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The Railway Mania and Commercial Crisis of the 1840s

Gareth Campbell

Britain in the 1840s

- ***Background***
- Railway Mania
  - Dividends
  - Leverage
  - Monetary and Legislative Policy
- Commercial Crisis
  - Impact of Speculation
  - Monetary and Legislative Policy
- Conclusion

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Background: 1830s

- First modern passenger railway opened in 1830
- Minor promotion boom in mid-1830s was followed by an economic downturn
- About 60 railway companies were in operation by 1843

Background: 1843-45

- Strong economic growth
- Low interest rates
- Increasing railway share prices
- Promotion of new railways

Background: 1846-50

- Beginning of Irish Famine at end of 1845
- Commercial Crisis of 1847
- Railway share prices declined
- New railways began construction, but experience difficulties in raising capital

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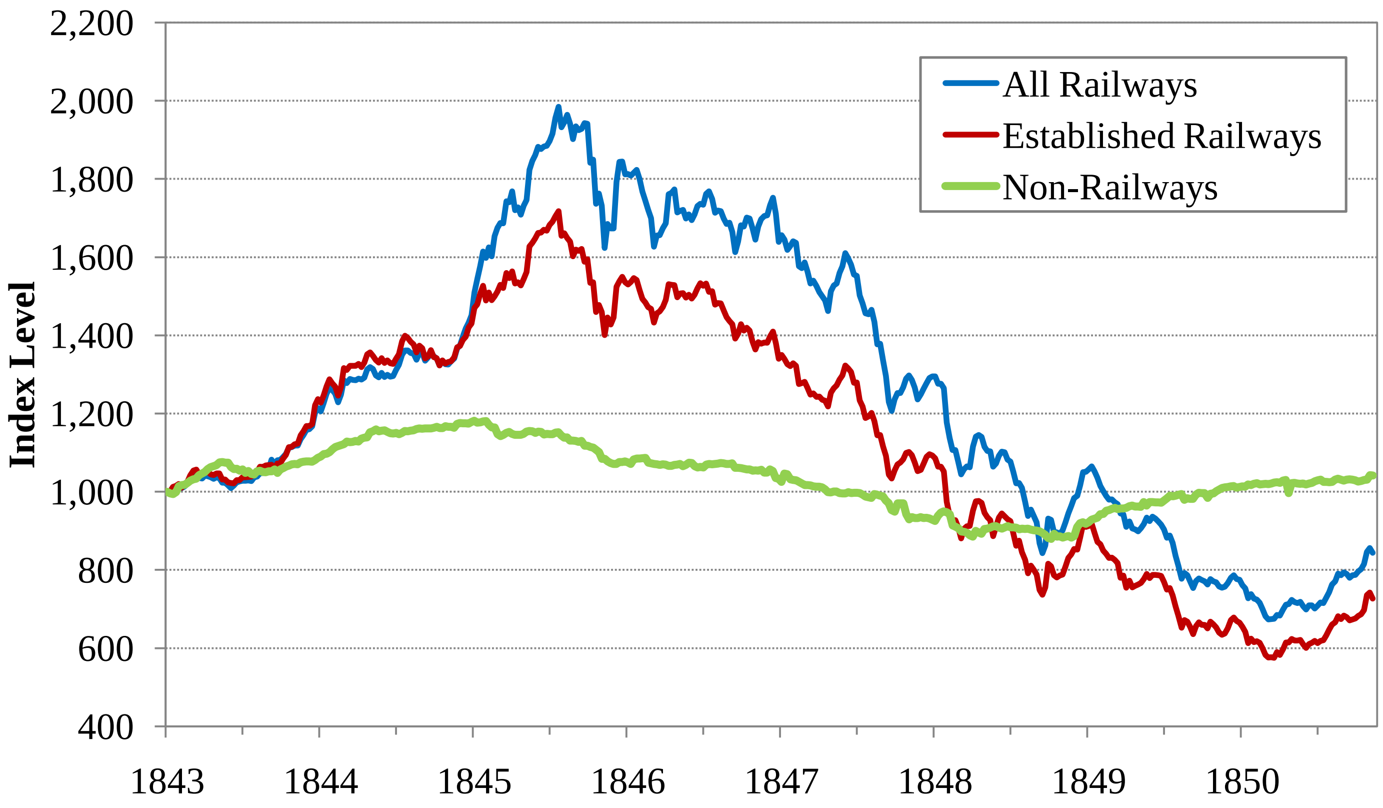
Significance of the Railway Mania

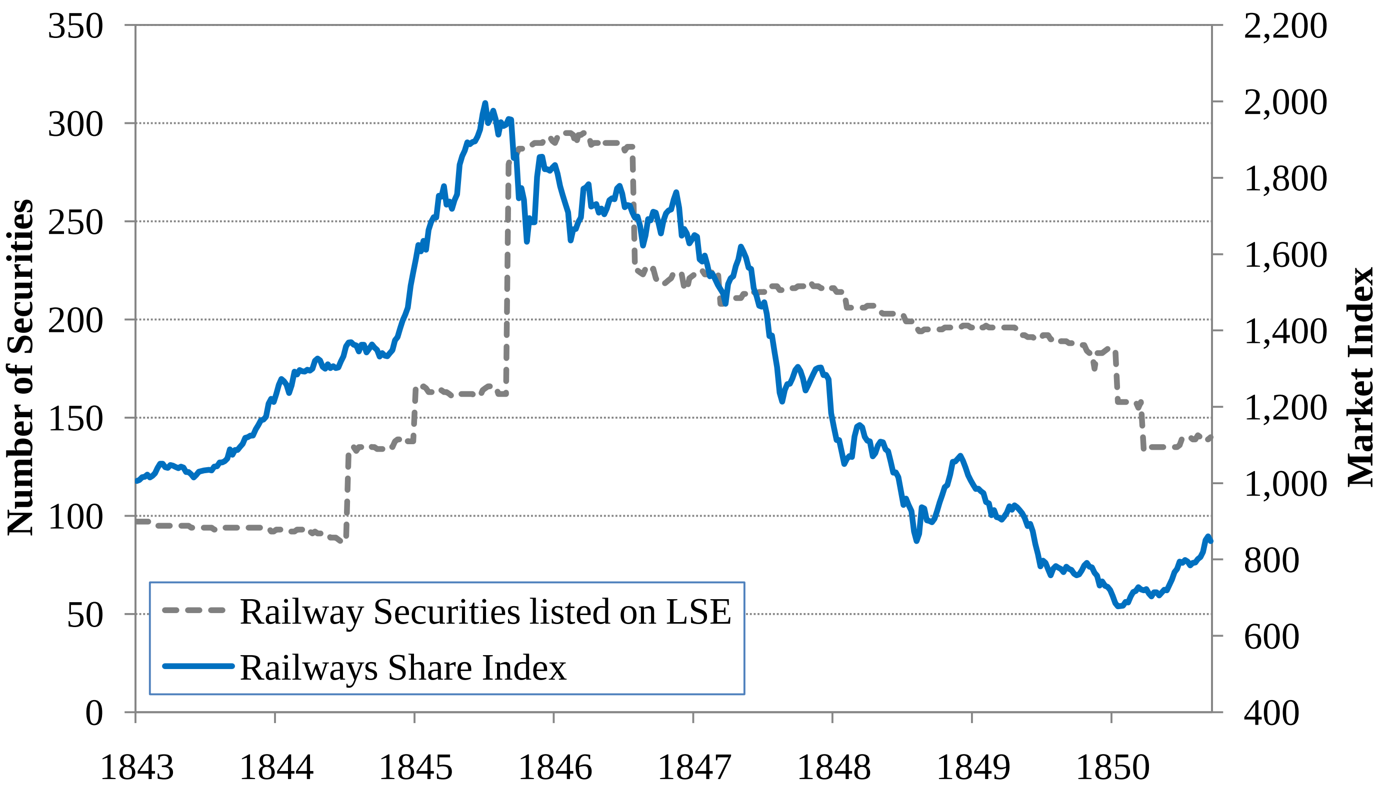
"Arguably the greatest bubble in history ... was Britain's Railway Mania in the 1840s."

