

Two Bubbles and a Crisis: Britain in the 1840s

Gareth Campbell
Queen's University Belfast,
Belfast,
BT7 1NN
(gareth.campbell@qub.ac.uk)

During a short period in the 1840s, Britain experienced two 'bubbles' and a financial crisis. Railway shares underwent a substantial price reversal during the Railway Mania, and the price of corn rose and fell dramatically soon afterwards. A period known as the Commercial Crisis then followed, which resulted in widespread company failures. These events occurred shortly after the introduction of the Bank Charter Act which resulted in a major reform of the monetary system. A Vector Autoregression analysis, using a new dataset which has been constructed for this paper, suggests that non-monetary changes were responsible for the origins of both bubbles and the crisis, but that monetary changes exacerbated each episode.

The role of monetary policy in the development, and mitigation, of bubbles and crises has taken on a particular relevance in the aftermath of the recent Housing Bubble and subsequent Credit Crunch. There have been several other periods in history where there has been some suggestion of a relationship between the monetary conditions, changes in asset prices, and financial instability. This paper examines one such period, and considers the respective importance of monetary and non-monetary changes on the bubbles¹ and crisis which occurred in Britain during the 1840s. During this period there was a Railway Mania, a Corn Bubble and a Commercial Crisis. The analysis in this paper suggests that the origin of each of these events was non-monetary, but that monetary changes exacerbated each situation.

1 Literature, Data and Methodology

This paper contributes to the literature which analyses the relationship between monetary policy, bubbles and crises. Voth (2003) has considered the role of the German central bank in pricking the stock market boom of the 1920s, whilst Friedman and Schwartz (1963), Bordo, Choudri and Schwartz (2002), and Hsieh and Romer (2006) have discussed the role of the gold standard and monetary policy during the Great Depression. The analysis in this paper also contributes to our historical understanding of the financial events of the 1840s. The Railway Mania has previously been discussed by Campbell and Turner (2010) and Odlyzko (2010), but there has been little analysis of the impact of monetary changes, whilst the Commercial Crisis has been considered by Ward-Perkins (1950), and Dornbusch and Frenkel (1984), but the respective roles of monetary and non-monetary factors has not been resolved.

For the analysis in this paper a new dataset has been collected from original sources. Data regarding the Bank of England has been obtained from *Parliamentary Papers*, (1847-48, VIII, Pt. II, p.16-21; 1850, XXXIII, p.202-211; and 1852-53, LVII, p.328-335). The price of

¹ O'Hara (2008) has noted that the term 'bubble' has several meanings. In this paper it is used to refer to a sustained rise and fall in prices, rather than to the rationality of those price movements.

wheat (WP), and the quantity imported (WQ), has been obtained on a weekly basis from the *London Gazette*. The number of failures (F) has been calculated by searching the City Intelligence column of *The Times* for any firm which was described as having failed or which had suspended. Data on the prices and par values for all railway shares listed on the London Stock Exchange have been obtained from Campbell and Turner (2010).

To analyse the relationship between these variables, a Vector Autoregression has been estimated. The initial step in the analysis was to test each variable for non-stationarity, using Augmented Dickey Fuller tests. If a variable was not stationary the first difference (denoted with prefix 'd') was tested for stationarity. The stationary form of each variable was then employed in a Vector Autoregression. A lag length of five was selected as this minimised the Akaike Information Criterion (AIC). Granger causality tests were conducted to analyse the joint significance of the lags of each variable on other variables, as shown in Table 1. The Cumulative Impulse Response Function, after five steps, was also calculated for each variable to analyse the impact that a one unit change in a variable had on another variable after five weeks, but is not reported in this summary. The hypotheses regarding the relationship between each variable, the results, and the implications are discussed in the following sections.

