

Were they ever 'productive to the capitalist'? *Rates of return on Britain's railways,* *1830-55¹*

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Introduction

The early railways were central to the development of the British economy. Their promotion and construction transformed the British economy of the mid-nineteenth century, stimulating economic activity. In 1845-9, for example, expenditure on railway construction represented 4.5 per cent of gross national product and even the wages paid by railway companies could amount to around 2 per cent of GNP.² The growth of the early railway industry also brought into being organisations of a size that led to major changes to the capital markets and to the ways in which the state sought to regulate business practice in the private sector.³

The first public railway in Britain was the Surrey Iron Railway (between Wandsworth and Croydon), a horse-drawn line opened in 1805 mainly for the carriage of agricultural produce and coal but the Stockton and Darlington Railway, which obtained its Act of Parliament in 1821, was the 'first to make use of steam railway techniques'.⁴ By

¹ The authors gratefully acknowledge the support of the Economic and Social Research Council, by means of grant R000222974.

² T.R. Gourvish, *Railways and the British Economy 1830-1914*, (London 1980), pp. 13, 21.

³ B.C. Hunt, *The Development of the Business Corporation in England 1800-1867*, (Cambridge, Mass. 1936), pp.101-7; J.R. Edwards, *A History of Financial Accounting*, (London 1989), pp. 104-5; J.R. Edwards 'Depreciation and fixed asset valuation in railway company accounts to 1911' *Accounting and Business Research* 16 (Summer 1986), p. 252; J.J. Glynn 'The development of British railway accounting: 1800-1911' *Accounting Historians' Journal* 11.1 (1984).

⁴ H. Parris, *Government and the Railways in Nineteenth Century Britain*, (London 1965), p. 2; H.G. Lewin, *Early British Railways*. (London 1925), p. 3; M.C. Reed, *Investment in Railways in Britain, 1820-44*. (Oxford 1975), pp. 3-4.

1830 some 70 companies (53 in England and Wales, 17 in Scotland) had Parliamentary authorisation to construct over 700 miles of line, mostly horse-drawn lines for the carriage of goods, but it was the opening of the Liverpool and Manchester line in that year, the first truly commercial railway line, that gave the major impetus to railway promotion. By 1849 over £200 million had been raised by the industry.⁵

Despite the considerable importance of the early railways to the economy and to the development of its financial markets, we know very little about the rates of return which railway companies earned on their capital, either at an individual company level or collectively, during the period 1830-55, or about the extent to which the measurement practices of the time provided an accurate representation of profitability.

The dearth of information about the financial affairs of the railway industry during its important early period would appear to be largely a function of the difficulties of data access. The Board of Trade Railway Department had been set up in 1840 as part of a government initiative to provide 'regulations for the control of railways as a whole' but, although it required companies to provide returns of their traffic revenues from 1843 and, although a House of Lords return of 1848 showed share and debt capitals in the industry, it was not until 1854 that companies were required to provide details of their expenses as well, thus allowing the calculation of profitability.⁶

Once the Board of Trade required returns of financial data, the position improved considerably. The data was 'by no means free

⁵ B.R. Mitchell and P. Deane, *Abstract of British Historical Statistics*, (Cambridge 1962), p. 225; Hunt, *The Development*, pp. 73, 105; T.R. Gourvish, 'Railway enterprise', in R.A. Church (ed), *The Dynamics of Victorian Business: Problems and Perspectives to the 1870s*, (London 1980), pp. 130-1.

⁶ The totals are published in Mitchell and Deane, *Abstract of British*, p. 225. Returns of traffic income were also collected for 1838 and 1842 by the Select Committees of 1839 and 1844 respectively, but these do not appear in Mitchell and Deane. See also PP 1839 X Cmd 517, pp. 528-45, PP 1844 XI, pp. 603-5. The figures for 1842 are used by G.R. Hawke, *Railways and Economic Growth in England and Wales 1840-1870*, (Oxford 1970), pp. 406-7.

from faults, some arising from defects in the information supplied by the companies, others from mistakes or misjudgements in the handling of it at the Board of Trade [but it]...offers a continuous view of the fortunes of each railway...that is to be had in no other way'.⁷ The Board of Trade, for their part, aggregated much of the data supplied to them, which provided the basis for the calculation of mean annual rates of return from 1854 onwards from Mitchell and Deane's well-known series.⁸ A leading authority on railway performance, Gourvish, accordingly has described the net rates of return on United Kingdom paid-up capital from 1854-75, based on the Mitchell and Deane series, as being the earliest measure of railway profits on a systematic basis.⁹ Although the series is useful, nonetheless the data returned to the Board of Trade suffers from a number of deficiencies that go beyond the inevitable and occasional 'mistakes or misjudgements'. These more systematic problems, concerning a form of capital partitioning and the treatment of interest and capital consumption charges, each of which are discussed below, tend to distort calculations of the profits and rates of return achieved by the companies concerned.

More importantly, in the earliest period of railway development, from 1830 until the mid 1850s, there are no consistent data series that cover the period, so that two different views of the profitability of the early railways have been put forward in the literature, relying upon either rather fragmentary data on traffic revenues and profits or a series of weighted average dividends paid on the ordinary shares of the leading British companies.¹⁰ Dividends clearly provide some indication of profitability but are not necessarily an accurate guide to rates of return on capital, particularly when the accounting measurement practices used to define profits, the maximum permissible dividend, are themselves unsound.

⁷ J. Simmons and G. Biddle, *Oxford Companion to British Railway History*, (Oxford 1997), p. 421.

⁸ Mitchell and Deane, *Abstract of British*, p. 225; B.R. Mitchell, *British Historical Statistics*, (Cambridge 1988), p. 545; see also Glynn, 'The development', p. 103.

⁹ Gourvish, 'Railway enterprise', pp. 126-7.

¹⁰ Gourvish, *op. cit.*, pp. 127-9.

The only other source of information on company profitability, and the only one available for railway companies prior to 1854, is published accounting data. The half-yearly financial reports of companies contain a good deal of detailed information, particularly during the 1850s, although the contents of financial reports are not always ideal.¹¹ Parliamentary influences on the accounting practices of the railways were slight until the passing of the Regulation of Railways Act of 1868, although the Company Clauses Consolidation Act of 1845 did impose a general obligation on all new companies to keep 'full and true accounts'. A number of writers have suggested that the accounting practices of the early railway companies were highly unsatisfactory, including Lee, for example, who identified the division of fixed assets expenditure between capital and revenue as a 'burning issue' of the time and the general 'laxity of classification' as contributory to a situation in which less-scrupulous directors could indulge in 'wilful manipulation of the accounts to justify inflated dividends, and so keep up the price of the shares', leading to a series of railway scandals during the late 1840s.¹² The views of Lee and others are not, however, seemingly based upon any very substantial or systematically derived evidence, and may be unduly influenced by George Hudson's practices at the Eastern Counties Railway.¹³ Nonetheless, it is clear that the published accounts of the early railway companies are, in

¹¹ The mean number of items disclosed by a large sample of railway companies rose from 44 in 1840 to 74 in 1845, 137 in 1850 and 174 in 1855. See S. McCartney and A.J. Arnold, 'Financial reporting in the context of crisis: Considering the impact of the 'mania' on early railway accounting', *European Accounting Review*, 11.2 (2002), p. 409

¹² G.A. Lee 'The concept of profit in British accounting, 1760-1900' *Business History Review* 49.6 (1975), pp. 21-2; see also J.R. Edwards 'The origins and evolution of the double account system: an example of accounting evolution' *Abacus* 21.1 (1985), pp. 26-7, 34; Glynn, 'The development', p. 107; Edwards, *A History*, p. 167; H. Pollins, 'Aspects of railway accounting before 1868', in A.C. Littleton and B.S. Yamey (eds). *Studies in the History of Accounting*, (London 1956), pp. 340-1; Simmons and Biddle, *Oxford Companion*, p. 214.

