Economic History Review (2012)

Childhood and child labour in the British industrial revolution[1]

By JANE HUMPHRIES*

Quantitative and qualitative analysis of a large number of autobiographies by working men who lived through the industrial revolution has demonstrated that there was an upsurge in child labour in the late eighteenth and early nineteenth centuries with children's work entrenched in traditional sectors as well as spreading in newly mechanized factories and workshops. I have interpreted this rise in terms of the appearance of a new equilibrium in the early industrial economy with more and younger children at work. The new equilibrium, in turn, was related to a number of co-incidental developments including: an increase in the relative productivity of children as a result of mechanization, new divisions of labour, and changes in the organization of work; the dynamics of competitive dependence linking labour market and families; high dependency ratios within families; stumbling male wages and pockets of poverty; family instability; and breadwinner frailty. The establishment of these links forges a new synchronization between revised views of the industrial revolution and a revisionist history of child labour.

My recent monograph, *Childhood and child labour in the British industrial revolution*, looked at the role of child labour not as reconstructed from the standard sources with their middle-class standpoint, reformist purpose, and social control agenda, but as history from below. My interest was in how the child workers of the industrial revolution themselves understood their suffering and made sense of their labour. I considered whether children's work was only a means to survive, and if so how it related to the household economy and the challenging labour market of the era, or whether it also delivered training, or a step on a career ladder, or even an escape into new adventure. This article provides an overview of the larger work but concentrates on the causes and chronology of child labour, and in particular how it fits into broader narratives of British industrialization. To this end I integrate some elements of my history from below with a novel theoretical framework and evidence from other sources. I argue that child labour, in terms of child participation rates and younger working, increased during the classic era of industrialization, and that this influenced the pace and nature of economic change. To make this argument from the bottom up, I use working people's own accounts of their lives, weaving together the measurable dimensions of child labour with annotations about what work involved, how it felt, and why it needed to be

* Author Affiliation: Oxford University.

[1] This article is based on the text of the Tawney Lecture, delivered on 28 March 2010 at the Economic History Society Annual Conference, University of Durham. I would like to thank the *Review*'s anonymous referees for their advice and assistance in turning the text from a lecture into an article. Support from the Economic and Social Research Council in the form of my Professorial Fellowship ('Memories of Industriousness: The Household Economy in Britain, 1700–1878') is gratefully acknowledged.

undertaken.[2] I begin with some voices from the past, the reminiscences of child labour by working men of the era.

Robert Collyer (born 1823)

> It is told of the Younger Pitt that, in looking around for more earners and still more to meet the demands for more money and still more to carry on the war with Napoleon, the great statesman said, 'We must yoke up the children to work in the factories' . . . I cannot vouch for the story . . . but [when between seven and eight] I found myself with many children of about my age or older standing at the spinning frames . . . 13 hours a day five days a week and eleven on Saturday.[3]

William Arnold (born 1860)

> When I was six years and two months old I was sent off to work. Fancy that, only just over six years of age! This was at the end of February, or early March, and I do not think I shall ever forget those long and hungry days in the fields . . . My work was about a mile from home, and I had for wages eighteen pence a week and my dinner on Sundays [which] made the Sunday the greatest and happiest day of the week . . . When the barley was up and the scaring of crows was unnecessary, I had to mind a flock of a hundred sheep . . . The sense of loneliness and responsibility frequently overcame me, and in my desperation I would shout 'Mother! Mother! Mother!' But mother could not hear: she was away that time working in the hayfield two miles away . . . Then I had the job of minding about forty pigs. Pigs are very different animals to mind from sheep. Sheep will keep together: every pig will go its own way careless of the others. The worry, the trouble, the running to and fro . . .[4]

Jonathan Saville (born 1759)

> Until I was seven years old, I lived partly with my father and grandmother and partly in Horton Workhouse. I was then bound apprentice to a man . . . he turned me over to the colliers in Denholme; on which my father said to him, 'I had rather you'd tied a stone round his neck, and drowned him'. I was a fine, growing, active lad at that time. I saw some cripples in the house of my new master, and the thought came across me that I was to share the same fate with them. At first I was taught to spin worsted; but it was not long before I was taken to the Coal-pit . . .[5]

John Shipp (born *c.* 1782)

> At the death of my poor mother . . . my brother . . . was pressed on board a man-of-war . . . I felt myself alone in the wide world . . . But the spirits of childhood, [are] buoyant and elastic . . . [and] I was naturally a wild dog, of an active and unconquerable spirit; . . . I was playing marbles in a lane called Love lane . . . [when] the shrill notes of a fife, and the hollow sound of a distant drum, struck on my active ear . . . [It was] a recruiting party of the Royal Artillery . . . The . . . fifer . . . very little exceeded that of the drum by which he stood. 'Surely' thought I to myself, sidling up to him, 'I must be myself as tall, if not taller, than this little blade, and should make as good a soldier!' . . . I

[2] The starting point for any historian interested in working-class autobiography has to be the bibliography by Burnett, Vincent, and Mayall, eds., *Autobiography*, completed in 1989. This bibliography lists more than a thousand documents published and unpublished from eighteenth-, nineteenth-, and twentieth-century Britain and provides an invaluable starting point for research in this area. Historians interested in the genre should also consult Vincent's pioneering monograph, *Bread, knowledge and freedom*, and Burnett's many thematic excerpted collections, such as *Destiny obscure* and *Useful toil.*

[3] Collyer, *Memories*, p. 15.

[4] Arnold, *Recollections*, pp. 13–14.

[5] Saville, 'Autobiography', p. 6.

> swallowed every word spoken by the royal sergeant . . . It was all about 'gentlemen soldiers', 'merry life', 'muskets rattling', 'cannons roaring', 'drums beating', 'colours flying', 'regiments charging' and shouts of 'victory! victory!' . . . [R]aising myself on tiptoe to appear as tall as possible, strutted up to the sergeant, and asked him, in plain words, if he would take I for a sodger?'.[6]

Edward Rymer (born 1834)

> In the winter of 1844 it was found necessary that my brother John and I should go to the pit. We had neither food nor shoes nor light in our first shift . . . The wagon man, Tommy Dixon by name, visited me and cheered me on through the gloomy night; and when I wept for my mother he sang that nice little hymn:
> In darkest shades if thou appear
> My dawning has begun
> And he brought me some cake and a candle . . .[7]

We will return to these voices and the stories they told in the course of the article.[8]

I

Croce's adage that all history is contemporary history, that historians bring to the past the anxieties of their day and interpret earlier periods through the frame of current interests, is well illustrated by the historiography of the industrial revolution as Cannadine argued in his well-known article.[9]

Cannadine identified four phases in the historiography of the industrial revolution. The first covered the classic descriptions produced in the early twentieth century, by Fabian and Socialist commentators preoccupied by the poverty, inequality, and negative externalities that seemed to proliferate in the industrial economy and persisted into their own times.[10] Child labour, not surprisingly, was to the fore in these pessimistic assessments of the socio-economic effects of industrialization. In the unstable and depressed interwar period, economic historians reinterpreted the industrial revolution in terms of the business cycle and a market economy's tendency to generate booms and busts.[11] When things improved, following the Second World War, the beneficiaries of this golden age of economic progress looked back on the industrial revolution as 'the take-off' into self-sustained growth. Their emphasis was on abrupt change in growth rates, leading sectors (cotton, iron), and a sudden shift in investment rates.[12] Some canonical writing from the era even sought to turn British experience into a template for economic development to guide policy in poor countries. In contrast, the end of the golden age, the failures of development economics, and the grip of stagflation introduced a fourth phase in which economic historians were converted to a new macro perspective that highlighted slow change, long roots, early devel-

[6] Shipp, *Memoirs*, pp.18–21.
[7] Rymer, 'Martyrdom', p. 3.
[8] For further detail on these authors and their subsequent life histories, see Humphries, *Childhood and child labour*.
[9] Cannadine, 'Present and the past'.
[10] Hammond and Hammond, *Town labourer*; Webb and Webb, *Industrial democracy*; Toynbee, *Lectures*.
[11] Beveridge, *Unemployment*; Gayer, Rostow, and Schwartz, *Growth and fluctuation*; Matthews, *Study*; idem, *Trade cycle*.
[12] Rostow, *Stages*; Deane, *First industrial revolution*; Kuznets, *Economic growth*.

opment of non-agriculture, and the retention of traditional labour-intensive production methods, while simultaneously downplaying the role of mechanization and the cotton industry.[13]

Cannadine's survey ended in 1984, yet developments in the historiography have continued to reflect concurrent issues. New recognition of the importance of institutions has stimulated an emphasis on the contributions of the strong Hanoverian state, financial stability, the security of property rights, and development of commercial and financial architecture. Anxieties about resource constraints have contributed to an environmentalist view of the industrial revolution as an escape from the organic economy.[14] In this interpretation, the possession and use of coal, a productive agriculture, and the development of the Atlantic economy appear as important drivers. Recently too, late twentieth-century concerns with consumerism have sensitized economic historians to the importance of the relative prosperity of the pre- and early industrial eras and the way in which aspirations to consume spurred work efforts in an industrious revolution that preceded and laid the groundwork for the industrial revolution.[15] Finally, the technological transformations of our own times have encouraged readings that stress scientific advance, the application of science to production, and the ways in which innovations took root in locally profitable conditions.[16]

Successive interpretations and reinterpretations have crowded out child labour. The current conventional wisdom downplays the importance of the cotton industry, factories, and poverty, features of industrialization that the first wave of writers identified as promoting children's work. Today the topic is peripheral to the study of the industrial revolution.

Ironically, while economic historians have turned their attention away from the ways in which economic changes put strains and stresses on working families, Britain faces pressing new social problems associated with the difficulties involved in reconciling the demands of an advanced industrial economy with a stable and rewarding family life. 'Broken Britain' is the media's favourite contemporary refrain, and dysfunctional families allegedly lie at its shattered core. Relationships between the generations are strained, working parents are harried, and family time is scarce. Many children seem unhappy, neglected, even abused. One in four children in the UK comes from a fatherless family with mothers the vast majority of single parents. Lone parenthood sets the scene for child poverty; fatherlessness contributes to emotional and psychological problems, drug use, poor educational outcomes, teenage motherhood, crime, and domestic violence; 10 per cent of children self-harm, unknown thousands live rough, and 17,000 act as nurses for physically and mentally ill parents.[17] We do not safeguard and cherish all our children even in economically advanced modern Britain with its mature welfare

[13] C. K. Harley, 'New views of the industrial revolution and labour markets', paper presented at a seminar on 'The First Modern Labour Market', Oxford (2006); idem, 'British industrialization'; Crafts, 'English economic growth'; idem, *British economic growth*; Crafts and Harley, 'Output growth'; idem, 'Precocious British industrialisation'.

