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SQUEEZING THE BEARS: CORNERING RISK AND LIMITS ON
ARBITRAGE DURING THE 'BRITISH BICYCLE MANIA', 1896-1898

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Squeezing the Bears: Cornering Risk and Limits on Arbitrage during the 'British Bicycle Mania', 1896-1898

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Abstract

Can limits to arbitrage explain historical asset price reversals? During the 'British Bicycle Mania' of 1896-1898, cycle share prices rose by 200 per cent before falling 76 per cent from their peak value. This paper argues that arbitrage during this episode was limited by the risk of being cornered after short selling shares. Three corners in cycle company shares occurred during the 'mania', two of which resulted in substantial losses for short-sellers. The first corner corresponded with a structural break in cycle share prices, and cross-sectional analysis reveals that companies for which cornering risk was greater experienced more pronounced mispricing.

Keywords: market corner, short selling, bicycle mania

JEL Classification: G19, N23

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1. Introduction

In financial markets, a corner occurs when a market manipulator gains control of the supply of a particular equity, and thereby forces an arbitrary price on short-sellers contractually obliged to obtain these shares. When done successfully, this can result in heavy losses for short-sellers (Allen et al., 2006; Jarrow, 1992). Indeed, if the probability of being cornered is high, traders are unlikely to short-sell, limiting their ability to profit by identifying overpriced stock. As a result, shares can become systematically overvalued. This suggests the theoretical possibility that cornering risk could contribute to an asset price reversal or ‘bubble’. Although the subject of historical asset price reversals has attracted considerable previous research, there has been little research into whether cornering risk has contributed to any of these historical reversals.¹

This paper addresses this gap in the literature by asking whether cornering risk acted as a short-sale constraint during the 1896-98 asset-price reversal in British bicycle stocks. Cycle share prices rose by over 200 per cent in the early months of 1896, and remained at a relatively high level until March 1897. The market for cycle shares then crashed, losing 76 per cent of its peak value by the end of 1898. The financial element of this episode has attracted little previous research (Harrison, 1969, 1981; Lewis and Lloyd-Jones, 2000; Millward, 1989; Amini et al., 2016). It therefore has the potential to generate new insights into asset-price reversals, as well as providing an opportunity for ‘out-of-sample’ tests of existing theories.

An interesting feature of this mania is that it occurred in a period in which there were very few formal restrictions on short-selling. The Birmingham and London Stock Exchanges in this period allowed traders to make unlimited short sales without borrowing the stock in advance (known as ‘naked’ short-selling in modern markets). These contracts were similar to modern forward contracts, with a price and delivery date agreed for shares that the seller did

¹ Previous literature on historical asset price reversals includes Frehen et al. (2013), Garber (1990, 2001), Goetzmann (2015), Kindleberger (1978), Kleer (2015), Shiller (2015), and Temin and Voth (2004).

not currently own, a practice often described by contemporaries as ‘bearing’ the market or ‘speculating for the fall’ (Wilson, 1897). However, a puzzle exists in that the financial press, despite repeatedly advising investors to sell cycle shares, did not explicitly recommend short selling.

This paper uses data on share prices, dividends, shareholder records, court proceedings, and contemporary newspaper coverage to argue that short selling at this time was partially constrained by the risk of a corner. Four pieces of evidence are presented in support of this hypothesis. Firstly, between November 1896 and July 1897, there were three high-profile episodes in which short-sellers were cornered. Two of these resulted in severe losses for short-sellers, and similar losses in the third corner were only avoided when promoters decided to abort the company’s flotation eight months later. One of these incidents also resulted in a widely-reported court case, which the short-seller lost. The scale of losses, or, in the case of the third corner, potential losses, was substantial enough that an investor would have accounted for the possibility of a corner when deciding how short a position to take in cycle shares. Secondly, in the overall cycle share market, corners which imposed losses on short-sellers were followed by higher returns than those experienced in the period prior to the corner. Conversely, the cancellation of the third corner was followed by a period of relatively low returns. Thirdly, structural break tests show that the most severe corner corresponds with a structural break in both the trend and level of cycle share prices. Finally, cross-sectional regression analysis finds that firms which were most vulnerable to a corner experienced disproportionately negative returns during the crash of cycle shares in 1897. This is the case even when controlling for measures of firm performance, suggesting that the shares of these companies had been overvalued relative to other cycle firms.

This paper contributes to the extant literature by providing evidence that cornering risk, by acting as a limit to arbitrage, could have been a factor in historical asset price reversals.

Narrative accounts are provided for three corners which occurred in bicycle companies, as well as qualitative and quantitative evidence that this inhibited arbitrage during the mania. This contradicts previous literature on historical asset price reversals, which suggests that limits to arbitrage did not play a major role in famous financial bubbles (Frehen et al., 2013; Temin and Voth, 2004).

This paper also contributes to the history of British equity markets by providing evidence that nineteenth-century investors were subject to a greater level of short-sale constraint than has previously been thought to be the case. Ranald Michie (1987, pp.266-267) has noted the relative difficulty of engineering a corner in the London Stock Exchange when compared with the New York Stock Exchange in the same period, and Leslie Hannah (2007, p.24) suggests that this helped align share prices more closely with fundamental values. The results of this paper suggests, however, that the risk of a corner in the London and Birmingham Stock Exchanges could still occasionally have been significant enough to adversely affect market efficiency.

More generally, this research provides a rare insight into the nature of short-selling in an early stock exchange, a topic which has attracted little previous research. Jan De Vries and Ad van der Woude (1997) and Edward Stringham (2003) have documented the emergence of short selling as a strategy in Netherlands in the seventeenth century, and subsequent attempts to ban the practice. Robert Sloan (2010) has studied the history of short selling on the New York Stock Exchange, emphasizing the extent of social opprobrium directed towards short-sellers. This paper suggests that the British public had a similarly negative view of short sellers in the late nineteenth century, and that this contributed to unsympathetic hearings for short sellers in court.

The remainder of the paper proceeds as follows. Section 2 outlines previous research on cornering, short-sale constraints, and historical asset price reversals, and develops the hypothesis of the paper. Section 3 provides background on the British bicycle mania and uses hand-collected data to illustrate the reversal in shares between 1895 and 1898. Section 4 discusses the three instances of cornering that occurred in the cycle share market during 1896 and 1897, the scale of the losses experienced by short-sellers, and what the incidents show about how short-selling was perceived. Section 5 analyses the performance of the overall cycle share market surrounding the corners, tests for structural breaks in cycle share prices, and uses cross-sectional regression analysis to investigate the effect of cornering risk on the market for cycle shares. Section 6 briefly concludes, arguing that the study of pre-1900 asset-price reversals may need to take account of cornering risk as a short-sale constraint when evaluating these episodes.

2. Cornering Risk

In stock markets, a corner occurs when an investor buys a controlling stake in shares which have been short sold, and then charges these short sellers an arbitrary price for the shares. This practice is sometimes referred to as a ‘short-squeeze’, and at the time of the cycle mania was sometimes referred to as a ‘bear squeeze’.² If done successfully, this results in heavy losses for the cornered short seller. This possibility potentially acts as a disincentive to short sell, and financial advice columns at the time advised against short selling for this reason.³ The core hypothesis of this paper is that, during the British Bicycle Mania of 1896-1898, this cornering

² *Cycling Magazine*, ‘Financial’, 30th July 1898.

³ *Bath Chronicle*, ‘Hints to Small Investors by a Finance Expert’, 1st October 1896.

risk mechanism restricted arbitrage, thereby contributing to the high price of bicycle company shares.

There is a small body of literature on the effect of market corners and squeezes on asset prices, much of which has been summarised by Tālis J. Putniņš (2012). A theoretical framework is provided by Albert S. Kyle (1984), Jean-Luc Vila (1987), Robert A. Jarrow (1992) and Franklin Allen et al. (2006), all of whom model instances of large investors manipulating prices by monopolising the supply of short-sold securities. The model of Allen et al. (2006) is important because it shows how the threat of being cornered can act as a constraint on short sales within a rational expectations framework. This model has three types of agent: the uninformed trader, the arbitrageur, and the market manipulator. The arbitrageur will only short-sell to correct the mispricing of the uninformed trader if the gains are sufficiently high to counteract the possibility of being cornered by the manipulator. Since the losses involved in a corner are potentially substantial, this can result in severe price distortions (Allen et al., 2006, p.648). Specifically, all shares for which a corner was a realistic possibility could remain at prices above their fundamental values.

There have also been some case studies of corners in specific assets. John J. Merrick Jr. et al. (2005) document a squeeze in the London bond market in 1998, and Narasimhan Jegadeesh (1993) and Bradford D. Jordan and Susan D. Jordan (1996) examine the Salomon Brothers' corner of a Treasury note auction in 1991. Allen et al. (2006) document 14 famous corners in the U.S. market between 1863 and 1980, 10 of which were successful. They also investigate the share price patterns in the overall market around the periods in which a corner takes place, finding that corners do appear to have caused similar assets to become temporarily overpriced. Charles M. Jones and Owen Lamont (2002) investigate a sample of companies that have tried to prevent short sales on their stock, by some combination of legal threats, lawsuits and market corners. They find that such firms tend to have significantly lower subsequent

returns. This suggests that shares had previously been overpriced as a result of efforts to constrain short sales. Jones and Lamont do not, however, investigate whether these constraints have a similar effect on the overall market, where investors may be unaware *ex ante* of which firms will take action to punish short-sellers.