2 Monetary Conditions

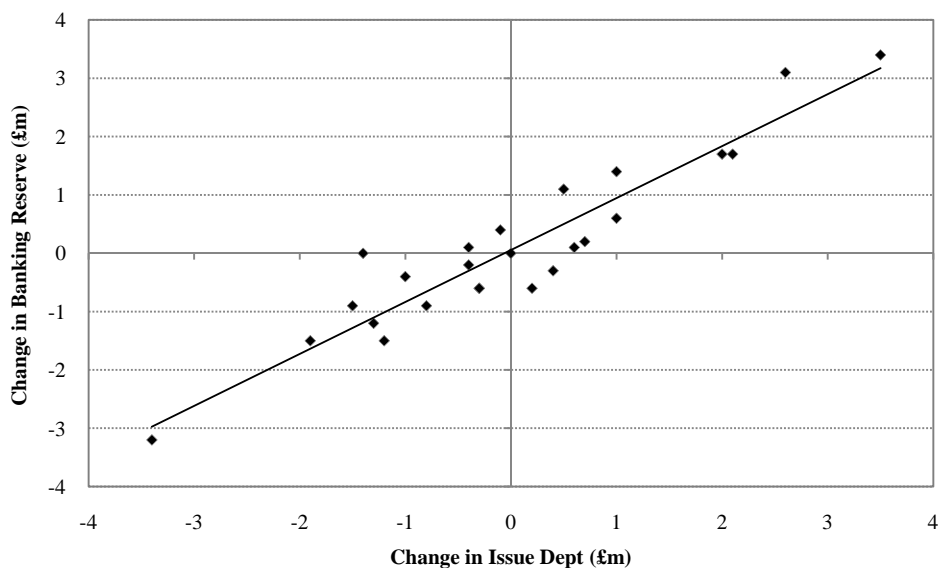
During the 1840s there was considerable discussion regarding the role of monetary changes in financial booms and crises, as summarised by White (1995, pp. 89-135). The Free Banking school advocated a system without a central bank, where private banks would issue their own notes, and explained the origin and transmission of the trade cycle in monetary terms. The Currency school considered the origin of a boom to be non-monetary, but an accommodating expansion of notes could, and often did, contribute to the boom, which eventually proved to

be unsustainable. The Banking school suggested that monetary changes had little role in the boom or bust.

A major monetary reform in 1844, known as the Bank Charter Act (*Parliamentary Papers*, 1844, I, p.67), was closely linked to the arguments of the Currency school. This Act ensured that the amount of currency outside the Issue Department moved in line with flows of bullion into and out of the country. However, the amount of currency in the hands of the public was also affected by the size of the reserve held by the Banking Department of the Bank of England. If the banking reserve increased, an inflow of bullion might be sterilised, and the amount of currency in circulation outside the bank may remain unchanged.

Figure 1 compares changes in the Issue Department and the Banking Reserve each quarter. A line of best fit is also plotted through the data. The results suggest that, on average, changes in the Banking reserve offset 89.1 per cent of the changes in the Issue department, meaning that an inflow of £1m of gold may actually have resulted in an increased circulation of just £0.1m in the hands of the public.

Figure 1: Change in Issue Department and Change in Banking Reserve, on Dates of Quarterly Peaks in Banking Reserve, 1844-50

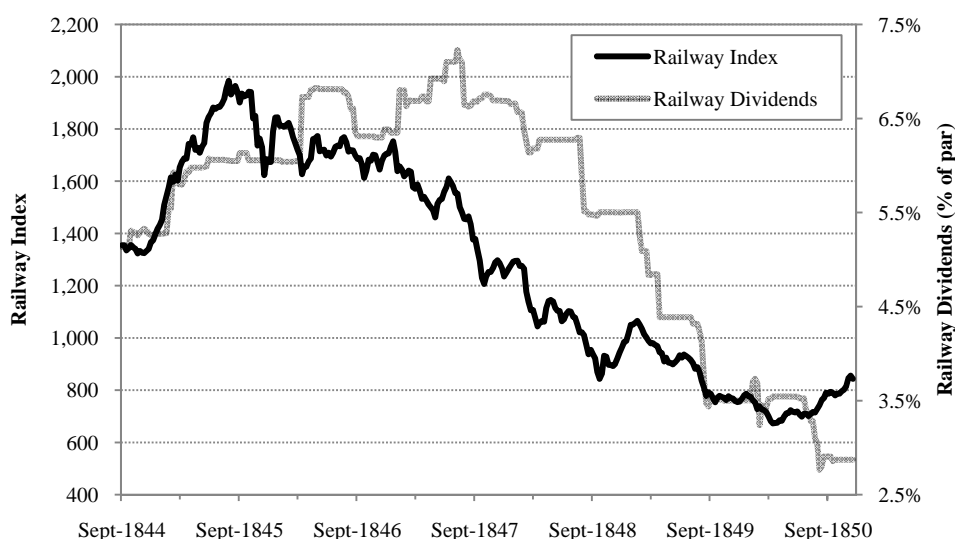


Notes: Trendline given by equation $y = 0.8907x + 0.0546$. Standard error of x is 0.0586.

