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Are Investments in Daughters Lower When Daughters Move Away?

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In much of the developing world daughters receive lower education and other investments than do their brothers, and may even be so devalued as to suffer differential mortality. Daughter disadvantage may be due in part to social norms that prescribe that daughters move away from their natal family upon marriage, a practice known as virilocality. We evaluate the effects of virilocality on female disadvantage using data from the Indonesia Family Life Survey. We find little support for the hypothesis. There is no evidence that the overall pattern of rough equality in the treatment of boys and girls in Indonesia masks differences according to post-marital residential practice. Virilocal groups do not have "missing daughters." Nor is there other evidence of son preference, such as in relatively low height for- age or education for girls and women in virilocal areas. Explanations of daughter disadvantage as due to virilocality should be subject to further scrutiny and contextualization.

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1. INTRODUCTION

In much of the developing world girls receive less nutrition and health care, and fewer years of education, than do boys. One hypothesis for this differential treatment is that daughters often move near their in-laws after they marry– a practice known as "virilocality" (Adam 1947). If parents understand and expect to follow virilocal rules, so their daughters will leave to live in other villages, their private return to investments in their daughters' health or education might be expected to be lower than their private return in investments in their sons. Although transfers to the young woman's family at the time of marriage, old age transfers from distant daughters, altruism that parents feel toward their daughters, and many other forces may partly equalize investments, it is easy to believe that these mechanisms might not fully overcome the disincentive to invest generated by a norm of virilocality.

There is considerable anecdotal evidence suggesting that virilocality is important. A vivid, if somewhat tragic, aphorism from a virilocal region in India is well-known: "Educating daughters is like planting seeds in a neighbor's field." The World Bank, in its *Voices of the Poor* volume of interviews, reports a number of comments reflecting this view (Naraya 2000: 209-10): "Families are dissuaded from educating girls and young women in some countries due to marriage systems that place the daughter in the care of the husband's family after marriage. This causes parents to see female education as a waste of money since it is like investing in someone else's family (Togo 1996; Nigeria 1997)…. As this is explained in Pakistan, "Daughters are destined to be 'other people's property'" (Pakistan 1996)…. It is wasting money to educate girls because they will marry and join another family. –South Africa 1998."

Anthropologists, demographers, and economists have also referred to virilocality as a central cause of daughters' disadvantage relative to sons, and women's lack of well-being, power and status compared with men. Dyson and Moore (1983: 44) suggest that in northern India, "Because women are out-marriers, parents can expect little help from their daughters after marriage, whereas sons will remain at home." Garg and Morduch (1998, p. 473) suggest that in Ghana women are more likely to move away, and marriage markets do not work perfectly to compensate investments in daughters, and so, "the full return to investing in sons is more likely to be reaped by parents than the return to investments in daughters."

Other authors note the connection between virilocality and female disadvantage, but ascribe disadvantage to the migration per se rather than lower investment. Bloom, Wypij, and Das Gupta (2001, p. 68), observe that in northern India, "women are transferred between patrilines at the time of marriage and live with affinal [that is, husband's] kin… any material good that is given to a daughter belongs, in effect, to her affinal kin after marriage. This organization of the kinship structure around property, ownership, and rights ultimately marginalizes daughters in north Indian society." Skinner (1997, p. 59) emphasizes the effects of the migration: "in the East and South Asian societies where marriage is exogamous, the bride moves not only to the groom's family but to another village or town altogether, where she has no connections and her social knowledge is no longer of use." Virilocality also features in Dube's (1997) excellent comparative analysis of gender relations between South Asia and South-east Asia.

Virilocality need not necessarily be associated with female disadvantage. Parents may compensate their daughters who move away in other ways. Daughters may receive larger inheritances than sons, despite having lower human capital. Virilocality may be combined with norms of special treatment of daughters-in-law by the families of the grooms. For a full welfare analysis of virilocality many dimensions of well-being would have to be measured over the lifespans women and men. These dimensions might include schooling attainment, time allocation, health status, nutritive and caloric intake, asset ownership, and self-esteem (see Quisumbing (1994) and Estudillo, Quisumbing and Otsuka (2002) for analyses of joint schooling and inheritance decisions).

There has, with a few notable exceptions, been remarkably little empirical work testing the link between virilocality and female disadvantage. For India, much remains to be done in terms of testing whether virilocality in the north is responsible for son preference. The common assumption is that northern India is strongly virilocal while southern India is not. Libbee and Sopher's (1975) work cast some doubt on the virilocality hypothesis as central to the large differences in son preference typically found when comparing north and south. They found that for India (1975, p. 356) "local exogamy and the fetching of brides from some distance seem to be more widely practised throughout India than is generally acknowledged in the literature, although by no means as universally in the north as is supposed." Jeffery, Jeffery and Lyon (1988) conduct a detailed micro-study of marriage patterns, and note the remarkable variation in terms of distance traveled by brides, for even a relatively small northern town. Some of that variation is accounted for by differences between Hindus and Muslims, some by differences along class lines, and some by differences among Hindu castes. They also note that Muslims, where brides travel relatively shorter distances, nevertheless have practices that might be correlated with less female autonomy.

This paper examines the virilocality hypothesis using data from Indonesia.[1] Indonesia is a good place to study the virilocality hypothesis because there is considerable variation in post-marriage residence. Some Indonesian ethnic groups practice virilocality, while others are ambilocal (residence with either set of parents), uxorilocal (residence with bride's family), and neolocal (residence with neither set of parents). There is also a substantial anthropological literature finding evidence of variation in the status of girls and women in Southeast Asia, although there is little evidence of the very strong son preference observed in parts of India and China (Atkinson and Errington 1990; Barnes 1980; Blackwood 1997; Errington 1990; Karim 1995; Stoler 1977; Wazir-Jahan Begum 1995). Some of this anthropological literature links the differential treatment of girls and boys to the virilocality hypothesis. To take one example, Ihromi (1994) notes that in Indonesia, among the Toba Batak, traditions were such that, "Daughters are married off to members of other lineages… Because their welfare is the responsibility of the men of those lineages, daughters do not inherit valuable goods." Ihromi then implies that investments in daughters were reduced for this reason.

In considering the narrow question of whether variation in treatment of daughters is correlated with variation in rules of post-marital residence, we take as given that causation is from the rule (virilocality) to the practice (differential treatment of daughters). The alternative, that places where parents do not invest in daughters are places where girls are easily married off to far-away places, is plausible. But this alternative does not seem to accord well with the findings of anthropologists that virilocality is indeed more like a social rule than simply an aggregate outcome of independent decisions.

Our central finding is that virilocality does not influence investments in daughters in Indonesia. This finding highlights the importance of more careful empirical work when making big-picture comparisons explaining son preference and daughter disadvantage across large regions, or when explaining son preference in India or China.

The paper proceeds as follows. Section 2 briefly reviews the theory of why virilocality might matter in making investments in daughters, and discusses circumstances when virilocality might not matter. We then discuss the statistical methods used to test the hypothesis. Section 3 introduces the dataset used in the paper and summarizes the data on post-marital rules of residence, showing a strong correlation between norms of residence and actual behavior. Section 4 presents the results of tests of whether investments in the human capital of girls are lower in virilocal areas or virilocal marriages. Section 5 offers some concluding comments.