Economist (December 18, 2008)

Market Indices



New Railway Promotion



Literature Review

- Narrative of events given in histories of early railways such as Jackman (1966) and Simmons (1978)
- Bryer (1991) has suggested that the Railway Mania was part of an attempt to ‘swindle’ investors
- However, McCartney and Arnold (2003) have argued that an analysis of company accounts implies that there was no systematic overstatement of profitability
- Has been limited quantitative analysis of changes in dividends, leverage, or pricing, which primary sources suggest were important

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Importance of Dividends

- ‘As regards the purchase of shares in the established lines we have simply to compare the market price of the share with the dividend which it pays.’

(*Short and Sure Guide to Railway Speculation*, 1845, p.5)

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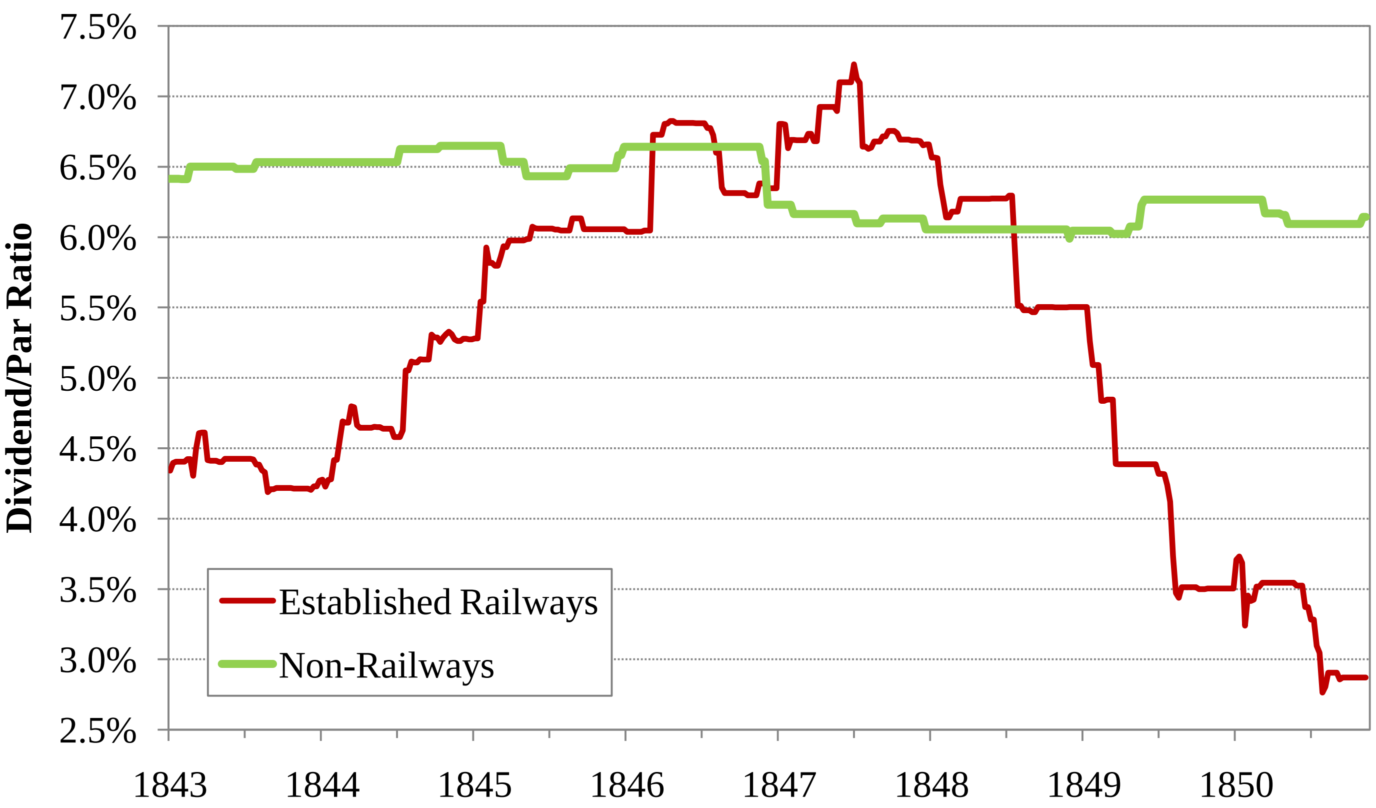
Dividend/Par Ratios



Asset Pricing Equation

- Dynamic Gordon model proposed by Campbell and Shiller (1988)

$$\delta_t \approx E_t \sum_{j=0}^{\infty} \rho^j \left(r_{t+j} - \Delta d_{t+j} \right) + \frac{c-k}{1-\rho}$$

- Suggests that log of dividend yields (δ) have a linear relationship with returns (r) and dividend growth (∆d)

- Use this model to analyse investor foresight and consistency of pricing between railways and non-railways

Investor Foresight

- If investor expectations are accurate, companies with a low dividend yield should experience higher dividend growth
- Previous research by Campbell and Shiller (1998) has indicated that dividend yields may predict dividend growth in the short-term, but not in the long-term