A clear implication of this research is that the risk of a corner can cause systematic overpricing of stock, even if no corner actually occurs. If, as Edward Chancellor (2000) argues, cornering was relatively common in pre-1900 stock markets, cornering risk could have been a contributing factor in many historical asset price reversals. Several studies of recent reversals have stressed the role of other forms of short-sale constraint in bubbles. Eli Ofek and Matthew Richardson (2003), for instance, argue that short-selling during the NASDAQ boom was restricted by high borrowing costs, large violations of put-call parity, and lock-in constraints, while Ernan Haruvy and Charles N. Noussair (2006) document the effect of restrictions on short-selling capacity, quantity limits on short positions, limits on cash available for purchases, and cash reserve requirements.

Since these forms of constraint were not generally present prior to 1900, studies of historical bubbles have tended to argue that short-sale constraints were unlikely to have been a factor. Those which have addressed the question directly have generally investigated whether a sub-set of investors fully closed their positions in the relevant stock (Frehen et al., 2013; Temin and Voth, 2004). This methodology does not entirely rule out the possibility of short-sale constraints having contributed to the bubble. In the case of Rik G. P. Frehen et al. (2013), the sub-sample of investors consists entirely of those who bought shares at some point during the South Sea Bubble, and therefore selects for optimism. There may have been an alternative group of sceptical investors who would have short-sold but for some form of constraint. Peter Temin and Hans-Joachim Voth (2004) study an investment bank which successfully ‘rode’ the bubble, thereby profiting from it without ever holding a short position. Again, this does not

preclude the possibility of other investors who would have short-sold the stock but for some form of constraint.

Was cornering risk a relevant consideration in pre-1900 bubbles? For several episodes there is some indication that contemporary investors were aware of the possibility. Chancellor (2000, p.156) states that corners are ‘as old as stock markets themselves’, but particularly widespread in the nineteenth century U.S, which experienced several asset-price reversals in various stocks (Chancellor, 2000, p.170). Corners also feature prominently in contemporary fiction relating to the British Railway Mania of the 1840s (Aytoun, 2008). Furthermore, Temin and Voth (2004) and Richard A. Kleer (2015) note that some of the South Sea Bubble may be explained by the South Sea Company engineering shortages of its own stock. Since this restricted the liquidity of shares, while keeping many in the hands of a small group of investors, this would have rendered short-sellers extremely vulnerable to a corner.

Directly assessing the effect of cornering risk for these reversals, however, is generally difficult, as there is no documented instance of a corner actually occurring during any of the aforementioned episodes. The British Bicycle Mania of 1896-1898 offers a solution to this problem, as three corners occurred in the shares of bicycle companies in this period. As a result, there is a wide range of data available that can provide an insight into the extent to which contemporary short-sellers were constrained by the threat of a corner.

3. The Bicycle Mania

Between 1890 and 1896, a succession of major technological innovations substantially increased the demand for British bicycles (Harrison, 1969, Rubinstein, 1977). Bicycle production increased in response: A. E. Harrison (1969) reports that the number of British cycle companies in existence quadrupled between 1889 and 1897. Many cycle firms took advantage

of the boom of 1896 by going public, resulting in the successful promotion of £17.3 million worth of cycle firms in 1896 and a further £7.4 million in 1897 (Harrison, 1981). By 1897 there was an oversupply problem in the trade, which was worsened by an exponential increase in the number of bicycles imported from the U.S. (Harrison, 1969). The bicycle industry entered recession, and the number of Birmingham-based cycle firms fell by 54 per cent between 1896 and 1900 (Millward, 1989).

This boom-bust cycle was accompanied by an equivalent reversal in the prices of bicycle company shares, the vast majority of which were listed on the Birmingham stock exchange. In order to quantify this reversal, a daily index of cycle share prices between the years 1895 and 1898 is developed, and supplemented with data on the firms' dividend payments. Share prices were hand-collected from the *Birmingham Daily Mail*, *Birmingham Daily Post*, and *Financial Times*, and dividends were obtained from *Stock Exchange Yearbooks*. The methodology used to calculate the index is similar to that of David Le Bris and Pierre-Cyrille Hautcoeur (2010), with returns weighted by price.⁴ Following Richard Grossman (2002), market capitalisation-weighted and unweighted indices were also calculated, but any differences between these indices were minor, and they are excluded for the sake of brevity. No calls on capital occur during this time, and so no adjustments for this are necessary. Returns are thus calculated as:

$$\text{Index return at time } t: R_t = \sum_{i=1}^N (w_{i,t} \times r_{i,t}) \quad (1)$$

with weighting $w_{i,t} = (p_{i,t-1}) / \sum_{i=1}^N (p_{i,t-1})$ and

$$r_{i,t} = [(p_{i,t} - p_{i,t-1})] / [p_{i,t-1}]$$

⁴ As dividends are paid in proportion to par value, price is defined as the cost of one nominal pound of shares.

where N is the number of stocks and p_i is the price of stock i at time t .

The index at the first date, 2nd September 1895, is set equal to 100. Each subsequent value of the index is calculated as:

$$I_t = I_{t-1} * (1 + R_t) \quad (2)$$

where I_t is the value of the index at time t and R_t is the price-weighted return between $t-1$ and t . The resulting index, alongside the companies' average subsequent dividend, is shown in Figure 1. An initial run-up in prices in spring 1896 could arguably be seen as a response to the extremely high dividends paid by a number of companies: an example of 'myopic rationality', whereby prices are consistent with a pricing model based on current dividends (Campbell, 2011). However, while prices subsequently fall in line with dividends for the remainder of 1896, there is a partial recovery between December 1896 and March 1897. This recovery, which involved many newly-promoted companies, occurred despite dividends continuing to fall. These price movements comfortably fulfil the most conservative criteria for an asset price bubble set out in William N. Goetzmann (2015), which requires only that share prices double within the space of one year and fall by more than 50 per cent in the course of the subsequent five years.

<<<INSERT FIGURE 1 HERE>>>

Were these price movements accompanied by an equivalent boom in the overall stock market? In order to answer this question, a price-weighted index of blue chip firms between 1895 and 1897 is developed. It is constituted of the thirty largest firms by ordinary capital in 1898, as reported by Robert Delargy and William Kennedy (2000). Where share price data was incomplete or unavailable for one of these companies, the next largest company was used. Daily prices are obtained from *The Times*, and the calculation method used is identical to that of the cycle share index. The resulting index, alongside the cycle share index for the same

period, is shown in Figure 2. It can be seen that the blue chip index is relatively flat in this period, with modest positive returns and no clear association with the boom in cycle shares.

<<<INSERT FIGURE 2 HERE>>>

Share prices in spring of 1897 are particularly high considering the rapid increase in the number of cycle corporations, as shown in Table 1. 70 cycle corporations were established in 1895, with a total nominal capital of £3.6 million; in 1896, 363 more were established with a total nominal capital of £27.3 million. The first half of 1897 saw a further 238 established, with a nominal capital of £12.1 million. Despite the obvious implications for the competitiveness of the market, share prices continued to increase into March 1897.

<<<INSERT TABLE 1 HERE>>>

The high price of cycle shares was frequently referenced by the contemporary financial press. *Money: A Journal of Business and Finance* repeatedly warned against the buying of cycle shares from June 1896 onwards.⁵ In particular, *Money* emphasised the substantial difference between public and private valuations of cycle firms, many of which went public at a substantial premium on the price their owners had received from promoters.⁶ *The Economist* was particularly critical of the prospectuses issued by these promoters, stating at one point that they appeared to have been imbued with ‘a very robust faith in the gullibility of the average investor.’⁷ The *Financial Times* published an article on May 1st 1897 stating that ‘the majority of companies are over-capitalised’, previous dividends generally indicate ‘a very precarious investment’, and ‘estimated profits are based upon results that are not likely to be maintained’.

⁵ *Money*, ‘The Cycle Craze’, 13th June 1896.

⁶ *Money*, ‘The Cycle Cataclysm’, 20th June 1896.

⁷ *The Economist*, ‘Cycle Company Promotion’, 27th June 1896.

The conclusion, said to be shared by cycle makers generally, was that ‘the end of the present year will see disaster’.⁸

The fact that the high price level was so well-documented poses the question of why cycle shares were not heavily short-sold, as short selling at this time was subject to very few legal restrictions. However, on three occasions during the bicycle mania, short sellers were cornered in cycle shares, resulting in heavy losses on two of these occasions. The following section outlines the events of these corners.

4. The Corners

Three known corners occurred during the British Bicycle Mania: the Bagot Tyre corner of November 1896 to January 1897, the James Cycle Company corner, and the Tubes (America) corner, both of which occurred in July 1897. The narrative and details of these episodes are reconstructed from a combination of shareholder records, contemporary news media, and specialist publications, particularly *Cycling Magazine*, which ran a weekly section discussing developments in the market for cycle shares. Ernest Hooley (1925, pp.74-79) reports having also engineered a corner in the shares of Humber (Portugal) in the spring of 1896, but Hooley was not a reliable source, and the press at the time of the supposed corner did not record any such event having occurred. There was also a corner in the shares of the Lady Hampton Company, a mining venture, in November 1896.⁹ However, the author is unaware of any other corners in cycle shares occurring at this time.

⁸ *Financial Times*, ‘The Cycle Outlook’, 1st May 1897.

⁹ *The Economist*, ‘A Stock Exchange “Corner”’, 28th November 1896.

