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Kin & Fertility in Indonesia: How do different measures of kin availability affect the results?

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Abstract

Objectives: Evidence suggests that kin presence may be correlated with fertility, but variation in how kin 'presence' is measured makes firm conclusions hard to draw. We investigate how the measure of the availability of a particular kin group, parents and parents-in-law, influences their effect.
Methods: Using four waves of data from the Indonesia Family Life Survey (IFLS), we compare parent's survival with co-residence in predicting fertility outcomes for female respondents. Other indicators of kin availability, including kin contact and distance from family members are used to determine the effect of kin above and beyond simply being alive. Finally, we analyze data on transfers of both financial and household help from kin to respondents to understand the possible mechanisms by which kin are influencing fertility.
Results: We find different results if we operationalize parent availability as survival or residence. Parent survival, but not residence has a positive effect on a respondent having a birth between waves. Mother-in-law residence has a positive effect on a respondent's progression to a birth in some models, help from mothers-in-law increases likelihood of having a birth, and postnuptial residence with in-laws results in higher overall fertility in particular regions of the country.

Introduction

Given that human females need help from others to successfully raise offspring, it has been argued that humans are cooperative breeders (Hrdy, 2005; Kramer, 2005). Previous research has shown that kin influence fertility outcomes in many different contexts (Sear & Mace, 2008; Sear & Coall, 2011). This evidence largely takes the form of correlations between the presence of kin and fertility rates. A review of this literature showed that though correlations between the availability of kin and fertility have been demonstrated in a number of populations, the existence and direction of these effects can vary substantially between populations and among different family members, though broadly the presence of husband's kin is more likely to be correlated with increased fertility than that of the woman's own kin (Sear & Coall, 2011), while the survival of the woman's kin is more likely to be associated with improved survivorship of offspring than the husband's kin (Sear and Mace, 2008).

This variation may be explained by several hypotheses which link kin presence to fertility, and each hypothesis may only apply under a certain set of conditions. First, kin may broadly support one another's reproductive outcomes as predicted by kin selection and cooperative breeding models (Hamilton, 1966; Hrdy, 2005). Alternatively, under conditions of resource stress and where close kin share the same resources, local resource competition may become important, resulting in the presence of certain kin reducing reproductive success (Sear, 2008; Strassmann, 2011). Further, there may be conflict between partners over the ideal family size which may result in a woman's fertility reflecting her partner's desired fertility rather than her own (Leonetti et al., 2007; Sear et al., 2003).

A problem with this literature, however, is that kin presence is measured in many different ways in previous research, depending on data availability. This limits the comparability of previous work. In many studies the survival status of family members is used as a proxy for kin availability (i.e. simply whether the relative is alive or dead, based on the assumption that living kin will be more able to influence fertility than those who are dead) (see examples: Sear et al., 2003; Tymicki, 2004). This measure may be confounded by other variables (such as wealth or genes for disease resistance, which may be associated with survival and fertility outcomes). In contexts where individuals migrate great distances, individuals may not live near family members, limiting kin's ability to influence reproductive outcomes. Others have measured kin availability by co-residence with kin, particularly postnuptial residence (see examples: Thornton et al., 1986; Snopkowski and Sear, 2012; Skinner, 2004). This may be biased if individuals who live with kin after marriage are systematically different from those who do not (for example, in their level of familial orientation).

Here we use a dataset which allows us to compare the effects of different measures of kin availability on fertility in a longitudinal dataset: this adds to the literature on whether kin influence fertility, but, importantly, also allows us to determine whether the results are similar using different measures of kin availability. We investigate the effects of parental survivorship and co-residence at an interview on their likelihood of progressing to a birth by the next interview. One drawback of much of the previous literature is that while parental 'survival' is known, it is often not known whether those

individuals live nearby, have frequent contact, or if they actually provide help (see exceptions Scelza, 2011; Bereczkei, 1998). This paper explores the frequency of contact of kin members along with their location (in the same village, same county, province, or elsewhere). This allows us to determine if contact with kin is necessary for them to impact fertility. Finally, we also use data on transfers to and from kin; both financial transfers and labor transfers (help with childcare or housework) to see if help is actually being provided by kin and if that help influences fertility outcomes. There are many hypotheses to explain the possible relationship between the effect of survivorship and the effect of co-residence with kin on fertility outcomes. Another benefit of this dataset is that we can use information collected at one interview to predict future fertility outcomes. Most datasets use retrospective information, which suffers from recall bias (which may get worse for events further in the past) and uses current information to predict past events (for example, using current socio-economic status to predict previous fertility, even though the direction of the effect may be reversed (Havanan, Knodel, & Sittitrai, 1992)). Panel data gives us more power to infer direction of causality.

