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Women's labour force participation and the transition to the male- breadwinner family, 1790–1865¹

By SARA HORRELL and JANE HUMPHRIES

Ivy Pinchbeck argued 65 years ago that the changes in the British economy during the industrial revolution promoted increased dependence on male wages and male wage-earners: a transition which was 'neither welcome nor understood' by the men and women who lived through it.² Pinchbeck's verdict has not gone unchallenged. She herself was anxious to shade the picture of declining economic opportunities for women, arguing that although the development of capitalist agriculture originally displaced women workers, by the early decades of the nineteenth century inadequate male wages, the French wars, and fading employment opportunities in domestic industries, followed by the abolition of allowances in aid of wages, combined to promote the appearance of a new class of women day labourers.

Although she recognized the gains in employment for women in the burgeoning textile factories, she did not forget the domestic outwork destroyed by competition with centralized machine methods. She saw a concentration of work (and wages) on some women in certain localities rather than an overall expansion of jobs. Nor did she blithely assume that wages meant independence and were unambiguously beneficial. She lamented the exodus of work from the home to centralized specialized workplaces in that it detached women from the hub of productive life and relegated them to the rump of economic activities that remained domestic: primarily the administration of consumption and the management of reproduction. But at the same time she argued that this exodus improved domestic circumstances, left working-class women free for the first time actually to create a *home*, and was probably beneficial.

In section I we shall see how other authors have responded to Pinchbeck's arguments. But first we must establish why it is important to study the effects of industrialization on women's work and family lives. Women deserve attention as historic actors whose experiences were not always the same as men's. But an account of women's lives is important not just to provide a more complete understanding of the past but because without it major historical misreadings go unchallenged.

Take the question of what happened to the standard of living of the

¹ We wish to thank the Leverhulme Trust for the generous support which made this work possible, and to thank participants in seminars at the Universities of Michigan and Illinois and Northwestern University, and an anonymous referee for their helpful comments.

² Pinchbeck, *Women workers*, p. 122. For a less shaded description of the downgrading effects of economic changes on women's lives see Clark, *Working life*.

working class during industrialization: perhaps the most contentious issue in economic history. After more than 50 years of historical research a relatively optimistic consensus has emerged, although the date from which improvement can be established is still contested and probably later than originally thought. But this consensus is based on trends in indices of the real wages of adult males calculated from surviving labour and product market data. The real wage approach implicitly assumes that the same number of people were dependent on the male wage through time, that non-wage inputs into welfare did not decline, and that the earning opportunities of women and children were unaltered. Yet it is in just these areas that industrialization is argued to have brought significant changes.³ Measuring the impact of industrialization on family living standards merely by changes in the male wage, with no recognition of the importance of these issues, leads to distortion of the complex transition that occurred and neglects vital factors in the determination of family welfare.⁴

To take another example, in the absence of information on the economic activities of women and children, economic historians have used narrow measures of the labour force which in turn distort productivity estimates.⁵ A focus limited to the labour input of adult males must overestimate productivity, and if women's and children's labour input varied over the course of the industrial revolution, estimates of productivity growth are likely to be inaccurate.⁶ But census estimates of female participation are unavailable prior to 1841 and are suspect thereafter.⁷

This article provides evidence on the economic activity of women and children during the industrial revolution drawn from an innovative dataset of 1,781 household budgets which detail household composition, sources of income in kind or in cash, and expenditures for the years 1787 to 1865. The dataset has been compiled from 59 sources including contemporary social commentators, Parliamentary Papers, local archives, provincial record offices, and working-class autobiographies. Some of the sources are well known and widely quoted; others unpublished and unused.⁸ None has been systematically analysed to reveal patterns in women's work and variation in

³ Humphries, 'Lurking in the wings', p. 37.

⁴ For a detailed analysis of family incomes during the industrial revolution see Horrell and Humphries, 'Old questions'.

⁵ In this context note that Deane and Cole's estimates of the pre-1851 labour force and its industrial distribution were based on the adult male labour force figures (available in the censuses from 1831) and the backward projection of the 1851 ratio of adult males to all other employees by industry. While defending this as 'a reasonable assumption', they note that it would give misleading results for industries that were undergoing rapid structural change and 'obscures what seems to have been an important characteristic of the process of industrialisation, namely, the tendency for economic opportunities for child and female employment to increase': Deane and Cole, *British economic growth*, pp. 139-40. This would have the effect of overstating the size of the effective labour force in 1841 and even more so in 1831.

⁶ E. Higgs, 'Women workers in agriculture' (unpub. conference paper, 1992); Berg and Hudson, 'Rehabilitating', pp. 35-8.

⁷ E. Higgs, 'Women workers in agriculture' (unpub. conference paper, 1992); *idem*, 'Women, occupations and work'.

⁸ The data sources and information recorded are described in detail in Horrell and Humphries, 'Old questions', app. I.

the contribution of women and children to family incomes across sectors and over time during industrialization.

Here we focus on a subset of the sample comprising families which have both a husband and a wife present (1,459 cases), where the husband's/father's earnings are positive and can be identified separately from those of the mother and children, and where the male head is employed in a known occupation (1,161 cases). Thus our data refer to the economic activities of married women whose husband is present and in work, though not necessarily in full work.

Our sample comprises whatever records have survived and been identified, however distributed across time, space, and family type. It is clearly not representative in the sense that average values calculated from it represent population means. To establish historical patterns from such data requires ingenuity. First the observations have to be grouped according to some meaningful principles. Here the putative variation in women's participation and women's and children's contributions to family incomes over time and according to local economic conditions guides the research. The data are sorted according to: (1) the subperiod during which the budget was recorded; and (2) the husband's/father's occupation, taken as a proxy for local economic opportunities. Occupationally specific experiences can then be weighted by the actual importance of the groups at different dates to recover the aggregate trends.

The data are grouped into five uneven subperiods. This periodization represents a compromise between the conventional perception of a watershed in 1815, and our own interest in separating periods of economic recession, namely 1816-20 and 1841-5, from periods of relatively full employment. These subperiods are adequately, if not evenly, covered by the budgets, with the smallest sample in 1841-5 (94 observations).⁹

Our use of husband's/father's occupation as the other main criterion for grouping the budgets may be more controversial. Occupation of the male head of household was taken as the best summary indicator of local economic conditions, and specifically of the job opportunities and types of work available to other family members.¹⁰ It was almost universally recorded for our families, and we consider that it affords a clearer indication of family employment opportunities than an alternative geographical variable such as county of residence.¹¹ Overwhelming *a priori* evidence that economic conditions in agriculture varied dramatically across major groups of counties prompted the subdivision of those families whose husband/father was an agricultural labourer according to whether he worked in a high- or low-wage county.¹² Although coverage of the broad occupational groups is uneven, there are more than 50 families in each group, with agricultural

⁹ Alternative periodizations were considered and these led to the same general conclusions.

¹⁰ Male rather than female occupations were also used for the pragmatic reason that many women had undefined or multiple occupations.

¹¹ Such a view is consistent with the importance of kinship networks in procuring jobs and with children being increasingly likely to work in the same occupation as their father as industrialization progressed. See Anderson, *Family structure*; Horrell and Humphries, 'Child labor'.

¹² The counties are grouped using information from Hunt, 'Industrialization and regional inequality', pp. 956-66.

labourers' families in the low-wage counties constituting the largest sample and tradesmen's families the smallest.

It remains possible that the data sorted by subperiod and male occupation are misleading, if, for example, in one time period the observations for, say, factory families are all drawn from certain districts, while in another subperiod they are drawn from other regions with different experience. Thus it is important to keep track of the original data and any potential regional biases they may contain.¹³ The appendix details the geographical coverage of the dataset by time period and male occupational group. Agricultural families are widely dispersed across regions for most time periods. Factory families, not surprisingly, are concentrated in Lancashire and Cheshire, but this is true for all subperiods except 1821-40, when a significant number of families in this group came from Somerset. Outworking families also commonly lived in Lancashire and Cheshire, but are also observed in midland counties. Mining families, although inevitably limited to the mining districts, are spread within these areas and over time. The only obvious potential source of bias is that almost all the budgets for 1816-20 are drawn from Lancashire, although it is not clear either that the Lancashire experience of the postwar dislocations would be significantly unrepresentative, or that this concentration produces a misleading comparison with occupationally specific observations before 1816 or after 1820.

