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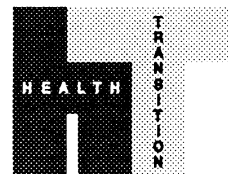
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Women's economic roles and child survival: the case of India*



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Abstract

This article provides evidence that women's employment, in spite of its other benefits, probably has one crucial adverse consequence: a higher level of child mortality than is found among women who do not work. We examine various intermediate mechanisms for this relationship and conclude that a shortage of time is one of the major reasons for this negative relation between maternal employment and child survival. However, even in the area of child survival, there is one aspect which is positively affected by female employment: the disadvantage to girls in survival which is characteristic of South Asia seems to be smaller among working mothers. This is in contrast to the effect of maternal education which may often have no clear relation to the sex ratio of childhood mortality even though absolute levels of child mortality are lower for educated mothers.

Introduction

The purpose of this article is to highlight a little-known fact. Its being little known is surprising, because it is quite widely available and also counter-intuitive, two features which usually make for easy attention. This fact is that, among the poorer sections of a population, the probability of a child's dying is greater for a mother who is employed than for one who is not.

It is interesting that in the demographic literature women's economic roles have been considered largely in the context of fertility. Discussion on the postulated incompatibility between a woman's productive and reproductive roles almost always centres on the implications of this incompatibility for fertility. For example, a seminar on Women, Work and Development sponsored by the International Labour Office (1984) concentrated

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entirely on the relationship between women's roles and fertility and family planning; in spite of the seminar's broader mandate, no mention was made of that other component of demographic growth, mortality. This is understandable in a sense because there are so many independent as well as interrelated reasons for us to want to increase women's employment and to reduce their fertility. But since we do not aim to reduce fertility to zero, working women will continue to bear children, even if fewer of them, and the possibly harsh impact on these children of their mothers' (or, more accurately, joint parental) work status therefore needs to be recognized in our calculations of the benefits of women's participation in the labour force.

We focus here on this possible negative aspect of female employment: its impact on the physical welfare of the child, measured at the extreme by the level of childhood mortality. Unfortunately this unpleasant implication of female employment has not received more than passing attention in the literature even though various data analyses have found a negative association between a mother's employment status and her children's survival. So, since this lead has rarely been followed, we know very little about this association and its possible causes. This is in sharp contrast to the large and still growing interest in the positive association between maternal education and child survival.

In the next three sections we use the case of India to explore the maternal employment-child mortality relationship not by using a single data set and running a multiple regression, but by using several data sources at different levels of aggregation to get a stepwise picture of various aspects of the problem. We begin by looking at data disaggregated only to the level of the state to present some stylized facts on a possible employment-mortality relationship. Wherever possible, we seek support or refutation of these facts from other geographical areas. We then look at progressively more disaggregated secondary data and at some primary field data, attempting in both cases to weed out some of the factors which may confound the observed relationship between the two variables of interest and to identify some of the mechanisms likely to be involved in it.

We aim not to make a case for discouraging rises in women's employment, but to identify and suggest ways of alleviating the determinants of the probable adverse relationship with child mortality. Discouraging an increase in female employment is not warranted because it is *a priori* possible that similar relations exist between child survival and *male* employment, when the mother also works, though this is difficult to establish statistically since the fraction of non-working fathers in any sample is likely to be extremely small. We also look at one specific aspect of child mortality in South Asia, namely, a sex differential in child survival which is heavily weighted against girls. Finally, we document the consistent positive association at the macro and micro levels between female employment and an egalitarian sex ratio of child mortality. This situation is compared with the converse relation that often exists between maternal education and child mortality, its being negative in the case of absolute levels of child mortality but often positive in the case of a discriminatory sex ratio of child mortality. We attribute the latter unexpected finding to low levels of women's employment in areas with the highest sex differentials in childhood mortality and to the inverse relationship between female education and female employment, at least at the initial stages of development.

While India is the overall focus of this analysis, the country is disaggregated wherever possible into two distinct regions, North and South, and to the states within these regions, because there are substantial differences in demographic parameters as well as the roles of

women between these two regions. Finally, as far as possible, we concentrate on the lowest socio-economic groups; for instance, the merely literate as opposed to those educated to any formal level, and the urban slum-dwelling poor or the rural as opposed to the total urban. Most of our hypotheses would be less tenable for the higher groups where the increased economic resources associated with education or employment can become the primary means for affecting child survival and, therefore, swamp other factors. It is worth emphasizing at this point that we do not have adequate evidence on the distribution of women's work by kinds of employment. Although we comment later on this issue no general hypothesis on child survival and the nature of maternal work is possible without more disaggregated data.

There is also the vexing question of suitable measures of women's employment. It is true, as the literature has increasingly begun to stress (see, for example, Anker, Khan & Gupta 1988; Krishnaraj 1990), that female labour force participation rates, especially in developing countries, are much higher than those estimated by conventional censuses and surveys, and that the greatest undercounting occurs in those activities in which women are disproportionately represented. This is not the place to go into the gender biases inherent in standard definitions of economic activity. For the present purposes, the crucial complaint is that women who work in activities which are commonly performed by men as well are much more likely to be counted as working. Since we rely heavily on secondary data here, it is primarily to these women that we refer in our analysis of women's economic roles and child survival. It seems that those women who are conventionally counted as economically active experience an important negative effect, namely, poorer child survival. At the same time, the value, however misinformed, attached to such conventionally defined productive work (and not just by organizations such as the census, but by households themselves) seems to lead to more equal treatment of sons and daughters in the question of survival when women work. Conversely, women who do not fall into these conventional work categories, even if they are as busy, seem to experience smaller child loss, but also greater inequalities in the mortality of boys and girls.

Over the following pages we try to establish that first, child mortality is higher when mothers work, and second, that differentials in child mortality are lower when mothers work. The Indian evidence is strikingly systematic. We are aware that our findings are likely to have political implications. While we comment on these our primary aim is to draw out, from a diversity of statistics, some systematic empirical relations.