4.1 *The Bagot Pneumatic Tyre Company Corner*

The Bagot Pneumatic Tyre Company was established in September 1896 as part of a wave of new cycle, tube and tyre promotions. The purpose of the company appears to have been to hold patents and thereby profit from royalties, rather than to manufacture tyres itself.¹⁰ While the nominal capital was 200,000 shares of £1 each, only 20,000 of these were applied for by the general public. Rather than abort the company's establishment, the directors took most of the outstanding shares, and proceeded to allotment.¹¹ The company comprehensively failed, winding up in 1902, having not paid a dividend at any stage, with company directors blaming the unexpected legal opposition of the Dunlop Company for the company's demise.¹²

The corner had its origins in October 1896. Following allotment, Mr T. Hewitt Myring, the promoter, immediately issued orders to buy and sell stock on the Birmingham and London Stock Exchanges at £1.25. Since this price was above the par value of £1, at which the stock was heavily undersubscribed, Mr. Myring found considerably more sellers than buyers. Between 7,000 and 10,000 were bought on the market, while Mr. Myring struck a deal with the holders of another 7,500 to pool their shares for six months. It was alleged that he then went to the market to induce traders to short-sell, but no evidence of this was produced in court.¹³ By January, only 1,766 shares were held by the general public.¹⁴ Shareholder records suggest that 8,203 shares had been short-sold, so investors short of the shares would have needed to

¹⁰ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 11th August 1897.

¹¹ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 7th August 1897.

¹² Bagot Pneumatic Tyre BT31 File, 'Special Resolution of the Bagot Pneumatic Tyre Company', 17th May 1902; *Stock Exchange Yearbook* 1900, p.1372; *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 10th August 1897.

¹³ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 7th August 1897.

¹⁴ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 10th August 1897.

buy most of the required shares either from Mr. Myring or from the investors involved in the pooling operation.¹⁵

The effect of the corner on the company's share price is shown in Figure 3, which plots the daily share price of Bagot Tyre stock as reported in the *Financial Times*. The shares open at a small premium, as a result of Mr. Myring instructing his brokers to put and call at £1.25. Thereafter, the price is temporarily driven down by sales, which Mr. Myring knew to be mostly short-sales because they were sold in much larger blocks than had been allotted. The effect of the pooling arrangement is then seen by the steep rise in prices at the end of November 1896. Subsequently, shares are so difficult to find that they disappear from the market altogether until January 1897. The price remains notably high until March, at which point the *Financial Times* stopped reporting any trade in the shares, suggesting that other short-sellers were still attempting to close their positions at this stage.

<<<INSERT FIGURE 3 HERE>>>

The 1900 *Stock Exchange Yearbook* reports that the company had not at that stage paid a dividend, and the company was dissolved in 1902.¹⁶ It therefore appears that the share price movements had no fundamentals-based justification, and were driven entirely by market manipulation. Even if they did not know the extent to which the company was unprofitable, traders would have expected the true value of the shares to be considerably lower than par in November 1896, since they were under-subscribed by a very wide margin. Theoretically, this was an excellent opportunity to short-sell, but those who did suffered heavy losses. The extent

¹⁵ 'Summary of Capital and Shares', The Bagot Pneumatic Tyre Company Limited, BT31 Files, National Archives.

¹⁶ *Stock Exchange Yearbook*, 1900, p.1372; 'Special Resolution', The Bagot Pneumatic Tyre Company Limited, BT31 Files, National Archives.

of these losses is evident from the record of investors, which details all share transfers which took place in January and February of 1897.¹⁷ It can be assumed that all of these transfers were to cornered short-sellers, because the firm was trading at such a dramatically inflated price that it is highly unlikely that anyone would buy its shares for any other reason. In total, 8,203 shares were sold between 16th January and 9th February. Assuming that the prices paid were those quoted in the *Financial Times*, the total losses to short-sellers would have amounted to £28,398, on shares with a par value of £8,203. Media coverage suggests that short-sellers struggled to buy shares even at the quoted price, however, so the true losses were potentially even greater.¹⁸

This incident resulted in a high-profile court case, which was tried in the High Court's Queen's Bench Division in August 1897. The defendant, Mr. Hamlyn, was a Dublin-based private investor who suffered substantial losses in the corner. The plaintiffs were his brokers, who resorted to taking him to court after he refused to pay for his losses. The details of this case are sufficiently informative to warrant describing in full.

On 22nd October 1896, Mr. Hamlyn agreed to sell 200 shares at £1.16, for delivery in January 1897. Since he did not own these shares, this constituted a naked short-sale. His barrister insisted in court that he had in fact intended to apply for shares at IPO, and sell these on the market at a premium, but could not do so because he 'did not have a cheque' on hand. Subsequently on 6th January 1897, the date for which delivery had been arranged, Mr. Hamlyn's brokers could not find any shares on the market.¹⁹

¹⁷ 'Summary of Capital and Shares', The Bagot Pneumatic Tyre Company Limited, BT31 Files, National Archives.

¹⁸ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn'. 6th August 1897.

¹⁹ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn'. 6th August 1897.

Buying-in day was 18th January 1897, after which the brokers would incur personal liability for breach of contract. On 9th January, the brokers secured 100 shares from a jobber at the price of £4.50, ignoring Mr. Hamlyn's instructions to pay no more than £4.25. They continued to offer increasingly high prices for shares on the open market, peaking at the January 16th deadline when their offer of £5.50 failed to obtain any shares. When the 18th January deadline arrived, they were still short 100 shares. They then resorted to buying from Mr. Myring, who, having an effective monopoly, sold at £21 per share. The total paid for the 200 shares was £2,550, to be delivered at a price of £231.25, for a loss of £2,318.75. To put this loss in context, Mr. Hamlyn's barrister noted that, had he succeeded in obtaining the shares at allotment, the profit would have been only £26.²⁰

Mr. Hamlyn's reaction to the loss was to label the entire episode a 'swindle', and refused to deliver payment to his stockbrokers. His stockbrokers duly sued, and despite the judge's recommendation, no settlement was reached and the case was tried. Mr. Hamlyn also issued a counter-claim against Mr. Myring for fraud, although this claim was later withdrawn. After a four-day trial, the jury ruled in favour of the stockbrokers, ordering Mr. Hamlyn to pay the full cost of the shares plus legal costs. While they conceded that no fraud had been proven, they 'desired to express their strong disapproval of the course taken by Mr. Myring and the directors of his company.'²¹

Four things are striking about the court proceedings. Firstly, short-sellers, or 'bears' as they are most commonly named, appear to have been subject to the disapproval of both the courts and the general public. Mr. Hamlyn's barrister, Mr. Carson Q.C., opens his case by trying to dispel the notion that his client had 'been a "bear" and must take the consequences of

²⁰ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn'. 6th August 1897.

²¹ *The Times*, 'Queen's Bench Division: Jackson and Others v. Hamlyn', 11th August 1897.

his gambling’, arguing that the short-sell had been an accident, and his client was if anything ‘a very tame bear’.²² This was addressed directly to the jury, who he presumably felt would be unsympathetic towards a professional short-seller. Mr. Myring, as part of his defence, argued that inducing investors to pool their shares was a legitimate defence against ‘bears’ who were ‘attacking’ the company. His barrister went on to submit that ‘there was nothing wrong about cornering the market’.²³ The Lord Chief Justice, in summing up, appeared sympathetic to this view.²⁴ Contemporary investor handbooks further suggest that the general public had a very low opinion of short-sellers in this period (Wilson, 1897). This incident shows how this general contempt for ‘bears’ could even result in an unsympathetic hearing in court.

Secondly, the jury rules in favour of Mr. Myring despite expressing strong condemnation for his actions. The Lord Chief Justice’s comments suggest that a case for fraud might have been established if brokers had induced a trader to short sell in shares in the knowledge that these shares would not go to allotment (although he was not certain of this). Simply attaining control over the market appears to have been allowed, although he acknowledges that the price charged by Mr. Myring might not be consistent with ‘old-fashioned notions as to what is straightforward and above-board in relation to business matters’.²⁵ There was, evidently, a certain level of deceptive activity in investment that the legal system was willing to tolerate.

Thirdly, Mr. Myring reports losing a considerable sum of money in the incident. As well as the damaging effect of the case on his reputation, he reported losses of £15,400 as a

²² *The Times*, ‘Queen’s Bench Division: Jackson and Others v. Hamlyn’. 6th August 1897.

²³ *The Times*, ‘Queen’s Bench Division: Jackson and Others v. Hamlyn’. 7th August 1897.

²⁴ *The Times*, ‘Queen’s Bench Division: Jackson and Others v. Hamlyn’. 11th August 1897.

²⁵ *The Times*, ‘Queen’s Bench Division: Jackson and Others v. Hamlyn’. 11th August 1897.

result of his dealings in the company. Having instructed his brokers to both put and call at £1.25, he would have made substantial losses without cornering the market, given the unprofitability of the underlying firm. Although he reports ‘a large profit’ for both himself and the investors involved in pooling their shares, this was seemingly insufficient to offset the losses involved in repeatedly paying excessive prices for the stock.²⁶

Finally, the incident highlights an agency problem inherent in short-selling stock through a broker. If there was a default on delivery of shares, the liability lay with the broker; but if an extraordinarily high price was paid to ensure delivery of shares, the liability lay with the client. The brokers in this case chose to pay an exorbitant amount of their client’s money in order to protect their own liability, a decision legally adjudged to be entirely reasonable. However, in later cycle company corners, brokers who had personally short sold stock overwhelmingly chose to default on share delivery and wait for the Stock Exchange to decide upon a special settlement. The resulting losses were still substantial, but on a much smaller scale than that incurred in the Bagot Pneumatic Tyre Company.

