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Media coverage and stock returns on the London Stock Exchange, 1825-70

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ON THE LONDON STOCK EXCHANGE, 1825-70

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Abstract:

News media plays an important role in modern financial markets. In this paper, we analyse the role played by the news media in an historical financial market. Using *The Times's* coverage of companies listed on the London stock market between 1825 and 1870, we examine the determinants of media coverage in this era and whether there was a media discount. Our main finding is that a media discount only manifests itself after the mid-1840s and that the introduction of arm's-length ownership along with markedly increased market participation was the main reason for the emergence of this discount.

Keywords: Media, financial press, historical stock markets, advertising

JEL Classifications: G12; N23

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1. Introduction

The UK capital market underwent a major transformation in the nineteenth century, with large capital-intensive companies raising funds on the equity market from multiple arms-length investors. This revolution resulted in a major increase in the number and value of companies listed, an increase in the number of stock exchanges operating outside London, and a substantial increase in the proportion of the UK's population investing in equities (Thomas, 1973; Michie, 1999, pp. 88–9; Grossman, 2002; Acheson et al., 2009; Rutterford, 2011). This expansion of the equity market was accompanied by an increase in the demand for corporate information, which was partially met by companies through annual shareholder meetings and annual reports. In addition, the financial press emerged during the nineteenth century to meet the demand from arm's-length investors for independent corporate news (Preda, 2001; Taylor, 2012).

In this paper, we analyse the press coverage of companies listed on the London stock market between 1825 and 1870. In particular, we examine the coverage by *The Times*, the leading newspaper of the day, of companies listed on the London stock market between 1825 and 1870. We also look at the determinants of press coverage to understand better what characteristics were associated with a greater probability of being covered by *The Times*. In particular, we examine whether companies which advertised in *The Times* in one year were more likely to be covered in it the following year. In addition, using monthly stock data collected from the *Course of the Exchange*, we test whether there was a media discount i.e., a return premium for companies not covered by the press. Such a discount might exist because companies not covered in the press need to pay a premium because they lack recognition among investors (Merton, 1987) and it might persist because there are

impediments to trade (e.g., liquidity constraints) which prevents traders from exploiting a mispriced security (Fang and Peress, 2009).

This paper is the first to examine the effect of the media on asset prices before and after the period when arm's-length and diffuse ownership emerged. We hypothesize that the media had no influence in the first half of our sample period because ownership was concentrated in the hands of a small number of shareholders, who would have had access to information on the firms they had invested in via local networks or through involvement in corporate governance. However, in the second part of our sample period, we would anticipate that media influenced asset prices in that press reporting provided arm's-length investors with additional and valuable information.

An additional motivation for this paper is that it tests the relationship between media and finance in an environment where there were few other substitutes or confounding information providers such as analysts, city circulars, 24-hour television, or internet news sources.¹ In addition, equity investors at this time were individuals rather than well-informed institutional investors (Anderson and Cottrell 1975; Cheffins, 2008, p.190; Turner 2009; Campbell and Turner, 2012). This makes the nineteenth-century stock market a unique and relatively noiseless environment in which to test the media-finance hypothesis.

A further feature of this era which makes this paper interesting is that, unlike with modern newspapers, advertisements were exclusively text based, making it easier to gather information on whether firms which were reported on in the newspaper had previously placed advertisements with the paper. We are not testing

¹ Dyck and Zingales (2003) in their study highlight that the effect of media is more pronounced for companies with low analyst coverage.

whether companies 'paid' for coverage or whether journalistic integrity was compromised — we simply wish to see if the two things are correlated, which might suggest some implicit and unspoken arrangement. Indeed, pressure for *The Times* to acquiesce to such arrangements may have grown during the century because of increased competition from aggressive parvenus in the newspaper market.

We find that media coverage was broadly comparable to modern markets, with *The Times* covering 58 per cent of our sample firms. Notably, the proportion of companies covered in a particular year increases in a non-linear fashion over time and the average number of articles written conditional on coverage also increased non-linearly over time. In terms of media coverage, the number of issued shares, company size and industry are all important determinants, suggesting that larger, widely-held firms were more likely to be covered by the press in the nineteenth century. Interestingly, we also find that if a company advertised in *The Times*, the likelihood of subsequent coverage by the newspaper increased by over seven per cent.

With regards to the media discount, when we examine the whole sample period and the first half of the sample period, we find no evidence of a discount. However, this is not the case when we focus on the period from the mid-1840s onwards because we find that companies with coverage have statistically significantly lower returns, even after adjusting for market and firm-specific risk factors. This is consistent with our hypothesis that a no-media premium would only manifest itself after the mid-1840s, when participation in the stock market increased dramatically and when arm's-length ownership began to emerge. In an attempt to corroborate this hypothesis, we test whether stocks with wider participation and arm's-length ownership have greater media discount. Using the number of shares issued as a proxy

for participation and arm's-length ownership, we find some evidence supporting our hypothesis.

This study contributes to the growing literature which examines the relationship between media and financial markets. One branch of this literature looks at whether sentiment, as measured by the optimism / pessimism of newspaper reporting, affects asset prices (Tetlock, 2007; Tetlock et al., 2008; Engelberg et al., 2012; García, 2013; Soo, 2013; Walker, 2014; Manela and Moreira, 2015). The other branch of this literature focuses on the informational role played by news media and therefore concentrates on the extent of coverage (Fang and Peress, 2009; Cumming et al., 2013; Ferguson et al., 2015). Our paper is most closely related to this second branch of the literature and our findings are similar to the seminal contribution of Fang and Peress (2009), who identify a media discount on NYSE and NASDAQ stocks in the period 1993–2002. However, our unique contribution is that we identify that the media discount only emerges when stock ownership becomes more diffuse and arm's length.

Our paper also augments the literature which looks at the informational role of media in historical contexts such as its effect on public health (Costa and Kahn, 2015), financial 'bubbles' (Bhattacharya et al., 2009; Campbell et al., 2012) and corporate scandals (Taylor, 2012). We augment these papers by looking at the informational role of media on the equity market for the middle two quarters of the nineteenth century. Bignon and Miscio (2010) examine the effect of payments made by French newspapers both directly through advertising and indirectly through investment banks placing laudatory articles in a newspaper's editorial section (so-called *réclames*) on media coverage. They find that companies paying for coverage

were more likely to be covered. We also find that companies that advertised in *The Times* were more likely to be covered.

The next section examines the institutional and historical setting of the study and our hypotheses are developed in this section. Section three describes our media and stock price data. Section four examines the determinants of media coverage. Section five asks whether there was a media discount in this historical market and offers an explanation as to why we only find a media discount in the second half of our sample period. Section six is a brief summary and conclusion.

2. The development of the equity market and the financial press

The UK equity market grew substantially during the middle two quarters of the nineteenth century. In terms of issues, the market grew by circa 40 per cent between 1825 and 1870, but in terms of market capitalisation to GDP, it trebled in size over this same time period (Acheson et al., 2009, pp. 1115–7). This growth was driven on the demand side by a growing number of middle-class investors looking for returns in excess of those provided by Consols (Jefferys, 1977). On the supply side, it was stimulated by the liberalisation of UK incorporation law (Shannon, 1933; Cottrell, 1980; Taylor, 2006) and the rise of capital-intensive infrastructure projects such as railways, gas-light and coke companies, waterworks, and telegraph companies (Acheson et al., 2009).

