Bride Price and the Returns to Education for Women*

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Abstract

Traditional cultural practices can play an important role in development, but can also inspire condemnation. The custom of bride price, prevalent throughout sub-Saharan Africa and in parts of Asia as a payment of the groom to the family of the bride, is one example. In this paper, we show a surprising economic consequence of this practice. We revisit one of the best-studied historical development projects, the INPRES school construction program in Indonesia, and show that previously found small effects on female enrollment mask heterogeneity by bride price tradition. Ethnic groups that traditionally engage in bride price payments at marriage increased female enrollment in response to the program. Within these ethnic groups, higher female education at marriage is associated with a higher bride price payment received, providing a greater incentive for parents to invest in girls' education and take advantage of the increased supply of schools. For those girls belonging to ethnic groups that do not practice bride price, we see no increase in education following school construction. We replicate these same findings in Zambia, where we exploit a similar school expansion program that took place in the early 2000s. While there may be significant downsides to a bride price tradition, our results suggest that any change to this cultural custom should likely be considered alongside additional policies to promote female education.

1 Introduction

It has become increasingly recognized that cultural norms play an important role in economic development. We have, however, a much less clear understanding of what traditional cultural practices imply for development policy and whether the efficacy of development policies depends

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on the cultural traits of societies. Development policies generally have not been tailored to the particular cultural characteristics of a society. Increasingly, there has been recognition that this one-size-fits-all strategy may not always work (World Bank, 2015).

Our analysis looks at a particular cultural norm – the bride price, which is a transfer made at the time of marriage from the groom to the bride's family. This cultural practice was (and is) prevalent in many parts of the world, including Asia and sub-Saharan Africa. More recently, the practice has come under attack, receiving condemnation as a repugnant and harmful practice, and leading to calls for its abolishment (Wendo, 2004; Mujuzi, 2010).[1] In this paper, we examine how, in some contexts, the impacts of development policies aimed at increasing education depend critically on this cultural practice. Looking at Indonesia in the 1970s and Zambia in the 2000s, we find that their school-building programs were only successful at increasing the education of girls of ethnic groups that engage in this form of marriage payment. Thus, our findings show that bride price customs are a critical determinant of the success of such programs.

Our empirical analysis begins by revisiting one of the best studied historical development projects, the Sekolah Dasar INPRES school building program of the 1970s in Indonesia, where 61,807 primary schools were constructed from 1974-1980. The seminal paper looking at the impacts of this project examines a sample of males only, which is in line with its objective of estimating the effect of education on wages (Duflo, 2001). In contrast, we examine the impacts of the program on girls' schooling. We first confirm that there appears to be no effect on female education, consistent with the small effects found in Breierova and Duflo (2002). We then document that this average effect masks important heterogeneity that depends on a group's marriage customs. A positive impact of the program on female education is only observed among girls from ethnic groups that traditionally engage in monetary bride price payments at marriage. Our empirical analysis shows that these findings are not driven by other cultural factors that may be correlated with bride price, like women's role in agricultural production and matrilocality.

We verify the findings by studying a similar school expansion program that took place in Zambia in the late 1990s and early 2000s, exploiting newly-collected data from the Zambian Ministry of Education. Zambia, like Indonesia, has societies that engage in bride price payments and others that do not. In Zambia, we observe the same patterns in the data. The school expansions had a substantially larger impact on female education among ethnic groups that engage in bride price payments at marriage.

We then turn to auxiliary analyses to investigate the mechanisms that underlie the effect that

[1]The custom fits several core reasons why monetizing transactions involving human beings is seen as repugnant. Roth (2007) categorizes concerns about monetization into three classes: (1) concerns that putting a price on things moves them into a category of impersonal objects; (2) concerns that offering substantial monetary payments might cause individuals to engage in transactions they would not engage in otherwise, leaving them open to exploitation; and (3) concerns that monetizing certain transactions, while not themselves morally repugnant, could lead to a slippery slope of more repugnant transactions. The first two categories are particularly well-represented in the debate on bride prices (Hague et al., 2011; Mangena and Ndlovu, 2013).

bride price has on female educational investments in response to the large-scale school construction programs. We show that among ethnic groups that practice bride price, the amount that the bride's family receives as a bride price payment increases with the level of education of the bride. Completing primary school is associated with a 100% increase in the bride price payment, completing junior secondary is associated with a further 40% increase, and completing college with another 100% increase. These relationships are very robust and remain strong even when conditioning on a large set of observable characteristics, including the groom's education.

The positive association between female education and bride price payments suggests two possible explanations for the greater impacts of school construction among bride price ethnic groups. One explanation is that groups that engaged in bride price payments at marriage were more likely to take advantage of the increased supply of schools by sending their girls to school because the returns to doing so were higher. Where bride price was practiced, increased investments in education by parents meant an increase in the amount of bride price received by parents at marriage. For societies that do not pay a bride price at marriage, or societies that pay a symbolic (or "token") bride price, this additional return to parents in investments in their daughters' education does not exist.