[1] Recent studies that examine the interaction of household bargaining power, customs, and investments in sons versus daughters in Indonesia include Quisumbing and Otsuka (2001), Frankenberg and Thomas (1999), and Thomas,

2. VIRILOCALITY AND INVESTMENTS IN DAUGHTERS

Whether virilocality affects investments in daughters depends, of course, on the lifetime pattern of interactions between parents and their children. Two key moments in that interaction are especially relevant: marriage of the daughter and retirement of the parents (or reduction in earnings with aging). Implicit in the hypothesis of virilocality leading to daughter disadvantage is the assumption that parents are not reimbursed by the groom or his family for parental investments in daughters. That is, parents who invest in their daughter create a positive externality in a virilocal society, but the externality need not reduce investment in daughters if the groom or his family can make a side payment that leads the wife's family to internalize the externality. Also implicit in the virilocality and daughter disadvantage hypothesis is the assumption that parents receive less in transfers from daughters as opposed to sons, especially during their old age when they have retired from work or are incapable of continuing to work. If expected transfers from daughters who married far away were particularly valuable to their parents, as in the case where weather shocks in the daughter's new village are uncorrelated with those of her parents' village, then parents might not have a disincentive to invest in the daughter. If daughters were expected to take in parents and care for them, even if the daughters had moved away, then there would still be incentives to invest in the daughters' future productivity and well-being.

We illustrate these points in a simple model of parents choosing how much to invest in their only daughter. To simplify the model as much as possible, we consider a static model (ignoring the actual lifecycle pattern of investments and transfers); we also ignore bargaining within the family. Parents choose lifetime consumption C and investment in their daughter I to maximize lifetime utility from own consumption $U(C)$ and the parents' valuation of their daughter's return from the investment $V(I)$, or

$$U(C) + V(I).$$

We assume the $V(.)$ function incorporates how higher investments in a daughter raises her productivity and household income and perhaps bargaining power in her marriage, netting out any resulting increase in transfers to the parents which lower her own consumption.

Parents operate subject to the budget constraint that their own earnings Y, bridewealth b, and transfers from their daughter t must equal $C + I$:

$$Y + b + t = C + I$$

Frankenberg and Contreras (2002).

The transfers from the groom or his family to the parents at the time of marriage (bridewealth, b) and from the daughter back to her family would presumably be increasing in investment in daughters, but also depend on how far the daughter moves away. Let the parameter v capture both the daughter's expected distance from her parents if she moves away and the probability of her moving away after marriage. This parameter measures the strength of the norm of virilocality. We then have, $b = b(I, v)$ and $t = t(I, v)$, where bridewealth increases in investments because high-investment daughters are more valuable to their future husbands and in-laws, so $b_I > 0$. This assumption may not hold if men do not like to marry women who are overly educated. In that setting, high education of a daughter may restrict the number of eligible husbands, and lead to high dowries (in our model, large negative bridewealth). Likewise, $t_I > 0$ under normal circumstances. Substituting in the budget constraint gives the parents' maximand with respect to I:

$$U(Y + b + t - I) + V(I).$$

The first order condition with respect to investment is:

$$U' \cdot (b_I + t_I - 1) + V_I = 0.$$

At the optimal level of investment, the marginal reduction in utility from investing in the daughter rather than consuming must be matched by the marginal utility of additional transfers and higher welfare from the daughter's well-being.

The key comparative static of interest for this paper is the responsiveness of investment to daughters moving further away (an increase in the virilocality parameter v). This effect is giving by the following expression:

$$dI/dv = [U_{YY} (b_I+t_I-1) (b_v+t_v) + U_Y (b_{Iv} + t_{Iv})] / [-U_{YY} (b_I+t_I-1)^2 - U_Y (b_{II} + t_{II}) - V_{II}]$$

The second-order condition ensures the denominator is positive. Thus, the sign for the expression depends on the sign of the numerator. There is no a priori reason for this to be positive or negative; this is an obvious point sometimes overlooked in the literature. For example, we might think that virilocality is associated with higher bridewealth but lower transfers, so $b_v > 0$ and $t_I < 0$. But there is no reason to think that one is larger in magnitude than the other, and so the sign of the term is ambiguous. Two other key terms in the numerator are b_{Iv} and t_{Iv}, which indicate how the returns to investments (in the form of bridewealth and transfers) change with virilocality. The returns to parents from investing in daughters who move far away may be higher or lower as distance away from parents increases. If the groom's family will receive a higher share of the daughters' productivity in virilocal regions, then the groom's family will pay a higher transfer for a more productive daughter-in-law, and $b_{Iv} > 0$. Working in the other direction, if distance makes the investments in daughters less useful (because less applicable to the new local environment), then $b_{Iv} < 0$. In a multi-period

model with uncertainty, a reduction in the size of transfers when the daughter is distant may be partially offset by the fact that such transfers may be less correlated with parental income; thus, dispersing children geographically can increase a family's diversification and improve expected well-being.

We might easily adjust the model to include the simultaneous decision of investments in sons, but no special insight is gained. The point is that theory does not give us any compelling reasons to think that virilocality will be associated with lower investments in daughters. The matter is an empirical one. Thus, our econometric tests of the virilocality hypothesis on investment focus on the differences between sons and daughters in terms of investments, education and expenditure shares on child-oriented goods. We estimate the reduced form equation:

$$I = \hat{a}_0 + \hat{a}_1 \cdot v + \hat{a}_2 \cdot v \cdot female + \hat{a}_3 \cdot \boldsymbol{X} + \hat{a}_4 \cdot \cdot \boldsymbol{Z} + \mathring{a}$$

where I is the level of investment in or expenditures on a child or children, $\boldsymbol{X}$ is a vector of child-level and household-level variables (such as birth order, gender, sibling size and composition), $\boldsymbol{Z}$ is a vector of variables controlling for regional characteristics that might affect incentives to invest in daughters as opposed to sons, and v is a dummy variable taking on value one for virilocal regions. Our main interest is in testing whether the coefficient $\hat{a}_2$ is negative; that is, whether daughters are treated less favorably than sons in virilocal regions.

This test of whether girls are relatively disadvantaged in virilocal areas cannot distinguish the possibility that some other, unobserved aspect of the local economic environment, correlated with post-marital residence patters, is responsible for disadvantage. By the same token, finding that there is no disadvantage associated with virilocality cannot rule out that there is some unobserved, correlated variable that cancels the incentive to underinvest in virilocal areas (e.g., marriage payments, old age transfers from daughters to parents, or higher market returns to investments in daughters).[2] In the regression analysis, we control for some regional characteristics, but others remain omitted.

One important issue is the appropriate region to include as a control for variables correlated with virilocality. The virilocality hypothesis assumes that parents have an expectation during the time of childhood of the daughter about whether the daughter will move away when she is married. This expectation need not actually come to pass; circumstances may dictate that the daughter marries close to her parents when the norm calls for her to marry far away. The relevant variable determining investment in the child is the likelihood that she will move away, not whether she

[2]The IFLS has several questions concerning transfers before and after marriage. Unfortunately for research purposes, there are many possible transfers from the bride, her parents, the groom, his parents, or the new couple collectively to each of the other groups and for the expenses of the wedding. The survey questionnaire was not detailed enough to permit clear categorization of the marriage payments reported. Thus, it is not possible to test if the bride's parents are "reimbursed" for the cost of her health and education in virilocal regions.

moves or not in practice. So the relevant regional characteristics are those of the person when the person was a child. Of course, her actual behavior may turn out to be a good proxy for the expectation her parents had of whether she was likely to move or not.