¹³ See A.J. Arnold and S. McCartney, 'It may be earlier than you think: evidence, myths and informed debate in accounting history', *Critical Perspectives on Accounting*, 14.3 (2003), pp. 227-53.

a small number of cases, highly unreliable and, more generally, inconsistent in their treatment of major cost items such as interest and capital consumption.

Research work on the profitability of the early UK railway companies was seen as potentially useful, in that it would increase our knowledge of the performance and potential effects of an industry that was very important to the growth patterns of the British economy.

The intention of this paper is, therefore, to construct series of rates of return for the early years (from 1830-55) of the railway industry, and to provide an assessment of the profitability of the railway industry in Britain during that same period. The series have been based upon the contents of a substantial set of published half-yearly reports (adjusted by reference to other archival materials in the limited number of cases in which their reliability could be seen to be seriously flawed)¹⁴ and on a recomputed basis, with standardised treatments for interest and capital consumption charges. The next sections of the paper discuss the existing literature, the research objectives and methodology and then set out the main results, before turning to a discussion of the findings and the drawing of some conclusions.

Existing views on railway profitability

In the absence of comprehensive data before 1854, writers have been compelled to devise other ways of inferring profitability in this period. Thus Clapham asserts that 'right down to 1850, the gross receipts – not the dividends – on all existing railways never reached 8 per cent on the capital expended' observing that his source, Lardner, gave this crude figure because 'the receipts alone are ascertainable with

¹⁴ The published accounts of companies controlled by George Hudson during the 1840s were alleged to have been 'cooked'. The paper accordingly looks to the Committee of Inquiry reports of the companies concerned for specification of what the reported profits should have been.

precision; the expenses and profits are left to conjecture'.¹⁵ However, Clapham has gone beyond his source here since Lardner's figures (giving traffic income of the railway industry as a percentage of capital expended) cover only 6½ years from July 1842. Moreover, whilst Lardner's revenue figures (which are for the UK, i.e. including Ireland) are presumably computed from the official returns referred to above, his figures for capital expenditure are based, not on returns of capital raised, but on his own extremely rough estimate of a cost of construction of £40,000 per mile of track.¹⁶ Lardner also attempted to estimate the return on capital employed, assuming operating expenses to be 40 per cent of receipts, a figure he takes as a minimum. His figures, showing receipts and profit before interest as a percentage of capital expenditure, are as follows:

| PERIOD | Traffic | Profit |
|------------------------------|---------|--------|
| Year to 30 June 1843 | 6.1 | 3.7 |
| Year to 30 June 1844 | 6.5 | 3.9 |
| Year to 30 June 1845 | 7.2 | 4.3 |
| Year to 30 June 1846 | 7.8 | 4.7 |
| Year to 30 June 1847 | 7.0 | 4.2 |
| Year to 30 June 1848 | 6.5 | 3.0 |
| 6 months to 31 December 1848 | 5.6 | 3.4 |

Source: Lardner, p. 264

Lardner (who regarded the above figures for profits as aggregate *maxima*) concluded that:

...whatever may be the advantages of particular railways as investments, the aggregate of the whole presents no signal advantages

¹⁵ J.H. Clapham, *An Economic History of Modern Britain, the Early Railway Age, 1820-1850*. (Cambridge 1964), p. 385. This statement of Clapham has been cited elsewhere as evidence of the low profitability of railways before 1850. See, for example, Edwards, 'Depreciation and', p. 257.

¹⁶ D. Lardner, *Railway Economy; A Treatise on the New Art of Transport*. (Newton Abbot 1968), pp. 242-3.

over other enterprises; and that they have been, since 1846, not much more productive to the capitalist than the public funds...it is evident that the railways, taken in the aggregate, have never yet produced a net profit of 5 per cent.¹⁷

Hawke also estimates the returns on railway investment (but as monetary amounts unrelated to figures for capital investment) in England and Wales from 1840 onwards, by assuming such returns to be 55 per cent of traffic income, figures taken from the already mentioned official returns, and then by interpolating and extrapolating.¹⁸ Pollins applies the same proportion (55 per cent) to the receipts for the UK from official returns in 1850 to produce a figure of £7.3m for the railway industry's profit before interest, which Irving has used to calculate a return of 3.05 per cent for the UK in that year.¹⁹

An alternative approach to estimating returns on capital employed is to use dividend payments as an indicator of returns to equity, on the assumption that the railway companies in this period distributed virtually all their earnings and financed additional expenditure on branch lines by raising further capital. The only systematic attempt to use dividends in this way has been Gourvish's series of weighted average dividend rates for the leading 15 companies from 1840 to 1875, based on data in Mihill Slaughter's *Railway Intelligence*. This shows an average dividend rate in excess of 6 per cent in 1840-6, a precipitous fall to under 3 per cent in 1849 and 1850 followed by a gradual rise to above 5 per cent by the early 1870s.

¹⁷ Lardner, *op. cit.*, p. 264.

¹⁸ Hawke, *Railways and Economic Growth*, pp. 406-7.

¹⁹ H. Pollins, *Britain's Railways: An Industrial History*, (Newton Abbot 1971), p. 56; R.J. Irving 'The Profitability and Performance of British Railways 1870-1914', *Economic History Review*, XXXI (1978), p. 46. Pollins gives the source of his estimate of railway profits in 1850 as B.R. Mitchell 'The Coming of the Railway and United Kingdom Economic Growth' *Journal of Economic History* 24.3, but this seems to be an error. The figure of 3.05% in 1850 is also accepted by Gourvish, 'Railway Enterprise', p. 129, although no source is given.