This mechanism will be particularly important if daughters cannot credibly commit to paying back their parents *ex post* for educational investments made *ex ante*. The bride price provides a shorter-term and more certain monetary benefit to educating daughters, which helps overcome the challenge of incomplete contracting (Gale and Scholz, 1994).[2] Indeed, anthropologists have interpreted the cultural institution of bride price as a compensation to the parents for the years of investment in their daughter, the returns of which the parents themselves are unable to reap.[3] Bau (2014) examines a similar channel and shows that in societies where daughters live with their family after marriage, rather than with the husband's family, investment in daughters' education is higher. This is consistent with parents being able to recoup a greater return on investments in their daughter when they live with her after marriage.

A second, but related, channel through which bride price could influence parental investments in daughters is in its ability to function, like other prices in the economy, as an aggregator and transmitter of information that guides economic decisions – in this case, investments in human capital (Hayek, 1945).[4] If parents are uncertain about the returns to education for women, the

[2]The problem is summarized by Gary Becker's words in his Nobel lecture: "Both the children and parents would be better off if the parents agreed to invest more in the children in return for a commitment by the children to care for them when they need help. But how can such a commitment be enforced? Economists and lawyers usually recommend a written contract to ensure commitment, but it is absurd to contemplate that a society will enforce contracts between adults and ten-year-olds or teenagers" (Becker, 1993).

[3]The Tswana describe the bride-price as expressing gratitude to the bride's parents for the great concern devoted to the upbringing and education of their daughter, and to their great kindness in giving her to the groom in marriage (Schapera, 1938, pp. 138–139).

[4]As is well-known, for price to function as an aggregator, it requires very little information to be known by each individual: "The most significant fact about this system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action. In abbreviated form,

elasticity of bride price with respect to education may serve as valuable information about the returns to education. This is particularly likely in rural areas, where traditional marriage payments are common, but information about urban or formal-sector wages is difficult to observe.

These two channels may also interact. Bride price may be particularly effective at increasing female education because it simultaneously affects two margins: the precision of information about the returns to investments in daughters' education, and the ability of parents to obtain a larger portion of these returns to educational investments.

To capture how these channel lead different ethnic groups to respond differently to education policy, we develop a simple model in which bride price rewards parental investment in a daughter's education. For this reason, girls from ethnic groups that engage in bride price payments are more likely to be educated. We derive a simple sufficient condition on the distribution of a daughter's returns to education under which we expect bride price ethnicities to also exhibit greater response to a school construction program: when enrollment rates are low and returns to education are single-peaked, ethnic groups with higher baseline enrollment also have higher responsiveness to a school construction programs.

This paper builds on and advance the literature that identifies real economic effects of cultural norms (e.g. Algan and Cahuc, 2010). We show that important large-scale development policies can have very different effects on groups depending on the cultural institution of bride price.

Our findings also contribute to a better understanding of the economics of marriage payments. While dowries have received a considerable amount of attention in the economics literature (Botticini, 1999; Botticini and Siow, 2003; Anderson, 2003, 2007b), bride price payments have been the subject of fewer studies, despite the fact that the practice is relatively widespread (Anderson, 2007a). By exploring the link between bride price and parental investment in daughters in both Indonesia and Zambia, this paper also adds to the literature on the relationship between marriage practices (in particular, virilocality and polygny) and investments in daughters in South-East Asia (Levine and Kevane, 2003) and in Sub-Saharan Africa (Jacoby, 1995; Tertilt, 2005, 2006; Gaspart and Platteau, 2010).

While there may be significant downsides to this cultural practice, particularly if it justifies abuse or lowers the status of women within marriage (Bishai and Grossbard, 2010), our results on the benefits of bride price payments suggest that abolishing or discouraging these payments should likely be considered alongside additional policies to promote female education.

The remainder of the paper is structured as follows. Section 2 discusses the institutional context of bride price in Indonesia and Zambia. Section 3 presents a simple model of the relationship between bride price customs and the impact of education policy. Section 4 examines various datasets

by a kind of symbol, only the most essential information is passed on and passed on only to those concerned. It is more than a metaphor to describe the price system as a kind of machinery for registering change, or a system of telecommunications which enables individual producers to watch merely the movement of a few pointers, as an engineer might watch the hands of a few dials, in order to adjust their activities to changes of which they may never know more than is reflected in the price movement." (Hayek, 1945, p. 526).

from Indonesia. Section 5 replicates the same findings for Zambia. Section 6 concludes.

2 Institutional Context

Bride price is a widespread custom throughout sub-Saharan Africa and many parts of Asia, with significant heterogeneity in how it is practiced and interpreted both within and across countries. Vroklage (1952) writes in detail on the practice of bride price in Indonesia, describing it as

> "a compensation for the expense, the care and trouble spent on the bride's upbringing. [...] It is compensation for the complete loss of a worker as a bride withdraws from her own kindred and henceforth belongs to her husband's."