[14] Wrigley, *Poverty*; idem, *Industrial growth*; idem, *Continuity*; Allen, *British industrial revolution*.

[15] de Vries, 'Purchasing power'; idem, 'Industrial revolution'; idem, 'Industrious revolution and economic growth'; idem, *Industrious revolution*.

[16] Mokyr, *Lever of riches*; idem, *Gifts of Athena*; idem, *Enlightened economy*; Allen, *British industrial revolution*.

[17] M. White, 'Britain broken or not?' *Guardian*, 1 Oct. 2008, http://www.guardian.co.uk/politics/2008/oct/01/davidcameron.welfare (accessed on 8 July 2009).

state. Looking further afield, internationally, many children's lives seem hard and hopeless in the face of chronic poverty, widespread disease, civil conflict, and horrendous natural disasters. As current concerns about children and families mount, perhaps it is time to look back at the past and reconsider childhood and child labour in this watershed era.

Although a small group of persistent (but unfashionable) scholars had maintained a steady trickle of work on the economic history of childhood,[18] recently, consistent with the Croce/Cannadine hypothesis and mounting concern about the well-being of children, the pace of publication has increased. Historians have rediscovered child labour and offered intriguing new insight into its role during industrialization.[19] They have suggested that child labour spread beyond the mills and mines that dominated in the classic accounts. It was ubiquitous too in traditional industries and small-scale production units and persisted long into the nineteenth century. At the same time, child labour possessed particular strategic importance in early water-powered factories, which were built far from centres of population and so had to be worked by imported labour. Workers were found in the form of pauper apprentices, a type of child labour whose supply has been expertly reconstructed from poor law records and foundling hospital archives.[20] However, recent research is either mainly qualitative or confined to the mid-nineteenth century when census records come on stream or based on sources that relate exclusively to particular forms of work such as pauper apprenticeship. This leaves the chronology of child labour uncertain. The lack of quantitative data that can reach back into the eighteenth century and simultaneously relate to the mid-nineteenth-century census estimates is particularly problematic. As a result, connections back to the mainstream drama of the industrial revolution remain speculative and tenuous. Unlike factors, such as inventions and coal, which have reappeared in revamped form to reprise old roles in the new accounts of industrialization, child labour remains in a backwater.

The failure of child labour to stage a mainstream comeback is surprising in that the current conventional wisdom retains complementary themes. For one thing, current views downplay but do not eradicate the contributions of the cotton industry and factories. These retain their strategic importance in industrialization. Thus, the sector and the organizational innovation most strongly associated with rising demand for child workers remain to the fore. Moreover, Smithian specialization and division of labour are now celebrated as the energizing forces behind eighteenth-century growth. In turn, such changes provided opportunities to substitute children for adults in the labour process. The reorganization of production around a more detailed division of labour created jobs, which children could fill. Indeed, some researchers have argued that organizational change was more impor-

[18] For example, Pinchbeck and Hewitt, *Children*; Rose, 'Social policy'; Lane, 'Apprenticeship'; Bolin-Hort, *Work, family and the state*; Nardinelli, *Child labor*; Sharpe, 'Poor children'; Dupree, *Family structure*; Horrell and Humphries, 'Exploitation'; Cunningham, *Children and childhood*; idem, 'Employment and unemployment of children'; idem, 'Combating child labour'; idem, 'Decline of child labor'; Cunningham and Viazzo, eds., *Child labour*; Hopkins, *Childhood transformed*; Horn, *Victorian and Edwardian schoolchild*; Heywood, *History*.

[19] Tuttle, 'Revival'; idem, *Hard at work*; Horrell and Humphries, 'Child labour; Humphries, 'Child labour'; Kirby, 'Causes of short stature'; idem, *Child labour*; Lavalette, ed., *Thing of the past?*; Honeyman, *Child workers*; Levene, 'Parish apprenticeship'; Rahikainen, *Centuries*.

[20] Honeyman, *Child workers*; Levene, 'Parish apprenticeship'. These authors build on earlier work drawing attention to the importance of pauper apprentices; see Rose, 'Social policy'; Lane, 'Apprenticeship'.

tant than mechanization in boosting demand for child workers.[21] In addition, although optimists have argued against the poverty and family hardship that an earlier generation of economic historians thought widespread in the period, they have not carried the day. The current consensus appears to be that real wages did not grow consistently until the second third of the nineteenth century, and that occupational, regional, and demographic pockets of poverty persisted.[22] In such pockets, conditions were rife for child labour. A judicious reading of the latest interpretations leaves space for an increase in both the demand for and supply of child workers during the industrial revolution.

My argument goes further. The claim is that a more gradual industrial revolution, sanitized by the relegation of dark satanic mills to a lesser role, nonetheless retained at its heart and pulsing through its life-blood this shameful feature of its older heroic variant. Child labour was a major contributing factor in Britain's industrialization.

My evidence comes from more than 600 autobiographies by working men who lived in the eighteenth and nineteenth centuries.[23] These memoirs describe their authors' labour as children, their childhoods, their family and social connections, their careers, and their schooling. The chronological and geographical spread of the memoirs provides an opportunity to investigate the causes and consequences of child labour in times and places where more conventional sources shed little light, while the rich individual detail opens up exciting possibilities to combine quantitative analysis of measurable dimensions of children's work with telling narrative. Readers might be suspicious of personal accounts, especially as a source for both qualitative and quantitative information, but close inspection has suggested a high degree of truthfulness and accuracy. Moreover, the economic circumstances and demographic structure of the autobiographers' families matches up with what is known of the population in these times.[24] The surviving set of memoirs appears to mimic a representative sample and has been treated as such in my search for patterns and relationships.[25] Bearing in mind the findings from other recent research described above, what has this prosopography revealed?

First, the autobiographies demonstrate that the classic era of industrialization, 1790–1850, saw an upsurge in child labour. This finding is consistent with older accounts as well as recent scholarship.

[21] Goldin and Sokoloff, 'Women, children and industrialization'.

[22] R. C. Allen, 'Pessimism preserved: real wages in the British industrial revolution', Oxford University, Department of Economics, working paper 314 (2007).

[23] I have already cited the pioneering bibliography by Burnett et al., which helped to identify and locate many working-class autobiographies. I did however add 75 autobiographies of men born before 1878 to those identified by Burnett et al. Although the success of Burnett et al. in publicizing this wonderful source ensured a flow of new material, the many volumes of *Lives of early Methodist preachers*, edited by Jackson, for instance, turned up overlooked examples. Humphries, *Childhood and child labour*, provides a full bibliography of the 617 memoirs drawn upon, including those newly discovered, and, where relevant, specifies the editions consulted.

[24] Humphries, *Childhood and child labour*, pp. 14–24.

[25] There is one obvious way in which the sample is unrepresentative: the autobiographers were all male. Women do appear in *Childhood and child labour* but only as wives, mothers, sisters, aunts, and other kin, and they are all seen through male eyes. There are far fewer autobiographies by working women, and it would have been difficult to provide a balanced picture in a single study. Current work, supported by the ESRC (Memories of Industriousness, RES-051-27-0273) begins to remedy the neglect of a female perspective by providing a comparative survey of female working-class autobiography.

The vast majority of working-class autobiographies record age at starting work.[26] They also usually provide a date of birth or its rough approximation, allowing stratification by cohort to span the chronology of the industrial revolution. The first cohort includes the earliest autobiographies with a cut-off birth date of 1790.[27] The second and third cohorts cover the classic period of industrialization, from 1791 to 1820 and 1821 to 1850. The final cohort runs from 1851 until 1878.[28] Cross-tabulations of age at starting work with cohort of birth reveals that age at starting work was lower for boys born in the two middle cohorts of the industrial revolution.[29] In the sample as a whole, mean age at starting work first declined and then increased over time, falling from 11.5 in the first cohort to 10.28 and 9.98 in the middle cohorts, before rising again to 11.39 in the final cohort.[30] This pattern is reflected in the cumulative frequency of age by which boys started work, as shown in figure 1. By the age of 15, work was almost universal in all cohorts, but there were dramatic differences over time in the proportions working at younger ages. Very young working was rare in the first and fourth cohort but much more common in the middle period. Thus, while only a fifth of boys under 10 were at work before 1791 and after 1850, this proportion was almost doubled in the two middle cohorts.

As the figure 2 shows, this pattern persists when the data are analysed by father's occupational group as well as cohort of birth.[31] Most occupational groups exhibit a U-shaped relationship between age at starting work and cohort. The cohort born after 1850 started work later than did the two middle cohorts in all occupational groups except the sea. In six occupational groups (agriculture, mining, factory, outwork, trades, and services) the cohort born before 1791 started work later than did those born in the crucible of industrialization.

However, although replicated within occupational groups, the U-shaped variation in age at starting work by cohort is dominated by the across-group differences, underlining the importance to boys' life chances of their fathers' occupations, for these determined men's wages and so their families' economic circumstances. For example, the sons of tradesmen, seamen, and service workers in all cohorts started work later than did the sons of domestic outworkers and casual labourers, even in the final cohort.

[26] Including a small number of additional authors who enabled age at starting work to be identified from contextual information, 520 autobiographers provided this information.

[27] The inclusion of autobiographers born in the seventeenth century could be viewed as problematical, as earlier writers might be drawn from more prosperous echelons of the working class, so biasing conclusions drawn from comparisons across cohorts. In fact, there are only two autobiographers born before 1650 (Leonard Wheatcroft, born 1627, and Edward Barlow, born 1642), and only 11 others born before 1700, altogether comprising 2.1% of the total sample.

[28] The first cohort, boys born between 1627 and 1790, comprises 19.9% of the sample; the second, those born between 1791 and 1820, 24.3%; the third, those born between 1821 and 1850, 27.7%; and the fourth, those born between 1851 and 1878, 27.4%. There are 10 boys whose date of birth is unknown (1.6% of the sample), but context allows six of these to be placed in a birth cohort, leaving only four boys (0.6% of the sample) with cohort unknown.

[29] 518 autobiographers recorded both age at starting work and cohort of birth.

[30] For further discussion of this result, including its economic and statistical significance, see Humphries, *Childhood and child labour*, pp. 175–7.

[31] Autobiographers usually recorded their fathers' occupation or activities, so classification by occupational group is possible in over 90% of cases, though requiring this additional information does reduce the sample size to 481.