Hypothesis 1 (H1): Cooperative breeding can be experienced most by individuals with frequent kin contact

It is possible that the effect of kin is correlated with their frequency of contact. This hypothesis predicts that focal women are most influenced by resident kin (RK) because they have more contact with these individuals. Women who have non-resident surviving kin (SK) have a lower amount of contact with kin, and finally, those women who have experienced the death of a particular kin member (DK) will not be able to be influenced by that individual at all. We expect that those individuals who have frequent contact with kin, by either living in the same household (RK) or seeing kin frequently (on a daily or weekly basis) (FK), are more influenced by kin than those who infrequently interact with kin (never, yearly or monthly) (IK). In this case, frequent contact with kin may have intermediate effects between residence kin and those with infrequently contacted surviving kin. There are many mechanisms by which kin may be influencing fertility, but if providing help is the (main) mechanism of kin influence, contact frequency may be an important prerequisite for receiving non-financial help.

H1a Prediction: RK > SK > DK

H1b Prediction: RK > FK > IK >= DK

Hypothesis 2 (H2): Living with kin may be an indicator of resource competition.

One reason that a couple may live with kin is that they do not have enough resources to set up their own household. In this case, resource competition may be an important influence on the relationships between kin (Strassmann & Garrard, 2011; Strassmann, 2011). This hypothesis predicts that individuals have reduced fertility outcomes if they live with kin. Individuals who live separately from kin (SK) experience less competition than those who are resident, but are still worse off than those individuals without any living kin. Alternatively, it is possible that only some individuals in a given context live with kin because of low resource availability. In this case, we expect an interaction between kin residence and wealth availability on fertility outcomes. In households with low wealth (LW) and resident kin (RK), fertility outcomes may be reduced more than in households with high wealth (HW) or households without resident kin.

H2a Prediction: DK > SK > RK

H2b Prediction: Not(RK) >= RK & HW > RK & LW

Hypothesis 3 (H3): Women who live with kin are systematically different or living with kin is systematically different

There may be something systematically different about individuals who choose to live with kin, (such as an inherent familial orientation). If this is the case, then women who choose to live with kin (RK) may have different fertility outcomes than women who have non-residence surviving kin (SK) and those who have experienced the death of a kin member (DK). Alternatively, there may be something systematically different about living with kin. For example, kin may only be able to influence fertility outcomes when they are present in the same household (for example, by limiting a woman's autonomy), but not if they are living separately.

H3 Prediction: RK != (SK = DK)

Hypothesis 4 (H4): Kin's effect is not related to distance

It is possible that the most important influence that kin provide is their advice or emotional support – in which case, distance may not matter. It is possible that an individual's survival (SK) is enough to make an effect, an effect which is not magnified by residence (RK). In this case, we expect the effect of kin member's survival to be the same regardless of whether the individual is resident. Individuals who have experienced the death of the kin member (DK) will have reduced effect of that individual.

H4 Prediction: SK= RK > DK

Methods

Data are derived from the four waves (1993, 1997, 2000, 2007) of the Indonesia Family Life Survey (IFLS), which provide information at the individual and family level on fertility, health, education, migration, and employment (http://www.rand.org/labor/FLS/IFLS). The survey represents an area that includes 83% of Indonesia's population (specifically, 13 provinces found on the islands of Java, Sumatra, Bali, West Nusa Tenggara, Kalimantan, and Sulawesi). Female respondents were first included in the sample when they were between the ages of 15 and 50. A total of 12,187 women were sampled in at least two waves, with 2964 interviewed in all four waves. We excluded women who were married multiple times because information on parents-in-law was only provided for the most recent spouse. This survey has the advantage of including information on survivorship of respondent's parents and parents-in-law, including year of death, postnuptial residence and residence at each year of the survey, which allows us to compare the survivorship and residence of parents and in-laws. Table 1 presents descriptive statistics of the dataset for the 1993, 1997 and 2000 waves (2007 data could not be used to predict future births since it was the last wave of data collection). Variables are calculated for ever-married women at the each interview (as reproductive histories were not collected for never married women given the low rate of births outside of marriage). Frequency of contact with kin was collected at each interview for parents. In-law contact information was extrapolated from husband's contact with his parents, which is likely correlated with a woman's frequency of contact with her in-laws. The location of the parents and parent-in-laws was collected in 1993, 2000 and 2007 and was categorized as living in the same village, county, province or elsewhere. Financial transfers and household help between respondents and kin were reported for the 12 months prior to each interview. Information was collected on the respondent's parents (together) if they were both still living and married and separately for each parent if they were not.

In 1993, the total fertility rate (TFR) of Indonesia was 2.90 and by 2007 it had dropped to 2.21, but many older women in this sample began their reproductive careers in the 1960s, when the TFR was approximately 5.60 (United Nations, 2011). In the decades preceding this survey, Indonesia experienced a rapid reduction in fertility and infant mortality, a dramatic increase in primary school attendance, and a state-sponsored family planning program (Molyneaux and Gertler, 2000). Indonesia has nearly universal marriage (97% in the IFLS are married by age 30) and essentially no non-marital fertility (estimates are hard to find given the social stigma of births out of marriage).