He adds that the bride price is also a compensation payment for the bride's future children, who will no longer belong to her parents' family.[5] Islam is not mentioned as a potential influence of this custom. The Koran calls for bride price, which is offered to the bride and functions as divorce insurance (Kressel et al., 1977). In contrast, bride price in Indonesia is paid to the bride's parents and is linked to "adat" (traditional culture which predates conversion to Islam) rather than religion. Thus, while in Indonesia both bride price and Islam are common, Indonesian bride price customs do not stem from Islamic bride price customs.

As in much of sub-Saharan Africa, bride price (known as *lobola*) is widespread in contemporary Zambia. In the data from the Zambia Fertility Preferences Survey (ZFPS, see Appendix B for a description of the data) in peri-urban Lusaka, bride price was paid in 85 percent of marriages. Bride price amounts and customs vary significantly between tribes. Our focus groups and qualitative interviews suggest that some of the variation in bride price across tribes is driven by the unit of negotiation.[6]

A lively public debate has ensued over the past decades, particularly in Africa, on the downsides of the bride price custom. The objections arise due to the commodification of human beings through

[5] In his qualitative research, the idea that bride price is equivalent to purchasing a woman is roundly rejected. Interviewees told him, "a bride is not a buffalo" and "a bride is not an animal." Thus, he suggests that patrilineality (when the bride's children trace their lineage through their father) is naturally associated with bride price. While he does mention that there are groups that practice matrilocality (the bride and her husband live with the bride's family after marriage) in which bride price is paid to the bride's parents, he observes that these customs likely originated in patrilocal societies and were then imitated by matrilocal societies. Matrilocality, which reduces the cost of monitoring and sharing goods with daughters, may also incentivize parents to invest in daughters by increasing the proportion of the returns on their investments they expect to capture. Consistent with this hypothesis, Bau (2014) finds that matrilocality is associated with greater educational investment in daughters relative to sons.

[6] For example, the Tonga people historically negotiated bride price in terms of cows and continue to negotiate in terms of cows to this day. Since cows have grown in value, Tonga bride prices are now thought to be relatively high. In his book *Traditional Marriages in Zambia: A Cultural History*, Chondoka (1988) writes that in areas where cattle were traditionally kept, marriage payments were negotiated in cattle, while in other areas they were negotiated in terms of small valuable items such as iron tools, beads, grain, bark, cloth, animal skins, and money. In Zambia, bride price also functions as a legal proof of marriage, and some churches do not consider a couple married until bride price is paid in full. Therefore, bride price is also important for inheritance and determining the lineage of any children of the marriage since, if a husband dies, it allows a wife to prove in court that they were officially married. Chondoka (1988) writes that traditionally, "marriages were all legalized on delivery of the 'main' payments" (p. 158).

a transaction, potentially leading to ill-treatment. Parents may have an incentive to "sell" their daughters early for bride price, and women may feel that they cannot leave a marriage because it would mean their parents would have to return the bride price. In Indonesia, where discussion of the downsides of bride price is less prevalent than in parts of Africa, concerns have been raised about women continually needing to "earn" their bride price through obedience to their husbands (Sitompul, 2009). This issue appears in much starker terms within policy debates on Africa: women's rights group Mifumi in Uganda reports cases where men say "I am beating my cows" when they hit their wives, or women are denied ownership of property, and it is noted that women may be expected to be sexually available to their husbands at any time and without protection (Eryenyu, 2014). One housewife in Tanzania described what often happens when bride price is paid, saying, "Unfortunately, this is overdone by some people who end up regarding a woman as mere property." (News, ed, 2006). Citing such stories, many activists have called for the abolishment of bride price. This abolition is perceived to be critical to promoting greater educational investment in young girls, whose parents may otherwise be tempted to marry their daughters off early (Mutebi, 2014).[7]

At the same time, many have argued that bride price is a positive tradition of appreciation for women (Mugisha, 2008) that actually creates incentives to educate girls. From the same policy debate in Uganda are the voices of fathers who share their experiences of bride price negotiations, arguing that "education of the girl child should be emphasized in order to improve the family's bargaining power in so far as bride price is concerned" (Muthegheki et al., 2012). Extended focus groups run by our research team in Zambia also suggest that bride price amounts grow in education expenditures: one respondent told us that when a parent negotiates *lobola*, he or she calculates how much was spent on education. Parents perceive bride price as a future income stream arising from investment in the girl-child, and view it as a substitute for old age support. For example, one of our respondents told us, "A girl child is business and we all need money" and "For girl children you benefit from charging while with boys support comes from them when you are old." Bride-price negotiators know what factors increase price amounts. As one described in a focus group: "*lobola* is up with level of education because the family knows that the husband and his household will be beneficiaries." The positive relationship between education and bride price in Indonesia is also popularly discussed, including in media articles that encourage future brides to know how much their individual bride-price increases with their education (Tang, 2014).

