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The limitations of economic counterfactuals: The case of the Lancashire textile industry

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Abstract

The article presents a history of the Lancashire cotton textile industry from the perspective of decision-making entrepreneurs as embedded historical actors, in contradistinction to the economics-based counterfactuals that dominate the recent historiography of the industry. A simulation approach is used to recreate the decision-making parameters faced by entrepreneurs and is used to support a genealogical path-dependent interpretation to overcome the problems of teleology and hindsight. Using historical evidence and evidence from the simulation, a critique of three economics-based counterfactuals is developed. These are the Lazonick counterfactual, the Keynesian counterfactual and the neo-classical counterfactual. It is shown that none of these take into account the full context of the decisions that were taken and none therefore offer a convincing explanation of the collapse of the industry.

Keywords • entrepreneurs • history simulation • Lancashire cotton textiles

Introduction

Ferguson (1998) has suggested that had Britain stayed neutral in 1914, it would not have blown up the achievements of 'a century of economic advance' (1998, 438–9). In 1919–20, these consequences of the war were far from apparent to entrepreneurs in a number of sectors, who organized and benefited from a speculative boom. Of course the boom was short-lived and the economic collapse of the 1920s and 1930s gives credence to Ferguson's claim. Nowhere was this more obvious than in the Lancashire textile industry, where the transition from boom to slump was perhaps the most spectacular. Lancashire and British textiles, the powerhouse sector of the export-led industrial revolution, never recovered from the collapse of the 1920s and in subsequent decades the industry entered a period of protracted decline.

Unsurprisingly then perhaps, Lancashire textile entrepreneurs have attracted a great deal of opprobrium. They have been blamed for failure to develop appropriate structures (Lazonick 1983; Mass and Lazonick 1990), for not investing in the right technology at the right time (Aldcroft 1964; Landes 1969, 337, 352–3) and for not exiting the industry when they ought to have done (Singleton 1991). These accusations are to be expected given the spectacular failure of the industry in the 1920s. However, all such conclusions are informed by hindsight and this raises a fundamental and general problem when the decisions and performance of entrepreneurs are analysed *ex post*. In the historiography of Lancashire textiles, this has resulted in the dominance of counterfactual analysis, perpetrated primarily by economists, wise after the event about what the industry leaders should have done. Notwithstanding the problem of hindsight, a crucial weakness of economics-based counterfactuals is the neglect of path-dependency and the marginalization of history.

Three schools of economic counterfactualism are dealt with, in chronological order of the period to which they most specifically apply. The first is the Lazonick counterfactual (LCF), which states that the industry should have copied the US textile industry in and vertically-integrated using ring spinning and automatic weaving technology in the period before 1914 and certainly in the inter-war period. The second is the Keynes counterfactual (KCF), which states that the industry should have reorganized through amalgamation in the response to the crisis of the 1920s. The third is the neoclassical counterfactual (NCCF), which states that the rational response to crisis was that firms should withdraw from the industry as rapidly as possible.[1]

This article develops a critique of these three economics counterfactuals and using a path-dependency approach presents a counter-narrative using the notion of embedded decision-making. The counter-narrative is a superfactual in the Clark et al. (2007, 85) formulation, in that it suggests that *even if* the stipulations of the economists' counterfactuals had been met, these would not have been sufficient to change the outcome. Following this method, entrepreneurial decision-making is contextualized in terms of antecedents and re-examined using simulations drawn from contemporary data. Such an approach is justified in the next section, which deals with the methodological problems of economics-based counterfactuals and suggests alternatives. In the remainder of the article, each of the economics counterfactuals is presented in turn and a critique of each is presented. A further section presents a counter-narrative. A final section presents discussion and conclusions on the case itself and suggests some lessons for managerial and organizational history.