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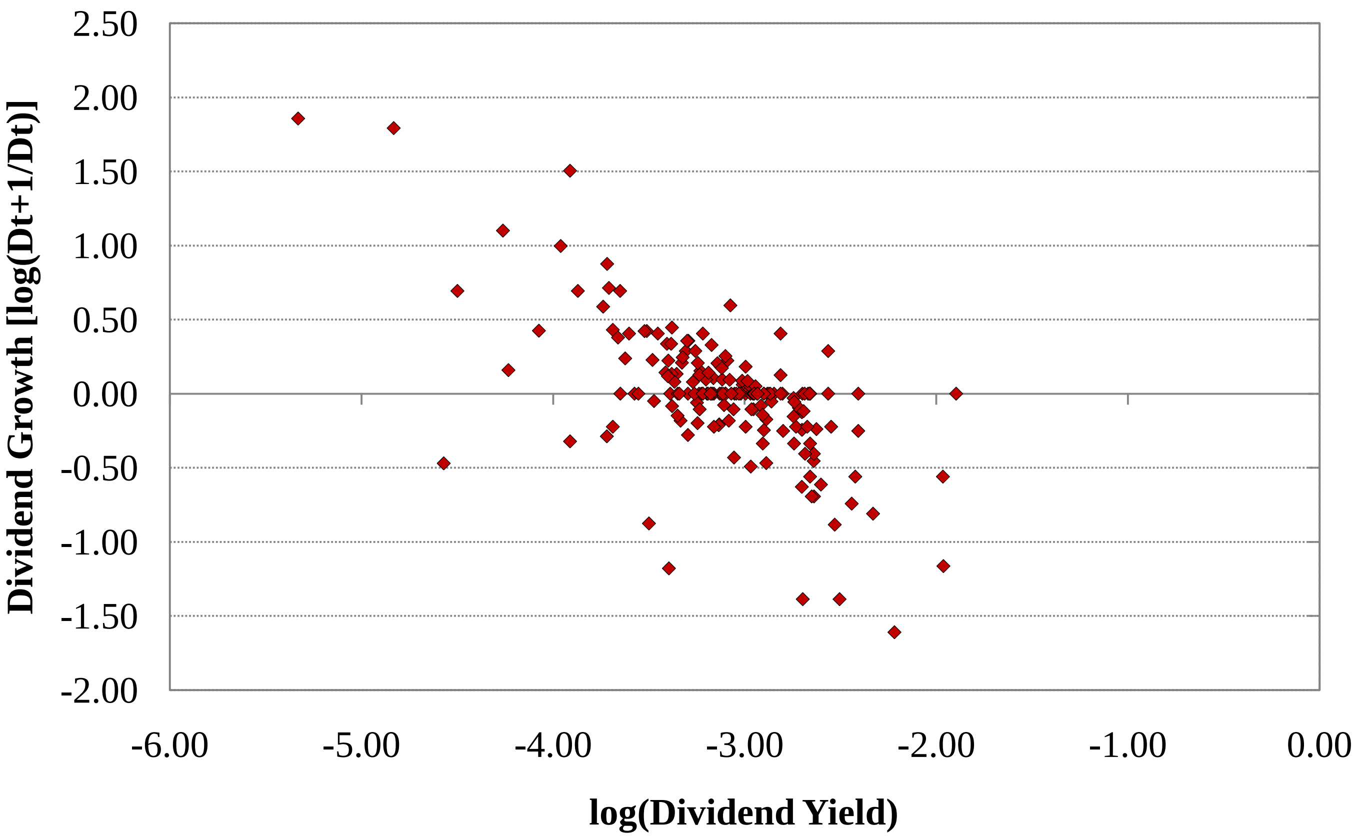
Investor Foresight



Investor Foresight

	Dividend Growth between years						
	t and t+1	**t+1 and t+2**	**t+2 and t+3**	**t+3 and t+4**	**t+4 and t+5**	**t+5 and t+6**	**t+6 and t+7**
$\ln(\text{DivYield})_t$	-0.863***	-0.174*	-0.035	0.363**	0.173**	0.057	-0.122*
	(0.098)	(0.088)	(0.096)	(0.161)	(0.068)	(0.075)	(0.071)
Beta_t	-0.000	-0.026	-0.086***	0.007	0.041	-0.023	0.037
	(0.025)	(0.044)	(0.026)	(0.027)	(0.037)	(0.037)	(0.026)
Size_t	-0.018*	-0.018	0.013	0.022*	0.029***	0.023***	0.028**
	(0.010)	(0.013)	(0.010)	(0.012)	(0.007)	(0.007)	(0.013)
Constant	-2.649***	-0.489	-0.142	0.990*	0.347	0.047	-0.525**
	(0.314)	(0.304)	(0.304)	(0.521)	(0.217)	(0.237)	(0.252)
Observations	187	162	155	146	143	137	133
Companies	47	40	39	35	35	33	31
Overall-R^2	0.549	0.037	0.049	0.166	0.126	0.042	0.060

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Consistency of Pricing

- Investors may have had limited foresight, but still priced assets in a procedurally rational manner

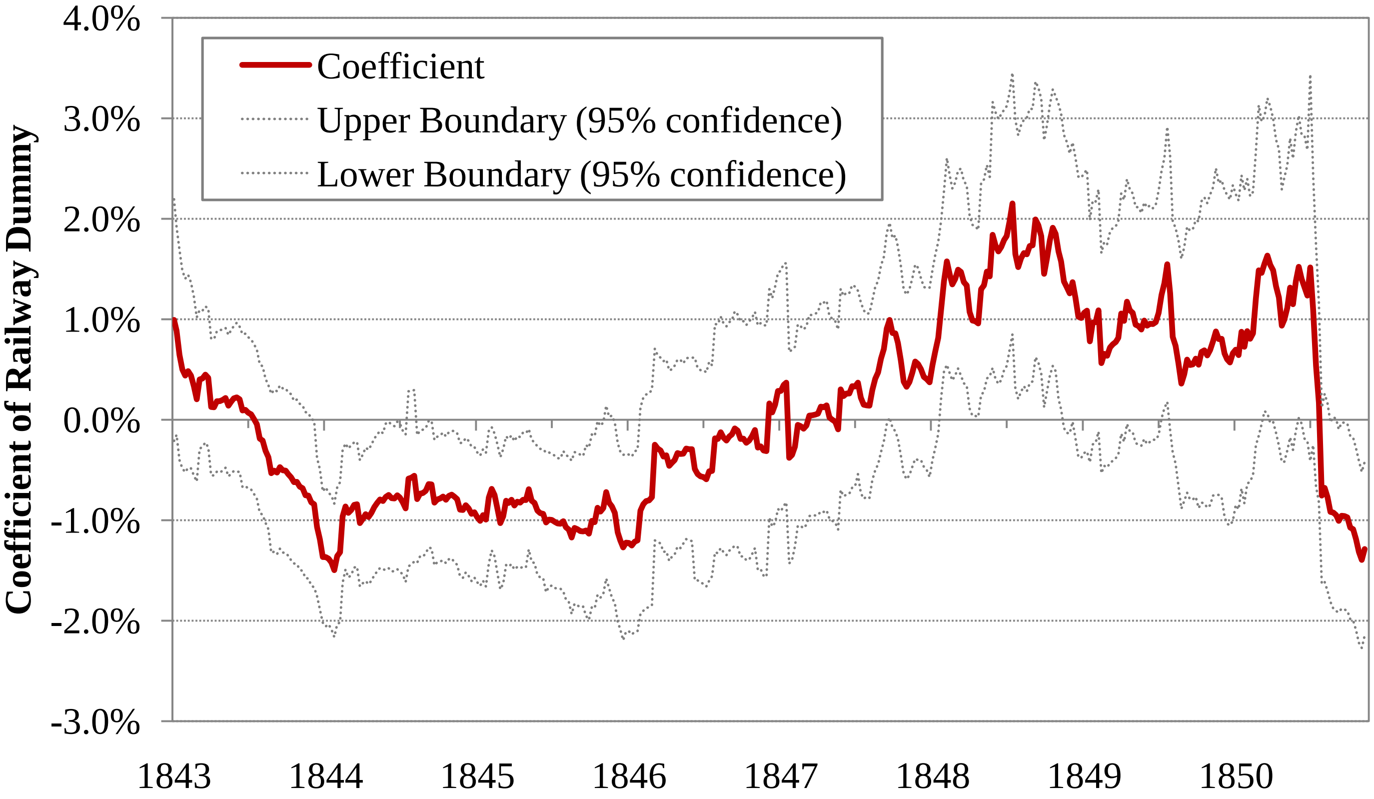
- To estimate the consistency of pricing between different assets, a cross-sectional regression is repeated for each week of the sample