Our empirical strategy exploits variation in bride price customs across ethnic group as classified by the *Ethnographic Atlas* (Murdock, 1957). The atlas provides clear definitions of these

[7] An alternative to banning bride price is putting limitations on the practice, such as banning refunds or limiting the amount that can be paid. Kenya's most recent set of marriage laws stipulates that a token bride price must be counted as sufficient to meet the needs of the custom (Dudley, 2014). The Zambian government has similarly spoken out to discourage families from requesting exorbitant amounts for their daughters, but this is not written into law and neither country defines what may be counted as token or exorbitant (Voice, ed, 2014). The local government in Laikipia County, Kenya has instituted a program to give cows to parents whose daughters graduate from high school.

categories: bride price marriages are "marriages normally involving a material consideration of which the principal element is a substantial property payment by the groom or his relatives to the kinsmen of the bride;" token bride price marriages are "marriages normally involving only a small or symbolic bride-price as a consideration;" bride service marriages are "marriages normally involving a substantial material consideration of which the principal element consists of labor or other service rendered by the groom to the bride's kinsmen;" gift exchange denotes "marriages normally involving a reciprocal exchange of gifts of substantial amount between the relatives of the bride and groom or entailing a continuing exchange of goods and services in approximately equal amounts between the groom or his kinsmen and the brides relatives;" and exchange of sister or female relatives involves "marriages normally involving a consideration in the form of a sister or other female relative of the groom given in exchange for the bride." Worldwide, out of the 1,265 ethnic groups in the *Ethnographic Atlas*, 646 ethnic groups traditionally engage in bride price payments (table 1).

To examine the extent to which bride price is related to other norms worldwide, we regress an indicator variable for whether a society has a token bride price norm on indicator variables for matrilocality, plow use, female dominant agriculture, and polygamy in the global sample of ethnicities from the *Ethnographic Atlas* in separate regressions. To ensure that correlations are not driven by the difference between Africa and the rest of the world, we control for regional fixed effects. Table 2 presents the results of these regressions. Exempting ethnicities who practice dowry reduces some of these coefficients in magnitude, but has little effect on the correlations, since only 2.7 percent of the ethnicities in the *Ethnographic Atlas* practice dowry (table 1).

Because the female agriculture variable in the *Ethnographic Atlas* contains additional information about relative female involvement in agriculture, we also run an ordered logit of this variable on bride price, controlling for the area fixed effects and excluding ethnicities who are not involved in agriculture.[8] The coefficient from this ordered logit is .631 ($p < .01$), indicating that globally, bride price is associated with greater female involvement in agriculture, although this does not appear to be the case *within* the countries we study, as we will show below.

3 Model

We present here a simple model of parental education decisions that intends to capture the impact of bride price customs on educational outcomes. In this basic framework, bride price payments reward parental investments in their daughters' human capital. When parents are altruistic, they may invest in the education of their daughter as long as she receives a return from it. However, if the daughter cannot commit to repaying them for the sunk investment, parents do not undertake the same investment that the daughter finds optimal. Bride price helps to overcome this

[8]The *Atlas* provides the following classification: 1= males only, 2=males more than females, 3=differentiated but equal, 4=equal, undifferentiated, 5=females more than males, 6=females only.

intergenerational incomplete contracting problem by ensuring a medium-term monetary return to the parents.

There are two simple but important predictions from this model. The first is that even a small amount of bride price can lead to higher education rates as long as there are households on the margin of making that educational investment. The second prediction is that, without strong assumptions on the nature of the preferences or of the savings technology, bride price has an ambiguous impact on the effects of education policy. However, we show that under mild assumptions on the distribution of the returns to education, we expect that reducing the cost of schooling has a larger effect on the enrollment rates of ethnicities that engage in bride price payments when enrollment rates are low, as we might expect in a developing country.

3.1 Setup

Parents live for two periods and receive utility from consumption c_t and through the well-being of their daughter V^d via an altruism parameter $\gamma \in (0,1)$. Daughters are characterized by ability a_i, which is distributed according to a probability density function $f(\ )$ and a cumulative distribution function $F(\ )$.

The utility of the daughter $V^d(a_i, E)$ depends on her ability a_i and her educational attainment E. Define $\Delta V(a_i) = V^d(a_i, 1) - V^d(a_i, 0)$ to be the returns to education for a daughter of ability a_i. $\Delta V(\ )$ is a strictly increasing function. These returns are distributed with a probability density function $g(\ )$, which is a monotone transformation of $f(\ )$, and cumulative distribution function $G(\ )$. The returns do not depend on the bride price custom and are meant to capture both labor market and marriage market returns that are enjoyed by a woman of ability a_i if she is educated.

In the first period, parents decide how much to consume (c_1) and whether or not to educate their daughter ($E \in \{0,1\}$) at the cost f_E. In the second period, they only decide how much to consume (c_2) and they receive a bride price payment (if they belong to an ethnicity that engages in this practice). Bride price amounts depend on a woman's ability and on her educational attainment:

$$BP(a_i, E) = h(a_i) + \pi E.$$

Assumption 1. *Bride price amounts are increasing in a woman's educational attainment:* $\pi > 0$.