He interprets the changes in profitability these figures indicate as follows:

...the more successful trunk-route operators such as the London & Birmingham and the Grand Junction...maintained high dividends in the 1840s in spite of the escalation of construction costs by concentrating on first-class passengers and high-tariff freight. Before 1846, the average ordinary dividends of the leading companies remained above 6 per cent...The investment 'mania' of 1845-7 brought a dramatic change however. In the ensuing depression, dividends fell below the yield on 3 per cent Consols – in 1849 and 1850 - and the 1850 'low' of 2.88 per cent was more than 50 per cent lower than the average return for the 1840s as a whole. The break in trend was clearly encouraged by the amplitude of the cyclical downswing, but it was also a product of government intervention and, in particular the encouragement of competition in the industry coupled with tighter controls on the companies' pricing freedom. From 1850, dividends showed a gradual but steady upward trend...[to 5 to 5.5%] by the early 1870s...(p. 129)

This series does present difficulties however. Firstly it is an average, and so shows nothing of the '[c]ompany diversity' which was, as Gourvish states, an 'important characteristic of railway profitability in the period'.²⁰ Secondly, as a weighted average, moreover of the leading companies, it may give a misleading impression of the profitability of the industry if smaller companies were less profitable, which Gourvish hints at in his reference to 'the more successful trunk-route companies'. There is some evidence to support this contained in other dividend data. Simmons states that in 1842, the average dividend of 36 companies in the UK, 'including all those of any importance' was 5.75 per cent,²¹ which would

²⁰ Gourvish, *op. cit.*, p. 129.

²¹ J. Simmons, *The Railway in England and Wales, Vol. 1: The System and its Working*, (Leicester 1978), p. 35.

suggest a slightly lower rate of return for companies outside the leading fifteen. Reed states that 'of twenty-five major English companies paying a dividend by the end of 1843, thirteen, with a total paid-up capital of £18.3m, were paying 4 per cent or more, seven of which were paying 5 per cent or more'.²² Similarly Clapham observes that, in the first half of 1841, 'the average dividend on the share capital of seventeen companies in what was to become the territory of the North-Eastern Railway was only about 3½ per cent, although the average was helped by the 15 per cent. of the Stockton and Darlington and the 9 per cent. of the York and North Midland'.²³

Thirdly, dividends are, of course, not the same as earnings. Gourvish compared dividends and earnings for three large companies in 1850-75 and calculated that the former were six to 13 per cent below the latter.²⁴ On the other hand, there is some evidence that companies paying high dividends in the 1840s deliberately understated the rate of distribution. For example, in 1844 the Liverpool and Manchester offered new £40 shares to its shareholders, which were to rank equally with existing shares, subject to 'interest' of 5 per cent p.a. on uncalled amounts. The accounts for the six months to 31 December 1844 show that no calls had been made at that date on the 12,09 shares thus created, but that they were paid the full 4.5 per cent dividend on the nominal value (£21,762) less interest of 2.5 per cent (£12,090). The existing shareholders had thus been given a bonus of the difference (£9,672) and this raised the *de facto* dividend rate above the 10 per cent p.a. limit specified in the authorising Act. The London and Birmingham issued £32 shares on similar terms, and called up only £2 in 1843. Holders of these shares received £1.70p in dividends for

²² Reed, *Investment in Railways in Britain*, p. 62. Reed's dividend data are taken from H. Scrivenor, *The Railways of the United Kingdom Statistically Considered...* (London 1849).

²³ Clapham, *An Economic History*, p. 385. The figure is quoted from W.W. Tomlinson, *The North-Eastern Railway: its Rise and Development*, (Newcastle 1914).

²⁴ Gourvish, *Railway Enterprise*, p. 130.

the year, from a total investment of only £2, increasing the effective dividend rate from an apparent 10 to over 11.5 per cent.

One attempt to estimate profitability from published accounting data is Reed's comparison of the actual construction costs, receipts and working expenses of six companies in 1843, with the estimates made in 1836, the year they were projected. The traffic estimates were fairly accurate, but construction costs greatly exceeded the estimates, by more than 100 per cent in some cases, leading to results that were well below forecast. There was, however, a wide variation in actual returns, as shown below:

| COMPANY | ROCE (%)* |
|-------------------------------|-----------|
| Birmingham and Derby Junction | 2.6 |
| Birmingham and Gloucester | 2.9 |
| Manchester and Leeds | 5.1 |
| Midland Counties | 4.4 |
| North Midland | 4.3 |
| York & North Midland | 9.2 |

*Roce: return on capital employed

Source: Reed, *Investment in Railways*, p. 25

Thus Reed, in contrast to Gourvish, sees actual returns on railway investment as modest, even before the Mania, and argues that:

It would appear, therefore, that private capital was forthcoming for railway investment on the scale on which it was undertaken in Britain in the later 1830s and early 1840s only because the eventual lowness of the private rate of return on some projects was not anticipated.²⁵

In summary, there appear to be two views of profitability in this period. Most writers have followed Lardner, despite the limited evidence he looks to, in viewing profits as being too low to justify the investment made, although recognising that a minority of companies may have performed very well. The alternative perspective, based upon the only

²⁵ Reed, *Investment in Railways in Britain*, p. 270.

series covering a large part of the period under discussion, is Gourvish's conclusion that returns on equity were relatively healthy until 1846, before they collapsed in the aftermath of the Mania.

The Research Project

The results set out in the next section of the paper are based upon data extracted from a substantial set of published half-yearly reports, supplemented in some cases by the use of other archival materials. The construction of the data set broadly reflected patterns of development in the railway industry. The success of the Stockton and Darlington (opened in 1825) and of the Liverpool and Manchester (opened in 1830) encouraged further investment in the industry and, by 1836, when the first railway mania was underway, railway promotion had become relatively commonplace.²⁶ Prior to this, however, data concerning even the raising of capital by the various railway companies is 'extremely scattered' and accordingly unreliable.²⁷ The one definitive source that is available, the various Acts of Parliament that established the individual railway companies does, however, enable the total set of companies in the (locomotive railway) industry in each year, and their authorised capitals to be defined.²⁸

A search was then carried out for the surviving accounting statements of each company (leaving aside the smallest, with authorised capitals of less than £50,000), for which purpose the substantial RAIL holdings at the Public Record Office (PRO) were invaluable. In many cases, the records had not survived, although in the case of the larger, more important companies, most of the relevant financial reports were still in existence. Moreover, in the period 1837-55, there were higher levels of investment in the industry, improved sources of information about overall levels of investment and a better

²⁶ Simmons and Biddle, *Oxford Companion*, p. 311.

²⁷ Reed, *Investment in Railways in Britain*, pp. 32-3.

²⁸ See also the list of railway acts and the capital-raising powers they authorised in Appendix 1 of the Report of the Select Committee of 1839, PP 1839 (Cmd 222) Vol X, pp. 75-9.

survival rate for the annual or half-yearly financial reports of the companies concerned, which meant that the composition of the industry could be defined in terms of its paid-up share capital (which provides a more precise measure than authorised capital investment levels in the industry), using the series in Reed for 1837-42, a Report of the House of Lords covering 1843-47 and the annual Board of Trade Returns for 1848-55.²⁹ The set included most of the large companies, and covered 70.9 per cent of the annual amounts of paid-up share capital in the industry in the period 1837-55.³⁰

The intention was that the new series covering the period 1830-55 could in principle be linked with the Mitchell and Deane series starting in 1854. The latter is, of course, based upon accounting data as returned to the Board of Trade by the individual companies and is therefore reasonably compatible with the new series, although there are some differences.