Counterfactuals in entrepreneurial history

Counterfactuals offer an interesting way out of a problem from the perspective of entrepreneurial history. According to this approach, entrepreneurs' decisions can be documented by the historian, as can the reasons for their taking decisions. However, because the historian is interested in cause and effect, and the search is assisted by making assumptions about rational behaviour, the search is always for a rational explanation of

the entrepreneur's action. Whatever the entrepreneur does, therefore, is necessarily subjected to *ex post* rationalization by the historian. So the entrepreneur does what one might have expected in the circumstances.[2] The counterfactual offers a potential alternative approach that addresses this problem by removing the basis of rationalizing entrepreneurial behaviour. For example, should Lancashire entrepreneurs have followed Lazonick and vertically integrated the industry in the second half of the 19th century? Were Lancashire's entrepreneurs rational to refloat in the 1919–20 boom? In the conditions following the first war was this hardly surprising? However, had the war not occurred, might they have recapitalized anyway? Without the counterfactual approach, major debates, such as entrepreneurial failure,[3] might even have to be ignored since standards against which decision-makers are judged could not be defined.[4]

However, although these approaches have enriched the debates surrounding the collapse of the Lancashire textile industry, all offer silhouetted explanations of the reasons for the collapse. In other words, the industry failed because its entrepreneurs *failed* to do x or y. Similarly, relating decisions made in one period to outcomes in another might be to mistake a sequence of historical events for cause and effect; another version of the hindsight problem. In combination, these factors create an interlinked problem of omission and over-determination, locking the historian into the view that a spectacular failure must have had grand causes. What is neglected is the possibility that relatively small almost unnoticed decisions had iteratively larger and ultimately disastrous consequences. Genealogical approaches have produced useful insights in other contexts (for examples see McKinlay 2006) and may do so again when applied to the case of Lancashire textiles.

Another important adjustment is necessary to overcome the problem of hindsight. Such adjustments are difficult to effect completely, since self-denial of knowledge on the part of the historian is always going to be difficult and indeed may seem almost self-evidently counter-productive. However, when evaluating past decisions, it is important to try to re-enact and reconstruct the mindset of the decision-maker (Dray 1999, Ferguson 1999). For that reason, it may be constructive to simulate the parameters of some of the decisions made by entrepreneurs. Relatively few attempts have been made to do this in the context of the Lancashire textile industry in particular and in economic and business history more generally.[5] To achieve this reconstruction, proxies are needed to model the mental process, which if *ex ante* rationality is assumed, can best be achieved by modelling price series within the known range of expectations. A simulation exercise is conducted below to test the likely outcomes using this expectation set. This is not to say that entrepreneurs utilized simulation methodologies, rather that the methodology allows us to simulate their mental processes within historically testable parameters.

The Lazonick Counterfactual (LCF)

In the LCF, instead of remaining an industry dominated by small, vertically specialized firms and governed by intense competition, Lancashire cotton should have secured its

competitiveness on the international stage by creating large, concentrated companies, thereby following the American model (Lazonick 1986). As suggested by Broadberry and Marrison (2002), the implicit counterfactual is that had firms adopted this model, they could have retained a higher than achieved share of international markets after 1914. For Lazonick (1983), industry structure was a significant barrier to the adoption of new technology, in particular the ring spindle and the automatic loom.[6] Indeed, the issue of technology dominated much of the criticism of Lancashire entrepreneurship. Perseverance with the so-called 'stubborn' mule (Saxonhouse and Wright 1987) and associated technology, when other nations were introducing and developing other production methods, has provided many contemporary and more recent critics with an apparently obvious explanation for the failure of the industry (for example, Lazonick 1987; Young 1902).

So why did Lancashire entrepreneurs not follow this advice? Like all entrepreneurs they were motivated by profit, and like many, they were successful at earning large returns on their investments. However, restructuring the industry and adopting new technology were neither necessary nor sufficient conditions for earning impressive profits. In the period 1870–1914, the genealogy of a new entrepreneurial class can be traced. Its origin lies in a mid-19th century experiment in industrial democracy. Cotton spinning factories were organized on cooperative principles and owned by their operatives. Mitchell Hey Spinning Company in Rochdale (1854) and Sun Mill (1859) in Oldham were the earliest examples (Toms 2002). Cotton workers were issued with shares and were entitled to vote as individuals without reference to the number of shares they owned, by attending quarterly company meetings in person. As more mills followed in the 1860s and 1870s a market developed for company shares. The emergence of this market, particularly in the mill-building boom of the early 1870s presented the first opportunity for the new cotton entrepreneurs. New mills were floated on local stock markets and operatives enticed with the promise of high dividends. As is common with such Initial Public Offerings, profits accrued to the insider-promoters, many of whom were former operatives and mill managers.