The credibility of the data is reinforced by several additional considerations. First, many of the social commentators involved in collecting the accounts selected their cases with an eye to their representativeness. Secondly, most of our budgets were accompanied by some evidence on expenditures which provide an internal check on the consistency of the income estimates. Finally, the budget estimates of nominal male earnings exhibit reassuring similarities with existing occupational and aggregate series.¹⁴

In section I we examine the wider literature on women's and children's activities during industrialization and investigate attempts to isolate the competing hypotheses found in varied historical accounts. Next, trends in participation and earnings are identified and discussed as a preliminary to the development of a model of married women's participation behaviour.

I

Orthodox historians have not so much challenged Pinchbeck's views as neglected them. The classic texts simply assumed that the industrial revolution created new job opportunities for women and children, especially in manufacturing.¹⁵ It was left to others to infer that industrialization promoted women's independence and emancipated them from the patriarchy of the pre-capitalist household.¹⁶

¹³ But note that the regression analysis performed later will control for these potential sources of bias.

¹⁴ See Horrell and Humphries, 'Old questions', p. 854 and n. 25.

¹⁵ See Deane and Cole, *British economic growth*, pp. 139-40; Deane, *First industrial revolution*, p. 147; Mathias, *First industrial nation*, pp. 175-6.

¹⁶ Thus, among the beneficial long-term consequences of the industrial revolution is listed its positive contribution to 'the emancipation of women': see Hartwell, 'Rising standard of living', p. 416. For the importance of this theme in historical sociology, see Thomas, 'Women and capitalism'.

One particular strand in this argument neatly connects the productive deployment of women and children and their expanded contributions to family income, to the (alleged) ability of the British economy to pull itself up by its own bootstraps through the expansion of domestic demand. So while 'the small earnings of women and children had made their modest contribution to the family budget for centuries . . . with the industrial revolution their earnings became central to the domestic economy . . . they made a significantly larger contribution [and] they made it to a significantly larger number of families'.¹⁷ Through this 'McKendrick effect' women's and children's increased work and wages becomes a cause as well as a consequence of the industrial revolution.

More recently, mainstream economic historians have shown greater awareness of the importance of women's and children's earnings and activity rates to an evaluation of well being during industrialization. Lindert and Williamson write that although 'thus far we have taken the orthodox path by focusing solely on adult male purchasing power. . . . Yet questions about the work and earnings of women and children have always been lurking in the wings'.¹⁸ They 'add on' some limited quantitative evidence on women's work and wages, the ambiguity of which seems inconsistent with their optimistic conclusion that, as far as wages were concerned, working women may have closed distance on unskilled men from 1750 to 1850: 'gleanings of data on relative weekly earnings . . . hint as much'. But they 'cannot be sure that there was any upward trend in the true relative values of women's work'.¹⁹ Perhaps women simply worked longer hours to maintain their relative position. Even if relative earnings were constant, Lindert and Williamson perceive participation to be declining. But again they are determinedly optimistic, reading this as voluntary, as 'the shadow price of women's time rose faster than the observed wage rate'.²⁰

The view that the industrial revolution increased women's and children's employment is not always associated with an optimistic perspective on the standard of living. Pessimists have made much of the negative effects of women and children's employment in mines and mills during the period of industrialization.²¹ More recently, Berg and Hudson, while not directly concerned with the standard of living *per se*, have restated the case for viewing the industrial revolution as a major discontinuity, citing the employment of women and children as one of its novel features.²²

Meanwhile a separate but parallel debate on the implications of industrialization for women's welfare has been rumbling on, both in the pages of specialist journals and in monographs explicitly focused on gender issues.²³ Some authors have searched for ways of conceptualizing the links between changes in the economy and changes in women's work and family lives. In

¹⁷ McKendrick, 'Home demand', p. 186. See also Mathias, *First industrial nation*, pp. 175-6.

¹⁸ Lindert and Williamson, 'English workers' living standards', p. 17.

¹⁹ *Ibid.*, p. 17.

²⁰ *Ibid.*, p. 19.

²¹ Hammond and Hammond, *Town labourer*; Marx, *Capital*.

²² Berg and Hudson, 'Rehabilitating', p. 37.

²³ For useful summaries and bibliographies, see Thomas, 'Women and capitalism'; Hudson and Lee, *Women's work*, ch. I.

this context feminist pessimists have argued that in the eighteenth and nineteenth centuries women's access to resources was unequal. Market, state, and familial processes of distribution discriminated against them. Moreover, these processes were not constant in the face of economic change. Industrialization opened new opportunities but closed others, and, less guardedly than Pinchbeck, these authors conclude that on balance women lost. This approach dovetails neatly with the influential view that capitalism and patriarchy as dual and imbricated structures 'cause' women's oppression. The most compelling historically specific version of the capitalist patriarchy model identifies the deterioration in women's position with protective labour legislation, the growing influence of chauvinist trade unions, and campaigns for 'a family wage' which are depicted as excluding women from jobs which paid well enough for them to support themselves and their children, and crowded them into badly paid and insecure sectors of the labour market, thereby promoting their dependence on husbands and fathers.²⁴

Is it possible to reconcile these seemingly disparate views? One source of compromise is *timing*. Perhaps the process of industrialization first increased female opportunities, only then to close them down. Some authors hint at such a scenario.²⁵ It is also possible that reconciliation can be pursued by distinguishing between proto-industrial activities and factory production. For some authors it is the expansion of the former that was associated with the growth of female employment, while others have focused upon factory production proper.²⁶ More generally, if outcomes for women were occupationally or perhaps regionally specific, it might help to explain how authors can simultaneously see opportunities both waxing and waning. In addition, occupationally specific stories seem essential to tighten the links between outcomes and the proximate institutional causes cited in the capitalist patriarchy model.

It might be possible to square the claim that industrialization increased women's work with the evidence of a strong female involvement in domestic industry by shifting the emphasis to the terms and conditions of the work. Thus Berg and Hudson write that what was new about women's employment 'in the period of the classic industrial revolution was the extent of its incorporation into rapidly expanding factory and workshop manufacturing and its association with low wages, increased intensification of work, and labour discipline'.²⁷ Can the empirical evidence help to clarify the arguments?

Unfortunately, empirical evidence is hard to find on any scale and in any detail.²⁸ Many authors have used nineteenth-century census data to demonstrate declining female participation and increasing employment segregation, although the censuses at best can only help with trends after 1841, in the last lap of the industrial revolution.²⁹ But even for this period

²⁴ Hartmann, 'Unhappy marriage'; Barratt, *Women's oppression*; Walby, *Patriarchy at work*; Benenson, 'Family wage'.

²⁵ Berg and Hudson, 'Rehabilitating', p. 37.

²⁶ Levine, *Reproducing families*; Deane, *First industrial revolution*.

²⁷ Berg and Hudson, 'Rehabilitating', p. 37.

²⁸ Ibid., p. 35.

²⁹ Richards, 'Women in the British economy'; Humphries, 'Most free from objection'; Jordan, 'Exclusion of women'; D. C. Betts, 'Women and work: industrial segregation in England and Wales,

the census enumeration of women's employment is demonstrably inaccurate.³⁰ In 1841 householders were advised that 'the profession etc of wives, or sons or daughters living with and assisting their parents but not apprenticed or receiving wages need not be inserted' on the census return. In 1851 householders were instructed that 'the occupations of women who are regularly employed from home, or at home, *in any but domestic duties*, [are] to be distinctly recorded'.³¹ So householders were not asked to say what work was performed by the members of their households but to specify what was their 'rank, profession or occupation', that is, the definition of participation was based on an occupational designation. Within this framework the extent to which householders and enumerators recorded women's work varied. Checks provided by other local and national evidence such as wage books and oral histories suggest substantial under-reporting of female work in the agricultural sector, in manufacturing, and in certain service occupations.³²

Frequently enumerators omitted any occupational designation for married women whose work was thus particularly under-reported.³³ Oral histories suggest that part-time work was also systematically under-recorded, again with particularly severe implications for an accurate view of married women's work.³⁴

The invisibility of married women's work may well have distorted views of the nineteenth-century labour force; for example the view that factory work was confined to the young and single may be a statistical artefact.³⁵ At the same time the census probably over-reports domestic servants who frequently bore some blood or marriage relation to other household members, and who are therefore of dubious status.³⁶ If the census is too late, and should in any case be checked against sources, what evidence can be used?