$$\delta_{i,t} = \beta_0 + \beta_1 E_t\left(\Delta d_{i,t+n}\right) + \beta_2 B_{i,t} + \beta_3 S_{i,t} + \beta_4 R_i + \varepsilon$$

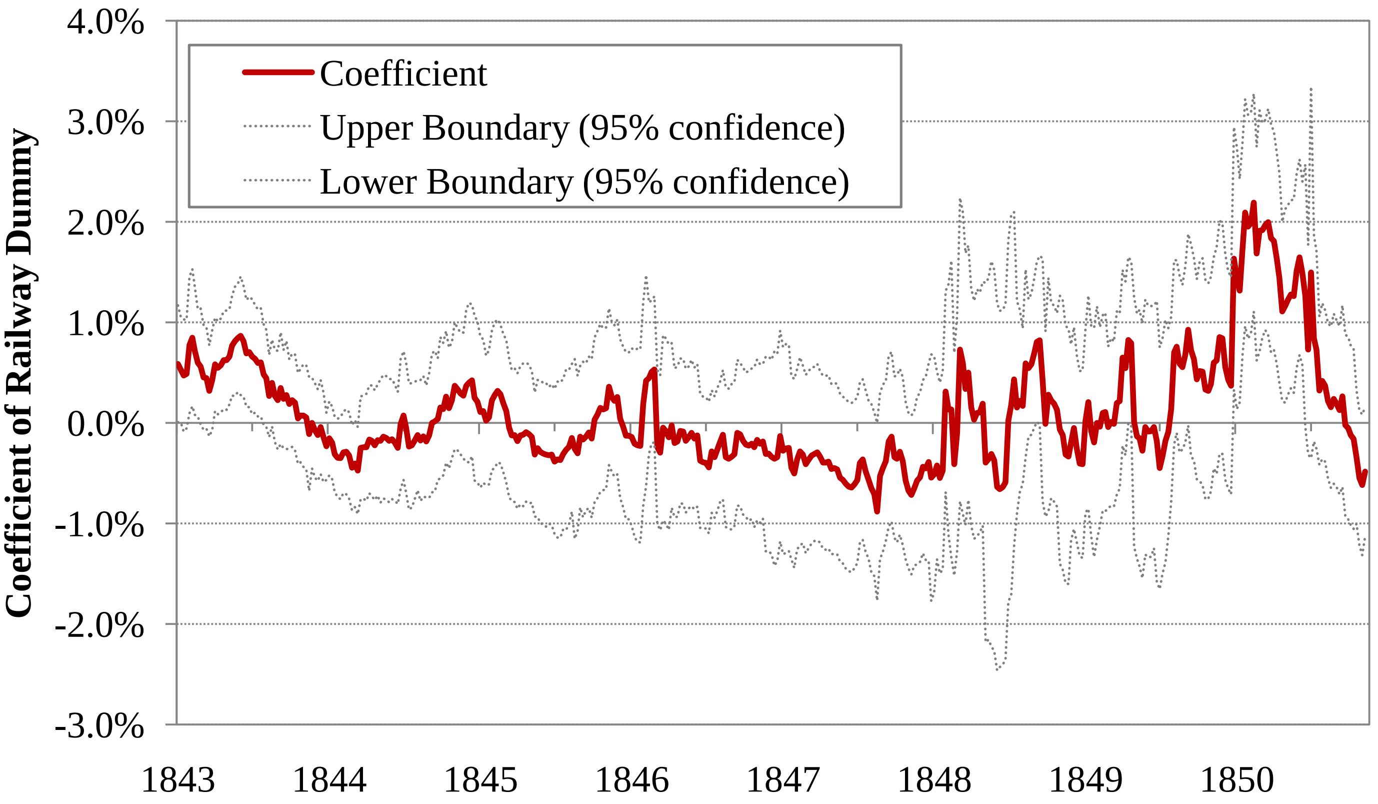
- Differences in dividend yields (δ) are explained in terms of differences in dividend growth (Δd), beta (B) and size (S)

- A railway dummy (R) tests for significant differences for the railways

Difference in Dividend Yields between Railways and Non-Railways



Difference in Dividend Yields given Short-Term Dividend Growth



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Leverage

- Shares in new railways were structured similar to mortgages
- Investors could purchase the shares for a small deposit, but regular calls for capital would then be made when more funds were needed for construction
- Meant that initial returns were multiplied due to the effects of leverage
- ‘Persons possessing only sufficient capital to pay the deposit, may more than double it in a day.’