In the earlier period, the figures for working receipts and expenses include some (relatively minor) receipts and expenses that relate to the non-railway activities of the companies concerned. Although this provides a less precise focus on railway activities, when profits are being compared with the total capital employed of the companies concerned, it avoids a form of (inconsistent) capital partitioning, since in many cases the companies used some of their capital for non-railway investments in the canals, in commercial securities and in a number of other ventures. In this early period, the profits are based on total receipts and expenses, consistent with the use of total capital in the rate of return calculations.

Secondly, in the early period, the Board of Trade practice of excluding charges for depreciation, which were generally seen at the time as appropriations of, rather than expenses against, profit has been

²⁹ Reed, *Investment in Railways in Britain*, pp. 35-6; Return to the House of Lords of the capital of railway companies for 1843-7, pp. 1847-48 (Cmd 71), XIV, pp. 1-27; Board of Trade Returns Relating to Share Capital and Loans for 1848-55.

³⁰ Companies that had leased their lines and thus no longer operated them have been excluded from the sample set. A list of the companies included in the data set for 1830-55 is provided in the Appendix.

extended to amounts charged as replacement expenditure, as this is merely an alternative approach to the recognition of capital consumption. Thus in the new series, as in the Mitchell and Deane series, returns on capital employed do not include any allowance for capital consumption effects. Although this is less than ideal in some respects, it does mean that the conclusions drawn are not dependent upon potentially misleading estimates of capital consumption.³¹

Thirdly, whereas the Mitchell and Deane series only enables the calculation of profits (before interest) from its figures for total working receipts³² and total working expenses³³ and their division by total paid-up capital and loans³⁴ so as to yield returns on total capital employed, during this earlier period the return figures have been disaggregated into the more revealing, separate returns to the two major forms of long-term capital, equity and debt. Throughout this paper, in line with modern finance precepts, (fixed return) preference capital has been included in debt and preference dividends accordingly treated as interest. As a result, in cases where preference dividends were not declared, the 'interest' charges are lower than they would have been had the debt been pure debt capital.

More importantly, the revenue charge for interest during the

³¹ The omission of depreciation charges from the Board of Trade's 'working expenses' is not all that obvious in the footnotes to the Mitchell and Deane series, but has been confirmed by a comparison of the Board of Trade figures for individual companies with the published sets of accounts concerned. Rate of return calculations would undoubtedly be depressed by charges for capital consumption, even though much of the capital expenditures of the early railways (e.g. surveys of the potential route, legal and other costs in connection with obtaining Parliamentary approval, land purchase, the levelling of the actual route by huge gangs of labourers and its preparation so as to receive wooden sleepers and iron rails) were assets that did not deteriorate in any meaningful sense. Only the later, and relatively more modest expenditures on the sleepers and rails themselves, on the construction of station buildings and the necessary engines and wagons led to the acquisition of assets that did deteriorate and thus needed to be eventually replaced.

³² See, for example, the half-yearly Returns Relative to the Passenger and Goods Traffic on Railways (PP 1854 LXII Cmd 1844 and 1932)

³³ See, for example, Appendix 87 of the Report of the Proceedings of the Railway Department (PP 1854-5 XLVIII Cmd 1965).

³⁴ See, for example, the Report of the Board of Trade on the Railway and Canal Bills (PP 1854-5 XLVIII Cmd 121), less the Irish companies included therein.

periods of railway construction was often understated through the (understandable) preference of many of the early companies to charge interest incurred against capital, until the line actually opened. This was common practice not only when existing companies sought to extend their networks but also in the case of newly-promoted companies, when a revenue account for the business had not yet been opened. In the latter case, however, the size of the 'problem' was constrained by the reluctance of potential lenders to subscribe until the construction period was close to completion (as equity was generally expected to bear the higher risks of the construction period). In those cases where debt was raised before operations began, in order to evaluate the returns provided to different forms of capital on a consistent basis across the total period of their investment, we have shown a normal return on debt capital in these years, even if it meant showing a negative return on equity (with the interest charges treated as losses borne by equity). The returns on debt have, therefore, been shown at their full amount, as far as possible from the available data, while the returns on equity as calculated properly reflect the long lead times between the investments being made and the operating returns being achieved that were so distinctive a feature of the early railway industry.³⁵

Finally, the use of a data set for the period 1830-55 derived from the financial reports of a number of individual companies has enabled the calculation of rates of return on two alternative bases; firstly as a weighted annual mean (the weights being the amounts of capital employed) and also as an unweighted annual mean (together with the distribution around that mean). The first approach provides a better measure of the returns on capital in the railway industry as a whole while the second provides a better focus on the rates of return that were achieved at the individual company level.

³⁵ This is not, of course, purely a feature of periods before a railway company's first line was built, as there is a similar (although less obvious) effect during periods in which line extensions were built.

Research Results

The main results are set out in Tables 1 to 3, which provide the basis for the discussion and conclusions in the final section of the paper.

Table 1 shows two types of return on capital (both as means and standard deviations) for each year in the period 1830-55, as reported by the companies in their published accounts;³⁶

ROCE (return on capital employed) : Profits before interest (PBI) to capital employed (debt plus equity), in columns 2 and 3 and

ROE (return on equity) : Net profit (NP) to equity (E), in columns 4 and 5, together with Gourvish's series based on the dividend payments of the fifteen leading railway companies, in column 6.³⁷

Table 2 shows, in columns 2 and 3, the return on capital employed (again as an annual mean and standard deviation) for each year in the period 1830-55 without the inclusion of capital consumption charges (whether as depreciation or replacement costs). In columns 4-5 are shown the returns on equity capital after the standardisation of interest charges, (described as ROE 1)³⁸ and, secondly, the preferred measure where both capital consumption and interest charges have been treated on a consistent basis (described as ROE 2), in columns 6-7. Finally, in column 8, the weighted mean version of ROE 2 is shown, described as ROE 3.

Table 3 provides further data relevant to the assessment of profitability;

the proportion of debt (D) to capital employed (CE), or 'gearing' (Cols 2 and 3) and, in columns 4 to 9, the proportion of turnover absorbed in interest, other expenses and net profit (with the latter

³⁶ Again, in the case of companies controlled by George Hudson during the 1840s, 'reported' profits are based upon the contents of the published accounts as amended by the reports of the Committees of Inquiry of the companies concerned. The returns have been computed from 1830 onwards. Prior to that, equity funds were invested without return in the Stockton and Darlington Railway (from 1821 until the line opened in 1825) and in the Liverpool and Manchester (from 1826 until the opening of the line in 1830).