There was a marked change in the ownership of public companies before and after the 1840s. Prior to the 1840s, shareholder numbers in most companies were in the low hundreds and shareholders typically lived close to the company they were investing in (Acheson et al., 2015). For example, canals, which were the largest companies in terms of market capitalisation in the pre-1840 era, fitted this

characterisation (Ward, 1974). From the mid-1840s onwards, there was a notable change in ownership of public companies which accompanied their growth in scale and their increased national rather than regional reach. This was true for the railway industry, which experienced a substantial surge in growth in the mid-1840s. For example, a Parliamentary survey of railway shareholders in 1855 found that there were 166,125 railway shareholdings (Parliamentary Papers, 1856). Three railway companies had in excess of 10,000 shareholders, a further three had 5,000 shareholders or more, and a further 10 had more than 2,000 shareholders (Parliamentary Papers, 1856). But the growth in shareholder numbers was not just limited to railways and new sectors. Banks grew in size and with it their shareholder bases. For example, the number of UK bank shareholdings grew from 23,941 in 1844 to 40,583 in 1869. Only one bank had more than 1,000 shareholders in 1844, yet by 1869, 12 banks had in excess of 1,000 shareholders.²

Consequently, from the mid-1840s onwards, the UK experienced the rise of the arm's-length and diffuse corporate ownership, which developed further in the last quarter of the nineteenth century, with the majority of large public companies at the beginning of the twentieth century being characterised by this type of ownership (Foreman-Peck and Hannah, 2012). The rise of this type of ownership from the mid-1840s onwards resulted in a change in investors' access to company information. When ownership was geographically concentrated and there were a low number of shareholders, information on performance was relatively easy to obtain via direct participation in governance, local knowledge, and social networks which contained company directors. However, the rise of dispersed and arm's-length ownership implied that investors required alternative information sources on company

² *Banking Almanac and Yearbook*, 1844 and 1870.

performance. Given that institutional investors did not participate in the equity market in this era and that there was no analyst coverage of stocks, investors could not rely on information being collected, analysed and disseminated by these sources. In addition, UK public companies did not face formal reporting requirements until the late 1860s (Watts and Zimmerman, 1983; Baskin and Miranti, 1997, p. 185) and it was not until the early twentieth century that companies listed on the London Stock Exchange were required to distribute their annual financial accounts to shareholders (Cheffins, 2008, p. 95).

Into this information lacuna stepped the press. *The Times* had covered financial and money markets from well before the 1840s, but the 1840s marked the beginning of widespread press coverage of equity markets by the news media (Preda, 2001; Taylor, 2012). This coverage came in two forms — expanded coverage by newspapers like *The Times* and the rise of weekly railway periodicals, e.g., *Railway Times* (est. 1837), *Herepath's Railway Journal* (est. 1835), and the *Railway Record* (est. 1844). These periodicals carried share price tables, editorial commentary, company financial reports, reports of company AGMs, and advertisements from railway promoters.

The credibility of the information provider is also something which matters for investors. For example, Dyck and Zingales (2003) in their study highlight that the effect of media is more pronounced the more credible is the news source. The railway press was far from impartial — it acted as a cheerleader for railway companies and talked up railway shares during the Railway Mania promotional boom of the mid-1840s, partially due to the large advertising revenue generated for it by railway companies and promoters (Kostal, 1994, p.37; Campbell et al., 2012). *The Times*, on the other hand, was a credible source which was perceived to be independent of the

companies it was reporting on. For example, it was extremely critical of speculation in railway shares and it published a highly critical exposé a few weeks before the railway ‘bubble’ crashed (Tuck, 1846; Simmons, 1978, p.40; Campbell et al., 2012).

In terms of our hypotheses, the context described above suggests that we should expect less press coverage of the equity market before the large expansion of arm’s-length ownership in the 1840s. In addition, because investors were well informed about the companies that they were investing in, there should have been no informational advantage to investors of press reporting on companies and there should be no discount on the shares of companies which are covered by the press. In contrast, after the expansion of arm’s-length ownership, we would expect greater coverage of companies because this is valued by newspaper readers who are investing in equities. We also hypothesize that by increasing the information available to investors, the press reduces company-specific risk, resulting in a premium for shares not covered in the press and a discount for those which are covered (Fang and Peress, 2009).

In terms of advertising, we hypothesize that companies which advertised in *The Times* were more likely to be subsequently covered by the newspaper. This could have occurred for several reasons. First, companies which advertise are more likely to have greater public recognition and therefore be covered by the press. Second, the placing of adverts may have simply brought companies to the attention of *The Times*’s reporters. Thirdly, as with the case of the French press discussed by Bignon and Miscio (2010), companies may have been indirectly paying for coverage. However, this is not to suggest that this revenue stream influenced the content of reports in *The Times*. Indeed, *The Times* demonstrated this in 1845 when it issued several highly critical reports concerning the railway sector, which was a major source of advertising revenue for the paper.

3. Stock and media data

Our stock data was obtained from the *Course of the Exchange (COE)*, a bi-weekly list which was regarded as the official price list for the London Stock Exchange (LSE). For listed securities, the *COE* reported dividends, number of issued shares, nominal and paid-up values of stock, and stock prices. The stock prices reported in the official list are usually the transaction prices from the previous day (Ye and Turner, 2014). We use Ye and Turner's (2014) hand-collected data for each common stock listed in the *COE* for every month between March 1825 and December 1870.

<INSERT TABLE 1>

Our dataset contains 102,408 observations, consisting of stocks issued by 580 companies. Panel A of Table 1 contains the summary statistics for our dataset, which reveals that stocks in this era had high denominations and that the mean market capitalisation was £650,000. Our data comprises stocks from 13 industries, including banks, bridges, mining, canals, docks, gas-light and coke, insurance, roads, railways, telegraphs, waterworks, and miscellaneous industrial and commercial firms. If media coverage is biased towards particular industries, this will be identified in subsequent analysis. In addition, to account for this possibility, industry controls are used when assessing the impact of media coverage on stock returns.

From Panels B and C of Table 1, we see that there were notable differences in the characteristics of stocks that did and did not appear in *The Times*. First, media stocks issued a far greater number of shares: the mean number of shares issued by companies covered by the media being 32,620, which was nearly twice that issued by companies not covered by the media. Second, the average size of media stock was much greater than non-media stock, with mean market capitalisation of £1.42 million and £0.46 million respectively. Both of these differences are consistent with our

hypothesis that the media played an important information role for investors in companies which had arm's-length and diffuse ownership.

Figure 1 demonstrates the step change which took place in the UK equity market in the mid-1840s. Prior to the mid-1840s, there had not been much growth in market capitalisation or in the number of issued shares on the market. This changed after the mid-1840s, largely due to the arrival of large companies such as the railways rather than a substantial increase in the number of companies on the market (Campbell, 2012). The average number of shares issued by public companies increased from 9,502 to 27,568 after 1845 and the issuance of a greater number of shares was coupled with a decrease in the nominal value of shares by 20.2 per cent. These changes capture an important market development — a significant increase in the number of shares available at lower denominations suggests that shares were held by a greater numbers of investors. The mid-1840s, therefore, marks the watershed moment in the development of diffuse and arm's-length corporate ownership in the UK (Acheson et al. 2015).