3 Railway Mania

The British economy began the 1840s in a subdued condition, but from 1843 the economy recovered. The prices of railway shares then began to rise substantially, and a large number of new railways were projected, during a period which has become known as the British Railway Mania. A market index of railway shares, shown in Figure 2, suggests that, on average, railway share prices increased by 98.4 per cent between January 1843 and August 1845. However, prices then fell dramatically, by 18.2 per cent by the end of November 1845. After a brief recovery, prices continued to fall until April 1850, with a decline of 57.5 per cent from peak to trough.

Figure 2: Railway Market Index and Railway Dividends, 1844-50



During this period the dividends paid by the established railway companies also changed considerably, rising from 4.3 per cent of par value in 1843 to 7.2 per cent in 1847, before falling to just 2.9 per cent by the end of 1850, as shown in Figure 2. The railways also made substantial ‘calls for capital’ from investors during the construction phase. Commentators at this time, such as the Economist (1848, p.1187), remarked on the difficulties which investors had in meeting these calls, and suggested that shares were often sold to raise funds, producing a downward pressure on prices.

The Bank Charter Act was introduced in the midst of the Mania, in August 1844. In the year prior to the introduction of the Act there had been a particularly low rate of interest prevailing. Between the introduction of the Act and June 1845, as railway share prices were increasing, there was a further inflow of bullion with the notes issued by the Issue department increasing from £28.6m to £29.9m. However, the Banking reserve also rose, from £9.0m to £9.9m. In the autumn of 1845, contemporaneous with the crash in railway share prices, there was a poor harvest which led to an increase in the imports of wheat, and the export of gold, with the notes of the Issue department falling from £29.9m in June to £26.8m in December 1845 whilst the Banking reserve also fell, from £9.9m to £6.9m.

The Granger Causality tests, shown in Table 1, suggest that there was a significant relationship between railway market returns and railway dividends. The volume of railway calls do not appear to be significant in this specification, but an untabulated bivariate analysis suggest that an increase in calls was associated with lower returns. The only monetary variable which had a significant influence on railway returns was changes in the notes issued by the Issue Department. These results suggest that, after controlling for sector-specific changes within the railway industry, the operation of the monetary rule may have contributed to the rise and fall in railway share prices which occurred during this period. However, the management of the Bank of England cannot be blamed for exacerbating the Railway Mania.

4 Corn Bubble

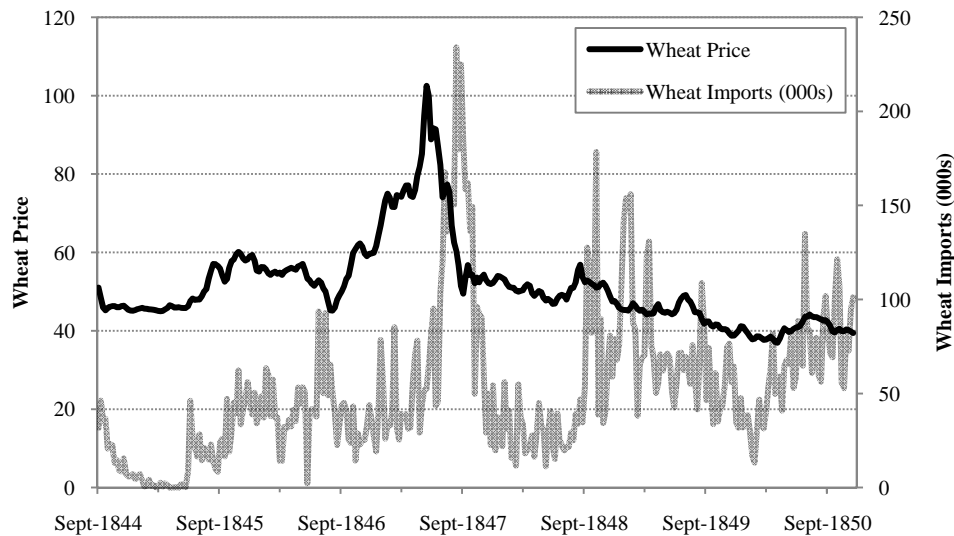
The Corn Laws were repealed in June 1846 in the aftermath of the poor harvest of the previous year. At the time of repeal the price of wheat was about 53s, but this had increased to 61s by the end of the year. It continued to increase almost relentlessly, reaching 77s by the end of March 1847, before peaking at 102s at the end of May 1847, as shown in Figure 3.