Child mortality in Indonesia has dropped quite dramatically in the past 50 years. In 1960, approximately 22% of children born died before their 5th birthday and by 1990, that proportion had fallen to 9% (UNICEF, 2000). Today, it is 3% (UNICEF, 2013). In our sample, women reported 13,244 live births, where 1398 of them had subsequently died, 1309 of them before the age 5. This corresponds to a child mortality rate (before age 5) of 10%. Given this high child mortality rate, many women may have higher fertility because they are "replacing" offspring who have died.

Data Analysis

Progression to an additional birth by the next wave

We used information from one wave to predict a birth by the next wave using a multilevel logistic regression analysis with a second level of analysis at the woman level (as some women were interviewed in several waves). We first compare residence and survival status for the respondent's parents and parents-in-law. We created categories of parental status to isolate the effects of each parent individually and conducted progressively more complex models adding likely covariates. These models only include women who have ever been married at each wave, as women who have never married have no information on in-laws and are assumed to have never given birth. Second, we explore the relationship between frequency of contact with kin and progression to an additional birth. Frequency of contact was grouped into frequent; that which occurred either on a weekly or daily basis and infrequent; on a monthly or less frequent basis. Women who lived with kin or whose kin were no longer living were kept as separate categories. Information on the help respondent's received from kin was only collected for parents who were alive, but not resident. Finally, a dichotomous variable of help received was used as an independent variable in our multilevel model. We further explored how helping behavior influences fertility outcomes by exploring two possible components of help: household labor and financial help.

Number of Children Born and Living Children

To analyze the number of children born and living children, a multiple regression analysis was conducted. We calculated the total number of children born and number of currently living children of ever-married women at the last interview for which the respondent was interviewed (n=10877) based on

postnuptial residence. This allows us to have a value for each woman regardless of her last interview date.

Controls

For each of these analyses, many controls were included as they are known correlates of fertility. In all analyses, religion is controlled for. Approximately 85% of the sample is Muslim. Other religions include: Hindu (5.4%), Catholic (2.5%), Protestant (5.6%), and Buddhist/other (1.6%). We divided the sample into the following regions: Sumatra, Java, Bali and Nusa Tenggara, Kalimantan and Sulawesi. Completed educational level is categorized as: no schooling, elementary (1-6 years), junior high (7-9 years), senior high (10-12 years), and postsecondary (13 or more years). Women classified each of their places of residence as an urban or rural area (in 1993 residence was reported as a village, small city and large city. For the analyses in this paper small and large city were combined for the urban category). A polygynous variable is included and describes whether the woman's husband reported that he had more than one wife (at each interview). A wealth variable was constructed as a factor of: number of rooms in the household, type of floor and outer wall of house, and whether the house has electricity, a telephone (in 1993) and a television (in 1997, 2000, 2007). This variable has a mean of 0 and a standard deviation of 1, where values greater than 0 represent an above average amount of wealth. This value is based on housing information at the time of each interview. Age is controlled for throughout the analyses, which controls for both age cohort and length of reproductive career. We also controlled for age at marriage, as earlier marriage allows for a longer reproductive span and possibly higher fertility. In the multilevel analyses of progression to a birth by the next wave, number of living children is controlled for (a categorical variable for 0, 1-2, 3-4, 5-6, 7-8 or 9+ children) and the wave as there was different lengths of time between waves making progression more likely between some waves than others.

Results

Progression to an additional birth by the next wave

Table 2 presents the output of the multilevel model predicting the progression to an additional birth with parental survival and residence. Across all models, we see that having both parents alive (but not resident) has a positive effect on progression to a birth by the next wave. The effect of a surviving mother (but not father) and the effect of a surviving father (but not mother) are not significant, but are consistently positive and they appear to have additive effects; resulting in the significant effect of both surviving parents. Resident parents did not have a significant effect on progression to a birth and the direction of the effect varies across the different combinations of parental residence. Table 3 presents the multilevel model of parents-in-law survival and residence. There is a significant effect of mother-in-law residence on progression to a birth (in combination with both dead fathers-in-law and surviving, but non-resident fathers-in-law) in the first two models. When the number of living children and age at marriage are included in the model the significant effect of mother-in-law residence becomes non-significant. This is likely because resident with one's mother-in-law also has effects on age at marriage and number of living children. There is also a significant effect if both in-laws are alive, but this effect also becomes non-significant when age at marriage and number of living children are included in the model.

Table 4 presents the output of the progression to a birth between waves by frequency of contact with parents. Each parent is entered into a separate model since there are 16 different combinations of outcomes for both parents and parents-in-law and the models do not converge. The results show that frequent contact has a larger positive effect on progression to birth than infrequent contact for all parents, except fathers-in-law. This effect is significant for fathers. Mothers-in-law have a marginally significant positive effect if they are resident. While location of parents is correlated with their level of frequency, location of parents (in the same village, province, etc.) is not a significant predictor of progression to a birth (results not shown). This suggests that amount of contact with kin is more important than their proximity; but of course, they are correlated.