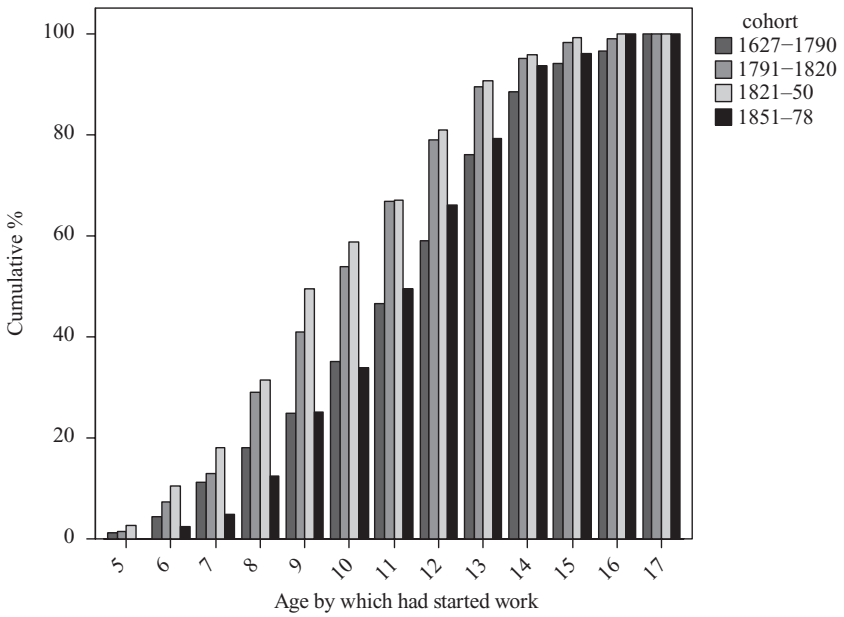


Figure 1. *Age at starting work, by cohort*
Source: Working-class autobiographies listed in Humphries, *Childhood and child labour*.

The ranking of the occupational groups was not static over time. Shifts in the occupational hierarchy are detectible in the relative ages at which sons began work. Domestic manufacturers, for example, were once part of the working-class elite, but deskilling associated with a more detailed division of labour and competition from factory-produced goods ground down their living standards. Their sons experienced a dramatic decline in age at starting work in the second cohort consistent with this loss of economic status. Soldiers' sons in the first and second cohorts started work later than did the sons of casual workers, but this advantage disappeared as soldiers' relative pay deteriorated. In contrast, seamen's sons did not manifest the decline in age at starting work for the middle cohorts. Sailors' apparent ability to support dependent children through this period reflects the effects of the French and Napoleonic wars when wages rose to extraordinary levels.[32]

Second, the evidence is also emphatic that child labour was endemic in the early industrial economy, entrenched in both traditional and modern sectors and widespread geographically. Table 1 demonstrates the extensive overlap between the most frequently recorded first jobs from the autobiographies and the top 20 jobs for 10- to 14-year-old males computed from the 1851 census by Kirby.[33] Not only does this boost confidence that the source is representative of economic conditions, but it confirms, for an earlier period, Kirby's assertion on the basis of census data that child labour extended well beyond the mills and mines that dominated its classic profile and that the biggest employers of children were the traditional sectors of the economy.

[32] See Davis, *English shipping*.
[33] Kirby, 'Brief statistical sketch', p. 242.

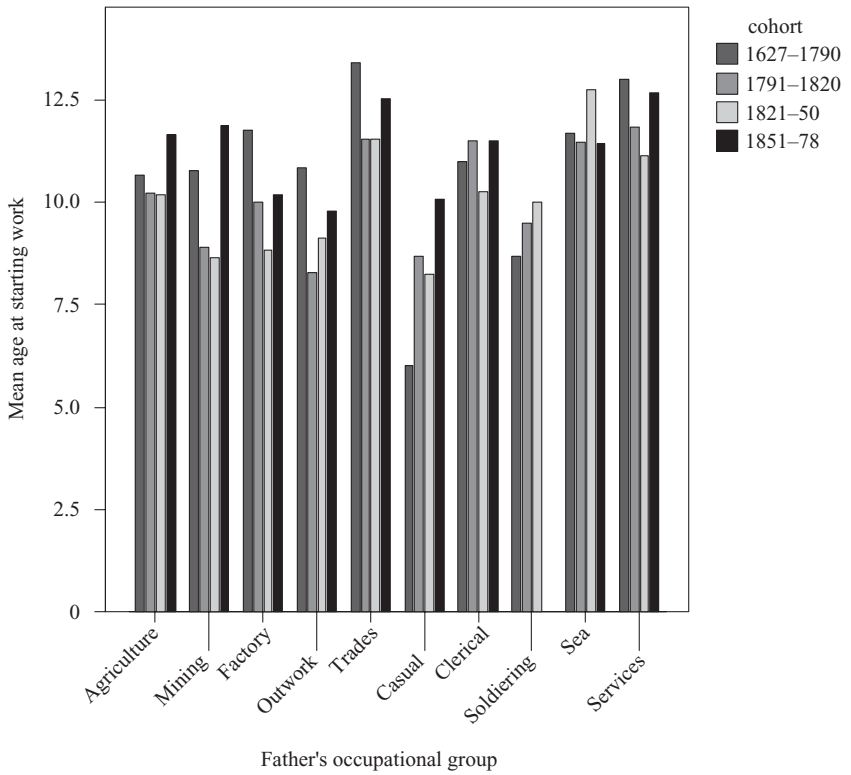


Figure 2. *Average age at starting work, by cohort and father's occupational group*
Source: As for fig. 1.

It is hardly surprising that agriculture, small-scale manufacturing, and services should provide the majority of jobs for children. After all, as the new views of the industrial revolution emphasize, these sectors, along with customary methods of production, dominated the developing economy, with factories and mechanization but tiny islands of modernity until well into the nineteenth century. Recognition of child labour's importance in traditional employments has coincided with a new appreciation for the role of agriculture, small-scale manufacturing, and services in industrialization, and this should help to restore child workers to the centre of the economic stage.

Third, although the autobiographical evidence concurs with other recent findings in recognizing the extent of children's employment in traditional sectors of the economy, it assigns a strategic role to their work in factories. The novelty of large-scale mechanized production units meant that they could not absorb the majority of child workers, but it also meant that they lacked an established labour force and the recruitment of children was essential if they were to expand. Honeyman makes this point in relation to pauper apprentices.[34] The autobiographies suggest that both these wards of the state and 'free' child workers constituted an important component of early factory labour, growing up to become a permanent

[34] Honeyman, *Child workers*.

Table 1. *Most frequently recorded first jobs and top twenty jobs for 10–14-year-old males in England and Wales (excluding London), 1851 Census*

Most frequently recorded first jobs	*Top twenty jobs*
1. Agriculture[a]	1. Agricultural labourer (out-door)
2. Messenger, porter	2. Farmer's, grazier's, son, grandson, etc.
3. Cotton manufacture[b]	3. Messenger, porter (not government)
4. Coal-miner	4. Farm servant (in-door)
5. Woollen/worsted manufacture[b]	5. Cotton manufacture
6. Shop boy/retail	6. Coal-miner
7. Monitor schoolteacher	7. Labourer (branch undefined)
8. Sailor	8. Woollen cloth manufacture
9. = Shoemaker	9. Worsted manufacture
9. = Office boy	10. Shoemaker
11. Domestic servant	11. Silk manufacture
12. Hawker/street-trader	12. Iron manufacture
13. Printer/compositor	13. Domestic servant (General)
14. Rope/paper manufacture	14. Earthenware manufacture
15. Carpenter/joiner	15. Tailor
16. Earthenware manufacture	16. Hose, stocking, manufacture
17. Silk manufacture	17. Blacksmith
18. Iron manufacture	18. Carpenter, joiner
19. Blacksmith	19. Mason, paviour
20. Tailor	20. Brickmaker

Notes: *a* includes all agricultural occupations; *b* includes factory work and domestic manufacturing.
Source: Census data taken from Kirby, 'Brief statistical sketch', p. 242.

workforce. A comparison of the relative proportions of fathers and sons who had jobs in factories, as shown in figures 3 and 4, illustrates the point.

According to the autobiographies, factory jobs always absorbed a larger share of the child labour force than of the adult labour force (roughly twice as large) although this gap narrowed as the sector grew in overall importance and its workforce became established. Whereas for the first cohort, factory workers comprised 7 per cent of the child workforce but only 1 per cent of the adult workforce, after 1850 they made up 16 per cent of the child workforce and by then 11 per cent of the adult workforce; the factory workforce became more adult while growing in both absolute and relative terms. The generational differences in factory employment lead to the same conclusion that Honeyman drew from her very different sources; without the early and important contribution made by child labour, it is difficult to see how the factory sector could have expanded at the pace and in the way that it did.[35]

Autobiographies from the late eighteenth century and early nineteenth century illustrate at the micro level just how important child workers were in these years of embryonic factory development. Robert Collyer (born 1823), described the need for labour and the way in which it was met:

> Very early in the last century there was an urgent need for children to work in the factories they were building then on all the streams they could find fit for their purpose in the West Riding of Yorkshire. The local supply of 'help' could not begin to meet the demand; and so the owners of the factories went or sent south to scour the asylums

[35] Ibid., pp. 91–111.

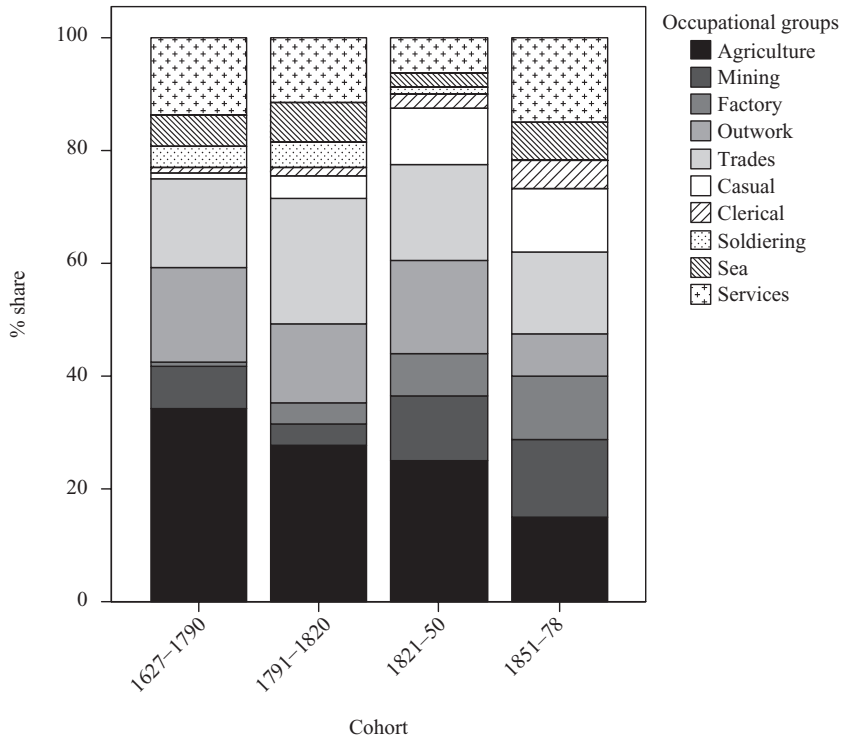


Figure 3. *Fathers' occupational groups, by cohort*
Source: As for fig. 1.

where children were to be found in swarms, to bring them north and set them to work as apprentices . . .[36]

This economic and social innovation had dramatic import for Collyer's own family. Collyer's parents were both the orphans of sailors lost at sea and sent from different distant parts of Britain to work in the same West Riding textile factory. Collyer senior came from a workhouse in London to which he had been consigned when his father was lost: 'He told me they gave him the free choice to go or stay and wanted him to stay; but he said "I will go." And so it was he went out, not knowing whither he went, was bound apprentice, and served his time . . . '.[37] Collyer's mother hailed from Norwich, suggesting this strategy was a widespread response by the overseers of the old poor law to maritime orphanage. In a later, more mature stage of its operation, the same factory saw Robert and his brother similarly employed, alongside many other children of around seven and eight years old, standing at the spinning frames, '13 hours a day five days in the week, and eleven on the Saturday'.[38]

Finally, the autobiographical evidence is also emphatic about the extent and chronology of very young working. Here it is at odds with Kirby's claim that very

[36] Collyer, *Memories*, p. 2.
[37] Ibid., pp. 2–3.
[38] Ibid., p. 15.