Risk-free profit opportunities also presented themselves in times of economic slump, the depression of the 1890s being a notable example. In view of the severity of the slump, operatives were willing to sell their shares on the open market for almost any price, with the consequence that entrepreneurs were able to accumulate block-holdings at very cheap prices. They knew that the market followed a boom-slump pattern and therefore anticipated a return to profitability at some point in the future. Their timing could not have been better, and the discovery of new sources of gold in 1896 provided the trigger for a period of unparalleled profitability that was to last until 1914. As profits soared, real wages advanced only modestly, and indeed fell behind when compared to other sectors and to the economy as a whole (Procter and Toms 2000). Entrepreneurs benefited from the defeat of the unions in the Brooklands lock-out of 1894 during the depths of the depression of the early 1890s, which had resulted in limitations on wages and the establishment of a link between wages and the trade-cycle. As a result, the entrepreneurs obtained a hedge against falling profits but were able to limit the share accruing to labour during an upturn.

As a result of these developments, entrepreneurs made handsome profits in the period 1896–1914, and these very satisfactory profit levels partly explain why there was no investment in new technology during this period. Much of this money was reinvested in the industry, but not in the form of restructuring or new technology. Instead, entrepreneurs bought shares in other companies and floated new mills, thereby becoming owners of groups of related businesses (Toms 2002). Such diversification provided a further hedge against downturns in specific sectors of the industry. The entrepreneurs also secured efficiency gains by promoting larger mule spinning concerns in successive boom periods.

Before 1914 productivity in ring and mule spinning increased at approximately equal rates (Higgins and Toms 1997, 213). Ring and mule labour cost statistics for the late 1880s and early 1890s, based on the Milnrow ring spinning companies and other mule and ring mills in nearby Oldham, show that the labour content of their output was actually *higher* in the 1880s and 1890s than for mule spindles (Toms 1998). Ring spinning nonetheless used cheaper female and unskilled labour and as an isolated process was more profitable than mule spinning. However, labour intensity in preparatory and doffing processes meant ring spinning lacked significant advantage when considered as part of the production process as a whole (Procter and Toms 2000).[7]

Successful adoption of ring spinning and automatic weaving as part of an integrated process therefore crucially depended on the automation of associated preparatory and intermediate processes. From 1920, high-drafting and improvements in intermediate processes provided opportunities to speed up production and offered savings in areas of traditional labour intensity (Catling 1970, 189; Noguera 1936, 20–3; Procter and Toms 2000; Tippett 1969). Where ring spinning mills replaced low-draft with high-draft spinning, labour productivity increased by around 50% (Board of Trade 1932, 135). From 1931, Japanese producers adopted these techniques. This, together with devaluations of the Yen, explained Lancashire's loss of traditional Far Eastern markets (Farnie and Abe 2000).

To benefit, Lancashire firms faced steep step costs for new capital equipment. As re-equipment decisions were delayed, the gap between book values of existing assets and replacement costs had become very wide by the 1930s. For example, according to manufacturers' price lists in 1935, automatic winding systems had a capital cost of nearly six times those on the 'ordinary system' and automatic looms had a capital cost of nearly three times the cost of plain looms (Joshi 1935, 10–11, 21). By now industry commentators recognized that 're-equipment was needed on a vast scale' (*Economist* 1930, 394). However, such investment was made impossible by the circumstances of financial reconstruction which occurred in 1919–20 and in turn these reconstructions reflected the emergence of the entrepreneurial class before 1914.

The Keynesian Counterfactual (KCF)

Keynes's critique of the cotton industry was based on its poor performance in the 1920s. He attributed this to the collapse of international markets and the resulting surplus

capacity, which resulted in excessive indebtedness. It was therefore incumbent upon the banks to rationalize and restructure the industry and their continuing failure to act along these lines that explained the protracted crisis that gripped the industry (Keynes 1981, 603, 614). He also argued that the recapitalizations of the 1919–20 boom were irrelevant as they did not affect earnings, suggesting that even if this capital were written off the problem would persist without solving the underlying problem of over-capacity (Keynes 1981, 629–31). Keynes and others who have made similar arguments (Bamberg 1988; Marchionatti 1995; Porter 1974) have ignored the earlier activities of the same entrepreneurs and indeed perhaps because they regard them as irrelevant have not investigated precisely who was responsible for the 1919–1920 re-floats. As a result therefore, they have not established any relation of cause and effect between the pre- and post-war phases of the history of the industry. The KCF thus provides a further example of static economics-based counterfactual reasoning. These writers find it easy to see what should have been done to solve the problem without fully analysing the reasons why nothing was done.