<INSERT FIGURE 1>

Our media data are sourced from *The Times* via *The Times Digital Archive* (TDA). *The Times* was by far the most significant newspaper in terms of influence during our sample period (Brown, 1985, pp. 27–9, 50; Simmons, 1991; Campbell et al., 2012). It also had by far the widest circulation of any daily UK newspaper, with three to four times the circulation of its nearest rival (Parliamentary Papers, 1852; Campbell et al., 2012, p. 464). Notably, our sample period predates the specialised daily financial press by nearly two decades, with the *Financial News* and *Financial Times* first published in 1884 and 1888 respectively. Although the *Financial Times* sought to provide cutting insight and commentary from its foundation, the market

reporting in *The Times* and other newspapers tended “to be fairly staid...[and] desperately dull” (Kynaston, 1988, p. 3). This is immaterial for our analysis because we are simply interested in whether the media reported on companies.

Unlike modern newspaper databases, the *TDA* enables users to identify advertisements through search filters. This has a twofold advantage for our study. First, we are able to see if any correlation exists between advertisements by companies and subsequent coverage in *The Times*. Second, we are able to remove advertisements from our definition of media coverage to ensure that our findings are robust.

Articles were identified using unique search filters for each of the 580 companies. Searches for company names were carried out for the period that they were listed in the *COE* and the search results on the *TDA* were set to exclude cases where a company was simply reported in a stock price table in the newspaper. An additional industry filter was occasionally used if there was ambiguity that articles were irrelevant. The number of articles published in each section of the newspaper for each year that the company was active was then recorded. The total number of articles published over the sample period was 6,995.

Table 2 shows that across the entire sample period, 57 per cent of stocks were covered by *The Times*. However, annual coverage rates in *The Times* varied between 5 and 42 per cent and of the companies that were covered (hereafter ‘media stock’). The mean and median number of articles published were 20.95 and 5.0, which indicates that there were some companies with substantial amounts of press coverage. Remarkably, Fang and Peress (2009) find that *The New York Times* covered 57 per cent of all companies listed on the New York Stock Exchange between 1993 and 2002. However, the mean and median number of articles published for media stock in

their sample were only 4.2 and 2.0 respectively, whilst annual coverage rates were substantially higher than in our sample, ranging from 41 to 62 per cent.

<INSERT TABLE 2>

The trend in Table 2 is also interesting because it is consistent with our hypothesis that after the expansion of arm's-length ownership, there is greater coverage of companies in terms of the number of articles per covered firm, with the average for the 1848–70 period being 20.46, compared to 10.56 for the first half of our sample period. There is also a noticeable step change in the annual fraction of firms covered after the mid-1840s. In the period 1825–47, the average annual fraction of firms covered in *The Times* was 0.15, whereas in the period 1848–70, the corresponding figure was 0.26.

Table 2 also provides details on how the relative importance of advertising changed over our sample period. From 1825 until 1847, 22 per cent of all media coverage was advertisements, but in the period 1848 until 1870, this nearly halves to 12 per cent.

Table 3 shows media coverage by industry and by section of the newspaper, i.e., advertisements and newspaper reporting on firms. 57.24 per cent of sample companies were covered in *The Times*, with 32.41 per cent of companies having advertisements and 47.07 per cent of companies being reported on by the newspaper. Notably, 10.17 per cent of our sample only appeared in adverts and were not reported on by *The Times*.

<INSERT TABLE 3>

In terms of industry coverage, Table 3 shows that of the large industrial sectors, railways were by some distance the most covered industry, with 87.69 per cent of railways in our sample being reported on by *The Times*. This is consistent with

our hypothesis that press coverage is greater for companies with more diffuse and arm's-length ownership. Canals and British mines are two large sectors with very little press coverage. This is also consistent with our hypothesis as canals and British mines were typically owned by investors living in proximity to the canals and mines, and were not characterised by diffuse and arm's-length ownership (Bartlett, 1850; Ward, 1974; Burke and Richardson, 1981). Investors in gas-light and coke companies typically came from the towns and cities in which they were located (Falkus, 1967), which is consistent with the relatively low coverage of this sector by *The Times*. Insurance companies have relatively a lot of coverage in *The Times*, but this is somewhat unsurprising due to the large number of advertisements placed by this sector. About half of the banks in the sample were covered by *The Times*. Many banks in our sample had diffuse ownership, but several were small provincial banks dominated by a local shareholder base (Turner, 2009; Newton, 2010), which explains the relatively low coverage of this sector. The miscellaneous sector contains industrial and commercial companies, many of which were established after the liberalisation of incorporation law in the mid-1850s. The relatively high press coverage of this sector is consistent with recent evidence which suggests that many of these firms had diffuse and arm's-length ownership (Acheson et al., 2015).

4. The determinants of media coverage

In this section, we examine the factors that determined coverage. In particular, we are interested in whether the diffusion of share ownership and advertising are covariates of media coverage. One of our main hypotheses is that diffuse ownership means that there was a greater need for media coverage. We also hypothesize that companies

which advertised in *The Times* were more likely to be subsequently reported on by the paper.

In order to assess the relationships between advertising and media reporting and share ownership and media reporting, we aggregate media coverage, number of shares issued, and advertisements to an annual level, and use the last observed values of the various company and stock characteristics for the given year. Lagged explanatory variables are used so that advertisements predate media reporting. To ensure that our variables are not capturing any company-specific characteristics, we control for observed variables such as industry, return, nominal value and market capitalisation. We use Fama-Macbeth (1973) regressions, but the findings are robust to using other approaches such as Rogers (1993) or Newey-West (1987) robust standard errors. Our regression specification is as follows:

$$Media_{it} = \gamma_{0t} + \gamma_1 Ads_{it-1} + \gamma_2 NShares + \gamma_3 X_{it-1} + \varepsilon_t \quad (1)$$

where $Media_{it}$ is the number of articles on company i reported on by *The Times* in period t , Ads_{it-1} is the number of advertisements placed by company i in *The Times* in period $t-1$; $NShares_{it-1}$ is the number of issued shares of company i in period $t-1$; and X_{it-1} is a matrix of control variables, with controls for industry, number of shares, return, nominal value, and market capitalisation.

Table 4 shows that each additional advertisement placed in *The Times* is associated with an additional article for that company in the paper in the following year. This finding is robust to excluding railway companies and using different time periods, with the advertising effect increasing in the post-1850 period.

<INSERT TABLE 4>

The coefficient on the $NShare$ variable in Table 4 variable indicates that the greater the number of issued shares which a company had, the greater the likelihood

that it was covered in the press. This finding is consistent with our hypothesis that firms with more diffuse and arm's-length ownership were more likely to be covered in *The Times*.