3. THE INDONESIA FAMILY LIFE SURVEY AND VIRILOCALITY

The data used in this analysis come from the 1993 and 1997 waves of the Indonesia Family Life Survey (IFLS). The 1993 survey has information on individuals in 7224 households distributed in 321 communities; the 1997 re-survey was able to track almost all of these original households (Frankenberg and Karoly 1995; Frankenberg and Thomas 1999). The IFLS is a representative sample of 13 of 27 provinces in the country; these provinces contained 83 percent of the population in late 1993. Small provinces and the politically unstable provinces of Aceh, Irian Jaya and the former East Timor were not sampled. After stratifying by urban and rural areas, households were randomly selected in the community, either villages or neighborhoods or census tracts. Within households different members were interviewed according to various selection criteria; for example, to ensure adequate numbers of older respondents.

We use a number of different sources to identify virilocal regions. One source is a unique survey of *adat*, the local norms and traditional law that applied in each village. This survey, part of the 1997 IFLS, asked respected elder in 274 of the 321 enumeration areas about local *adat*. These traditional laws and local norms stand in contrast to the formal laws of the nation-state (Warren 1995). In many parts of Indonesia the state is far removed, and *adat* norms guide behavior. The *adat* questionnaire included approximately ninety questions related to customs concerning family life and gender. Each respondent was asked to state whether the custom held in traditional law and whether it was common practice at the time of the 1997 interview.

The *adat* survey contained a small component for determining the residential location of new conjugal units, a basic aspect of local family systems. Experts were asked, "Putting aside economic constraints, where does the newly married couple live after the wedding?" If the expert indicated that the couple would live in the parents' house, they were asked for how long. If the expert indicated that they would reside in the parents' 'place', or in a new 'place', they were asked whether this 'place' was with the male's or female's parents or relatives. We coded answers to these questions as follows. First, we coded the adat as ambilocal if the expert indicated one of the following: the new couple resided "wherever they want"; if they resided in "a new place for the couple;" if they resided in the parents' place but not 'with' anyone; if the couple resided with relatives after the wedding but then went on their own later; or if the expert gave

multiple responses (i.e. could live with relatives or parents of either male or female). Second, we coded as an area as virilocal if the expert indicated that after the wedding the couple lived in the male's parents' house or in the male's place, and then continued to live with the male's parents or relatives, or if the couple started off in the male's place and did not move into their own place until they had a house, child, or work. Third, we coded the adat as uxorilocal if the expert indicated that after the wedding the couple lived in the female's parents' house or in the female's place, and then continued to live with the female's parents or relatives, or if the couple started off in the female's place and did not move into their own place until they had a house, child, or work. Of the 270 communities, 53% were categorized as traditionally uxorilocal, 23% virilocal, and 23% ambilocal. Thirty-two localities were reported as 'switching' from uxorilocal or virilocal to ambilocal, five switched from ambilocal to uxorilocal, and only one from ambilocal to virilocal.

Table 1 shows that the *adat* assessment of local traditions corresponds well with individual responses to whether and where a person had moved at marriage. According to the individual responses from the 1997 survey, in adat areas that were labeled virilocal twice as many women married virilocally as did uxorilocally, while in uxorilocal areas the pattern was reversed. Similar results hold for the responses offered by men, or using the data from the 1993 round, or using answers to questions about migration patterns that were asked in separate interviews.

When we cross-tabulate norms of post-marriage relocation and ethnicity, we find the expected patterns. We code ethnicity using a common method for the IFLS, which is to use the language of interview if not in Indonesian. Smaller language groups are coded into larger groups according to the classifications in LeBar (1972). Hindus living in Bali are coded as Balinese. Christians living in North Sumatra are counted as Batak. We have then gone through the dataset and applied the ethnicity codings to siblings and biological children of anyone coded. These codings correspond very well with adat experts' responses concerning dominant ethnic groups of the enumeration area. As seen in Table A1 in the appendix, Balinese, Batak and Sasak reported 94, 63 and 83 percent of marriages as virilocal, respectively. In contrast, the Bugis, Javanese and Sundanese, Madura, Minang, and Banjar were predominantly uxorilocal and ambilocal (though some more mixed than the virilocal groups). We also report the relevant anthropological understanding of residence patterns from LeBar's (1975) comprehensive compilation.

Javanese (who made up almost half the sample) were the most difficult to categorize. Ethnographies emphasize the ambilocal nature of Javanese norms, with a modest tendency to locate near the wife's family (e.g., Jones, 1992). In contrast, one third of the Javanese *adat* experts claimed their locality was virilocal. Actual marriages in these Javanese areas were also more likely to be virilocal than in other parts of Java, though virilocal marriages still constituted less than

50% of marriages. The virilocal marriages among Javanese were more concentrated in central Java, ambilocal more common in Yogjakarta, and uxorilocal concentrated in eastern and central Java.

Virilocal or uxorilocal norms mean more, presumably, when movement of sons or daughters is further away. About one-third of women move out of their villages upon marriage, with women in virilocal areas more likely to move further (Table 1). The IFLS also asks whether the new location was a different district or administrative unit (kecamatan and kabupatan). Between one-third and one quarter of those moving crossed sub-district and district lines when they moved. Women in virilocal marriages were more likely to cross district lines than men in uxorilocal marriages. Other measures, such as how often a person interacted with siblings, showed patterns consistent with virilocality and uxorilocality, implying greater social distance for women and men, respectively (not shown).

Virilocal, uxorilocal and ambilocal population groups exhibited some differences in socio-economic indicators (restricting the sample of adults to men and women who were married at least once), as seen in Table 2. Because the Balinese are both virilocal and Hindu, virilocal enumeration areas are less likely to be Muslim. Education for both adults and children are similar for virilocal, uxorilocal and ambilocal areas, though men in virilocal areas had slightly higher average levels of schooling than men in other areas. Households in virilocal areas tended to have similar values for household assets as did residents in other areas. Heights and weights were similar. People in virilocal societies had more siblings, ranging from one-third to one half a child larger on average.

Using the data on individuals living in virilocal areas, we also find that women in virilocal areas were slightly less likely to be heads of households (and hence perhaps less likely to be divorced). This brings up one problem with using information on actual marriage patterns, or normative marriage patterns from the *adat*, as indicative of a rule influencing behavior. Perhaps the rule is or has been of little import because marriages in Indonesia may not be expected to last very long. A daughter who moves away, but is highly likely to return after a quick divorce, would not be subject to the investment externality. Guest (1992) reports on World Fertility Survey data from 1976, and finds the incidence of divorce to be quite high in Indonesia, with 28% of marriages ending in divorce within the first five years. Guest (1992) finds that divorce rates vary predictably with age at marriage (more divorce for younger marriers) and education (less divorce for more educated), and have been declining across cohorts. Ethnicity apparently is a major element after controlling for these other factors: Sundanese have much higher divorce rates and Balinese much lower. Divorce is far less frequent in the more recent IFLS sample, with only than 2% of respondents indicating having been divorced. This evidence is in accord with other evidence of rapidly declining divorce rates in Indonesia (Jones 1994).