In the case of Mr. Hamlyn, heavy losses were compounded by a prolonged, expensive and unsuccessful legal battle. *The Times* covered this court case in its entirety, and the verdict was also reported by a wide range of local and national newspapers.²⁷ The episode is therefore likely to have made investors wary of short selling shares, particularly those of newly established cycle companies. *Cycling Magazine*, for this reason, welcomed the verdict, stating that ‘there will be less “bearing” done after one or two sharp lessons of this kind.’²⁸

²⁶ *The Times*, ‘Queen’s Bench Division: Jackson and Others v. Hamlyn’. 10th August 1897.

²⁷ Articles were published in *The Morning Post*, *Freeman’s Journal*, *Midland Daily Telegraph*, *The Standard*, and *The Liverpool Mercury*.

²⁸ *Cycling Magazine*, ‘Financial’, 21st August 1897.

As well as deterring short-sales, this incident may have contributed to overpricing by encouraging uninformed investment in cycle shares. Table 2 shows the occupations, as reported in the company's shareholder register, of all investors who profited as a result of the corner. For the purposes of estimating profits, it is assumed that shares were allocated to these investors at IPO, and then sold at the price listed in the *Financial Times* on the date at which the shares were transferred. The court proceedings indicate that few shares were bought on the secondary market by anyone other than Mr. Myring in the period following allotment, but profit levels would have been similar even if this had occurred. Notably, the vast majority of gains from the corner accrued to non-specialist investors.²⁹ 'Gentlemen' and members of the armed forces were the main beneficiaries, and listed occupations ranged from 'hotel keeper' to 'theological student'. In contrast, bankers, stock brokers, directors, agents and industry insiders accounted for just 5.48% of cornering profits.

<<<INSERT TABLE 2 HERE>>>

This is relevant for two reasons. Firstly, stories of members of the public making extravagant gains are likely to encourage other non-professionals to invest in cycle shares. The role of simple, colourful stories in spurring further investment in a bubble has been emphasised by Karl E. Case and Robert J. Shiller (2003). Secondly, holders of shares in other companies are likely to have become more inclined to join pooling operations. This may have been a factor in the development of the two further corners that took place in 1897, both of which required some small shareholders to commit to a similar arrangement. This, in turn, increases the cornering risk for short sellers to account for. The incident therefore would have made traders wary of short selling, while encouraging investment from uninformed investors. In combination, these factors could have contributed to the high price of cycle shares.

²⁹ 'Summary of Capital and Shares', *The Bagot Pneumatic Tyre Company Limited*, BT31 Files, National Archives.

4.2 The James Cycle Company Corner

The corner of James Cycle Company shares differs from that of the Bagot Tyre Company in that it involved a highly profitable and successful company. The firm was registered in May 1897 with a nominal capital of £50,000, issued in shares of £1 each. It paid a dividend of 10 per cent per annum for the six months to November 1897, 7.5 per cent for 1897-98, and 2.5 per cent for 1898-99; modest sums in isolation, but respectable in an era in which most cycle firms paid no dividend at all and many declared bankruptcy.³⁰ The firm later moved into motorcycle production, continuing business until the 1960s.

The corner was engineered by the company director, Mr. James. The *Birmingham Daily Post* reported that it was brought about ‘in much the same way’ as the Bagot Tyre corner of the previous year.³¹ The shares went to market in June 1897, a period of rapidly falling cycle share prices, and with almost no cycle companies trading above par, traders short sold the company accordingly. Mr. James responded by placing large orders to buy in an effort to prop up the company’s share price.

The company’s share price, as reported in the *Financial Times*, is shown in Figure 4. The initial price of around £1.25 is consistent with the dividends paid by the company over the following 18 months, so *ex post* it was not an ideal opportunity to short-sell. The price initially falls slightly before rapidly rising to a peak of £2 10s on 23rd July. It is unclear whether this is a consequence of manipulators buying all available stock, short-sellers desperately trying to cover their positions, or some combination of both. *Cycling Magazine* reported at this stage that ‘some bears got nicely cornered over shares in James Ltd. on Monday afternoon [July

³⁰ *Stock Exchange Yearbook*, 1900, p.1528.

³¹ *Birmingham Daily Post*, 21st December 1897.

19th].³² The Birmingham Stock Exchange responded by suspending all trading in the shares pending the settlement of the matter.³³ The shares thereafter did not trade for four and a half months.

<<<INSERT FIGURE 4 HERE>>>

This settlement was eventually made on January 10th 1898 and decreed that, Mr. James having withdrawn a controversial circular, the short-sellers must fulfil their contracts and find the shares from somewhere. The ‘buying-in’ rule was suspended, however, and they therefore had an indefinite period of time to procure the shares.³⁴ A stand-off followed, with the short-sellers refusing to offer more than £3 per share and Mr. James refusing to accept less than £8 per share. With Mr. James apparently considering legal action, the stand-off ended in July 1898 when the short-sellers managed to buy shares from elsewhere at £4 each. They were, in total, 1,150 shares short, so assuming the shares were short sold at the opening-day price of £1.25, the total loss would have been £3,162.50.³⁵ The maximum potential gain from the short-sell, if the shares had fallen to a price of £0.05 by the closing date, would have been £1,380. The realistic prospects for profit were much smaller, however, given the timeframe involved and the standing of the company. In contrast, if the corner had been entirely successful, the losses at £8 per share would have amounted to £7,762 10s. This reaffirms the severe tail-end risk involved in short selling a stock when there is some risk of being cornered.

³² *Cycling Magazine*, ‘Financial’, 24th July 1897.

³³ *Cycling Magazine*, ‘Financial’, 31st July 1897.

³⁴ *Cycling Magazine*, ‘Financial’, 15th January 1898.

³⁵ *Cycling Magazine*, ‘Financial’, 23rd July 1898.

Mr. James, like Mr. Myring in the Bagot Tyre case, did not manage to corner the market entirely, and is likely to have also suffered heavy losses as a result.³⁶ The profit was made by those who had sold their shares to Mr James in the first instance and, especially, by those who sold shares to the short-sellers in July 1898. The heavy losses accrued by short-sellers, however, are still likely to have acted as a disincentive to short-sell stock in general. *Cycling Magazine*, for this reason, was satisfied by the outcome, writing that, “if it only teaches speculators to be more careful, the James ‘bear squeeze’ will not have been in vain.”³⁷

4.3 *The Tubes (America) Corner*

Tubes (America) Limited was a company floated in the UK in order to acquire three American tube companies. The nominal capital was £350,000 in shares of £1 each, 203,163 of which were put forward for public subscription. The company was heavily undersubscribed, and instead of abandoning the project the directors decided to take on the remaining shares themselves.³⁸ Since under-subscription suggested that shares were overvalued at par, several brokers proceeded to short-sell. Shares of this company, however, were held by a small network of investors: over half were in the hands of American directors, who were locked in for twelve months, with many more in the hands of close associates and the company’s promoters. Orders were placed to buy and, in the words of *Cycling Magazine*, ‘the unsuspecting “bears” fell into the trap’.³⁹

³⁶ *Cycling Magazine*, ‘Financial’, 30th July 1898.

³⁷ *Cycling Magazine*, ‘Financial’, 30th July 1898.

³⁸ *Cycling Magazine*, ‘Financial’, 5th March 1897.

³⁹ *Cycling Magazine*, ‘Financial’, 24th July 1897.

Figure 5 shows the company's share price as reported in the *Financial Times* for July 1897, the only month in which the firm was listed. In an effort to close their positions, short-sellers placed bids at up to £5 per £1 share, but after twelve days these offers were still unsuccessful. At this stage the only potential course of action was to buy from the company directors that had engineered the corner, and who were therefore likely to charge extremely high prices. *Cycling Magazine* suggested they would have to pay £10 or more per share in order to close their position, while *London Daily News* simply stated that they would probably be made to pay "through the nose".⁴⁰

<<<INSERT FIGURE 5 HERE>>>

As with the James corner, the Birmingham Stock Exchange barred the shares from trading in an effort to prevent the rig from having further effect, and arranged for a settlement to take place.⁴¹ In the event no such settlement was necessary, as the establishment of the company was aborted in March 1898. All trades were subsequently cancelled and money returned to subscribers, and the short-sellers therefore did not experience a loss.⁴²

The striking feature of the coverage of this incident is the level of ill-feeling directed towards the 'bears' that short-sold the stock. The *Edinburgh Evening News* describes the short-sellers as 'reckless' and praises those cornering the stock for 'making good use of the opportunity'.⁴³ The *London Daily News* describes the 'bears' as having been 'caught in their own trap', hoping that they will be 'taught a lesson'.⁴⁴ *Cycling Magazine* states that, 'A few

⁴⁰ *Cycling Magazine*, 'Financial', 24th July 1897; *London Daily News*, 'Birmingham Cycle, Tyre and Tube Market: A 'Corner' in Tubes', 19th July 1897.

⁴¹ *Cycling Magazine*, 'Financial', 31st July 1897.

⁴² *Cycling Magazine*, 'Financial', 5th March 1897.

⁴³ *Edinburgh Evening News*, 'Financial Notes: A Cycle "Rig"', 20th July 1897.

⁴⁴ *London Daily News*, 'Birmingham Cycle, Tyre and Tube Market: A 'Corner' in Tubes', 19th July 1897.

similar corners in the shares of a few other concerns would, we have not the slightest doubt, be extremely welcome to the general body of investors just now'.⁴⁵ The episode was not covered especially widely, but those publications which did report it were in agreement that short-sellers who lost money were getting what they deserved.