³⁷ Gourvish, 'Railway Enterprise', pp. 127-8.

³⁸ The standardisation of interest charges raised the overall rate of interest as a return on debt capital from 3.47 per cent in the published accounts to 4.40 per cent.

TABLE 1. Rates of return, 1830-55 as published

| | ROCE | | | ROE | | Gourvish |
|-------------|----------|------------------|--------------------|------------------|--------------------|------------------|
| | (1) n | (2) mean % | (3) std dv % | (4) mean % | (5) std dv % | (6) mean % |
| 1830 | 2 | 3.09 | | 3.95 | | |
| 1831 | 2 | 6.63 | | 8.25 | | |
| 1832 | 3 | 4.51 | | 6.63 | | |
| 1833 | 4 | 3.23 | | 4.23 | | |
| 1834 | 5 | 2.20 | | 1.99 | | |
| 1835 | 7 | 1.86 | | 2.56 | | |
| 1836 | 24 | 0.94 | 2.23 | 1.19 | 3.29 | |
| 1837 | 15 | 1.02 | 2.16 | 1.01 | 2.61 | |
| 1838 | 17 | 1.50 | 2.78 | 2.03 | 3.65 | |
| 1839 | 21 | 2.12 | 3.12 | 2.27 | 3.81 | |
| 1840 | 21 | 2.69 | 3.32 | 2.95 | 4.04 | 6.60 |
| 1841 | 21 | 3.82 | 3.10 | 3.99 | 3.80 | 6.80 |
| 1842 | 21 | 4.10 | 2.72 | 4.06 | 3.53 | 6.10 |
| 1843 | 20 | 4.44 | 2.56 | 4.44 | 3.60 | 6.00 |
| 1844 | 21 | 4.56 | 2.82 | 5.07 | 3.78 | 6.40 |
| 1845 | 23 | 4.05 | 2.97 | 4.67 | 3.80 | 6.80 |
| 1846 | 22 | 3.10 | 2.57 | 3.47 | 3.07 | 6.80 |
| 1847 | 26 | 2.65 | 1.97 | 3.11 | 2.61 | 6.00 |
| 1848 | 25 | 2.67 | 1.60 | 2.70 | 1.92 | 5.10 |
| 1849 | 23 | 2.75 | 1.42 | 2.37 | 1.73 | 3.50 |
| 1850 | 22 | 3.15 | 1.77 | 2.58 | 2.34 | 2.90 |
| 1851 | 22 | 3.71 | 1.78 | 3.23 | 2.44 | 3.20 |
| 1852 | 20 | 3.43 | 1.04 | 2.67 | 1.37 | 3.20 |
| 1853 | 20 | 3.83 | 0.95 | 3.38 | 1.27 | 3.30 |
| 1854 | 19 | 3.95 | 0.83 | 3.55 | 1.42 | 3.70 |
| 1855 | 19 | 4.06 | 0.73 | 3.66 | 1.27 | 3.40 |
| Ave 1830-9 | 10.00 | 2.71 | | 3.41 | | |
| Ave 1840-6 | 21.29 | 3.82 | | 4.09 | | 6.50 |
| Ave 1847-55 | 21.78 | 3.36 | | 3.03 | | 3.81 |
| Ave | 17.12 | 3.23 | | 3.46 | | |

Notes: n = number of companies
 ROCE = return (profits before interest) on capital employed
 ROE = return (net profit) to equity
 Gourvish = ordinary dividends

Sources: cols 1-5: half-yearly financial reports of sample companies
 Col 6: extracted from Gourvish, 'Railway enterprise' p. 128

**TABLE 2. Rates of return, 1830-55 with interest
and capital consumption standardised**

| | (1) n | ROCE | | ROE (1) | | ROE (2) | | ROE (3) | |
|-------------|----------|------------------|--------------------|------------------|--------------------|------------------|--------------------|---------------------|--|
| | | (2) mean % | (3) std dv % | (4) mean % | (5) std dv % | (6) mean % | (7) std dv % | (8) wt mean % | |
| 1830 | 2 | 3.09 | | 2.88 | | 2.88 | | 1.70 | |
| 1831 | 2 | 6.63 | | 8.07 | | 8.07 | | 8.42 | |
| 1832 | 3 | 4.51 | | 6.63 | | 6.63 | | 7.19 | |
| 1833 | 4 | 3.23 | | 4.18 | | 4.18 | | 6.17 | |
| 1834 | 5 | 2.25 | | 1.99 | | 2.06 | | 4.22 | |
| 1835 | 7 | 1.95 | | 2.56 | | 2.70 | | 3.69 | |
| 1836 | 24 | 0.94 | 2.23 | 1.03 | 3.25 | 1.03 | 3.25 | 1.55 | |
| 1837 | 15 | 1.02 | 2.16 | 0.86 | 2.64 | 0.86 | 2.64 | 0.73 | |
| 1838 | 17 | 1.52 | 2.80 | 1.09 | 3.70 | 1.14 | 3.71 | 1.97 | |
| 1839 | 21 | 2.16 | 3.19 | 1.56 | 4.14 | 1.62 | 4.27 | 3.19 | |
| 1840 | 21 | 2.73 | 3.35 | 2.18 | 4.52 | 2.24 | 4.60 | 3.47 | |
| 1841 | 21 | 3.90 | 3.16 | 3.58 | 4.11 | 3.73 | 4.20 | 4.87 | |
| 1842 | 21 | 4.19 | 2.81 | 3.76 | 3.76 | 3.91 | 3.88 | 4.86 | |
| 1843 | 20 | 4.54 | 2.67 | 4.31 | 3.64 | 4.48 | 3.80 | 5.73 | |
| 1844 | 21 | 4.63 | 2.88 | 4.86 | 3.83 | 4.99 | 3.96 | 7.10 | |
| 1845 | 23 | 4.11 | 3.04 | 4.49 | 3.79 | 4.59 | 3.91 | 6.57 | |
| 1846 | 22 | 3.10 | 2.57 | 2.97 | 3.21 | 2.97 | 3.21 | 5.14 | |
| 1847 | 26 | 2.65 | 1.97 | 2.37 | 2.60 | 2.37 | 2.60 | 3.77 | |
| 1848 | 25 | 2.68 | 1.61 | 2.20 | 2.04 | 2.23 | 2.06 | 3.15 | |
| 1849 | 23 | 2.89 | 1.43 | 2.01 | 1.89 | 2.22 | 1.88 | 2.89 | |
| 1850 | 22 | 3.24 | 1.78 | 2.39 | 2.43 | 2.53 | 2.42 | 3.07 | |
| 1851 | 22 | 3.80 | 1.80 | 3.15 | 2.50 | 3.29 | 2.52 | 3.85 | |
| 1852 | 20 | 3.50 | 1.08 | 2.61 | 1.39 | 2.72 | 1.44 | 3.36 | |
| 1853 | 20 | 3.88 | 0.97 | 3.31 | 1.31 | 3.38 | 1.34 | 3.86 | |
| 1854 | 19 | 4.00 | 0.85 | 3.48 | 1.48 | 3.58 | 1.53 | 4.05 | |
| 1855 | 19 | 4.12 | 0.75 | 3.66 | 1.27 | 3.78 | 1.31 | 4.25 | |
| Ave 1830-9 | 10.00 | 2.73 | | 3.09 | | 3.12 | | 3.88 | |
| Ave 1840-6 | 21.29 | 3.89 | | 3.74 | | 3.84 | | 5.39 | |
| Ave 1847-55 | 21.78 | 3.42 | | 2.80 | | 2.90 | | 3.58 | |
| Ave | 17.12 | 3.28 | | 3.16 | | 3.24 | | 4.18 | |