Ideally we want to know the norm of marriage residence that applied to the person when the person was a child. But a small fraction of the IFLS respondents moved from their childhood homes well before marriage. If a person's parents moved when the child was under age twelve (about 2.7% of the sample), then the ethnicity of the parents might not be a good guide to what norm guided their behavior. The individual's parents might have adapted to new customs. These individuals we exclude from the analysis. Another larger group of respondents moved to a new island in the archipelago after childhood (about 7% of the sample), that is, after age twelve when the investment by their parents in schooling had been substantially completed. For these, if the person's individual ethnicity could be coded, and if their ethnic group had a well-defined norm, we assigned to them the 'locality norm' of their ethnic group rather than the norm of their present residence. Otherwise they were excluded from the sample. We recognize there is some possibility of sample selection bias. We simply have no feasible way of knowing which norm, between two competing norms (that of the parents or that of the new locality), might have influenced the investment decisions of the parents. Nor can we control for the sample selection, since for adults we have little information on the determinants of their parents to migrate when the present adults were children.

4. ARE INVESTMENTS IN DAUGHTERS LOWER IN VIRILOCAL AREAS?

We now proceed to examine the extent to which virilocality predicts low investments in daughters. We start with the relation of virilocal adat and other norms that disadvantage daughters, as reported by the *adat* experts. We then consider birth spacing and other measures of son preference. Following that we examine investments in early nutrition and health by looking at height-for-age, and investments in education. We close by examining buying patterns of food versus adult goods; having more daughters in virilocal areas should increase expenditures on adult goods such as tobacco if daughters are less valued.

(a) Virilocal adat and other norms

A number of authorities provide examples from different parts of Asia where virilocal norms are part of a network of norms that reduce the status of women (Agarwal 1994; Dube 1997). If virilocality is part of a system of patriarchy, then it will also predict women marry young relative to their husbands and women make fewer decisions in the household. Virilocality might also be correlated with inheritance patterns. If inheritances are partly a reward for caring for elderly parents, then parents have lower incentives to provide inheritances to distant daughters (and daughters have a difficult time claiming any inheritance their parents would like them to have).

We check the correspondence between virilocality and gendering of household and social relations, using the responses given by the *adat* experts. While the experts are not a random sample, they are people that one might want to ask about norms. Their answers are meaningful in the same way that polling 270 anthropologists might be meaningful: subject to bias, but informative. In this case, the answers are very interesting. Virilocality is correlated with some gendered social outcomes, but often these are the opposite of what one might expect. Table 3 tabulates the responses of the experts. Consider a first category of responses concerning marriage norms. The only important and significant differences are in practices of polygamy. Virilocal areas have less polygamy, according to the *adat* experts. On other dimensions of marriage there are no significant diferences in practices; dowry and bridewealth practices are comparable, and although in virilocal areas girls marry younger, the difference is not significant.

On other dimensions the correlates, as given by the *adat* experts, of virilocality are mixed. For intra-household relations, women seem to fare slightly better in virilocal areas. After marriages end, however, they fare worse (in terms of what happens to assets of the couple). Children remain with the father in virilocal areas.

Consider next the answers given by *adat* experts regarding norms that disadvantage daughters. Compared to uxorilocal regions, the *adat* experts in the virilocal regions were more likely to claim traditional norms emphasized preferring a son as first child (.60 vs. .47), and were also more likely to have no pressure to also have a daughter (.88 vs. .70). (When an *adat* expert indicated that there was social pressure to have a son, an answer coded 0 almost always meant no pressure to have either gender, rather than pressure to have a daughter.) These preferences presumably were related to the fact that in 48 percent of the uxorilocal regions, but only 12 percent of the virilocal ones, parents traditionally lived with their daughters, according to the *adat* experts. (Cameron (2000), finds that there is no actual gender pattern in the residency decisions of adults over age 60, using the IFLS sample.) Correspondingly, daughters were far less likely to get the same share of inheritance as their brothers in virilocal regions (13 percent vs. 35 percent). More directly related to the issue of disadvantage, boys were far more likely to be given education priority in the uxorilocal regions (59 percent) than in the virilocal regions (30 percent). This result contradicts the view that virilocality is bad for daughters. More consistent with that story, boys and girls usually received equal priority in health care, but almost none of the exceptions were in uxorilocal regions.

While there is more son preference in virilocal areas (in terms of wanting to have sons, and giving them better health care), the magnitude of the son preference is not strikingly high in any of the areas. Other incentives against daughters are present: according to the *adat* experts, in virilocal areas elderly parents are less likely to live with daughters,

and sons definitely inherit more than daughters. On the other hand, sons seem to receive less education. The *adat* data tells us, then, that the hypothesis that there may be more son preference in virilocal areas cannot be immediately rejected. The *adat* data also tell us that virilocality is not always associated with a constellation of patriarchal norms that disadvantage women.

(b) Fertility and mortality behavior indicating son preference

Tables 4 to 6 give the results for several standard tests of son preference. In general we find few significant differences between the virilocal, uxorilocal and ambilocal areas (as defined by the *adat* experts). The tests are carried out using samples of different cohorts constructed from different modules of the IFLS. One module was a questionnaire administered to all ever-married women between the ages of 20-49. The second was reports by adult household heads and spouses about their own siblings (i.e., their families when they were children). The data for the 1940-60 cohorts are from the adult responses, while the 1970-90 cohorts are from the ever-married women responses. Further details on the samples can be found in Kevane and Levine (2001).

If girls receive lower investments in health and nutrition in virilocal regions, then there should be a problem of "missing girls" as in much of South and East Asia (Bardhan and Klasen 1999). Table 4 breaks down the percent of children alive at particular times who are boys, according to whether the parents of the children are currently living in virilocal or uxorilocal areas. Thus, the theory of virilocal disadvantage for girls predicts a majority of children under five will be male. In fact, there are always very close to as many boys as girls, and the small deviations from equality show no pattern of preference for boys in virilocal regions. This fact of roughly equal numbers of boys and girls corresponds with census figures.

Table 5 presents data on infant and child mortality from the retrospective pregnancy history asked of all ever-married women under 50. While recall data on mortality is always suspect, census figures may hide complex patterns of mortality and migration and appear to indicate no neglect of daughters. It is therefore important to 'triangulate' using data on mortality when available. Mortality data from such a small sample cannot be expected to yield statistically significant differences, but the raw data do not suggest any strong neglect of daughters. Concentrating on the ratio of girl infants to boy infants and girl child deaths to boy child deaths, by decade, it can be seen that virilocal areas in three have lower ratios than uxorilocal areas; girls died less often than boys. There is no support for the idea that girls die more often in virilocal areas.