Household i solves the following problem:

$$\begin{aligned} max_{E\in\{0,1\},c\geq 0} \quad & c_1 + \beta c_2 + \gamma V^d(a_i, E) \\ s.t. & \\ & c_1 + f_E \cdot E \leq y_1 \\ & c_2 \leq y_2 + BP(a_i, E) \end{aligned} \tag{1}$$

Note that there is no borrowing nor saving. We assume that $y_1 > f_E$, i.e. that the household does not need to borrow to finance the education of the daughter.

3.2 Bride price and education decision

Substituting the budget constraints in the objective function, we have that a household educates the daughter ($E_i = 1$) whenever

$$-f_E + \beta\pi + \gamma\Delta V(a_i) \geq 0.$$

The household that is on the margin between making the educational investment or not, depending on the bride price custom BP and on the cost of education f_E, has returns to education for the daughter equal to

$$\Delta V_*(BP, f_E) = \frac{f_E - \beta\pi}{\gamma}.$$

Define as $a_*(BP, f_E)$ the corresponding ability level obtained by inverting function $\Delta V(\ )$: $\Delta V_*(BP, f_E) = \Delta V(a_*(BP, f_E))$.

Household i makes the educational investment as long as the returns for the daughter are higher than the ones of the marginal household ($\Delta V(a_i) \geq \Delta V_*(BP, f_E)$). Hence, the probability that household i educates the daughter is:

$$P(E_i = 1|BP, f_E) = P(\Delta V(a_i) \geq \Delta V_*(BP, f_E)) = 1 - G(\Delta V_*(BP, f_E)).$$

Proposition 1. *The probability of education $P(E_i = 1)$ is:*
(i) decreasing in the cost of education;
(ii) higher among ethnicities that engage in bride price payments.

Proof. See Appendix A. □

Proposition 1 simply tells us that we should observe higher rates of enrollment among ethnicities that practice bride price ($BP > 0$ and $\pi > 0$). This result is intuitive: bride price provides an additional incentive for parents to educate their daughter, in addition to altruism. Higher enrollment rates among bride price ethnicities imply, in this setting, that girls of relatively lower ability would get educated in bride price ethnicities, because the bride price premium justifies the education investment of the parents.

Proposition 2. *The average ability of educated girls is higher among ethnicities that do not engage in bride price payments relative to ethnicities that do.*

Proof. See Appendix A. □

It is worth noting that, as long as both the returns to education $\Delta V(a_i)$ and bride price payments $h(a_i) + \pi E$ are increasing in ability a_i, bride price amounts are higher for educated women whether or not $\pi > 0$. If more able women are more likely to be educated and to receive high bride price, hedonic regressions of bride price payments do not have a causal interpretation, as mincerian regressions do not typically identify the labor market returns to education (Griliches, 1977; Card, 1994; Heckman et al., 2006).

3.3 Bride price and education policy

We now examine how a change in the cost of education f_E affects the probability of education depending on the bride price custom, in particular on whether $\pi > 0$ or $BP = 0$. For this analysis, we make an additional simplifying assumption.

Assumption 2. *The distribution of daughters' returns to education is single peaked.*

For example, a normal or a log-normal distribution are both unimodal distributions that satisfy this assumption.

Definition 1. *Education rates are low if a girl with modal returns does not get educated.*

The above definition is somewhat loose because, if the distribution of returns is skewed to the right, the definition applies to cases in which education rates are in fact well above 50%. When the single-peaked probability distribution is symmetric (e.g. a normal distribution), definition 1 becomes more intuitive and translates into education rates that are below 50%, since mode and median then correspond.

Proposition 3. *A drop in the cost of education increases the probability of education more in ethnicities that engage in bride price payments compared to other ethnicities, if education rates are low.*

Proof. See Appendix A. □

Proposition 3 tells us that, in settings with low rates of schooling, we should observe that ethnicities which engage in bride price payments will be more responsive to changes in the cost of education. On the contrary, we should expect bride price to have the opposite effect when education rates are already high.[9]

Figure 1 provides a simple intuition for this result: when the density of the returns to education is decreasing, a decline in the cost of schooling affects the group with higher schooling rates (bride

[9]This argument is related to one put forth by Fabinger and Weyl (2013), who show that a unimodal distribution of consumer valuations leads to S-shaped demand functions. Then, the elasticity of demand with respect to a price change depends on whether such a change occurs in a part of the demand curve that is concave or convex. Becker et al. (2010) use a similar argument to explain why women's education rates have overtaken those of men in developed countries.

price ethnicities, in our case) more because this group has higher density on the margin of the educational investment.