Table 5 presents the output of the progression to a birth between waves based on whether the respondent and her partner received help from their parents. Help received by one's parents are exactly the same if they are still married, so there is a high correlation between help received from one's mother and father. For this reason, the models were conducted separately with the recognition that separating the effects of help from one's mother or father is difficult. The results show that receiving help has a positive effect on progression to a birth for mother, fathers, mothers-in-law and fathers-in-law, but the only significant effect occurs for mothers-in-law. Helping behavior is broken down into financial help and household help. The significant effect of mothers-in-law help on progression to a birth is driven by a significant effect of mothers-in-law household help. Interestingly, mothers have a significant positive effect of financial help on progression to a birth, even though their overall level of help was not a significant predictor.

Total children born and living children

Table 6 displays the results of multiple regression analyses predicting total children born and living children for ever-married women by postnuptial residence. For both number of live births and living children, living with the husband's kin immediately after marriage has a significantly positive effect. Living with the wife's family postnuptially has a negative effect on births and living children compared to couples who reside neolocally, but these effects are not significant. There is a significant interaction between region and postnuptial residence. The regions of Sumatra and Sulawesi drive the positive effect of virilocal residence.

Discussion

Survival of both one's mother and father has a positive effect on progression to a birth, while residence with them does not. The in-law effect seems to be dominated by mothers-in-laws who have a positive effect on fertility if they provide help, particularly household help, to the respondent. Fathers-in-law do not have significant effect on progression to a birth. Frequent contact with kin has more of a positive effect on progression to a birth than infrequent contact, but this effect is only significant for mothers-in-law. Postnuptial residence with kin has differing effects on fertility. Living virilocally after marriage has a positive effect on number of live births and number of living children, while living uxorilocally has a slight negative effect.

Our results suggest that kin effects are related to proximity (hypothesis 1) with higher amounts of kin contact resulting in a higher likelihood of progression to a birth, although our expectation that residence with kin would have the largest effect is not seen for women who live with their parents. We do not see much evidence for a resource competition model, except that women living with their own parents after marriage have slightly lower overall fertility, but no effect on progression to births between waves. Hypothesis 3 predicts that there is something unique about residence with kin. This may be the case with mothers-in-law that have a positive effect on fertility when they are resident, but not with any other parent. Generally, it is the norm in many parts of Indonesia for the youngest daughter to stay in her parent's home after marriage and take care of her parents in old age. If this is the case, then postnuptial residence is somewhat randomly assigned, but cannot explain the high levels of virilocal residence. While this may be a preference for many parents, there seems to be large deviations from this preference and possibly different preferences among different ethnic groups across Indonesia. Finally, hypothesis 4 argues that the effect of kin will not be related to proximity. This does not seem to be the case as more frequent contact had consistently positive effects on progression to a birth.

This research suggests that how kin influence is measured can alter the results and it is important for authors to be clear about how they are operationalizing kin "presence" so that results can be easily compared across research.

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Table 1 Descriptive Statistics

		1993	1997	2000
Parent Status	Both Dead	545 (15.92%)	903 (18.25%)	1110 (16.99%)
	Only mother alive	894 (26.11%)	1097 (22.17%)	1367 (20.93%)
	Only father alive	294 (8.59%)	354 (7.15%)	436 (6.67%)
	Both alive	1417 (41.38%)	1650 (33.35%)	2418 (37.02%)
	Mother res, father alive	48 (1.4%)	82 (1.66%)	90 (1.38%)
	Mother alive, father resident	3 (0.09%)	7 (0.14%)	13 (0.20%)
	Mother resident, father dead	158 (4.61%)	358 (7.24%)	435 (6.66%)
	Mother dead, father resident	17 (0.50%)	49 (0.99%)	71 (1.09%)
	Both resident	48 (1.40%)	448 (9.05%)	592 (9.06%)
		3424 (100%)	4948 (100%)	6532 (100%)
Parent-in-law status	Both Dead	790 (27.13%)	1139 (28.31%)	1446 (26.18%)
	Only mother-in-law alive	792 (27.20%)	939 (23.33%)	1293 (23.41%)
	Only father-in-law alive	254 (8.72%)	298 (7.41%)	381 (6.90%)
	Both alive	911 (31.28%)	1207 (30.0%)	1827 (33.08%)
	Mother-in-law resident, father-in-law alive	12 (0.41%)	30 (0.75%)	36 (0.65%)
	Mother-in-law alive, father-in-law resident	3 (0.10%)	5 (0.12%)	12 (0.22%)
	Mother-in-law resident, Father-in-law dead	118 (4.05%)	195 (4.85%)	249 (4.51%)
	Mother-in-law dead, Father-in-law resident	16 (0.55%)	33 (0.82%)	49 (0.89%)
	Both resident	16 (0.55%)	178 (4.42%)	230 (4.16%)
		2912 (100%)	4024 (100%)	5523 (100%)
Postnuptial Residence	Neolocal	2180 (27.25%)	1707 (25.72%)	1736 (25.66%)
	Uxorilocal	3679 (45.99%)	3086 (46.5%)	3148 (46.53%)
	Virilocal	2140 (26.75%)	1843 (27.77%)	1882 (27.82%)
		7999 (100%)	6636 (100%)	6766 (100%)
Education Level	None	444 (12.21%)	639 (10.42%)	597 (7.4%)
	Elementary	1989 (54.69%)	3054 (49.84%)	3738 (46.34%)
	Jr. High	533 (14.65%)	985 (16.07%)	1431 (17.74%)
	Sr. High	541 (14.87%)	1149 (18.75%)	1737 (21.53%)
	Postsecondary	130 (3.57%)	301 (4.91%)	564 (6.99%)
		3637 (100%)	6128 (100%)	8067 (100%)
Region	Sumatra	839 (23.99%)	1414 (21.83%)	1864 (21.62%)
	Java	1940 (55.46%)	3747 (57.85%)	4996 (57.94%)
	Bali & Nusa Tenggara	370 (10.58%)	673 (10.39%)	916 (10.62%)
	Kalimantan	160 (4.57%)	275 (4.25%)	364 (4.22%)
	Sulawesi	189 (5.4%)	368 (5.68%)	483 (5.60%)
		3498 (100%)	6477 (100%)	8623 (100%)
Religion	Islam	3096 (85.27%)	5387 (87.45%)	7175 (87.72%)
	Protestant	191 (5.26%)	287 (4.66%)	367 (4.49%)
	Catholic	86 (2.37%)	105 (1.70%)	162 (1.98%)
	Hindu	202 (5.56%)	310 (5.03%)	412 (5.04%)
	Buddhist	56 (1.54%)	59 (0.96%)	61 (0.75%)
		3631 (100%)	6148 (100%)	8177 (100%)
	Average age (std dev)	32.72 (0.129)	35.07 (0.160)	33.26 (0.113)
	Average number of children born (std dev)	3.40 (0.038)	3.14 (0.033)	2.79 (0.028)
	Average number of living children (std dev)	3.09 (0.034)	2.88 (0.30)	2.57 (0.025)

