51 in Pyke, F. Becattini, G. and Sengenberger, W. (eds), *Industrial Districts and Inter-Firm Co-Operation in Italy*, Ginevra (CH), International Institute for Labour Studies
- Belussi, F and Caldari, K. 2009. At the origin of the industrial district: Alfred Marshall and the Cambridge school, *Cambridge Journal of Economics*, vol. 33, 335–355
- Booth, C. 1886. Occupations of the People of the United Kingdom 1801–1881, *Journal of the Royal Statistical Society*, vol. 49, no.2, 314-435
- Bresnahan, T. F. and Reiss, P.C. 1991. Entry and Competition in Concentrated Markets, *Journal of Political Economy*, 977–1009
- Cain, P.J. and Hopkins, A.G. 1993. *British Imperialism, 1688-1914: Innovation and Expansion*, Harlow, Longman
- Campbell, J.R. and Hopenhayn, H.A. 2005. Market size matters, *The Journal of Industrial Economics*, vol. 53, no. 1, 1-25
- Carter, S. and Ram, M., 2003. Reassessing Portfolio entrepreneurship, *Small Business Economics*, vol. 21, no.4, 371–380
- Carter, S., Tagg, S. and Dimitratos, P. 2004. Beyond portfolio entrepreneurship: multiple income sources in small firms, *Entrepreneurship & Regional Development*, vol. 16, no.6, 481–499.
- Checkland, S.G. 1964. *The Rise of Industrial Society in England 1815-1885*, London, Longmans
- Clapham, J.H. 1932. *An Economic History of Modern Britain, Vol. 2: Free trade and steel 1850-1886*, Cambridge, Cambridge University Press

- Copelman, D. 1996. *London's Women Teachers: Gender, Class and Feminism, 1870-1930*, London, Routledge.
- Cottrell, P.L. 1980. *Industrial Finance, 1830-1914: The Finance and Organization of English Manufacturing Industry*, London and New York, Methuen
- Crafts, N.F.R. and Mulatu, A. 2005. What explains the location of industry in Britain, 1871-1931?, *Journal of Economic Geography*, vol. 5, no. 4, 499-518
- Crossick, Geoffrey and Haupt, Heinz-Gerhard 1995. *The Petite Bourgeoisie in Europe, 1780-1914*, London, Routledge.
- Dei Ottati, G. 2017. Marshallian industrial districts in Italy: the end of a model or adaptation to the global economy?, *Cambridge Journal of Economics*, vol. 42, no. 2, 259–84
- Digby, A. 1994. *Making a Medical Living: Doctors and Patients in the English Market for Medicine, 1720-1911*, Cambridge, Cambridge University Press
- Duménil, G. and Lévy, D., 1995. Structural change and prices of production, *Structural Change and Economic Dynamics*, vol. 6, no. 4, 397-434
- Everitt, A. 1976. Country carriers in the nineteenth century, *Journal of Transport History*, 3, 179-202
- Gardner, P. 1984. *The Lost Elementary Schools of Victorian England*, London, Croom Helm
- Garicano, L. and Hubbard, T.N. 2009. Specialization, firms, and markets: The division of labor within and between firms, *The Journal of Law, Economics, and Organization*, vol. 25, no. 2, 339–71
- Groenewegen, P. D. 1993. A weird and wonderful partnership Mary Paley and Alfred Marshall 1877-1924, *History of Economic Ideas*, vol. 1, no. 1, 71-109
- Guinnane, T., Harris, R., Lamoreaux, N. R. and Rosenthal, J.-L. 2007. Putting the Corporation in its Place, *Enterprise and Society*, vol. 8, no. 3, 687-729
- Haltiwanger, J., Jarmin, R. and Krizan, C.J. 2010). Mom-and-Pop meet Big-Box: Complements or substitutes? *Journal of Urban Economics*, vol. 67, no. 1, 116-34
- Hannah, L. 2014. Corporations in the US and Europe 1790-1860, *Business History*, vol. 56, no. 6, 865-99
- Hatton, T. J. 2014. Population, migration and labour supply: Great Britain 181-2011, pp. 95-121 in R. Floud, J. Humphries and P. Johnson, eds., *The Cambridge Economic History of Modern Britain: Volume II: 1870 to the Present*, Cambridge, Cambridge University Press.

- Hopenhayn, H. 2014. Firms, misallocation, and aggregate productivity: a review, *Annual Review of Economics*, vol. 6, no. 1, 735–70
- Jeremy, D. J. 1998. *A Business History of Britain, 1900-1990s*, Oxford, Oxford University Press
- Keynes, J. M. 1936. *The General Theory of Employment Interest and Money*, London, Macmillan
- Keynes, J. M. 1972. 'Mary Paley Marshall' in *Essays in Biography, Collected Writings of John Maynard Keynes*, volume X, London, Macmillan
- Krugman, P. 1991. *Geography and trade*, Cambridge, Mass.: MIT Press
- Landini, F., Arrighetti, A. and Bartoloni, E. 2020. The sources of heterogeneity in firm performance: lessons from Italy, *Cambridge Journal of Economics* 2020, doi:10.1093/cje/beaa001
- Law, C. M. 1967. 'The growth of urban population in England and Wales, 1801-1911', *Transactions of the Institute of British Geographers*, vol. 41, 125-43
- Marchionatti, R. 2006. The 'increasing returns and competition' dilemma: from Marshall to Pigou, , pp. 617-4 in T. Raffaelli, G. Darco and M. Becattini eds., *The Elgar Companion to Alfred Marshall*, London, Edward Elgar
- Marshall, A. and Marshall, M. P. 1879. *The Economics of Industry*, London, Macmillan
- Marshall, A. 1898. Distribution and exchange, *Economic Journal*, vol. 8, no. 29, 37–59
- Marshall, A. 1919. *Industry and Trade*, London, Macmillan
- Marshall, A. 1920. *Principles of Economics*, 8th edn. London, Macmillan
- Marshall, A. 1961. *Principles of Economics*, 9th (variorum) edn., Vol 2, London, Macmillan
- Martin, R.L. 2006. The Localization of Industry, pp. 393-400 in T. Raffaelli, G. Darco and M. Becattini eds., *The Elgar Companion to Alfred Marshall*, London, Edward Elgar
- Melitz, M. J. and Ottaviano, G. I. P. 2008. Market Size, Trade, and Productivity, *The Review of Economic Studies*, vol. 75, no. 1, 295-316.
- Mitchell, B. R. 1964. The coming of the railway and United Kingdom economic growth, *Journal of Economic History*, vol. 24, 315-336.
- More, C. 1980. *Skill and the English Working Class, 1870-1914*, London, Croom Helm

