# EARLY RAILWAYS 7


*edited by John Liffen and Stephen K Jones*

# THE RAILWAY MANIA OF THE 1860s

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**Introduction**

Britain experienced three great railway manias.[1] That of the 1840s is the famous one. It was an investment disaster, but provided the country with a nationwide communication network of great utility. It was preceded by the mania of the 1830s, which was successful not only in terms of social utility, but in providing above-market returns to investors.[2] And then there was the third and last big mania, that of the 1860, about which there is very little in the literature. Yet in terms of real capital investment, it was about as large as the one of the 1840s (but considerably smaller relative to the size of the economy), and about twice as large as the one of the 1830s.

The railway mania of the 1860s heavily involved so-called 'contractors' lines,' lines whose promotion, financing, and construction were said to be orchestrated by railway contractors. Those have been almost universally reviled in the literature, as they have been blamed for the investment disaster of the 1860s, including the Overend, Gurney financial crash of 1866. It is shown here that while contractors were important, they were just one of several elements that combined through novel forms of 'financial engineering' to inflate the general investment mania of the 1860s.

Modern economic and financial history has disappointingly little to say about Britain in the 1860s. What is available is usually presented briefly, in connection with the Overend, Gurney crash of May 1866. However, there were many other interesting developments in finance in that period. They

1 For simplicity, Britain in this work will be taken to refer to all of the British Isles, including Ireland. In the 19th century this was all part of the United Kingdom of Great Britain and Ireland. However, the vast majority of railway mileage, and even more of railway capital, was in Britain itself. The special aspects of Irish railways are an interesting topic by themselves, but are ignored here.

2 A M Odlyzko (2010b) 'This time is different: An example of a giant, wildly speculative, and successful investment mania', *B E Journal of Economic Analysis & Policy*, vol. 10, issue 1, Article 60 (2010). Preprint available at (http://ssrn.com/abstract=1573974).

seem worthy of study, especially for anyone interested in understanding how crashes such as the Overend, Gurney one occur, and how they might be prevented or at least mitigated. They also lead to some provocative insights into the rise of modern corporate capitalism.

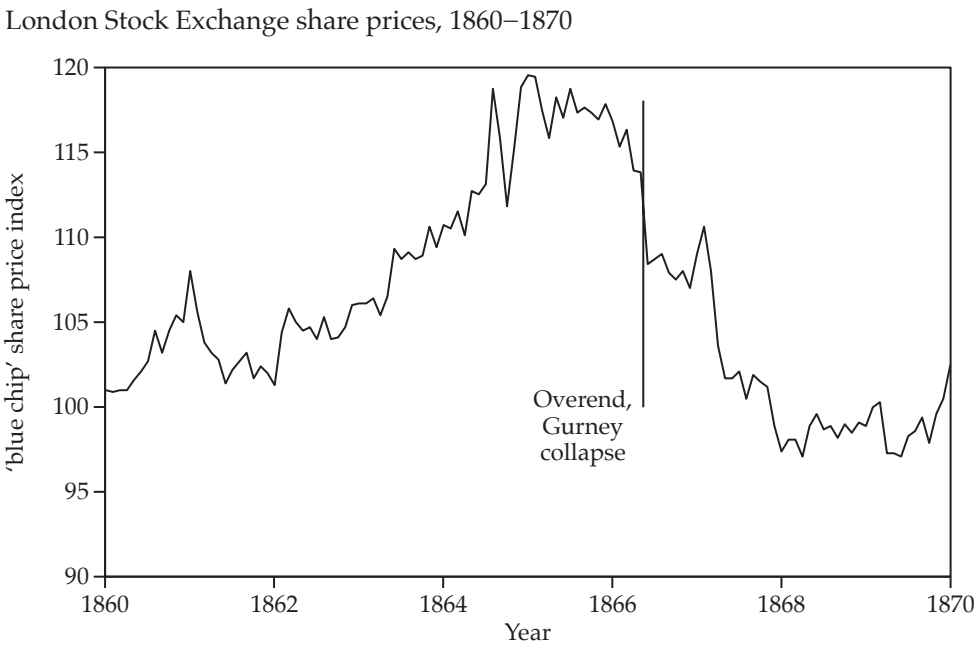


Fig 1. London Stock Exchange, index of 'blue-chip' domestic company share prices, 1860 to 1870

Fig. 1 shows an index of London Stock Exchange prices during the decade of the 1860s. It is the 'blue chip' index from a recent work,[3] and so is dominated overwhelmingly by the large well-established British domestic railways.

Fig. 1 shows there was a large and rapid decline in share prices that preceded the Overend, Gurney crash of May 1866, and that it continued for a short while afterwards. But then there were two additional declines in 1867. Those later declines do not seem to be covered in modern economic history literature.[4] That is a pity, as the share price declines of both 1866 and 1867 were closely related and were the outcomes of the same complicated financial processes. Neither can be fully understood without taking into

3 G Campbell, R S Grossman, and J D Turner (2019) 'Before the cult of equity: New monthly indices of the British share market, 1829-1929', preprint, available at (http://repec.wesleyan.edu/pdf/rgrossman/2019003 grossman.pdf).