While no losses eventually occurred, this only became clear eight months after the corner, during which time investors short of Tubes (America) stock would have expected to suffer heavy losses. Occurring simultaneously with the James corner, this would have served to further emphasise the tail-end risk inherent in short selling shares that were vulnerable to a corner.

5. The Effect of Corners on the Cycle Share Market

Numerous contemporary press reports, particularly in *Cycling Magazine*, suggested that the cornering incidents discussed in the previous section would discourage further short-sales.⁴⁶ Was this really the case? This section seeks to answer this question by investigating the price patterns in other cycle shares during the periods in which corners occurred. One methodology, used by Allen et al. (2006), is to compare patterns of trading in other shares before, during, and after cornering incidents. For each of the three cycle corners, three periods are identified: a pre-corner period of 55 trading days, the ten days immediately preceding the corner, and the ten days after the corner occurs. These window lengths are chosen for consistency with Allen et al. (2006), but alternative window lengths are tested for the sake of robustness, with little effect

⁴⁵ *Cycling Magazine*, 'Financial', 24th July 1897.

⁴⁶ *London Daily News*, 'Birmingham Cycle, Tyre and Tube Market: A 'Corner' in Tubes', 19th July 1897; *Cycling Magazine*, 'Financial', 24th July 1897; *Cycling Magazine*, 'Financial', 21st August 1897; *Cycling Magazine*, 'Financial', 30th July 1898.

on the results. A similar approach is used for each settlement, including the Tubes (America) cancellation, which would, if anything, be expected to spur further short sales.

The results of this approach are presented in Table 3. Returns in the pre-corner period are consistently negative, whereas those in the immediate aftermath are, on average, positive. The largest difference is in the case of the Bagot Tyre corner settlement, for which pre-event daily returns are -0.05 per cent and post-event daily returns are 0.68. The positive post-event returns are notable because *ex post* it is known that cycle shares were overpriced relative to future profits throughout this period. The cancellation of the Tubes (America) corner, in contrast, is followed by a period of even more negative returns than before.

<<<INSERT TABLE 3 HERE>>>

While these results are consistent with the hypothesis that cornering acted as a short-sale constraint, they give little idea of the significance of this effect. An alternative methodology is to perform structural break tests on the cycle share index, in order to determine whether any of the aforementioned cornering incidents substantially affected the overall trend of cycle share prices. Recent literature has frequently used this methodology in order to ascertain the significance of past events.⁴⁷

The structural break test used is that of Eric Zivot and Donald W. K. Andrews (1992). This test proposes, as a null hypothesis, a unit root process with no exogenous structural change of the form:

$$y_t = \mu + y_{t-1} + \varepsilon_t \quad (3)$$

⁴⁷ See for example: Choudhry (2010); Brown and Burdekin (2002); Frey and Kucher (2000); Willard, Guinnane and Rosen (1996).

where y_t is the value of the index at time t , μ is the expected weekly change in the value of the index, and ε_t is an independent and identically distributed error term. The alternative hypothesis is that the series is stationary about a deterministic time trend and there is a one-time change in the level of y_t , the drift μ , or both. The major benefit of this test is that it does not require the dates of potential structural break points to be identified in advance. Instead, the proposed break point is chosen as the date at which the t-statistic for rejection of the null hypothesis is maximised. The results are therefore independent of the author's prior expectations.

To account for the possibility of more than one structural break in the data, it is necessary to perform the test multiple times, on a 'rolling window' of observations. Choosing the appropriate window length is a trade-off: too short a window length will result in the identification of spurious break points; too long a window length will result in the failure to identify genuine break points (Choudhry, 2010). For the purposes of this paper, a relatively long window length of 300 trading days is chosen, minimising the possibility of falsely identifying structural breaks.⁴⁸

The dates of the four identified structural breaks are shown in Table 4. The break of 14th January 1897 is likely to have been associated with the Bagot Tyre corner: its share price rose from £2.25 to £5.50 between 1st January and 14th January 1897, and the first short

⁴⁸ The window length is varied as a robustness check. The structural break in January 1897 is consistently identified using larger window lengths. Using significantly smaller window lengths, similar to those of Choudhry (2010), produces slightly erratic results: the January 1897 break point is identified when using a 20-day or 30-day window, but not when using a 40-day or 60-day window. This is likely the result of variation in the value of μ when using smaller samples of returns.

contracts were due on 16th January.⁴⁹ The other breaks are associated with the initial mania in the spring of 1896 and the publication of an article in the *Financial Times* recommending the sale of cycle shares in July 1897.⁵⁰

<<<INSERT TABLE 4 HERE>>>

As Figure 6 shows, this structural break is a change from a relatively stationary pattern in cycle shares to an upwards trend. As previously noted, this upwards trend occurred while dividend payments were falling. This is consistent with the hypothesis that the failure of arbitrageurs to correct overpricing by short-selling securities can partly be explained by cornering risk.

<<<INSERT FIGURE 6 HERE>>>

A third test of the cornering risk hypothesis is a cross-sectional approach, asking whether companies that were vulnerable to corners were more overpriced than those which were not. This approach has previously been used by Jones and Lamont (2002), who find that short-sale constrained firms experience lower medium-term returns as a result of having been initially overpriced. Two factors are used as proxies for cornering risk: an establishment date within the previous three months and under-subscription.

Recently established firms were especially vulnerable to a corner because immediately after establishment the number of publicly-available shares, and who held those shares, was often obscured (Thring, 1880). All publicly-traded firms had to send a record of all shareholders to the Registrar of Companies under the Companies Act of 1862, but the first

⁴⁹ 'Summary of Capital and Shares', The Bagot Pneumatic Tyre Company Limited, BT31 Files, National Archives.

⁵⁰ *Financial Times*, 'Cycle Shares & American Over-Production', 6th July 1897.

copy was only required from the company within fourteen days of its first Annual General Meeting, which was, under the Companies Act of 1867, required to be held within four months of the company's establishment. Prior to this, shareholder records needed to be obtained from the company's registered office, and could be withheld for a 30-day period if notification was issued to a local newspaper (Thring, 1880, p. 183, p.362.).⁵¹ As a result, it was generally unclear how much of a firm's nominal capital had been subscribed and called up, or how many shares were in the hands of directors. A consequence of this during the Bagot Tyre corner was that, at one stage, short-sellers had agreed to sell more shares than had been issued to the general public.⁵²

Under-subscribed firms were more vulnerable to a corner because company directors had an incentive to issue calls at a price above par in order to attract further subscription. This practice has been identified by Kleer (2015) as a cause of overpricing during the South Sea Bubble, and was the basis of Mr. Myring's successful defence against accusations of fraud relating to the Bagot Tyre Corner. Since this practice was designed to engineer a shortage of the stock, anyone who short-sold it would be especially vulnerable to a corner. The possibility of this practice occurring also produced a selection effect: under-subscription was a sign of low demand, so theoretically, under-subscribed firms are those which traders would have most liked to short-sell. The usefulness of both measures as proxy variables is emphasised by the fact that all three of the aforementioned corners occurred within three months of establishment, and all three were in under-subscribed firms.

Of the 89 cycle firms for which data is available at the share price peak of March 1897, 20 were established in the previous three months, and 49 were under-subscribed. This cross-

⁵¹ Thring, 'Law and Practice', p.183; p.362.

⁵² *Cycling Magazine*, 'Financial', 12th December 1896.

sectional variation is exploited to test whether these firms experienced disproportionately negative subsequent returns. Subsequent returns of individual cycle firms are regressed on proxies for short-sale restrictions and controls. The dependent variables are two, three, four, five and six-month returns in the period after March 1897. It is hypothesised that firms which were more difficult to short-sell were overpriced at this point, and will therefore experience lower future returns.

The following indicators of firm performance and risk are used as control variables in the regression:

- a. Three-year dividend payments, expressed as a percentage and discounted to present value.
- b. Each firm's beta, calculated as the coefficient of a regression of all daily share price returns during 1897 against the returns of a blue-chip stock index.
- c. A dummy for whether the firm went bankrupt, as opposed to ceasing business due to a voluntary wind-up, reconstruction, or merger.
- d. A dummy for whether the firm disbanded prior to 1900, as a proxy for long-term performance.
- e. A dummy for whether the firm's yearly dividend was paid outside the period for which six-month returns are calculated.

These variables are obtained from a combination of *Stock Exchange Yearbooks* and BT31 files of defunct companies, which were obtained from the National Archives in Kew. Beta is calculated using a blue-chip stock index derived from prices listed in *The Times* as a benchmark. Summary statistics for each variable and correlation coefficients are shown in Tables 5 and 6 respectively.

<<<INSERT TABLES 5 AND 6 HERE>>>

Table 7 shows the results of OLS regressions of subsequent returns on all explanatory variables. *Ceteris paribus*, recently established companies experienced two-month returns 8.5 percentage points lower on average than other cycle companies. Four-month and six-month returns are 12.0 and 10.7 percentage points lower respectively. Under-subscribed firms experienced two-month returns 7.8 percentage points lower, four-month returns 8.1 percentage points lower, and six-month returns 10.1 percentage points lower. While insufficient to fully explain the high level of share prices, this is an economically significant effect: the average return on all cycle shares during these periods were -17.1 per cent, -32.4 per cent, and -35.8 per cent respectively. This suggests that, in March 1897, corner-vulnerable firms were trading at a substantial premium.