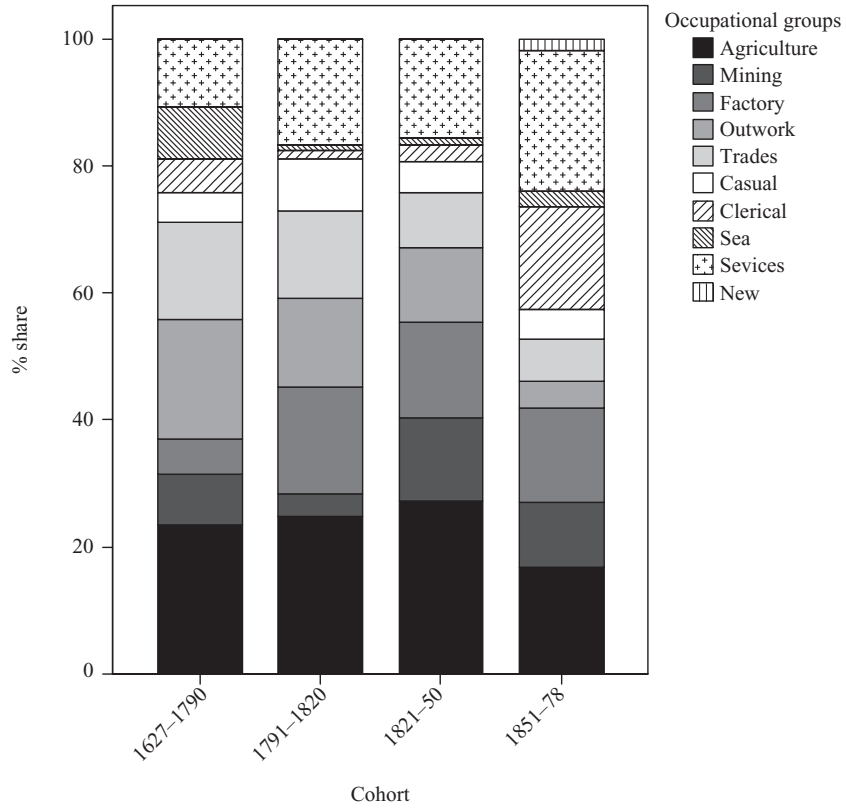


Figure 4. *First jobs, by cohort*
Source: As for fig. 1.

young working was 'never widespread' in Britain.[39] The rise in child participation rates in the late 1700s and early 1800s was associated (given the almost universal participation of boys over 14 almost necessarily) with younger working, and, if 'very young' working meant working before the age of 10, this was far from rare. In the cohorts that lived through this period, the sons of miners, factory workers, outworkers, casual workers, and soldiers all on average started work below the age of 10. Of the boys from whom we heard, Robert Collyer started work aged eight, William Arnold aged six, Jonathan Saville aged seven, and Edward Rymer aged ten. None of these boys considered their age at starting work exceptional, though Arnold notes how strange an early twentieth-century audience would find it. We do not know how old John Shipp was when he started work, but he was about 12 when he volunteered for the army and had been boarded out with a local farmer and so working at least part-time for several years prior to this event.[40]

[39] Kirby, *Child labour*, p. 131.
[40] Collyer, *Memories*, p. 5; Arnold, *Recollections*, p. 13; Saville, 'Autobiography', p. 6; Rymer, 'Martyrdom', p. 3; Shipp, *Memoirs*, pp. 18–20. For further evidence on ages at starting work, see Humphries, *Childhood and child labour*, pp. 172–209.

II

How can we interpret the upsurge in child labour that accompanied the industrial revolution? In this section, I use Basu and Van's influential model of labour markets with child labour to explicate the findings described above.[41]

Two basic assumptions are central to this model: the luxury axiom and the substitution axiom. The luxury axiom asserts that households send their children to work only when driven to do so by poverty. Children's 'non-work' (that is, their attendance at school or their leisure) is a luxury good. Households whose adult incomes are very low cannot afford to keep children out of some productive activity, and only when adult incomes rise are children withdrawn. Implicit in this account is an altruistic view of parents and guardians. They prefer their children not to work and only consent to their employment to make ends meet. As soon as circumstances improve, children are withdrawn from the labour force.

The substitution axiom asserts that adult and child workers are substitutes subject to some adult equivalency correction. Contrary to the traditional idea that some tasks are better suited to children, and indeed in the limit require children to perform them, adults can do anything that children can do; from a purely technical point of view, it is always possible to replace children with adults in the labour process. Of course, adults cost more and so employers may be reluctant to do so, but technically substitution is possible. Together these two assumptions found the basic static model of labour markets with child work.[42]

Assume for simplicity that the economy consists of N households and that each household consists of one adult and m children. Labour is the only productive factor. In one day, each adult can supply a unit of labour and each child γ ($\neq 1$): a formalization of the substitution axiom. Let the daily wage rate for an adult be w and for a child be w^c, so that $w^c = \gamma w$.

Each household decides on the minimum acceptable level of consumption, called here subsistence consumption, s, though s may involve some historically-established standard of living. Adults work full-time. Only if income nonetheless falls below subsistence consumption are children sent to work, as assumed in the luxury axiom.

Figure 5, taken from Basu and Tzannatos, illustrates the comparative statics of the basic model.[43] The main interest is the supply of labour. In the figure, the adult wage is represented on the vertical axis. If this wage is greater than s, only adults supply labour. Assuming, for simplicity, that adult labour supply is perfectly inelastic, then AB is part of the aggregate supply. As w falls below s, children are sent to work in an effort to reach the target income, and aggregate labour supply increases. This continues until all child and adult labour is supplied, whereupon the labour supply becomes inelastic once more.

The essential feature of labour supply in this model, ABCF, is its backward-bending section. The precise shape of this section depends on the particular

[41] Basu and Van, 'Economics'; see also, Basu, 'Child labor'; Basu and Tzannatos, 'Global child labor problem'.
[42] Basu, 'Child labor', pp. 1100–3.
[43] Basu and Tzannatos, 'Global child labor problem', p. 150.

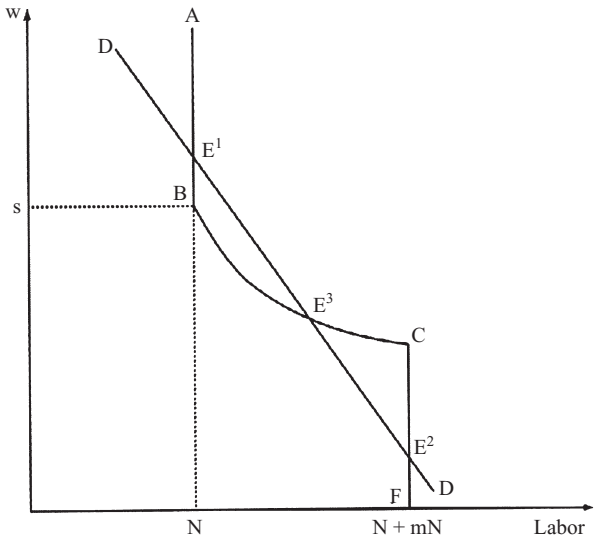


Figure 5. *Labour market with child labour*
Source: As for fig. 1.

assumptions made. For example, the stretch BC can be a segment of a rectangular hyperbola under the assumption that the household uses child labour to attain its target income, *s*. However, so long as there is a backward-bending section, as implied by the luxury and substitution axioms, it is possible that the demand curve will intersect the supply curve more than once.

Figure 5 illustrates the case of a conventional downward sloping demand curve for labour. There are three equilibria, E^1, E^2, and E^3. Of these, E^1 and E^2 are stable. At E^1, wages are high and there is no child labour, and at E^2, wages are low and children as well as all adults work. The same economy can be stuck at either equilibrium, and if this model were fitted into a Walraisian system, each equilibrium would be Pareto optimal. However, it is easy to show that workers' households are better off at E^1 compared with E^2. Therefore, if the welfare of poorer people were prioritized E^1 is preferable. The inability of workers to move the economy from the 'bad equilibrium' E^2 to E^1 can be thought of as a coordination failure. If all workers could credibly commit to not employing their children, then the economy would be at their preferred equilibrium E^1 with higher adult wages but no child labour.

Development economists use the model to identify changes that would eliminate child labour. The relative productivity of children is a key factor. Technological change that lowers the relative productivity of children, such as the use of computers, reduces γ, and, as figure 5 illustrates, this shifts F left and the equilibrium with child labour disappears. In this case, technological progress alone eradicates child labour. The model also helps development economists design effective policy by illustrating whether a proscription of child labour would succeed. Consider the implications of a ban on child labour. Even if the economy were at E^2 initially, a ban on child labour would reduce the supply of labour to NA, and if demand conditions were unchanged the economy would settle at the only

surviving equilibrium, E^1.[44] Subsequently, even if the authorities withdrew the bar on child labour, the economy would remain at E^1 since this was an equilibrium of the original economy, the 'benign intervention' simply solving the workers' coordination problem and facilitating their attainment of their preferred equilibrium. Similarly, compulsory schooling, or trade union action to exclude child workers if it was sufficiently widespread and binding, could also drive the economy to the equilibrium without child labour.

However, the model can also be used, as here, in reverse, to illustrate the circumstances, which make child labour both possible in terms of the existence of an equilibrium with child labour, and probable in terms of the potential for exogenous developments to shift the economy to such a bad equilibrium. How historically realistic are these circumstances and are there historical candidates for exogenous developments which consigned the early industrial British economy to a bad equilibrium?