Table 2

	Model 1		Model 2		Model 3		Model 4		Model 5	
Had Another Birth	Log Odds	Std. Err.	Log Odds	Std. Err.	Log Odds	Std. Err.	Log Odds	Std. Err.	Log Odds	Std. Err.
Region (Sumatra = reference)										
Java	-0.298***	0.057	-0.262***	0.058	-0.173**	0.063	-0.134*	0.068	-0.157*	0.069
Bali & Nusa Tenggara	-0.115	0.096	-0.114	0.098	-0.163	0.104	-0.078	0.112	-0.097	0.114
Kalimantan	-0.410***	0.112	-0.418***	0.113	-0.322**	0.121	-0.313*	0.130	-0.330*	0.131
Sulawesi	-0.008	0.104	-0.000	0.107	-0.001	0.115	0.018	0.125	0.026	0.127
Other	-0.048	0.770	0.02300	0.767	-0.042	0.804	-0.023	0.813	0.124	0.812
Religion (Islam = reference)										
Protestant	0.309**	0.117	0.196^	0.118	-0.026	0.128	-0.075	0.139	0.015	0.141
Catholic	-0.114	0.194	-0.225	0.197	-0.262	0.213	-0.449*	0.228	-0.337	0.233
Hindu	-0.265*	0.122	-0.218^	0.125	-0.168	0.134	-0.258^	0.142	-0.275^	0.144
Buddhist	-0.343	0.359	-0.339	0.376	-0.299	0.397	-0.374	0.450	-0.263	0.460
Other	-0.971	0.850	-0.959	0.855	-0.721	0.843	-0.529	0.882	-0.295	0.885
Urban	0.042	0.045	-0.014	0.049	-0.091^	0.053	-0.101^	0.057	-0.097^	0.058
Age category (15-19 = ref)										
20-24	-0.147	0.104	-0.168	0.105	-0.064	0.124	-0.189	0.144	-0.192	0.147
25-29	-0.640***	0.102	-0.672***	0.103	-0.619***	0.126	-0.748***	0.146	-0.732***	0.149
30-34	-1.279***	0.103	-1.296***	0.105	-1.250***	0.132	-1.391***	0.152	-1.438***	0.155
35-39	-2.269***	0.112	-2.260***	0.115	-2.331***	0.144	-2.440***	0.163	-2.550***	0.167
40-44	-3.722***	0.156	-3.667***	0.158	-3.922***	0.188	-4.002***	0.207	-4.162***	0.211
45+	-5.385***	0.307	-5.413***	0.321	-5.870***	0.354	-5.766***	0.364	-5.964***	0.367
Parent Status (ref = dead)										
Only mother alive	0.148	0.092	0.149	0.093	**0.182^**	**0.097**	0.166	0.104	0.141	0.105
Only father alive	0.147	0.115	0.130	0.116	0.111	0.122	0.129	0.129	0.114	0.131
Both alive	**0.274****	**0.086**	**0.244****	**0.087**	**0.243****	**0.092**	**0.249***	**0.098**	**0.205***	**0.099**
Mother res, father alive	-0.152	0.189	-0.194	0.191	-0.221	0.204	-0.068	0.220	-0.053	0.223
Father res, mother alive	0.177	0.479	0.205	0.490	-0.126	0.557	0.557	0.762	0.575	0.785
Mother res, father dead	0.010	0.120	-0.031	0.121	-0.110	0.129	0.047	0.141	0.026	0.143
Father res, mother dead	0.282	0.233	0.240	0.236	0.115	0.254	0.196	0.291	0.142	0.299
Both res	0.141	0.109	0.095	0.111	-0.011	0.120	0.137	0.136	0.091	0.138
Constant	0.567***	0.133	0.396*	0.168	0.071	0.223	0.089	0.247	0.014	0.253
Education (ref = none)										
Elementary			0.083	0.097	0.053	0.100	0.038	0.106	-0.038	0.107
Jr. High			0.217*	0.109	0.101	0.115	0.101	0.122	-0.046	0.124
Sr. High			0.460***	0.110	0.248*	0.120	0.269*	0.127	0.114	0.130
Post-secondary			0.811***	0.139	0.399*	0.157	0.366*	0.168	0.180	0.172
Wealth indicator			-0.096	0.028	-0.085**	0.030	-0.086**	0.033	-0.062^	0.033
Kids living (ref = 0)										
1-2					-1.023***	0.090	-0.924***	0.102	-0.841***	0.105
3-4					-0.886***	0.106	-0.844***	0.118	-0.682***	0.121