- Nicholas, T., 2004. 'Enterprise and Management', pp. 227-52 in R. Floud, J. Humphries and P. Johnson, eds., *The Cambridge Economic History of Modern Britain: Volume 2: Economic Maturity, 1860-1939*, Cambridge, Cambridge University Press
- Payne, P. L. 1984. Family Business in Britain: An Historical and Analytical Survey, pp. 171-206 in A. Okochi and S. Yasuoka, eds., *Family Business in the Era of Industrial Growth: Its Ownership and Management*, Tokyo.
- Payne, P. L. 1988, *British Entrepreneurship in the Nineteenth Century*, 2nd. ed., London, Macmillan
- Penrose, E. T. 1959. *The Theory of the Growth of the Firm*, Oxford, Basil Blackwell
- Peteraf, M. A. 1993. The cornerstones of competitive advantage: a resource-based view, *Strategic Management*, vol. 14, no. 3, 179–91
- Porter, M. 1990. *The Competitive Advantage of Nations*, New York, The Free Press
- Robson, B. 1973. *Urban Growth: An Approach*, London, Methuen
- Romer, P.M. 1986. Increasing Returns and Long-Run Growth, *Journal of Political Economy*, vol. 94, no.12, 1002–37
- Rosenthal, S. and Strange, W. 2003. Geography, industrial organization, and agglomeration, *Review of Economics and Statistics*, vol. 82, no. 2, 377–93
- Rosenthal, S. and Strange, W. 2004. Evidence on the Nature and Sources of Agglomeration Economies. pp. 2119–71 in J. V. Henderson & J-F. Thiesse, eds, *Cities and Geography* Vol. 4, Amsterdam.
- Routh, G. 1965. *Occupation and Pay in Great Britain, 1906-60*, Cambridge, Cambridge University Press.
- Satchell, M., Bennett, R.J., Shaw Taylor, L., and Bogart, D. (2019). *Constructing Parish-level Data and RSD-level Data on Transport Infrastructure in England and Wales 1851-1911*. Cambridge, University Depository, <https://doi.org/10.17863/CAM.37313>
- Schürer, K. and Higgs, E. 2014. *Integrated Census Microdata (I-CeM), 1851-1911* [data collection], Colchester, Essex, UK Data Archive [distributor] SN: 7481, <http://dx.doi.org/10.5255/UKDA-SN-7481-1>
- Stamp, J. 1916. *British Income and Property: The Application of Official Statistics to Economic Problems*, London, King

- Syverson, C. 2004. Product substitutability and productivity dispersion, *Review of Economics and Statistics*, vol. 86, no. 2, 534–50
- Teece, D. J. 2009. *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth*, New York, Oxford University Press
- Teece, D. J., Pisano, G. and Shuen, A. 1997. Dynamic capabilities and strategic management, *Strategic Management Journal*, vol. 18, no. 7, 509–33
- Turnock, D. A. 1998. *Historical geography of Railways in Great Britain and Ireland*. Aldershot, Ashgate
- Westhead, P. and Wright, M., 1998. Novice, Portfolio, and Serial Founders in Rural and Urban Areas. *Entrepreneurship: Theory and Practice*, vol. 22, no. 4, 63–100
- Willan, T. S., 1936. *River Navigation in England 1600-1750*, Oxford, Oxford University Press
- Wilson, J.F. and Popp, A. (eds.) 2003. *Industrial clusters and regional business networks in England, 1750-1970*, Aldershot, Ashgate
- Wilson, J.F. and Singleton, J. 2003. The Manchester industrial district, 1750-1939: Clustering, networking and performance, p. 44-67 in J.F. Wilson and A. Popp, eds. *Industrial clusters and regional business networks in England, 1750-1970*, Aldershot, Ashgate

Notes

1. It is clear that both contributed to the early development of concepts crucial to this paper, but it is not proposed here to evaluate the different contributions by Alfred and Mary; see evaluations by Keynes (1972, p. 241), Groenewegen (1993), and the literature and evidence they review.
2. Citations to *Principles* use the 1920 edition, as the cited text is generally identical to the 1890-1 first and second editions that is near-contemporary with the data examined. The few important deviations from this text cite the 1961 variorum edition.³ ‘General Instruction’, Census of England and Wales, Householder’s Schedule, 1861; for the other census years 1871 and 1881 the question remained almost identical.
3. ‘General Instruction’, Census of England and Wales, Householder’s Schedule, 1861; for the other census years 1871 and 1881 the question remained almost identical.