Notes: n = number of companies
 ROE(1) = net profit to equity after standardising interest charge
 ROE (2) = net profit to equity after standardising interest and CC charges
 ROE (3) = weighted average version of ROE (2)

Source: half-yearly financial reports of sample companies

TABLE 3. Supplementary rates of return data, 1830-55

| | (1) n | Gearing | | Int: T/o | | Other exp: T/o | | NP: T/o | | T/o: Equity | |
|-------------|----------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|-------------------|---------------------|
| | | (2) mean % | (3) std dv % | (4) mean % | (5) std dv % | (6) mean % | (7) std dv % | (8) mean % | (9) std dv % | (10) mean % | (11) std dv % |
| 1830 | 2 | 43.05 | | 26.03 | | 52.80 | | 21.17 | | 14.17 | |
| 1831 | 2 | 42.12 | | 14.29 | | 52.30 | | 33.40 | | 26.37 | |
| 1832 | 3 | 31.07 | | 13.17 | | 56.19 | | 30.63 | | 24.60 | |
| 1833 | 4 | 24.83 | | 12.85 | | 60.92 | | 26.23 | | 20.50 | |
| 1834 | 5 | 21.01 | | 19.16 | | 60.95 | | 19.89 | | 13.37 | |
| 1835 | 7 | 15.53 | | 14.98 | | 58.64 | | 26.38 | | 12.31 | |
| 1836 | 24 | 8.15 | 18.03 | 18.55 | 12.95 | 60.95 | 21.63 | 20.49 | 13.87 | 5.00 | 14.18 |
| 1837 | 15 | 10.88 | 16.24 | 16.45 | 7.14 | 47.94 | 6.15 | 35.61 | 1.76 | 3.10 | 6.66 |
| 1838 | 17 | 19.16 | 17.84 | 22.02 | 14.21 | 51.80 | 10.00 | 29.46 | 11.94 | 4.72 | 8.43 |
| 1839 | 21 | 25.11 | 16.77 | 22.17 | 11.13 | 52.74 | 11.72 | 23.84 | 19.08 | 6.57 | 8.90 |
| 1840 | 21 | 27.79 | 15.76 | 22.18 | 11.12 | 54.33 | 12.60 | 23.42 | 21.20 | 8.46 | 8.28 |
| 1841 | 21 | 30.90 | 12.54 | 25.50 | 15.66 | 48.60 | 17.39 | 25.97 | 23.31 | 11.22 | 7.69 |
| 1842 | 21 | 34.59 | 11.33 | 27.14 | 19.12 | 47.86 | 15.22 | 26.28 | 17.93 | 12.21 | 6.80 |
| 1843 | 20 | 34.28 | 12.99 | 25.44 | 15.04 | 43.05 | 14.74 | 31.51 | 18.47 | 12.43 | 6.22 |
| 1844 | 21 | 31.28 | 16.08 | 20.68 | 11.79 | 39.65 | 14.05 | 39.67 | 16.13 | 12.17 | 7.05 |
| 1845 | 23 | 24.01 | 15.73 | 16.06 | 8.47 | 39.78 | 14.57 | 44.16 | 13.21 | 10.17 | 7.30 |
| 1846 | 22 | 23.66 | 14.88 | 19.19 | 13.23 | 45.97 | 15.23 | 36.35 | 16.58 | 8.35 | 6.84 |
| 1847 | 26 | 26.22 | 13.34 | 21.09 | 10.39 | 47.72 | 13.29 | 31.19 | 14.16 | 7.53 | 5.80 |
| 1848 | 25 | 27.89 | 13.92 | 23.02 | 11.20 | 50.89 | 19.61 | 29.72 | 18.59 | 7.98 | 5.06 |
| 1849 | 23 | 29.83 | 12.99 | 27.04 | 15.28 | 50.27 | 11.85 | 22.69 | 21.30 | 8.71 | 4.47 |
| 1850 | 22 | 31.11 | 12.46 | 26.51 | 13.18 | 50.19 | 9.79 | 23.30 | 20.23 | 9.54 | 4.53 |
| 1851 | 22 | 32.97 | 9.66 | 24.78 | 10.49 | 47.11 | 7.69 | 28.11 | 14.90 | 10.78 | 4.31 |
| 1852 | 20 | 36.57 | 11.04 | 27.17 | 9.82 | 47.97 | 6.75 | 24.86 | 13.00 | 10.91 | 3.34 |
| 1853 | 20 | 38.16 | 11.56 | 24.93 | 9.16 | 46.29 | 10.28 | 28.78 | 12.34 | 12.05 | 2.87 |
| 1854 | 19 | 41.86 | 11.67 | 23.93 | 8.44 | 50.20 | 7.15 | 25.87 | 12.08 | 14.27 | 3.29 |
| 1855 | 19 | 43.35 | 12.17 | 23.79 | 7.96 | 50.03 | 6.44 | 26.19 | 10.90 | 15.21 | 3.65 |
| Ave 1830-9 | 10.00 | 24.09 | | 17.97 | | 55.52 | | 26.71 | | 13.07 | |
| Ave 1840-6 | 21.29 | 29.50 | | 22.31 | | 45.61 | | 32.48 | | 10.72 | |
| Ave 1847-55 | 21.78 | 34.22 | | 24.70 | | 48.96 | | 26.74 | | 10.78 | |
| Ave | 17.12 | 29.05 | | 21.47 | | 50.58 | | 28.28 | | 11.64 | |

Notes: Gearing = debt (as standardised)/capital employed

Int: T/o = interest/turnover

Other exp: T/o = other expenses/turnover

NP: T/o = net profit (ROE (2) as per Table 2)/turnover

T/o: Equity = turnover/equity capital

Source: as Table 1.

defined as ROE 2). Measures of return, such as ROE 2, can of course be disaggregated into their margin and volume components and these are shown in columns 8 and 10 respectively.³⁹

Table 1, based upon the published results of the set of railway companies, shows consistently low aggregate returns on capital employed; the average for the period 1830-55 was only 3.23 per cent and in no year (apart from 1831, when only two companies were operational) did this exceed five per cent (see Table 1 column 2). The early years 1834-40, in which many companies were still constructing lines, was a time of very low average returns, typically of less than 3 per cent, although the high variability of the returns indicates that some companies were able to achieve reasonable returns on their capital. The most buoyant period was 1842-45, in which annual returns were in excess of 4 per cent (and in which variability in the level of returns was quite high), but even this minimum level (as debt cost at least 4 per cent) was otherwise achieved only in 1831-2 and 1855. The relative means and standard deviations (see Table 1 columns 2-3) suggest that returns on capital were becoming less variable from 1845 and, by 1855, had become much more consistent between companies. In overall terms, these returns were little different from the rates of interest that were payable on debt, so that the use of debt did not lever up the returns to equity to levels appropriate to risk-bearing investment; apart from 1831-2 (when only a very small number of companies were operational), average annual returns to equity exceeded 4 per cent only in 1842-5, and then only narrowly.