Just as a fall in the relative productivity of children can eliminate an equilibrium with child labour so a rise in their relative productivity can call into existence a new equilibrium with child labour. Marx argued that machinery by making children relatively more productive led to their substitution for adult workers and underpinned the boom in children's work that he associated with early factory production. The basic model can illustrate this classic explanation. If technology changes so that children become relatively more productive, γ would increase. From figure 5 it is clear that this would result in F moving right and the bad equilibrium would then involve more (younger) children working or a new equilibrium with child labour would appear in an economy where initially there had been no intersection of the demand curve with the CF section of labour supply.

The autobiographies include many cases where mechanization created jobs for children, the archetype being in the early textile factories, here vividly described by J. R. Clynes:

> Clatter, rattle, bang, the swish of thrusting levers and the crowding of hundreds of men, women and children at their work. Long rows of huge spinning frames, with thousands of whirling spindles, slid forward several feet, paused and then slid smoothly back again, continuing this process unceasingly hour after hour while cotton became yarn and yarn changed to weaving material . . .[45]

However, jobs for children were often conjured into existence not by full mechanization but by the partial mechanization of one specific sub-procedure, and this happened in many sectors, modern and traditional. Thus Robert Dollar, in describing how aged 12 in 1856 he started work in a machine shop, alerted his readers to what he suggested was a common children's job. Dollar was set on to attend a lathe: 'In those days there were no self-feeding lathes and small boys were used for that purpose'.[46]

Yet mechanization, despite its hold on the imaginations of economic historians, was not alone in creating the possibility of a bad equilibrium. Other changes, such as a more detailed division of labour, greater work discipline, or an expansion in

[44] Less happily, if the demand for labour only intersects the supply curve in the range CF, banning children's work would only make things worse for poor families.

[45] Clynes, *Memoirs*, p. 29.

[46] Dollar, *Memoirs*, p. 3.

the scale of production might by making children relatively more productive have the same effect. Just such organizational initiatives were hallmarks of the domestic manufacturing and putting out systems that drove Smithian growth in the eighteenth century. Significantly, many labour historians have seen this phase of economic development rather than factory production as the high-water mark of child labour. Nor do the implications of attention to organizational changes stop with the proto-industrial phase of textile production, for these innovations were particularly important in miscellaneous manufacturing such as boot, shoe, glass, and paper manufacturing, where children's work has been perhaps relatively underestimated. Examples abound.

Frank Galton described the effects of competition from workshops using a more detailed division of cheaper labour on once-skilled workers and their standard of living. Galton's father was a saddler, a highly skilled trade that had called for a substantial apprenticeship premium. When Frank was born in the 1860s, Galton senior had been able to earn 70s. a week, which at that time meant 'comfort and even some luxury'.[47] Ominously, a new system of production had begun to invade saddle making and 'there were springing up at Walsall and Wolverhampton large workshops where saddles were made on the principle of subdivided labour in which many parts were performed by boys and girls'.[48] The increased supply forced down the price and reduced wages for the London saddlers, Galton senior included. Moving several times to decreasingly salubrious surroundings, the family's fortunes fell to their lowest ebb when Galton senior became unemployed. Although in this case the father eventually found work, which enabled the family to survive albeit without restoring its previous prosperity, by then both elder boys aged 13 and 11 were at work and Mrs Galton too had sought paid employment both within and outside the home.[49]

Another way in which a more detailed division of labour created jobs for children was through its association with an increased need to move work in progress and finished goods around the workplace. Children in the pottery industry moved clay to the potters, moulds to the kilns, pots to the packing cases, returned moulds to the stores, and so on, in never-ending circles of effort.[50] Children on the brickfields lugged clay to the brick maker and transported barrowloads of bricks, stacking, heaving, and struggling until humpbacked from the labour.[51] Children in coalmines hauled and hurried sleds and corves of coal further and further distances as the workings extended, and although wheels and later ponies made their toil easier, they still pushed the carts or guided the animals.[52] Everywhere we might look in the early industrial economy, there were forces promoting equilibria with child labour.

[47] British Library of Political and Economic Science, Department of Manuscripts, MS, F. W. Galton, 'Autobiography', (no date), p. 1.
[48] Ibid., p. 5.
[49] Ibid., p. 21.
[50] See the autobiographies by Charles Shaw and John Finney as cited in the bibliography of Humphries, *Childhood and child labour*, pp. 402, 385.
[51] See the autobiographies by Will Thorne and Arthur Marshel as cited in the bibliography of Humphries, *Childhood and child labour*, pp. 406, 395, and the overview account by the Victorian philanthropist George Smith, *Cry of the children*.
[52] See the autobiographies by Edward Rymer, George Parkinson, Robert Watchorn, and a Trade Union Solitary, as cited in the bibliography of Humphries, *Childhood and child labour*, pp. 401, 398, 407, 406.

Equally important, there were no institutions holding the economy at a good equilibrium without child labour. In fact, we can interpret the era after 1750 as one of deregulation, associated with the weakening and dismantling of institutions and norms that might have held the economy at E_1 with no child labour and solved the coordination failure. Deregulation was manifest in the lack of protective labour legislation, the decay of guild controls, the repeal of statutory apprenticeship (1814), the Combination Acts, and, the increasingly punitive poor law. An anonymous master shoemaker described the deregulation of his trade in Northampton which he visited in the 1820s. Boots and shoes continued to be produced in a domestic setting, but both methods and tools had been redesigned to accommodate women and children's labour:

> Factory Acts and School Boards were then unknown, and the detestable custom of compelling women to do men's labour, and taking children from their pap to work like niggers was in full swing. Too small to use the clams in ordinary use, clams of a smaller size were introduced for these child-workers. A feeling of horror used to creep over me whenever I passed over a threshold where this kind of labour was indulged in.[53]

As a result of these organizational initiatives, the prices for closing shoes were much lower in Northampton than in London, and according to the anonymous author the only ways a single workman could survive without the help of a wife and children, were to 'scamp' it or work 16 hours a day. Competition from family labour involved either compromising quality or working longer hours.

However, child labour was not supplied passively to farms, workshops, domestic enterprises, shops and offices. Instead, it contributed actively to the developing divisions of labour and organizational readjustments that sustained traditional units of production and maintained their competitiveness. Key to understanding this is that children, while competitors in the labour market, were dependents and contributors in the household. When family incomes were inadequate, children became 'added workers' but as added workers they increased the amount of labour available, promoted deskilling, and reduced pay further. 'Competitive dependence', as Doepke and Zillibotti term it, thus engineers an equilibrium with child labour.[54]

In trade after trade, autobiographers describe such cycles of competitive dependence and not only in the obvious case of handloom weaving. Frank Galton was sent to work at a relatively young age on account of his father's falling wages, as competition from workshop production using a detailed division of labour and child workers drove down prices. Galton junior was not himself employed in making saddles but the sons of other men were and we do not have to look far to find unambiguous examples of competitive dependence, where a son's own cheap labour undercut his father's skilled work. William Arnold recollected:

> When I was just over seven I went into the boot trade. There was no room for a child my age in the kind of work my father did . . . But about this time an entirely new method of making shoes came up. It was called riveting . . . Now in riveting there are two processes. The first is to fit the upper to the last and fix the sole in its proper place ready for nailing. This is highly skilled labour, and requires some little knowledge of

[53] Anon., 'My life and adventures', p. 376; see also Arnold, *Recollections*.
[54] Doepke and Zilibotti, 'Macroeconomics', p. 1492.

> shoemaking, quick judgment, and a good eye for shape and appearance. The other process is driving in the rivets that are to hold the boot together—one or two rows of nails all the way round the sole. This part is not nearly so difficult . . . It was soon discovered that boys could do this second part of the work quite so well as men, and generally quite as quickly, so it was usual for each riveter to have a boy . . . known as the sprigging boy.[55]

At its root, however, poverty, as manifest through the luxury axiom, is the main factor behind child labour in Basu and Van's basic model. Superficially, this might be hard to square with recent accounts of trends in living standards during the industrial revolution. However, there is strong evidence to suggest that not all families shared in economic progress and a sufficient number might have fallen behind to contrive the bad equilibrium. Key to economic well-being was the level and regularity of a father's wages, which could easily slip below what was needed to withhold children from the labour market. There were many reasons for such inadequacy. First, men top-sliced their wages, creaming off a share to finance their personal expenditure. Such guerdons were not always frittered away on tobacco, the ale-house, or gambling, and their legitimacy was generally accepted by other family members as a just reward for the breadwinner's efforts, but men's pocket money nonetheless meant that wages did not go in their entirety to support wives and children. Second, the reorganization of work and the introduction of new technology dispensed with many traditionally acquired skills and obliterated the premia associated with them, reducing wages for workers in these ill-fated trades. Third, even outside such hapless occupations, wages did not rise consistently over the period. The late 1700s and early 1800s, in particular, saw a clear stalling out of growth, described in Allen's work as 'Engels' pause'.[56] Wages did not rise and possibly fell in the largest occupation of all, that of agricultural labour. Fourth, to add to the problem of inadequate wages, the demographic growth of the period skewed the population towards younger age groups and elevated the dependency ratio. Families contained larger numbers of children requiring support. Fifth, even if men's wages were adequate in good times, there were seasonal and cyclical periods of under- and unemployment with which to contend. The autobiographies contain illustration of all such sources of inadequate male wages. Bill H's memoir weaves together a number of these themes. Bill's father was an agricultural labourer who earned 7s.–9s. a week when fully employed but was often out of work.[57] In addition, the family was very numerous. As a result, the children's living standard was miserable and their diet, in particular, suffered. In one memorable scene, Bill recalled the family was on the brink of starvation, which prompted him to beg some frozen turnips from a local farmer to try to feed his little brothers and sisters while his mother overcame her pride and appealed to the parson for help. Eleven children were born into this family, but not surprisingly, under these conditions, infant and child mortality was high; 'we died down to six', reported Bill laconically.[58]

Wages that fell below the breadwinner standard are not the end of the story, however, for a significant number of families appear to have had no breadwinners

[55] Arnold, *Recollections*, p. 21.
[56] Allen, 'Engels' pause'.
[57] B. H——, 'Autobiography of a navvy', *Macmillans Magazine*, 5 (Nov. 1861–April 1862), pp. 140–51.
[58] Ibid., p. 140.

at all or none in the form of a father. Mortality was one factor, for the demographic realities meant that about 18 per cent of fathers would die before their sons had reached the age of 14.[59] However, while the autobiographers were rendered motherless at rates comparable with those estimated for the population at large, they were made fatherless at higher rates, a finding interpreted as meaning that men reported as dead fathers who had merely gone missing. An unpleasant fact in these hard times was that fathers were not always reliable and sometimes disappeared while probably still alive. If we add the 10 per cent of excess male mortality to the 8 per cent of fathers whom autobiographers acknowledged had deserted their families, it appears that 18 per cent of boys grew up in households abandoned by their male heads.[60]

The results of orphanage or marital breakup in terms of the survival of lone parent households appear very similar to findings from conventional sources: lone mothers massively outnumbered lone fathers. Families that were de facto fatherless augmented those whose heads had perished to form a hard core of around a third of all families. These poor and vulnerable families were a major source of child labour and of very young working.