(*Railway Investment Guide*, 1845, p.10)

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First Day Returns on New Railways

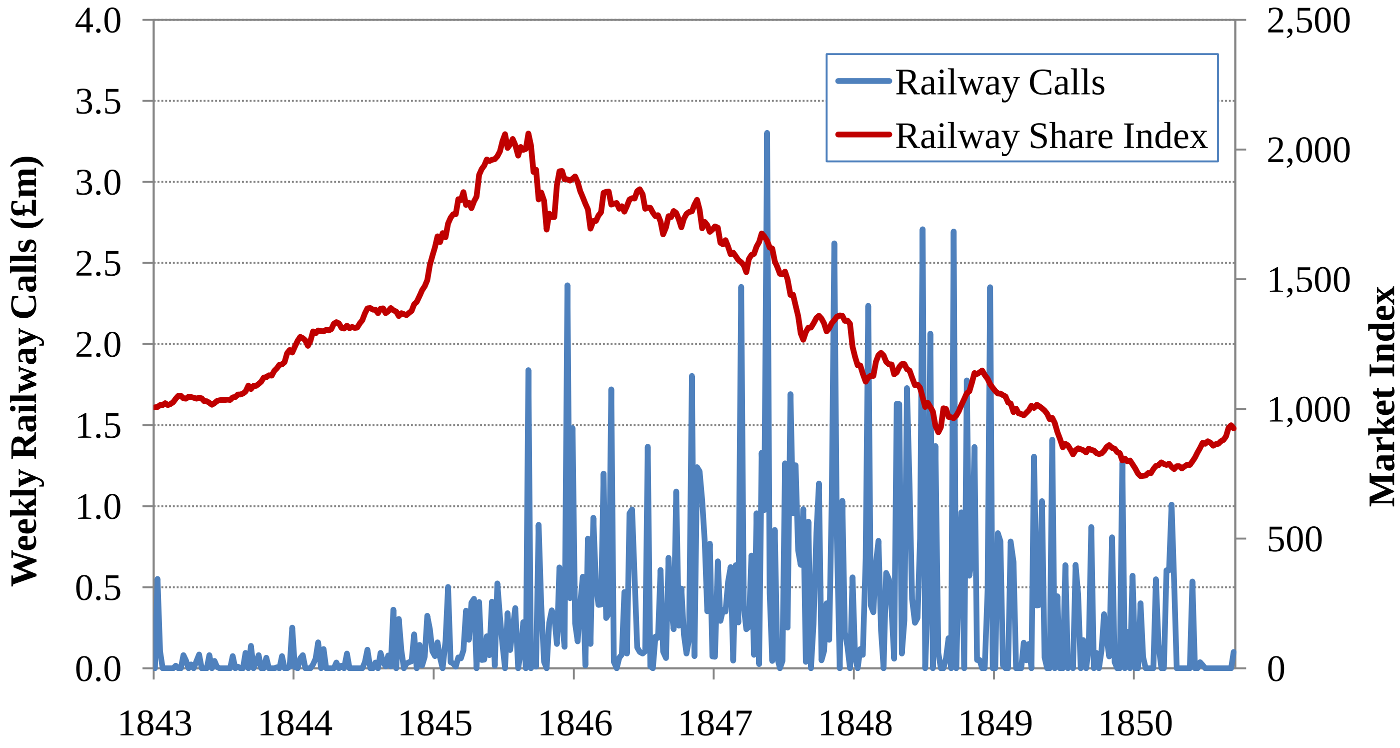
Year	N	Average Deposit (%)	Average First Day Return on Partially Paid Shares	Average First Day Return of Equivalent Fully Paid Shares
1844	38	10.2%	76.2%	5.5%
1845	79	6.2%	106.7%	7.1%
1846	40	15.8%	1.9%	3.4%
1847	9	20.0%	8.3%	1.3%
1848	1	10.0%	37.3%	3.8%
Total	167	10.2%	69.0%	5.5%

Impact of Deleveraging

- ‘Every fresh call that was made upon exhausted shareholders was attended by one of two effects – either the shares themselves upon which the call had been made were sold in order to avoid payment, or some other shares were sold in order to raise the money for that purpose.’

(*Economist*, October 21, 1848, p.1187)

Deleveraging



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Regulation during Boom

1. Railways' Regulation Act (1844)
   - Required companies to run at least one train per day for a fare not exceeding 1d/mile
   - Gave government the right in 21 years time to purchase a railway or revise its fares

2. Railway Clauses Consolidation Act (1845)
   - Covered standard technical details of new lines

3. Joint Stock Companies Act (1844)
   - Liberalisation of company promotion, but an exception was made for transport companies which still required authorisation

Regulation during Boom

4. Each railway line required Parliamentary authorisation
   - Each region considered in individual sub-committees
   - Railway Department of Board of Trade attempted to provide a national perspective, but was disbanded

5. Companies required to deposit capital before plans considered
   - In1842, the deposit required was reduced from 10% of total cost to 5%
   - In July 1845 the deposit required was raised again to 10%

Regulation during Boom

- Parliament may have facilitated the promotion boom by authorising too many of the projected lines
- This led to increased competition amongst railways, and difficulties in raising capital to finance all of the construction
- The increase in the deposit required to apply for authorisation may have been an attempt to curb speculation
- However, there was still an unprecedented increase in the promotion of new railways after the change