Son preference also implies particular 'stopping patterns' as families make fertility decisions in ways that ensure one or more sons live to adulthood. The three panels of Table 6 present results for three typical tests of the implications of son preference for optimal stopping. First, son preference implies that fertility will be completed, on average, more often following the birth of a son. Panel (a) of Table 6 breaks down by locality the percent of last children who are sons, for families that have completed their fertility. There are no statistically significant differences from equality using the *adat* breakdown. Second, Son preference also suggests that families of girls should be larger, on average, as parents who have daughters continue to have children in hope of producing their desired number of sons. In fact, family sizes are almost identical for boys and for girls (Panel (b), Table 6). Finally, son preference implies that time intervals following birth of a daughter are shorter in length than intervals after the birth of a son, as parents hurry to have the desired son. Again, while two results have statistically significant differences from equality in panel (c) of Table 6, one shows longer and the other shows shorter intervals after daughters in virilocal regions.

In summary, for five tests of son preference, as expressed in mortality rates, sex composition of fertility patterns, and birth spacing, there is no evidence of son preference being stronger in virilocal regions.

(c) Investments in health and education indicating son preference

In another test of the virilocality hypothesis, we estimate regressions trying to explain variation in two major investments parents make in their children: height and education. For children under age 10 we measure height as a standardized z-score using the NCHS-WHO standard height-for-age. We test whether height for age z-scores are lower in virilocal areas. For adults, we expect a gap between male and female adult height; our tests involve checking whether this gap is larger in virilocal regions. For measuring education, we use years of schooling for adults, and whether a child is enrolled for children.

Table 7 reports the results from regressions with height z-score and education enrollment and attainment as dependent variables. The regressions do a credible job in explaining the cross-sectional variation. As expected, urban residents fare quite a bit better on both height and schooling indicators. In addition, non-Muslim Indonesians were comparatively privileged in the past, at least as measured by height and education. There is also an interesting contrast between the younger and older cohorts in the correlation of sibling size with investment outcomes. For the older cohort, number of siblings is positively correlated with nutrition and education outcomes. These results suggest that having surviving siblings is correlated with family wealth, and hence better outcomes. For the younger cohort greater number of

siblings is negatively correlated with outcomes, perhaps reflecting a tightening of family budget constraints as children survive childhood due to improvements in medical interventions and public health. Contrary to the findings of Garg and Morduch (1998), the percent of siblings who are boys does not affect outcomes.

There are two explanatory variables of primary interest. These are interaction terms that measure being female and living in a virilocal region as opposed to an uxorilocal area (where girls might be expected to be favored). As can be seen, virilocality does not seem to matter for girls relative to boys, for nutrition and education investments.

We replicated, for the children, these regressions using a fixed-effects estimator, in order to control for unobserved characteristics of families. The comparison is then between girls and boys living in the same households, in virilocal as opposed to uxorilocal and ambilocal areas. Again, the coefficients on gender interacted with post-marital residence are not significant (results available upon request).

(d) Expenditure shares

Another common test of son preference is to see whether consumption shares on items largely benefiting children are higher when a larger number of children are male, and whether consumption shares on items largely intended for adults are lower when a larger number of children are male. Intuitively, parents with strong son preference who have many sons will spend less on tobacco and adult clothing and more on children's clothing or milk than parents of many daughters. Importantly, although the intuition of this test is sensible, even places where other evidence suggests very strong son preference exists, such as Bangladesh, sometimes do not exhibit son preference based on this test (Deaton, 1997; see also Burgess and Zhuang 2000 for negative results in a region of China with strong son preference). It may be that nutrition is not the mechanism through which son preference is expressed. We report the results of this test nevertheless, because the other correlates of expenditure patterns are comparable to those found in other studies.

Our test uses a standard Engel curve, where we define child-oriented goods as basic foodstuffs and adult-oriented goods as coffee and tea, tobacco products and betel, alcohol, ceremonies, and sweepstakes. We control for the log of expenditure, the number of adults in the household, and the age and sex composition of the household. We include variables on whether the household is in a virilocal or uxorilocal area (with ambilocal the excluded category). We also include an index of prices from 1993, which captures spatial variation development and market integration across enumeration areas. Our sample is all families with at least one child 14 or younger living at home. We estimate two equations, one using levels of expenditures and control variables for 1993 and the other using the differences between 1993 and 1997 (that then controls for household heterogeneity). Columns 1-4 of Table 8 report the results from the cross-

sectional regressions for the two periods; in columns 5-6 the variables are measured as the change in the variable from 1993 to 1997.

The results on the control variables accord with what others have found. Food shares are generally higher and the shares for adult goods are generally lower when there are more young children, lower overall expenditures. Consistent with the hypothesis that adult women are more concerned with children than are adult men and with the Indonesian custom that men smoke more often than women, the food share is higher when there are more adult women or when the head is female. Adult goods tend to have the converse results. The proportion of children who are daughters has no effect on the share of expenditures on food or on adult goods

The main results relevant for this paper are easy to summarize. When we compare virilocal and uxorilocal regions, the presence of more daughters continues to have no relation with the share of expenditures on adult goods or on food expenditures. Results are similar when we examine how changes in demographics affect changes in consumption shares (columns 5-6).

(e) Inheritance Patterns

For several reasons it is likely that sons inherit more in virilocal regions. In virilocal regions, sons are more often the traditional caretakers for elderly parents. If so, parents have a higher return to a son's assets than a daughter's assets. In addition, if lineages are defined on the male line in virilocal areas, then lineages have a strong incentive to see the son prosper. In contrast, the matrilineal Minagkabu have the two norms of husbands moving near the family of their new wives (uxorilocal marriages) and for assets to be passed from mother to daughter.

In table 9 we examine if, in fact, sons inherit more in virilocal regions and daughters inherit more in uxorilocal regions. We classify regions according to adat expert indication of norm prevailing in community. The data on value of inheritance is quite noisy and impossible to correct for inflation; thus, we analyze only an indicator variable for whether any inheritance was received by adults who have lost one or more parents. This measure understates female disadvantage because Muslim law both requires that daughters inherit a positive share and prescribe that it be half the share of sons.

Around 30% of adults reported inheriting from one or both parents. ,Female and male inheritance rates are fairly close in uxorilocal and ambilocal regions, though males have a slight advantage in both. In contrast, males have a very large advantage of inheritance in virilocal regions, with almost twice the rate after the death of a parent (33 percent of sons inherit but only 18 percent of daughters). The regression results confirm this. We present the results from three

regressions, including different variables as explanatory variables. The first regression includes a variable indicating the year of death of the parent. Much of this data is missing, and this greatly reduces the sample size. The other two specifications drop this variable. Our interest is in the third regression, where it can be seen that daughters in virilocal areas inherit with substantially lower probability compared with sons. Thus, in inheritance, unlike most other measures of investments in children, sons are advantaged in virilocal regions.

(f) Summary

Our results find little evidence of son preference in virilocal areas, and are thus consistent with other evidence of no systematic son preference in Indonesia on average (Kevane and Levine, 2001). The exception is that sons are much more likely than their sisters to inherit when a parent dies in a virilocal region. We performed extensive checks to make sure our results were robust to changing definitions or measures of virilocality. For example, results for Tables 3 to 6 are similar when we disaggregate birth cohorts more finely. The tables and regressions presented categorized "virilocal" communities according to the *adat* expert. We replicated all results using three additional definitions of what constituted a virilocal comunity: (1) looking at communities with over 75 percent virilocal behavior; (2) defining at the individual level whether the parents in the household had followed virilocal norms; and (3) grouping communities into ethnic groups, and using the average virilocal or uxorilocal tradition of the ethnic group to code the community. Alternative cuts of households and communities did not change the basic story.

5. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Evidence from the Indonesia Family Life Survey finds no strong correlation between virilocality and differential investments in or treatment of daughters. On the one hand, regions with virilocal norms were more likely than other regions to report other norms that disadvantaged their daughters. On the other hand, virilocal regions did not have "missing daughters," nor patterns of rapid attempts to have another child after the birth of a daughter, nor relatively lower levels of education of women, nor relatively low height for age for women, relative to uxorilocal or ambilocal regions. The evidence we and others have found against strong son preference in Indonesia does not seem to be a statistical artifact of averaging over a large country with much diversity.

Many scholars have argued convincingly that there is a causal relationship between virilocality and son preference. The evidence from Indonesia casts doubt on these assertions. A suggestive study using district-level data from India by Malhotra, Vanneman and Kishor, (1995), also finds that a proxy for movement at marriage under

virilocality is not related to fertility outcomes. At the same time, it is possible that the received wisdom applies in other countries, even if not in Indonesia, because virilocality there is coupled with other norms that harm women. There have been efforts to identify cultural complexes within India, and then use these complexes to explain son preference (Dyson and Moore 1983). The clustering of patriarchal norms does not seem to be very tight in Indonesia. It could be the combination of norms that include, but are not restricted to, virilocality, reduces investments in daughters. Moreover, daughters in virilocal regions may retain more contact with their parents in Indonesia than in most of India or China.

For that reason, arguments about the effects of virilocality should be complemented by examination of the marriage market and norms regarding care of parents, and should be confirmed by looking more intensively at border areas where there is variation in norms of post-marital residence. Recent studies are indeed beginning to shed more light on the link between virilocality, son preference, marriage markets, and other aspects of economy and society. Burgess and Zhuang (2001) argue that census-level data from two provinces in China suggests that son preference diminishes with rising per capita income. Anderson (2000) develops a model explaining differences in dowry payments across societies. Zhang and Chan(1999) and Hallman (2000) use unique datasets from Taiwan and Bangladesh, respectively, to unpack some of the differential effects of marriage payments on subsequent marriage outcomes.

Further research is needed to shed light on the importance of transfers from the groom's family that reward investments in daughters, the role of altruism, and potential economic or non-economic forces that raise the relative status of women in Indonesia and other regions in Southeast Asia relative to much of South and East Asia.

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Table 1: Actual marriage patterns and *adat* expert indication of norm prevailing in community

	adat according to expert		
	uxorilocal	virilocal	ambilocal
Percent of first marriages that were:			
uxorilocal	0.62**	0.27	0.54**
virilocal	0.28**	0.61	0.34**
neolocal	0.09	0.11	0.12
moved out of village at marriage	0.18**	0.34	0.22**
N of women	1844	948	1092
N of enumeration areas	135	62	77

Notes: Means take into account complex survey design. ** (*) represents statistical significant difference at the 1% (5%) level between virilocal and uxorilocal or virilocal and ambilocal groups on a two-sided t-test. Respondents are all women married after 1970 in areas where adat experts responded, using 1997 IFLS. Marriages before 1970 had similar patterns. Virilocal marriages have the bride coming to the groom's residence, uxorilocal marriages have the groom coming to the bride's residence, neolocal means the bride and groom set up a new household, and ambilocal the refers to communities where post-marriage residence is not predetermined.

Table 2: Averages or percentages of individual socio-economic variables, according to *adat* expert indication of norm prevailing in community

	adat according to expert		
	uxorilocal	virilocal	ambilocal
Adults			
Muslim	0.96**	0.66	0.97**
Age	42.12	42.23	41.02
Siblings still alive	3.29*	3.75	3.33
Divorced	0.02	0.02	0.03
Household assets, 100,000 rupiah	81.53	89.38	72.72
Urban	0.29	0.23	0.31
% of siblings alive who are male	0.51	0.51	0.51
height in cm. (male)	159.60	159.73	160.05
height in cm. (female)	148.74	148.33	149.44
Years schooling (male)	5.05*	5.94	5.47
Years schooling (female)	3.79	4.35	4.04
Years schooling father	2.00*	2.27	2.18
Years schooling mother	1.18	1.35	1.25
N of adults	5135	2501	2899
Children			
Siblings still alive	2.26*	2.61	2.14**
% of siblings alive who are male	0.51	0.50	0.51
z-score height(male)	-2.01	-2.09	-1.90
z-score height(female)	-1.65*	-1.94	-1.83
(years of school)/(age-6) for boys	0.73	0.73	0.77
(years of school)/(age-6) for girls	0.78	0.72	0.78
N of children	3123	1530	1626

Notes: Means take into account complex survey design. ** (*) represents statistical significant difference at the 1% (5%) level between virilocal and uxorilocal or virilocal and ambilocal groups on a two-sided t-test. Samples are adults and children in roster of 1993 survey.

Table 3: Adat questions related to gender norms

	adat according to expert		
	uxorilocal	virilocal	ambilocal
	n=132	n=60	n=78
Marriage			
man chooses marriage, woman does not	0.08	0.02	0.09
wedding ceremony is in males house	0.01**	0.50	0.05**
girls marry when under 17	0.50	0.37	0.58*
grooms more than 3 years older	0.45	0.37	0.38
females family gives to male (dowry)	0.34	0.30	0.27
males family gives gifts at marriage	0.67	0.70	0.65
females family gives gifts at marriage	0.53	0.57	0.45
man can have multiple wives	0.64**	0.43	0.68**
man can marry two wives without consent	0.18*	0.05	0.17*
Relations within the family			
woman cannot own land before marriage	0.30	0.27	0.21
woman cannot own business	0.07	0.10	0.05
woman cannot earn living outside house	0.18	0.12	0.05
man manages household finances	0.44	0.37	0.31
man manages daily household expenses	0.09	0.07	0.06
man manages household luxury expenses	0.35**	0.15	0.23
man manages medical expenditures	0.33	0.24	0.26
man manages transfers to relatives	0.24	0.14	0.08
man decides about savings	0.28	0.16	0.20
man decides selling livestock and land	0.29	0.30	0.26
man decides about selling jewelry	0.14*	0.04	0.08
man decides about children's education	0.24	0.19	0.28
When marriage ends			
husband gets all pre-wedding assets	0.03	0.10	0.01*
husband gets all post-wedding assets	0.05*	0.15	0.05
husband gets children	0.05**	0.32	0.09**
old widows don't remarry, widowers do	0.47	0.40	0.36
dead mans family, not wife, gets assets	0.30*	0.45	0.44
Son preference			
want male child for first child	0.47	0.60	0.41*
pressure to have a male child	0.42	0.45	0.27*
no pressure to have female child	0.70**	0.88	0.78
husband might remarry if no male child	0.07	0.08	0.10
if adopt, boys more likely to be adopted	0.00	0.03	0.11
boys given education priority	0.59**	0.30	0.46
boys given health care priority	0.02**	0.10	0.08
boys receive more than 50% of inheritance	0.65**	0.87	0.60**
parents live with daughter	0.48**	0.12	0.44**

Notes. Items are coded 0 or 1, so that unity reflects a norm favoring men or boys. ** (*) represents statistical significant difference at the 1% (5%) level between virilocal and uxorilocal on a two-sided t-test, or between virilocal and ambilocal on a two-sided t-test.