Table 1: Granger Causality Tests

	RR	dRD	RC	dWP	WQ	dBI	dBD	dBR	F
RR		2.813	8.887	3.803	2.676	9.697 *	23.318 ***	4.539	1.327
dRD	13.285 **		3.466	4.037	9.498 *	4.895	18.795 ***	3.013	5.470
RC	4.286	6.289		6.399	27.882 ***	1.033	3.669	8.402	18.226 ***
dWP	5.753	6.874	10.472 *		31.658 ***	2.574	11.222 **	14.038 **	7.797
WQ	3.603	6.220	7.522	4.928		4.948	10.062 *	6.742	25.838 ***
dBI	17.636 ***	3.632	21.800 ***	8.603	17.213 ***		14.524 **	3.710	2.641
dBD	4.633	1.822	10.714 *	6.571	17.429 ***	9.414 *		144.210 ***	43.827 ***
dBR	2.296	0.840	6.119	5.267	15.910 ***	9.900 *	136.230 ***		30.032 ***
F	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 ***

Notes: Granger Causality Tests calculated from Vector Autoregression. RR=Railway Market Returns, RD=Railway Dividends, RC=Railway Calls, WP=Wheat Price, WQ=Wheat Imports Quantity, BI=Bank of England Issue Department, BD=Bank of England Banking Department Deposit to Reserve Ratio, BR=Bank of England Bank Rate, F=Failures. *** p<0.01, ** p<0.05, * p<0.1

Figure 3: Wheat Price and Weekly Wheat Imports, 1844-50



Prices then fell dramatically, reaching just 49.5s in the middle of September, implying a fall of over 50 per cent in less than four months. The imports of grain had increased dramatically during this period, as shown in Figure 3, attracted by the high prices and the suspension of all import duties. There were also considerable monetary changes at this time, with the poor harvest of 1846 leading to a sustained outflow of gold. The notes issued by the Issue department fell from £29.9m in September 1846 to £25.0m in March 1847, and £22.5m in April 1847. Between September 1846 and March 1847, as the note issue of the Issue Department was declining, the Banking reserve fell from £9.8m to £5.7m, and reached just £2.6m on April 17, 1847.

The Granger Causality tests in Table 1 suggest that none of the variables were individually significant in predicting changes in the price of wheat. However, there is a suggestion that changes in price were a significant predictor of changes in imports. This would tend to support the suggestion that the higher volume of imports from July to October 1847 contributed to the rapid price declines in wheat around this time.

The railways were said to have had several effects which contributed to the conditions. Although the prices of railway shares continued to decline during this period, falling by 26.8 per cent during 1847, there was little suggestion that this fall in prices was responsible for the crisis. The chief accusation was that the calls for capital, which the railway companies made to enable them to construct their line, diverted capital from other uses.

As failures mounted, the Bank of England attempted to continue discounting. On the quarterly peaks of the Banking reserve, the Issue department fell from £23.6m in June 1847 to £22.3m in September 1847, whilst the Banking reserve fell from £5.7m to £4.5m. This again suggests that changes in the Banking reserve sterilised most of the bullion outflows. With the payment of the October dividends the notes in the Banking reserve fell to just £1.2m, so low that the Bank faced the dilemma of suspending payments or substantially reducing its activities. It was forced to refuse any further advances on Exchequer bills or Consol warrants. Four joint stock banks in Liverpool, Newcastle and Wales stopped payment and numerous small country banks were declared insolvent (Evans, 1849, p.77). Mercantile failures continued and Evans stated that the ‘week of terror’, ending October 23, would ‘long linger in the remembrance of those who witnessed its career’ (Evans, 1849, p.83).