5-6	-0.395**	0.136	-0.330*	0.149	-0.163	0.152
7-8	-0.253	0.195	-0.228	0.214	-0.057	0.219
9+	1.258***	0.287	1.208***	0.300	1.484***	0.303
Age at marriage	0.062***	0.007	0.065***	0.008	0.064***	0.008
Polygynous (spouse)			-0.023	0.120	-0.165	0.123
Start of Wave (ref = 1993)						
1997					-0.265***	0.069
2000					0.665***	0.065

Table 3

	Model 1		Model 2		Model 3		Model 4		Model 5	
Had Another Birth	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Region (Sumatra = reference)										
Java	-0.265***	0.061	-0.218	0.063	-0.131^	0.068	-0.128^	0.069	-0.153*	0.070
Bali & Nusa Tenggara	-0.037	0.103	-0.044	0.104	-0.082	0.111	-0.063	0.113	-0.076	0.114
Kalimantan	-0.396	0.118	-0.403	0.119	-0.319*	0.128	-0.317*	0.131	-0.335*	0.133
Sulawesi	0.015	0.113	0.020	0.117	0.037	0.125	0.003	0.127	0.012	0.129
Other	-0.496	0.910	-0.415	0.901	-0.557	0.940	-0.571	0.942	-0.391	0.939
Religion (Islam = reference)										
Protestant	0.351**	0.127	0.237^	0.129	0.007	0.139	-0.021	0.142	0.066	0.144
Catholic	-0.312	0.209	-0.408^	0.212	-0.536*	0.237	-0.547*	0.238	-0.444^	0.244
Hindu	-0.324*	0.129	-0.250^	0.132	-0.231	0.141	-0.240^	0.143	-0.263^	0.146
Buddhist	-0.141	0.409	-0.065	0.433	-0.151	0.462	-0.161	0.463	-0.051	0.474
Other	-1.046	0.855	-1.044	0.861	-0.878	0.852	-0.589	0.881	-0.333	0.883
Urban	0.039	0.048	-0.015	0.053	-0.090	0.057	-0.110^	0.058	-0.106^	0.059
Age category (15-19 = ref)										
20-24	-0.161	0.113	-0.186	0.114	-0.087	0.137	-0.165	0.145	-0.170	0.148
25-29	-0.655***	0.110	-0.681***	0.112	-0.614***	0.139	-0.707***	0.147	-0.691***	0.150
30-34	-1.284***	0.111	-1.286***	0.114	-1.223***	0.145	-1.344***	0.153	-1.390***	0.156
35-39	-2.299***	0.121	-2.273***	0.124	-2.308***	0.158	-2.422***	0.165	-2.532***	0.169
40-44	-3.707***	0.166	-3.639***	0.168	-3.859***	0.204	-4.001***	0.211	-4.161***	0.216
45+	-5.394***	0.336	-5.428***	0.354	-5.841***	0.394	-5.930***	0.397	-6.127***	0.400
In-law Status (ref = both dead)										
Only mother-in-law alive	0.081	0.077	0.045	0.078	0.035	0.081	0.063	0.082	0.048	0.083
Only father-in-law alive	0.107	0.102	0.089	0.103	0.042	0.108	0.044	0.110	0.031	0.112
Both alive	**0.179***	**0.073**	0.127^	0.074	0.099	0.078	0.110	0.079	0.073	0.080
Mother-in-law res, father-in-law alive	**0.593***	**0.269**	**0.529***	**0.269**	0.335	0.293	0.290	0.296	0.325	0.299
Father-in-law res, mother-in-law alive	-0.519	0.521	-0.649	0.525	-0.602	0.537	-0.622	0.538	-0.758	0.539
Mother-in-law res, father-in-law dead	**0.323****	**0.120**	**0.293***	**0.121**	0.189	0.131	0.183	0.132	0.194	0.134
Father-in-law res, mother-in-law dead	0.107	0.262	0.047	0.265	-0.148	0.289	-0.155	0.293	-0.218	0.303