The alternative is to put together a picture of trends from piecemeal data on employment and participation. The story is complicated by the self-provisioning or handicraft production for direct marketing which occupied many women and children.³⁷ Somehow estimates of the economic value of these activities have to be factored into the accounts. At this point Pinchbeck's scholarly trawl through the qualitative and quantitative evidence seems masterly. Subsequently progress has stalled. Lindert and Williamson's citation of a few figures on female wage rates stands in sharp contrast to

1851-1901' (Dept. of Economics, Southern Methodist Univ., working paper, 1991). Furthermore, it is not easy to separate married women's work from the employment of all females in the census data.

³⁰ Higgs, 'Women, occupations, and work'.

³¹ Ibid., p. 63. Note that the work of women in the family economy was not explicitly included and the directive probably served to restrict the census to work done in the market setting. Moreover, no guidance was given to the treatment of part-time, casual or seasonal work except that to be recorded it had to be 'regular'.

³² E. Higgs, 'Women workers in agriculture' (unpub. conference paper, 1992); Lown, *Women and industrialisation*; Davidoff, 'Separation of home and work'; Walton and McGloin, 'Holiday resorts'; Gerrard, 'Invisible servants'.

³³ Lown, *Women and industrialisation*.

³⁴ Roberts, 'Working wives'.

³⁵ Hutchins and Harrison, *Factory legislation*; Branca, 'A new perspective'.

³⁶ Anderson, *Family structure*; Higgs, 'Women, occupations, and work'.

³⁷ Humphries, 'Enclosures', pp. 35-42.

their extensive documentation of men's wage rates over some 18 occupations. More serious attempts to compile series on female earnings contradict Lindert and Williamson's optimism but are themselves occupationally and temporally specific, and stand to be challenged by evidence for other groups of women workers in other times and places.³⁸

There is even less certainty about overall trends in opportunities. The census evidence, while widely used to confirm claims of declining trends in the later nineteenth century, can do little to inform us about earlier events. It seems weak to argue that *logically* participation had to be higher in the 1780s than the 1850s because the economy was less developed in the earlier period and could support fewer non-workers.³⁹

Creative researchers have mined other data sources to try to get a grip on trends in employment in the pre-census period. Earle has searched depositions of female witnesses before the London church courts in the late seventeenth and early eighteenth centuries for detailed information about women's employment. On this basis he has argued that a very high proportion of the women of the period were wholly or partly dependent on their own earnings; that the structure of occupations was close to that revealed by the 1851 census, as was the degree of gender concentration; and that a high proportion of women's occupations were casual, intermittent, and seasonal.⁴⁰

Snell has used settlement examinations of applicants for poor relief to establish the seasonal distribution of unemployment by gender, and then used this to infer that the division of labour by sex in agricultural work tightened after 1750, bringing with it a declining participation of women within the agricultural workforce.⁴¹ Sharpe has used age at marriage and evidence on female migration to infer the possibilities for female independence afforded by the lacemaking industry in Colyton.⁴² But the problem remains that so long as the data cited are regionally and occupationally specific, counter-examples may be forthcoming.

Indeed the problems involved in obtaining empirical evidence have led one recent author to despair of defensible generalizations: 'Histories of women on the grand scale, whether optimistic or pessimistic, are amazingly premature when the available documentation is so sketchy.'⁴³ But the prospects for less grand histories may not be so bleak. We must work from the detailed studies of particular occupations, and using quantitative data innovatively must push back into the eighteenth century. This article is intended as a contribution to this project.

II

Women's work, and that of married women in particular, was probably just as invisible to the men who gathered the information surveyed here as

³⁸ See Neale, *Writing marxist history*, p. 117.

³⁹ Richards, 'Women in the British economy', p. 337.

⁴⁰ Earle, 'Female labour market'.

⁴¹ Snell, *Annals*.

⁴² Sharpe, 'Literally spinsters'.

⁴³ Thomas, 'Women and capitalism', p. 547.

it was to census enumerators and wages clerks. In describing a family's circumstances our sources were free to record whether or not the wife worked and at what particular occupation. A husband's occupation was considered vital evidence, and was not recorded in only 3 per cent of cases (42 out of the 1,459 husband/wife households in our dataset), whereas for some 567 wives (39 per cent of these cases) either occupation and/or work status is unknown. A further 538 (37 per cent) are explicitly recorded as not working. Defining participation by the designation of an occupation (definition *A*) gives the first series in table 1.

But whether or not our sources were myopic about married women's occupations, they were under some pressure to record the *earnings* of wives and mothers. Their brief was to provide a summary of the economic circumstances of families and this included giving details of expenditure. The omission of women's and children's earnings left household accounts suspiciously in deficit.⁴⁴ Sources of income could not be ignored. For some families commentators conflated women's and children's earnings but sometimes it is possible to isolate the earnings of wives/mothers. In the cases where women's and children's earnings are given together it seems unlikely that women's earnings were zero. Non-zero earnings provide a second criterion by which to judge women's membership of the labour force and this definition (*B*) generates the second series shown in table 1.⁴⁵

The occupational definition, as expected, by and large produced lower estimates of participation than the earnings definition. This is especially true for those women who were married to agricultural workers, particularly in low-wage counties. The chronic under-reporting of occupations, while partly ideological, also reflects the intermittent and varied work undertaken and its tendency to be embedded in the family economy.⁴⁶ What occupational heading adequately describes the married woman who 'supposing her to be . . . industrious' would have spent six weeks hay making, two weeks reaping, two weeks cutting beans, two weeks raking oats and barley, but who would also have earned by her needle and washtub?⁴⁷ How should the ubiquitous designation 'assisting' be coded in outworker families?

Not surprisingly, an occupational designation is a less chronic underestimator of the participation of women married to men who had non-agricultural occupations, and so were more likely themselves to have more permanent, full-time, and altogether conspicuous work. In mining and metalworking, for example, although the samples are inevitably small, the *A* and *B* definitions give rise to almost identical estimates. Nonetheless, the essentially opportunist and fragmented character of married women's work can be

⁴⁴ Thus in drawing up a comparative statement of the incomes of 48 labourers, one poor law sub-commissioner reports his suspicions about one man's accounts: 'refuses to give information of the earnings of his wife who is post-woman, errand woman, and keeps a shop': *S.C. on Poor Law Amendment Act* (P.P. 1837-8, xviii), pt. III, p. 453.

⁴⁵ The two definitions can be combined into a broader hybrid definition of participation (*C*): women are counted in the labour force if they have either an occupational designation or positive earnings. The assumption is that a recorded occupation implied habitual employment even if a specific income was not reported.

⁴⁶ See, for example, the recent survey by Bythell, 'Women in the workforce', pp. 33-4.

⁴⁷ *Report from Commissioners on the Poor Law* (P.P. 1834, xxviii), p. 269.

Table I. Summary of trends in married women's participation rates^a

High-wage agriculture			Low-wage agriculture			Mining			Factory			Outwork			Trades			Casual			
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
1787-1815	23.8	52.4	54.8	33.3	83.8	84.9	40.0	20.0	40.0	26.3	36.8	45.5	45.5	62.5	62.5	0.0	100.0	100.0	65.7		
1816-20	31.6	34.2	34.2	n.a.	(99)	(5)	25.9	27.8	27.8	4.2	4.2	38.9	38.4	41.9	26.7	30.0	30.0	66.7	66.7	66.7	
1821-40	6.7	22.2	22.2	11.8	84.6	84.6	33.3	33.3	33.3	71.4	78.6	85.7	47.9	52.1	54.3	0.0	62.5	62.5	8.3	66.7	66.7
1841-5	20.0	40.0	40.0	44.4	55.6	55.6	6.3	6.3	9.4	100.0	0.0	100.0	38.6	61.4	72.7	100.0	100.0	100.0	0.0	0.0	57.5
1846-65	4.6	47.8	47.8	0.0	63.0	63.0	0.0	0.0	0.0	100.0	100.0	100.0	1.8	67.3	69.1	42.9	42.9	42.9	n.a.	45.3	(94)
	(46)	(46)	(81)	(9)	(32)	(1)	(1)	(1)	(5)	(5)	(5)	(5)	(55)	(44)	(44)	(7)	(7)	(7)	(1)	(1)	(195)

Notes: ^a Participation defined as: A having either a recorded occupation or non-zero earnings.

^b Aggregated using male employment weights for working-class occupations: see Horrell and Humphries, 'Old questions', n. 40 for the construction of these weights.

Women's participation in low-wage agricultural families in 1816-20 is assumed to be the same as in the previous period. Women's participation in casual occupations in 1846-65 is assumed to be zero as in the previous period. Sample sizes in parentheses.