4 For example, B C Hunt. 'The Development of the Business Corporation in England, 1800–1867', (Cambridge, Massachusetts, 1936), does not mention them at all, and this is typical.

account the other. 'History does not repeat, but it rhymes,' is a famous saying that applies well to financial crises. The Overend, Gurney crash of 1866 and the railway share crashes of 1867 have many features in common with the Global Financial Crisis of 2008, and possibly with the global markets of late 2021, as this work is being written. Hence they may provide lessons for the future. Some are discussed in another paper,[5] while others are covered in an extended version of this work, which provides far more detail about many of the topics that are only touched upon here.[6]

Many of the potential lessons from the railway mania of the 1860s concern the 'financialisation' of our economy. The roots of this process can be traced back to that earlier period, when the agents that Karl Marx called 'the roving cavaliers of credit' came to dominate the markets, and led British society in indulging in combinations of outright fraud, artful manipulation of accounts, wishful thinking, willful closing of one's eyes, and cynical creation of 'beautiful illusions' in order to find and snare a 'greater fool'.

The focus of this work is on the relaxation of government regulation, the opacity of accounts, and the financial innovation that enabled those 'roving cavaliers of credit' to accomplish a huge expansion of the British railway network. What is perhaps most surprising is they managed to do it surreptitiously. There were many astute observers of the financial markets and of railways, and many of them saw at least some of the potential dangers, but it was only after the railway share crash of 1867 that the full extent and complexity of what had happened became apparent.

What is still lacking in the literature are reliable and precise quantitative measures of what happened in the British economy, and especially in its financial aspects, in the 1860s. To obtain such will require much further research, and one motivation for this work is to stimulate such investigations by showing they might have interesting implications not just for economic history, but for current evolution of financial systems. Accounts of most key institutions from that period, especially the finance houses and railway contractors, are rare. A careful examination of records of individual railways might provide insightful data that is simply no longer available from any other sources about the financial flows of the 1860s. Railway history could thereby provide valuable new insights into an important phase in the evolution of modern corporate capitalism.

5 A M Odlyzko (2019b) 'Bagehot's giant bubble failure', preprint available at (https://ssrn.com/abstract=3445450).

6 6 A M Odlyzko (2022) 'The railway mania of the 1860s and financial innovation', preprint available at (https://ssrn.com/abstract=4006745).

| Year | Miles of railway | Capital authorized £ Millions | Capital paid up £ Millions |
|---|---|---|---|
| 1850 | 6,621 | 362.8 | 240.3 |
| 1855 | 8,335 | 375.0 | 297.6 |
| 1860 | 10,433 | 399.4 | 348.1 |
| 1865 | 13,289 | 576.3 | 455.5 |
| 1867 | 14,247 | 642.9 | 502.3 |
| 1870 | 15,537 | 596.2 | 522.9 |

**Table 1. Expansion of the British railway system**

Table 1 shows that in 1860, the British rail network had about 10,000 miles, and by 1870 that had been extended (largely by financing activities of 1862 through 1866) to about 15,000 miles. Eventually, around 1914, that network reached its peak extent of about 20,000 miles. Thus about half of the expansion of railway mileage between 1860 and the peak in 1914 was accomplished in a few years in the 1860s.

By 1860, the beginning of the period considered here, the British economy was growing vigorously, and the important role of railways in enabling that growth was widely accepted. There was increasing demand for more lines, to prevent localities from being left behind and allow them to develop further. A very rough summary of the situation in Britain at that time is that:

- Everybody wanted railways
- Nobody wanted to invest in railways

More precisely, essentially nobody wanted to invest in ordinary (common) shares of railways after the painful losses of the great Railway Mania of the 1840s. On the other hand, because of government restrictions on railway finance (with loans generally restricted to no more than a quarter of total capital, for example), and high and growing demand for railway services, railway bonds and preference shares were doing very well. So, not unnaturally, British investors came to regard railway common shares with great suspicion, but were willing to invest in bonds and preference shares. Table 2 provides a summary view of the capital structure of railway industry. It is based on official government statistics,[7] and it shows the success of 'the roving cavaliers of credit' in making bonds and preference shares riskier by decreasing the safety cushion provided by a preponderance of ordinary shares. This increased leverage was enabled by relaxation of various rules, either by explicit decisions by Parliament, or by creative financiers and creative lawyers finding ways to get around restrictions.

7 United Kingdom (1859) Report of Proceedings of Railway Dept., 1858, Parliamentary Papers 1859 Session 2 [2560] XXVII.637; United Kingdom (1876) Railway Returns for England and Wales, Scotland and Ireland, 1875, Parliamentary Papers 1876 [C.1540] LXV.117

| Year | Common shares £ Millions | Preference shares £ Millions | Debenture bonds £ Millions | Debenture stock £ Millions |
|---|---|---|---|---|
| 1850 | 150.0 | 34.7 | 55.5 | – |
| 1855 | 169.6 | 52.8 | 75.2 | – |
| 1860 | 190.8 | 67.9 | 81.9 | 7.6 |
| 1865 | 219.6 | 124.3 | 97.8 | 13.8 |
| 1870 | 229.3 | 158.7 | 90.7 | 51.2 |
| 1875 | 254.6 | 222.3 | 40.4 | 123.0 |

**Table 2. Capitalisation of British railways**

It needs to be emphasized that Parliamentary restrictions that made railway loan and preference share capital a very safe investment before the 1860s were not enacted primarily to protect investors. (And investors in ordinary shares did suffer losses that attracted only a few words of sympathy in Parliamentary debates.) What Parliament was determined to achieve was that each railway that was authorized was going to be built and would continue to operate in ways that provided real service to the public. That was felt to be the only way to justify the gross violation of the 'sacred right of property' that Parliament was engaging in by giving railways the right of compulsory acquisition of land.