After the war in 1918, the entrepreneurial groups that had emerged to prominence before 1914 once again turned their attention to the mills and to the opportunities of the stock market. They formed syndicates for the purposes of investing in the re-valued capital of existing mills (Thomas 1973), and as before the war attracted capital mainly from investors in the region including Manchester (Filatotchev, Higgins and Toms 2007).[8] Their decision to refloat existing mills at three times their pre-war values (Thornley 1923) reflected market conditions. There was a shortage of building materials and labour in the aftermath of the war, and as a consequence the capital value of installed capacity became much higher. When demand collapsed after 1920, because of the way the industry was controlled and financed by the entrepreneurs and their syndicates, the most important priority became the recovery of their capital. The recapitalizations exposed them to the higher fixed costs associated with depreciation charges, and borrowing in the face of varying revenues and depreciated stock market values prevented them exiting the market at a profit. Ownership structure therefore preceded and explained the consequent problem of overcapacity. It also explained why the entrepreneurs' mills now engaged in cut-throat competition with each other, using what profits were available to fund shareholder dividends (Filatotchev and Toms 2006).

Furthermore, because we know that the entrepreneurial groups were one and the same, it is reasonable to model their mindset in 1919 on the basis of their pre-war decisions. This overcomes the problem of hindsight, without losing the cause and effect relationship. To conduct this analysis a simulation method was used. The refloats were based on revaluations of three times the pre-war value. In 1918 the yarn margin was even more highly inflated. Taking a pre-war average as a base index = 100, the 1918 index value was 297.07.

The Neo-classical Counterfactual (NCCF)

The NCCF has risen to prominence with the rise of globalization and states that labour-intensive industries will be faced with competition from low-wage countries to

which production will inevitably migrate. When confronted with the rise of lower-cost producers therefore, the NCCF states that Lancashire firms should have left the industry (Sandberg 1974; Saxonhouse and Wright 1987). According to this view, the decline of the industry was entirely inevitable, and attempts to preserve it represented a serious mis-allocation of resources (Singleton 1991).

Much of the evidence presented above to examine the LCF and the KCF also applies to the NCCF. Lancashire capitalized on the expansion of the world market and the shift in global currency conditions, and such an expansion was consistent with the NCCF. When these conditions reversed in 1920, the rational NCCF response was closure and exit from the industry. However, the circumstances of the path-dependent recapitalizations of 1919–20 imposed a serious exit barrier. Stock market collapse and availability of cheap spare second-hand machinery meant that the economic gain from continuing in production was greater than the realizable value of the assets. Moreover, because the terms of trade had shifted against Lancashire before, and on a comparable scale in the period 1890–96, the rational expectations of the entrepreneurs in the 1920s was that the shift of the 1920s would also be temporary. As the evidence from the simulation shows, their investment decisions in 1918 reflected these expectations.

Lancashire entrepreneurs therefore correctly concentrated their efforts on addressing the problem of monetary instability and world market dislocation. They argued that the causes of that depression (high world gold prices) were also part of the present difficulties. These commentators noted that when gold prices fell in the period 1897–1914, the cotton industry had experienced the greatest boom in its history (*Economist* 1930, 520; FMCSA 1936) and that whenever poor export performances were recorded, including during pre-1914 recessions, the fault lay with governments and monetary policy.[9]

Notwithstanding this evidence, the NCCF also begs the question, why, for example, in the globalized world of the 19th century, did the British textiles industry not lose out to the cheaper labour countries, in particular India? If the industry was doomed in 1920 or 1980, was it not also doomed in 1880? Clingingsmith and Williamson (2005) have shown that before 1860, India had relatively high real wages because climatic problems reduced harvests and increased food prices. However, after 1860, these conditions reversed and India benefited from the depreciation of silver prices and increased demand for its raw cotton during and after the American Civil War. Even so there was no migration of cotton production from Lancashire to India in the period 1860–96. Political considerations, including the dirigiste control exercised over the Indian market by first the East India Company and later by the British Empire prevented this and continued to do so until the 1930s, notwithstanding the protestations of Gandhi.