Table 2 shows the impact of the standardisation of the treatment of interest, as discussed earlier in the paper, which decreased average returns on equity investment from 3.46 per cent to 3.16 (see column 4 of Tables 1 and 2). Table 2 also shows returns on equity when both capital consumption and interest charges have been standardised (see above). Although these two adjustments are in principle important, equally it is clear that they have had only modest effects upon the rates

³⁹ Columns 8 and 10 in Table 3 can, at the individual company level, be multiplied to yield column 6 in Table 2.

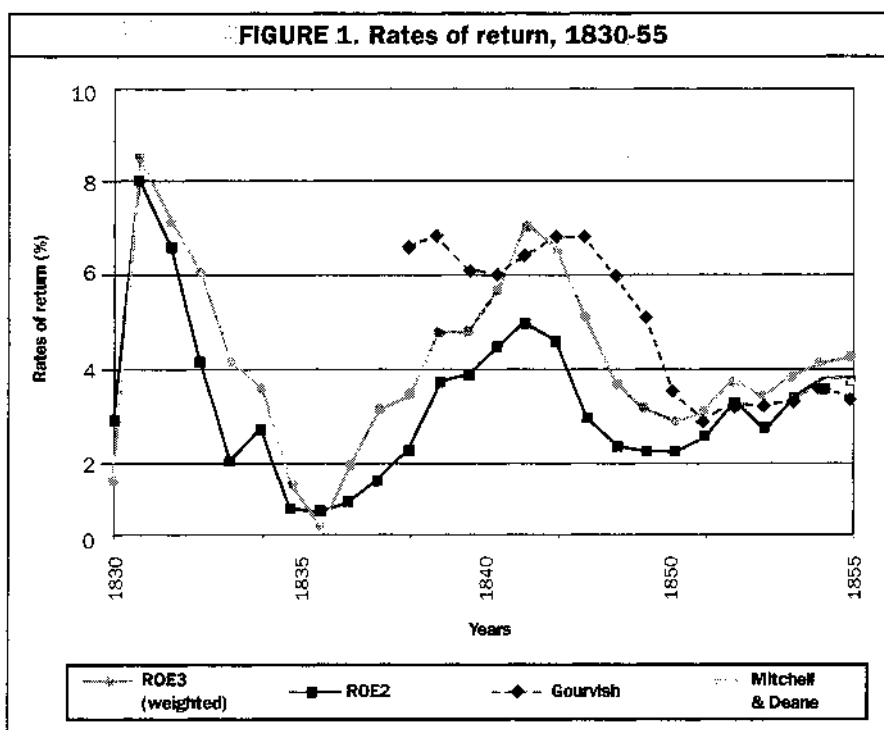
of return based upon the published data; average returns on equity remain very low at 3.24 per cent, well below the rates that would have been expected on even comparatively risk-free investments. Once again, the variation between decades is slight, with 1842-45 again the most rewarding period for returns. These low returns were not, of course, a universal experience, as is indicated by the size of the standard deviations relative to the returns on equity (Table 2, columns 6-7). Indeed the weighted mean (as shown in Table 2, column 8), is above the unweighted on average by nearly one percentage point, is higher in every year bar two (1830 and 1837) and, in some years (e.g. 1840-48) quite considerably so.

The use of debt generally increased over time, from 24 per cent of total capital employed in the 1830s to 30 per cent in the period 1840-6 and 34 per cent thereafter (see Table 3 column 2) with, however, sharp, albeit temporary, falls in both 'mania' periods (1836-7 and 1845-7) when there were sudden increases in the amount of equity capital issued. In many industries, debt could have been used to gear up the returns to equity, but in the railway industry of the period 1830-55, returns were too low for this to take place and, in many cases, debt would have provided a more satisfactory return on the funds invested in the companies concerned than equity finance, when risk levels are taken into account.

Rates of return are a function of both the volume of business generated (relative to the levels of capital involved) and of the profitability of given amounts of business. Table 3 (columns 4-9) shows that interest charges absorbed just over twenty per cent (21.47 per cent) of turnover, and other expenses just over 50 per cent, leaving a substantial average net profit margin of over 28 per cent of turnover. The railways, as an acutely fixed cost business, offered the prospect of rapid increases in returns on capital employed if the volume of business could be sufficiently expanded but it is apparent (from Table 3 column 10) that the volume of business generated in the unplanned and highly competitive conditions of the private sector development of the UK's railways was, on average, far too low to even begin to justify the commercial risks involved. Turnover, which in many industries is a

multiple of capital employed, reached 15 per cent of equity capital only in 1831-3 and 1855 and averaged a very low 11.64 per cent over the period as a whole.

Two factors need emphasis here. Firstly, the large-scale construction of railways during the period under consideration was bound to depress the ratio of turnover to capital employed (and profitability) since large amounts of capital were tied up in lines as yet unopened, or in the early stages of their operation. Thus the ratio falls away dramatically in the mid-1830s as the first railway mania increases the amount of 'unproductive capital' (as it was commonly termed), but then climbs again as the lines promoted and authorised in the boom are constructed and opened. The peak of 12.43 per cent is reached in 1843, just on the eve of the second railway 'mania', which results in another fall to a low point of under eight per cent in 1847-8. The trend is then consistently favourable in the first half of the 1850s. The profitability ratios in Table 2 work in a very similar manner, slightly lagging the



turnover ratio (and peaking in 1844) and reaching their post-mania low in 1848-9. The impact of 'unproductive capital' on returns is clearly considerable, and suggests that estimates of returns based on dividends, ignoring the 'dead period' inevitably faced by initial investors in the ordinary shares of the early railways, between paying calls during construction and the lines becoming operational, may provide a potentially misleading indicator of overall business performance.⁴⁰

Secondly, the differences between the unweighted ROE 2 and the weighted ROE 3 provide evidence of a persistent 'size effect'. Figure 1 shows the main available indices for the period 1830-55, Gourvish's dividend-based series for 1840-55, Mitchell and Deane's series starting in 1854 and the new series in their unweighted (ROE 2) and weighted (ROE 3) versions.