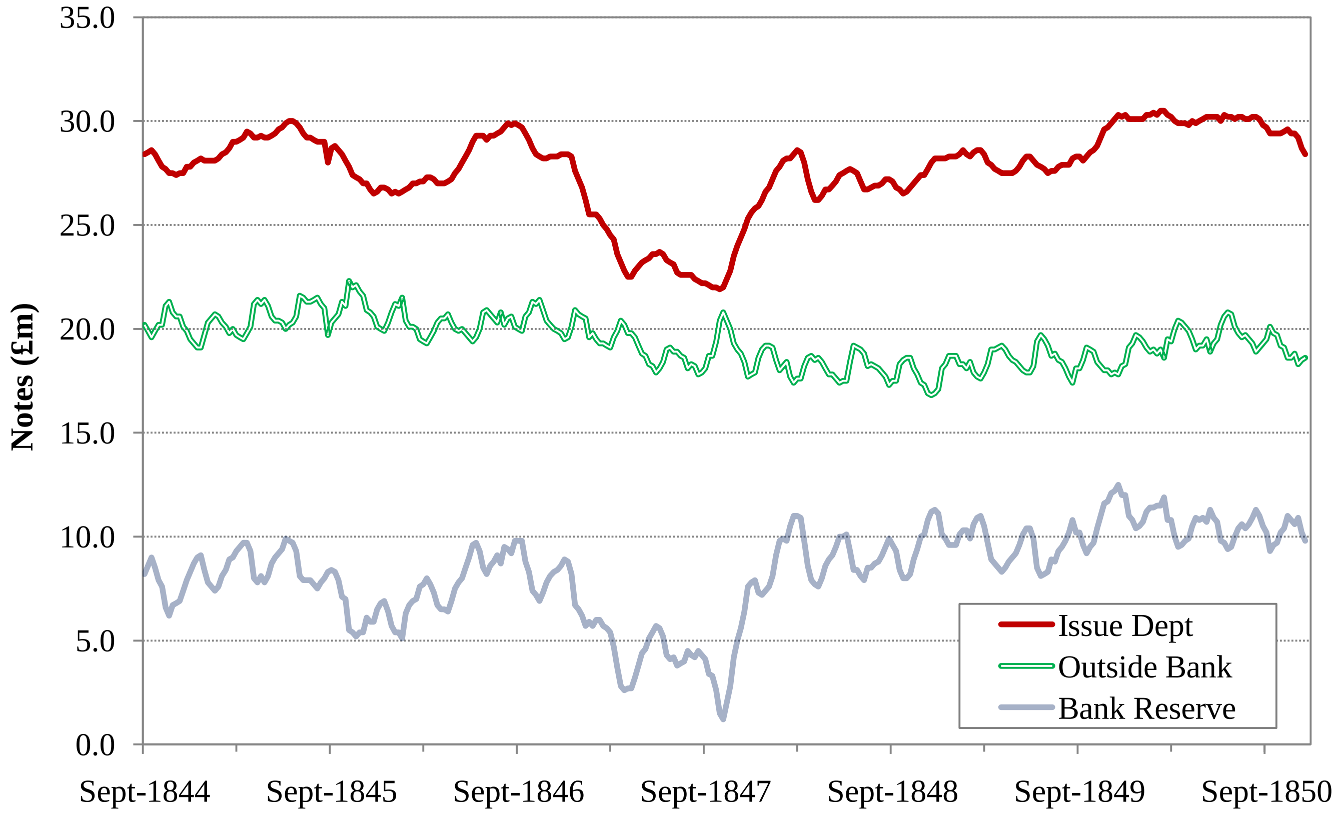
Regulation during Downturn

- After the market crash there was also a sharp decline in the number of new projects seeking authorisation
- Regulation focussed on allowing projected companies to dissolve, and on extending the time within which authorised lines could complete construction
- Represented an attempt to reduce the demands for capital, but investors still faced a huge volume of calls

Monetary Policy during Railway Mania

- Bank Charter Act had been introduced in August 1844 in midst of Mania
- Split the Bank of England into an Issue Department and Banking Department
- Notes in the hands of the public was affected by both departments, and were thus influenced by both rules and policy

Bank of England Notes



Money during Railway Mania

- Bank of England did not seem to intervene in the development of the Mania
- Note issue of Issue Department increased during boom, but declined during market crash of October 1845
- Banking Department reduced its Bank Rate to historical low of 2.5% during boom, but increased it to 3.5% during market crash
- These changes may have contributed to price changes, but they cannot explain why the boom was focused in the railway sector

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Granger Causality Tests

	Rail Returns		dRail Dividends	Rail Calls		dWheat Price		Wheat Imports		dBank Issue		dBank Dep/Res		dBank Rate		Fails	
Rail Returns			2.813	8.887		3.803		2.676		9.697	*	23.318	***	4.539		1.327	
dRail Dividends	13.285	**		3.466		4.037		9.498	*	4.895		18.795	***	3.013		5.470	
Rail Calls	4.286		6.289			6.399		27.882	***	1.033		3.669		8.402		18.226	***
dWheat Price	5.753		6.874	10.472	*			31.658	***	2.574		11.222	**	14.038	**	7.797	
Wheat Imports	3.603		6.220	7.522		4.928				4.948		10.062	*	6.742		25.838	***
dBank Issue	17.636	***	3.632	21.800	***	8.603		17.213	***			14.524	**	3.710		2.641	
dBank Dep/Res	4.633		1.822	10.714	*	6.571		17.429	***	9.414	*			144.210	***	43.827	***
dBank Rate	2.296		0.840	6.119		5.267		15.910	***	9.900	*	136.230	***			30.032	***
Fails	1.605		3.776	8.521		4.806		22.829	***	4.440		45.095	***	20.369	***		
All	62.441	**	36.754	78.666	***	52.381	*	116.750	***	49.225		300.780	***	309.380	***	179.060	***

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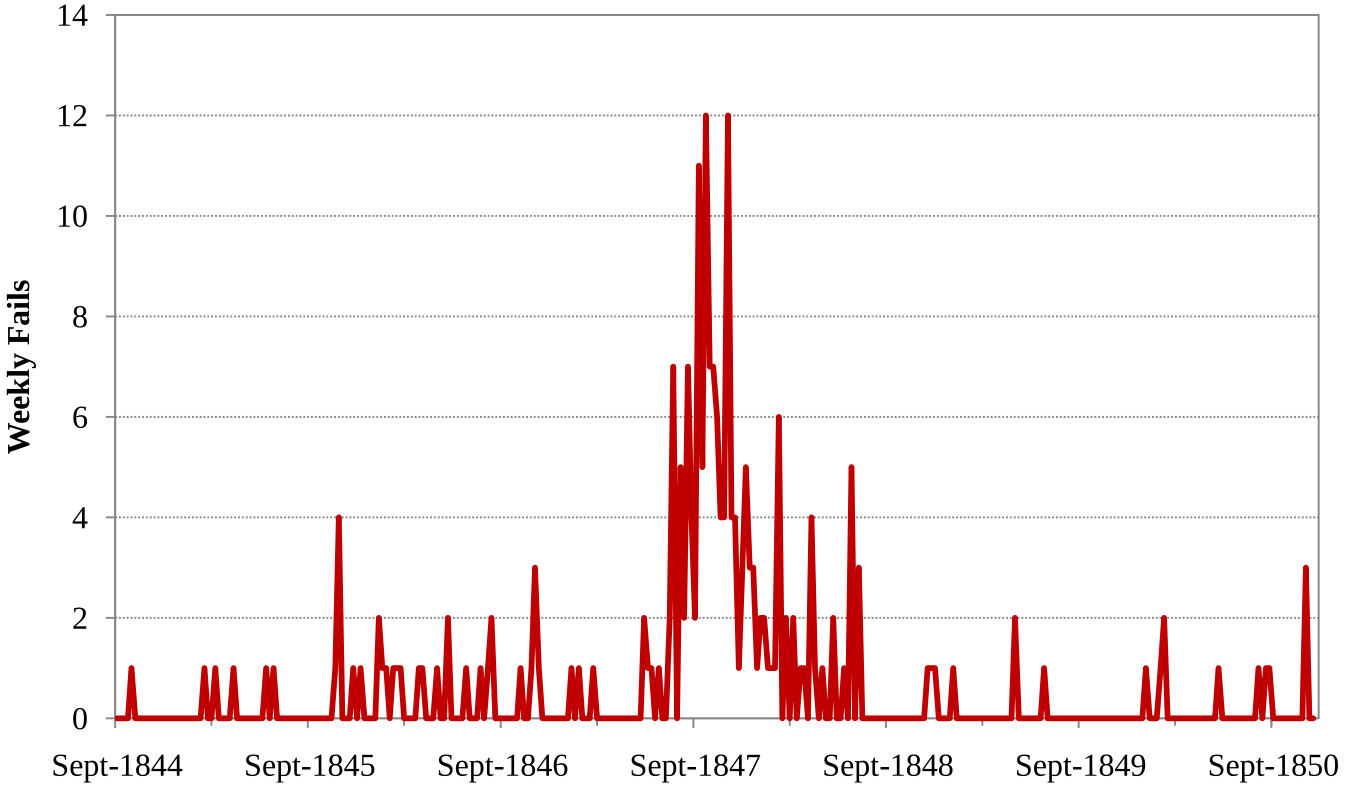
Failures