Embedded decision-making: A path-dependent explanation

The previous discussion of three counterfactuals suggests that Lancashire entrepreneurs had good reasons for continuing to invest in the textile industry. The main basis of this

claim is that the existing information available to these entrepreneurs gave them no compelling reason to discontinue their involvement in the industry or to opt for radical restructuring. However, to describe the behaviour of these entrepreneurs as purely path-dependent would not be entirely accurate. Classical path-dependency theory assumes that once certain institutional arrangements have been adopted during 'critical junctures' (Collier and Collier 1991), it becomes progressively more difficult to return to an initial point where multiple alternatives are still available (Liebowitz and Margolis 1995; Mahoney 2000; Sydow, Schreyögg and Koch 2005). Implicit in the concept of cognitive path-dependency, in particular, is the notion that path-dependency can constrain future intellectual trajectories to a degree that reflectivity is hampered in favour of the implementation of inferior, but easily adoptable, alternatives (Stam 2002). The problem with applying this argument to the context of the Lancashire textile industry is that, unless we assume that potentially weak constraints such as customs and tradition played a major role in this region, it is relatively difficult to identify genuine 'critical junctures' which would have compelled entrepreneurs to continue with their investment practices.

Conceptually closer to our narrative, therefore are notions of 'time-geography' (Hãgerstrand 1970, 1982, 1984; Thrift 1996), in which it is assumed that decisions are affected by the time and space in which they occur. Time-geography based narratives specifically assume that human action is conditioned on temporal and spatial circumstances, or as Hãgerstrand (1984, 376) notes that '… human action always has to unfold in real dioramas [metaphor for situations] and that whatever foreseen or unexpected consequences come about, they depend on what is present and what is absent and in what sort of relation precisely where the actions happened' (Stam 2002, 3). In Lancashire, the typical manufacturing unit was small and specialized, with the result that production decisions were technical and tactical and therefore usually entrusted to senior foremen and the mill manager. By contrast the directors were preoccupied with buying and selling decisions that were crucial to the profitability of the firm. Their principal function was to operate on the firm's behalf in the cotton and yarn markets of Liverpool and Manchester respectively, where judgement of prices, and hence margin, was the crucial ingredient of entrepreneurial success (for a firm-level case study, see Law 1996; Toms 1996). They were assisted by associations with agents and brokers' networks and these connections also fostered investments in the shares of the mill companies (Filatotchev et al. 2007; Toms 2002). It would be reasonable to conclude therefore that their decision-making mentality was embedded in the mechanics of these particular markets.

Using this embedded framework, the appropriateness of decisions taken in these markets, at that time, becomes a testable hypothesis. This can be expressed in the question as to whether given past knowledge about yarn margins, an entrepreneur would have continued to invest in the industry. It should be stressed that we are concerned here with the entrepreneurs' past knowledge as of 1918, not the historian's hindsight. The use of the simulation model allows us to forecast forward from 1918 on the basis of only information available in 1918. Using random variables to generate a price series within parameters of 1918 knowledge ensures that only outcomes which could have been believed to be possible at that time are