The nature of the maternal employment-childhood mortality relation

Table 1 presents some aggregate state-level data for India on child mortality and some possibly interrelated socio-economic variables. It seems to suggest that there is no relation between proportions of women in the labour force and overall child mortality as measured by $q(5)$ ¹. Figure 1, which graphs columns 3 and 4 of Table 1, captures, by its peaks and troughs, this lack of relation. But as soon as we move to a more disaggregated view, as is presented in Table 2 with rural census data, a relationship appears between $q(5)$ and maternal employment which is systematic to the point of being dramatic. In each of the nine states, child mortality is higher for working mothers. Note also that overall values of $q(5)$ are generally higher in the North Indian states.

¹ $q(5)$ values represent indirect estimates of the probability of dying by the age of five years (see United Nations 1983).

Table 1
The macro picture

Region/State	Per.Cap. NDP at constant prices 1980-81	% Women aged 15+ literate 1981 (rural)	% Women aged 30-34 employed 1981 (rural)	q(5) 1981 (rural)	Sex ratio (m/f) of q(5) 1981 (rural)	Sex ratio (m/f) of CEB* to women 30-34 1981 (rural)
1	2	3	4	5	6	7
India		17.6	27.8	167	0.93	1.12
North						
Punjab	1354	25.0	4.1	124	0.87	1.12
Haryana	1060	12.7	9.1	150	0.81	1.11
Uttar Pradesh	519	8.7	10.4	204	0.83	1.13
Rajasthan	535	5.2	18.0	190	0.90	1.10
Madhya Pradesh	516	8.5	44.5	213	0.96	
South						
Andhra Pradesh	647	13.2	52.5	153	1.05	1.02
Karnataka	687	18.8	39.4	155	1.01	1.05
Tamil Nadu	584	23.5	44.3	146	1.13	1.04
Kerala	621	69.0	27.3	83	1.01	1.05

Source: Census of India, 1981; Yearbook of the Ministry of Health and Family Planning 1987.

* children ever born.

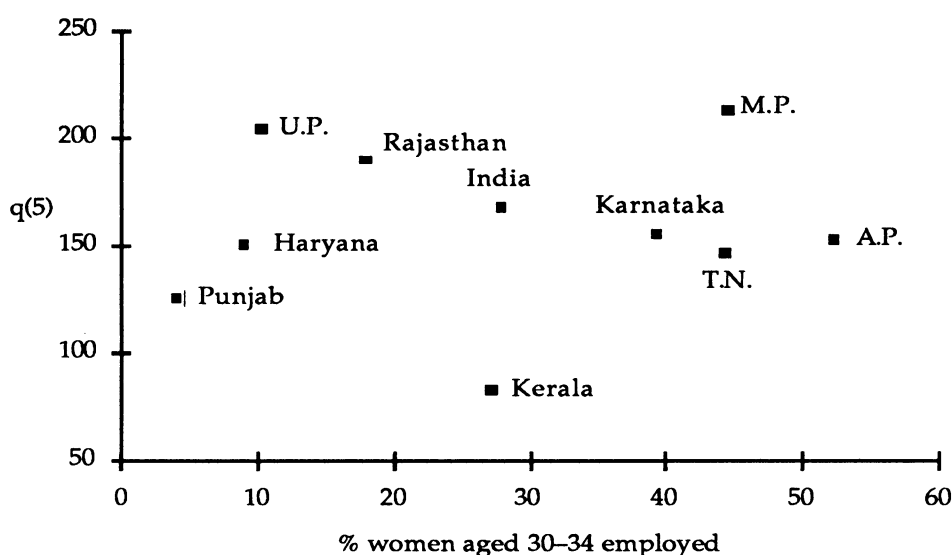
Table 2
Maternal employment and child mortality, 1981 Census, rural

Region/State	q(5) non-working women	q(5) working women	(3) - (2) (2)	q(5) only illiterate women
1	2	3	4	5
India	157	179	0.14	178
North				
Punjab	122	131	0.07	129
Haryana	145	165	0.14	154
Uttar Pradesh	201	209	0.04	210
Rajasthan	177	206	0.16	193
Madhya Pradesh	187	220	0.18	220
South				
Andhra Pradesh	128	162	0.27	160
Karnataka	134	172	0.28	164
Tamil Nadu	97	163	0.68	156
Kerala	73	102	0.40	118

Source: Registrar General of India 1988a.

Figure 1

Child mortality according to the percentage of women aged 30-34 employed, rural India, 1981



Our own data (Table 3), based on poor migrant households from two distinct regions, Uttar Pradesh and Tamil Nadu, confirm this kind of negative association between maternal employment and child mortality (see Basu n.d.). For both regional groups in the study, currently working women had experienced greater child loss than non-working women.

Table 3

Maternal employment and child mortality, urban slum

Region of origin of women	Number of live births	Percentage of live births (to women aged 15-59) that have died	
		Non-working women	Working women
Tamil Nadu	2007	24.5	32.1
Uttar Pradesh	2482	17.9	22.9

At first sight our finding seems to conflict with the view that greater female employment is desirable. But that is not a correct interpretation. It can still be the case that economic power gives women precisely those freedoms and equalities that are associated with increased child survival when they arise from other sources such as education or the absence of physical seclusion or even just the knowledge that employment is a socially acceptable option. But in the case of actual employment, there appears to be a crucial trade-off between such autonomy and other factors detrimental to child survival. Given that the negative relation between maternal work and child survival occurs among poorer

households, our study illustrates yet another tragic aspect of poverty and, in particular, how poverty presents a mother with a fatal dilemma. There is a need to investigate the kinds of employment which would minimize this negative effect of work; we do not have adequate data for such an analysis here, but emphasize the need to pursue such research in future.