The results in Table 4 suggest that larger companies, as proxied by the *Market Capitalisation* variable, were more likely to be covered by the media, which is a similar finding to that of Bignon and Miscio (2010). Notably, a stock's absolute return is not a covariate of media coverage, suggesting that the media were not more likely to report on stocks which were performing particularly well or poorly.

5. Did media affect returns?

If the press is increasing the information available to investors (Taylor, 2012; Griffin et al. 2011; Tetlock, 2010), it reduces perceived company-specific risk, which should result in a premium for shares not covered in the press and a discount for those which are covered (Fang and Peress, 2009). We initially use a broad definition of media coverage which views media coverage as advertisements plus media reports on companies. We do this for a theoretical and a practical reason. The theoretical reason for doing this is that advertisements in newspapers may have aided investor recognition just as easily as press reporting on companies and the only difference was that advertisements were simply coverage which was paid for by the company. The practical reason is that prior to 1846, there are insufficient companies with media coverage that are not advertisements to facilitate a statistically-robust portfolio analysis. However, for the sake of robustness, we also present the results when advertisements are excluded from our definition of media coverage.

To test if media coverage affected returns at the cross-sectional level, we form portfolios of stocks based on media coverage. For each year, we divide our sample

into companies with media coverage and those without. While the media effect may vary between companies with high and low coverage, there is not sufficient variation in our media coverage to facilitate this level of analysis. The performance of each portfolio is then assessed over the next 12 months to ascertain if any significant difference existed between companies with media coverage and those without. This is repeated for each of the years in the sample. Our portfolios based on media coverage are relatively stable — of the companies with no coverage in a given year, the likelihood of them being covered the next year was less than one per cent. The likelihood of a company with coverage in a given year being covered the next year was 96.69 per cent.

When assessing the impact of media coverage, it is necessary to adjust performance for known risk factors which may otherwise be captured by media coverage (Fang and Peress, 2009). Furthermore, given that larger firms are more likely to be covered by the media, if no adjustment for size is made, the effect of media coverage may be overestimated. We adjust for firm size and other known risk factors by calculating CAPM and Fama-French adjusted returns at the portfolio level. To do this, we utilise our monthly *COE* data on firm reported dividends, share prices and the number of shares issued. The monthly yield on Consols, low-risk and liquid government perpetuities), is used to proxy the risk-free rate. Consol prices were obtained from the *COE*. We can therefore assess the impact of the media using three measures of performance: raw returns, CAPM-adjusted returns and Fama-French-adjusted returns.

Figure 2 shows the performance of media stock portfolios relative to non-media stock portfolios. Although there appears to be cyclicalities in the media effect, the long-run trend demonstrates that a media-premium gave way to a media-discount

from the late-1840s. From 1826 to 1850, the media portfolio had on average a higher raw return of 0.0519 per cent per month. When adjustments for market and firm-specific risk are factored in, this increases to 0.1106 per cent for CAPM-adjusted and 0.1479 per cent for Fama-French adjusted returns. The media premium is limited to the first half of the sample, after which media coverage is associated with lower returns. Thus, until the mid-1840s, it does not appear that investors required a premium on companies that were not covered by the media. However, from the mid-1840s onwards, media stocks tended to have lower returns than non-media stocks. Once again, this is more pronounced after adjusting for firm-specific characteristics. From 1850 to 1870, the media portfolio had on average a lower raw return of 0.1737 per cent per month, and after CAPM and Fama-French adjustments, this difference increases to 0.3238 and 0.3392 respectively.

<INSERT FIGURE 2>

The statistical significance of the media effect is tested using the monthly difference between the returns of the media and no-media portfolios: $R_m - R_{nm}$, where R_m denotes the monthly return on the media portfolio and R_{nm} denotes the monthly return on the no-media portfolio. This is equivalent to forming long-short zero investment portfolios. For the sake of robustness, and because the hypothesized change to the media discount is not likely to be identifiable to a single date, we analyse the portfolio differences over the entire sample period, from 1827–45, from 1846–70 and from 1851–70 — see Table 5. Furthermore, we include results for both equally- and value-weighted portfolios. Following Ye and Turner (2014), we use three different treatments for missing prices. Firstly, we assume missing prices were the same as the last available price. We call this the *zero return method*. Second, in the *listwise method*, observations with missing prices are deleted and all calculations

only use the remaining observations. Finally, in the *mean return method*, we filled in the total returns of the observations when prices were missing with the mean returns of the same stock over the sample period. When stocks were delisted, they disappear from our dataset. When delisting was the result of bankruptcy rather than name changes, mergers or listing migrations to regional exchanges, shareholders potentially suffered large losses, which are not captured by our analysis. The difficulty in identifying the cause of delisting is highlighted by Ye and Turner (2014). If the reason for delisting is unknown, we assume that the reason for delisting was bankruptcy. We assign a -40 per cent return to all stocks on the month following delisting, following the assumption made by Ye and Turner (2014). As the delisting adjustment does not affect our main findings, we focus our discussion on the results with no adjustment for delisting bias unless otherwise stated.

Because railways were the dominant sector on the equity market after the mid-1840s and because the Railway Mania of the mid-1840s may distort our findings, we also present results when railway companies are excluded from the analysis. For the sake of robustness, we also look at the difference between media and no-media portfolios using a narrower definition of media coverage, i.e., one which excludes advertisements.

<INSERT TABLE 5>

Table 5 shows the size and statistical significance of return differentials between the media and no-media portfolios. The first thing to note about these results is that there is no statistical difference in return differentials when we focus on the overall period. However, consistent with our hypothesis, we see that when we look at before and after the mid-1840s, something interesting emerges. Prior to the mid-1840s, firms with media coverage tended to have higher returns, but the statistical

significance of this result is very weak, with only Fama-French adjusted differential returns for both the mean return and delisting-adjusted returns having statistical significance. In other words, there is little evidence of a media effect prior to the mid-1840s. After the mid-1840s, the results in Table 5 show that firms with media coverage tended to have lower returns. The magnitude of the difference is consistent, typically being in the range 0.3 to 0.4 per cent per month. The difference is highly statistically significant in both equally and value-weighted portfolios, as well as across different time periods and when railway companies or advertisements are excluded from the analysis. Results are strongest for the 1851–70 period, although statistically significant differences are present for the 1846–70 period. This simply implies that there was no single date when companies with media coverage started to have systematically lower returns. The scale of the media discount is comparable to modern markets, where Fang and Peress (2009) found no media stock annually outperform media stock by 3 per cent after adjusting for known risk factors. We find the media discount for the 1846–70 period to be slightly higher at 3.94 per cent. These findings are consistent with the literature on media influence in modern markets and suggest that the media were playing an informational role in the market and decreasing the risk of firms by reporting on them.

The results above suggest that a media discount emerged at some point after the mid-1840s. We argue that this media discount appears at this point in time because corporate ownership in the UK becomes diffuse and arm's length and the media plays an important information role for the new cadre of arm's-length investors from the middle classes. In order to obtain corroborating evidence for this conjecture, we test whether differences in the degree of arm's-length and diffuse ownership explain the differences in the returns between the media and no-media portfolios. To

conduct this test requires data on ownership structure. Unfortunately, systematic evidence on corporate ownership structure or number of shareholders in this era is very sporadic (Acheson et al., 2015). Instead, we have to rely on a proxy for ownership structure. The proxy we use is the number of shares companies issued because this gives some idea about how many shareholders the company wished to hold their stock and the diffuseness of ownership.