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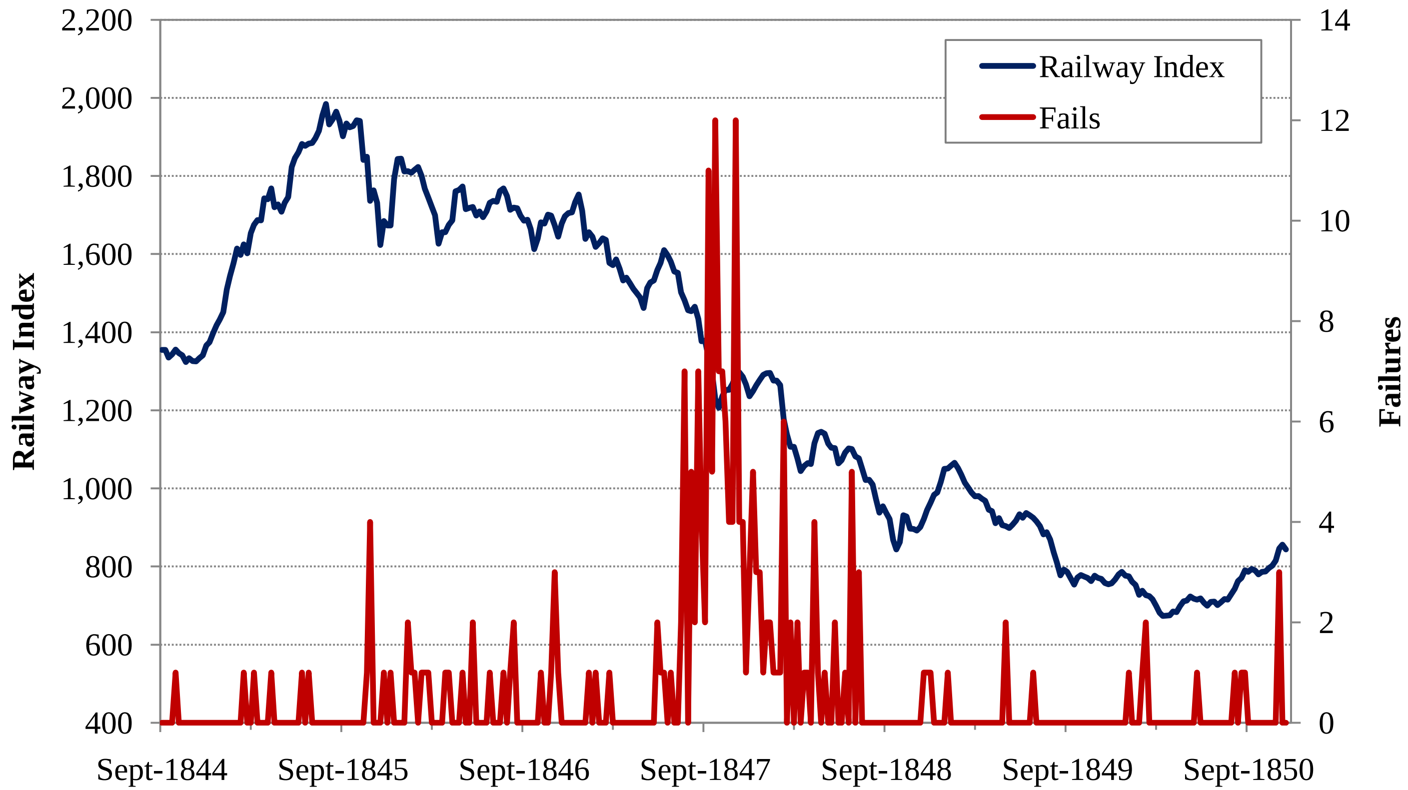
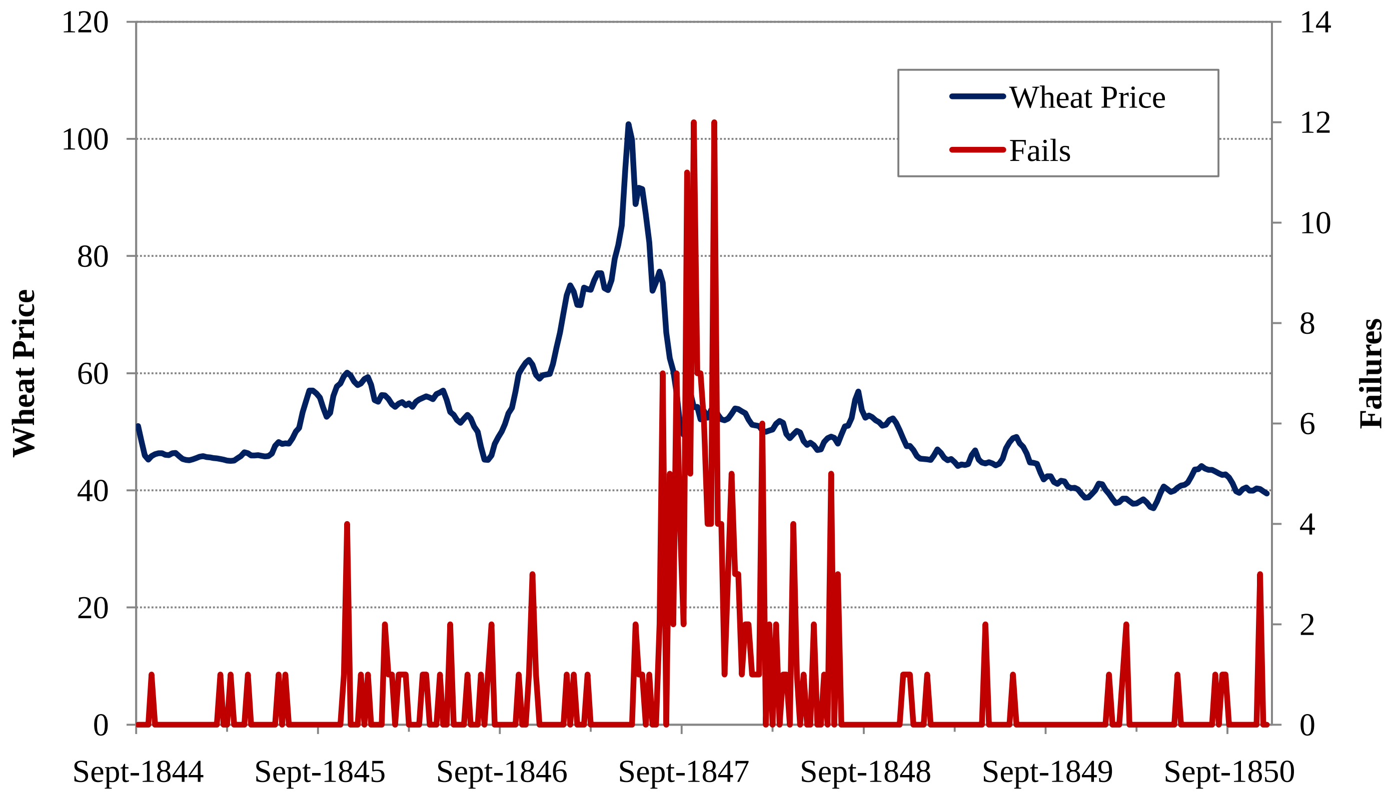
Railway Share Prices and Failures