Much fault can be found with the indicators used in Table 2. Particularly troublesome is the fact that working women may have more in common besides their being employed; factors other than their work may lead to greater child mortality. In responding to this, we begin by observing that column 3 of Table 2 looks at all working women. Given that working women, like non-working women, are heterogeneous, it is implausible that they share a common disadvantage which predisposes them to greater child loss. We do not think that income is an important confounding variable. There is little empirical evidence for an independent income-child mortality relationship within a poor population where the range of income variation is narrow. More often than not, income is a proxy for other more direct determinants of child mortality such as maternal education, rather than a determinant of such mortality itself. Moreover, while employed women may be forced to work because of their greater poverty, the additional income from working reduces their poverty.

The impact on child mortality of a mother taking up work has two parts: the direct impact of her working and the indirect one of the household's increased income. If final incomes in households with working women are no lower than incomes in households where women do not work, and the effect of income *per se* on survival is positive, then our data unequivocally show that the direct effect of mother's work on child mortality is positive. The direct effect itself is made up of a combination of non-income factors, such as maternal control over resources; our results suggest that the adverse factors among these swamp the beneficial ones. While the net outcome of the combination of direct and indirect effects demands further investigation, it seems probable that, given the low income of rural women, even the combined effect on child mortality of a mother's work would be positive.

Although there is a case for investigating the confounding effects of other variables, the strength and consistency of the relation between maternal employment and child mortality suggests that it cannot be spurious and caused entirely by correlated income differentials.

We next examine the role of maternal education as a confounding variable. We know that education has a powerful independent effect on child mortality and that, at least at the lower levels of education, educated women are more likely to be outside the labour force than uneducated women. Is the child mortality differential between working and non-working women then due to differences in the proportion of educated women in the two groups? The last column of Table 2 suggests that this is not so. Except for Kerala, the values of $q(5)$ for working women are similar to or higher than they are for only illiterate women. But if education were the determining variable, the child mortality experience of working women should have been lower than that of illiterate women, given that the former category does contain some educated women while the latter has none. Indeed, the impact of employment is even greater than suggested by the comparison of columns 2 and 5 in Table 2, because the illiterate women's child mortality has been raised by the employed women among them. If we could look only at illiterate, unemployed women, their overall child mortality would be even lower, thereby accentuating the working-not working differential. This argument also reflects on the possible confounding effect of income in the postulated relationship between employment and child mortality, given that there is some positive association between maternal education and household income.

We have not carried such refinements further because of data difficulties and because the report by U.N.(1985a) has done part of this job for us. In a multivariate analysis of data sets from 16 developing countries this report on socio-economic differentials in child mortality found that the negative relationship between maternal employment and child survival was maintained even after controlling for possible confounding factors such as maternal education, urban-rural residence, mother's marital status and paternal occupation, the last two as proxies for economic level. Moreover, the relationship was strongest for the Asian countries included in the study. The central finding bears quoting: 'In 10 of 14 countries, therefore, women who do not participate in economic activities or who work within their family enterprises have the lowest level of child mortality' (U.N. 1985a:158).

Similarly, using aggregate data from the Registrar General of India's (1981) survey of infant and child mortality, Beenstock and Sturdy (1990) concluded that, controlling for other socio-economic factors, the relative probability of infants dying was 27 per cent higher for working than non-working mothers (Beenstock & Sturdy 1990). The difference would probably have been even more striking for child mortality. The same remarks apply to the multivariate analysis of Lesotho data by Banda, Lesetedi and Shastri (1990) which concluded that working women were 1.2 times more likely to experience an infant death than non-working women.

Besides socio-economic factors confounding the observed maternal employment-child mortality relationship, certain biodemographic variables may also be important. The most relevant of these is the age of the mother. Because women's labour force participation rates tend to rise with age (U.N. 1985b), employed women may have a higher proportion of older women and therefore, theoretically, a higher proportion of women at risk of high child mortality for whatever reason (parity, exposure, and cohort effects). But in the Indian case, labour force data suggest that there are no major changes in women's employment rates associated with age after early adulthood (Registrar General of India 1988b). Moreover, since we are using $q(5)$ values as an indicator of child mortality, there is a kind of age control in any case, given that the $q(5)$ estimate is based on information corresponding to women aged 30–34 at the time of the census or survey (U.N. 1983).

There are still many problems of definition: for instance, current work status is a barely adequate classification for an employed woman; we would much rather know her work status during each child's first years. But research suggests that women's participation in the labour force is fairly stable: most women who have ever worked since marriage are likely to be currently working as well (Lloyd 1990). Similarly, there is the small possibility that women who have lost a child are relatively free and thus more likely to join the labour force. But as female labour force participation rates rise, this kind of selection is likely to be increasingly irrelevant. The main point is that in spite of so many simplifications in the data used, the relationship is so consistent.

Possible mechanisms

If we accept the proposition that women do not kill their children so that they can join the labour force, it makes sense to study the mechanisms rather than the motivations involved in the negative maternal employment-child survival relationship. Interest in the impact of maternal employment on child health has been growing, although there has been little attempt so far to carry these analyses one step further and seek an impact on child mortality. As yet the small amount of information available is often inconclusive, perhaps not because of a real absence of consistent relationships but because this research area is

still in its infancy or because the findings are often a by-product of totally different research interests. An attempt follows to draw a few hesitant conclusions from the existing literature and from some disparate data sources.

The most important of the redeeming features of maternal employment is the increased resources available for child welfare. As Mencher (1988) has graphically illustrated with data from villages in Tamil Nadu and Kerala, it is not just the fact of more money coming to the household that counts; what seems to matter is who brings in the extra money: with total household income remaining the same, a larger proportion of it seems to be spent on child welfare if the wife is working. That is, women's wages have a higher probability of being used for household (especially child) welfare than equivalent incomes earned by men. Similarly, Kumar (1977) concluded from field work in Kerala that improvements in wage income were translated into improvements in child nutritional status more readily in households where the women were employed. With data from Panama, Tucker and Sanjur (1988) too concluded that maternal employment had a positive impact on children's dietary intakes. Popkin and Solon (1976) reached a similar conclusion in the Philippines, where mother's work was found to have an independent effect on food expenditures.

Such findings are consistent with the hypothesis that employment gives women greater command over resources and greater autonomy in decision-making, factors which have been attributed to education and held responsible for improved child survival by several writers (see, for example, Caldwell 1986). In our field study, for both regional groups, women who were employed took significantly greater responsibility for deciding on matters such as expenditure on food and clothing, what to cook and how to treat a sick child².

There is also likely to be a positive association between women's employment and access to knowledge about better childbearing and childrearing practices, as well as a greater confidence and freedom in translating this knowledge into behaviour. This certainly seems to be true in the case of fertility-regulating behaviour and there is no reason to doubt that exposure to and willingness to accept health-related innovations are similarly higher for working women. For instance, in the field study of the slum, working women were more likely to have had their babies delivered in a hospital than at home, a possibly important influence on perinatal mortality (see Jain 1985); or to have initiated breastfeeding within a day of the birth.

Other macro or community-level effects might support a positive maternal employment-child survival relationship. These effects operate through the negative two-way link between women's employment levels and their seclusion levels in a society, in both the literal and the metaphorical senses. While psychological seclusion can affect child health through the kind of KAP variables mentioned above, physical seclusion of women has important direct consequences for health. For example, in our urban study the North Indian woman's greater reluctance to interact with the outside world was reflected in the very low proportion of hospital deliveries in this group (13% as opposed to 32% for the Tamil sample), even when the births took place in Delhi and the women therefore theoretically faced the same institutional choices as those facing the South Indians in the slum.

² On the other hand, working women in our urban slum study often did worse on indicators such as watching television, going to the cinema or talking to their husbands: we attribute this not to greater seclusion but to shortage of time.

Even more invidious in their impact are health-affecting practices which have their roots in the restrictions on the physical movement of women and girls, and which become more dangerous in the crowded and unhygienic environment of an urban slum. In our study, many women and girls from the Uttar Pradesh households avoided the public taps and toilets provided in the area: as many as 51 per cent of girls aged 10–12 years used the area just outside the home for urinating; 25 per cent even defaecated there. The infection possibilities of such behaviour can well be imagined and not surprisingly, residents of the North Indian lanes were more subject to gastro-intestinal ailments than residents of the South Indian lanes in the slum.

Data of this kind make a strong case for those who manage employment-generation and income-raising schemes to be more sensitive to the situations of various household members. But it does seem that where child survival is concerned, there is an important trade-off between the benefits of maternal employment and some more abstract kind of maternal investment³.

What can the poor non-working mother provide which the poor working mother with more money and knowledge cannot? The answer is, probably, time. Although as long ago as 1978 DaVanzo and Lee developed a time-allocation model for studying the compatibility of child care with labour force participation and non-market activities, this approach does not seem to have been extended to study the ultimate outcome of child care, namely, survival. So we can now do little better than speculate.

For example, existing knowledge on the links between maternal work status and child nutrition (see Leslie 1989) suggests that there are no significant differences in the prevalence of breastfeeding among children of employed and unemployed mothers, but that the employed mothers' duration of (especially exclusive) breastfeeding is probably much shorter. Such shortened breastfeeding can have a clear health impact. Popkin and Doan (1990) report that in their longitudinal study in the Philippines, four-month-old urban infants fed breastmilk plus non-nutritive liquids such as tea, water and broths were twice as likely to have diarrhoea as exclusively breastfed infants, and those given no breastmilk were thirteen times as likely to have diarrhoea.

There also seems to be a significant negative relationship between maternal employment and child nutritional status, but causality is unclear. Two of the studies cited in Leslie (1989) obtained interesting results by disaggregating children according to age: in both cases there was a negative association between maternal work and child nutritional status for infants and a positive association for weaning-age children. Chutikul (1986) concluded from nutritional-status data for children in rural Thailand that mother's work in the formal labour market had a significant negative association with child nutritional levels. There is also some evidence now which suggests that infant birthweight and health are better served by the mother's rest in the last trimester of pregnancy than by her food during this time.

We are not on much firmer ground when we look for links between maternal employment and general child care: see Joekes 1989 for a review of what little is known. Obviously a woman cannot be in two places at once, and the woman who has young

³ We are referring to the maternal employment which leads to only negligible or moderate increases in household income; where these increases are large and consistent, naturally the trade-off can cease to exist.

children and works away from the home must leave the daily care of her children to others unless her work allows them to accompany her. But even in the latter case, as well as in the case of women who are involved in economic activities in or near the home, the demands of the job may often mean that the physical proximity between mother and child has no more than notional value.

There is now considerable interest in the advantages of sustained and active interaction between mother and child for the emotional as well as physical development of the child. Paolisso, Ngare and Timiyan (1989) report from a time-allocation study in Kenya that during periods of peak agricultural activity, mothers reduced the amount of time they spent holding infants and that this seemed to be associated with an increase in infant diarrhoea. Similarly, Popkin and Doan (1990) have catalogued a number of studies which found an association between the efficiency of food utilization by children and the quality and quantity of maternal time that they received.

But the mother is not, from this point of view, irreplaceable. Paolisso et al. (1989) found that for young girls to hold their infant siblings was just as effective in preventing diarrhoea as for their mothers to hold them. The impact on the young girls themselves was not mentioned but our urban slum study found that even in the 10–12 year age group, only about 38 per cent of the Tamil girls were in school. Moreover they were the most likely to be removed from school if their mothers worked or had several children. In both cases the motivation was clear: the girls were kept from school not because school was an unattractive proposition but because there were now new demands on their time and labour. Close to 40 per cent of the non-school-going Tamil girls aged 10–12 years did not attend school either because they went out to work with their mothers or were needed at home. And this is still the pre-adolescent stage: with rising age, these responsibilities and duties can only increase.

All this compounds the ill-effects on child health of non-attendance in school. Not only are these young children of working mothers missing educational experience which can influence their knowledge and attitudes in health-related areas, but the additional physical load that they bear also has a direct detrimental impact on their health, reflected partly perhaps in the higher mortality levels among the children of working mothers.

Under existing conditions, even the elder siblings or the preferred adult substitute care-givers are often not available. In our study, about 28 per cent of the Tamil children aged 5–9 years fended for themselves during the day, but only 5 per cent of the Uttar Pradesh children. This reflects the availability of other household members and the kind of employment favoured by the women in the two groups. On the whole, if the women from Uttar Pradesh earned an income, they were likely to engage in activities which involved minimum interaction with the outside world and especially with men from the outside world. Almost all such employment was household-based and generally centred around traditional feminine skills such as sewing or the processing of foods for sale by others. Conversely, the women from Tamil Nadu were much more flexible in the kinds of employment they were willing to consider and had few inhibitions about taking jobs outside the home. But these were also the jobs most incompatible with childbearing and childrearing which goes to explain at least part of their lower fertility (Basu & Sundar 1988) as well as the greater physical neglect of children in the Tamil sample.

We now proceed to hazard our most tentative hypothesis. Table 4 presents Indian survey data on child-care arrangements made by working mothers for five-year-old

children in the rural areas. Once again, there seems to be a North-South differential, which is probably related to household structures as well as to differences in the occupational mix of working women in the different states. Table 5 shows larger proportions of rural working women in the southern states working as labourers, and larger proportions in the North working as cultivators, the latter occupation presumably being more compatible with childminding. For comparability with earlier tables, Table 5 should ideally have presented only rural rates and preferably for women aged 30-34. But this is not a great handicap as occupational mobility is not high; moreover, since we are comparing cultivators with agricultural labourers, we are looking only at rural workers in any case.

Table 4
Percentage distributions of source of child care when mother goes to work, rural girls aged five years, 1979

State/region	Mother herself	Grandparent	Other household member	Non-household member	No one
1	2	3	4	5	6
India	49	17	20	4	11
North					
Punjab	43	44	14	—	—
Haryana	20	21	41	—	19
Uttar Pradesh	65	19	12	—	5
Rajasthan	53	20	13	—	15
Madhya Pradesh	60	19	14	—	7
South					
Andhra Pradesh	43	16	27	7	8
Karnataka	46	12	16	7	20
Tamil Nadu	43	6	18	10	24
Kerala	22	21	20	11	25

Source: Registrar General of India 1981.

Of great interest are the proportions of five-year-old girls who are reportedly looked after by no one when their mothers go to work (column 6 in Table 4). Compare this with column 4 of Table 2 which shows the extent of the child mortality differential between working and non-working women in the different states. Figure 2 shows that there seems to be a close association between the differential between working and non-working mothers and the proportion of children left to themselves. The southern states do worst in this regard and the gap in child mortality between working and non-working mothers is the greatest for them. Punjab and Uttar Pradesh seem to suffer the least, both in the extent of the child mortality differential and in the proportion of children with no one to look after them.

Our hypothesis therefore is that a major explanation for the higher child mortality experience of working women can be found in their greater physical inability to look after their children themselves and to arrange adequate substitute childcare. This value of parental child care is analogously suggested in studies which comment on the relationship between fertility and child mortality; see, for example, National Academy of Sciences 1989.

Studies on the relation between maternal education and child mortality (for example, Caldwell 1986) say that the mother is the first to notice a child’s ill-health and the need to do something about it: if she is educated and free to act, the chances are greater that something will be done; whereas even if the father is educated and autonomous, his impact on child survival is smaller because he is less likely to notice the ill-health in the first place. Restating this argument, even if the mother is autonomous and confident, she has first to be aware of a child’s needs before she can act to meet them.

Table 5
Percentage distributions of female main workers by industrial category, 1981
Census, rural

State/region	Cultivators	Agricultural labourers	Services	Others
1	2	3	4	5
India	33	46	7	14
North				
Punjab	6	26	47	21
Haryana	49	22	19	10
Uttar Pradesh	48	22	19	10
Rajasthan	67	16	6	11
Madhya Pradesh	47	41	4	8
South				
Andhra Pradesh	24	59	5	12
Karnataka	25	50	6	19
Tamil Nadu	23	53	6	18
Kerala	5	44	19	32

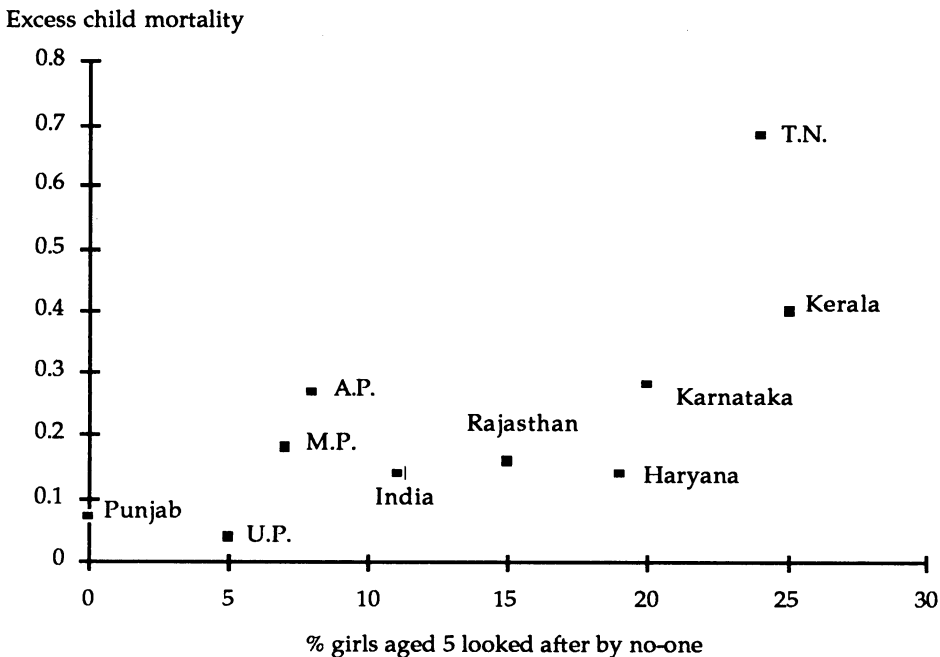
Source: Registrar General of India 1988b.

Similar conclusions are reached by other studies on infant and child mortality which have looked in some detail at the primary care-giver. Hilderbrand *et al.* (1985) have documented the significantly higher risks of death faced by children of the Tamasheq (nobles) in rural Mali, than children of the Bella (slaves). The latter can hardly claim to have greater economic resources; their main difference from the Tamasheq seems to be that Bella children are rarely separated from their mothers, whereas Tamasheq children are cared for by Bella nursemaids (who are often children themselves) and taken to their mothers only for breastfeeding. The authors stress the ignorance of Tamasheq mothers about their children’s problems, the practice being to hand the child over to the servant at the slightest sign of troublesomeness.

Similarly, Sussman (1980) recorded higher infant mortality in the early nineteenth century among Parisian babies who were sent away to wet nurses in the country than among ordinary French infants who were not. Even more revealing in the context of this article is that the mortality of these children rose in the summer and autumn months, when agricultural employment was more available to the wet nurses, making them perhaps less attentive to their charges.

Figure 2

Proportionate excess child mortality of working women according to the percentage of girls aged 5 looked after by no one when mother goes to work



Maternal employment and sex differentials in child mortality

The sex differential in childhood mortality in South Asia and probably the Middle East seems to contradict information from other parts of the world that girls are physiologically hardier than boys and therefore have a better chance of surviving early childhood. Moreover, there has been no automatic reduction in the female disadvantage in survival in these areas with development and with declines in the absolute level of child mortality.

The South Asian region is large and diverse and disaggregation of the unit of analysis provides interesting information on some of the crucial cultural and socio-economic variables which influence the sex ratio of child death rates. Column 6 of Table 1 presents the sex ratio (male/female) of childhood mortality in the different states of India. That this ratio is not uniformly disadvantageous to girls is well brought out in the North-South comparison in the table. The North Indian states show a higher sex differential in childhood mortality than the southern part of the country (see also Bardhan 1974; Miller 1981; Registrar General of India 1981; Kynch and Sen 1983; Dyson and Moore 1983; Dyson 1988; Basu 1989). Indeed, the regional contrast is probably sharper than it appears; column 7 of Table 1 suggests a higher underreporting of dead daughters in the northern states, which means that female child mortality is underestimated and therefore so is the sex differential in child mortality. For all states, neonatal mortality is included in the $q(5)$ estimates used to derive the figures

in column 7. But neonatal mortality, of which endogenous causes are a large component, is significantly higher for boys and hence the post-neonatal mortality disadvantage to girls is greater than an all-inclusive figure of childhood mortality implies.

Of course the northern and southern regions of the country are differentiated by several factors other than the sex ratio of child mortality, as Table 1 indicates. But if the high sex differential in child mortality in the north is ‘artificially’ maintained in the sense that neutral household behaviour should lead to worse male survival and that impersonal influences from the outside are unlikely to be sex-selective in their impact, two of the more likely determinants of the regional difference in the sex ratio of child mortality would be female education and female employment.

Although we present data for both regions of the country in the following discussion, we concentrate more on the situation in the North on the assumption that the southern states already have a sex ratio of child mortality which would become grossly unfair to boys if we tried to raise it any further.

The left-hand half of Table 6 displays estimates of the sex ratio of child mortality according to maternal literacy status derived from 1981 rural census data. The education variable we use is limited to women who have not gone beyond primary schooling. This seems to be justified because a few years of school is the most that the bulk of literate women in the country can boast; confining the sample in this way controls to some extent for other socio-economic factors: and even a few years of mother’s schooling has a marked impact on child mortality.

Table 6
Sex ratio of child mortality* according to maternal characteristics, 1981 Census, rural

State/region	Illiterate women	Literate women	Non-working women	Working women	Non-manual workers
1	2	3	4	5	6
India	0.92	0.99	0.90	0.99	1.04
North					
Punjab	0.87	0.87	0.87	0.92	1.15
Haryana	0.80	0.95	0.82	0.91	1.25
Uttar Pradesh	0.83	0.80	0.82	0.91	0.93
Rajasthan	0.89	0.92	0.88	0.92	0.95
Madhya Pradesh	0.96	1.01	0.91	1.00	1.04
South					
Andhra Pradesh	1.05	1.14	1.07	1.04	1.15
Karnataka	1.01	1.05	1.02	1.01	1.08
Tamil Nadu	0.99	1.06	1.01	1.02	1.10
Kerala	1.07	1.11	1.12	1.15	1.18

Source: Registrar General of India 1988a.
* male q(5)/female q(5)

The findings in Table 6 are initially a little surprising. While there is a very distinct fall in the child mortality experience of literate mothers, there is not a consistent difference between the sex ratio of child mortality in educated and uneducated mothers for the

northern region. This is also in line with the finding in Table 1 that juvenile sex ratios have scarcely fallen over time in this region even though female literacy rates have climbed, especially rapidly in the case of Punjab (see also Weinberger & Heligman 1987).

Lest it be countered that macro-level data, such as from a census, are prone to unacceptably high levels of biases and inaccuracies, Table 7 presents sex differentials in childhood mortality according to maternal education from the field study mentioned earlier. While the sex ratio of child mortality is higher for literate mothers among Tamil (South Indian) households, it is lower for the Uttar Pradesh (North Indian) households. While confirming the macro picture evident in Table 6, this finding for the Uttar Pradesh sample also brings out the other important feature of the sex differential in child mortality in India and its potential for change. This is the regional contrast in the impact of maternal education on sex differentials in child mortality, which explains the confusion in the literature about the relation: some, for example, Das Gupta (1987), say that these sex differentials are wider for educated mothers; and others, for example, Caldwell, Reddy and Caldwell (1983), say that they are narrower. Once the cultural⁴ context is specified, the northern state of Punjab in Das Gupta’s study and the southern state of Karnataka in Caldwell et al.’s, there is no conflict between the two views.

The right-hand half of Table 6 shows sex ratios of child mortality according to whether the mother is a worker or not. There is no ambiguity in the direction of *this* association. For every northern state the sons and daughters of working mothers face more equal risks of death than the children of non-working mothers, where the relative advantage of boys is consistently greater. In some states the difference is larger than in others which may be related to the occupational mix of working women. For example, it is quite plausible that the sex ratio of childhood mortality is the most egalitarian in the case of children of mothers who work outside the home for a well defined cash income. The lower half of Table 7 based on our field data also shows that for both regional groups, the daughters of working mothers face a smaller relative disadvantage in survival than the daughters of non-working mothers.

Table 7
Sex ratio of child mortality according to maternal characteristics, urban slum

Maternal characteristics	Region of Origin					
	Uttar Pradesh			Tamil Nadu		
	% Boys dead	% Girls dead	Boys/Girls	% Boys dead	% Girls dead	Boys/Girls
No education	25.3	28.4	0.89	24.3	25.2	0.96
Some education	10.3	22.9	0.45	20.2	16.3	1.24
No occupation	23.7	27.9	0.85	19.4	23.0	0.84
Some occupation	32.6	30.9	1.06	25.8	23.6	1.09

⁴ In principle it should be possible to decompose the amorphous concept of ‘culture’ into more tangible causes. But that turns out to be very difficult in practice. A society’s culture evolves over centuries and beliefs, attitudes and behaviours associated with a cultural group may persist well after their original motivations have vanished (Basu, Jones & Schlicht 1987). For the purpose of short-period studies, it may be best to treat culture as a primitive causal factor. This irreducibility of culture as a causal factor even in economic decision-making, using the same primary data as here, is discussed in the context of migration in Basu, Basu & Ray (1987).

This is a pleasantly surprising finding because we had expected (from macro-level data as in Table 1) only that the sex differential in mortality would be smaller in areas where the potential for women's participation in the labour force was greater (see, for example, Schultz 1982). But it appears that even in areas with low overall female employment and probably also low female employment potential, there is a difference in the sex ratio of child mortality between working and non-working women.

Why should there be such a clear link between maternal occupational status and the sex differential in child mortality and not one between maternal education and this sex differential, even though education also presumably leads to a greater control over resources? The anomaly may be more apparent than real. Even the slight education which is all that the literate women in Tables 6 and 7 can boast, increases their confidence and ability to improve the household physical environment and to deal with the outside world, especially the terrifying outside world of hospitals and doctors, but this education hardly provides any reasons for increasing the value of girls. On the other hand, the mechanisms involved in the consistent relationship between maternal employment and the sex differential in child mortality must include, besides the greater confidence of women stemming from exposure to the outside world, the changed values wrought by the awareness that girls are also potentially useful individuals. Cain's (1984) argument that in societies where women have an economic value, son preference will be weaker for reasons of lifetime (and especially old age) security, was advanced to explain persistent high fertility in the South Asian region; but it applies equally well to explanations of the continuing large sex differential in child mortality in this region.

Before closing the case for the relevance of women's employment to more equal treatment of sons and daughters, one needs to consider a final confounding factor. It may be that working women exhibit a more egalitarian sex ratio of child mortality not because they believe in and practise equal treatment, but because they do not have the means, in this case primarily the time and the attention, to discriminate more effectively against their daughters and in favour of their sons. This argument is analogous to the one which attributes the worse sex differential in child mortality among educated mothers to their enhanced skills in manipulating child survival. The non-working mother is, in such an analogy, comparable to the educated mother in having a greater control over her children's survival and therefore a greater ability to discriminate.

This argument can be tested by comparing the sex ratio of childhood mortality for better-off working mothers, who are able to override the negative aspects of their jobs, with that for non-working women. Column 5 of Table 6 shows that even when mothers theoretically have the means to influence their children's survival status and when this rises markedly, the mothers who work continue to maintain a more balanced sex ratio of child mortality.

The ways in which women may affect the sex differential in child mortality include discrimination in the allocation of food (Chen, Huq & D'Souza 1981; Sen & Sengupta 1983), health care (Das Gupta 1987; Basu 1989) and general care (Miller 1981). In addition, there are relatively indirect and less deliberate ways in which girls can face smaller life chances than boys. For example, female employment or the South Indian culture may influence the traditional inhibitions which are at least partly responsible for worse health care and, by extension, higher mortality in girls (Basu 1990). These inhibitions exist in a culture of female seclusion about exposing girls to outside eyes, especially in the intimate way involved in a

medical examination and especially by a male doctor. Moreover, few women are professionally qualified and few female medical and paramedical staff are willing to work in remote areas.

These same inhibitions may also indirectly create at least some of the sex differential in mortality. Aaby’s (1988) work suggests that the severity of an infectious illness is affected by the intensity of exposure. In the traditional South Asian context this can be greater for girls who are more likely to stay at home and therefore to become secondary cases (infected by another household member) than index or primary cases (infected by an outsider such as a school companion). If one spends more time with other household members than with outsiders, it is postulated that secondary cases face a greater intensity of exposure and thus severity of infection.

The discussion so far has tried to clarify the role of maternal employment in sex differentials in child mortality. But it has been less definite about the reasons for the positive or unchanged relation between maternal education and this sex differential. An explanation for this latter finding may lie with the existing relation between female education and female employment. Table 8 indicates that literate women, including those not educated to any formal level as well as those with primary and middle schooling, are much less likely to be employed than completely illiterate women. This seems to be a fairly universal finding (see Lloyd 1990). The reasons are complex and must include the unattractiveness and perceived indignity of the kind of low-status job available to women of slight education and belonging to the lower socio-economic orders. Since our material suggests that female employment is the key to smaller sex differentials in mortality, it follows that there is no reason for these differentials to narrow for women with a few years of schooling.

Table 8
Female labour-force participation rates by educational attainment, 1981

Education level	Rural	Urban
Illiterate	17.2	7.9
Literate (without education level)	8.9	3.1
Primary	11.4	3.9
Middle	9.3	3.7
Matriculation or higher secondary	12.1	10.4
Non-technical diploma or certificate	50.0	50.0
Technical diploma or certificate	72.7	58.3
Graduate and above	30.3	29.1
All	16.0	7.3

Source: Census of India 1981.

But Table 8 also shows a rise in female labour force participation rates as educational levels rise beyond a certain point. Perhaps as levels of education in a region rise enough for overall employment rates to be higher among the literate than the illiterate, the sex differential in child mortality will also reach greater equality among the literate because this category will now have a larger proportion of working women than the illiterate group.

Discussion

This is an open-ended article. Some leads have been explored, but the case is not closed. Some questions remain and it is hoped that newer data analyses can address them. Not all

studies have found a clear positive association between maternal work status and child survival. For example, even the U.N. (1985a) study found that in some African countries, notably Ghana, Kenya, Liberia and Nigeria, 'employees' experienced lower child mortality than non-working women. While this may be related to the kind of work women are most likely to take up in these countries, it is a question worth following up. Similarly, Hobcraft, McDonald and Rutstein (1984) were unable to find any consistent relation between maternal employment and child mortality in World Fertility Survey data but, given the force of the supporting evidence, we would hazard that this was due to extraneous factors connected with those data, including the definition of the work status of the mother. It is noteworthy that any relationship found between maternal employment and child mortality was positive: for instance, that between mother's work and neonatal mortality in Pakistan and overall child mortality in Thailand and Sri Lanka.

The relation could do with much more research scrutiny; in particular, it would be very useful to look at historical material on trends and cross-sectional differentials in child mortality and in female labour force participation rates. Could the latter have been an important influence on the higher urban infant and child mortality during the Industrial Revolution? In contemporary periods too there are various macro and micro-level data sets that could be usefully tapped for further clues. One possibly revealing analysis might be through data on cause of death as well as on morbidity. If the children of working mothers have a higher risk of dying from or experiencing accidents and injuries, this would provide some support to our value-of-parental-time hypothesis. Similarly, the kind of work the mother does may be more important in contemporary urban areas in developing countries, where to the hours of actual work must be added the often considerable travel time involved in several occupations, as well as the smaller possibility of access to adequate substitute care-givers, especially within the household.

We have omitted the possible role of fertility as an intermediate variable in the link between women's economic roles and child mortality. This does not seem to be such a serious lapse for several reasons. The biological relationship between fertility and mortality would be more relevant for infant mortality, whereas we have been looking at overall child mortality; behavioural factors are probably more important than biological ones in the association between women's employment and child mortality, given that education and employment both tend to lower fertility and still seem to have opposite effects on child survival; even the biological relationship between fertility and child mortality is far from clear (see National Academy of Sciences 1989); and although working women have lower fertility, their child mortality experience is higher. However, there is one way in which this last finding is consistent with fertility's being an intermediate variable: with lower fertility, the proportion of first births increases and presumably this therefore increases the proportion of high-risk births as well.

More can also be said about macro versus micro level effects in the case of the sex ratio of child mortality. In areas of high female labour force participation, even non-working women have a relatively balanced sex ratio of child mortality. This is possibly because of the development of a culture which values women's economic potential and because the attitudes and practices of working women now spread to the non-working woman as well. Cleland and Wilson's (1987) views on the role of ideational as opposed to structural factors in explaining fertility transitions are just as applicable to mortality behaviour in this context.

Finally, there is the curious case of Madhya Pradesh and the way it acts as a bridge between the North and the South in the present article. Its absolute levels of child mortality are as high as in the North because it has the high women's labour force participation rates of the South without the compensating southern advantages of higher female educational and other culturally determined female autonomy levels. On the other hand, its high level of female economic activity seems to lead to a sex ratio of mortality more egalitarian than that associated with the northern region with which it shares high absolute mortality, and more egalitarian than that in the northern states of Punjab and Haryana which by virtue of their economic development have managed to reduce these absolute levels of child mortality. Compare, for instance, the situation in Madhya Pradesh with that in the state of Punjab where child mortality is low but the sex differential in child mortality is high.

If the relations discussed here are genuine, several policy implications suggest themselves. Among the most valuable would be an encouragement of a later age of entry into the labour force; presumably this would be associated with a relative crowding of births in the first years of childbearing so that the woman would not always have a young child to care for. This kind of behaviour seems to be appearing in the industrialized countries and if it is possible to overcome the adverse physical consequences of short birth intervals, which in any case are conditioned by general poverty, then maternal employment may become, at least negatively, disconnected from child survival. This would also help decrease the discrimination against girls because the overall level of female employment in a community has an important bearing on the sex ratio of childhood mortality.

Another policy implication is a direct attack on the intermediate variables through which the maternal employment-child mortality relationship operates. These would include the provision of better child-care facilities and maternal work conditions, but it is a moot question whether this is possible in a typical Third World country where so much female labour is outside the organized sector. Finally, the importance of greater economic resources for household survival must be emphasized. Our results suggest that at similar household income levels, working women experience higher child loss than non-working women. They do not say anything about child survival in households where women do not work, but do not have the increased income associated with their work either.

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