Table 4: Are there more boys than girls in virilocal areas?

% boys of children under 5 alive in year indicated

	adat according to expert					
	uxorilocal		virilocal		ambilocal	
	% boys	n	% boys	n	% boys	n
ever-married pregnancy history						
(1) 1973	0.48	795	0.47	340	0.53	473
(2) 1983	0.48	2079	0.51	1046	0.51	1126
(3) 1993	0.52	1814	0.51	983	0.52	1015
(4) 1997 (under age 3)	0.50	793	0.50	419	0.52	439
household roster						
(5) 1993 all children in household	0.53*	1787	0.50	927	0.51	1024

Notes: Means take into account complex survey design, using household weights from 1993 survey. ** (*) represents statistical significant difference in the number of boys compared with number of girls at the 1% (5%) level. Rows (1), (2) and (3) count children aged five and under who were alive in January of 1973, 1983, and 1993, as reported in the pregnancy history administered to 4890 women in the 1993 IFLS. Row (4) counts children aged three and under who were alive in January of 1997 as reported in the pregnancy history administered to 3142 women in the 1997 IFLS. Row (5) counts all children on household roster in 1993.

Table 5: Infant and child mortality according to marriage residence patterns

	uxorilocal	virilocal	ambilocal
Ratio of deaths of girls (aged 0-1) to deaths of boys			
1970s (n=395)	.72	.76	.69
1980s (n=428)	1.05	.52	.76
Ratio of deaths of girls (aged 1-5) to deaths of boys			
1970s (n=222)	1.12	1.54	.59
1980s (n=200)	1.76	.91	.69

n = number of deaths. Infant deaths decline from 88 per 1000 births in 1970s to 70 per 1000 births in 1980s. Child deaths decline from 50 per 1000 births in 1970s to 33 per 1000 births in 1980s. The confidence intervals for the estimated ratios are very large because of the small sample size for deaths, and so none of the ratios are different from unity with any statistical significance (or from a ratio a bit under one, given that boys tend to die more than girls in non-discriminatory settings). There are even fewer recorded deaths in the sample for the decades of the 1960s or 1990s, and so these are not reported.

Table 6: Tests of stopping strategies consistent with son preference

	adat according to expert		
	uxorilocal	virilocal	ambilocal
(a) Percent of youngest children who are boys			
where youngest child born in 1940s-70s	0.49*	0.51	0.49*
where youngest child born in 1980s-90s	0.49	0.53	0.51
(b) Ratio of number of children in family for boys to number for girls			
for children born in 1940s-70s	1.01	1.00	1.00
for children born in 1980s-90s	1.01	0.99	1.02
(c) Ratio of mean interval until next child following birth of a son to interval following birth of a daughter			
for siblings of adults born in 1940s-70s	1.02	1.04	1.05*
for children born in 1980s-90s	0.99	0.94*	0.99

Notes: Means and significance tests use household weights and take into account complex survey design. * and ** indicate significant difference at the 5% and 1% level, respectively.

Panel (a). Observations for 1940-70 come from families of adult household heads and spouses, while 1980-90 observations come from survey of ever-married mothers who had completed fertility, determined by having responded negatively to a question about desire for more children. Test: two-sided t test that ratio different from .5125 (the normal proportion of boys).

Panel (b). Observations for 1940-70 come from families of adult household heads and spouses, while 1980-90 observations come from survey of ever-married mothers, and includes families that have not completed fertility. Test: size of family of girls different from size of families of boys.

Panel (c). Observations for 1940-70 come from families of adult household heads and spouses, while 1980-90 observations come from survey of ever-married mothers, excluding intervals where the previously born child died prior to conception of the next child. Intervals calculated using year of birth for column older cohort, and year and month of birth for more recent cohort. If interval less than .66 years or greater than 15, then excluded. Test: interval till the next child following birth of a boy is different from the interval following a girl, using a Wald test for differences in means.

Table 7: Do Females Fare Worse in Virilocal Regions?

	(1)	(2)	(3)	(4)
	children		adults	
	z-scored height (Children under age 10)	is child enrolled? (probit, children aged 5 to 20)	height in cm.	years of schooling
Female	0.113	0.012	-10.941	-1.953
	(0.91)	(0.27)	(15.49)'	(4.64)**
Virilocal area	-0.283	-0.034	-0.545	0.315
	(2.84)**	(1.15)	(0.91)	(0.80)
Uxorilocal area	-0.109	-0.003	-0.183	-0.637
	(1.37)	(0.11)	(0.37)	(1.92)
Virilocal area * female	0.077	-0.007	-0.031	0.131
	(0.75)	(0.31)	(0.05)	(0.42)
Uxorilocal area * female	0.089	-0.028	-0.292	0.474
	(1.08)	(1.20)	(0.68)	(1.93)
Age in years	-0.335	0.156	0.143	0.077
	(10.33)**	(12.30)*'	(1.49)	(1.26)
Age squared	0.028	-0.008	-0.003	-0.002
	(8.83)**	(15.03)*'	(2.33)'	(2.24)*
Number of siblings	-0.029	-0.014	0.039	0.131
	(1.47)	(3.34)*'	(0.81)	(4.57)**
Only child	0.048	-0.045	-0.243	-0.154
	(0.52)	(1.93)	(0.72)	(0.68)
Percent siblings who are brothers	0.018	-0.030	-0.302	-0.332
	(0.31)	(1.91)	(0.95)	(1.87)
Urban area	0.358	-0.048	0.962	2.023
	(5.34)**	(1.73)	(3.51)'	(8.44)**
Years schooling of mother	0.031	-0.017	0.064	0.247
	(4.05)**	(0.43)	(1.53)	(7.76)**
Years schooling of father	0.006	0.096	0.059	0.434
	(0.88)	(5.61)*'	(1.71)	(18.80)**
Muslim	-0.204	0.016	-1.423	-0.769
	(1.92)	(6.59)*'	(2.33)'	(1.93)
Muslim * female	-0.046	0.017	0.138	-0.015
	(0.42)	(8.13)*'	(0.22)	(0.04)
Constant	-1.051		160.213	4.212
	(6.84)**		(77.98)'	(3.24)**
Observations	4188	7800	5591	5795
R-squared/F-stat for probit	0.10	76.43**	0.39	0.38

Notes: Regressions take into account complex survey design. Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level.

Table 8: Do Families with Daughters Spend Less on Food and More on Adult Goods in Virilocal Regions?