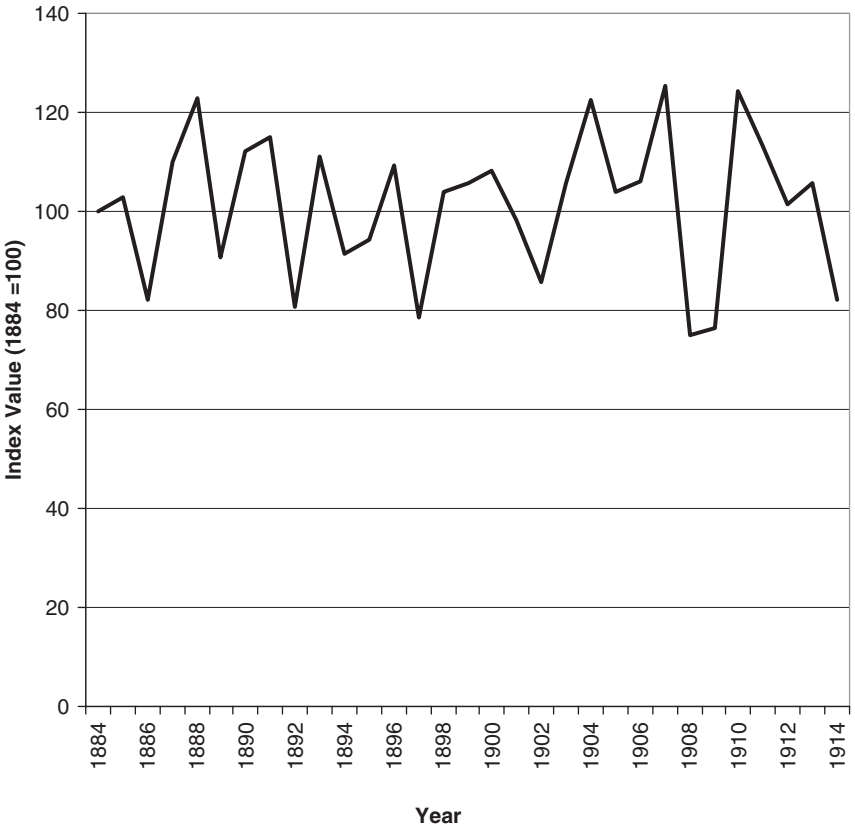

Figure 1 Yarn Margins, 1884–1914

considered. Figure 1 depicts Robson's yarn margin from 1884 to 1914.[10] From this graph it can be seen that the series is stationary and the volatility is constant.

This general observation can be given greater precision via a simple simulation exercise. In this particular simulation, random values for future profits for the period from 1918 to 1938 (year 1 to 21) are generated via the Box-Muller algorithm (Box and Muller 1958):

$$X = (-2 \ln U_1)^{1/2} \cos 2\Pi U_2 \quad (1)$$

where U_1 and U_2 are independent random variables, X is a normally distributed random variable with zero mean and unit variance.[11] Equation (1) is modified to generate a random time series with these characteristics parameterized by the historical information set:

$$X_t = \mu_{t-1} + \sigma (-2 \ln U_1)^{1/2} \cos 2\Pi U_2 \quad (2)$$

So that X_t is a random variable with expected mean μ and standard deviation σ, where μ_{t-1} is the mean value of the preceding historical time series for the first observation

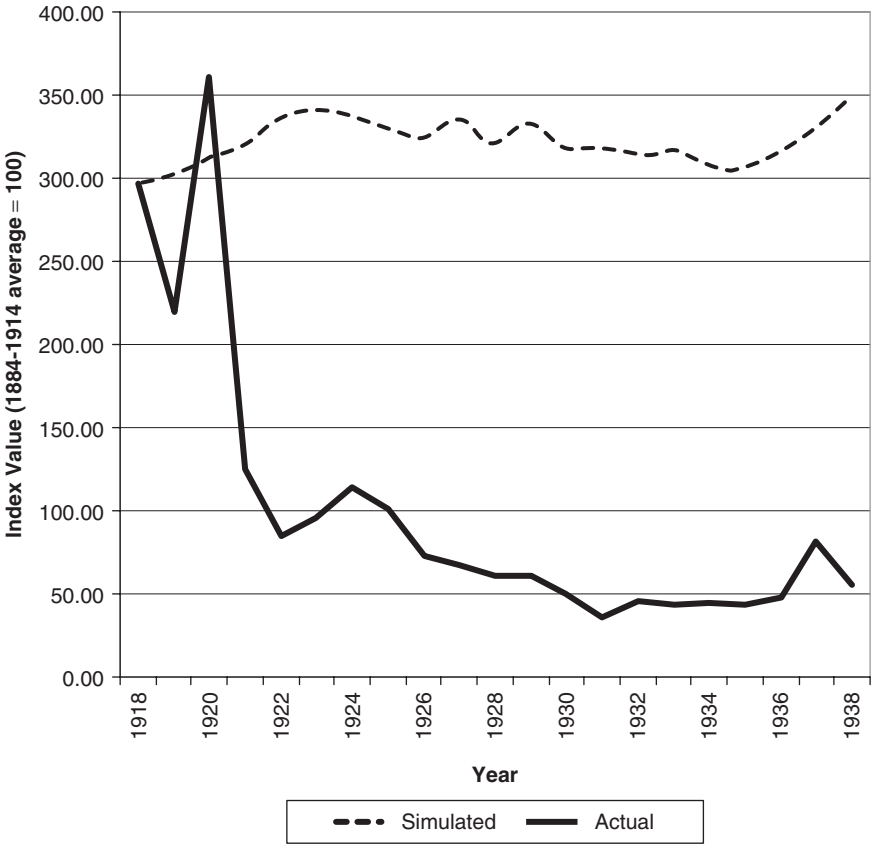

Figure 2 Actual and Simulated Margins, 1918–38

and X_{t-1} subsequently. In the example the opening mean of the time series is the average yarn margin in the period 1884–1914 and the standard deviation is computed from the series between those dates (Figure 1). Tests for normality on the 1884–1914 data confirm these assumptions to be reasonable.[12] The time series has some right hand side skewness which might have encouraged entrepreneurs to be optimistic if informed by history rather than hindsight.