<<<INSERT TABLE 7 HERE>>>

This section has presented three piece of evidence to suggest that cornering risk contributed to the asset-price reversal. Firstly, the market responds to news relating to corners in a way consistent with the hypothesis that cornering risk acted as a short-sale constraint. The emergence of new corners, and expensive settlements for short-sellers, were generally followed by a period of increased buoyancy in the overall cycle share market. Conversely, the Tubes (America) settlement, which did not impose a loss on short-sellers, was followed by a period of more negative returns. Secondly, the heavy losses experienced by short-sellers in the Bagot Tyre corner coincide with a structural break in cycle share prices. Finally, during this ‘bubble’ period, companies which were either under-subscribed or recently established traded at a substantial premium. The most likely explanation for this is the increased cornering risk associated with these firms.

6. Conclusion

This paper argues that the risk of being cornered constituted a short-sale constraint that exacerbated an asset-price bubble in bicycle shares in 1896-1898. Although only three corners occurred, the losses experienced were so substantial that this still represented a significant source of additional risk. High-profile cornering incidents, in which short-sellers usually made extremely heavy losses, were typically followed by periods of relative buoyancy in the cycle share market, and the most severe cornering losses are associated with a structural break in the prices of other cycle shares. Furthermore, shares which were particularly vulnerable to a corner appear to have been more overpriced than the rest of the market.

Cornering risk is unlikely to have been the primary driving force behind the reversal in bicycle share prices; it appears to have merely exacerbated overpricing, and slowed the subsequent downward adjustment of share prices. Nevertheless, the results of this paper suggest the need to reconsider the role played by short-sale constraints in historical asset-price reversals. The lack of regulation in early regional stock markets allowed investors to make unlimited naked short-sales, but also did nothing to ease the risks involved in doing so. Short selling therefore came to be seen as inherently dangerous, best left to specialist ‘bears’, who were subject to social disapproval. The limits this placed on arbitrage could form part of the explanation for the multiple asset-price reversals that occurred in early stock exchanges.

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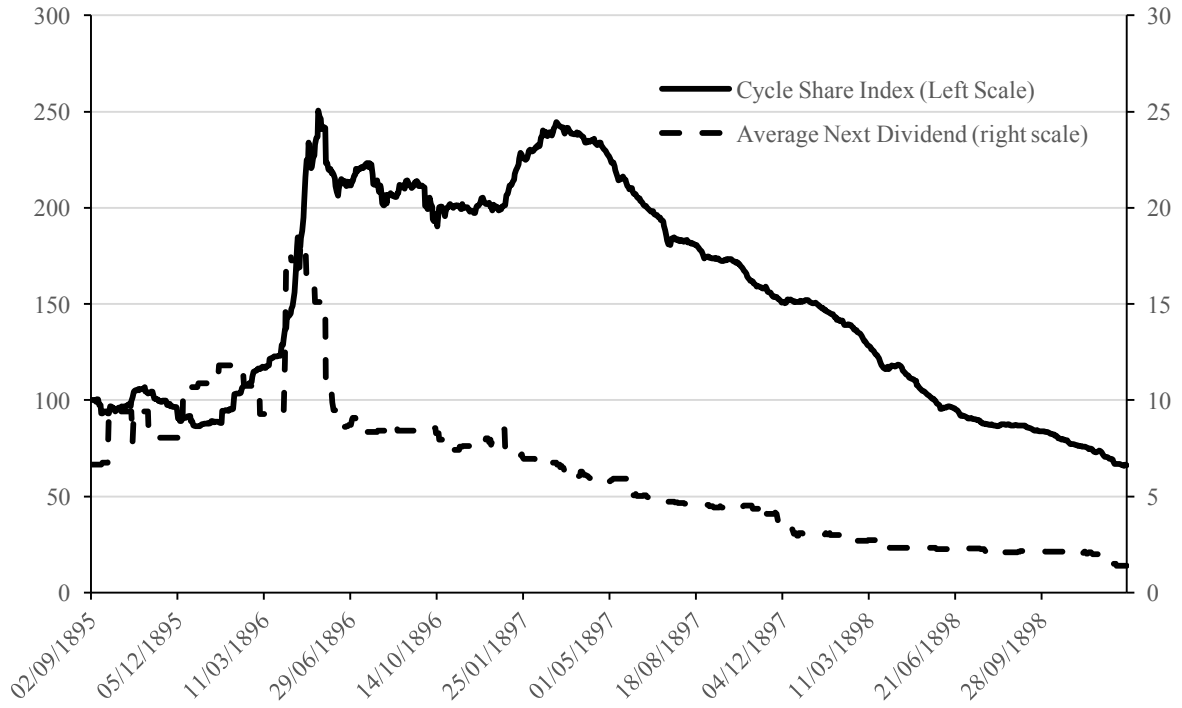


FIGURE 1
CYCLE SHARE INDEX VS. SUBSEQUENT REPORTED DIVIDENDS, 1895-1898

Source: Share prices obtained from *Birmingham Daily Post*, *Birmingham Daily Mail*, and the *Financial Times*. Dividends obtained from the *Stock Exchange Yearbooks*, 1895-1900.

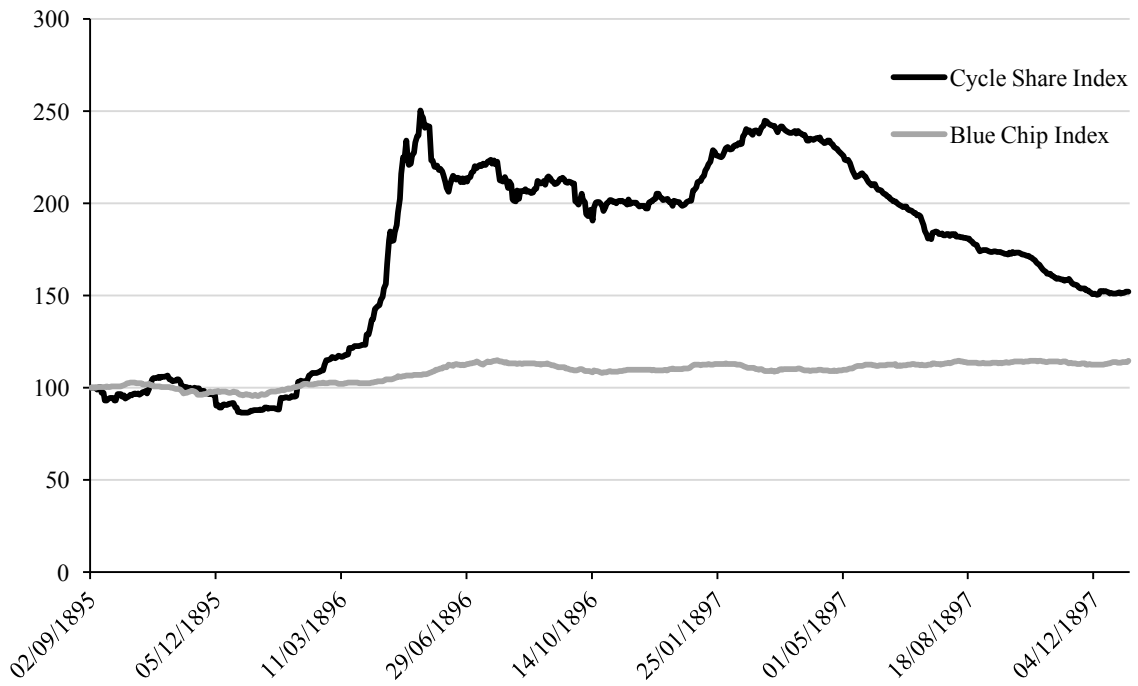


FIGURE 2
CYCLE SHARE INDEX VS. BLUE CHIP INDEX, 1895-1897

Source: *Birmingham Daily Post*, *Birmingham Daily Mail*, *Financial Times*, and *The Times*.

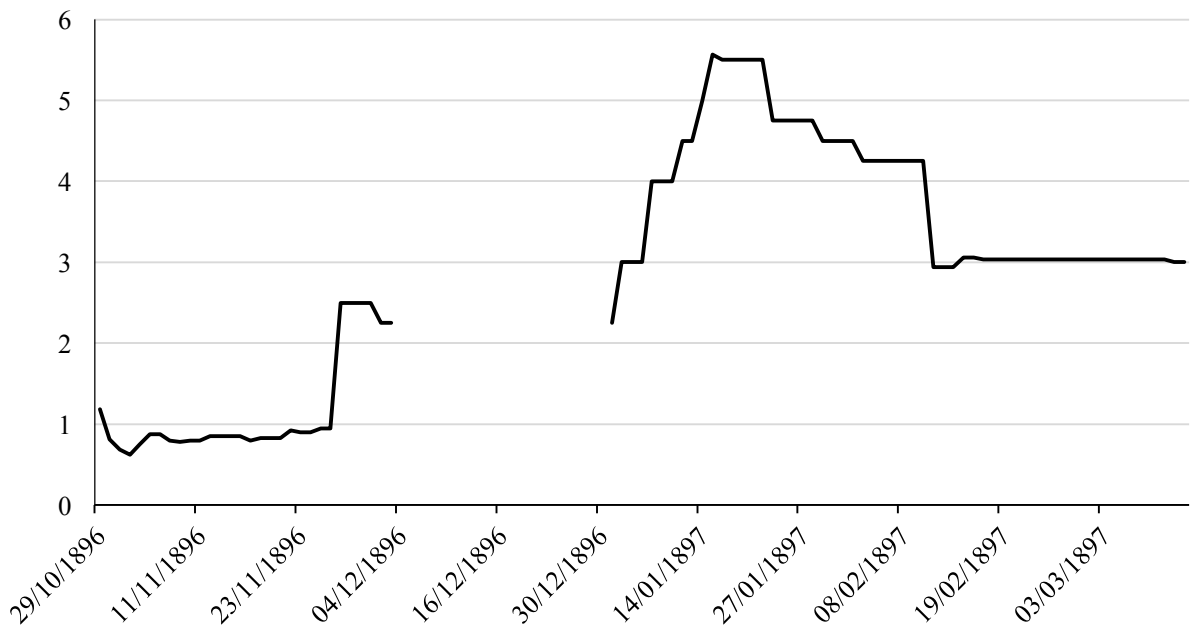


FIGURE 3
 BAGOTS PNEUMATIC TYRE SHARE PRICE (£), OCTOBER 1896-
 MARCH 1897

Source: *The Financial Times*.