Source: see text

illustrated even within this group: witness the miner's wife who when times were hard in 1842 '[got] a little to make up the rent by making colliers' flannel shirts at 7d. apiece', paid for the black lead and mustard 'by any little job' she could get, obtained salt in exchange for old bones, and took in a lodger.⁴⁸ Even in the factory districts women often undertook ancillary work which was not subject to mill discipline and organization, for example picking cotton, a hand process that could be done intermittently and at home.⁴⁹ Only 49 women with non-zero earnings and a further five with zero earnings reported factory occupations (5 per cent of the sample) though some of the women who earned but had no recorded occupation may also have worked in factories.⁵⁰

The occupational and earnings definitions are also close for women in outworkers' families in the years between 1787 and 1840. But the earnings definition generates dramatically higher estimates of participation in the final periods.

Variation in under-reporting of wives' occupations creates anomalies in cross-sectional comparisons. For example, definition A suggests that women in agricultural families participated in the workforce much less frequently than miners' wives or the wives of outworkers, whereas the earnings definition (B) suggests a higher level of participation among the wives of agricultural labourers, although this was probably seasonal and part-time. Note too that the contribution of women in both agricultural and domestic industry families had become almost invisible in accounts of occupations by mid century (capitalism 'in the full flood of industrialism' using 'a principal supply of labour so modestly'⁵¹) but in both cases the earnings definition suggests a much higher level of involvement. Thus, as other authors have suggested, occupational designations, and therefore the census returns, are likely to underestimate married women's paid work.

The most inclusive definition of participation—by which a woman is counted as active if she has either earnings or an occupation—provides estimates which vary over time by occupation, and within agriculture by region. In all occupations the effects on women's work opportunities of the depression following the Napoleonic wars are evident. While some of the decline may be a consequence of the regional concentration of these observations, some is undoubtedly real. Other authors have noted the severity of this downturn, and the male earnings estimates from the budgets are comparable to alternative occupational series based on wider regional

⁴⁸ First Report of Midland Mining Commission (P.P. 1843, XIII), p. 116.

⁴⁹ Collier, *Family economy*, p. 17.

⁵⁰ The budgets do not detail the type of work undertaken by over half of those women with earnings or an occupation recorded, a proportion which remained reasonably stable throughout. The most important occupation specified was outwork, with less than 10% recording agricultural or casual work. Very few women worked in mining or trades occupations. Around 15% of working married women were recorded as working in factories at the turn of the century and this had declined to 10% by the 1830s. In fact, 60% of women with husbands with factory occupations were themselves working in factories in 1831-50, a higher proportion than the 14% of married women employed in factories in Preston in 1851: see Anderson, *Family structure*, p. 72. In the 1840s, 38% of our women are working; this is considerably higher than the estimate of 7% in Birmingham in 1841: see Barnsby, *Birmingham working people*, p. 195, and again illustrates the downward bias of census estimates.

⁵¹ Richards, 'Women in the British economy', p. 338.

dispersions.⁵² The postwar dislocation had a common impact on women's work experience. Subsequently experiences diverged.

Married women's participation does appear to have declined during industrialization for families whose head worked in mining or had a casual occupation. The story is more ambiguous for agricultural labourers' wives. In high-wage agricultural areas women's participation declined, then increased around mid century, consistent with the Pinchbeck hypothesis. In low-wage counties women's participation remained high but showed some decline after 1840.⁵³ In contrast the participation rates of outworkers' wives increased after the 1816-20 slump: perhaps their contributions became increasingly necessary for family survival as male earnings were squeezed by falling piece rates and competition from machine methods.⁵⁴ Women in factory areas also showed steadily increasing participation after the postwar decline. The consequences of industrialization for women's work varied and any overall picture must depend on the weights attached to these individual experiences.⁵⁵

The last column in table 1 summarizes the occupationally weighted, aggregate participation series. This shows the sharp decline in participation in the postwar slump, the increase in the 1830s, and further loss of jobs in the 'hungry forties', a trend which continued after mid century.

Overall, then, there is a suggested decline in participation.⁵⁶ But these data do not, as yet, tell us anything about causation. Were women leaving the labour force voluntarily as husbands' incomes rose, or were they being driven out by discrimination or structural changes that reduced women's jobs? To help answer some of these questions we turn to the evidence on women's and children's contributions to family income.

III

Table 2 summarizes the contribution of men and of women and children together in our sample of families.⁵⁷ The patchy increase in the absolute amounts contributed by women and children to low-wage agricultural family incomes represents a fairly narrow range of variation in the percentage contributions. Over the period as a whole, women and children contributed

⁵² Lindert and Williamson, 'English workers' living standards', p. 15, shows the severity of the postwar slump. For comparisons of male earnings from different sources see Horrell and Humphries, 'Old questions', p. 854, tab. 6 and n. 25.

⁵³ Declining opportunities for women in agricultural areas after 1815 are found elsewhere. See Allen, *Enclosure; Snell, Annals*.

⁵⁴ This would be consistent with the evidence of Lyons, 'Family response'.

⁵⁵ For a qualitative survey, largely supportive of our results, of women's work across several occupations see Bythell, 'Women in the workforce'.

⁵⁶ The decline of married women's work would imply downward bias in the use of the 1851 census proportions to predict the size of the labour force in earlier periods.

⁵⁷ The remaining components of household income were poor relief and income in kind, for instance gleaning and coal provided by the employer. Figure 1 demonstrates the relative unimportance of this other income beyond 1815 and outside the agricultural sector. Families were heavily dependent on earnings. Poor relief formed much the largest part of other income but this was unimportant for factory, mining, and outwork families and it is only found in 1821-40 for our broadly defined trades families, constituting 7% of total income. The main recipients were agricultural families but poor relief made up less than 1% of total income on average and was virtually non-existent by the final period. The exception was low-wage agriculture in 1821-40 when 8% of family income was from poor relief.

between 18 per cent and 22 per cent of family incomes. There was more variation in the high-wage counties (from 7 per cent to 20 per cent), the relatively high contributions in the earlier years probably reflecting industrial and proto-industrial earnings. The increase in the amounts of income contributed by women and children to agricultural families from 1787-1815 to 1816-20 in the high-wage counties, and from 1787-1815 to 1821-40 in those where low wages prevailed, constitutes some evidence for the 'McKendrick effect' though this was both minor and short lived given the subsequent decline in contributions. The relative contributions of wives and children appear to follow the inverted 'U' shape suggested by some feminist pessimists. The welfare implications of the eventual decline in contributions depend on its causes. The absolute and relative poverty of these families during the years when contributions from women and children were low and falling makes it difficult to see the decline as the result of income effects on the demand for women's and children's leisure.⁵⁸

Miners' and metalworkers' wives and children contributed first more and then less to family incomes: another occupation for which the inverse 'U' shape seems valid. Again any 'McKendrick effect' was transitory and, given the continuous decrease in wives' participation, probably has more to do with trends in children's earnings. The transition for these families to increased dependence on men was perhaps made more abrupt by the Mines Regulation Act of 1842 which generalized the hitherto patchy decline in women's and children's work underground.⁵⁹

Women and children whose husbands and fathers worked in factories contributed a higher share of family income than those in all other occupational categories except outworkers, with some increase during the process of industrialization. But given that few of these women themselves worked in factories, and that the factory districts afforded good employment opportunities for children, the children's contribution was probably paramount.

Contributions of women and children to outworkers' family incomes were persistently high in relative terms, though declining in absolute amounts, illustrating both the adverse secular trends in family incomes and the important role that these earnings played in family survival and the persistence of employment in certain declining occupations. Even here there is a decline in the relative contributions in the post-1845 period.

The contributions of the wives and children of artisans increased and then decreased in both absolute and relative terms. The pattern is similar to that within agriculture and mining.⁶⁰ The occupationally specific trends are compared in the bar charts reproduced as figure 1.

With the exception of factory families, women and children do not appear to have increased substantially their relative contributions to the household

⁵⁸ For families in the agricultural sector real male earnings were static or falling until the 1840s and real family incomes only began to make minor advances in the 1830s: see S. Horrell and J. Humphries, 'Male earnings estimates from household accounts' (unpub. working paper, 1992).

⁵⁹ See Humphries, 'Protective legislation'.

⁶⁰ The numbers in the 'casual' category are too small to permit any general comments although women's and children's earnings were particularly important to these families.