To perform this test, we regress the portfolio differences in number of shares ($Nshares_m - Nshares_{nm}$, where $Nshares_m$ is the average number of shares issued by companies covered by the media and $Nshares_{nm}$ denotes companies not covered by the media) against differences in returns ($R_m - R_{nm}$). We would expect that the relative degree of ownership diffuseness for the media-covered stocks comparing to the no-media stocks is negatively associated with the degree of media discount. That is, as share ownership becomes more arms-length for the media-covered stocks, we conjecture that the media start to play an informational role for the dispersed shareholders who require a lower return on these companies relative to the companies for which they are not well informed about via news media. We use the differences in number of shares to remove the time trend from both series, ensuring that any correlation is non-spurious. Differencing the number of shares means that a change in the number of shares issued by no media companies may offset a change in the number of shares issued by media companies and given that companies not covered by the media increased their number of shares over this period, this reduces the likelihood of identifying a significant relationship.

Table 6 shows the results of the regression where the difference in number of issued shares ($Nshares_m - Nshares_{nm}$) is regressed on the difference between stock returns of companies covered and not covered by the media ($R_m - R_{nm}$). For the

overall sample period, we can see that the coefficients on the differential in number of issued shares is negative and statistically significant for the difference in value-weighted returns for the media and no-media portfolios. However, as can be seen from Panel A of Table 6, no significant relationships are identified for the equally-weighted portfolios. These findings suggest that the influence of diffuseness on the media effect is stronger among larger firms.

Panel B of Table 6 presents evidence that the media effect and number of issued shares are related. For the entire period, for raw, CAPM and Fama-French adjusted value-weighted returns, the number of shares differential is significantly and negatively correlated with the return differential. In other words, as firms covered by the media increase the number of shares issued relative to no-media firms, they experience falling returns relative to no-media stocks, which suggests that arm's-length and diffuse ownership contributes to the media discount. This finding is robust to the *mean return* and *listwise return* methods of addressing missing prices, with the significance and magnitude of relationship between the media discount and number of shares unchanged. Furthermore, the headline finding of a negative and significant relationship between risk-adjusted returns and number of shares is robust to adjusting for delisting bias, excluding railway companies and excluding advertisements. When advertisements are excluded, there are insufficient companies with media coverage to form portfolios until 1830 and analysis has been adjusted accordingly. The value-weighted number of shares coefficient shows a positive relationship with the media discount for raw returns with the *mean return* and delisted adjusted returns. However, after adjusting for known risk factors, both CAPM and Fama-French adjusted returns are negatively correlated with the number of shares.

<INSERT TABLE 6>

If the premium for no-media stocks represents mispricing, *arbitrageurs* can eliminate the premium only if there are no significant impediments to trade. Thus, it may be that no-media stocks are insufficiently liquid for the mispricing to be exploited by traders and for the media discount to disappear. We assess this possibility by including a portfolio-level measure of liquidity when assessing the media discount. We approximate the zero-return measure of liquidity at each year for each stock by discounting the number of months with non-zero capital gain by the number of months listed. Liquidity measures are then aggregated to the portfolio level. The liquidity measure for stock i at year t is:

$$Liquidity_{it} = 1 - \frac{\text{No. of months stock } i \text{ had no price reported or zero return}}{\text{No. of months in which stock } i \text{ was listed}} \quad (2)$$

Table 7 shows that in our sample, the media discount is not attributable to liquidity-related issues. As with previous results the number of shares issued by companies is significantly related to the media discount of value-weighted portfolios, for all treatments of missing prices and both with raw returns and CAPM and Fama-French adjusted returns. While our liquidity measure is insignificantly correlated with the media discount, its inclusion does alter our results in that there is no longer a statistically significant difference between the media and no-media stock for the zero return method, suggesting that while it is not a significant factor in the media discount it has some explanatory power. As per previous results we make adjustments for delisting, exclude railway companies and exclude advertisements. Our findings are robust to these changes.

6. Conclusions

The main finding of this paper is that media coverage of stocks grows substantially after the emergence of arm's-length and diffuse ownership in the UK from the mid-

1840s onwards. We conjecture that the media were playing an important informational role for the new cadre of middle-class investors which emerged at this time. Consistent with this, we find that there was a discount on media stocks after the mid-1840s, which suggests that by increasing the information available to investors, the press reduced company-specific risk. In other words, as in modern developed country stock markets, there was a media discount in the nineteenth-century London market, but this only emerged after ownership became arm's-length and diffuse. Therefore, our findings imply that arm's-length and diffuse ownership may be a prerequisite for the media effect. Indeed, the absence of arm's-length and diffuse ownership may explain why media appears to have little effect on developing country financial markets today (Griffin et al., 2011).

Our findings suggest two avenues which could be explored by future scholars. First, our findings highlight the relationship between press reporting and advertisements. Future work should explore the nature of this relationship and whether it was insidious or benign. Second, newspaper reporting on financial markets in our period was factual, which means that an analysis of the tone or language used in newspaper reports is not possible. However, the development of the UK's daily financial press in the 1880s and whether it influenced financial markets through its use of language is something that future work should explore.