Figure 2 depicts an average of ten simulations incorporating the 1000th run of the tenth simulation, as a dotted line, together with the actual index value of returns in post-war prices as a solid line. Similarly in Figure 3, the simulated values from the period 1918–38 are compared with the actual values for the years 1884–1904. In Figure 2, the opening value of the two series is 297.07 which is the value of 1918 yarn margins indexed to the average pre-war value. As can be seen from Figure 2 actual prices fell rapidly after 1921 and were typically below the 100 index level thereafter. In the simulation the series tracks the 300 level fairly closely in the typical run. The volatility is understated on the graph due to the averaging effect. In about 20% of

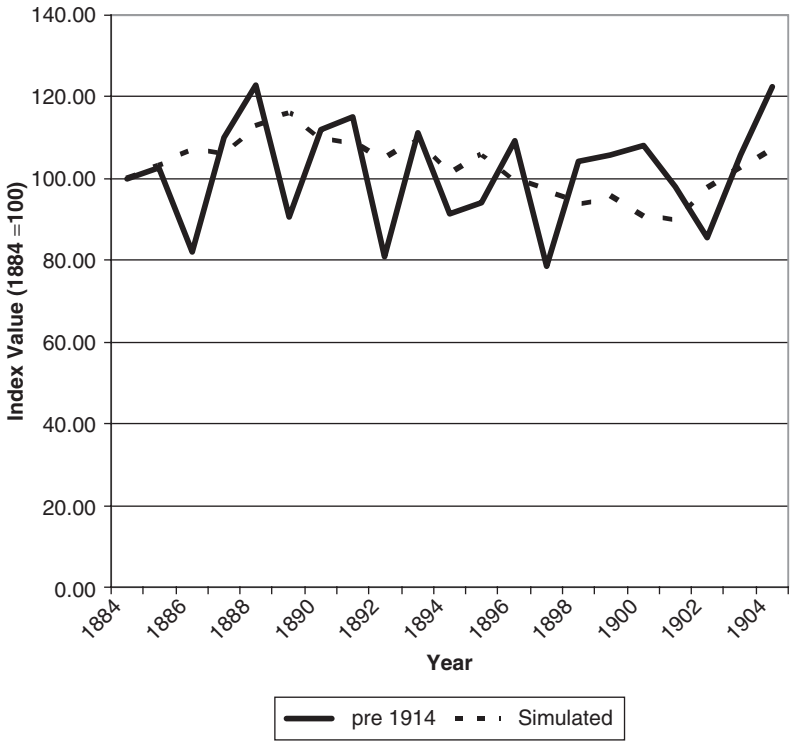

Figure 3 Margins, Actual and Simulated 1884–1904

simulations the value falls below 100 on at least one occasion, but in almost all cases recovers beyond that level subsequently. The exceptions were a small minority of cases where the 100 level was breached in the last three years of the simulation, or in an even smaller number of cases where the price collapses to zero. As would be expected, with the exception of the zero constraint, the simulations returned roughly symmetrical patterns of cases which breached the 500 level followed by subsequent downturns. Figure 3 is indexed to the 1884 value at 100 and shows that the simulated results are similar to the pre-war series, as would be expected. Again the amplitude of volatility is lowered by an averaging effect.

Discussion and conclusions

Bearing the patterns in Figures 2 and 3 in mind, clear conclusions can be drawn about the actual series, in the period 1918–38. First, the actual sequence would have been beyond the normal expectation set of virtually every entrepreneur. Second, once the level had breached the 100 mark and through the mid 1920s, expectations of a subsequent recovery were entirely reasonable.