Intuitively, in a society where few women are educated, the ones who are must have very high returns from education. The unimodal assumption guarantees, loosely, that there are only a few women with very high or very low returns, relative to the number of women with modal returns. A marginal decrease in the cost of education leads women whose returns to education were previously marginally below the cost of education to become educated. If women in bride price ethnicities need slightly lower returns in order to get educated relative to women in non-bride-price ethnicities, there will be more women on the margin of responding to the policy change in bride price ethnicities since their returns are closer to the modal returns. In contrast, in a society where most women are educated, the ones who are not must have very low returns. If women in bride price ethnicities need to have even lower returns in order to not get educated relative to women in non-bride price ethnicities, fewer of them will be on the margin of responding to the policy change.

4 Evidence from Indonesia

We begin our empirical analysis by examining data from Indonesia, where bride price payments are widespread. Our first goal is to establish whether development policy has differential effects based on these cultural practices. To do so, we exploit the same quasi-experimental variation in number of schools built by birth district in Indonesia as in Duflo (2001) and study the differentials effect of school construction policy on schooling by bride price custom.

To investigate the channels by which bride price might influence the impact of education policy, we use bride price information from the Indonesia Family Life Survey (IFLS) of 2000 and 2007 and the Indonesia Intercensal Survey of 1995 to study the association between the bride's education and bride price value, which is one of the hypotheses of our model. We also document that the custom of bride price is associated with higher rates of female schooling.

In both datasets, we link individuals to bride price customs through their ethnicity. The 2007 IFLS contains information on 28 ethnicities. The 1995 Indonesia Intercensal Survey contains finer language information, reporting 174 different languages spoken. We manually match these languages or ethnic groups in the surveys to the ethnic groups in the *Ethnographic Atlas*.[10]

Table 3 presents the distribution of cultural practices for the final 28 ethnic groups in the 1995 Intercensal Survey. Of these groups, 13 have bride price, 2 have bride service, 2 have token bride price, and 3 have gift exchange, 4 have sister or relative exchange, and 4 have nothing.

[10]Since the categories in the *Ethnographic Atlas* are less fine than those in the survey data, the concordance matches multiple ethnic groups in the census to a single ethnic group in the *Ethnographic Atlas*, and not all ethnic groups can be matched. For instance, 6 ethnicities in the IFLS cannot be matched to the *Ethnographic Atlas*, comprising 5.6 percent of the sample of recently married couples who were asked questions about their bride price payments and had a recorded ethnicity. Similarly, 11 languages in the Indonesia Intercensal survey could not be matched to the *Ethnographic Atlas*, making up 0.43 percent of the data for which a non-missing mother tongue was listed.

Bride price payments are important in contemporary Indonesia. Figure 3 graphs the distribution of bride price payments for ethnicities that traditionally make payments at marriage using rounds 3 and 4 of the Indonesia Family Life Survey, while figure 4 graphs the distribution for all non-zero bride price payments (including ethnicities that pay token bride price). In 2000, 87 percent of marriages reported to the IFLS had a dowry or bride price and in 2007, 85 percent of marriages included a dowry or bride price.[11] Table 9 reports summary statistics for bride price marriages for rounds 3 and 4 of the Indonesia Family Life Survey.

We find that across all marriages (i.e., in the full IFLS sample), the median bride price is 5 percent of GDP per capita and the mean bride price is 35 percent of GDP per capita. Moreover, if we restrict the sample to ethnicities that we identify as having a bride price custom, the median bride price is 13 percent of GDP per capita and the mean is 57 percent.[12] Therefore, bride price payments are significant, particularly compared to a family's annual income.

4.1 Bride price and school construction policy

We consider the impacts of Indonesia's massive school construction program of the 1970s. In 1973, the Indonesian government launched a large-scale school construction program called the Sekolah Dasar INPRES program. Over the course of the next five years, 61,800 primary schools were constructed, leading to an increase in enrollment rates of children aged 7 to 12–from 69 percent in 1973 to 83 percent in 1978 (Duflo, 2001). This was equivalent to adding an average of 2 schools per 1,000 children enrolled in 1971. Duflo (2001) shows that the program causally increased years of schooling completed by male students by 0.27 years and that controlling for a concurrent program which improved sanitation and water allocation only strengthened this result.

First consider the baseline equation from Duflo (2001):

$$y_{idk} = \alpha_k + \alpha_d + \beta_1 I_k^{Post} \times Intensity_d + \sum_j \mathbf{X}'_d \mathbf{I}_k^j \mathbf{\Gamma}_j + \varepsilon_{idk} \tag{2}$$

where i indexes individuals, d district of birth, and k year of birth. y_{idk} is the dependent variable of interest, an indicator variable that equals 1 if individual i finished primary schooling. α_k and α_d denote cohort (i.e., birth-year) fixed effects and district fixed effects. I_k^{Post} is an indicator variable equal to 1 if an individual belongs to a cohort born between 1968 and 1972 (so that they would have fully experienced the intervention). The untreated cohort is born between 1950 and 1962

[11] The IFLS asks about dowry and bride price together and does not distinguish between the two. However, according to the IFLS documentation the marriage custom is typically bride price except for marriages among the matrilocal Minangkabau, who we omit from the analysis (RAND, 1999).