To alleviate the crisis the Prime Minister, Lord John Russell, and the Chancellor of the Exchequer, Charles Wood, sent a letter to the Bank which recommended that the Bank of England ‘enlarge the amount of their discounts and advances’, but that the ‘rate of interest should not be less than 8 per cent’ (*The Times*, October 26, 1847, p.4). From that date there was a gradual but progressive return to confidence (Evans, 1849, p.90).

The Granger Causality tests shown in Table 1 suggest that railway calls may have had an impact on the extent of the crisis, with higher calls associated with higher failures. The results

also suggest that the Corn Bubble had a significant impact on the crisis, with higher imports of wheat associated with higher failures, as shown in Table 1. The influence of the preceding bubbles implies that the crisis may have originated for non-monetary reasons.

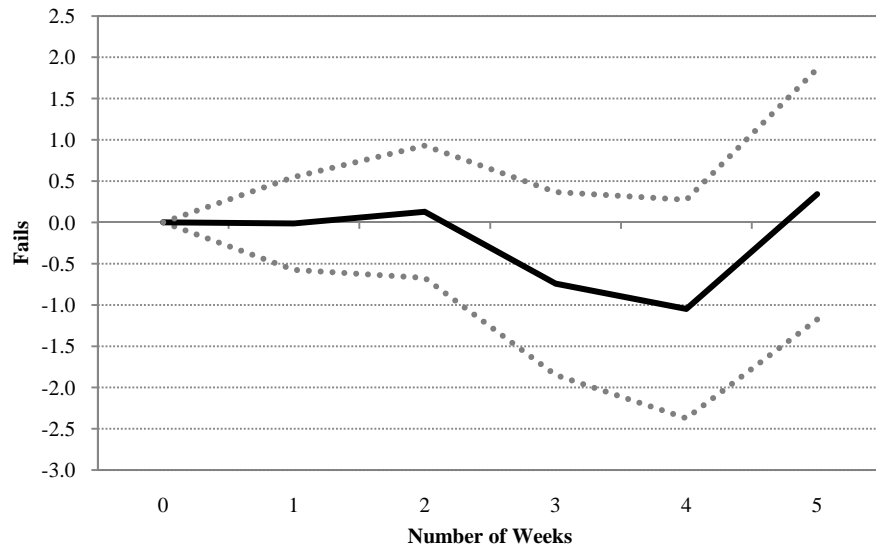
Changes in the Issue Department were not a significant predictor of failure, which is consistent with the data which suggests that the largest declines in the Issue Department had taken place in the first half of the year. The Banking department seems to have been more influential during the crisis, with interdependence between the number of failures, changes in the Banking department's deposit to reserve ratio, and changes in the Bank rate, as suggested by the Granger Causality tests in Table 1.

The Cumulative Impulse Response Function in Figure 5 illustrates the dilemma which the Bank directors faced. The immediate impact of an expansionary policy, as measured by a higher deposit to reserve ratio, or a lower bank rate, was initially associated with lower failures. However, as time progressed a higher ratio led to more failures, possibly reflecting concerns about the sustainability of a higher deposit to reserve ratio.