The four series provide very similar measures of profitability as far as 1854-55 are concerned, as do the three series covering the years from 1850 onwards.⁴¹ Prior to that, the new series indicate that the high returns of the two pioneering railways, the Stockton and Darlington and the Liverpool and Manchester (particularly the larger Lancashire line) were followed by a period in which returns fell as the new lines of the first 'Railway Mania' were being constructed. The use of dividends, in our view, serves to exaggerate returns, particularly in the early years of the 1840s, by concentrating on operational lines and effectively ignoring the inevitably flat returns of the construction periods. After 1832, the unweighted ROE 2 never even reaches 5 per cent (see also Table 2 column 6), a common interest level on debt, indicating that equity investments in the majority of even the larger railways never paid, even before 1855. Even ROE 3, which gives more weight to the performance of the largest companies, provides rates of

⁴⁰ See J.R.T Hughes, *Fluctuations in Trade, Industry and Finance, 1850-60*, (Oxford 1960), p. 186.

⁴¹ The Mitchell and Deane series provide rates of return as follows: 1854 3.86 per cent, 1855 3.75 per cent, based upon the inclusion of total working receipts, total working expenses, and total paid-up capital and loans as the divisor (1854: $(19.3-8.8)/271.7$ and 1855: $(20.5-9.9)/282.4$.

return from 1840-50 that are consistently and distinctly below the dividend series (except in 1844).

Concluding Remarks

The purpose of this paper was to construct new series of rates of return for the railway industry from 1830-55, so as to provide a basis for resolving disagreements within the existing literature on the profitability of the early railways.

The series have been based upon the contents of a substantial set of published half-yearly reports (adjusted by reference to other archival materials in the limited number of cases in which their reliability could be seen to be seriously flawed) and on a recomputed basis, with more consistent treatments for interest and depreciation. Although these changes were, in principle, important in fact neither had any very substantial effects upon the computed rates of return. The new series confirm that profitability was generally poor from 1850 onwards and suggest that, before 1850, equity investments in the majority of even the larger companies never paid although, as in any industry, some companies were able to earn superior returns. The evidence also suggests that, in this early period, the railways, as an acutely fixed cost business, offered the prospect of substantial increases in returns on capital employed if the volume of business could be sufficiently expanded but that the volume of business generated in the unplanned and highly competitive development of the UK's railways was, on average, far too low to justify the commercial risks involved.

The new series have been computed on a basis that tends to *increase* the returns, because of a data survival bias and because (in common with the later Mitchell and Deane series) they include no charges for depreciation or other forms of capital consumption. Some companies were more profitable than the industry as a whole but the results, taken as a whole, lend further weight to Reed's view that, if investors had been able to foresee the returns that were to result, the funds to build the railway network in this early period would probably not have been forthcoming.

APPENDIX

Companies included in data-set

| | |
|--------------------------------------|--|
| Birkenhead, Lancashire and Cheshire | London and Croydon |
| Birmingham and Derby | London and Greenwich |
| Birmingham and Gloucester | London and North Western |
| Birmingham, Bristol and Thames | London and South Western |
| Bristol and Exeter | London and Southampton |
| Cheltenham | Manchester and Birmingham |
| Chester and Holyhead | Manchester and Leeds |
| Durham and Sunderland | Manchester Bolton and Bury |
| East Lancashire | Manchester, Sheffield and Lincolnshire |
| Eastern Counties Railway | Midland |
| Edinburgh and Glasgow | Midland Counties |
| Glasgow and South Western | Newcastle and Carlisle |
| Glasgow, Paisley, Kilmarnock and Ayr | Norfolk |
| Great North of England | North British |
| Grand Junction | North Eastern |
| Great Northern | North Midland |
| Great Western Railway | North Staffordshire |
| Hull and Selby | Northern and Eastern |
| Lancashire and Yorkshire | South Eastern and Dover |
| Lancaster and Carlisle | South Devon |
| Leeds Northern | South Wales |
| Liverpool and Manchester | Stockton and Darlington |
| London and Birmingham | Thames Haven |
| London Blackwall | York, Newcastle and Berwick |
| London and Brighton | York and North Midland |

REFERENCES: OFFICIAL PUBLICATIONS

Note on abbreviations used:

PP UK Parliamentary Papers

PRO RAIL Railway archives held at the Public Record Office, London.

Companies Clauses Consolidation Act (1845) 8 & 9 Vict. c. 16.

Financial records, York and North Midland Railway; (Capital) Receipts and Payments accounts, 1836-45, PRO RAIL 770/13; Revenue Accounts 1839-45, PRO RAIL 770/13; Ledgers 1836-45, PRO RAIL 770/91.

Regulation of Railways Act (1868) 31 & 32 Vict. c. 119.

Report of the Select Committee of 1839 (PP 1839, X).

Report of the Select Committee of 1844 (PP 1844, XI).

Report of the Committee of Investigation to the Shareholders of the Eastern Counties Railway ('EC Report'); reproduced as Appendix 'A' of the Second Report of the House of Lords Select (Monteagle) Committee on the Audit of Railway Accounts; (PP 1849, Cmd 371), X, pp. 381-427.

Response of the Directors of the Eastern Counties Railway to the Eastern Counties Report (1849), London; LSE Reference Library.

Report of the Committee of Investigation to the Shareholders of the Midland Railway ('Midland Report'); Derby Mercury (Extraordinary Edition), 15 August 1849, pp. 1-62; Derby City Reference Library.

Reports of the Committee appointed by the proprietors of the York, Newcastle and Berwick Railway, to investigate the Great North of England Purchase Account ('Prance Report'); attached as Appendix 'B' to the Second Report of the House of Lords Select (Monteagle) Committee on the Audit of Railway Accounts; P.P. (1849, Cmd 371), X, pp. 428-61; Third Report of the Committee of Investigation to the shareholders of the York, Newcastle and Berwick Railway, ('Meek Third Report'); PRO RAIL 772/15; Fifth and Final Report..., ('Meek Fifth Report'); The Herald (York) Extraordinary Edition, 22 October 1849; PRO RAIL 772/15.

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Return to the House of Lords of the capital of railway companies for 1843-7 (PP 1847-8 XIV Cmd 71, pp. 1-27).

Returns Relating to Capital and Loans...[for the years to 31 December]

| | |
|--------|---------------------------------------|
| [1848] | PP 1849 LI Cmd 535 pp. 117-35. |
| [1849] | PP 1851 LI Cmd 187 pp. 179-97. |
| [1850] | PP 1851 LI Cmd 623 pp. 199-221. |
| [1851] | PP 1852-3 XCVII Cmd 172 pp. 193-221. |
| [1852] | PP 1854 LXII Cmd 98 pp. 479-509. |
| [1853] | PP 1854 LXII Cmd 494 pp. 517-47. |
| [1854] | PP 1854-5 XLVIII Cmd 510 pp. 591-623. |
| [1855] | PP 1856 LIV Cmd 316 pp. 533-65. |

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