[12] We see little evidence of bride price inflation or deflation over time. Marriage year is negatively correlated with bride price, but this correlation is entirely driven by marriages that are reported to have occurred before 1980 (which make up 7 percent of the bride price ethnicity data), and these respondents had to recall bride prices from at least 20 years ago when they responded to the survey.

(and were already out of school by the time of the intervention). As in the baseline specification of Duflo (2001), partial treatment cohorts are dropped from the analysis. $Intensity_d$ is the number of schools (per 1,000 school- age children) built in birth district d during the school construction program. I_k^j is an indicator variable that equals 1 if individual i's year of birth is equal to j and 0 otherwise, and $\sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j$ denotes cohort fixed effects interacted with the following district-level covariates: the number of school-aged children in the district in 1971 before the school building program took place, the enrollment rate of the district in 1971, and the exposure of the district to the second largest INPRES program, a water and sanitation program.

Estimates of equation (2) are reported in Table 6. The dependent variable is an indicator variable that equals one if the individual completed primary school, and zero otherwise. Column 1 reports estimates for the males only, which is the sample used by Duflo (2001). Column 2 reports estimates for the sample of females only. As shown, while one estimates strong effects of the treatment for the sample of males, the estimated effects are much weaker, and not different from zero, when examining the female sample.

We now show that these modest impacts mask significant heterogeneity, consistently with Proposition 3. To do this, we estimate an extension of equation (2) that allows for a differential impact of the school construction program depending on whether an ethnic group practices the tradition of bride price payments:

$$\begin{aligned} y_{iedk} \;=\; & \beta_1 I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice} + \beta_2 I_k^{Post} \times Intensity_d \times I_e^{BridePrice} \\ & + \alpha_k I_e^{NoBridePrice} + \alpha_k I_e^{BridePrice} + \alpha_e + \alpha_e I_k^{Post} + \alpha_e Intensity_d + \alpha_d I_e^{NoBridePrice} \\ & + \alpha_d I_e^{BridePrice} + I_e^{NoBridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j + I_e^{BridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Upsilon}_j + \varepsilon_{iedk} \end{aligned} \tag{3}$$

where all indices and variables are defined as before. Additionally, e indexes the ethnicity of individual i and $I_e^{BridePrice}$ is an indicator variable equal to 1 if ethnic group e traditionally makes non-token bride price payments at the time of marriage, and $I_e^{NoBridePrice}$ is an indicator that equals one if the group does not. The inclusion of $I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$ and $I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$ allows us to estimate the impact of school construction separately for ethnic groups that undertake bride price payments at marriage and those that do not. Thus, β_1 and β_2 are our coefficients of interest.

The specification includes district fixed effects, but now allows the district fixed effects to vary depending on bride price customs of the ethnic group: $\alpha_d I_e^{NoBridePrice}$ and $\alpha_d I_e^{BridePrice}$ as well. These absorb the double interaction components, $Intensity_d \times I_e^{NoBridePrice}$ and $Intensity_d \times I_e^{BridePrice}$, of the triple interaction terms. We also interact the ethnicity fixed effects with the post-treatment indicator variable, $\alpha_e I_k^{Post}$. These absorb the double interaction terms $I_k^{Post} \times I_e^{NoBridePrice}$ and $I_k^{Post} \times I_e^{NoBridePrice}$. Lastly, we allow the impacts of our baseline set of district-level covariates interacted with cohort fixed effects to vary depending on whether ethnicity e prac-

tices bride price. We therefore control for the following interactions: $I_e^{NoBridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j$ and $I_e^{BridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j$.

The estimates of equation (3) are reported in column 3 of table 6. As shown, we find a significant differential effect of the school construction program on elementary school completion rates. For ethnic groups without bride price, school construction had no impact. For ethnic groups that practice bride price, it had a positive and significant effect. The point estimates suggest that an increase of 1 school per 1,000 school-aged children in a district increases the likelihood that a female from a bride price ethnicity will complete primary school by 2.4 percentage points. We confirm this finding by estimating equation (3) separately for girls belonging to ethnic groups with bride price (column 4) and for ethnic groups without bride price (column 5).

As a placebo test, we repeat the school construction analyses using the children aged 12–17 at the time of the school construction as the treated cohort. The placebo untreated cohort is the cohort aged 18-24. Table 7 shows that there are no significant effects on this untreated cohort.

Because the school construction program built elementary schools, we focus our analysis on the elementary school completion rates. Examining years of schooling, we find similar but less precise results. In addition, we confirm our findings from the 1995 Indonesian Intercensal Survey using data from the 2010 Indonesian Census, which reports elementary school completion, but not educational attainment. One benefit of the 2010 data over the 1995 data is a sample size that is over 1.7 million observations larger. The estimates, which are reported in table 8, show results that are qualitatively similar to the estimates using the 1995 data.