Reasons for a father's disappearance were many and varied. Ironically, industriousness often unintentionally separated men from their wives and children. The journeyman baker's father left his family in search of higher wages, but he was shipwrecked, lost his tools, took to dram-drinking, and stopped remitting money. The baker's mother dispersed her older children, a daughter into service, a son to herd cows, and another to live with an uncle, while she strove to support the little ones from her hand spinning.[61]

War and postwar trauma also destabilized families. Britain was at war for roughly half of the long eighteenth century.[62] Mobilization was on a wholly new level, reaching one in five adult males during the French wars from 1793 to 1815.[63] As Shipp's story reminds us, recruitment did not stop with adults. The fiscal military state's appetite for soldiers and sailors reached into the child population itself. While the role of institutions like the Marine Society in the recruitment of boy sailors is well known, the army's enlistment of adolescents has not received so much attention. Yet in 1797, several experimental regiments each composed of some 1,000 poor or orphaned boys aged between 10 and 16 were set up to augment the supply of recruits in the early years of the French wars and to relieve the burden that the boys constituted on their parishes.[64] Shipp volunteered for just such a regiment.

Of course, recruitment was mainly of adult men, and so of fathers, and many never came home. Loss of life among service-men was proportionately higher in 1794–1815 than 1914–18.[65] However, even if fathers survived and continued to serve, Army and Navy pay seldom trickled back to their families and they often lost

[59] Anderson, 'Social implications' p. 49.
[60] For further discussion of these points, see Humphries, *Childhood and child labour*, pp. 63–83.
[61] Anon., 'Life of a journeyman baker'.
[62] The intervening periods of 'peace' were often marked by considerable military and naval activity; see Bowen, *War*.
[63] Emsley, *British society*; Conway, *War*, p. 38.
[64] Spiers, *Army and society* , pp. 45–6.
[65] Greenwood, 'British loss of life', pp. 5–6, 15–16.

touch with their loved ones. Finally, and most traumatic of all, men who did return were often physically or mentally disabled or simply unable to readjust to civilian life. There was no hope of them resuming a breadwinner responsibility. Again, the autobiographies contain many illustrations, and one example will have to suffice. John James Bezer's father lost an eye in active service. He had been a sailor and floggings had left their mark on his flesh. 'They had unmanned him; can you wonder at that? Brutally used, he became a brute—an almost natural consequence'.[66] Bezer senior received a small pension in compensation for his damaged sight, but it secured 'extra big thumps' rather than 'little extra comforts' for it was spent on drink, which maddened him. Eventually, he was incarcerated in Greenwich Hospital, leaving the family dependent on poor relief.

Another background factor setting the scene for the boom in child labour was the precocious development of familial dependence on the male head. The growing dominance of waged labour, the relative lack of small-scale (peasant) agriculture, and (perhaps) the relatively high male wages of the early modern period contributed to a growing reliance by wives and mothers on their male partners. Britain developed breadwinner-dependent families early in its history, and in advance of sufficient prosperity or social discipline. Men's wages were not sufficiently high or sufficiently stable and men themselves not sufficiently reliable or self-controlled to bear the burden. The inadequacy of men's earnings and fallibility of male breadwinners resulted in 'breadwinner frailty' whereby families that were precociously dependent were vulnerable to disaster.[67] The death, incapacity, disappearance, or poor performance of a male head of household was catastrophic, plunging the family into poverty and threatening its disintegration. Add to this weakness the growing conditionality of poor relief. Long before the new poor law made explicit demands for self-reliance, industry, and prudence, the overseers of the old poor law had begun to require families to do everything they could to help themselves before they could be judged deserving of poor relief. Self-help included the employment of children, even young children, whose duty it was to help support mothers and siblings. In cases where families needed additional breadwinners, their older children were in the firing line. The stage was set for the boom in child labour.

III

Quantitative and qualitative analysis of a large number of autobiographies by working men who lived through the industrial revolution has demonstrated that there was an upsurge in child labour in the late eighteenth and early nineteenth centuries with children's work entrenched in traditional sectors as well as spreading in newly mechanized factories and workshops. I have interpreted this rise in terms of the appearance of a new equilibrium in the early industrial economy with more and younger children at work. The new equilibrium, in turn, was related to a number of co-incidental developments including: an increase in the relative productivity of children as a result of mechanization, new divisions of labour, and changes in the organization of work; the dynamics of competitive dependence linking labour

[66] Bezer, 'Autobiography', p. 159.
[67] For further discussion of these ideas, see Humphries, *Childhood and child labour*, pp.172, 367–8.

Table 2. *Proximate causes of age at starting work*

	β	*t-statistic*
Constant	714.676**	5.025
Date of birth	–0.786**	–4.976
Date of birth squared	0.0002**	5.006
Father's occupational group[a]		
Mining	–0.490	–1.139
Factory	–1.541**	–3.124
Domestic manufacturing	–1.044**	–2.630
Trades	1.327**	3.519
Casual	–1.499**	–3.097
Clerical	0.849	1.170
Soldiering	–0.095	–0.111
Sea	0.878	1.609
Services	1.297**	2.937
Unknown occupational group	–0.756	–1.033
Total children	–0.130**	–3.531
Mother's economic activity	–0.402	–1.681
Father dead	–0.078	–0.229
Father absent	–1.467**	–3.346
Poor law dummy	–0.810**	–2.183
Small business dummy	1.238**	3.635
N	386	
R^2 (adj)	0.283	
SEE	2.210	
F	9.456**	

Notes: a agricultural labourers constitute the omitted category; ast; significant at 10 per cent level; ** significant at 5 per cent level.
Source: Working-class autobiographies listed in Humphries, *Childhood and child labour*.

market and families; high dependency ratios within families; stumbling male wages and pockets of poverty; family instability; and breadwinner frailty. The establishment of these links forges a new synchronization between revised views of the industrial revolution and a revisionist history of child labour. The reintegration of child labour in the economic currents of industrializing Britain can be illustrated more formally by a regression analysis of age at starting work, reported in table 2, which shows its dependence on the factors indicated in this essay.

Thus, age at starting work fell then rose over the course of the industrial revolution even when other determinants are taken into account. It was conditioned too by father's occupation as the latter was crucial to a family's economic circumstances. Younger working was associated with more siblings, dead and absent fathers, and poverty as indicated by an encounter with the poor law authorities. Readers wanting further reassurance about these links can consult the tables that report these results in detail in my monograph.[68] However, I would like to conclude on a different note by returning to the voices with which I began and contemplating their authenticity and authority.

IV

The findings that I have described in this article are based on a methodology, the combination of quantitative and qualitative analysis, with which historians are

[68] Ibid., pp. 176, 181.

often uncomfortable, and a source, autobiography, of which they are suspicious. As far as the former is concerned, I would argue that combining quantitative and qualitative analysis gets the best out of both methodologies by using them to check, balance, and inform each other. However, in the end it is the sources that distinguish my work, and I know that sceptics will remain unconvinced. As noted above, in *Childhood and child labour*, much effort went into demonstrating that the autobiographers were generally honest and their circumstances commonplace. Here I want to emphasize that the writers, themselves, often anticipated readers' doubts and sought to reassure them. While the authors admitted possible mistakes in recall of dates and places, they were ardent in their claims to 'general truth'.[69] They were convinced too that their stories were similar to and stood for many others of their time and class. Indeed this sense of commonality and community, of standing for something in the larger scale of things, was often what drove men to pick up the unfamiliar equipment of the scholar and with work-worn fingers to write their tales. Look at the way in which Will Thorne introduced his memoir: 'Perhaps as I tell you my story, which, with variations, is the story of hundreds of thousands of my East End neighbours and of millions of my brothers all over the country, you will begin to understand'.[70] He believed he spoke for everyman.

And in the end, even committed sceptics will be haunted by the images. Who could forget William Arnold, cold and lonely little farm worker, weeping for his mother, or Edward Rymer, without food, shoes, or light in his first shift in the mines, finding solace in the words of an ancient hymn and a few sweet crumbs? Who did not understand John Bezer's fear of a father hardened if not brutalized by beatings, death, and killing? Who did not smile at John Shipp's bold exuberance as he 'strutted up' to the sergeant and volunteered as a 'sodger' while fearing too for his future in those bellicose times? Whose sympathy was not aroused by Bill H's desperately optimistic attempt to cook the frozen turnips? These images reek of authenticity and reinforce each other like the parts of a symphony, 'with variations' as Will Thorne said, summarizing the experience of a whole generation. These children bore many of the social and economic costs of the industrial revolution but they also contributed to its success and thereby through time to our own comfort and prosperity. Their part in this great historical divide merits remembrance.

Date submitted *25 January 2011*
Revised version submitted *18 November 2011*
Accepted *22 November 2011*

DOI: 10.1111/j.1468-0289.2012.00651.x

[69] See Vincent, *Bread, knowledge and freedom*, p. 5.
[70] Thorne, *Life's battles*, p. 13.

Footnote references

Allen, R. C., 'Engels' pause: technical change, capital accumulation, and inequality in the British industrial revolution', *Explorations in Economic History*, 46 (2009), pp. 418–35.
Allen, R. C., *The British industrial revolution in global perspective* (Cambridge, 2009).
Anderson, M., 'The social implications of demographic change', in F. M. L. Thompson, ed., *The Cambridge social history of Britain 1750–1950*, II: *People and their environment* (Cambridge, 1990), pp. 1–70.
Anon., 'The life of a journeyman baker, written by himself', *Commonwealth*, 13 (1856), unpaginated.

