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Jane Humphries & Ryah Thomas

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‘THE BEST JOB IN THE WORLD’: BREADWINNING AND THE CAPTURE OF HOUSEHOLD LABOR IN NINETEENTH AND EARLY TWENTIETH-CENTURY BRITISH COALMINING

Jane Humphries and Ryah Thomas

ABSTRACT

This article explores the effects of gender inequality and women’s disempowerment in the context of historical coalmining. Across the United States and Europe, ex-coalmining regions are characterized by significant deprivation. While there are many reasons for persistent problems, this study focuses on the restrictions imposed on women’s involvement in economic life. Families in mining communities exemplified the male breadwinner structure, in which men’s earnings supported wives and children who provided domestic services in return. Using evidence from Britain, this article exposes a different reality of household economics characterized by dominance and subordination: All family members were integrated into the coalmining production process and the creation of profit. Women’s unpaid work did not simply provide domestic comfort; it transferred well-being from women and children to men and simultaneously contributed to the colliery companies’ profits. These findings revise accounts of mining families while explaining the intransigence of deprivation in ex-coalmining areas.

KEYWORDS

Family wage, women’s labor force participation, economics of the family

JEL Codes: A14, D1, J22

HIGHLIGHTS

- Women’s disempowerment in historical mining communities had adverse effects that persist today.
- Pit women’s labor propped up profits and wages and discouraged infrastructure investment.

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- Breadwinning secured increased leisure time and higher income for men not women.
- Hours and incomes of “double shift” factory women compare favorably to pit women.
- Regeneration must confront the gendered identities embedded in ex-mining communities.

INTRODUCTION

Much empirical evidence suggests that gender equality contributes positively to economic growth and well-being, a relationship now often built into development policy (Klasen 1999; Kabeer 2016). We explore this relationship in reverse. By tracing the effects of gender *inequality* and women’s *disempowerment*, we highlight their role in the persistent relative deprivation of certain “left behind” communities in developed countries, specifically ex-coalmining communities. Across the US and throughout Europe, such communities have proved very difficult to regenerate and remain characterized by high levels of deprivation (Foden, Fothergill, and Gore 2014; Barthélemy et al. 2017; Porter 2021). While there are many reasons for persistent problems, the family form inherited from the era of industrialized mining and its implications for women’s agency and involvement in economic life is seldom discussed. With their concentration of male labor in a single physically demanding but nominally well-paid job and few opportunities for women’s work, these communities exemplify the male breadwinner structure, in which the husband/father’s earnings support his wife and children who provide domestic services in return. Other characteristics of miners’ families – early marriage and large numbers of children – follow as a result of limited women’s employment and related low opportunity costs of childcare (Haines 1979; Szreter 1996). We interrogate this masculine narrative, exposing a very different reality of household economics and associated relations of dominance and subordination. We show how all family members were integrated into the coalmining production process and the creation of profit. Women’s unpaid work within the home provided more than a comfortable domestic environment; it transferred a degree of well-being from women and children to men and simultaneously contributed to the colliery companies’ profits. Our argument is based on evidence from Britain but has strong resonance with other national experiences (for example, Parpart 1986; Kideckel 2004; Hao 2015; Della Bosca and Gillespie 2018; Barragàn Romano and Papastefanaki 2020). Our findings revise accounts of both mining families and male breadwinning while providing insight into the intransigence of deprivation in ex-coalmining areas.

Conventionally, male breadwinner families, consistent with the “income effects” of orthodox economics, are associated with rising male wages.

These enabled wives and mothers to withdraw from paid work and devote themselves to homemaking while children could be sent to school not work, offering improved living standards, human capital formation, and economic growth. Alternatively, radical feminist historians have seen male breadwinner families as the patriarchal outcome of chauvinistic trade unions and protective labor legislation that excluded women from waged work and rendered them dependent on husbands and fathers (see Creighton 1996, 1999). Both explanations fit British coalmining. Historically, mining had provided employment for whole families, but the nineteenth century saw a transition to a male monopoly on paid work. Miners' wages did increase in line with reduced women's participation; on the other hand, mining trade unions were notoriously chauvinistic, and the 1842 Mines Regulation Act banned women, girls, and boys under ten years old from working below ground.

We argue, however, that mining communities retained the family labor systems of their past but this was hidden behind new divisions of labor and a form of remuneration that focused exclusively on one part of the collective effort needed to earn the wage. The work of the husband/father was the paid-for tip of an iceberg of endeavor.

We begin by looking more carefully at the coalmining wage itself. How wages came to be paid and then perceived created a myth of individual ownership, and the extent to which they were shared became dependent on men's munificence. As a result, men were able to impose "shift work" – work exclusively related to their employment – onto their dependants. Colliery companies benefitted from the labor of miners' wives and children not only in sustaining and reproducing their employees but also in maintaining their industrial kit, organizing the working day, and saving significant expenditure on infrastructure.

To demonstrate these dynamics, we use a variety of original sources to detail the working day for pit women in the nineteenth and twentieth centuries. We estimate the time cost of their tasks, cross-checking with evidence from different but analogous contexts. We find miners' wives heavily engaged in demanding, colliery-specific work in a shift system that multiplied their burdens, crowding out any extra-familial efforts to earn. In contrast to miner's wages, which were paid at the pithead, formally related to individual output, and celebrated as hard won through individual effort, women's labor took place in the home, was unpaid, and routinely trivialized. Over time, these distinctions created a cultural gender trap deeply embedded in family and community socialization.

We examine how the management of pit villages in the nineteenth century displaced costs of production directly onto miners' families, and use a case study to examine the implications of this exploitation in the context of contemporary alternatives. Contrary to the advantages claimed for high-wage breadwinning, in this example colliery women labored

longer hours than factory women while their households earned less per capita. Finally, we explore the extent to which the capture of women's labor within a colliery monoculture effected a lasting change in women's labor force participation.

We conclude that economists and policymakers have underestimated the significance of gendered labor in coalmining, not only in terms of the opportunity cost of earning the family wage but also in the extraordinary degree to which all family members specialized in coal. After closures, communities continued to revolve around the absent pit, and local jobs did not fit family structures and expectations (see Department of Employment and Productivity 1970). Households in their entirety – not simply male heads – were mismatched to new economic realities. Effective regeneration policies must confront the gendered culture and identities embedded in ex-mining communities.

HISTORY OF THE COALMINING “FAMILY WAGE”

Coalmining was an ancient though small-scale industry that developed through two centuries into a central pillar of British industrialization (Wrigley 2010). Pre-modern mining, like many industrial activities, made use of the established production teams and divisions of labor provided by families (John 1980; Humphries 1981, 2004). Early drift and bell coal mines, where the coal was readily accessible, were worked by local families, but when deeper shafts were sunk, female underground labor disappeared from some coalfields (Nef 1966; Pinchbeck 1981). By 1840, a Royal Commission investigating working conditions in mines focused initially on child labor. When women's underground employment was revealed to be extensive albeit localized, it caused widespread public revulsion.

The Report provides a voluminous account of coalmining production processes and management strategies. The bord and pillar system predominated in the major coalfields during the expansion decades of the nineteenth century and was invariably in use where women and children were employed underground (Ashton and Sykes 1964). It involved driving tunnels (headways) along the grain of the coal from which the bords or stalls of the miners were cut. In these cramped spaces the coal-face workers or “hewers” used hand tools to bring down the precious mineral, for which they were paid by the ton. Large numbers of ancillary workers were needed to repair the roadways, to operate the air doors or “traps,” and to move (“hurry” or “draw”) the coal from the individual stalls to the surface where it was weighed and logged. The “overhead” workers were hired directly by the mine owner or his agent. But, perhaps with a nod to the hewers' traditional independence, the recruitment, supervision, and remuneration of the transport workers, since they catered to individual colliers, was delegated to the men themselves. Left to find regular dependable helpers,

miners enlisted wives and children as hurriers or drawers, while younger children were employed as “trappers.”

Employers benefitted from this devolution. Shifting responsibility meant escape from tedious details of pit management, enabled owners to deny liability for the employment of women and children in appalling conditions, and answered the problem of supervising underground labor. Paid by weight of coal delivered to the surface, miners drove their assistants. Most importantly, the employment of kin meant that the hewer’s family retained the whole wage (Humphries 1981).¹ Despite the involvement of wives and children, adult males were credited with the output and usually received the wage. Was the contribution of other family members recognized in its allocation?

We have little direct evidence on the disposition of earnings in the context of the coalfields’ family labor system, but any financial independence for the ancillary workers was likely illusory. Even if helpers were paid directly, independence would still have eluded them since lone individuals could not be sure of work or board and lodging. However, family involvement in earning the wage likely shifted the limits of patriarchal power. Fathers’ entitlement to the majority of available food was justifiable when they were the sole earners involved in physical work. When other family members were involved, some reallocation was warranted, indeed essential, if they were to function efficiently within the team.

At a stroke, the 1842 Act eliminated family labor: wives, daughters, and sons under the age of 10 were prohibited from underground work. How employers and families responded is difficult to detect. There is some evidence that hewers’ wages rose with consumers paying more for coal (see Symons, cited in Humphries [1981]), consistent with the interpretation of working men’s support for protective labor legislation as a device to limit competitive labor. However, there is also evidence that hewers had to forego their traditional independence and began to work more regularly in order to earn enough to support their now-dependent families. These changes were welcomed by employers as mines became more capital-intensive and labor needed to be organized and coordinated. Lone breadwinning was thrust on male workers by the absence of jobs for women (and younger children) and perhaps proved an effective weapon in increasing diligence and discipline in coalmining as elsewhere. Women’s reactions are even more difficult to detect from the historical record. Perhaps they were despondent about their new dependency. Their comments to the Commissioners suggested that it was not work *per se* that they thought burdensome but hard labor underground (Humphries 1981). This interpretation may explain their later attempts to contribute and be seen to contribute in the struggle for the wage. At any rate, elimination of family labor individualized the wage, gave men authority over it, and meant that sharing became a private matter at the breadwinners’ discretion.

The transition to male breadwinning created pressures both within families and at workplaces in many sectors of employment, but these tensions were exacerbated in coalmining where regulation prevented family participation and where there were few jobs for women. Moreover, the intensification of work left men yearning for pleasure in their few hours of freedom (Field, Ewing, and Wayne 1957). Pursuit of enjoyment usually excluded families and involved activities with ominously addictive qualities such as drinking and gambling. We might then expect that some selfish resistance to wage sharing – “breadwinner abuse” as Wally Seccombe (1993) termed it – might arise.

MEN’S “OWNERSHIP” OF THE WAGE

Sociologists have observed numerous ways in which wages were allocated within families, with different regions and occupations favoring different systems (Pahl 1980; Seccombe 1993). A significant minority of men surrendered their entire pay to their wives, receiving back a modest amount for their own use determined by agreement with or at their spouses’ discretion. This “whole-wage system” clearly benefitted women and children, and the men who accepted it were extolled as good husbands who regarded marriage as a partnership and wives as contributors (Pahl 1980). It was more common, however, for men to allocate a housekeeping allowance, often the minimum on which wives were able to manage (Rathbone 1986; Seccombe 1993). This “fixed allowance system” had the advantage of providing wives with a stable income, often called their “wages” in recognition of their contribution, but extraordinary expenses meant supplication to husbands for a bit extra. Moreover, wives were often unaware of their husbands’ earned income, and unless the “housekeeping” was adjusted, rising wages boosted men’s share while the family remained stunted.

From the family perspective, the most difficult variant involved husbands who retained command of the pay packet and prioritized their own consumption leaving only a fluctuating residual for family support. The proportion of working men who opted for this selfish stance is unknown, but Seccombe (1993) suggests that such breadwinner abuse has been underestimated by researchers. Gender historians, however, have long recognized the pressures imposed by such selfishness, forcing wives to struggle to manage on unpredictable resources that they often had to prise from partners (Burnett 1982; Ross 1982; Roberts 1988; Gillis 1985).

Jan Pahl (1980) thought that the whole wage system predominated among poorer families but cautioned against reading this as giving wives and mothers power. Wives’ receipt of scanty wages displaced responsibility for managing expenditure when there was little room for manoeuvre. Better circumstances created space for the allowance system, but unless

shares were renegotiated, they became increasingly unfair with rising wages, inflation, or more children (Pahl 1980; Seccombe 1993). Whereas “wage pooling” developed in areas with a long tradition of women’s employment, allowance systems dominated in fishing ports or heavy industrial areas where the local economy offered few opportunities for women and created intense male solidarity. Our emphasis is on the piece rates and payday rituals that linked wages to earners – reconstructing wages as individual property – and how these factors played out in mining communities.

Peter Stearns (1972) described miners’ wives in late nineteenth-century Yorkshire waiting on the doorstep for husbands on paydays. In a ritual called “the tip-up,” men handed over their wages in sight of their neighbors who were thus witness to a fair allocation (Stearns 1972: 108). Norman Dennis, Fernando Henriques, and Clifford Slaughter (1956), however, looking back from the 1950s, held that in “Ashton”, their anonymized Yorkshire community, the allowance system was universal: “the husband’s duty to his family goes little at all further than delivering *part* of his wage each Friday. . . . It is for him to earn the money and for [his wife] to administer it wisely” (Dennis, Henriques, and Slaughter 1956: 196, our emphasis). Other evidence supports this interpretation (Saxton 2000: 57; Carswell and Roberts 1992: 64).

In a brief life account provided to James MacFarlane, a historian of Denaby Main in South Yorkshire, a miner’s wife described the spousal financial arrangements as a kind of sharing: “he used to have a bit for hissen, and a bit for me, a pocket for me and a pocket for him” (Cook: 1–2). Significantly, the allocation into pockets seems to have been in his control. Similarly, while Richard Llewellyn’s picture of Welsh miners depicted wives’ commandeering the wage, the old minister in Treaclewyd concluded marriage ceremonies by recommending the “whole wage system” but more in hope than expectation (cited in Gier 1993; Coombes 1939). Valerie Hall’s interviews with Northumberland miners and their families suggest that while exemplary husbands “tipped it up,” many retained a significant share, quaintly called the “keepie back” (2004: 524). Evelyn Haythorne (1990) also recounts a share-out on payday, in South Yorkshire, with the women gathering at the pit head as the men collected their wages, but she also notes that “a minority” of men slipped money first into their own pockets. Reginald Davies, the local vicar in the early twentieth century, through his funeral eulogies and bereavement counseling, was privy to intimate details on the relationships between miners and their families. One of his informants recounted how on pay day many miners went straight into the colliery-owned public house; another never saw her husband’s pay packet and was often forced to ask for help from her wider family. Two sisters reported that in over fifty-one years of marriage, their father never disclosed how much he earned. “He’d bring money home after mum had

gone to bed. He left more in the locker at the pit. There was money hidden under the carpet, behind mirror, even under the soap” (Davies 2009: n.57, see also, 38).

Men’s affirmation of the allowance system and (occasional) resort to breadwinner abuse reflected the individualization of remuneration in industrialized coalmining. Hewers were paid by piece rates, with earnings determined by the individual output of each miner in bringing down the coal. Individual effort was underlined by pay day rituals. In Denaby, for example, pay was calculated by the wages clerk who would put the stall’s money into individual tins marked with the stall number, reinforcing ideas of exclusive ownership. Wages were then paid out in a local (often company-affiliated) public house (Davies 2009: n. 48). In Bert L. Coombes’s Welsh pit, wages were calculated literally by the inch and reckoned underground by representatives of management known as “the measurers” (1939: 47). Certain amounts had already been deducted for rent for the colliery cottages, benevolent fund, company doctor, union dues, purchases from the company store, and, over time, amenities that the companies were shamed into offering but then required their employees to subsidize.² To men these deductions likely seemed a major installment toward family support. Released from bondage on payday, the miners sought relaxation among their fellows, their solidarity expressed by gathering together to reflect on the week’s work and drink. Another manifestation of comraderie was sharing ideas about how to trick wives and mothers out of some informally agreed portion of the wage. Mike Kirkup described how miners in 1950s Ashington would rummage on the floor of the pit office for a payslip that was a few pounds less than their own, obscuring the true size of the “keepie back” from their wives. Some hid the extra money in toilet cisterns (1993: 201). Coombes’ Welsh colleagues practiced similar deceptions (1939: 100). One story told with “great glee” in Ashton, albeit partly as a joke, concerned a miner who on marriage to a girl from a neighboring coal community was told by her father that throughout his married life he would regularly “knock a few shillings off her wage for a shovel or a pick” despite no longer having to pay for his own tools and advised his new son-in-law to “do t’same thesen” (Dennis, Henriques, and Slaughter 1956: 189). The young man carried on this family tradition of deception, regularly advised by workmates about other plausible “deductions.”

Thus the individualistic incentives and methods of remuneration employed by the colliery companies embedded a “money-antagonism” between husbands and wives (Dennis, Henriques, and Slaughter 1956: 186–201). A regular exchange between one of Rev. Davies’ informants got to the origin of these power relations in the man’s idea that he alone delivered the wage: it was his property. Whenever Harriet asked for money, her husband Tom would reply: “You want that you put boots

on.” When he did share, he expected gratitude: “Well you’ve got half of it” (Davies 2009: 37). Cissie Charlton’s father’s “public face” was that of a likable rogue but in private he was “very selfish.” He would “happily go on a drinking spree” but at home “every penny had to be accounted for,” which “amounted to a kind of cruelty” and “added one more burden to [her] mother’s hard life” (Charlton 1988: 48). Not all men were so harsh, but bitterness did accumulate, especially if men spent at the pub or dog track when their families were needy (for further illustration see Haythorne 1990: 25).

Men’s command of the wage was reinforced by the contrast between men’s toil and the ways they imagined wives to spend their days. Jack Harrison acknowledged that “We menfolk thought women were lucky; they didn’t go down the pit; they were never in the two o’clock foreshift” (quoted in Kirkup 1993: 168).³ “I wish I could swap jobs with our lass (the wife) – it’s the best job in the world, stopping at home all day” was the half-jest of many an Ashton husband, who envisaged women as spending hours “callin” (gossiping) in each other’s houses (Dennis, Henriques, and Slaughter 1956: 197). The reality was very different.

CAPTURE OF HOUSEHOLD LABOR

Scholars agree that women’s labor played “an enormous, though unpaid, part in maintaining the viability of the mining industry” (Hall 2004: 522–3, 2013: 7ff.), a role typically characterized as involving heavy physical reproductive and domestic labor (Carr 2002: 5; Gier 1993: 15ff; Jones 2011: 110). But autobiographical and ethnographic evidence shows the work of miners’ wives to be qualitatively as well as quantitatively different from that undertaken by other working-class homemakers. We use this evidence to estimate time use and conclude that many of the excess hours worked in miners’ homes constituted part of the colliery stint or shift itself, even if after the masculinization of the pay packet it was not understood in this way. Two factors set miners’ wives apart.⁴ First, their most arduous tasks were not reproducing the colliery’s labor, but completing the work of the miner’s shift. Second, their labor was substituted for otherwise essential infrastructure investment, which saved the companies money and propped up the miner’s pay packet.

Closely examining women’s working day shows that it was ultimately regimented to serve the interests of the colliery, not the senior breadwinner or the family. We focus on two particularly labor-intensive services – bathing and laundry – which were required to clear away the industrial filth incurred each shift by every miner. A close reading of life accounts and sociological studies identifies the component tasks involved in the provision of these services per shift per miner. Many sources suggest the

time involved per task, or at least summarize the time overall. We cross-check the estimates of time taken in bathing and laundry by drawing on anthropological studies and evidence from time budgets relating to comparable domestic settings.⁵

The estimates of domestic colliery labor discussed here (Tables 1–4) relate first to the labor time incurred servicing one miner working one shift, six days per week. Many households had more than one miner, often working different shifts, a complication discussed below. Where several co-resident miners all worked the same shift, we have introduced economies of scale by discounting the time added to each domestic job by the marginal worker.⁶ For example, in Table 1, we estimate a shift bath entailed 60 min of labor for one miner (Column A), and if additional men worked the same shift, an additional 30–40 min per miner (Column B) unless exceptional concessions were made (see discussion below). If miners worked different shifts, many scale economies were curtailed and 60 min were required per miner after each shift. If she was fortunate, the wife (or eldest resident woman) was assisted by daughters or sisters, although such help was limited by early marriage and adolescent girls' departure in search of work (Walker 1997). Neil Evans and Dot Jones caution that even if this work was spread over the girls who remained at home, “this hardly reduced it overall: more likely it socialized the younger women into a job which would be a lifetime's sentence” (1994: 9). Here, we focus on quantifying total domestic time use.

After considering the domestic work specific to the colliery shift (Table 4, Section I), we repeat this procedure to account for the additional labor time required to support both colliery and family amid the disamenities for which pit villages became increasingly notorious over the nineteenth and into the twentieth centuries (Table 4, Section II). Finally, we turn to the ordinary domestic work of nineteenth-century homemaking (Table 4, Section III), noting how pit women tried to demonstrate their contribution to the wage by engaging in repetitive battles with the industrial environment. By this method, we estimate that domestic shift work added up to a minimum of approximately three hours per shift, six days per week (if only one miner worked that shift) and three hours extra for the weekly washing of pit clothes; colliery disamenities added an additional eighteen hours per week; and nineteenth-century homemaking, a further thirty-three hours. That women's total hours of work are so oppressive (over seventy hours a week, assuming one shift and one miner) should not take us by surprise unless we gloss over the meaning of such common phrases as “She was never still” in memorials of miners' wives (Davies 2009: 29, 41).

We draw on fifteen first-hand descriptions (Brennan n.d; Cook n.d; Hodges n.d; Bell 1902; “Miner, and ‘Miner's Wife” (Mrs. K) in Pollock 1926; Lawson 1932; Coombes 1939; Andrews 1957; Paynter 1972; Smith 1975; Williamson 1982; Charlton 1988; Pallister, cited in Evans and Jones 1994; Saxton 2000), witness statements to the Coal Commission (1919), collected

Table 1 Time-use estimate, shift bath

<i>Description</i>		(A)	(B)
		<i>Minutes per shift</i>	
		<i>1st miner</i>	<i>2nd miner</i>
1.	Carry the large wood tub or long zinc bath into place	5	–
2.	Carry water from the outside pump or kitchen tap to the set pot in the range or in pans on the fire	10	10
3.	Tend fire	5	5
4.	Carry coals	2	2
5.	Heat water	10	10
6.	Fill bath with water	2	2
7.	Wash miner	10	10
8.	Pour water into drain	2	–
9.	Carry water to tub	5	–
10.	Clean tub	3	–
11.	Pour water into drain	2	–
12.	Carry tub back	5	–
Total minutes		61	39

Source: Carr (2002) and authors' estimates from colliery life accounts, sociological surveys, and contemporary time-use estimates.

interviews and oral histories (MacFarlane 1976; Carswell and Roberts 1992; Kirkup 1993; Davies 2003; Crook cited in Jones 2011; Hall 2013), as well as accounts by informed contemporary commentators (Williams 1922–3; Arnot 1953) to construct our time budgets.

The filthy working environment of the pitman meant not only that he required a thorough washing at the end of shift but that his work-clothes needed attention to be wearable next day. The importance of these tasks is reflected in the ubiquity of descriptions of bathing and care of pit clothes in mining life accounts. Griselda Carr's (2002: 55–6) summary of the work involved in the miner's bath, based on observations from the key coalfields of Yorkshire, Durham, and Northumberland, provides the template:

Most households had a large wood tub or, later, a long zinc bath which the women set before the living room fire and filled with water carried from the outside pump or [later] kitchen tap and heated in the set pot in the range or in pans on the fire. Once the miner had soaked himself his wife washed his back—except for those men who believed that washing the back weakened the spine. Finally, the wife poured the filthy water into the nearest outside drain. If there were several pitmen

Table 2 Time-use estimate, maintenance of pit clothes

<i>Description</i>	<i>(A) (B)</i> <i>Minutes per shift</i>	
	<i>1st miner</i>	<i>2nd miner</i>
1. Collect the clothes	2	2
2. Shake out pockets	2	2
3. Beat the dry dust out of the clothes ("dadding")	10	10
4. Clean the area	5	–
5. Carry water from the boil to the kitchen sink	1	–
6. Wash pit drawers in the sink	8	8
7. Wring drawers	3	3
8. Carry waste water away	5	–
9. Clean sink	2	–
10. Move rails or horse in front of the fire	2	–
11. Hang clothes on rails/horse	5	5
12. Turn clothes periodically during night to dry/warm	15	15
Total minutes	60	45

Source: Carr (2002) and authors' estimates from colliery life accounts, sociological surveys, and contemporary time-use estimates.

in the family the whole process might be repeated for each man and boy; alternatively, the younger ones bathed in the cooling water made dirty by their elders.

The detailed tasks that Carr identifies are listed in the first column of Table 1.

In addition to information on shift baths, memoirs and interviews often include descriptions of home layouts and organization, or reference the distance to the nearest water and drains (Bell c.1902; Coal Commission 1919; Saxton 2000). These enable plausible minimum estimates of the time required for each task in a typical colliery home.

Until well into the twentieth century pit villages had poor access to water, with often only one pump or a few shared stand pipes, so any task that required water entailed a walk with bucket(s) to the queue at the village tap, waiting one's turn, pumping the water up, and carrying the full bucket(s) home – tasks that often fell to daughters (Bell 1902; Kirkup 1994). Coombes remembered chattering girls at the standpipes as he tried to sleep after his night shift, interrupted only by mothers' urgent calls for water (Coombes 1939).

Table 3 Time-use estimate, laundry

<i>Description</i>		(A)	(B)	(C)
		<i>Minutes per task</i>		
		<i>Domestic</i>	<i>Shift</i>	
		<i>Household member</i>	<i>1st miner</i>	<i>2nd miner</i>
1.	Collect the clothes	2	2	2
2.	Shake out pockets	–	2	2
3.	Beat the dry dust out of the clothes (“dadding”)	–	15	15
4.	Clean the area	–	10	–
5.	Carry water from the outside pump, standpipe, or kitchen tap	10	10	–
6.	Carry “poss’ tub into place	2	–	–
7.	Pour water into the poss tub	1	1	–
8.	Pound dirt out of submerged clothes with a stick (“possing”)	7	15	15
9.	Pour water out of poss tub	1	1	–
10.	Clean poss tub	5	–	–
11.	Maintain fire	5	5	–
12.	Carry coals to the fire	2	2	–
13.	Carry water from the outside pump (or etc.) to the copper	10	10	–
14.	Carry coals to the copper with a shovel	1	1	–
15.	Boil water in the copper	10	5	–

(Continued).

Table 3 Continued.

		(A)	(B)	(C)
		<i>Minutes per task</i>		
		<i>Domestic</i>	<i>Shift</i>	
<i>Description</i>		<i>Household member</i>	<i>1st miner</i>	<i>2nd miner</i>
16.	Boil/wash clothes in the copper	5	10	–
17.	Carry clothes to the kitchen sink	1	1	–
18.	Carry water from the outside pump (or etc.) to the sink	10	10	–
19.	Rinse clothes in the sink	5	5	5
20.	Set up mangle	2	2	–
21.	Put clothes through the mangle	10	10	10
22.	Carry waste water away	10	10	–
23.	Clean sink	2	–	–
24.	Clean mangle	2	–	–
25.	Clean built-in copper	2	–	–
26.	Hang clothes to dry outside or indoors	15	15	15
27.	Heat iron	2	–	–
28.	Iron clothes	15	15	15
29.	Mending	5	15	15
30.	Put clothes away	5	5	5
Total minutes		147	177	99
Total hours		2.5	3.0	1.7

Source: Carr (2002) and author's estimates from colliery life accounts, sociological surveys, and contemporary time-use estimates.

Table 4 Domestic labor in colliery households

<i>Description</i>	<i>(A) Hours / Shift</i>	<i>(B) Hours / Week</i>
I. Colliery shift	3	21
Bath	1	6
Maintenance	1	6
Laundry	–	3
Floors	0.5	3
Meals (3)	0.5	3
II. Colliery disamenities		18
Nursing		0.5
Carrying water, waste, coal		11
Sanitation (sewage, pavements, closets, etc)		7
III. Domestic labor		33
Cooking		11
Servicing coal fires		5
Laundry		5
General cleaning		4
Shopping		4
Turning out rooms		2
Bathing		2
Swilling and chalking pavements		1
Total weekly hours		72

Providing water for several men might require “dozens” of trips (Bell c.1902: 33), but in Tables 1 and 2 we have assumed parsimoniously that one miner could bathe (and his “pit drawers” be washed) in the water of one visit to the tap. Less fastidious men might reuse water; sometimes lads followed their fathers into the tub; and sometimes too, but rarely, men helped dispose of the waste water (Coombes 1939). Table 1 suggests that bathing three miners after one shift required (if they all had fresh water) 60 min (Column A) for the first man plus an additional 30–40 min (Column B) per each additional pitman, totaling 130 min. If all three miners bathed in the same water (repeating only the task on line 7), this would equate to 80 min. How does this square with some explicit time costings? Robert Page Arnot recorded a daughter’s recollection that when three colliers returned at the same time, it was two hours before they had bathed (quoted in Carr 2002: 35). In Lottie Brennan’s home, shared by several households, “the tin [bath] was never off the floor” (Brennan n.d.: 13).⁷

Another laborious task that fell to the household at each shift was cleaning and repairing the miner’s kit. Pit clothes were wet with sweat and filthy water and laden with dirt and dust; their restoration required serious effort. Concern about how their pit clothes could be rehabilitated,

and particularly who would wash their “pit drawers” (a daily task), was one factor behind miners’ hesitant support for the pithead baths which were inextricably linked to schemes for drying and rehabilitating work clothes (Coal Industry Commission 1919). As with bathing, the detailed tasks involved can be listed and time costed as below.

Men tended to pass over these hours of domestic shift work: “Then the dirty clothes were collected and dried, and put away until the evening when they were placed on a chair by the fire. The trousers were almost like ice to the touch in the morning” (Gregory 1888: 52–3). Women were more likely to recall the extensive labor involved in ensuring that the clothing was wearable next day (for example, Pollock 1926: 74–5), a burden that prompted their support for pithead baths and drying facilities. They felt the grime of the pit should be left at the pit (Mrs. Hart, testimony before Coal Commission 1919: 1017).

Work maintaining miners’ bodies and kit spilled from wives and mothers onto daughters. A girl in a large mining family, Adeline Hodges, spent hours cleaning mining equipment: blacking and polishing the men’s boots, melting tallow candles to obtain the grease to render the boot leather pliable and waterproof, filling the boiler for the men to bathe, rubbing the miners’ backs to get as much of the coal dust off as possible (in her district a mining superstition required that backs remain unwashed), and “dashing” the pit clothes against a wall to dislodge the dirt and encourage the beetles to move on. She examined the pit clothes for necessary mending and later carefully folded them away. She also rose along with her mother to assist with the start of the next shift, to spread the clothes before the fire to warm and prepare breakfast. Only then were “the workers called from their sleep” (Hodges n.d.: 9).

If we add the labor involved in the *daily* maintenance of the miner’s clothing to that required for the washing of his body, it amounts to around two hours for the first miner per shift and almost an hour and a half for each additional man. E. Colston Williams, County Medical Officer for Glamorganshire in the 1920s, reported in *Public Health* (1922–3) that in a representative colliery family with three men returning simultaneously from work, a woman and her grown daughter would be kept busy for two hours before and after their return, that is, servicing three men returning simultaneously required four hours of adult female labor time, or one hour and twenty minutes per miner per shift. In this case, although one man was a lodger and probably expected clean bathwater, another was a young son who might have been content with a recycled wash, so bringing our figures neatly into line.

In addition to this *daily* labor, once a week there was a day of stupendous effort. Wash day was dreaded by all working-class women who expected to be “a bit done-like” after its toll, especially if there was no water on tap (Reeves and Reeves 1979 [1913]: 160). But in miners’ homes, both the

unique nature of the work clothes and their accumulated filth meant that it was “a major event,” as Cissie Charlton recalled (1988: 20; see also Hodges n.d.: 10; Carswell and Roberts 1992: 60–1, 63). Carr’s summary of the tasks involved again provides guidance:

Where filthy clothes were concerned, the women first beat the dry dust out of them (. . . called “dadding” in the north-east). They then carried every drop of water they needed . . . to the “poss’ tub where the immersed clothes had the dirt pounded out of them with a “poss’ stick, a stout multi-footed, three-foot pole. They boiled the dye-fast linens and cottons in the built-in copper (if they had one) where they heated the water with red-hot coals carried on a shovel from the ever-burning living room fire. . . . They then rinsed all the clothes in the stone kitchen sink and put them through the mangle. If it was fine, if the wind was not blowing too many soots from the pit or from neighbors’ chimneys and if tradesmen and hawkers were not about with their carts, those without their own back yards would hang their clothes to dry . . . across the street. When it was raining, they hung the clothes, sheets, etc., on rails or horses in front of the living-room fire. Finally, that day or the next, they did the ironing” (2002: 55).

We decompose the activity of washing laundry into thirty component tasks and estimate the minutes required for each (Table 3). We first estimate the time required for one typical wash (Column A), which we consider standard working-class domestic effort not unique to the colliery shift. However, the additional time required to handle the miner’s kit separately from the other washing is tallied in Column B, and the incremental increase resulting from additional miners in the household in Column C. We assume that some tasks, for example passing, would have to be repeated if washing for more than one collier, but others, such as moving equipment, involve the overhead labor standard in most working-class homes at the time (Column A).

Again, daughters shared the work. As a child Cissie Charlton grated huge bars of soap into flakes that would dissolve more quickly; later she graduated to the poss-tub, which she described as “back breaking work” (Charlton 1988: 20). A normal washday would also include the family laundry and took the whole day, with ironing and mending spilling over, but we assign only the time spent on the miner’s clothing, as detailed above, in estimating the unpaid domestic labor that was *shift labor* (for example, required as a result of occupational filth).

In Table 4, Section I, we estimate the total unpaid domestic labor required in the mining household as a result of the occupational affiliation: the domestic colliery shift work. We sum our estimates of the time to bathe a single miner and maintain his kit per shift to a weekly total assuming

that the miner worked six shifts. We add the extra time required at the weekly wash estimated in Column B, Table 3. Finally, we include two other shift jobs. First, miners required their meals at odd hours when they came off shift, eating separately from their families (see, for example, Harry Sheffield in Carswell and Roberts 1992: 53–4). This entailed additional labor in food preparation, conservatively figured as three hours a week. Second, off-shift miners brought home tremendous amounts of industrial filth. Coombes (1939), for example, learned to drink a cup of tea with paper around the handle so as not to soil, and his wife placed sacks on the rugs to prevent his work clothes from polluting their living space. Thus, a miner’s return from work meant additional sweeping and floor washing, costed up, again conservatively, as an extra three hours per week. Overall, twenty-one hours of colliery shift work were needed.

This table presents minimum estimates of the domestic support needed in a *single collier* household before pithead baths were widely available. The ability of company and collier to take the cost of this substantial shift work out of unpaid household labor caused a significant divergence in unpaid working hours between colliery and other families. But this total is dwarfed when we recognize that families often had *several men working different shifts*. In these circumstances, the unpaid domestic shift labor increased dramatically.

The colliery shift system was the joint outcome of the coal companies’ pursuit of profits, miners’ endurance, and industry regulation. The Ten and later Eight Hour Day meant that to operate pits without interruption and so maximize profits, miners had to work in relays through the day and night, despite the disturbance to everyday life. The organizational costs were transferred from mine owners onto the women who directly managed the routines.

Shifts disrupted family life and increased domestic toil in other industries as well (Reeves and Reeves 1979 [1913]). But shifts in mining were relentless. Morning shifts started early, 5:00 am, according to an experienced miner interviewed by Margaret Pollock (1926). Invariably, wives rose ahead of their husbands, ensuring that the miner could “have a cup of tea before he goes out and so that his clothes can be warmed ready to put on” (Pollock 1926: 61). She was up by 4:30 am – not that she had slept well, since the pit clothes had to be put before the fire to dry and “. . . those dirty, wet clothes must be turned through the watches of the night” (Pollock 1926: 74–5). Reverend Davies’ interviewees, referring to the 1960s and 70s, reported that men were never left to get up alone: one mother was “always up at 4.00 am to get dad out to the pit;” another “always up with dad to make the fire and breakfast” (Davies 2009: 40). One informant claimed her father “would never have made it to work without her [mother] getting up” (Davies 2009: 40). A missed shift cost the housekeeping allowance.

We now understand that shift work imposes health deficits known as Shift Work Sleep Disorder Syndrome (Wickwire et al. 2017). One symptom is difficulty waking up, which helps explain why wives were needed to get men up and off to work. But women also sought to contribute while men felt entitled to ministrations. This apparent exchange of nurture for financial support, however, contributed to the management of the workforce by ensuring punctuality and reliability. As mines became deeper and more capitalized, it was only when balanced teams of workers assembled promptly that takeovers ran smoothly and the pit worked efficiently. Colliery companies faced significant muster costs, which they displaced onto domestic workers.

The costs of working shifts extended beyond disturbed sleep. Shift work disrupted the normal rhythms of family life, schooling, eating, bathing, and domestic work. "... [C]alendars and clocks do not indicate the hours in a miner's home. Our mornings are made up not of minutes and dawns," as the miner's wife interviewed in *Working Lives* put it; instead, the daily schedule was governed by shifts with workers coming and going at all hours of the day and night (Pollock 1926: 74).

Disruption was exacerbated by the peculiarities of the miner's job: the imperative to wash, to clean the pit clothes, to lay them out in the order in which they were to be put on, and to prepare and pack the next day's food. Returning men trekked in new filth requiring repeated cleaning of floors and surfaces four times a day, according to Mrs Hart before the Coal Commission (1919: 1017; see also, Minnie Pallister quoted in Evans and Jones 1994). Although they might be working different shifts, baths and meals were required promptly on men's return, their preparation interspersed with the ordinary work of the household (Davies 2009: 40). In these circumstances, the women in the family hardly rested:

The morning is a shift coming in, at 4.30, the drying of pit-clothes, the outgoing shift at 5.15. . . . The day shift gone, it is time for the school bairns, and the lighting of the wash fire. . . . The children off to school, the baby is to be attended, and the washing put in order and gone on with. . . . at 1.30 in the afternoon another outgoing shift, and by 3.15 the day shift returns -dinner, clothes-drying, sewing, lessons for school, and ironing. At 8.30 the night-shift outgoing, and at 9.30 the afternoon shift returning (Pollock 1926: 75).

One detailed account describing the twenty-one-hour working day (3:00am–12:30am) of a woman whose household contained six miners on four shifts (4:00am, 6:00am, 2:00pm, 10:00pm) is reproduced in Online Supplementary Material 1. We also tentatively estimate the likely increase in domestic shift work required when households had more than one man and these men were working different shifts (Appendix One). While we

concluded that domestic shift labor amounted to around twenty hours per week if only one shift was worked six days per week, as Table 4 showed, if there was more than one miner on a single shift this could grow to thirty hours or more (twenty-one hours for the first miner, and ten for each additional miner working the same shift). If the men in the family worked different shifts, this not only increased domestic shift labor per man at a higher rate but extended the length of the working day for colliery wives, which could reach over 100 h per week with four men working two shifts, for example (see Appendix Table A1). Again, Williams, an independent observer, emphasized that in three-shift districts and with men on different shifts, the labor of the women was “greater and more continuous” and it was widely said that while the men worked seven hours per shift, their women put in seventeen, that is over 100 per week (1922–3: 242). Fred Saxton fixed on an identical seventeen hours when reflecting on his mother’s working-day housekeeping for her widower miner father and two miner brothers (Saxton 2000: 53). According to the women who testified before the Sankey Commission, the extra domestic labor required by the shift system meant that the miner’s wife was “little better than a slave” (Coal Commission 1919: 1016). What has been overlooked is the extent to which this burden was really unpaid shift work that served the interests of the colliery companies as well as the men. The imposition of shift work in the colliery system shortened the working day for men and enabled the coal to be worked continuously, but doubled the working day for women.

The second feature that distinguished miners’ wives and daughters from other working-class women was that the arduousness of their work was caused not only by the nature of their husbands’ jobs but also by the miserable facilities of pit villages: poor access to water, markets, and transportation links; wretched sanitation; and cramped homes with bad light and ventilation, rudimentary cooking facilities, and low-cost but labor-intensive heating. These disamenities were not unique to coal fields (Reeves and Reeves 1979 [1913]), but such progress as England made toward better housing and sanitation over the late-nineteenth and early-twentieth centuries was in the teeth of opposition from property owners, and largely relied on urban initiatives or new construction (Crosby 2019). Pit communities faced particular problems. As companies sought deeper deposits, mines were sunk in areas with sparse population, and settlements developed from scratch. In such constructed communities, the colliery companies were all powerful (MacFarlane 1976; Fordham 2016).

When the company was in charge not only of housing but of civil administration generally, it also had the authority to evade improvements to sanitation, electricity, and plumbing. In such cases, the company might agree to improving existing amenities only in a cost-sharing scheme, with partial (or full) expense of improvements docked directly from miners’ wages.⁸ These schemes were generally unpopular: since disamenities

disproportionately fell upon unpaid labor, there was little incentive to take it out of the breadwinner's earnings.⁹ Inevitably, pit villages became infamous for lagging standards, of both housing and sanitation exacerbated by extraordinary industrial filth (Brittain 1971; Humphries and Thomas 2020; see also Coal Industry Commission 1919).

In the second section of Table 4, we note the most consequential of these as "Colliery Disamenities." We have already commented on the work involved in accessing water in the context of bathing and laundry. But these were only two of many requirements for water in the course of the day. Rosa Bell remembered that she and her mother "[had] to carry most of the water a quarter mile when the rain water ran out. . . . How mother used to long for the rain to come and fill them up again" (c.1902: 118–9). Although pipes eventually brought cold water into some houses, difficulties persisted well into the twentieth century. Reverend Davies believed pit women's lives revolved around the tin bath and the coal-fired range. Warm water remained precious even in the 1950s with women using it repeatedly and for different tasks. Mothers often did the washing in a tub and then washed their children by pouring the water over them (Davies 2003: 38). Housekeeping generated waste in excess of dirty water that had to be carried out to the nearest drain or ditch. Mrs. Hart explained to the Sankey Commission that ashes and other refuse had to be carried "a considerable distance" for disposal (1919: 107). The ready supply of coal, usually free as long as the household contained a worker, nonetheless had to be "carried throughout the day in bucket or shovel to the fire," creating additional dirt (Carr 2002: 55–8, 52; see also, Coombes 1939: 130). In the East German coalmining community of Hoyersweda in the 1960s where coal or wood burning units were used for heating, Gerhard Lippold observed that fuel and ash carrying added significantly to domestic toil (1972). We thus allow an additional ten hours per week for "Carrying water, waste, coal, etc," an estimate that aligns with L. Gordon and E. Klopov's (1975) finding that the absence of "communal conveniences" (running water, gas) increased household maintenance in early postwar Soviet families containing one (non-mine) worker by some seven hours per week.

Then there were the costs of looking after invalids and convalescents. No other breadwinners were so constantly liable to serious injury as colliers (Turner and Blackie 2018) and where they and the company wished to avoid medical costs, pitmen were nursed at home. Given both the regularity and severity of miners' ailments (Mills 2010), we have allowed twenty to eighty hours per year for home nursing, which hardly affects the weekly total but which would be extremely trying on the occasion. In overcrowded, under-sanitized homes, accommodating a recuperating patient let alone a dying man had serious consequences for the efficiency and health of the busy household. Evelyn Haythorne provides an unsentimental account of the effects of her father's drawn out illness on both the family economy

and the household's functioning, including an episode when her normally redoubtable mother exploded with anxiety and overwork (1990: 46; see also Carr 2002: 66).

Next, life accounts are replete with information about the time and terrors involved in the lack of sanitary infrastructure in most colliery villages. We estimate that seven hours of labor were needed to cope with the wretched sanitation: emptying chamber pots, "universally used inside the houses especially in winter and by the elderly and the very young" even into the mid-twentieth century; scrubbing out and whitewashing the dry lavatories (middens), and cleaning the seats, "the rottenest job of all" (Hodges n.d.: 10) but best done "as often as you could" (Florrie Harris, in Carswell and Roberts [1992]: 61). All this is totted up in Table 4, Section II, as Disamenity Labor.

Finally, of course there was the ordinary "Domestic Labor" required to maintain the family. We have allowed minimum estimates for cooking, shopping, and cleaning based on our sources and cross-checked against early estimates of domestic time use, but we have not estimated for child care. The figure for domestic laundry is achieved by doubling the estimate in Column A (per household member) of Table 3, which would be a conservative estimate for a household. For very large families, the minimum estimates for tasks such as cooking and shopping and cleaning up would be increased. Our estimate of thirty-three hours per week in a single miner household is conservative in light of Bureau of Home Economics 1920s survey of over 1,000 housewives when over half spent over forty-eight and one-third over fifty-six hours per week in "homemaking" (Kneeland 1929).¹⁰

The litany of toil does not stop here, however, for the division of labor between miners and their wives and the male command of the wage created another type of burden.

As part of their quest to contribute and so justify their support, women in mining communities developed elaborate, extreme forms of housekeeping. These often followed rigid timetables inherited from the past, verged on obsession, and served no particular hygienic function. Fred Saxton's mother did "the same work on the same day every week of the year" struggling to turn her mean surroundings into a "shining palace" (Saxton 2000: 127). Customary displays involved peculiar, futile, and time-consuming battles against the environment: hanging white lace curtains that immediately darkened with airborne pollution and "chalking" the front step which smudged with the first footfall (for other examples, see Gier 1993). The women's imprisonment within their domestic routines is reflected in Davies' funeral eulogies: "She was never still;" "She created a good home life;" "She was known for her washing and ironing;" "She was always in;" "She was always the same and always there" (Davies 2003: 39, 40,

41). In only one of his many obituary notes is there a reference to interests beyond the home (Davies 2003: 47).

Just as women's domestic labor was fetishized, so was service to men. The motive was to escape becoming what Cissie Charlton described as "a non-paying passenger" and to be seen to contribute (1988: 55). The less husbands did at home, the better wives appeared. Women were remembered for "not letting dad do anything" or having "no hobby but looking after [her husband] and family." One woman's family spoke with pride about how "[H]er life revolved round [her husband]. Not once in their sixty years together did he have to wait for his dinner." Another boasted of "spoiling" her husband: "I waited on him hand and foot" (Davies 2003: 40, 46, 41). Subservience spilled over onto daughters and sisters. "It was the job of the girls in the family to look after the welfare and comfort of the workers. Men never cleaned their own boots. They were always done for them by the females" (Hodges n.d.: 8). As the "owners" of the wage, men expected deference and service, even when they were not working. Jim MacFarlane's mother went potato picking during the 1926 strike, but her husband was unhappy about the bread and cold potatoes left for his meal. When she came home she "didn't get in t'door before [she] got a crack" (Hallet, cited in MacFarlane 1976). Substitutes for wives' attendance were not acceptable. J.B. and his wife were sharing a house with another couple, and when he came home from work he was presented with a meal cooked by the other woman as a favor to his wife who had gone to the market. J.B. had no complaints about the food, but he boasted afterwards that he had thrown it "straight to t' back o' t' fire" and when his wife returned, he told her that he had married *her* and he was going to have his meals cooked by *her* (cited in Dennis, Henriques, and Slaughter 1956: 182). A miner interviewed in the 1960s explained his opposition to the employment of married women even if the cash they earned enabled the purchase of substitutes: "if I'd wanted just a housekeeper I would have got one without having to marry her" (Klein 1965: 69).

Although pit villages were urbanizations, they benefitted from none of the entrepreneurial by-employments found in other towns and cities in which women commonly earned money on the side. Miners insisted on personal service from wives who accepted, indeed embellished, their role in a bid to appear indispensable, so in these communities there could be no outsourcing of domestic labor, often the basis for a vibrant local economy with multiplier effects on women's employment (Lippe et al 2004). Significantly, the only pervasive entrepreneurial activity undertaken by wives was the taking in of lodgers. In the coalfields as elsewhere where high rates of in-migration exacerbated housing supply, chronic shortages created a market for lodgings. Andrew Walker's (1997: 327) study of mining settlement on the Yorkshire coalfield documented that some 20 percent of all homes contained lodgers, and 80 percent of these

were headed by miners. Overcrowding was the inevitable result. Cramped 2-up 2-down houses in South Kirby on the Yorkshire coalfield contained on average 6.8 people and four had over eleven inhabitants (Davies 2003: 124). Moreover, lodging involved more than shelter, for as we have shown, pit men needed many hours of supporting labor if they were to be able to work. Coombes' (1939) account of his move to the Rhondda shows how additional (lodger) colliers were slotted into the household's existing bathing, eating, and washing arrangements, adding many more hours to women's work but providing a way in which they could augment family incomes. Wives' response to this opportunity was tolerated by their men and encouraged by colliery management. Although shift and domestic work was multiplied and made more difficult by overcrowding, landlords were retained at home, and in public, at least, male breadwinning was affirmed as the model of the mining household (Walker 1997). Such financial transactions were internal to the household but with a low multiplier for local economic activity. For the colliery companies, the availability of nearby lodging, even if overcrowded, substituted for additional expenditure on colliery housing and facilitated employers' broader strategy of shuffling labor around the coalfields according to demand conditions.

The 1842 Mines Regulation Act fundamentally changed the value of women's labor in colliery communities. By displacing a stunning amount of industrial work onto their wives and daughters and deprecating its value, miners exaggerated their own economic dominance, stifled economic growth in their communities, and collaborated with employers in substituting unpaid household labor for managerial organization and infrastructure. This had immediate consequences. Women fetishized domestic cleanliness and seriously neglected their health, while men took top-cut of wages, food, rest, healthcare, decision making, and the shorter shift. Finally, the surplus of work-hours facing the household meant that mining deprived children of attention and educational opportunities even if the pit did not employ them.

FAILURE OF THE FAMILY WAGE

However, this does not mean they fared better elsewhere. If we have shown that colliery women worked excessive hours, it still might have been less than factory women who worked the "double shift." Even after industrial reforms in the mid-nineteenth century limited their shift to ten hours, this was similar to that of miners (McCormick and Williams 1959). By our estimations from the work of A. L. Bowley (1895) and George Henry Wood (1910), the average textile wage was less than the average colliery wage by between 40–60 percent over the second half of the nineteenth century. Given this unfavorable rate of pay, colliery households might still have

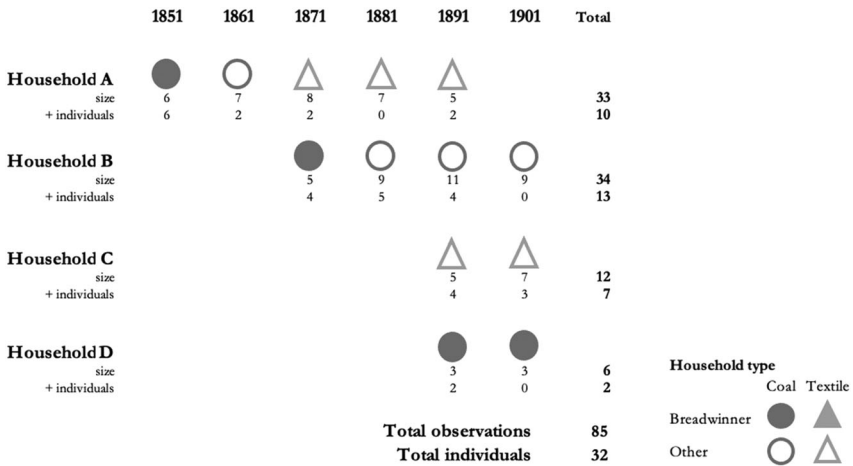


Figure 1 Case study (linked census microdata)

Notes: “Size” indicates the number of people in the household, summing to the total number of individual observations. “+ Individuals” indicates the number of additional “new” people in the household, summing to the total number of people observed over time. For example, in 1861, Household A “lost” one member and “added” two new ones (Figure 2).

Source: Integrated Census Microdata (I-CeM). Linked as part of previous study (Thomas 2018).

enjoyed a sufficient income advantage to compensate for extensive unpaid labor.

In truth, the comparison depends on the ways of working adopted by households under these different constraints. To consider the meaning of our time-use estimate in context, we apply it to a repeated cross-section of four related households that worked in both industries across the last half of the century. As Figure 1 shows, the original household (Household A) lived in a colliery district (Scremerston, Northumberland) from 1851–61, and a textile district (Bury, Lancashire) from 1871–91. Two siblings (children of A, who moved out to form their own households B and C) remained resident in coal and textile areas respectively; while a third-generation household (D) worked in coal. Altogether, the figure visualizes thirty-two unique individuals in eighty-five total observations.

The useful detail provided by the census is indicated by Figure 2, which shows Household A over the first three census years. Here, the breadwinner arrangement – where the male head was the sole earner supporting the household – was relatively rare over the life course. Out of thirteen household observations, a breadwinner appears only four times (for example, Household A in 1851, above).¹¹ In five others, one or more dependents was also employed (Household A in 1861)¹²; while in the rest,

● 1851, Northumberland				
Person	Relationship	Age	Sex	Occupation
1	Head	29	M	Coal miner
2	Wife	30	F	-
3	Son	8	M	Scholar
4	Daughter	6	F	Scholar
5	Daughter	2	F	-
6	Son	0	M	-

○ 1861, Northumberland				
Person	Relationship	Age	Sex	Occupation
1	Head	39	M	Overlooker (Coal mine)
2	Wife	40	F	His wife
4	Son	16	M	Laborer (Coal mine)
5	Daughter	12	F	Scholar
6	Son	10	M	Scholar
7	Son	6	M	Scholar
8	Daughter	2	F	-

△ 1871, Lancashire				
Person	Relationship	Age	Sex	Occupation
1	Head	49	M	Carter
2	Wife	50	F	Wife
5	Daughter	22	F	Assistant in draper's shop
6	Son	20	M	Warehouseman
7	Son	16	M	Weft packer
8	Daughter	12	F	Scholar
9	Daughter	7	F	Scholar
10	Daughter	5	F	Scholar

Figure 2 Household A in the census, 1851–71

Source: Integrated Census Microdata (I-CeM). Linked as part of previous study (Thomas 2018).

adult children of breadwinning age (20 years or older) had not established their own households but continued to earn as members of the parental family (Household A, 1871).¹³

We apply our time-use estimates to these eighty-five individual observations and also consider the relative earnings ratios implicit in the “high wage” argument. While neither miners nor textile workers labored six shifts every week of the year, we are interested in the fundamental ratio implicit in these ways of working, most efficiently calculated by imposing a standard weekly interval for all. We are therefore comparing the *minimum*

Table 5 Relative laboring hours per shift, week

<i>Industry</i>	<i>Worker</i>	<i>1851</i>	<i>1861</i>	<i>1871</i>	<i>1881</i>	<i>1891</i>	<i>1901</i>
Coal	Male, Adult	1.00	1.00	1.00	1.00	1.00	1.00
	Male, Young adult	1.20	1.20	1.20	1.20	1.20	1.20
	Domestic, shift	0.35	0.35	0.35	0.35	0.35	0.35
	Domestic	0.84	0.84	0.84	0.84	0.84	0.84
Textiles	Male, Adult	–	–	1.20	1.20	1.20	1.20
	Female, Adult	–	–	1.00	1.00	1.00	1.00
	Young adult	–	–	1.00	1.00	1.00	1.00
	Children	–	–	1.00	1.00	1.00	1.00
	Domestic	–	–	0.54	0.54	0.54	0.54

Notes: Domestic hours are exclusive of childminding. “Domestic, shift” assuming only one miner per household

Sources: Author’s calculations as described in the text (see Table 4), McCormick and Williams (1959). See also Appendix Table A5: FTE Hours per shift, 1871–1901.

of household labor (Table 4) to a reasonable *maximum* of remunerative labor as suggested by the census, and we evaluate both hours (Table 5) and earnings (Table 6) as a ratio of the breadwinner standard, the coal hewer. To create Table 6, we use established historical wage series (Bowley 1895; Wood 1910; Johnson 2003; Boot and Maindonald 2008) to estimate earnings by industry, gender, and age.¹⁴ To set laboring hours for colliery men and boys for Northumberland in Table 5, we draw on the detailed comparative analysis of B. McCormick and J. E. Williams (1959) and arrive at a standard of six ten-hour shifts per week for breadwinners.¹⁵ The domestic hours of colliery women are the sum total of those in the second and third sections of Table 4, with their domestic shift labor (Section I) given separately as “Domestic, Shift.” The latter comes to 3.5 h per miner per shift, or 35 percent (0.35) of the breadwinner baseline; while the former comes to 50.5 h per week, or 84 percent (0.84) of the baseline. The domestic laboring hours of women in textile districts are set to the general domestic total (Section III) from Table 4, which come to thirty-three hours per week, or just over half (0.54) the baseline. We assume that any major variation from the latter applied to all households.¹⁶ Since our example demonstrates how this system worked in practice, we do not explore the family history in detail, although there is much of interest. However, for those who wish to examine the case or our calculations more closely, the anonymized microdata is provided in the Online Supplementary Material, along with explanatory notes. Appendix Tables A2–A5 give the intermediate calculations for earnings in Table 6.

The results (Table 7) can be conveyed by the following two figures. First of all, households in a breadwinner formation had the highest rates of

Table 6 Relative wages in cotton textiles

<i>Industry</i>	<i>Worker</i>	<i>1871</i>	<i>1881</i>	<i>1891</i>	<i>1901</i>
Coalmining	Male	1.00	1.00	1.00	1.00
Textiles	Male, Adult	0.82	0.90	0.73	0.73
	Female, Adult	0.51	0.56	0.45	0.45
	Young adult	0.30	0.32	0.26	0.26
	Children	0.09	0.10	0.08	0.08

Sources: Authors' calculations from Bowley 1895; Wood 1910; Johnson 2003; Boot and Maindonald 2008. See also Appendix Tables A2–A4.

women's labor of any household, even when we distribute that labor among all resident women of laboring age (8 years or older, Column K). Figure 3 also shows that their households did not earn more: at best, women in colliery breadwinner households with 30–40 percent of a breadwinner's wage per person worked time and a half over their sisters in textile homes. In fact, the average earnings ratio per capita was 0.28 for coal and 0.43 for textiles. Women in textile households did not necessarily work more hours, and they benefitted from higher earnings.

Figure 4 plots each household's gender-specific labor hours divided by the number of members of that sex of laboring age. The dashed line represents parity, or the point at which both genders would be working equal hours per person. Generally speaking, in colliery households, women's hours substantially exceeded men's hours; whereas in textile households, women's hours were typically less. This was not because the "double shift" did not exist for factory women; but because domestic work was partible, and the value of their labor prevented the degree of extraction that occurred at the colliery.

For the individual lives in question, these differences were profound. For example, the collier's wife in Household A worked in excess of seventy hours a week in 1851 and sixty in 1861, for which she earned nothing. In Lancashire where female by-employment was readily available, even if we allow that she could have picked up casual work that was not enumerated in the census, she probably did not work more thirty-five hours a week in 1871 and 1881, of which less than half would have been unpaid domestic labor (since her daughters continued to share household duties). In 1871 therefore, her work had decreased by 60–80 percent while her household's income per capita increased.

We can also compare her daughter (Person 5, Household A) with her daughter-in-law (Person 13, Household B): they were even born in the same year in the same place. Person 5 probably worked at least twenty hours a week assisting her mother in 1861, in addition to minding her younger

Table 7 Shifts and earnings for case study households, 1851–1901

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Household	Year	Sector	Type		Total shifts	Total wages	Shifts per capita	Wages per capita	Shifts per male	Shifts per female	Shifts paid, female	Shifts paid, total
A	1851	Coal	Breadwinner	●	2.2	1.0	0.4	0.2	0.3	1.2	0%	45%
A	1861	Coal	Other	○	3.5	1.7	0.5	0.2	0.4	0.7	0%	61%
A	1871	Textile	Other	△	5.4	2.8	0.7	0.3	0.8	0.5	74%	90%
A	1881	Textile	Other	△	6.7	4.6	1.0	0.7	1.2	0.8	82%	92%
A	1891	Textile	Other	△	3.7	2.1	0.7	0.4	1.0	0.8	67%	85%
B	1871	Coal	Breadwinner	●	2.2	1.1	0.4	0.2	1.0	1.2	0%	45%
B	1881	Coal	Other	○	2.9	1.5	0.3	0.2	0.6	0.6	0%	58%
B	1891	Coal	Other	○	5.6	2.8	0.5	0.3	0.6	0.6	0%	59%
B	1901	Coal	Other	○	6.7	4.2	0.7	0.5	1.0	0.6	22%	69%
C	1891	Textile	Other	△	2.9	1.6	0.6	0.3	1.2	0.6	67%	81%
C	1901	Textile	Other	△	6.8	2.7	1.0	0.4	0.9	1.1	83%	92%
D	1891	Coal	Breadwinner	●	2.2	1.0	0.7	0.3	1.0	1.2	0%	46%
D	1901	Coal	Breadwinner	●	2.3	1.1	0.8	0.4	0.6	1.2	0%	50%

Notes: Columns H and I are calculated per total number of household members. Columns J and K are calculated per number of gender age 8 or older. Itemized calculations per person (from Tables 5 and 6) are available in the Online Supplementary Material.

Sources: Case study, as described in the text and available in Online Supplementary Materials; author's calculations from Tables 4 and 5, and so on.

siblings. Had her family not moved into textiles, by 1871 she would either have been working about sixty hours a week as her mother's assistant in support of three miners (similar to her niece in Household B in 1901), or she might have married a breadwinner of her own. For that outcome, we can look to her sister-in-law: in 1871, her brother's wife worked over seventy hours a week (plus minding three children under the age of 6). Instead, Person 5 became a draper's assistant in Lancashire, an occupation notorious for exploitative hours and low pay. But even if she worked six twelve-hour shifts a week, she still worked no more than her sister-in-law back at the colliery – and she was paid for every shift. In 1871, her household earned about 30 percent of a breadwinner's wage per person, while her sister-in-law's earned 20 percent.

If in this comparison women's labor force participation raised incomes without raising women's working hours, it also mitigated two further threats faced by colliery households: the dangers of top-slicing and of vulnerability associated with dependence on specialized earner in a single industry. The crucial difference to all three benefits was the presence of women's wages: women were paid for 70–80 percent of their working hours in

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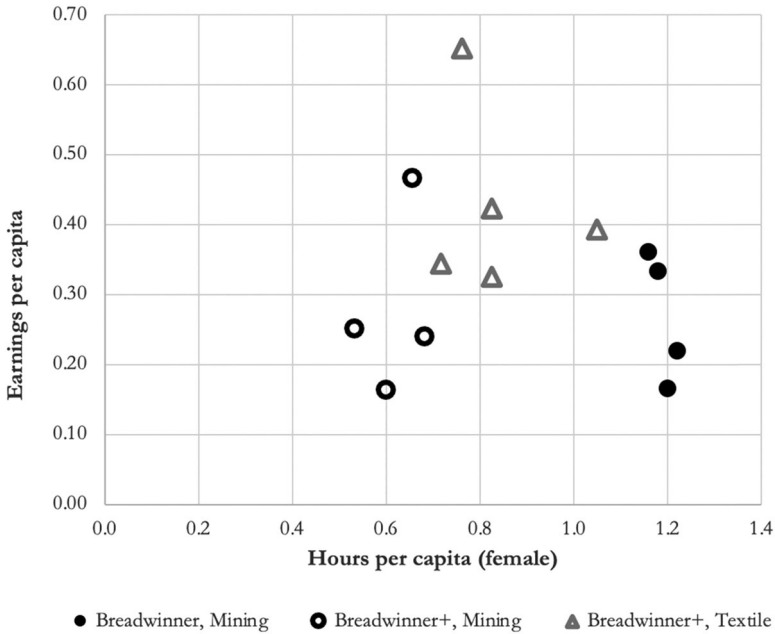


Figure 3 Female hours and household earnings

Notes: Hours are calculated as the household’s total weekly labor hours for women, divided by the number of women of laboring age (8 or older), expressed as a ratio of breadwinner standard hours. Earnings are calculated as the weekly household total divided by the number of household members, and expressed as a ratio of a breadwinners’ earnings for the same period.

Sources: Case study, as described in the text and available in Online Supplementary Materials; author’s calculations from Tables 4 and 5, and so on.

these textile homes (compared to 0 percent in mining homes). Figure 5 shows that even setting family size aside, we find no earning advantage in colliery households, and textiles had a fundamentally higher proportion of remunerated labor. They were never paid for less than 81 percent of total labor, while mining households were never paid for more than 69 percent (the minimum was 45 percent), the gap created by the colliery’s capture of household labor. In fact, Figures 3 and 4 suggest that the only way for women’s hours to decline to parity in colliery homes was by increasing the number of unpaid workers (daughters). The lowest ratio of women’s labor hours is achieved by Household B in 1891, when three daughters are available to share ninety-six hours with their mother. If the miner’s quip about his wife having the best job in the world was ever true, it was at his daughters’ expense.

This comparison not only strengthens our doubt that high male wages secured the benefits often claimed for breadwinning and the “family wage,”

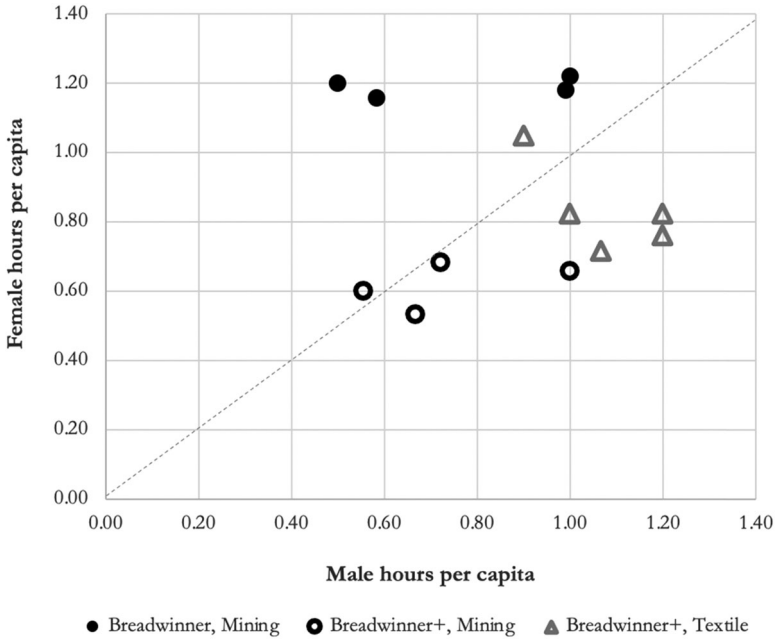


Figure 4 Female and male hours per capita

Notes: Hours calculated as the total gender-specific hours labored per household, divided by the number of members in that household of laboring age (8 or older).

Sources: Case study, as described in the text and available in Online Supplementary Materials; author's calculations from Tables 4 and 5, and so on.

but suggests serious long-run disadvantages compared to other ways of working. The readiness of colliery owners and coal miners alike to deflect costs onto unpaid labor in the miner's home, and of women to engage and perpetuate this system, suggests the perverse effects on human capital that arose when women were excluded from earning. It also repositions the large family size of miners as a response to the failure of the breadwinner model: a colliery household was an occupational unit in which several workers – not just the miner – met the colliery's high demand for manual labor. Ironically, it was only by abandoning the breadwinner configuration that these colliery families might prevent a double shift for women and keep the youngest girls in school rather than work.

THE LEGACY: WOMEN'S PARTICIPATION IN WAGED LABOR

It is now accepted that local demand for women workers was the major determinant of female labor force participation (FLFP) in the past

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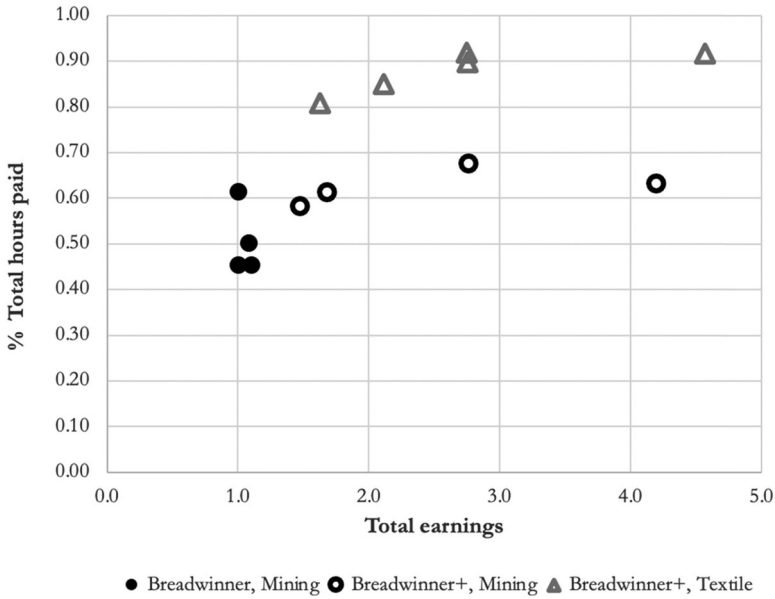


Figure 5 Total earnings (ratio) over share of hours paid
 Sources: Case study, as described in the text and available in Online Supplementary Materials; author’s calculations from Tables 4 and 5, and so on.

(Humphries and Sarasúa 2012). As a result, local economic structure played a decisive role, illustrated in English data by the significant regional variation in women’s waged work (Goose 2007; Shaw-Taylor 2007; You 2014). The lack of opportunities for women in mining districts represents one extreme of this demand-determined panorama. This is shown by Xuesheng You’s (2020) analysis of female participation rates (LFPRs) from the 1881 census enumerators’ books by district economic structure, family life cycle, and husband’s occupation. Although married women’s LFPRs varied over the life stage everywhere, in cotton textile areas they were about seven times higher than in agricultural areas in early married life, and even by a later life stage when children remained resident but less than half in employment, they were still about four times higher. In mining areas, where the demand for women’s labor was still lower than in agricultural areas, the difference with cotton was even more pronounced at around 3 percent compared with over 30 percent (You 2020). Comparisons of married women’s LFPRs within the same type of local economy by husband’s occupation picks up the income effects of men’s wages as well as the burdens deriving from the operation of the household economy. Within cotton areas, married women’s LFPRs were at similarly high levels for each stage of life except for husbands in agriculture or the professions, while

in contrast within mining areas, married women's LFPRs were dampened almost regardless of their husbands' jobs. You (2020) interprets these findings as reflecting the importance of opportunities for women: robust in textile districts, thin in mining communities. But a notable exception to the lower LFPRs in mining districts concerns the wives of textile workers, who even in these inauspicious contexts found work. While You attributes this to the presence of nearby textile factories, it might also capture a more permissive, less onerous familial context like the ones we observe in our case study. Moreover, the very low levels of LFPRs of miners' wives in mining areas, lower even than the wives of professional men, supports our argument that in addition to any income effects of relatively high nominal wages, the displacement of shift work onto miners' wives and their capture within their homes strongly inhibited their pursuit of paid work.

These effects did not fade with time. Married women's LFPRs in mining areas remained distinctively low long into the twentieth century (James 1995). Elizabeth Allen said that she "Never went to work... My husband wouldn't let me to and I had no desire to go out to work." Her husband gave her an unchanging fixed allowance to keep the whole family though "he helped" if she got into debt. No wonder she was grateful "when family allowances came in" (Carswell and Roberts 1992: 64).

Even after the era of pit closures, despite some convergence towards national averages, FLFPRs in ex-coalmining communities have continued to lag (Beatty 2016). Such persistence is not surprising, as researchers have demonstrated that historical experiences molded the extent to which women's work is socially acceptable and continues to contribute to current geographical variations in women's activity rates. For example, Michael Wyrwich has shown that the persistent regional pattern of women LFPRs in Germany is explained not by enduring structural factors but deep-rooted cultural norms associated with much earlier historical organization (Wyrwich 2019). In particular, Wyrwich demonstrates that the historic employment share in mining has an effect on current labor force participation in both an OLS analysis and IV estimation using Protestantism as the instrument. Similarly, in the UK, relatively low married women's LFPRs outlived the local dominance of coalmining (Beatty 2016).

Our study has exposed the material basis for this persistence in the capture of women's labor within the home by both miners and the early colliery companies. Of course, as is widely known, census FLFPRs capture only regular full-time work and so provide inaccurate estimates of the extent to which women contributed to family incomes in the past when much of their effort was opportunistic and sporadic, and likely exceptionally so in mining communities (Humphries and Sarasúa 2012). For this reason, we may be missing a significant segment of economic activity. Indeed, just such "penny capitalist" activities by married women with their significant multiplier effects and social spillovers have been

identified as vital in local growth. Unfortunately, both our meta argument and micro evidence refute the existence of such a substratum of women's activity in the coal communities we studied. The hours of "shift labor" required of women, added to the extra toil caused by disamenities and a normal domestic load, left little time for either regular waged labor or petty entrepreneurialism. Moreover, miners' rejection of any outsourcing of domesticity, accompanied by the ritualization of personal service and household activities, stymied the inception of exchanges that could have matured into a market in goods and services that offered opportunities for women's involvement.

There were exceptional miners' wives who worked for wages (Hedley 2019), and even more who sought engagement with the economy of make-shift when their families fell on hard times. Thus, Evelyn Haythorne's mother sold home-made peas and pies from her house when her husband was incapacitated (1990) and several of Rev. Davies' informants' mothers took seasonal agricultural work. Yet the transience of such efforts stands out in comparison with the casual labor of women in other types of community. In Jim MacFarlane's recollection of the wife who got a crack for her efforts to earn a bit extra, she also never collected her wages. The only socially sanctioned and employer-encouraged earnings opportunity was taking in lodgers, which we have argued was permitted because it did not disturb divisions of labor and enabled labor mobility in the absence of housing investment. Even Tina James, anxious to identify economic activity by miners' wives, concluded that at least until her third and most recent generation of her interviewees, such activity "wasn't the done thing" (Case 06; quoted in James 1995). Mining communities were denied an underpinning of women's initiative that has elsewhere provided a base for reinvention and renewal.

CONCLUSION

Ex-coalmining communities around the world remain "left behind" in their national contexts. This paper has focused on one overlooked contribution to this lag in the UK: the gender relations and social norms created in an earlier era of patriarchal and capitalist exploitation. We have argued that the position of women in these communities deprived them of sources of growth and reinvention that would have been of value in the coming socioeconomic transition and the design and implementation of regional policy. Moreover, occupational specialization rooted in family life precluded many communities from seizing what opportunities became available in the service and care sectors. Initially, redundant miners shunned "women's work" in an often-vain pursuit of traditionally male jobs (Nixon 2006). Today, most of this generation have reached statutory retirement age and their sons have not enjoyed the same luxury. Men's

adoption of jobs in shops, hotels, and catering has been slow and painful, but it has also left fewer positions for women entrants to the labor market and held women's participation rates back, creating a rise in unemployment. Many of those jobs offered low pay and insecure contracts (Beatty 2016: 832), incompatible with the masculinist local traditions and memories that shaped individual preference and with the basic economic unit of these communities – the occupational household. Successful adjustment in ex-coal districts has required not only new jobs, but new family economics and gender norms. The new dovetailing of family and labor may look more gender equal; but if with closer inspection it also suggests leveling down rather than up, this partly explains the local enthusiasm for new mines that regularly splashes today's headlines.

Enthusiasm is also fueled by nostalgia. It is not uncommon for life accounts to recount appalling conditions alongside a fondness for the cohesiveness and camaraderie of colliery life. For generations, laying patriarchal laurels on the heads of uncomplaining, self-sacrificing wives and mothers hid the realization that pit women had propped up the profitability of Britain's mining industry long before (and after) it went into decline. If women in coalmining had been paid for their shift labor at a similar discount to that experienced by women in textiles, by our estimate it would have added at least 15–20 percent to the shift wage. If the industry had invested in proper facilities much earlier (a cheaper option), the idealized benefits of the high male wage might have been realized, sending Britain's coalfields into the industry's decline as one of the better educated and wealthy districts instead of the reverse. Crucially, these communities would almost certainly have escaped the additional burden of a sticky gender trap and found it far easier to integrate into other labor markets when pits closed. The extraordinary contribution of colliery women to the UK's industrial advantage in the late-nineteenth century suggests the valuable part that such women might play in a greener and more prosperous future. Repudiating the capture of their labor by "breadwinners" and their erstwhile employers is key to realizing this potential.

Jane Humphries
 History, All Souls College
 All Souls College, Oxford OX1 4AL, UK
 email: jane.humphries@all-souls.ox.ac.uk

Ryah Thomas
 Faculty of History, University of Oxford
 George Street, Oxford OX1 2RL, UK
 email: ryah.thomas@history.ox.ac.uk

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NOTES ON CONTRIBUTORS

Jane Humphries is (Emeritus) Professor of Economic History at Oxford University and Centennial Chair London School of Economics.

Ryah Thomas is a DPhil candidate at Oxford University.

NOTES

- ¹ There were downsides too. The incentive to employ kin promoted child labor and adversely affected wives' health as they struggled with a double shift of domestic labor and onerous employment often when pregnant or soon after childbirth. Miners, needing help, were tempted to marry early and so families were large, creating further pressures for children to contribute.
- ² The "individualization" of the wage may help to explain miners' resistance to communitarian schemes for the provision of amenities, (pithead baths, libraries, even educational infrastructure) that involved contributions from companies and men. Miners' were reluctant to surrender any part of their earnings on goods and services beyond their control.
- ³ On reflection he realized "how wrong we were," for women were "on call twenty-four hours a day" (quoted in Kirkup [1993]: 168).
- ⁴ By "wives," we denote the women responsible for managing the domestic workload. From accounts of widowed households or ill mothers, it is clear that the most senior woman in a family assumed ultimate responsibility to the breadwinner for all domestic tasks, although if she was fortunate to have capable sisters or daughters, she did not work alone. Fred Saxton's mother was thus "pitchforked into being the unpaid housekeeper" aged 18 when her mother died (2000: 35).
- ⁵ In this exercise, we are aided by the fact that until the mid-twentieth century, amenities in most pit villages were rudimentary in a conventionally rural sense: for example, the time involved in pumping water by hand, carrying water by hand or on the head, or boiling water in pans on an open fire are dictated by straightforward physical considerations that are easily replicated today.
- ⁶ For a discussion of scaling in household work see Nancy Folbre, Martha Murray-Close, and Jooyeun Suh (2018).
- ⁷ Although some tasks could be shared between multiple women and carried out synchronously, for a variety of reasons including propriety norms, safety, and the physical limitations of space in overcrowded miners' homes, the time savings possible from multitasking was limited.
- ⁸ The British Miners Welfare Fund, established as a result of the Mining Industry Act in 1920 and financed from a levy on coal raised, proposed schemes to establish pithead baths. But these were unpopular with some miners who preferred to wash at home rather than pay the subsidy required by management to use the facility

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(Coal Commission 1919; Fordham 2016: 51), a clear example of costs displaced first by management on the miners and then by the men on their wives. Pit women campaigned strenuously in favor of such facilities (Coal Commission 1919; Evans and Jones 1994).

- ⁹ A fair objection, since in other places such improvements were more often funded through the rates or municipal loans (Crosby 2019: 94).
- ¹⁰ These housewives were mainly from rural homes with no labor-saving equipment and received no help from men, so analogous to the mining families (Kneeland 1929; see also Gordon and Klopov 1975; Tyazhelnikova 2006).
- ¹¹ Household A 1851, Household B 1871, Household C 1891, Household D 1891, 1901.
- ¹² Household A 1861, Household B 1881–1901, Household C 1911.
- ¹³ Household A 1871–91, Household B 1901.
- ¹⁴ Most of these observations (90 percent) are employed in their area’s primary industry (textiles or coal), which dominated employment in both areas. The remaining 10 percent are too few to alter the conclusions we draw and were unlikely to earn at far higher rates. We explain the discount/premium at which we attribute wage ratios to these values in the Notes to Online Supplementary Material 2.
- ¹⁵ McCormick and Williams (1959) concluded that typical mining hours in Northumberland were unusually low for adult men (seven to eight hours per shift), while boys worked a ten-to-twelve-hour shift that spanned the two daily shifts at the collieries. To make our example more representative of the general in the industry, we set the shift hours of adult men in Northumberland to ten hours, instead of eight. This overestimates the labor of the specific colliers in our case study, and underestimates the shift ratio for their dependents. For example, the domestic shift work would come to 0.47 (47 percent of the collier’s hours) in the more likely case that a collier was working seven hours per shift, as opposed to 0.33 (33 percent) in the general estimate we have chosen to use here, of ten hours per shift.
- ¹⁶ Further work on comparative domestic time use, specific to industries, is certainly merited.

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SUPPLEMENTAL DATA

Supplemental data for this article can be accessed at <http://doi.org/10.1080/13545701.2022.2128198>.

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APPENDIX ONE

Shift working

The hours given here correspond to those in Table 4 in the main text, and show how they increase by the shift. As Table 4 shows, if there was more than one miner on a single shift, the domestic shift work could easily grow to thirty hours or more per week (twenty-one hours for the first miner and ten for each additional miner on the same shift). With two miners working the same shift, the amount of shift-specific labor each week (thirty-one hours) was approximately equal to the

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standard domestic labor we estimate in Section III of Table 4 (thirty-three hours). If there was more than one shift in the household, this not only increased working time by a slightly higher rate (for example from thirty-five hours of work for two shifts instead of thirty-one for a single shift), but it also extended the working day for colliery wives (see Appendix A1).

Table A1 Effect of additional miners and shifts on weekly domestic labor

<i>Number of shifts</i>	(A)	(B)	(C)	(D)	(E)	(F)
	<i>One shift</i>			<i>Additional shift</i>		
	<i>1st</i>	<i>2nd</i>	<i>3rd</i>	<i>1st</i>	<i>2nd</i>	<i>3rd</i>
<i>Number of miners/shift</i> <i>Description</i>	<i>Hours/Week/Miner</i>			<i>Hours/Week/Miner</i>		
I. Colliery shift	21	10	10	14	10	10
Bath	6	4.1	4.1	6	4.1	4.1
Maintenance	5.6	4.1	4.1	5.6	4.1	4.1
Laundry	3	1.7	1.7	1.7	1.7	1.7
Floors	3	0	0	0	0	0
Meals (3)	3	0.6	0.6	0.6	0.6	0.6
II. Colliery disamenities	18	0	0	0	0	0
III. Domestic labor	33	0	0	0	0	0
Total weekly domestic labor hours:						
If one miner	72					
If two miners on one shift		82				
If three miners on one shift			92			
If two miners on two shifts				85		
If three miners on two shifts					96	
If four miners on two shifts						106

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APPENDIX TWO
Wage data

Table A2 Relative wages in textile trades and coalmining

<i>Industry</i>	<i>1860</i>	<i>1866</i>	<i>1870</i>	<i>1874</i>	<i>1877</i>	<i>1880</i>	<i>1883</i>	<i>1886</i>	<i>1891</i>
Coalmining	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Textiles	0.44	0.51	0.53	0.42	0.54	0.58	0.54	0.63	0.47

Notes: Index represents average wage in cotton textiles in each year (men, women, and children) when coalmining wage = 100.

Source: Authors' calculations from Table V in A.L. Bowley (1895).

Table A3 Relative wages for youths and adults in cotton textile

<i>Worker</i>	<i>1851</i>	<i>1861</i>	<i>1871</i>	<i>1881</i>	<i>1891</i>	<i>1901</i>
Men 18–60yrs	1.00	1.00	1.00	1.00	1.00	1.00
Children under 13yrs	0.20	0.16	0.12	0.11	0.11	0.11
Men 13–17yrs	0.29	0.32	0.35	0.36	0.36	0.37
Women 13–17yrs	0.29	0.32	0.35	0.35	0.37	0.37
Women 18–60yrs	0.41	0.51	0.61	0.62	0.63	0.64

Notes: Index represents average, population weighted, full employment earnings, by age per week, relative to men 18–60 yrs = 100, British cotton industry, selected years.

Source: Authors' calculations from Boot and Maindonald (2008).

Table A4 Conversion of relative wages (Table A3) to average textile wage (Table A2)

<i>Worker</i>	<i>% Textile labor force</i>	<i>Average ratio of male wage 1871–1901</i>	<i>Ratio of average textile wage</i>	<i>Share of total textile wages (ylding average = 1)</i>
Adult men	0.4	n/a	1.55	0.62
Adult women	0.2	0.63	0.97	0.19
Young adults (13–17)	0.3	0.36	0.56	0.17
Children	0.1	0.11	0.18	0.02

Source: Author's calculations from Tables A2 and A3.

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Table A5 FTE shift hours per shift

<i>Industry</i>	<i>Worker</i>	<i>1851</i>	<i>1861</i>	<i>1871</i>	<i>1881</i>	<i>1891</i>	<i>1901</i>
Coal	Man, Adult	10.00	10.00	10.00	10.00	10.00	10.00
	Man, Young Adult	12.00	12.00	12.00	12.00	12.00	12.00
	Domestic	3.50	3.50	3.50	3.50	3.50	3.50
Textiles	Man, Adult	–	–	12.00	12.00	12.00	12.00
	Woman, Adult	–	–	10.00	10.00	10.00	10.00
	Young adult	–	–	10.00	10.00	10.00	10.00
	Children	–	–	10.00	10.00	10.00	10.00
	Domestic	–	–	0.00	0.00	0.00	0.00

Notes: Domestic hours are exclusive of childminding. Domestic hours in coal are the weekly total (21) divided into six shifts (3.5).

Source: Author's calculations as described in the text (see Table 4), McCormick and Williams (1959).