Many of the themes that are prominent in this work, such as contractors' lines, finance houses, Lloyd's bonds, and poor accounting, have already been treated, or at least touched upon, in a variety of other publications.[8] What this work does is bring these themes together, puts them into perspective as key elements of the investment mania of the 1860s, and explains in much greater detail just how legal and financial innovation enabled the fleecing of large segments of the investing population in order to build out the railway network.

## The railway mania of the 1860s

By 1860, railways were by far the most visible industry in Britain, and the one with capitalization that dwarfed all other private enterprise. Yet calls for extensions of the railway system were not abating. Holders of ordinary railway shares opposed such extensions, but, in the words of a railway paper:[9]

8 P L Cottrell, 'Railway finance and the crisis of 1866: Contractors' bills of exchange, and the finance companies', *Journal of Transport History*, vol. 3 (NS), no. 1, Feb 1975, 20–40; P. Cross-Rudkin (2016) 'Contractors' lines – a system of tampering and jobbery?', in *EMLR1*,130–147; Hunt (1936); L H Jenks (1957), *The Migration Of British Capital To 1875*, (New York, 1957); H Pollins, 'Railway contractors and the finance of railway development in Britain–I', *Journal of Transport History*, vol 3, no. 1, May 1957, 41–51; H. Pollins,'Railway contractors and the finance of railway development in Britain–II', *Journal of Transport History*, vol 3, no. 2, Nov 1957, 103–110; H. Pollins,'Railway auditing–A report of 1867', *Accounting Research*, vol 8, no. 1, Jan 1957, 14-22; L Popplewell, *Contractors' Lines* (Bournemouth, 1988).

9 *Railway News*, 9 Sep 1865, 279, leader entitled 'Next session–More railways!'

> The old companies can no more prevent new railways being made than they can stop the action of the law of gravitation The district without a railway is in these days a district behind the age. It is, in a measure, left outside the pale of civilisation.

Table 1 gives some figures for the growth of the British railway system. The investment of about £240 million by 1850 consisted of about a third, or £80 million, arising from the (successful for investors) railway mania of the 1830s, and two thirds, or about £160 million, from the big (and disastrous for ordinary share investors) Railway Mania of the 1840s. The mania of the 1860s absorbed about £170 million, so just about as much as the Railway Mania, and added about as much rail mileage. At that time, £170 million was close to 20 per cent of gross domestic product [GDP], and most of it was spent in about four years. By comparison, the largest recent public transportation infrastructure project in the UK has been Crossrail, which apparently will end up costing about £20 billion, or about 1 per cent of GDP, and will have taken about a decade.

The railway mania of the 1860s was by far the dominant part of the general investment mania of that period. However, even very knowledgeable and inquisitive experts, such as Walter Bagehot and William Newmarch, who were perturbed by some of the anomalies they saw in the financial markets, failed to realize until very late in the game that it was 'financial innovation' tied to railway investments that was behind what they observed.[10]

**Contractors' lines**

Railway history as well as general business history literatures frequently cite, usually in derogatory terms, the prominent role that 'contractors' lines' played in the mania of the 1860s. What characterized contractors' lines was the heavy involvement of contractors in the financing of those lines.

The standard and very negative view of contractors' lines is presented, with a variety of citations to observers from that period and later, in the book of Popplewell.[11] These views were counterbalanced recently by the study of Cross-Rudkin,[12] who examined a selection of railways that had been characterised as contractors' lines, and showed that the stereotype description does not apply to them. Pollins has written a good general overview of contractors and their role in financing railways, with many specific examples of the varied ways these contractors operated and interacted with the railway industry.[13] A general overview of railway contractors is available in the book of L Jenks.[14]

10 For more details, see Odlyzko 2019b and Odlyzko 2022
11 Popplewell 1988
12 Cross-Rudkin 2016
13 Pollins 1957
14 Jenks 1957

There were a few voices in the 1860s that supported contractors and acclaimed their role in the expansion of the railway network. Their basic argument was that established lines would not invest to provide needed railway accommodation, and the investing public would not directly provide the necessary funds either. Perhaps the most effusive defense of the existing system was provided by Thomas Coates.[15] He wrote:

> And so, by degrees, excepting in the case of existing and affluent Companies, the construction of Railways has been left in the hands of Contractors. And here let me give my poor meed of homage to a class of men who strangely enough are in this country often talked of with a sneer. For my part, I cannot help looking with reverence upon those who are covering the whole civilized world with monuments of their enterprise and their skill. Without them the intercourse of nations would be interrupted, and to them it is that this country, above all, owes a deep debt of gratitude.