Anon., 'My life and adventures, by a master shoemaker', *Boot and Shoemaker*, 2 (1879), pp. 279–80, 291–2, 302–4, 314–16, 327–8, 339–40, 351–3, 363–4, 374–6, 386–7, 399–400, 412–13, 423–4 (13 weekly articles).
Arnold, W., *Recollections of William Arnold*, preface by H. Pickett and introductory note by J. Saxton (Northampton, 1915).
Basu, K., 'Child labor: cause, consequence, and cure, with remarks on international labor standards', *Journal of Economic Literature*, XXXVII (1999), pp. 1083–119.
Basu, K. and Tzannatos, Z., 'The global child labor problem: what do we know and what can we do?', *World Bank Economic Review*, 17 (2003), pp. 147–73.
Basu, K. and Van, P. H., 'The economics of child labor', *American Economic Review*, 88 (1998), pp. 412–27.
Beveridge, W. H., *Unemployment: a problem of industry 1909 and 1930* (1930).
[Bezer, J. J.], 'The autobiography of one of the Chartist rebels of 1848', in D. Vincent, ed., *Testaments of radicalism. Memoirs of working class politicians 1790–1885* (1977), pp. 153–87.
Bolin-Hort, P., *Work, family and the state: child labour and the organization of production in the British cotton industry, 1780–1840* (Lund, 1989).
Bowen, H. V., *War and British society, 1688–1815* (Cambridge, 1998).
Burnett, J., ed., *Destiny obscure: autobiographies of childhood, education, and family from the 1820s to the 1920s* (1982).
Burnett, J., ed., *Useful toil: autobiographies of working people from the 1820s to the 1920s* (1994).
Burnett, J., Vincent, D., and Mayall, D., eds., *The autobiography of the working class: an annotated critical bibliography*, 3 vols. (Brighton, 1984–9).
Cannadine, D., 'The present and the past in the English industrial revolution 1880–1980', *Past and Present*, 103 (1984), pp. 131–72.
Clynes, J. R., *Memoirs 1869–1924* (1937).
Collyer, R., *Some memories* (Boston, Mass., 1908).
Conway, S., *The war of American independence 1775–1783* (1995).
Crafts, N. F. R., 'English economic growth in the eighteenth century: a re-examination of Deane and Cole's estimates', *Economic History Review*, 2nd ser., XXIX (1976), pp. 226–35.
Crafts, N. F. R., *British economic growth during the industrial revolution* (Oxford, 1985).
Crafts, N. F. R. and Harley, C. K., 'Output growth and the British industrial revolution: a restatement of the Crafts-Harley view', *Economic History Review*, XLV (1992), pp. 703–30.
Crafts, N. F. R. and Harley, C. K., 'Precocious British industrialisation: a general equilibrium perspective', in L. Prados de la Escosura, ed., *Exceptionalism and industrialisation: Britain and its European rivals, 1688–1815* (Cambridge, 2004), pp. 86–107.
Cunningham, H., 'The employment and unemployment of children in England *c*. 1680–1851', *Past and Present*, 126 (1990), pp. 115–50.
Cunningham, H., *Children and childhood in western society since 1500* (1995).
Cunningham, H., 'Combating child labour: the British experience', in H. Cunningham and P. P. Viazzo, eds., *Child labour in historical perspective, 1800–1985: case studies from Europe, Japan and Colombia* (Florence, 1996), pp. 11–22.
Cunningham, H., 'The decline of child labour: labour markets and family economies in Europe and North America since 1830', *Economic History Review*, LIII (2000), pp. 409–28.
Cunningham, H. and Viazzo, P. P., eds., *Child labour in historical perspective, 1800–1985: case studies from Europe, Japan and Colombia* (Florence, 1996).
Davis, R., *The rise of the English shipping industry in the 17th and 18th centuries* (1962).
Deane, P., *The first industrial revolution* (Cambridge, 1965).
Doepke, M. and Zilibotti, F., 'The macroeconomics of child labor regulation', *American Economic Review*, 95 (2005), pp. 1492–524.
Dollar, R., *Memoirs of Robert Dollar* (San Francisco, Calif., 1918).
Dupree, M., *Family structure in the Staffordshire potteries, 1840–1880* (Oxford, 1995).
Emsley, C., *British society and the French wars, 1793–1815* (1979).
Gayer, A. D., Rostow, W. W., and Schwartz, A. J., *The growth and fluctuation of the British economy, 1790–1850: an historical, statistical and theoretical study* (Oxford, 1953).
Goldin, C. and Sokoloff, K., 'Women, children and industrialization in the early republic: evidence from the manufacturing censuses', *Journal of Economic History*, XLII (1982), pp. 741–74.
Greenwood, M., 'British loss of life in the wars of 1794–1815 and in 1914–18', *Journal of the Royal Statistical Society*, CV (1942), pp. 1–11, 'Discussion on the paper', pp. 11–16.
Hammond, J. L. and Hammond, B., *The town labourer, 1760–1832* (1925).
Harley, C. K., 'British industrialization before 1841: evidence of slower growth during the industrial revolution', *Journal of Economic History*, XLII (1982), pp. 267–89.
Heywood, C., *A history of childhood: children and childhood in the west from medieval to modern times* (Cambridge, 2001).
Honeyman, K., *Child workers in England, 1780–1820: parish apprentices and the making of the early industrial labour force* (Aldershot, 2007).
Hopkins, E., *Childhood transformed; working-class children in nineteenth-century England* (Manchester, 1994).
Horn, P., *The Victorian and Edwardian schoolchild* (Gloucester, 1989).

Horrell, S. and Humphries, J., ' "The exploitation of little children": child labour and the family economy in the industrial revolution', *Explorations in Economic History*, 32 (1995), pp. 485–15.
Horrell, S. and Humphries, J., 'Child labour and British industrialization', in M. Lavalette, ed., *A thing of the past? Child labour in Britain in the eighteenth and nineteenth centuries* (Liverpool, 1999), pp. 76–100.
Humphries, J., 'Child labour in the industrial revolution', in P. Scholliers and L. Schwarz, eds., *Experiencing wages: social and cultural aspects of wage forms in Europe since 1500* (Oxford, 2003), pp. 251–68.
Humphries, J., *Childhood and child labour in the British industrial revolution* (Cambridge, 2010).
Jackson, T., ed., *The lives of early Methodist preachers, chiefly written by themselves*, 6 vols. (1865–6).
Kirby, P., 'Causes of short stature among coalmining children, 1825–1850', *Economic History Review*, XLVIII (1995), pp. 687–99.
Kirby, P., *Child labour in Britain, 1750–1870* (2003).
Kirby, P., 'A brief statistical sketch of the child labour market in mid-nineteenth century London', *Continuity and Change*, 20 (2005), pp. 229–46.
Kuznets, S., *Economic growth and structure: selected essays* (1966).
Lane, J., 'Apprenticeship in Warwickshire cotton mills, 1790–1830', *Textile History*, 10 (1979), pp. 161–74.
Lavalette, M., ed., *A thing of the past? Child labour in Britain in the eighteenth and nineteenth centuries* (Liverpool, 1999).
Levene, A., 'Parish apprenticeship and the old poor law in London', *Economic History Review*, 63 (2010), pp. 915–41.
Matthews, R. C. O., *A study in trade cycle history: economic fluctuations in Great Britain, 1833–1842* (Cambridge, 1954).
Matthews, R. C. O., *The trade cycle* (Cambridge, 1959).
Mokyr, J., *The lever of riches: technological creativity and economic progress* (New York, 1990).
Mokyr, J., *The gifts of Athena: historical origins of the knowledge economy* (Princeton, N.J., 2002).
Mokyr, J., *The enlightened economy: an economic history of Britain, 1700–1850* (2009).
Nardinelli, C., *Child labor and the industrial revolution* (Bloomington, Ind., 1990).
Pinchbeck, I. and Hewitt, M., *Children in English society*, II: *From the eighteenth century to the Children Act 1948* (1973).
Rahikainen, M., *Centuries of child labour. European experiences from the seventeenth to the twentieth century* (Aldershot, 2004).
Rose, M. B., 'Social policy and business; parish apprenticeship and the early factory system, 1750–1834', *Business History*, XXI (1989), pp. 5–32.
Rostow, W. W., *The stages of economic growth: a non-communist manifesto* (Cambridge, 1960).
Rymer, E. A., 'The martyrdom of the mine, or, a 60 years' struggle for life', facsimile reprint in two parts, *History Workshop Journal*, I and II (1976), pp. 220–44.
Saville, J., 'Autobiography', in F. A. West, ed., *Memoirs of Jonathan Saville of Halifax; including his autobiography* (1948), pp. 5–39.
Sharpe, P., 'Poor children as apprentices in Colyton, 1598–1830', *Continuity and Change*, 6 (1991), pp. 253–70.
Shipp, J., *Memoirs of the extraordinary military career of John Shipp, late a lieutenant in His Majesty's 87th regiment. Written by himself, with an introduction by H. Manners Chichester* (1890).
Smith, G., *The cry of the children from the brickyards of England: and how the cry has been heard, with observations upon the carrying out of the act* (1879 edn. repr.) (Whitefish, Mont., 2007).
Spiers, E. M., *The army and society, 1815–1914* (1980).
Thorne, W., *My life's battles* (1925).
Toynbee, A., *Lectures on the industrial revolution in England* (1884).
Tuttle, C., 'A revival of the pessimist view: child labour and the industrial revolution', *Research in Economic History*, 18 (1998), pp. 53–82.
Tuttle, C., *Hard at work in factories and mines: the economics of child labor during the British industrial revolution* (Boulder, Colo., 1999).
Vincent, D., *Bread, knowledge and freedom: a study of nineteenth-century working class autobiography* (1981).
de Vries, J., 'Between purchasing power and the world of goods: understanding the household economy in early modern Europe', in J. Brewer and R. Porter, eds., *Consumption and the world of goods* (1993), pp. 85–132.
de Vries, J., 'The industrial revolution and the industrious revolution', *Journal of Economic History*, 54 (1994), pp. 249–70.
de Vries, J., 'The industrious revolution and economic growth, 1650–1830', in P. A. David and M. Thomas, eds., *The economic future in historical perspective* (Oxford, 2003), pp. 43–72.
de Vries, J., *The industrious revolution: consumer behavior and the household economy, 1650 to the present* (Cambridge, 2008).
Webb, S. and Webb, B., *Industrial democracy* (1920).
Wrigley, E. A., *Continuity, chance and change: the character of the industrial revolution in England* (Cambridge, 1988).
Wrigley, E. A., *Poverty, progress, and population* (Cambridge, 2004).
Wrigley, E. A., *Industrial growth and population change: a regional study of the coalfield areas of north-west Europe in the later nineteenth century* (Cambridge, 2007).