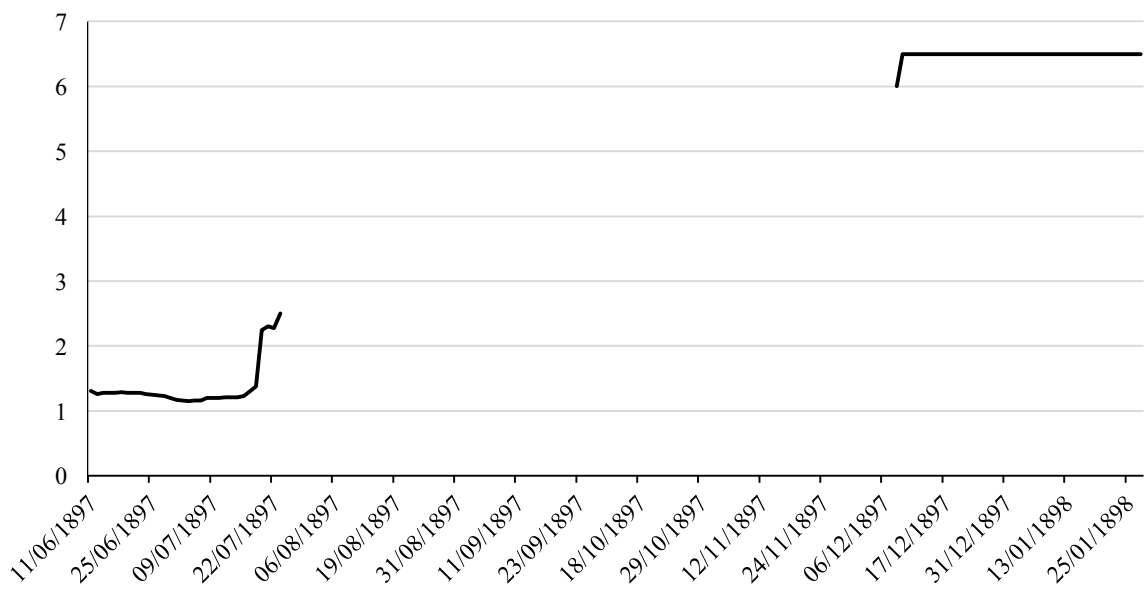


FIGURE 4
 JAMES CYCLE LTD. SHARE PRICE (£), JUNE 1897-JANUARY 1898

Source: *Financial Times*.

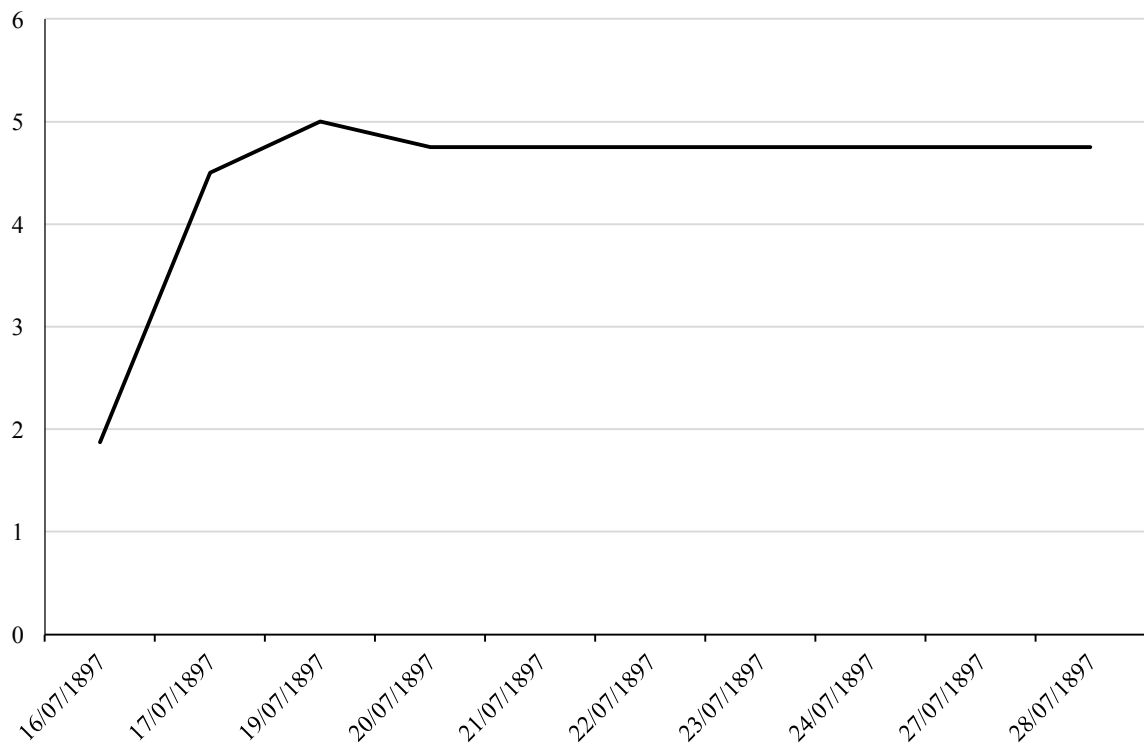


FIGURE 5
TUBES (AMERICA) SHARE PRICE (£), JULY 1897

Source: *Financial Times*.

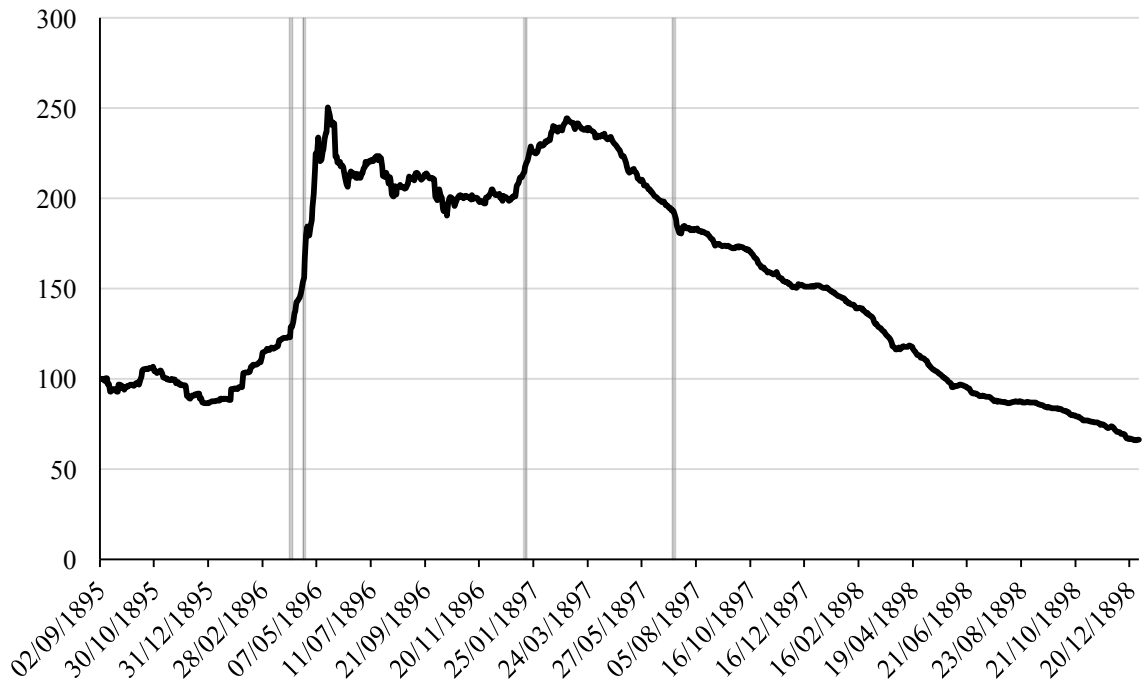


FIGURE 6
CYCLE SHARE INDEX WITH STRUCTURAL BREAKS, 1895-1898

Notes: Structural breaks identified using Zivot-Andrews tests with a window length of 300 days.

TABLE 1
CYCLE CORPORATION ESTABLISHMENT, JANUARY 1895-
JUNE 1897

| | | No. of Companies Established | Average Nominal Capital (thousands of £) | Total Nominal Capital (thousands of £) |
|--------------|----|------------------------------------|--|--|
| 1895 | Q1 | 17 | 21.03 | 357.5 |
| | Q2 | 12 | 15.21 | 182.5 |
| | Q3 | 15 | 108.27 | 1,624.0 |
| | Q4 | 26 | 56.77 | 1,476.1 |
| 1896 | Q1 | 34 | 48.27 | 1,641.1 |
| | Q2 | 94 | 147.31 | 13,847.2 |
| | Q3 | 96 | 55.38 | 5,316.6 |
| | Q4 | 139 | 46.44 | 6,454.6 |
| 1897 | Q1 | 156 | 47.24 | 7,370.0 |
| | Q2 | 82 | 58.09 | 4,763.6 |
| Total | | 671 | 64.13 | 43,033.2 |

Source: *Birch's Manual of Cycle Companies 1897*.