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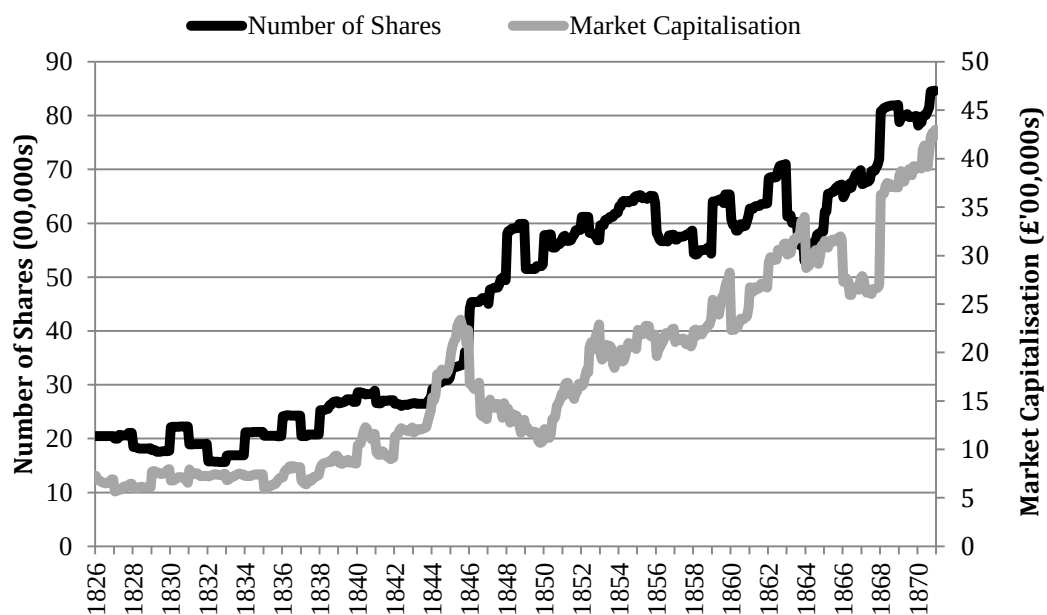
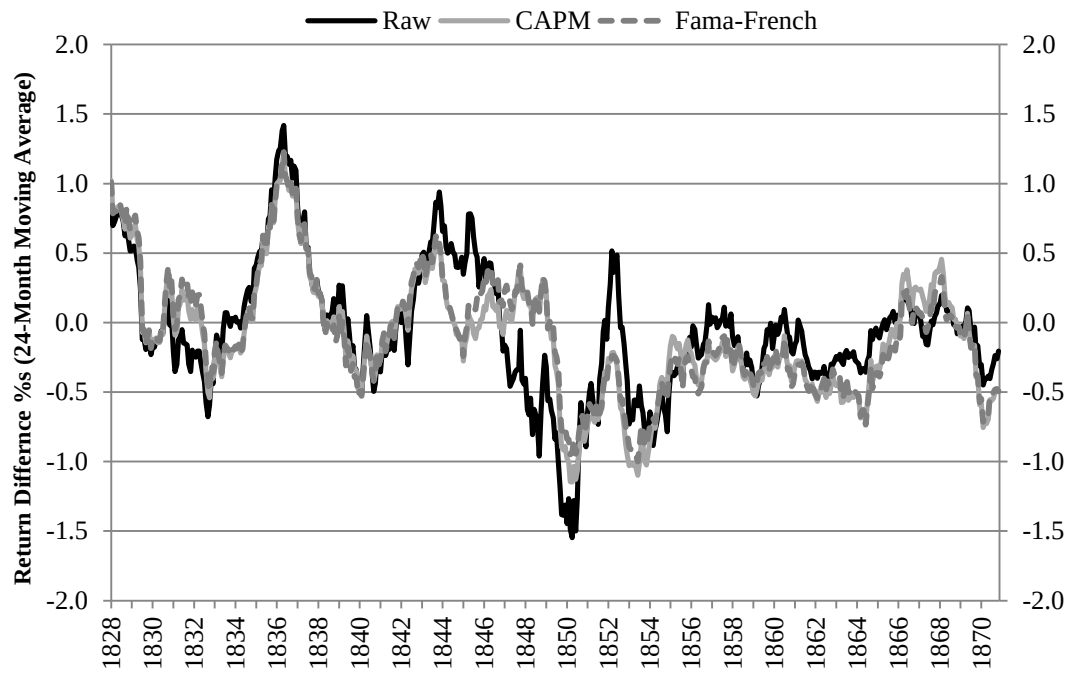
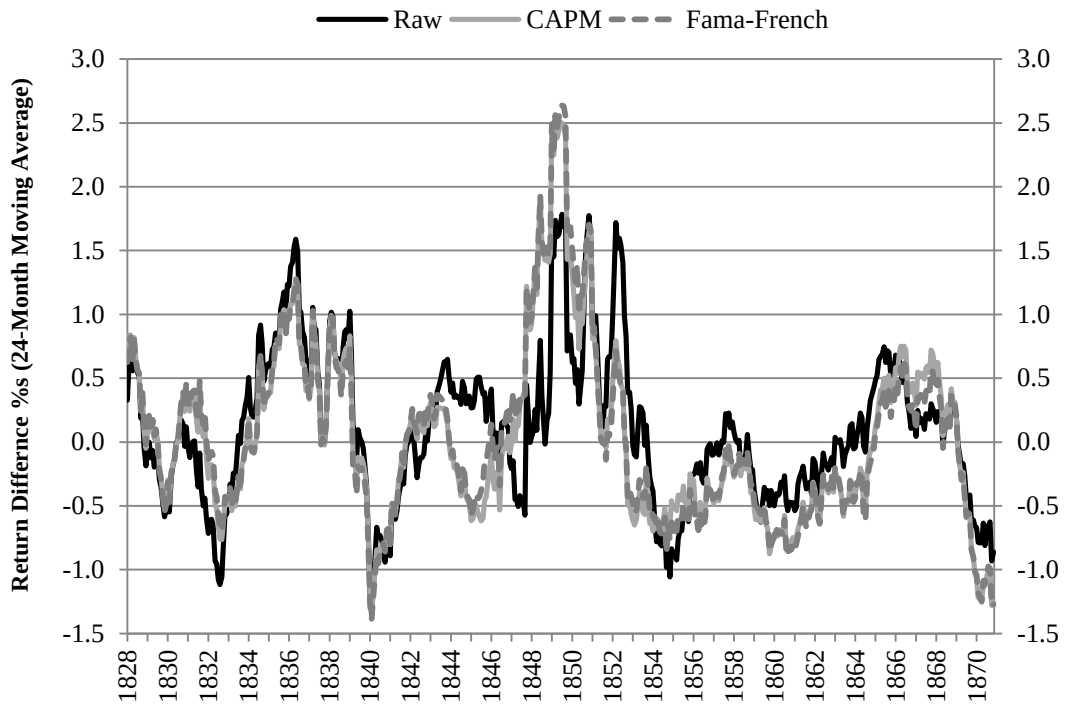


FIGURE 1
TOTAL NUMBER OF ISSUED SHARES AND MARKET CAPITALISATION,
1826–1870

Sources: Authors' calculations based on data from *Course of the Exchange* (1823–70).



PANEL A. VALUE-WEIGHTED RETURNS



PANEL B: EQUALLY-WEIGHTED RETURNS

FIGURE 2

RETURN PREMIUM FOR COMPANIES WITH MEDIA COVERAGE 1828–1870

Source: See text.

TABLE 1
DESCRIPTIVE STATISTICS BY MEDIA COVERAGE, 1825–1870

	No. of Shares (000s)	Nominal Value per Share (£)	Paid up Capital per Share (£)	Stock Price (£)	Market Capital- isation (£m)	Paid Capital (£m)	Dividend Yield (%)
PANEL A: All Companies							
Mean	19.73	77.02	51.33	71.43	0.65	0.64	0.41
Median	10.00	63.60	36.50	29.00	0.21	0.25	0.39
Std. Dev.	31.86	88.74	48.97	157.62	1.72	1.63	0.72
PANEL B: Companies with Media Coverage							
Mean	32.62	73.07	55.29	52.23	1.42	1.56	0.45
Median	20.00	100.00	50.00	30.25	0.52	0.68	0.36
Std. Dev.	43.93	77.16	52.19	59.50	3.20	3.05	1.31
PANEL C: No Media Coverage Companies							
Mean	16.59	78.03	50.37	76.10	0.46	0.41	0.40
Median	8.00	61.00	33.00	29.00	0.17	0.20	0.40
Std. Dev.	27.23	91.42	48.11	172.96	1.01	0.90	0.48

Sources: See text.

Notes: The definition of media coverage includes advertisements in *The Times* as well as reporting on companies. The number of observations differ slightly across variables because of missing data: number of shares, paid up capital per share, stock price, market capitalisation, paid capital and dividend yield are all based on 102,408 observations, while nominal value per share is based on 98,712 observations.