Of course the entrepreneurial failure advocates and counterfactualists could simply argue that this is yet more evidence of the entrepreneurs of the 1920s living in a pre-war mindset of old-fashioned attitudes and failing to update their expectations to the new trading conditions. However, they would need to bear in mind several factors. First, entrepreneurial behaviour reflected the embedded information set given to them by their experience of trading in those markets. Such markets, remembering Hayek, provide the epistemological basis for assimilating large quantities of data in the mind of the decision-maker. The NCCF School in particular cannot have it both ways. Either exit from the industry was rational and should have happened, or the market prices should have formed rational expectations and there should have been no exit; but not both. Second, there is the LCF argument that entrepreneurship goes beyond merely responding rationally to price signals and the objective of the entrepreneur is to remove constraints. For Lazonick (1987), the technological constraint was the most important. For Lancashire entrepreneurs, however, profitability was a question of ensuring adequate prices in the Liverpool and Manchester markets, and it is not surprising that they devoted their efforts to lobbying for policies likely to alter monetary conditions and world demand in their favour (*Economist* 1930, 520; FMCSA 1936). After all, this is what had rescued the industry from the gloom of the 1890s. As is now known, the fundamentals would continue to move against Lancashire. Shifts in the terms of trade further eroded Lancashire's labour cost advantages vis-a-vis important export markets like India and attempts to restore pre-war monetary conditions did little to help the competitiveness of British exports. Third, if entrepreneurs had had perfect foresight they would have exited the industry. However, because expectations about future profits were reasonably associated with market information and past experience, the values attributable to deployed assets in continued use remained above the values that could be obtained from liquidation (Filatotchev and Toms 2006). In other words, the expectation set of entrepreneurs embedded in pre-war market behaviour was in itself an exit barrier, since all plausible scenarios based on re-enacted knowledge result in justification for the status quo. The outcome could only have been different therefore if the entrepreneurs had based their expectations on something other than market price information.

Finally conclusions can be drawn on the relative merits of economics-based counterfactuals and alternative genealogies utilizing path-dependency. Specifically, the above discussion has counterposed each of the three economics-based counterfactuals with historical evidence based around the genealogy of a group of entrepreneurial decision-makers. It has also showed how simulation can be used to explain the motives of contemporary decision-makers, suggesting why an economist with access only to the contemporary information set of real decision-makers would be very likely to have come to a different conclusion. Much more historical evidence might have been cited, but the purpose of this paper is to start the process of re-establishing the importance of historical methods, which for this industry at least have stood too long in the shadow of the narrow hypotheses of economics-driven counterfactuals.

It is unlikely that Lancashire could ever have kept its cotton industry. Entrepreneurs carry some of the blame. Although they were rational in their decision-making throughout, their dominance of the decision-making process and associated short-term profit orientated

behaviour, spelled long-run disaster for the industry. The bigger reasons for its disappearance were closely connected to the reasons for its appearance in the first place. These were the rise of British military and political power in export markets, principally India, the Far East and Latin America. Governments therefore share much of the blame for the destruction of economic and social capital in Lancashire. As Britain surrendered its influence, it surrendered its textile industry. The First World War was in important step in this process and non-participation would have resulted in a very different outcome for the textile industry.

Notes

1. Singleton (1991, 232) has argued that changes in comparative advantage meant there was no benefit to be had from saving the UK cotton industry.
2. So, as Carr (1990: 97) suggests, the only way for the historian is to write 'as if what happened was bound to happen'.
3. Aldcroft (1964: 113–34); Landes (1969); McCloskey and Sandberg (1972: 89–108); Sandberg (1974).
4. Casson (1982: 10–11).
5. In limited applications Sandberg (1974) and Toms (1998) examine the relative profitability of different investment decisions.
6. The essential difference was that ring spinning was a continuous process, whereas mule spinning was intermittent, with twist inserted only on the outward movement of a wheeled carriage. For a more detailed explanation see Sandberg (1974: 18–20).
7. The LCF specifies the requirement of vertical organization to ensure high speed throughput and therefore only applies to the incompatability of ring spun weft yarn with the plain loom. When used with automatic looms, ring spun weft yarn could be fed directly into feeders and the process thereby could be integrated. However, producers of warp yarn, whether on ring or mule frames, would both have needed to wind their output onto beams prior to the yarn being used in weaving, regardless of the weaving technology (Lazonick 1987).
8. For biographical details of these entrepreneurs, see Filatotchev et al. (2007).
9. Munro (1892: 691); Federation of Master Cotton Spinners' Associations (1936).
10. Where margin is the difference in shillings between the selling price of yarn and the associated raw material cost of production (Robson 1957: 337).
11. Box-Muller generates standard normally distributed (zero expectation, unit variance) random numbers, given a source of uniformly distributed random numbers.
12. The Shapiro-Wilk test rejected the hypothesis of non-normality.

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