Both res	0.151	0.130	0.094	0.132	0.111	0.147	0.080	0.151	0.095	0.154
Constant	0.663***	0.129	0.493**	0.169	0.196	0.230	0.242	0.238	0.146	0.246
Education (ref = none)										
Elementary			0.059	0.102	0.033	0.106	0.040	0.107	-0.036	0.109
Jr. High			0.244*	0.115	0.102	0.122	0.112	0.124	-0.035	0.126
Sr. High			0.500***	0.117	0.278*	0.128	0.292*	0.130	0.135	0.132
Post-secondary			0.741***	0.148	0.350*	0.168	0.374*	0.171	0.190	0.174
Wealth indicator			-0.114***	0.030	-0.095**	0.032	-0.088**	0.033	-0.065^	0.034
Kids living (ref = 0)										
1-2					-0.986***	0.101	-0.941***	0.104	-0.857***	0.106
3-4					-0.914***	0.117	-0.877***	0.120	-0.712***	0.123
5-6					-0.413**	0.149	-0.363*	0.151	-0.190	0.155
7-8					-0.337	0.215	-0.341	0.221	-0.167	0.225
9+					1.115***	0.305	1.112***	0.310	1.392***	0.313
Age at marriage					0.0608***	0.008	0.062***	0.008	0.060***	0.008
Polygynous (spouse)							0.000	0.122	-0.145	0.125
Start of Wave (ref = 1993)										
1997									-0.278***	0.070
2000									0.663***	0.066

Table 4[1]

	Mother		Father		Mother-in-law		Father-in-law	
Had a birth between waves	Log Odds	SE	Log Odds	SE	Log Odds	SE	Log Odds	SE
Frequency Category (ref = dead)								
Infrequent Contact	0.078	0.082	0.015	0.070	0.067	0.077	0.037	0.074
Frequent Contact	0.120	0.077	0.147*	0.064	0.077	0.068	0.027	0.063
In household	-0.072	0.105	-0.017	0.111	0.182^	0.110	-0.111	0.133
Constant	0.089	0.246	0.111	0.241	0.137	0.245	0.200	0.242
Log likelihood	-4566.5087		-4563.1612		-4427.0247		-4428.2662	
n	10242		10247		9976		9983	
n (groups)	5048		5045		4988		4987	

Table 5

	Mother		Father		Mother-in-law		Father-in-law	
Had another birth	Log Odds	Std. Err.	Log Odds	Std. Err.	Log Odds	Std. Err.	Log Odds	Std. Err.
Constant	-0.219	0.347	-0.533	0.377	-0.249	0.468	0.338	0.435
Region (Sumatra = reference)								
Java	-0.129	0.097	-0.095	0.112	-0.322*	0.127	-0.231^	0.122
Bali & Nusa Tenggara	0.091	0.158	-0.078	0.174	-0.279	0.234	-0.249	0.195
Kalimantan	-0.436*	0.186	-0.307	0.218	-0.478*	0.235	-0.594*	0.246
Sulawesi	0.331^	0.172	0.065	0.196	0.105	0.214	-0.014	0.221
Other	0.509	1.020	0.747	1.027	1.595	1.877	-1.031	1.318
Religion (Islam = reference)								
Protestant	0.115	0.178	0.013	0.220	-0.149	0.253	0.260	0.251
Catholic	-0.422	0.334	-0.307	0.350	-1.903*	0.765	-0.193	0.362
Hindu	-0.304	0.200	-0.186	0.210	-0.398	0.309	0.059	0.267
Buddhist	-0.519	0.569	-0.257	0.675	-0.073	0.770	-0.409	0.830
Other	-1.266	1.151	-0.281	1.295	-23.83	195265.000	-0.650	1.188
Urban	-0.101	0.081	-0.101	0.094	0.062	0.106	-0.180^	0.104
Education (ref = none)								
Elementary	<0.001	0.144	-0.069	0.163	-0.109	0.187	-0.159	0.196
Jr. High	0.048	0.168	0.007	0.190	-0.199	0.218	-0.087	0.225
Sr. High	0.058	0.178	-0.028	0.201	-0.127	0.231	-0.019	0.238
Post-secondary	0.013	0.251	0.006	0.290	-0.408	0.313	0.100	0.317
Age category (15-19 = ref)								
20-24	-0.373	0.229	-0.152	0.224	-0.307	0.320	-0.009	0.230
25-29	-0.916***	0.228	-0.849***	0.226	-0.738*	0.318	-0.405^	0.234
30-34	-1.640***	0.236	-1.570***	0.238	-1.435***	0.325	-1.275***	0.251
35-39	-2.625***	0.252	-2.624***	0.263	-2.610***	0.343	-2.269***	0.283
40-44	-4.240***	0.312	-3.890***	0.332	-4.023***	0.410	-3.810***	0.418
45+	-6.360***	0.638	-5.508***	0.581	-5.968***	0.789	-4.659***	0.666
Wealth Indicator	-0.042	0.047	-0.002	0.053	0.0459	0.062	-0.065	0.059

[1] Controls for region, religion, urban/rural residence, education, age category, age at marriage, number of living children (categorized into 0, 1-2, 3-4, 5-6, 7-8 and 9+), spouse's polygyny status, and wave.