	(1)	(2)	(3)	(4)	(5)	(6)
	All independent variables in levels				All independent variables first-differenced	
	share of food items 1993	share of adult goods 1993	share of food items 1997	share of adult goods 1997	change in share of food items 1997-1993	change in share of adult goods 1997-1993
% girls aged 0-14	-0.014	-0.031	0.074	0.004	-0.002	-0.021
	(0.47)	(2.46)*	(2.83)**	(0.37)	(0.07)	(1.50)
% boys aged 0-14	0.027	-0.034	0.074	0.017	-0.046	-0.027
	(1.06)	(2.88)**	(2.88)**	(1.34)	(1.34)	(1.46)
% older women aged 30+	0.019	-0.025	0.068	-0.006	0.005	-0.019
	(0.69)	(2.12)*	(2.39)*	(0.47)	(0.15)	(1.33)
% young men aged 15-29	-0.079	0.002	0.047	0.042	-0.051	0.041
	(2.44)*	(0.14)	(1.46)	(3.01)**	(1.27)	(2.45)*
% older men aged 30+	-0.132	0.034	-0.075	0.077	-0.101	0.069
	(3.65)**	(1.82)	(1.94)	(4.75)**	(2.29)*	(3.26)**
household size	0.005	-0.002	0.007	0.001	0.002	0.001
	(2.45)*	(2.14)*	(3.93)**	(0.97)	(0.63)	(0.78)
% girls aged 0-14*viri adat	-0.073	0.037	-0.082	0.041	-0.048	0.026
	(1.20)	(1.73)	(1.19)	(1.72)	(0.51)	(0.74)
% boys aged 0-14*viri adat	-0.033	0.028	-0.013	0.015	0.061	0.031
	(0.66)	(1.13)	(0.24)	(0.65)	(1.02)	(0.92)
% young women aged 15-29*viri adat	0.005	-0.000	0.022	0.042	0.013	-0.023
	(0.08)	(0.01)	(0.32)	(1.76)	(0.10)	(0.61)
% older women aged 30+*viri adat	-0.079	0.007	-0.069	-0.001	0.114	0.017
	(0.86)	(0.23)	(0.76)	(0.07)	(0.93)	(0.43)
% older men aged 30+*viri adat	0.074	-0.001	0.115	-0.015	-0.090	0.030
	(1.14)	(0.03)	(1.76)	(0.53)	(1.32)	(1.01)
household size*viri adat	-0.002	-0.001	0.003	-0.003	0.007	-0.001
	(0.46)	(0.64)	(0.69)	(1.59)	(1.32)	(0.57)
female headed household	0.012	-0.022	0.017	-0.014		
	(0.89)	(4.32)**	(1.55)	(2.84)**		
log total expenditures in 1000 rupiah	-0.043	0.000	-0.056	-0.005	-0.029	-0.005
	(7.19)**	(0.21)	(7.34)**	(2.30)*	(3.28)**	(1.74)
is enumeration area rural?	-0.012	0.010	-0.003	0.018		
	(1.38)	(2.20)*	(0.32)	(4.49)**		
virilocal marriage adat	0.014	-0.012	0.010	-0.010		
	(0.28)	(0.57)	(0.19)	(0.59)		
uxorilocal marriage adat	-0.016	0.001	-0.007	0.006		
	(1.51)	(0.32)	(0.61)	(1.50)		
local price index	-0.141	-0.026	-0.021	-0.014		
	(2.37)*	(1.05)	(0.33)	(0.60)		
Constant	0.875	0.135	0.893	0.116	0.082	-0.000
	(12.77)**	(5.06)**	(10.98)**	(4.16)**	(12.23)**	(0.15)
Observations	5820	5820	4995	4995	5386	5386
R-squared	0.06	0.03	0.07	0.04	0.01	0.02

Notes: Regression results take into account complex survey design. Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level. Excluded category is percent young women aged 15-29 Source: IFLS 1993 and 1997.

Table 9: Do daughters inherit less in virilocal regions?

	(1)	(2)	(3)
	did person receive inheritance?	did person receive inheritance?	did person receive inheritance?
son	0.066	0.073	-0.014
	(1.42)	(2.02)*	(0.14)
age in years	0.006	0.005	0.005
	(2.89)**	(2.92)**	(2.98)**
both parents died	0.547	0.552	0.579
	(6.91)**	(9.77)**	(9.98)**
father alone died	0.015	-0.000	
	(0.19)	(0.00)	
decade of last parental death	0.001		
	(0.40)		
number of siblings	0.008	0.014	0.014
	(0.70)	(1.55)	(1.15)
percent brothers	0.122	0.130	0.106
	(1.67)	(2.43)*	(1.23)
virilocal adat	-0.078	-0.079	0.102
	(0.61)	(0.69)	(0.88)
uxorilocal adat	0.018	0.035	0.050
	(0.23)	(0.46)	(0.56)
both parents died*daughter			-0.051
			(0.71)
number of siblings*daughter			-0.000
			(0.02)
percent brothers*daughter			0.049
			(0.42)
uxorilocal adat*daughter			-0.027
			(0.32)
virilocal adat*daughter			-0.361
			(3.43)**
Constant	-0.918	-0.861	-0.824
	(4.57)**	(7.94)**	(7.67)**
F-statistic	21.62**	31.32**	21.09**
Observations	4108	7064	7064

Notes: Regression results take into account complex survey design. Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level. Excluded category is percent young women aged 15-29 Source: IFLS 1993 and 1997.

Table A1: Ethnic groups and residence patterns after marriage y Enumeration Areas (EA)

	# of EA with adat answers	% of EA virilocal adat	% of EA uxorilocal adat	% of marriages virilocal	% of marriages uxorilocal	Predominant island	Comment from LeBar
Balinese	15	87	0	94	3	Bali	Residence after marriage is virilocal, and usually in the houseyard of the man's parents… [preferred marriage is with father's brother's daughter] (pp.62-3)
Banjar	9	0	89	27	63	Kalimantan	Banjar is major city in Dayak/Ibon area; LeBar does not give information about locality
Batak	10	80	20	63	26	Sumatra	Normally patrilocal, although temporary bride service in the home of the girl's father occurs in cases where the full bride-price cannot be met… The [maximal lineage] is theoretically exogamous…(p. 21)
Bugis	9	11	78	18	71	Sulawesi	…membership in localized nonunilineal corporate descent groups through either his father or mother… ultimate membership is by choice. (p. 144)
Java + Betawi	125	14	48	37	53	Java	There is no fixed rule of residence determining where a married couple should live (p. 50)
Madura	9	0	56	29	63	Java	Although the ideal is an independent neolocal household after marriage, many young couples stay at the wife's parents' house for the initial period of married life. One of the daughters, moreover, remains permanently, with the obligation to care for the parents in their old age.(p. 53)
Minang	15	0	100	15	77	Sumatra	Matrilocal in the village with the husband residing with his wife's matrilineally extended family…Value is placed on village endogamy, and a majority of marriages are within the village.(p. 25)
Sasak	10	100	0	83	10	Lombok	Residence is generally neolocal or ambilocal…(p. 67)
Sundanese	42	7	54	23	60	Java	The ideal is an independent neolocal household after marriage…(p. 55)
Other	26	35	42	49	35		
Mixed	26	n.a.	n.a.	33	67		
All	270	22	49	45	49		

Notes: Ambilocal communities are the omitted category, so that %virilocal + %uxorilocal + %ambilocal = 100%
Betawi are Jakarta's indigenous community. Sample size = 304 enumeration areas for marriages
All groups are predominantly Muslim except for largely Christian Batak and the largely Hindu Balinese.