TABLE 2
OCCUPATIONS OF BAGOT TYRE CORNER
BENEFICIARIES

| Occupation | Profits (£) | Percentage of total profits |
|-------------------|-----------------|--------------------------------|
| Agent | 262.5 | 0.86 |
| Armed forces | 6961.25 | 22.86 |
| Banker | 93.75 | 0.31 |
| Broker | 468.75 | 1.54 |
| Clerk or Manager | 1106.25 | 3.63 |
| Cycle Maker | 375 | 1.23 |
| Director | 468.75 | 1.54 |
| Gentleman/Esquire | 7723.75 | 25.37 |
| Manufacturer | 600 | 1.97 |
| Merchant | 3817.5 | 12.54 |
| Skilled trade | 3037.5 | 9.98 |
| Unknown | 4130 | 13.56 |
| Woman | 1403.75 | 4.61 |
| Total | 30448.75 | 100.00 |

Source: Bagot Tyre Company shareholder register.

TABLE 3
CYCLE SHARE RETURNS DURING CORNERS AND SETTLEMENTS

| Event | Pre-Event Period: t-65, t-10 | Event Period one: t-10, t | Event Period two: t+1, t+10 |
|---------------------------------------|---|--------------------------------------|--|
| | Daily Return (%) | Daily Return (%) | Daily Return (%) |
| Bagot Tyre Cornered | -0.09 | -0.14 | 0.13 |
| Bagot Tyre Settlement | -0.05 | 0.39 | 0.68 |
| James and Tubes (America) Cornered | -0.35 | -0.88 | -0.33 |
| James Settlement | -0.46 | -0.23 | -0.35 |
| <i>Mean</i> | -0.24 | -0.21 | 0.03 |
| Tubes (America) Corner Cancelled | -0.16 | -0.26 | -0.51 |

TABLE 4
STRUCTURAL BREAKS IN CYCLE SHARE INDEX, 1895-1898

| Date | Daily Return (%) | Context |
|------------|---------------------|---|
| 30/03/1896 | 5.82 | Rapid price increases associated with the acquisition of the Pneumatic Tube Company and expectation of high dividend payments at several cycle companies. |
| 15/04/1896 | 3.56 | |
| 14/01/1897 | 0.85 | Bagot Tyre shares rise to a peak of £5.56, imposing heavy losses on short-sales, and preceding a period of relative buoyancy in the cycle share market. |
| 06/07/1897 | -0.49 | <i>Financial Times</i> publishes an article strongly recommending the sale of cycle shares, accelerating the downward trajectory of prices. |

TABLE 5
SUMMARY STATISTICS FOR REGRESSION VARIABLES

| Dependent Variables | Mean | Std. Dev. | Min | Max | Obs |
|--|-------------|----------------------|------------|------------|------------|
| Two-Month Returns | -0.171 | 0.143 | -0.764 | 0.137 | 88 |
| Three-Month Returns | -0.234 | 0.156 | -0.750 | 0.036 | 88 |
| Four-Month Returns | -0.324 | 0.162 | -0.791 | 0.000 | 89 |
| Five-Month Returns | -0.354 | 0.168 | -0.746 | 0.000 | 88 |
| Six-Month Returns | -0.358 | 0.178 | -0.775 | 0.020 | 89 |
| Corner Vulnerability Proxies | | | | | |
| Established in 1897 | 0.225 | 0.420 | 0 | 1 | 89 |
| Unsubscribed Shares Dummy | 0.551 | 0.500 | 0 | 1 | 89 |
| Control Variables | | | | | |
| Log Subscribed Capital | 4.436 | 1.061 | 0.961 | 8.422 | 89 |
| Discounted Three-Year Dividend Payments (%) | 9.641 | 10.955 | 0 | 57.381 | 89 |
| Bankruptcy Dummy | 0.337 | 0.475 | 0 | 1 | 89 |
| Accounts made up to Oct-Mar Dummy | 0.112 | 0.318 | 0 | 1 | 89 |
| Pre-1900 Disband Dummy | 0.438 | 0.499 | 0 | 1 | 89 |
| Beta | -0.067 | 1.363 | -4.452 | 4.290 | 89 |

Sources: Returns calculated from share prices published in the *Financial Times*, and Beta is calculated relative to a blue-chip index calculated using share prices published in *The Times*. All other variables are obtained from a combination of *Stock Exchange Yearbooks* and BT31 files.

TABLE 6
CORRELATIONS BETWEEN REGRESSION VARIABLES

| | Two- Month Returns | Three- Month Returns | Four- Month Returns | Five- Month Returns | Six- Month Returns | Established in 1897 | Unsubscribed Shares Dummy | Discounted Three- Year Dividends | Log Subscribed Capital | Bankruptcy | Accounts Made up to Oct-Mar | Pre-1900 Disband | Beta |
|---------------------------------------|--------------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|---------------------------------|---|------------------------------|------------|-----------------------------------|---------------------|------|
| Two-Month Returns | 1 | | | | | | | | | | | | |
| Three-Month Returns | 0.8272 | 1 | | | | | | | | | | | |
| Four-Month Returns | 0.6825 | 0.8231 | 1 | | | | | | | | | | |
| Five-Month Returns | 0.653 | 0.7515 | 0.8996 | 1 | | | | | | | | | |
| Six-Month Returns | 0.6135 | 0.7123 | 0.8559 | 0.9343 | 1 | | | | | | | | |
| Established in 1897 | -0.2052 | -0.1453 | -0.2366 | -0.1791 | -0.1976 | 1 | | | | | | | |
| Unsubscribed Shares Dummy | -0.2073 | -0.1875 | -0.1638 | -0.2191 | -0.2164 | -0.0531 | 1 | | | | | | |
| Discounted Three-Year Dividends | 0.198 | 0.1423 | 0.2759 | 0.3506 | 0.4079 | -0.0906 | 0.0837 | 1 | | | | | |
| Log Subscribed Capital | -0.1102 | -0.1646 | -0.1461 | -0.0465 | -0.0130 | -0.0853 | -0.1973 | 0.0572 | 1 | | | | |
| Bankruptcy | -0.0823 | -0.1106 | -0.1058 | -0.1242 | -0.1207 | -0.1204 | 0.0981 | -0.0058 | -0.2254 | 1 | | | |
| Accounts Made up to Oct-Mar | -0.0078 | -0.1961 | -0.0623 | -0.0854 | -0.1735 | -0.0951 | 0.035 | 0.0285 | -0.066 | 0.1274 | 1 | | |
| Pre-1900 Disband | -0.0202 | -0.144 | -0.1679 | -0.2241 | -0.261 | -0.1065 | -0.045 | -0.2818 | -0.0554 | 0.0164 | 0.1186 | 1 | |
| Beta | -0.0259 | 0.0213 | 0.0519 | 0.1769 | 0.1433 | 0.0591 | -0.1364 | 0.0074 | 0.0801 | 0.013 | -0.1768 | 0.0074 | 1 |

TABLE 7
CYCLE SHARE RETURNS AFTER MARCH 1897

| | Two-Month Returns | Three-Month Returns | Four-Month Returns | Five-Month Returns | Six-Month Returns |
|--------------------------------|----------------------|------------------------|-----------------------|-----------------------|----------------------|
| Established in 1897 | -0.085* (0.044) | -0.100** (0.045) | -0.120*** (0.040) | -0.105** (0.041) | -0.107** (0.045) |
| Under- Subscription | -0.078** (0.035) | -0.081** (0.035) | -0.081** (0.035) | -0.090** (0.034) | -0.101*** (0.035) |
| Three-Year Dividends | 0.003* (0.002) | 0.002 (0.002) | 0.003* (0.002) | 0.005** (0.002) | 0.006*** (0.002) |
| Log Subscribed Capital | -0.031 (0.202) | -0.041* (0.021) | -0.041* (0.022) | -0.030 (0.021) | -0.025 (0.020) |
| Bankruptcy | -0.039 (0.032) | -0.059* (0.035) | -0.065* (0.035) | -0.062* (0.036) | -0.059 (0.037) |
| Accounts paid up to Oct-Mar | -0.014 (0.050) | -0.086 (0.052) | -0.026 (0.054) | -0.021 (0.051) | -0.078 (0.052) |
| Pre-1900 Disband | -0.001 (0.033) | -0.049 (0.036) | -0.056 (0.034) | -0.063* (0.033) | -0.075** (0.036) |
| Beta | -0.004 (0.013) | 0.001 (0.013) | 0.006 (0.013) | 0.021* (0.011) | 0.013 (0.012) |
| Constant | 0.014 (0.104) | 0.048 (0.108) | -0.054 (0.117) | -0.140 (0.113) | -0.158 (0.111) |
| No. of Observations | 88 | 88 | 89 | 88 | 89 |
| R-squared | 0.126 | 0.183 | 0.224 | 0.270 | 0.296 |

Notes: Results of an OLS regression of cycle share returns in the period after March 1897 on auxiliary variables. Heteroscedasticity-robust standard errors are in parenthesis. *, ** and *** denotes significance at a 10 per cent, 5 per cent and 1 per cent level respectively.