Age at Marriage	0.074***	0.012	0.083***	0.014	0.0755***	0.015	0.057***	0.016
Children living (ref = 0)								
1-2	-0.526	0.161	-0.592	0.172	-0.449*	0.212	-1.019***	0.196
3-4	-0.405*	0.179	-0.345^	0.195	-0.256	0.239	-0.848***	0.229
5-6	0.152	0.221	0.432^	0.248	0.064	0.293	-0.252	0.290
7-8	0.168	0.313	0.435	0.368	0.117	0.389	0.216	0.425
9+	1.848***	0.391	2.218***	0.430	0.777	0.656	0.816	0.573
Spouse Polygynous	-0.039	0.182	0.140	0.221	0.083	0.220	0.007	0.252
Wave (Ref = 1993)								
1997	-0.292***	0.081	-0.169^	0.089	-0.283*	0.125	-0.371***	0.103
2000	0.544***	0.101	0.815***	0.128	0.511***	0.120	0.821***	0.136
Receive Help	**0.091**	**0.075**	**0.137**	**0.085**	**0.254***	**0.105**	**0.062**	**0.102**

Table 6
Effect of Postnuptial Residence on Number of Births and Living Children

	Live Births				Living Children			
	B	SE	B	SE	B	SE	B	SE
Constant	3.421***	0.301	3.328***	0.304	2.883***	0.275	2.823***	0.277
Region (ref = Sumatra)								
Java	-0.61^***	0.045	-0.480***	0.082	-0.528***	0.041	-0.435***	0.075
Bali and Nusa Tenggara	-0.046	0.076	0.218^	0.115	-0.051	0.069	0.136	0.106
Kalimantan	-0.580***	0.089	-0.557**	0.165	-0.582***	0.082	-0.564***	0.153
Sulawesi	-0.179*	0.082	-0.199	0.162	-0.124^	0.075	-0.218	0.150
Religion (ref = Islam)								
Protestant	0.615***	0.086	0.551***	0.087	0.561***	0.079	0.504***	0.080
Catholic	0.037	0.125	0.016	0.125	0.093	0.114	0.077	0.114
Hindu	-0.461***	0.097	-0.410***	0.102	-0.332***	0.090	-0.284**	0.094
Buddhist	-0.322	0.252	-0.362	0.252	-0.165	0.218	-0.203	0.218
Urban	0.008	0.039	0.014	0.039	0.013	0.036	0.018	0.036
Educ (ref = none)								
Elementary	-0.232**	0.078	-0.235**	0.078	-0.046	0.071	-0.048	0.071
Jr. High	-0.336***	0.088	-0.340***	0.088	-0.058	0.081	-0.063	0.081
Sr. High	-0.378***	0.091	-0.379***	0.091	-0.103	0.083	-0.105	0.083
Postsecondary	-0.427***	0.105	-0.431***	0.105	-0.168^	0.096	-0.174^	0.096
Age Category (ref = 15-19)								
20-24	0.975**	0.286	0.950**	0.285	0.825**	0.261	0.804**	0.261
25-29	1.575***	0.282	1.55***	0.281	1.403***	0.258	1.387***	0.257
30-34	2.263***	0.282	2.237***	0.282	2.083***	0.258	2.060***	0.258
35-39	2.944***	0.283	2.912***	0.282	2.708***	0.258	2.682***	0.258
40-44	3.371***	0.283	3.349***	0.283	3.076***	0.259	3.056***	0.259
45-49	4.260***	0.282	4.232***	0.281	3.791***	0.257	3.769***	0.257
Wealth Indicator	-0.021	0.027	-0.014	0.027	0.010	0.024	0.016	0.024
Age at marriage	-0.136**	0.004	-0.135***	0.004	-0.119***	0.004	-0.119***	0.004
Postnuptial Residence (ref = Neolocal)								
Uxorilocal	-0.046	0.042	-0.030	0.088	-0.064^	0.039	-0.082	0.081
Virilocal	0.123**	0.047	0.520***	0.097	0.110*	0.043	0.420***	0.089
Postnuptial Res * Region								

Uxorilocal * Java	-0.012	0.103	0.022	0.095
Uxorilocal * Bali	-0.327^	0.197	-0.158	0.181
Uxorilocal * Kalimantan	0.175	0.206	0.167	0.190
Uxorilocal * Sulawesi	0.101	0.195	0.166	0.179
Virilocal * Java	-0.529***	0.116	-0.419***	0.107
Virilocal * Bali	-0.650***	0.154	-0.517***	0.141
Virilocal * Kalimantan	-0.432^	0.254	-0.415^	0.235
Virilocal * Sulawesi	-0.024	0.246	0.160	0.227