TABLE 2
SUMMARY STATISTICS OF COVERAGE IN *THE TIMES*

Year	Fraction of Active Firms Covered	Covered Firms Average Articles		Fraction of Adverts/ Articles	Year	Fraction of Active Firms Covered	Covered Firms Average Articles		Fraction of Adverts/ Articles
		Mean	Median	Articles			Mean	Median	Articles
PANEL A: Annual statistics									
1825	0.20	1.80	1.0	0.53	1848	0.42	6.50	3.5	0.04
1826	0.20	2.17	1.0	0.35	1849	0.32	4.68	2.0	0.06
1827	0.20	2.84	2.0	0.41	1850	0.31	4.22	2.0	0.10
1828	0.08	4.15	2.0	0.15	1851	0.29	3.64	2.0	0.09
1829	0.13	1.73	1.0	0.39	1852	0.31	5.68	2.0	0.06
1830	0.10	1.75	1.0	0.50	1853	0.22	3.12	2.0	0.18
1831	0.10	1.88	1.0	0.37	1854	0.23	2.22	1.5	0.26
1832	0.12	1.84	1.0	0.31	1855	0.25	2.62	1.0	0.25
1833	0.05	9.38	1.0	0.00	1856	0.26	3.30	2.0	0.20
1834	0.13	3.23	1.0	0.15	1857	0.25	3.64	2.0	0.10
1835	0.11	3.43	1.0	0.19	1858	0.20	3.98	2.0	0.12
1836	0.14	2.40	1.0	0.22	1859	0.18	2.40	1.0	0.12
1837	0.18	2.36	1.0	0.30	1860	0.24	5.89	3.0	0.04
1838	0.17	2.58	1.0	0.29	1861	0.19	2.58	2.0	0.14
1839	0.14	3.53	2.0	0.19	1862	0.21	3.14	1.0	0.16
1840	0.19	2.72	1.0	0.22	1863	0.19	3.38	2.0	0.25
1841	0.14	3.55	2.0	0.17	1864	0.16	3.62	1.0	0.38
1842	0.16	2.88	2.0	0.09	1865	0.24	5.72	2.0	0.07
1843	0.12	2.82	1.0	0.13	1866	0.25	7.44	3.0	0.04
1844	0.17	3.42	1.0	0.08	1867	0.15	5.53	2.0	0.10
1845	0.17	4.41	2.0	0.28	1868	0.11	3.84	2.0	0.24
1846	0.23	3.78	1.0	0.18	1869	0.17	4.79	2.0	0.19
1847	0.29	2.98	2.0	0.17	1870	0.17	3.61	2.0	0.17
PANEL B: Period statistics									
1825– 1847	0.54	10.56	3.0	0.22					
1848– 1870	0.56	20.46	5.0	0.12					
1825– 1870	0.57	20.95	5.0	0.14					

Sources: See text.

Notes: The figures for 1825–1847, 1848–1870, and 1825–1870 are not averages of the various years, but consider the three periods in their entirety.

TABLE 3
SUMMARY STATISTICS OF INDUSTRY COVERAGE IN *THE TIMES*

	N	Any Section	Adverts	Reporting	Advert Only	Reporting Only
	Companies (%)					
Banks	73	53.42	34.25	41.10	12.33	19.18
Bridges	5	80.00	60.00	80.00	0.00	20.00
British Mines	57	12.28	12.28	7.02	5.26	0.00
Canals	64	26.56	12.50	20.31	6.25	14.06
Foreign and Colonial Mines	40	45.00	22.50	27.50	17.50	22.50
Docks	14	78.57	42.86	64.29	14.29	35.71
Gas-light and Coke	42	45.24	26.19	33.33	11.90	19.05
Insurance	60	71.67	55.00	48.33	23.33	16.67
Miscellaneous	80	63.75	36.25	48.75	15.00	27.50
Waterworks	14	57.14	42.86	50.00	7.14	14.29
Roads	5	0.00	0.00	0.00	0.00	0.00
Telegraph	7	100.00	42.86	100.00	0.00	57.14
Railways	130	87.69	39.23	86.92	0.77	48.46
All Companies	580	57.24	32.41	47.07	10.17	24.83

Sources: See text.

Notes: 'Adverts' refers to the fact that the company has advertised in *The Times* and 'Reporting' is where *The Times* has carried a news report on a company. 'Any section' refers to both news reports and advertisements.

TABLE 4
DETERMINANTS OF COVERAGE USING FAMA MACBETH (1973) TWO-
STEP PROCEDURE

	All Companies		Excluding Railways	
	(1)	(2)	(3)	(4)
	1825–1870	1825–1850	1851–1870	1825–1870
Advertising	1.079*** (0.220)	0.842*** (0.223)	1.391*** (0.412)	1.077*** (0.220)
Number of Shares	0.233*** (0.045)	0.173*** (0.049)	0.312*** (0.079)	0.316*** (0.057)
Share Denomination	0.002*** (0.000)	0.001** (0.000)	0.004*** (0.001)	0.003*** (0.000)
Market Capitalisation	0.175*** (0.034)	0.215*** (0.043)	0.122** (0.051)	0.198*** (0.036)
Absolute Return	3.926 (5.825)	6.085 (10.63)	1.085 (3.046)	4.472 (6.887)
Volatility	-1.482 (1.529)	-2.760 (2.610)	0.120 (0.839)	-1.752 (1.771)
Constant	2.968*** (0.370)	2.729*** (0.486)	3.284*** (0.578)	3.348*** (0.421)
Industry Controls	Yes	Yes	Yes	Yes
Observations	6,111	2,800	3,311	6,111
Adj. R-squared	0.165	0.177	0.164	0.160
Equities/Month	44	25	19	44

Notes: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Media*, which is the number of news articles on a company reported in *The Times* in year t. *Advertising* is the number of advertisements placed in *The Times* by a company in year t–1. *Number of shares* is the natural log of number (in 000,000's) of shares outstanding for a company in year t–1. *Industry Controls* are a series of dummy variables to capture industry effects. *Share denomination* is the nominal value of shares in £s for a company. *Market capitalisation* is the natural log of market value of a company in £millions in year t–1. *Absolute return* is the previous year's absolute return. *Volatility* is the previous year's standard deviation in returns.