Table 2. Contributions to family income by men, women, and children

	<i>Family income (£)</i>	<i>Sample size</i>	<i>Man's contribution (%)</i>	<i>Woman's and children's contribution (%)</i>	<i>Woman's contribution^a (%)</i>	<i>Sample size^a (%)</i>
<i>High-wage agriculture</i>						
1787-1815	25.08	(42)	88.5	10.5	5.2	(39)
1816-20	41.21	(38)	75.8	19.9	3.8	(31)
1821-40	36.68	(45)	87.5	9.2	1.7	(40)
1841-5	34.74	(5)	91.4	7.4	5.0	(5)
1846-65	41.86	(46)	86.1	13.9	0.5	(24)
All time periods	36.19	(176)	85.0	13.0	3.0	(139)
<i>Low-wage agriculture</i>						
1787-1815	23.00	(99)	78.5	18.4	9.6	(99)
1821-40	31.86	(136)	62.6	21.9	11.6	(81)
1841-5	31.29	(9)	77.7	20.4	5.6	(9)
1846-65	37.02	(81)	80.2	19.6	1.9	(35)
All time periods	30.43	(325)	72.3	20.2	8.9	(224)
<i>Mining</i>						
1787-1815	45.37	(5)	74.0	20.1	8.2	(5)
1816-20	53.81	(54)	71.6	26.3	3.9	(54)
1821-40	87.24	(6)	74.0	25.3	3.0	(6)
1841-5	52.56	(32)	86.5	13.4	0.5	(32)
1846-65	78.66	(1)	89.8	0.0	0.0	(1)
All time periods	55.27	(98)	76.9	21.4	2.9	(98)

	Factory	Outwork	Trades
1787-1815	74.77 (19)	67.5 (22)	32.7 (19)
1816-20	67.29 (24)	72.5 (28)	25.1 (24)
1821-40	71.18 (28)	63.3 (2)	36.5 (16)
1841-5	81.90 (2)	60.3 (5)	39.7 (2)
1846-65	93.60 (78)	52.9 (7)	47.1 (1)
All time periods	72.57	66.4	32.8 (59)
			4.9
1787-1815	59.17 (22)	57.4 (198)	40.9 (186)
1816-20	44.19 (94)	62.8 (94)	37.0 (78)
1821-40	43.78 (44)	61.8 (44)	35.4 (44)
1841-5	31.33 (55)	60.7 (413)	38.7 (27)
1846-65	43.15 (413)	73.6 (413)	26.4 (354)
All time periods	43.39	63.5	35.6 (354)
			8.3
1787-1815	44.36 (8)	80.0 (30)	16.5 (7)
1816-20	45.74 (8)	80.8 (8)	19.2 (26)
1821-40	47.67 (1)	65.6 (1)	23.9 (3)
1841-5	41.03 (7)	95.1 (7)	4.9 n.a.
1846-65	68.80 (54)	86.7 (54)	3.4 (7)
All time periods	48.72	79.4	17.2 (43)

Note: a Observations where women's earnings can be identified separately from those of children.
Source: see text

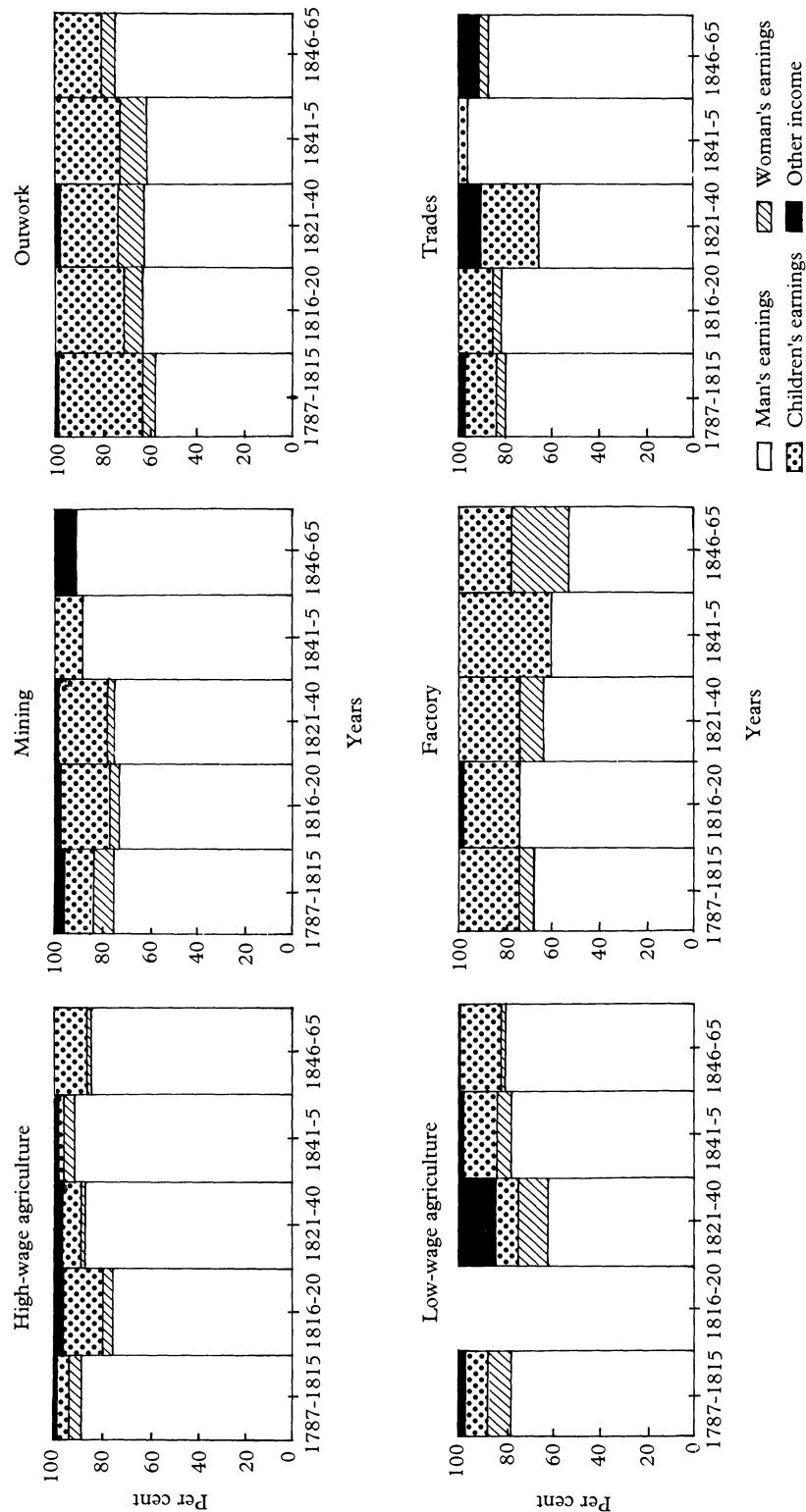


Figure I. Contributions to household income, per cent

Notes: The percentage contributions to total income are taken from table 2. Other income is the residual after men's and women's and children's earnings are taken from total income. Women's and children's contributions are separated using the information on women's contributions, leaving children's as a residual. There is no information on the split of women's and children's earnings in the trades category in 1841-5, so the figure shows the whole amount attributed to children.

Source: tab. 2

in most of the occupational groups. If anything, there was a decline, with increasing dependence on male earnings as its mirror image. Moreover, male earnings appear to have increased in relative importance more than the earnings of other family members contracted, as other income declined from the modest levels seen in late eighteenth-century budgets. Insofar as there was a heyday for the democratic sourcing of family incomes it appears to have been in the years after the Napoleonic wars and before 1835, though perhaps later for outworkers.

The aggregate trend may still have been towards increased contributions from women and children if an increasing share of families fell into categories in which male earnings were relatively unimportant. But although the economic restructuring associated with industrialization may have increased the importance of the outworkers' group until the 1830s, its decline thereafter, and the increased importance of artisan and mining families in which women's and children's earnings were less important, suggests that in aggregate the trend in the relative contributions of women and children was probably negative.

Three important conclusions emerge. The first is that accounts of women's and children's contributions to family incomes must be conditional on their occupational and regional identity, which limits 'grand theories' of the causes of women's marginalization. Theories that depict women, whatever their circumstances, as undifferentiated victims of allied economic and ideological forces must give way to detailed analyses of institutional changes at occupational and regional levels.

Second, except in the cases of factory and outworker families, women's and children's contributions were relatively small at the end of the eighteenth century and remained so throughout the period. While few families were entirely dependent on husbands and fathers, for many families male earnings were of crucial importance. This reliance preceded industrialization, with husbands'/fathers' earnings contributing more than three-quarters of family incomes to all groups other than factory workers and outworkers between 1787 and 1815. Industrialization afforded at most a chimera of independence. Only in the case of outworkers did women and children play a persistent and substantial role in the sourcing of income.

Third, the variation of women's and children's contribution over time and across occupations is not consistently related to family income level. Low-wage agricultural families at both the beginning and the end of the period were among the poorest, yet the percentage contributions of wives and children were small relative to much better-off families whose fathers were employed in factories, for example. This suggests demand-side constraints: an interpretation reinforced by the evidence that as total family real incomes in this sector struggled upwards after 1835, wives and children contributed proportionally more, not less. On the other hand, for miners' families the evidence is consistent with a situation where increasing family incomes driven by higher male earnings secured a relaxation of the efforts of wives and children. Symmetrically, stagnant male earnings perhaps enforced the persistently high contributions from other members in outworking families. Artisans seem to have made an early transition to a

family structure in which women's and children's earnings were relatively unimportant though they were not the highest earners and real male wages did not increase until 1835.⁶¹ It remains possible that women and children were constrained by demand in their attempts to contribute to family income, and that a man's occupational status carried with it ideas about appropriate employment patterns within families that were relatively independent of his earnings. This again rules out universal explanations (capitalism, patriarchy) or at least demands that such explanations contain detailed, proximate, occupationally specific, institutional causes of the outcomes described.

Although the isolation of married women's contributions unfortunately reduces the sample sizes in certain cells to unreliable small numbers, in general, table 2 confirms the suspicions voiced above that children's contributions exceeded those of their mothers. Only in low-wage agriculture at the peak of industrialization did wives and mothers match the contributions of their children. In agricultural families the relatively high participation rates of wives and mothers generated at most 5 per cent of family incomes in high-wage and 12 per cent in low-wage counties, which clearly reflects the seasonal and discontinuous nature of the work undertaken. In mining families, married women's contributions were most important early on, but even then constituted only around 8 per cent of income. Women who were married to men employed in factories also appear to have made relatively small contributions except in certain exceptional families. Outworkers' wives added over 11 per cent during 'the hungry forties' but their help was halved by mid century. Artisans' wives were dependent on the earnings of husbands and other family members throughout the period. Only perhaps in low-wage agriculture and outworking families in certain periods did wives' and mothers' earnings make up over 10 per cent of families' incomes and even then children's earnings were as important or more so.⁶²

Wives' earnings did not boost those of their husbands to generate significant increases in disposable income. From a fairly uniform picture at the end of the eighteenth century, with wives contributing between 3 and 10 per cent of family income across occupations, untidy and occupationally specific patterns developed: a fairly steady decline in high-wage agriculture and mining; growth and then decline in low-wage agriculture and outwork; perhaps some increase in families whose heads were employed in factories, though the lack of observations in the later periods makes this little more than guesswork; and stability in the archetypically male-breadwinner families

⁶¹ Real male earnings and family incomes are given in S. Horrell and J. Humphries, 'Male earnings estimates from household accounts' (unpub. working paper, 1992).

⁶² To put our findings in perspective: Meyering, using Le Play's French family budgets, found that a peasant's wife in 1861 contributed 20% of family income (not including housework), a weaver's wife at about the same time, some 7% of family income, and the industrious wife of a Republican Guard in Paris in 1881, 15% of family income: Meyering, 'La petite ouvrière'. The figure for Le Play's weaver's wife fits well with our data. The striking difference is the fairly substantial contribution made by the relatively prosperous Parisian. Differences in the expectations of women within bourgeois families in the nineteenth century may help to explain persistent divergences in patterns of female activity between Britain and France. Working married women in Britain in 1984 contributed some 24% of family income (Horrell, 'Working-wife households', p. 53), whereas women in France contributed 34-48% of household income in 1981 (Bouillaguet-Bernard and Gauvin, 'Women's employment', p. 172).

of artisans. In almost all the groups the contributions of married women were fading by mid century and had in any case never constituted much more than a taste of independence.

Table 3. *Earnings of working married women as percentages of family income and husband's earnings^a*

	<i>1787-1815</i>	<i>1816-1820</i>	<i>1821-1840</i>	<i>1841-1845</i>	<i>1846-1865</i>	<i>All time periods</i>
High-wage agriculture						
% family income	9.2	16.7	13.5	12.5	12.5	11.4
% husband's earnings	11.7	22.3	35.2	16.2	14.3	17.2
Sample size	(22)	(7)	(5)	(2)	(1)	(37)
Low-wage agriculture						
% family income	11.4		15.6	10.0	13.4	13.1
% husband's earnings	15.7	n.a.	27.5	27.6	15.9	20.8
Sample size	(83)		(60)	(5)	(5)	(153)
Mining						
% family income	40.9	13.9	9.1	8.5		14.2
% husband's earnings	69.2	26.4	16.7	10.3	n.a.	26.0
Sample size	(1)	(15)	(2)	(2)		(20)
Factory						
% family income	23.1	17.6	15.6		24.3	18.2
% husband's earnings	48.2	21.4	22.6	n.a.	37.5	29.9
Sample size	(4)	(1)	(10)		(1)	(16)
Outwork						
% family income	14.7	20.9	24.8	18.9	18.3	20.9
% husband's earnings	24.1	41.6	55.3	32.5	23.9	41.1
Sample size	(7)	(65)	(33)	(27)	(9)	(141)
Trades						
% family income	5.2	18.0			8.0	11.2
% husband's earnings	7.2	24.3	n.a.	n.a.	10.9	15.3
Sample size	(4)	(5)			(3)	(12)

Note: a working defined as earnings recorded (participation definition B)

Source: see text

Was the decline in married women's relative contributions simply the result of decreasing participation, or was it the case that even considering only women who worked, their relative earnings were not maintained? A look at those working married women for whom earnings are separately identified suggests that while falling participation was one factor in the decline of women's relative contributions, the latter also fell (as in the case of mining), or rose and then fell (as in all other groups but factory workers) in the all-worker sample (table 3).⁶³ Except for the wives of factory workers, married women who earned in the period 1816-40 added larger percentage shares to incomes than those who worked after 1840. Women's earnings relative to men's followed the same occupationally specific trends.⁶⁴

⁶³ The particularly small samples for factory workers' wives for 1816-20 and 1846-65 make it hard to comment on their experience.

⁶⁴ Table 3 relates married women's earnings to those of their husbands. But the fact that a wife worked may well signal that her husband was a relatively poor earner and that she was a relatively good earner. Therefore the ratio of wife's to husband's earnings will overstate true female relative earnings. The first point is demonstrated by a comparison of male earnings in working-wife families with male

The variation in relative earnings power over time and across occupations might help to explain the patterns in participation with which we began. While for some occupations women's earnings increased relatively in the second quarter of the nineteenth century, for all occupations they grew at a lower rate than men's (or children's) earnings after 1840. Perhaps it was the inability of married women to hold their relative earnings positions, even if they did work, that fed the declining participation rates and not an exogenous decline in participation rates that drove their falling contributions to family incomes. This tentative suggestion is pursued in the next section which formalizes our search for an explanation of changes in female participation.

IV

Neoclassical economic theory proposes a model of the decision whether or not to work as the outcome of a rational weighing of alternatives, in which the goal is to maximize utility or satisfaction.⁶⁵ Individuals, including married women, decide whether or not to participate in paid employment by comparing the value of their time in the market (indexed by the wage rate) with the value of their time in the home ('the reservation wage').⁶⁶ The probability of participating is reduced to a function of their own real wage, other real income, including their husbands' earnings (which affect the reservation wage), and a vector of variables to allow for constraints on the participation decision and for heterogeneous tastes. Examples of the former include local employment opportunities, and of the latter, the number and ages of children and husband's work status conventionally assumed to imply 'a taste' for home production. These variables should then be able to explain all the occupational and temporal differences in women's participation rates, with no role remaining for the influence of ideological and institutional factors. How appropriate is such a model in the context of early industrial labour markets and how easily can it be estimated using historical data?

One problem is that our lack of wage data forces an unconventional recasting of the value of market work on an earnings basis. Can this be defended? The women in our study did not choose their hours conditional on the decision to take a job. By and large, they were offered package deals: harvest work, employment by the piece, so much cotton to pick.⁶⁷ Their choices were to exploit these opportunities, fitting the hours around

earnings in the whole sample. The former invariably fell short of the latter with the gap wider for non-agricultural families and wider over time: evidence suggesting that the usual finding for contemporary studies that, *ceteris paribus*, the higher a husband's income the lower the likelihood that his wife works can be generalized to historical studies. Put in conventional terms, higher male earnings increase the value of women's time in the home and reduce the probability of their participation in the workforce. The second point is taken up in the final section below.

⁶⁵ See Becker, 'A theory of the allocation of time'; Mincer, 'Labour force participation of married women'.

⁶⁶ Major early empirical work on this topic includes Cain, *Married women*; Bowen and Finnegan, *Economics of labor force participation*. Gronau and Heckman have contributed to the development of relevant statistical techniques; see, for example, the collection of papers in Smith, *Female labor supply*.

⁶⁷ Of our working sample 57% had unclassified occupations; of the remainder 80% did outwork, casual work or (predominantly seasonal) agricultural work.

their domestic schedules, or not to earn at all. A second issue is the need to build into the model variable attitudes to married women working and local economic conditions. Occupational dummies serve this purpose. The hypothesis that industrialization had an adverse impact on women's job opportunities can also be tested by the inclusion of time trends. The question is whether these have some explanatory power in addition to the conventional economic arguments.

Another set of problems relates to selection bias. Here the orthodox literature provides some guidance. The participation decision is partly based on the wage the woman could command in the labour market, but information on earnings is available only for those women who actually worked. Non-workers could be omitted from the analysis but this would truncate the sample systematically and introduce bias.⁶⁸ We need estimates of the potential earnings for all the women in the sample if we are to investigate the decision not to participate. The usual procedure involves predicting the wages of non-participants from those of participants; the wages of working women are related to characteristics such as education and training, assumed within a human capital model to influence productivity. Not only are the education levels of women in our sample unknown, but we doubt the applicability of the human capital model to historical wage determination. Most early nineteenth-century skills were readily learned; formal education was rare and irrelevant to female jobs; age-earnings profiles were flat.⁶⁹ Productivity was more likely to be related to health, and potential earnings to factors exogenous to individual women such as the local employment structure.⁷⁰ It is possible to relate the earnings of working wives to variables which reflect local employment opportunities and use this equation to predict the potential earnings of non-participants. Accordingly, women's earnings were related to regional variations in wage rates,⁷¹ to opportunities for agricultural, industrial, or home-working as defined by the male occupational status, to the cost of living,⁷² and to time: variables intended to represent the exogenous determinants of earnings (see table 4).

⁶⁸ See Heckman, 'Sample selection bias'; Fallon and Verry, *Labour markets*, pp. 64-70 for a less technical explanation.

⁶⁹ Skill requirements for most workers were no higher than those found for pre-industrial Britain, and very rarely were women found in higher skilled groups. See Tranter, 'Labour supply', pp. 223-4; Rose, 'Social change', p. 265. Only about 50% of women were literate in 1840: Tranter, 'Labour supply', p. 223. In any case, it has been argued that educational qualifications did not increase job opportunities and analysis of wage rates has shown low rates of return to literacy for women. See Deane, *First industrial revolution*, p. 280; Mitch, 'Underinvestment in literacy'. In our sample there are 141 cases where both the woman's earnings and age are known. Controlling for time and occupation, regressions of earnings against age do show age to be a significant, but negative, determinant of earnings. Similarly age is found to be a significant determinant of boys' earnings but not of girls'. See Horrell and Humphries, 'Child labor', tab. 6.

⁷⁰ The significant regional variation in wage rates is shown in Hunt, *Regional wage variations*. Physical health of the labour force is commonly accepted as important in improving productivity. See Tranter, 'Labour supply'.

⁷¹ The regions are grouped using information from Hunt, *Regional wage variations*, p. 8.

⁷² Lindert and Williamson's 'revised best-guess' index until 1850 and the Sauerbeck 'total food' price index subsequently. Lindert and Williamson, 'English workers' real wages', p. 148; Mitchell and Deane, *British historical statistics*, p. 474.

Table 4. *Probit regression of female participation*

<i>Earnings equation</i>		<i>Probit equations on participation^a</i>		
<i>dependent variable</i> <i>ln (earnings)</i>			<i>predicted earnings</i> <i>without correction</i>	<i>predicted earnings</i> <i>with correction</i>
Constant	0.851 (4.38) ^b	Constant	1.899 (7.14) ^b	-1.873 (-5.10) ^b
Region:		Predicted female real earnings	-0.049 (-0.69)	1.670 (15.31) ^b
London and Home Counties	-0.603 (-2.05) ^c	Male real earnings	-0.037 (-4.80) ^b	-0.049 (-5.10) ^b
South west	0.110 (0.96)	Real income from parish	-0.023 (-0.83)	-0.071 (-2.16) ^b
Wales	-0.035 (-0.16)	Other family members' real income	-0.023 (-3.93) ^b	-0.031 (-4.42) ^b
Midlands	-0.388 (-2.45) ^b	Child aged under 2	0.689 (5.21) ^b	0.666 (4.33) ^b
Lincolnshire & Yorks	0.155 (0.41)	Number of children	-0.059 (-2.32) ^c	-0.040 (-1.34)
Lancashire & Cheshire	0.163 (1.20)	Time	-0.200 (-9.07) ^b	0.065 (2.16) ^c
Cumberland, Westmorland, S. Scotland	-0.175 (-1.04)	Time ²	0.0057 (8.63) ^b	-0.0034 (-3.59) ^b
Northumberland & Durham	-0.029 (-0.13)	Time ³	-0.000044 (-8.29) ^b	0.000023 (3.16) ^b
N. Scotland	0.716 (1.88) ^c	Mining	-0.089 (-0.44)	-1.842 (-7.18) ^b
Unspecified	-0.365 (-0.77)	Factory	0.296 (0.87)	-5.203 (-11.34) ^b
Male occupation:				
Agriculture	-0.285 (-2.09) ^c	Outwork	0.272 (1.34)	-3.713 (-13.19) ^b
Factory	0.518 (2.58) ^b	Trades	-0.038 (-0.15)	-1.406 (-5.01) ^b
Outwork	0.346 (2.54) ^b	Casual	0.480 (1.24)	-1.017 (-2.37) ^c
Time	0.010 (4.25) ^b	Chi-squared	233.2	555.6
ln (cost of living)	0.189 (0.63)	Predicted correctly	74.4%	86.2%
Lambda	0.215 (1.57)	Sample size	930	930
R ²	0.38			
Sample size	387			

Notes: *a* participation defined as earnings recorded, definition *B*. *t*-ratios in parentheses

b indicates significance at 1% level

c indicates significance at 5% level

Source: see text

The regions and available types of work had plausible effects and time had a significant positive impact on nominal earnings.⁷³

But this is where another kind of sample selection bias can creep in. The women who participated are likely to have had different unmeasured characteristics from those not in work. In contemporary analysis this is interpreted as the effects of training and education which are not captured

⁷³ Various specifications of the earnings equation were considered. Cubic time trends were not significant so the linear time trend was retained. The presence of a child under two and the number of

by the standard measures of these variables. If the correlation between the measured and unmeasured characteristics differs between the two groups a possible bias emerges. It is widely held that unmeasured characteristics which cause a woman to have higher potential earnings will also make it more likely that she participates.⁷⁴ Unless this problem is corrected the potential earnings of non-participants will be over-predicted.⁷⁵

Heckman proposes a two-stage method of correcting for this source of bias.⁷⁶ The essence of the procedure is to enter an additional term ('lambda') into the wage equation which reflects the positively correlated unmeasured characteristics of those currently employed which enhance their potential earnings. Estimating a probit equation for participation using predicted earnings calculated without the sample selection correction allows the variable capturing the unmeasured differences, lambda, to be created.⁷⁷ Lambda is then entered in the earnings equation to correct for the selectivity bias. Although it is not significant in our regression, being in work did have the anticipated positive effect on earnings.⁷⁸

Our interest in correcting for selection bias in earnings is to improve the performance of the probit equation for participation. So although lambda did not prove significant, the theoretical justification for correction is so strong that predicted earnings with the correction were re-entered in the probit and the labour supply model re-estimated (see table 4). Note that the correction of the earnings estimates by and large left both the parameters in the participation equation and their significance levels unchanged, the main exception being the women's earnings variable. The coefficient on women's predicted real earnings becomes both positive and significant with the adjustment. This is entirely consistent with the logic underlying the correction procedure.⁷⁹

The probit equation for participation performs well.⁸⁰ Perhaps surprisingly, the conventional neoclassical model appears to fit the behaviour of our early industrial wives and mothers. Specifically, women had a positive response to their own real earnings, whereas increased income from other sources

children may be thought to proxy a woman's age and hence her work experience, but neither of these variables was significant.

⁷⁴ Smith, *Female labor supply*, for example, makes this argument.

⁷⁵ And if such biased estimates of earnings are employed in models of labour supply, the responsiveness to own earnings will be underestimated.

⁷⁶ Heckman, 'Sample selection bias'.

⁷⁷ Technically 'lambda' is equal to (f/F) , the inverse Mill's ratio, where F is the value of the standard normal cumulative distribution function that corresponds to the estimated probability that an individual is in employment. The term f is the value of the standard normal density function that corresponds to F . See Heckman, 'Sample selection bias'.

⁷⁸ These earnings equation results are virtually the same as those from the initial predicted earnings equation which did not use the sample selection correction parameter.

⁷⁹ An alternative specification for dealing with the selection bias was tried. An initial probit model of participation was estimated, which excluded predicted own earnings but included the exogenous variables which are hypothesised as determinants of earnings. Information from this probit was then used to construct an inverse Mill's ratio which was included in a separate earnings equation, the earnings predicted from which were then employed in a second probit equation. The results are virtually identical whichever procedure is used.

⁸⁰ The earnings definition of participation (B) is used because observations on all working women's earnings are necessary to use the two-stage correction method.

reduced the probability of participation.⁸¹ Children had a negative effect on participation but having a child under the age of two increased the probability of the woman working. The positive relationship between the presence of a baby and the probability of participating, so surprising in the context of contemporary studies, documents the historically important life cycle variation in women's work. Women worked during the early years of family formation but dropped out when children were old enough to take their place in the labour market.⁸² Finally, the cubic time trend is significant in all three terms. Calculation of turning points showed a maximum in 1797 and a minimum beyond our period in 1871. Controlling for real earnings and income effects, the first half of the nineteenth century was associated with a rapid decline in the labour force participation of married women.

The importance of the trend in explaining women's participation suggests that economic variables, wages and incomes, and household characteristics are not sufficient to capture the changes occurring. Instead, changing institutional and ideological factors played a role and operated to affect adversely women's employment opportunities. The trend follows the predominantly downward path indicated by aggregate participation in table 1 and confirms the importance of exogenous factors in the overall picture of women's work during industrialization. But the patterns for the individual occupations are not always the same as those for the whole sample, and the occupational specificity suggests that any search for institutional and ideological obstacles to women's participation be conducted at this level.⁸³

Most industrial occupations showed a pattern of dislocation during the Napoleonic wars followed by growing opportunities for women's employment, possibly resulting, as Pinchbeck argued, from the increasingly common practice of putting out work related to factory production and increased industrial employment. The reversal of the trend at mid century may reflect the decline of outwork as well as emerging male-breadwinner ideologies and protective labour legislation. The general trend in agriculture was downwards. Women were losing what employment opportunities they had through the commercialization of agriculture and the decline in outwork activities, as described in the qualitative literature. The high proportion of households still engaged in agriculture largely ameliorates the increased participation of women found in the other occupations, creating a downward trend in the overall pattern of participation.

⁸¹ A rough interpretation of the associated elasticities can be gained from the proportionality relationship between these coefficients and those of the linear probability model: see Maddala, *Limited-dependent*, p. 23. Evaluated at the means of the regressors, the elasticity of the probability of participation with respect to the woman's real earnings, man's real earnings, and other family income respectively was 2.2, -0.4, and -0.1. These all operate in the expected directions and are within the ranges found in contemporary studies. See, for example, Killingsworth, *Labour supply*; Fallon and Verry, *Labour markets*, p. 50.

⁸² This effect is found in other historical studies: see Goldin, 'Household and market production'; Rotella, 'Women's labour force participation'; Meyering, 'La petite ouvrière', p. 135. Modern studies would be more likely to interpret the negative relationship between the presence of children and participation in terms of the effects on the shadow price of time in the home.

⁸³ Probit regressions performed for each of the occupational groups separately found time trends with similar patterns to those observed for the occupationally specific participation rates: see tab. I.

V

The household budgets illuminate the pattern of married women's labour market activity in the pre-census period. Participation was clearly related in a predictable way to conventional economic and demographic variables, but was also affected by a negative time trend which may substantiate the claims of some pessimistic feminists that there were mounting institutional and ideological obstacles to women working. The decline in participation was neither continuous nor uniform across occupational categories, and this helps to reconcile the disparate hypotheses discussed earlier. In the second quarter of the nineteenth century industrialization was associated with higher relative earnings for some women. These and new job opportunities increased female labour force participation in some occupations above its post-Napoleonic war level. However, this period of increased financial independence for women was short lived; participation rates and relative earnings declined after mid century. There is little support for the argument put forward by Lindert and Williamson that women dropped out of the labour force as the shadow price of domestic work increased relative to wages. The argument that the decline in participation was caused not by supply shifts (changes in the reservation wage) but by changes in demand associated with structural and/or institutional changes still runs. Within the main narrative of women's increasing economic dependence on men, there is room to find pockets of improvement and independence clearly associated with industrial opportunities.⁸⁴ Sixty-five years on we find that our evidence largely supports Pinchbeck's views.

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⁸⁴ A finding which is consistent with the recent evidence for a relative deterioration in the stature of convict women from England during the period of early industrialization: see Nicholas and Oxley, 'Living standards of women'.

Table A1. APPENDIX: *Distribution of budgets by county, year, and male occupation*

County and occupation	1787-1815	1816-20	1821-40	1841-5	1846-65	1846-65
Bedfordshire Agriculture	117	3		Kent Agriculture	6	1
Bedfordshire Trades	5			Lancashire Agriculture	4	38
Bedfordshire Casual	10			Mining	50	3
Berkshire Agriculture	10	1	2	Factory	15	24
Berkshire Agriculture	10			Outwork	14	198
Buckinghamshire Agriculture	3	2		Trades	1	65
Buckinghamshire Casual	1				1	1
Cambridgeshire Agriculture	3	4		Suffolk Agriculture	1	1
Cheshire Agriculture	3			Surrey Agriculture	11	3
Cheshire Factory	7	2		Sussex Agriculture	4	1
Cheshire Outwork	1	4		Warwickshire Agriculture	8	3
Cornwall Agriculture	17	4		Mining	36	4
Cornwall Mining				Outwork		2
Cumberland Agriculture	2	1	2	Casual		1
Cumberland Mining	2			Westmorland Agriculture	8	1
Cumberland Outwork	3			Outwork	4	1
Derbyshire Agriculture	3	1	3	Trades	1	6
Derbyshire Mining		1				
Derbyshire Outwork	1	21		Wiltshire Agriculture	1	4
Northamptonshire Agriculture				Northamptonshire Agriculture	2	2
Northamptonshire Outwork				Northamptonshire Outwork	2	2
Worcestershire Agriculture				Worcestershire Agriculture	2	2
Yorkshire, East Riding Agriculture				Yorkshire, East Riding Agriculture	15	2
Yorkshire, East Riding Trades				Yorkshire, East Riding Trades		2

Devon	Agriculture	3	12		Northumberland	Agriculture	3	2		Yorkshire, North Riding	Agriculture	1
Dorset	Agriculture	17	1	7	Nottinghamshire	Mining	1	1		Yorkshire, West Riding	Agriculture	6
Durham	Agriculture	7	1	2	Oxfordshire	Agriculture	10	3		Factory	2	2
	Mining	2	3		Outwork		8			Outwork	7	
	Trades	2			Agriculture		1	4		Wales, north	Agriculture	2
Essex	Agriculture	2			Rutland	Agriculture		3		Wales, south	Agriculture	3
Gloucestershire	Agriculture	6		3	Shropshire			3		Mining		2
	Outwork		1		Agriculture		2	1		Scotland, north	Agriculture	5
	Trades	1			Somerset	Agriculture	2	1		Outwork		12
Hampshire	Agriculture	16		1	Factory		16	7		Scotland, south	Agriculture	2
	Casual	1			Outwork		18	1		Mining	1	3
Hertfordshire	Agriculture	5			Trades		1			Unspecified		2
Huntingdonshire	Agriculture	3						3		Outwork		1
												2

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