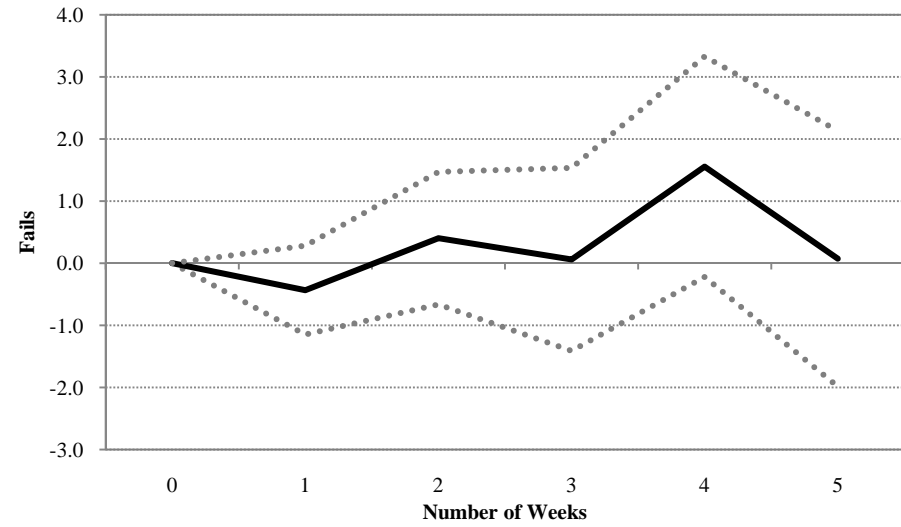
A sympathetic view of the Bank's policy would applaud it for attempting to provide discounting when merchants and financial institutions were failing and suspending payment. However, it could also be argued that the Bank could have raised its discount rates further, and earlier, in an attempt to stabilise its reserve. By delaying its actions it may have reduced its ability to provide credit when it was most needed, and contributed to panic by raising fears that it may have to suspend payment.

Figure 5: Impulse Response Functions

Panel A: Impact of Change in Bank Deposit:Reserve Ratio on Number of Failures



Panel A: Impact of Change in Bank Rate on Number of Failures



Notes: Impulse Response Functions calculated from Vector Autoregression.

These results suggest that non-monetary causes, namely the effects of the preceding Railway Mania and Corn Bubble led to the Commercial Crisis. However, the actions of the Bank of England played an important role, with an expansionary policy initially reducing the number of failures, but its unsustainability eventually aggravated the panic.

6 Conclusion

This paper has analysed the relative importance of monetary and non-monetary changes on the bubbles and crisis which occurred in Britain during the 1840s. A Vector Autoregression analysis, using a new dataset, suggests that non-monetary changes may be regarded as the origin of each episode, but there is a suggestion that monetary changes aggravated each event. These results suggest that preventing bubbles may be difficult as they may have sector-specific, non-monetary, origins. However, changes in the monetary environment have the potential to exacerbate the extent of price changes, and the severity of a crisis.

References

- Bordo, M.D., Choudhri, E.U. and Schwartz, A.J. (2002), 'Was Expansionary Monetary Policy Feasible during the Great Contraction? An Examination of the Gold Standard Constraint', *Explorations in Economic History*, vol. 39, no. 1, pp. 1-28.
- Campbell, G. and Turner, J. (2010), "'The Greatest Bubble in History': Stock Prices during the British Railway Mania", *SSRN Working Paper*.
- Dornbusch, R. and Frenkel, J.A. (1984), 'The Gold Standard and the Bank of England in the Crisis of 1847', in Bordo, Michael D., and Schwartz Anna J., Eds., *A Retrospective on the Classical Gold Standard, 1821-1931*, University of Chicago Press, Chicago.
- Evans, D.M. (1849), *The Commercial Crisis, 1847-1848*, David and Charles, Devon.
- Friedman, M. and Schwartz, A.J. (1963), *A Monetary History of the United States, 1867-1960*, Princeton University Press.
- Gayer, A.D., Rostow W.W. and Schwartz A.J. (1953), *The Growth and Fluctuation of the British Economy, 1790-1850*, Oxford University Press.
- Hsieh, C.T. and Romer, C.D. (2006), 'Was the Federal Reserve Constrained by the Gold Standard During the Great Depression? Evidence from the 1932 Open Market Purchase Program', *Journal of Economic History*, vol. 66, no. 01, pp. 140-176.
- O'Hara, M. (2008). Bubbles: Some Perspectives (and Loose Talk) from History. *Review of Financial Studies* 21(1):11-17.

- Voth, H.J. (2003), “With a Bang, not a Whimper: Pricking Germany's ‘Stock Market Bubble’ in 1927 and the Slide into Depression”, *Journal of Economic History*, vol. 63, no. 01, pp. 65-99.
- Ward-Perkins, C.N. (1950), ‘The Commercial Crisis of 1847’, *Oxford Economic Papers*, vol. 2, no. 1, pp. 75-94.
- White, L. (1995), *Free Banking in Britain: Theory, Experience and Debate, 1800-1845*, Institute of Economic Affairs, London.