Some of the positive evaluations of contractors' lines carefully skirted a key issue, namely the fate of the people who ultimately ended up providing funding for them. Others were more forthright in applauding the fleecing of investors, as long as the public gained through construction of additional railways. The writer of a letter to *The Times* was explicit in saying that even overpriced railway construction that ruined investors provided a net benefit to the nation, because of all the ancillary benefits.[16] That writer also declared if restrictions were imposed, investors would likely 'expend the capital upon some undertaking which is less certainly conducive to the general welfare than a railroad.'

Many people were surely offended by such attitudes. A few months later, after extensive financial data emerged about the shenanigans at the London, Chatham, and Dover Railway, *The Times* declared in a leader that 'there can be no excuse for a purely fictitious and illusory compliance with Parliamentary regulations, and… for a process which has inflicted ruin on innocent people.'[17] Yet the desire for more railways was strong enough that many were willing to overlook the damage to 'the innocent people'.

During the railway mania of the 1860s, contractors were a key part in the financing of railway expansion. While many of them had large assets, those were small compared to the huge sums required by the mania of the 1860s. Hence they became not principals providing funds for new railways, but agents procuring funds. The high prices they charged did not simply go into their pockets. Those extra sums helped cover the financing cost, as various market agents demanded discounts to compensate for their risk in the search for 'a greater fool' that securities could be sold to.

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15 T Coates, *Railway Deposits Discussed in a Letter to the Chairman of the Committee*, (London, 1864). Available online at (https://books.google.com/books?id=p6RVAAAAcAAJ)

16 *The Times*, 4 June 1866, 5, letter of 'H' on 'Lord Redesdale and railway legislation'

17 *The Times*, 12 Oct 1866, 6

**Search for a greater fool**

The global financial crisis [GFC] of 2008 was facilitated by the creation and dissemination of complicated financial instruments through collaborative but only loosely coordinated efforts of many agents and agencies. Yet very few went to prison. Overoptimism, willing suspension of disbelief, and simply averting one's eyes from potential dangers are often hard to distinguish from intentional deceit.

The same general themes can be discerned in Britain of the 1860s, but of course in much more primitive form. But it was much more sophisticated than what had been seen before. A year after the Overend, Gurney crisis, a retrospective piece noted:[18]

> The ingenuity of financiers, the ease with which debentures got taken through misapprehension of the true nature of their security, the facility with which, in unscrupulous hands, a system of depreciated issues and temporary loans unknown to shareholders gave fictitious values to the stocks brought out – all these means helped to float more and more lines year after year, till at last there came a crisis…

As with the GFC almost a century and a half later, it required the cooperation of many agents to create those 'fictitious values'.

What kept the game going for a long time is that in addition to naive individual investors there was a large class of 'greater fools' that market players could hope would either unwittingly or wittingly but unwillingly come to the rescue. The goal of promoters of railway extension was to get the big lines to provide service, either by getting them to expand on their own, or by forcing them to take over new projects. And it worked in a large number of cases. Thus the Chairman of the Great Western Railway, one of the largest and most prominent lines, told his shareholders that they faced some hard times as they struggled to recover from an approach in which '[t]hey had in too many instances bought off opposition by taking over contractors' lines.'[19]

The standard way this process worked was for promoters to obtain Parliamentary sanction for a line from town A on line X to town B on line Y, and then effectively run an auction, asking lines X and Y to bid to buy them out. If line X purchased the line (after it was built, or, more frequently, after the Act was obtained but before any substantial sum was invested in construction), it could then use it to capture some of the traffic that line Y carried through B, and vice versa.

We next consider the relaxed regulation and legal and financial innovation that made it convenient and inexpensive for those independent projects to arise.

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18 T Hennell, 'Railway finance', *Quarterly Review*, vol 122, April 1867, 489–506. Available online at (https://books.google.com/books?id=HUEpq HaiwC).

19 *The Times*, 5 Mar 1866, 6

**Strict initial government scrutiny**

In the very early years of railways, there was a thorough scrutiny of each new project that came up for authorization. This scrutiny also ensured that railway projects were widely discussed, and their proceedings, financial and otherwise, were visible to the public. Success in passing that early Parliamentary scrutiny did serve to provide some reassurance to investors that the project was pretty solid and likely to be profitable. For example, *Railway Record* in the fall of 1845 discussed the myriad projects that were being prepared for submission in the 1846 session. It opined that most would be discarded as insubstantial or outright fraudulent, but '[i]f they pass Parliament, they may be looked upon as profitable investments, seeing the points on which Parliament must be satisfied respecting them . .'[20] This no longer held in the 1860s, as railway financing became opaque. A string of bankruptcies preceding the Overend, Gurney crisis of early May 1866 slowly revealed what had been happening. In the week preceding that crash, a railway paper wrote that a financial mystery was finally being solved. For some time, it noted, 'people wondered' how so many projects had been going on without publicity, 'silently, noiselessly, triumphantly – as if the parties had become possessed of some mine of wealth, and feared to have too much said about it. The magic turns out to be "Finance".[21]

A major part of Parliamentary scrutiny was testimony by people from a proposed line's locality about its utility. Landowners, manufacturers, and traders would discuss how their or other businesses would gain from better railway communication. But 'talk is cheap', and speakers would not have to demonstrate their commitment to schemes being investigated. Thus, for example, Sir Charles Wood, MP, testified in favour of a line affecting the town he represented, but he 'had never owned a railway share and had no intention of doing so now'.[22]

There were three quantitative aspects of the economics of a project that were scrutinized by Parliament in the 1830s and 1840s, in ways specified not by legislation, but by Standing Orders:

- cost to build and operate the line
- revenues of the line
- availability of capital to build the line

Considerably more detailed discussion of the first two items in the list is available elsewhere.[23] Here let us just note that estimates of costs came from engineers. And railway engineers, just like other technologists before and since, to this day, have almost universally been too optimistic on costs (as well

20 *Railway Record*, 19 Nov 1845, 1734
21 *Herapath's Railway Journal*, 5 May 1866, 538
22 Cross-Rudkin 2016, 139
23 A M Odlyzko (2010a) 'Collective hallucinations and inefficient markets: The British Railway Mania of the 1840s', manuscript available at (http://ssrn.com/abstract=1537338); A M Odlyzko (2019a), 'Dionysius Lardner, the denigrated sage of early railways', *EMLR2*, 39–58. Preprint available at (https://ssrn.com/abstract=3445470)

as on performance and time to completion). This was already known before railways appeared on the scene. But there was nothing that could be done about it, so engineers continued to provide their (faulty) cost projections. And that was what investors and Parliament had to rely on, although some allowance was usually made informally for cost overruns.

Estimates of revenues for a railway, once it was completed, were provided in the smaller mania of the 1830s and up through the 1845 Parliamentary session in the big Railway Mania by a small and short-lived group of professionals called the 'traffic takers'. Requirements for those estimates were eliminated in 1846.

The third item on the list involved subscription contracts. In the 19th century, investors in new ventures would normally sign legally binding subscription contracts which would oblige them to first put down a deposit, on the order of 10 per cent of the nominal value of each share. Then, as the company proceeded with its project, they would have to respond to 'calls' from the management, asking for more funds for the works, up to the limit of each share.[24]

To ensure that a project had solid funding, Parliament required that when promoters submitted their projects for approval, they had to provide subscription contracts covering at least 75 per cent of the equity capital, and deposit 10 per cent of that 75 per cent with a government agent.[25] The subscription contracts were scrutinized by Parliamentary committees. The expectation was that the money would come from those who subscribed for shares, and, if a project was approved, would be used for construction, with the subscribers putting up the rest of the funds as works proceeded. While discussion of the validity of subscription contracts occupied much time, this seldom had much of an effect on approvals. Opponents could only raise questions about a few of the purported investors, and since some mistakes were unavoidable, and it was hard to estimate the affluence of individuals in days when there were no credit bureaus, it was very hard to reject a project on the basis of a few questionable entries in the contract. In fact, subscription contracts were often full of what were called 'men of straw', namely subscribers who had no means of providing the full amount their share allotments called for. That this was happening was known to many of those seriously involved in the railway industry, although nobody had any quantitative estimates of the extent of such practices.[26] Still, the Standing Orders requirements for subscription contracts did impose some barriers on promoters, as they had to go to substantial efforts to prepare lists that

24 This is still how the process works today for large investors in venture capital or private equity funds.

25 There were some brief periods when the 10 per cent was departed from.

26 Various concrete examples were cited in the press, for example in the leader 'Dragon's teeth - Petonia in the East', in *Railway Times*, 20 Jan 1857, 43–44

looked at least moderately plausible. This requirement was eliminated in 1858, though. As part of a move to simplify operations, Parliament moved to require only a deposit of 8 per cent of approved equity capital.

This did give rise to some concerns even before the mania of the 1860s became noticeable, as in a letter published in *The Times*.[27] So that there were some observers who thought that having to present a plausible-looking list of subscribers had acted as a brake on the more visionary railway schemes, and that this brake was now gone.

What remained to constrain 'promoters of adventurous disposition' were the 8 per cent deposits. But some clever legal engineering soon eliminated even that obstruction.

**Evasion of government regulation**

The intention of Parliament was always that the deposits should come from what were universally called bona fide investors, ones who were able and willing to pay down the deposit on application and then, as construction proceeded, the remainder of the par value of their shares. However, it was an open secret among the more knowledgeable observers of the railway industry that the funds for the deposits were frequently borrowed.

Deposits were made with Accountant-General of the Court of Chancery, the safest place one could imagine. However, promoters had to search for lenders and pay high interest rates, since the money was borrowed by the promoters of the railway project, and deposited in their names. Thus it was at risk, in case the promoters were to run into difficulties. The problem was solved in 1861 by Robert Baxter, a lawyer.[28] He decided that the way the Standing Orders were written, the deposit did not have to be made to the account of the promoters, but could be made by any persons or institutions in their own names. What seems even more remarkable than this piece of legal inventiveness is that 'the clerks of the [Parliamentary office responsible for administering Standing Orders], acting on their own responsibility, acceded' to his interpretation.[29] MPs only learned of the change by accident, in 1864.

Baxter's ingenuity meant that promoters were relieved of most of their financial burden. This enabled small entrepreneurial groups to concoct independent lines. Practically any new project encountered fierce opposition from established railways that were potentially threatened by it. That posed a major hurdle. In the words of one observer, '[t]he risks and uncertainties of a Parliamentary contest are so great that no capitalists ever do or will come forward with money to make a line the Bill for which is not passed.'[30] So

27 *The Times*, 6 Jan 1859, 5, letter entitled 'Railway competition'

28 However, Thomas Coates, a Parliamentary agent cited earlier, claimed he had thought up the approach first, and suggested it to Baxter: Cf. T Coates 1864)

29 United Kingdom, Report from the Select Committee on Standing Orders (Parliamentary Deposits), Parliamentary Papers 1864 (423) X.613, iv

30 *The Times*, 22 May 1866, 6, letter entitled 'Private Bill legislation'

some local promoters would get together a small fund, bring in an engineer to prepare a plan for the line, collect endorsements from locally eminent people, borrow the money for the deposit from a bank or an insurance company, and go through the Parliamentary contest. If they lost, they would repay the loan, and suffer the loss of their investment, typically just a couple of thousand pounds. But if they won, they would either bring in larger capitalists, or effectively sell the Act to them, or else sell to one of the neighboring lines. This led to a proliferation of independent schemes being submitted to Parliament.

Baxter's innovation was likely accepted because it was just an extreme example of many evasions of the law that were practised and tolerated. In the case of limits on borrowing powers, for example, railways claimed that it was not possible to operate within them. Railways, or projected railway projects, basically had just one chance each year to apply to Parliament for new limits. But the need for additional funding often arrived at unexpected times.

Sometimes railways borrowed illegally for long periods. In the late 1830s and early 1840s, faced with never-ending cost overruns, railways starting issuing what were called 'loan notes'. These were basically unsecured loans. They were an open secret, as they were written about in the press, and were sometimes quoted in listings of financial instrument prices. But they went against the intent of Parliament, and were explicitly outlawed in 1844.

Gladstone's 1844 Act did constrain railway borrowings, but legal and financial ingenuity managed to overcome that barrier. Some time around 1860, just in time for the railway mania of the 1860s, John Horatio Lloyd (1798–1884), an eminent member of the English bar, came up with a solution, which came to be called a Lloyd's bond.

What was a Lloyd's bond? It was a properly certified promise by a railway to pay, but not for a cash loan, which would have violated Gladstone's 1844 Act, but rather for specific goods or services. Since railways had to pay for a profusion of goods and services, especially while under construction, this gave railway managers a means of spending essentially un- limited sums, with essentially no oversight. And, in many cases, they only pretended to pay for specific goods and services, and basically took a cash loan, making it the now clearly illegal 'loan note'. There was some initial controversy as to whether Lloyd's bonds were legal, as they were clear evasions of Parliamentary intentions, but the courts did uphold their validity.

The other major concern about Lloyd's bonds was about railway directors being able to bypass the scrutiny not just of Parliament, but of their own investors. At the end of 1862, a railway paper published a letter that elaborated on how Lloyd's bonds were used to mislead investors, and posed

dangers to investors and the economy as a whole.[31] It was extraordinarily perceptive in terms of understanding how the various players and institutions interacted, and where dangers might lie. So it is worth quoting at length:

> A knot of landowners, lawyers, engineers, and contractors, find themselves in possession of an act of Parliament for a railway, but without a Proprietary to give effect to it. Bound by the public, the enterprising contractors, at their own price, and for the immediate bonds of the Company, undertake to construct the line. These bonds they deposit with a joint-stock bank, anxious for business, and on them obtain advances within a certain margin. More than 50 per cent. of the capital being thus immediately created by bonds, and advanced on by the bank, the Company is now in a position to borrow on debentures, which are of course handed to the contractors, and by them paid into the bank as cover for further advances, and thus affairs proceed until the bank has come under advance on the full amount of capital and debentures which the Company is authorised to issue. Hitherto things have gone on smoothly… But the discovery is now made that all the money powers are exhausted, and the line but half made. An act of Parliament, preference shares, and further debentures are the result, and the bank being now committed, and having no alternative, repeats the process of advancing…

The letter cited above shows that there were some observers who understood very clearly the dangers of the combination of deregulation, opacity, and financial innovation. However, there do not seem to have been very many of them, and none appear to have presented any quantitative estimates of how big and dangerous the problems were. Lloyd's bonds continued proliferating, and they were universally thought to have been a major contributor to the financial debacle.

**Results of the mania of the 1860s**

There were certainly large losses for shareholders and creditors in many companies. However, as a whole, railways did not do too badly. Statistics show earnings on total capital (that is, revenues minus operating expenses as a fraction of all money invested in the industry) starting out at 4.93 per cent in 1842, rising to 5.48 per cent in 1845 (the peak of the great Railway Mania, and a significant contributor to making that episode of investor exuberance as large as it was), crashing down to 3.31 per cent in 1850, then rising, with some ups and downs, to 4.37 per cent in 1865, and then descending to 4.01 per cent in 1867, followed by a recovery to 4.83 per cent in 1872.[32]

The big difference between the 1840s and 1860s is that the Railway Mania of the 1840s tripled railway mileage and capitalization in Britain, so investment losses were giant and very visible. The mania of the 1860s

31 *Herapath's Railway Journal*, 20 Dec 1862, 1304, letter entitled 'Railways, contractors, and joint stock banks'

32 *Herapath's Railway Journal*, 11 Jan 1873, 27–28

consumed just about as much capital, but it started with a much larger base. So the losses overall were not as painful as two decades earlier.

The railway mania of the 1860s did much to satisfy the widespread desire for an enlarged railway system. But it did so very inefficiently, and so magnified the inefficiency that already plagued that infrastructure. With some careful data collection and analysis, a much better network could have been built, even aside from the waste involved in the financing operations.

Mark Casson has shown that the British rail system on the eve of World War I could have been replaced by one that provided equivalent service, but with reductions in cost and mileage in the 25–35 per cent range.[33] This is actually consistent with some estimates made by railway engineers in the 19th century, but Casson went beyond those in providing an actual network design that very likely would haved achieved those savings. However, Casson's claim that similar savings could have been achieved with a modest change of policy in 1845–46 is unlikely to be correct. The problem is that with very few exceptions, the general public as well as policy makers and railway industry experts held incorrect notions about locality of traffic and nature of growth of demand.[34] They expected that once a line opened, traffic on it would build up over a couple of years, and then level off. Further, they thought most of the revenue came from transporting passengers between terminal cities on a line.

By the 1860s, the knowledge of continuing growth was spreading, but was still not firmly settled in many people's minds. On the other hand, the importance of local traffic was still not understood in 1860s, and in general is still not fully appreciated even today. There was a lack of quantitative tools to evaluate the likelihood that particular branches and extensions might be profitable. Gravity models, discovered by Desart in the 1840s, had been forgotten, and would not be used widely in transportation planning until the 20th century.[35]

Even in the absence of growth or locality estimates, it seems a more efficient expansion of the British rail network could have been designed in the 1860s had a more centralized approach been taken, one which considered demands from various localities. There were many complaints from contemporaries about inconsistent decisions by Parliament. Surely an even greater defect was that schemes were considered separately from

33 M Casson, *The World's First Railway System: Enterprise, Competition, and Regulation on the Railway Network in Victorian Britain*, (Oxford, 2009)

34 A M Odlyzko (2016) 'The early British railway system, the Casson counterfactual, and the effectiveness of central planning', *Essays in Economic & Business History*, vol. 34, 60–94. Online journal version: (http://www.ebhsoc.org/journal/index.php/journal/article/viewFile/322/302).

35 A M Odlyzko (2015), 'The forgotten discovery of gravity models and the inefficiency of early railway networks', *OEconomia*, vol 5, no. 1, 157–192, with online journal version at (http://oeconomia.revues.org/1684).

each other, and much depended on various chance factors as well as skills and personalities.

The counterargument to all the hypotheticals above is that had people been as rational, diligent, and inquisitive as needed to carry out the recommended steps, very little railway construction would have been done in the 1860s, as investors would have known they could only obtain miserable returns. Provision of much-desired railway connectivity would then have required development of new approaches, and in the British political system of the 19th century that would have taken a long time. Instead, 'the roving cavaliers of credit', together with contractors, engineers, and other helpers managed to bamboozle investors into financing a giant expansion.

**Conclusions**

Although the economy has changed, there are common themes that do repeat. One clear lesson from the 1860s that arose in subsequent manias is the danger of combining 'financial innovation' with opaque accounting, especially in complex systems. Another is that even very clever observers, such as Bagehot and Newmarch, sometimes fail to see the signs of dangerous instability, even when they search for them. And sometimes even very clever observers, such as Bagehot and Newmarch, fail to take into account some glaringly obvious information, such as that on volume of railway investment in their case.

This work provides some new perspectives on the railway mania of the 1860s, in particular on its intimate connection with financial developments. It also shows how little is known about those connections, and this will hopefully stimulate much further research in railway history. That would be of interest not just in illuminating an interesting period in the development of that industry, but also would be of use in filling in gaps in our knowledge of the development of finance and the whole economy, and might provide guidance for the future.

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## GENERAL ABBREVIATIONS

Within the notes for individual papers, a reference such as 'Derbyshire Record Office [DRO]' is, if repeated, given as 'DRO', or L Wiener, *Articulated Locomotives* (London, 1930) as 'Wiener 1930'. Throughout the volume, however, the most frequently cited organisations, journals, books, and repositories are always abbreviated as follows:

| | |
|---|---|
| AIA | Association for Industrial Archaeology |
| ICE | Institution of Civil Engineers |
| IMechE | Institution of Mechanical Engineers |
| MEIMME | North of England Institute of Mining & Mechanical Engineers, Newcastle upon Tyne |
| NRM | National Railway Museum, York |
| R&CHS | Railway & Canal Historical Society |
| RO | Record Office |
| SE | Search Engine (NRM library and archive) |
| SLS | Stephenson Locomotive Society |
| TNA | The National Archives of the United Kingdom (formerly Public Record Office, Kew) |
| *EMLR1* | Peter Cross-Rudkin (ed), *Early Main Line Railways, papers from the International Early Main Line Railways Conference* (Clare, 2016) |
| *EMLR2* | Mike Chrimes (ed), *Early Main Line Railways 2, papers from the Second International Early Main Line Railways Conference* (Croydon, 2019) |
| *ER1* | Andy Guy and Jim Rees (ed), *Early Railways: a selection of papers from the First International Early Railways Conference* (London, 2001) |
| *ER2* | M J T Lewis (ed), *Early Railways 2, papers fronm the Second International Early Railways Conference* (London, 2003) |
| *ER3* | Michael R Bailey (ed), *Early Railways 3, papers fronm the Third International Early Railways Conference* (Sudbury, 2006) |
| *ER4* | Grahame Boyes (ed), *Early Railways 4, papers fronm the Fourth International Early Railways Conference* (Sudbury, 2010) |
| *ER5* | David Gwyn (ed), *Early Railways 5, papers fronm the Fifth International Early Railways Conference* (Clare, 2014) |
| *ER6* | Anthony Coulls (ed), *Early Railways , papers from the Sixth International Early.Railways Conference* (Milton Keynes, 2019) |
| *IRR* | *Industrial Railway Record* |
| Lewis *EWR* | M J T Lewis, *Early Wooden Railways* (London, 1970) |
| *TNS* | *Transactions of the Newcomen Society* |
| *VCH* | *Victoria History of the Counties of England* |

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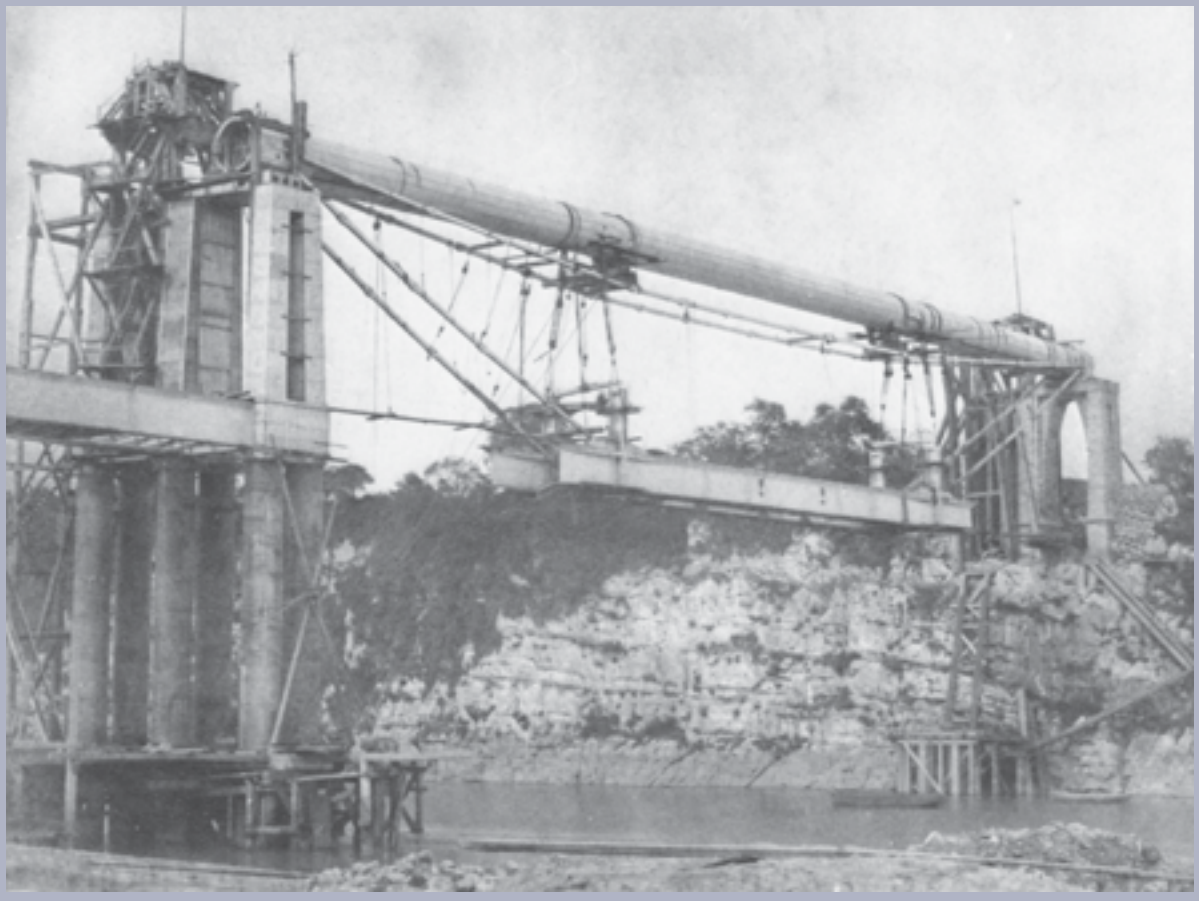

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