Railway Speculation and the Crisis

- Railway share prices did decline during 1847 but there was little suggestion that these changes caused the crisis
- Many commentators did blame the calls for capital of the railways for diverting capital from other uses

Wheat Price and Failures



Corn Speculation and the Crisis

- Poor harvest of 1845 had led to repeal of Corn Laws in 1846
- Another poor harvest in1846 led to sharp increases in the price of corn, and suspension of all import duties
- Large volumes of imports, and expectations of a good harvest, led to a 50% decline in price, beginning in June 1847
- Corn speculators who had expected prices to remain high suspended payment

Corn Speculation and the Crisis

- Failures of large corn merchants led to the suspension of bill brokers
- This was followed by failures amongst other merchants, especially those in the East India trade
- Four joint stock banks suspended payment

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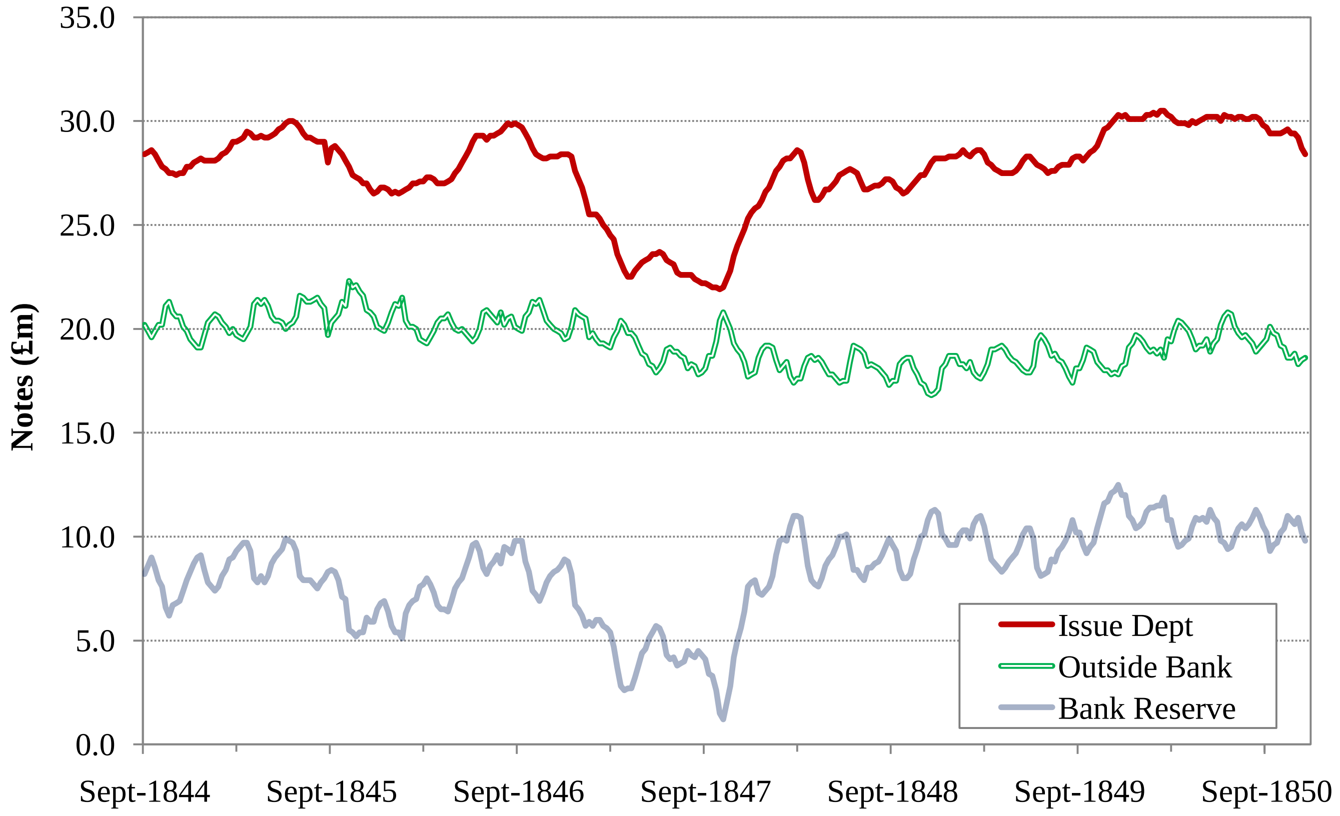
Bank of England Notes



Monetary Policy Before Crisis

- Note issue of Issue Department declined from £29.9m to £22.5m during the phase of increasing corn prices
- Banking Department pursued an expansionary policy, and sterilised most of the outflow
- This policy was unsustainable and forced the Banking department to contract sharply in April 1847
- However, the reserve of the Banking department remained low

Monetary Policy During Crisis

- Issue Department did not change substantially
- Banking Department attempted to continue lending, despite its low reserve
- Could not sustain expansionary policy and began to contract its discounting

Legislative Policy During Crisis

- Prime Minister and Chancellor of Exchequer wrote to Bank of England to say it would not be held liable for infringing the Bank Charter Act
- Recommended an increase in discounting and advances, which eased the panic
- Required an interest rate of at least 8% to be charged
- Despite a subsequent Parliamentary inquiry the Bank Charter Act was not modified or revoked

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Time Series Analysis

- Higher failures resulted from an increase in railway calls and wheat imports
- The expansionary policy of the Banking department initially reduced failures, but may have had ambiguous longer term effects

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Conclusion

- The Railway Mania resulted from the response of investors to short-term dividend changes, the availability of leverage, and loose monetary conditions

- The Commercial Crisis was caused by speculation on both railways and corn, but an expansionary monetary policy may have reduced the depth of the panic