TABLE 5
TESTING THE MEDIA DISCOUNT: THE DIFFERENCE BETWEEN RETURNS
OF COMPANIES COVERED AND NOT COVERED BY THE MEDIA (%)

Returns	Equally Weighted Portfolios				Value Weighted Portfolios			
	1827– 70	1827– 45	1846– 70	1851– 70	1827– 70	1827– 45	1846– 70	1851– 70
PANEL A: Zero return method								
Raw	0.064	0.114	0.025	-0.155	-0.053	0.242*	-0.290***	-0.202**
CAPM-Adjusted	0.016	0.077	-0.032	-0.347***	-0.092	0.203*	-0.328***	-0.329***
FF-Adjusted	0.021	0.104	-0.044	-0.378***	-0.080	0.231*	-0.328***	-0.340***
PANEL B: Mean return method								
Raw	0.039	-0.149	0.189	0.056	0.0542	-0.270**	0.314***	0.213**
CAPM-Adjusted	-0.084	0.114	-0.241**	-0.230**	-0.097	0.223**	-0.351***	-0.340***
FF-Adjusted	-0.069	0.134	-0.231**	-0.227**	-0.089	0.249**	-0.357***	-0.358***
PANEL C: Listwise return method								
Raw	0.0362	0.171	-0.0713	-0.203	-0.0636	0.230	-0.298***	-0.200**
CAPM-Adjusted	-0.0153	0.132	-0.132	-0.412***	-0.103	0.191	-0.336***	-0.328***
FF-Adjusted	-0.0156	0.152	-0.149	-0.444***	-0.0913	0.220*	-0.338***	-0.342***
PANEL D: Delisting adjusted (<i>Zero return method</i>)								
Raw	-0.047	-0.192	0.069	0.0001	0.030	-0.262*	0.263**	0.167*
CAPM-Adjusted	0.0001	0.156	-0.122	-0.181*	-0.070	0.222*	-0.301***	-0.295***
FF-Adjusted	0.012	0.182	-0.124	-0.195*	-0.055	0.251**	-0.298***	-0.304***
PANEL E: Excluding Railways (<i>Zero return method</i>)								
Raw	0.030	0.040	0.022	-0.185	-0.084	0.188	-0.301***	-0.211**
CAPM-Adjusted	-0.013	0.008	-0.030	0.270	-0.121*	0.150	-0.336***	-0.328***
FF-Adjusted	-0.013	0.035	-0.051	-0.407***	-0.104	0.184	-0.333***	-0.342***
PANEL F: Excluding Advertisements (<i>Zero return method</i>)								
Raw	—	—	0.010	-0.141	—	—	-0.289**	-0.203**
CAPM-Adjusted	—	—	0.034	-0.360**	—	—	-0.328***	-0.335***
FF-Adjusted	—	—	0.008	-0.402***	—	—	-0.324***	-0.344***
Obs.	538/540	312	300	240	538/540	312	300	240

Notes: The dependent variable is the excess return of media over no-media stocks. Reported figures are constants from a linear regression with no explanatory variables. The figures thus represent the media discount; the mean monthly excess return in media over no-media stocks. When advertisements are excluded there are insufficient companies with media coverage until the 1840s, thus results are not generated for this period. Portfolio-specific risk characteristics are corrected for using CAPM and Fama-French adjusted returns. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 6
STOCK MARKET PARTICIPATION AND THE MEDIA DISCOUNT

		<i>Zero Return Method</i>	<i>Mean Return Method</i>	<i>Listwise Return Method</i>	<i>Delisting Adjusted Returns</i>	<i>Excluding Railways</i>	<i>Excluding Advertisements *1830–70</i>
PANEL A: Equally-Weighted Portfolios							
Raw	Constant	0.004	-0.061	0.095	-0.145	-0.029	-0.131
	Nshares	4.634	7.648	-4.360	7.508	5.269	17.476
CAPM- Adjusted	Constant	0.039	0.0901	0.128	0.179	0.007	-0.280
	Nshares	-1.765	-13.31	-10.706	-13.65	-1.745	19.735
FF- Adjusted	Constant	0.031	0.0868	0.119	0.175	0.009	-0.269
	Nshares	-0.727	-11.93	-10.048	-12.48	-1.900	18.588
PANEL B: Value-Weighted Portfolios							
Raw	Constant	0.326*	-0.337*	0.329*	-0.344*	0.185	0.244
	Nshares	-29.060**	29.94***	-29.249***	28.62**	-23.271**	-22.712
CAPM- Adjusted	Constant	0.346**	0.346***	0.347**	0.363***	0.202*	0.163
	Nshares	-33.359***	-33.83***	-33.497***	-33.10***	-28.451***	-22.182**
FF- Adjusted	Constant	0.338**	0.337**	0.340**	0.355***	0.205*	0.145
	Nshares	-31.960***	-32.596***	-32.065***	-31.39***	-27.210***	-20.186*

Notes: The dependent variable is the excess return of media over no-media stocks. *Nshares* is the difference in number of issued shares/100,000 between media and no-media portfolio. *Liquidity* is the number of months with non-zero capital gain/number of months listed. As the number of shares issued by media stocks increases we expect the return on media stocks to fall, there should be a negative coefficient on *Nshares*. The constant represents the media discount; the mean monthly excess return in media over no-media stocks after controlling for the number shares. When advertisements are excluded there are insufficient companies with media coverage until the 1830s, thus results are limited to the period 1830–70. Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1.

TABLE 7
LIQUIDITY AND THE MEDIA DISCOUNT

		<i>Zero Return Method</i>	<i>Mean Return Method</i>	<i>Listwise Return Method</i>	<i>Delisting Adjusted Returns</i>	<i>Excluding Railways</i>	<i>Excluding Advertisements *1830–70</i>
PANEL A: Equally-Weighted Portfolios							
Raw	Constant	-0.595	-0.254	-0.007	-0.148	0.060	0.052
	Nshares	-0.700	5.545	-5.458	7.483	5.711	17.75
	Liquidity	2.806	0.951	0.507	0.0114	-0.456	-0.683
CAPM- Adjusted	Constant	-0.263	0.455*	0.220	0.362	0.363	0.002
	Nshares	-4.004	-9.368	-9.719	-11.70	-0.0297	20.16
	Liquidity	1.393	-1.799*	-0.456	-0.897	-1.815	-1.049
FF- Adjusted	Constant	-0.358	0.412	0.113	0.267	0.226	-0.111
	Nshares	-3.746	-8.422	-10.12	-11.49	-0.853	18.83
	Liquidity	1.795	-1.601	0.0323	-0.455	-1.106	-0.588
PANEL B: Value-Weighted Portfolios							
Raw	Constant	-0.003	-0.404	0.420	-0.386	0.230	0.328
	Nshares	-32.524***	29.20**	-28.26**	28.16**	23.50**	-22.59
	Liquidity	1.571	0.334	-0.455	0.210	-0.228	-0.314
CAPM- Adjusted	Constant	0.213	0.543***	0.569***	0.542**	0.438**	0.326
	Nshares	-34.940***	-31.71***	-31.11***	-31.19***	-27.32***	-21.94**
	Liquidity	0.635	-0.970	-1.105	-0.878	-1.200	-0.608
FF- Adjusted	Constant	0.139	0.435**	0.478**	0.447**	0.337	0.226
	Nshares	-33.968***	-31.54***	-30.57***	-30.41***	-26.57***	-20.06*
	Liquidity	0.944	-0.482	-0.690	-0.448	-0.676	-0.300

Notes: The dependent variable is the excess return of media over no-media stocks. *Nshares* is the difference in number of issued shares/100,000 between media and no-media portfolio. *Liquidity* is the difference between the average number of months with non-zero capital gain/number of months listed for each portfolio. As the number of shares issued by media stocks increases we expect the return on media stocks to fall, there should be a negative coefficient on *Nshares*. The constant represents the media discount; the mean monthly excess return in media over no-media stocks after controlling for the number shares. When advertisements are excluded there are insufficient companies with media coverage until the 1830s, thus results are limited to the period 1830–70. Standard errors in parentheses and *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.