JOBNAME: No Job Name PAGE: 25 SESS: 9 OUTPUT: Tue May 8 18:01:31 2012
/v2503/blackwell/journals/ehr_v0_i0/ehr_651

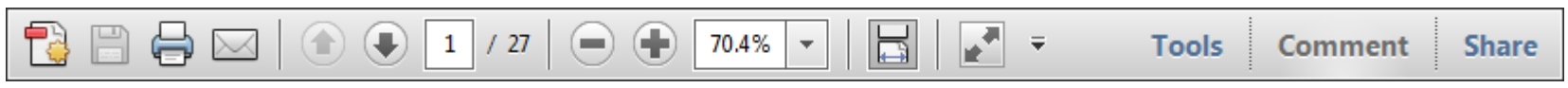
Toppan Best-set Premedia Limited	
Journal Code: EHR	Proofreader: Elsie
Article No: 651	Delivery date: 8 May 2012
Page Extent: 24	Copyeditor: Edmond

WILEY-BLACKWELL

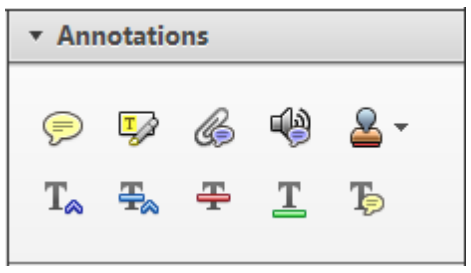
USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

Required software to e-Annotate PDFs: Adobe Acrobat Professional or Adobe Reader (version 8.0 or above). (Note that this document uses screenshots from Adobe Reader X)
The latest version of Acrobat Reader can be downloaded for free at: http://get.adobe.com/reader/

Once you have Acrobat Reader open on your computer, click on the Comment tab at the right of the toolbar:



This will open up a panel down the right side of the document. The majority of tools you will use for annotating your proof will be in the Annotations section, pictured opposite. We've picked out some of these tools below:

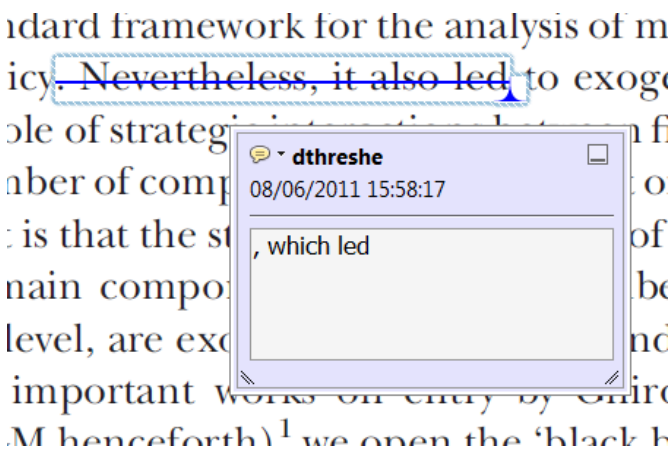


1. Replace (Ins) Tool – for replacing text.

Strikes a line through text and opens up a text box where replacement text can be entered.

How to use it

- Highlight a word or sentence.
- Click on the Replace (Ins) icon in the Annotations section.
- Type the replacement text into the blue box that appears.

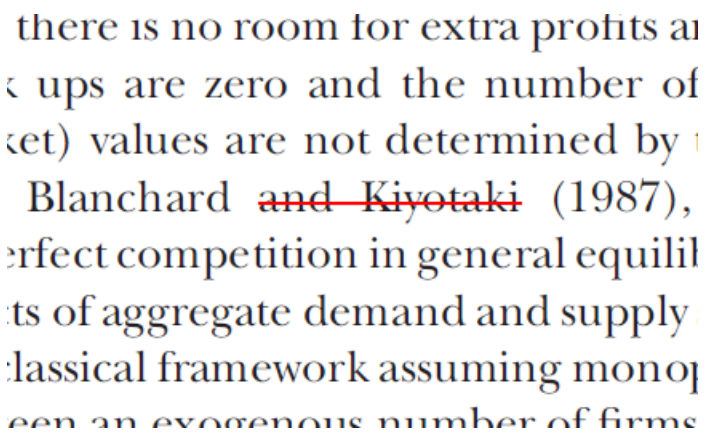


2. Strikethrough (Del) Tool – for deleting text.

Strikes a red line through text that is to be deleted.

How to use it

- Highlight a word or sentence.
- Click on the Strikethrough (Del) icon in the Annotations section.

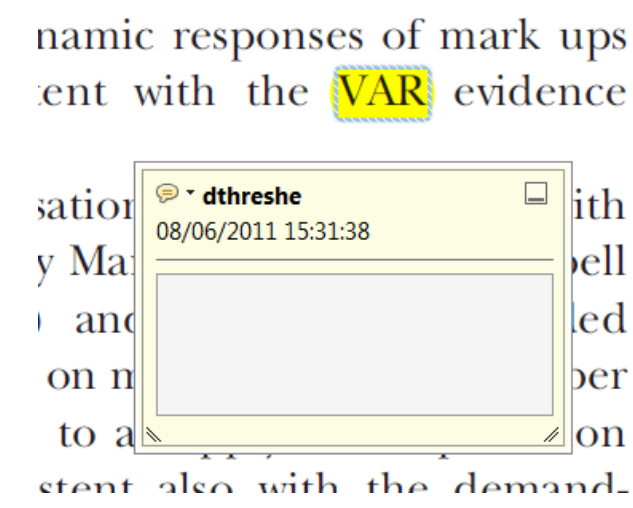


3. Add note to text Tool – for highlighting a section to be changed to bold or italic.

Highlights text in yellow and opens up a text box where comments can be entered.

How to use it

- Highlight the relevant section of text.
- Click on the Add note to text icon in the Annotations section.
- Type instruction on what should be changed regarding the text into the yellow box that appears.

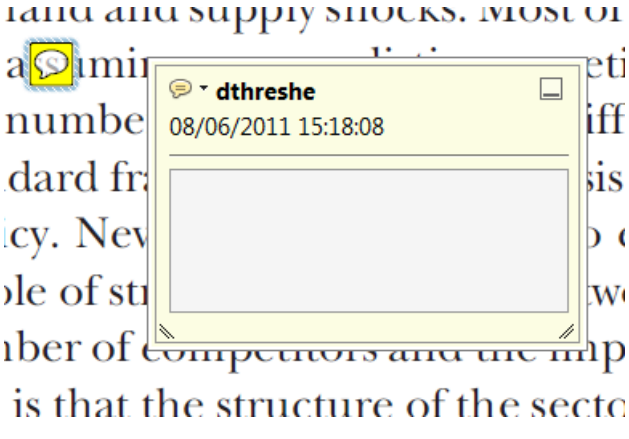


4. Add sticky note Tool – for making notes at specific points in the text.

Marks a point in the proof where a comment needs to be highlighted.

How to use it

- Click on the Add sticky note icon in the Annotations section.
- Click at the point in the proof where the comment should be inserted.
- Type the comment into the yellow box that appears.



WILEY-BLACKWELL

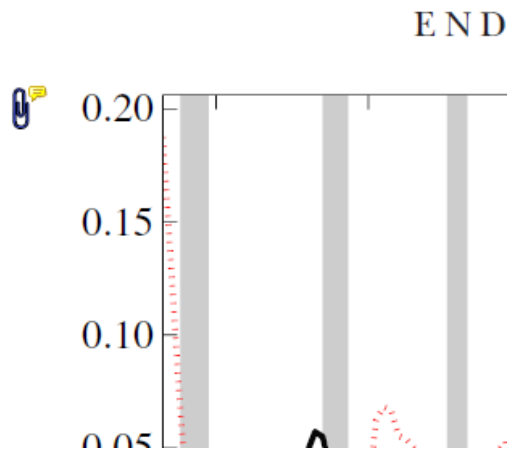
USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

5. Attach File Tool – for inserting large amounts of text or replacement figures.

Inserts an icon linking to the attached file in the appropriate pace in the text.

How to use it

- Click on the Attach File icon in the Annotations section.
- Click on the proof to where you'd like the attached file to be linked.
- Select the file to be attached from your computer or network.
- Select the colour and type of icon that will appear in the proof. Click OK.

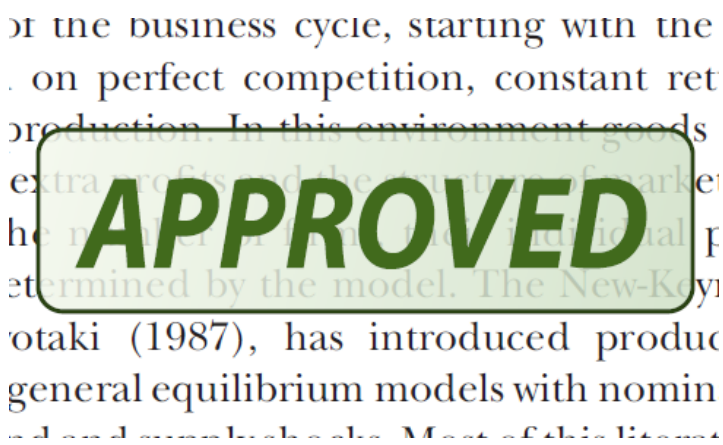


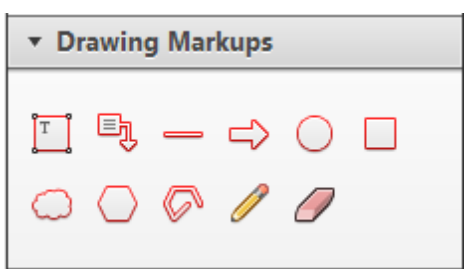
6. Add stamp Tool – for approving a proof if no corrections are required.

Inserts a selected stamp onto an appropriate place in the proof.

How to use it

- Click on the Add stamp icon in the Annotations section.
- Select the stamp you want to use. (The Approved stamp is usually available directly in the menu that appears).
- Click on the proof where you'd like the stamp to appear. (Where a proof is to be approved as it is, this would normally be on the first page).



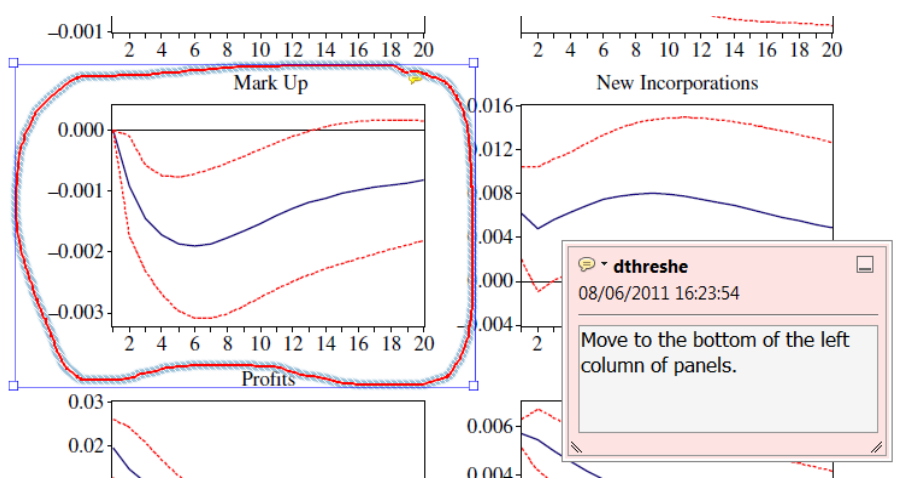


7. Drawing Markups Tools – for drawing shapes, lines and freeform annotations on proofs and commenting on these marks.

Allows shapes, lines and freeform annotations to be drawn on proofs and for comment to be made on these marks..

How to use it

- Click on one of the shapes in the Drawing Markups section.
- Click on the proof at the relevant point and draw the selected shape with the cursor.
- To add a comment to the drawn shape, move the cursor over the shape until an arrowhead appears.
- Double click on the shape and type any text in the red box that appears.



For further information on how to annotate proofs, click on the Help menu to reveal a list of further options: