Women's Paid Labor Force Participation and Child Immunization: A Multilevel Model

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We estimate the effect of women's cash work on recent child immunization in 30 countries across Africa, Asia and Latin America. Previous efforts to explore the effects of maternal wage work on children's health have shown mixed results across various cultural settings. This variation in outcomes is commonly explained in terms of the degree of compatibility between work and child care. Maternal employment tends to support children's health through increased household income and expenditure on children's needs, but the time women spend in the labor force sometimes has undesirable consequences for general child care. Analysis at the individual level measures the net effects of this income/time trade-off. However, we hypothesize that the total effect of women's labor force participation on children's health depends not only on the individual income/time trade-off, but also on the social context of women's work. More specifically, it seems that the benefits to children from maternal work might be underestimated because in communities where women's work is more common, children might benefit from women's mobility and from information exchanged in work-based social networks.

We examine whether the proportion of women participating in the paid labor force within a community or subregion affects the probability of child immunization, and we also estimate the effects of the individual mother's employment status. Thus we are able to determine whether a social context where women's work is normative also supports childhood immunization, regardless of whether individual working women have the time to immunize their own children. Often community-level effects and individual-level effects run in the same direction, but here there is more reason to suspect a positive effect of work at the community level than at the individual level.

Women's Work and Immunization

There is abundant evidence that women are considered a key health resource for their families. They provide care at home, teach health care, seek appropriate medical care for their families, and procure immunizations (Pinelli, 1993). Yet, the literature on women's work and child health in the developing world remains ambivalent and understudied concerning the consequences of labor force participation on child health. While some studies have observed that maternal cash earnings help mitigate child undernutrition (Whyte and Kariuki,1997), other analyses reported that children whose mothers were away from home more than six hours a day were less likely to be taken for immunization and medical treatment (Sempebwa, 1988). Our analysis offers a contribution to this emerging body of knowledge about the impact of work across a wide range of cultural and economic settings, and with particular attention to the benefits from women's paid labor force participation that might accrue even to women who do not themselves work.

Community-level effects

Existing literature provides reason to believe that community-level influences might be relevant to women's access and choices regarding child health and immunization. Greater numbers of women in the workforce have been associated with increases in the status of all women. When women work, the flow of health and nutrition information among them also tends to increase (Agadjanian, 2000). Proportion of women working may then be an indicator of women's autonomy and health knowledge. Pebley et al. (1996) suggest that family and community membership are very important determinants of the use of modern health services, even when controlling for several observed characteristics of individuals, families, and communities. Kravdal (2004) demonstrates the sharp contextual effect of other women's education on preventative child care and child's disease risk in India. Sastry (1996) shows evidence of community effects on child survival in Brazil and includes a thoughtful discussion of how community characteristics shape individual survival probabilities. As another example, Parashar (2005) found that a child's immunization status is influenced by the "spillover" effect of other women's education, independent of maternal education. Women's participation in the labor force might work in a similar fashion, with even women who are not engaged in cash-based employment having higher rates of immunized children if the community context is one where it is normative for women to access those health resources. Moreover, factors such as access to immunizations are likely to be shared in common by women in a given community, which may in turn enhance their use of such health inputs.

However, identifying community effects is difficult for a variety of reasons (Diez Roux, 2004; Kravdal, 2004). Numerous unobserved community factors may actually determine both the proportion of women working and the level of immunization. We include control variables that reflect the socioeconomic development of the community, but the set of these is incomplete and does not cover other possible omitted variables. Therefore, we also include community fixed effects to account for at least the unobserved time-invariant factors.

Data and Methods:

The data are from the Demographic and Health Surveys (DHS), spanning 14 years from 1991 to 2004 (Rounds II-IV). Our sample includes women of reproductive age at interview. The child immunization data are linked to individual women's records. We model the probability of immunization as a function of women's work type and proportion of women in the paid labor force in the community. Other community and individual attributes contribute to immunization outcomes, and we therefore employ a multi-level multinomial regression model to estimate the determinants of immunization. We control for community fixed effects with a series of dummy variables for region.

Survey Data

We use data from the 30 countries that had more than one Demographic and Health Survey after 1990: Bangladesh (1994, 1997, 2000 and 2004); Benin (1996 and 2001); Bolivia (1994, 1998, and 2003); Brazil (1991 and 1996); Burkina Faso (1992, 1999 and 2003); Cameroon (1991 and 1998); Colombia (1995 and 2000); Dominican Republic (1991, 1996, 1999 and 2002); Egypt (1992, 1995 and 2000); Ghana (1993, 1998

and 2003); Guatemala (1995 and 1999); Haiti (1995 and 2000); Indonesia (1994, 1997 and 2003); Kazakhstan (1995 and 1999); Kenya (1993, 1998 and 2003); Madagascar (1992 and 1997); Malawi (1992 and 2000); Mali (1996 and 2001); Morocco (1992 and 2003); Nepal (1996 and 2001); Niger (1992 and 1998); Nigeria (1990, 1999 and 2001); Peru (1992, 1996 and 2000); Philippines (1993, 1998 and 2003); Rwanda (1992 and 2000); Senegal (1992 and 1997); Tanzania (1992, 1996 and 1999); Uganda (1995 and 2000); Zambia (1992, 1996 and 2002); Zimbabwe (1994 and 1998). We omit countries for which the major geopolitical regions identified were not compatible across the surveys.

Definition of "work" (Key Independent Variable)

Maternal work is measured by the respondent's work-for-earnings status at time of interview. Community levels of cash work are measured by the proportion of women in the entire region who are working. Work characteristics (sector of employment, whether working at home or away, child's caretaker during the work day) will be added to the model after the overall effect of work was estimated. This will serve to indicate how much of the effect of work depends upon maternal work characteristics.

Sector of work is categorized as modern, traditional, and agricultural. Modern sector work may be the least compatible with child care, but it is more likely to increase a woman's knowledge of modern health interventions, such as immunization, that enhance children's health. Traditional work, such as sales in the informal sector, has often been associated with better outcomes for children than more formalized work (Chutikul, 1986). Agricultural work is distinguished from other forms of paid employment because it is often compensated seasonally, on an irregular basis, or using some combination of cash and non-cash forms of remuneration. Safilios-Rothschild (1990) has argued that income regularity is a key determinant of whether work will improve women's status. Thus, agricultural work may not convey consistent benefits for child health.

Community Characteristics

The socioeconomic controls that we include at the community level are women's education and wealth. Community level education is the average number of years of schooling among women of reproductive age. We also created an index for wealth based on housing quality and consumer durables in the household. We pooled data from all countries and survey years for the purpose of weighting our asset index by principle components: thus the asset index reflects wealth across the entire sample rather than relatively within communities. We then averaged the linear wealth index within regions to create the community wealth variable.

Other Independent Variables

Individual education is represented by a set of dummy variables with no education as the reference category and primary education distinguished from secondary and higher. We also include bio-demographic controls for sex, age and birth order of child. The sample is restricted to children 12 to 35 months of age because the World Health Organization (WHO) recommends that infants should receive all immunizations in the first year of life.

Dependent Variable

Our dependent variable is the child's immunization status. The outcome is measured in three categories: none, incomplete (1-7), and complete (8) vaccinations. We do not include the immunization data on children who have died, as this data was obtained with varying degrees of success across surveys.

Hypotheses

We expect:

(1) Individual women's labor force participation will not have a significant influence on immunization outcomes. It is possible that because immunization does not require ongoing investment of maternal time, women's work will have a positive effect at the individual level. But because of the income/time trade off, this effect could be highly variable and net out to zero in the aggregate.
(2) Child immunization will be more prevalent in communities where women's paid labor force participation is at higher levels.
(3) In communities where more women are engaged in modern and traditional employment, immunization will be more widespread than in areas where women are working predominantly in agriculture.
(4) In communities where more women work at home, the benefits associated with high rates of women's labor force participation will be lower.

REFERENCES

Agadjanian, V. (2000) Women's work and fertility in a sub-saharan urban setting: A social environment approach. *Journal of Biosocial Sciences.* **32**, 17-35.

Chutikul, S. (1986) *Malnourished Children: An Economic Approach to the Causes and Consequences.* Papers of the East-West Population Institute, No. 102. Honolulu: East-West Population Institute.

Diez Roux, A.V. (2004) Commentary: Estimating neighborhood health effects. The challenges of causal inference in a complex world. *Social Science & Medicine.* **58**, 1953-1960.

Kravdal, Ø. (2002) Education and fertility in sub-Saharan Africa: Individual and community effects. *Demography* **39**, 233-250.

Kravdal, Ø. (2004) Child mortality in India: The community-level effect of education. *Population Studies*. **58**, 177-192

Parashar, S. (2005) Moving beyond the mother-child dyad: Women's education, child immunization, and the importance of context in rural India. *Social Science & Medicine.* **61**, 989-1000.

Pebley, A. R., N. Goldman, and G. Rodríques. (1996) Prenatal and Delivery Care and Childhood Immunization in Guatemala: Do Family and Community Matter? *Demography.* **33**, 231-247.

Pinnelli, A. (1993) The Condition of Women and the Health and Mortality of Infants and Children. In *Women's Position and Demographic Change*. N. Federici, K. O. Mason and S. Sogner. Oxford, Clarendon Press: 162-189.

Safilios-Rothschild, C. (1990) Women's Income Profile as a Key Indicator of Women's Status for the Understanding of Changing Fertility Behaviours in Rural Kenya. *Genus.* **46**, No. 3-4.

Sastry, N. (1996) Community Characteristics, Individual and Household Attributes, and Child Survival in Brazil. *Demography* **33**, 211-229.

Sempebwa, E. (1988) The relationship between mother's availability and infant and child health. Paper presented at workshop on Research and Intervention Issues Concerning Infant and Child Mortality and Health, International Research Development Centre, Ottawa, August.

Whyte, S. R. and P. W. Kariuki (1997) Malnutrition and Gender Relations in Western Kenya. In *African Families and the Crisis of Social Change*. T. S. Weisner, C. Bradley and P. L. Kilbride. Westport, CT, Bergin and Garvey: 135-153.