Our results suggest that the school construction program had different effects for females who belonged to bride price and non-bride price ethnicities. Since bride price norms may be correlated with other social norms that are related to gender outcomes, we further investigate whether our results are robust to controlling for the triple interactions between two other important ethnic norms – female agriculture and matrilocality – with $Intensity_d$ and I_k^{post}. We choose these norms in particular since both may be related to greater investment in females. Boserup (1970) hypothesized that female agriculture is related to bride price and Giuliano (2014) shows that this prediction is true across all the ethnicities in the *Ethnographic Atlas*. Moreover, Alesina et al. (2013) show that use of the plow, which discourages female participation in agriculture, is related to greater gender bias. Similarly, Bau (2014) hypothesizes that matrilocality incentivizes parents to invest in daughters and provides evidence that matrilocal females receive more education relative to their brothers. Since information on these norms is missing for some tribes in the *Ethnographic Atlas*, we code missing values as 0 and also include triple interactions for missing female agriculture and missing matrilocality information. Table A1 reports the results of these regressions. The coefficients on the bride price and non-bride price interactions are virtually unchanged.

4.2 Bride price amounts and educational attainment

We next turn to an examination of the specific mechanisms underlying the concentrated benefit of the school construction program among ethnic groups that practice bride price. To do this, we begin by examining the spouses' characteristics that are correlated with the amount of the bride price paid at the time of marriage, to examine the plausibility of assumption 1. We do so by analyzing cross-sectional variation from two rounds of the Indonesia Family Life Survey (2000 and 2007). Table 9 provides summary statistics from rounds 3 and 4 of the Indonesia Family Life Survey.

We first estimate the following hedonic regression:

$$\begin{aligned} \ln BridePrice_{iet} &= \alpha_t + \beta_1 I(PrimarySchool)_i + \beta_2 I(Junior\ Secondary)_i + \beta_3 I(College)_i \\ &\quad + \alpha_t + \phi_{it} + \varepsilon_{iet} \end{aligned} \tag{4}$$

where i indexes married women, e ethnic groups, and t the survey year (2000 or 2007). $BridePrice_{iet}$ is the reported amount of the bride price paid at the time of marriage. $I(PrimarySchool)_i$ is an indicator variable that equals one if individual i has completed primary school and attended junior secondary school, $I(Junior\ Secondary)_i$ is an indicator variable equal to 1 if an individual has completed junior secondary school and attended upper secondary school, and $I(College)_i$ is an indicator for having attended college. α_t is a survey-year fixed effect and ϕ_{it} is a marriage year fixed effect.

In additional regressions, we include either ethnicity effects or an indicator variable for belonging to a bride price ethnicity, as well as controls for a female's age at the time of marriage. In some regressions, we also include the following potentially endogenous covariates that are specific to a woman's marriage market outcomes: controls for her husband's education and her husband's age at the time of marriage.

Estimates of equation (4) are reported in table 10. Column 1 reports the returns to different education levels controlling only survey-year and marriage year fixed effects. Column 2 adds marriage age controls and column 3 includes a control for belonging to a bride price ethnicity. In column 4, we include ethnicity fixed effects to capture any correlation between belonging to an ethnicity that practices higher bride price and receiving more education. The results are very similar.

The estimates show that more educational attainment by the bride is strongly associated with a higher bride price payment received at marriage. According to the estimates reported in column 4, completion of primary school is associated with a 54% increase in bride price payments (relative to no schooling), completion of junior secondary school is associated with an additional 62% increase in bride price payments, and completion of upper secondary schooling and attendance of college is associated with an additional 89% increase. According to the estimates, parents of women who attended college, on average, receive bride price payments that are 205% higher than payments to

parents of women without completed primary education.

The remaining columns in table 10 report estimates that include husband's education, as well as husband's age (and age squared) at the time of marriage. Although the estimates in table 10 must be taken with the caveat that the additional covariates are potentially endogenous to our variables of interest, the estimated effects of a bride's educational attainment are consistent with the estimates from the first four columns of the table. The potentially-endogenous variables absorb part of the effect of education on bride price amount, but the relationship between a bride's educational attainment and bride price remains large, positive, and statistically significant.

Overall, the estimates reported in table 10, while not causal, are consistent with the hypothesis that a bride's education has a very large impact on the amount of bride price that the bride's parents receive at the time of marriage.

4.3 Bride price and school enrollment

We next turn to an examination of the relationship between an ethnic group's bride price practices and female schooling, by examining variation in schooling enrollment across ethnic groups and ask whether girls are more likely to be enrolled in school in ethnic groups that engage in bride price payments at marriage, as predicted by proposition 1. In these regression, we also compare females to males to hold the unobserved characteristics of bride price ethnicities constant.

Our estimating equation is:

$$\begin{aligned} I_{ie}^{Enrolled} &= \alpha + \beta_1 I_e^{BridePrice} + \beta_2 I_e^{BridePrice} \times I_i^{Female} \\ &\quad + \beta_3 I_e^{Matrilocal} + \beta_4 I_e^{Matrilocal} \times I_i^{Female} + \beta_5 I_e^{Agriculture} + \beta_6 I_e^{Agriculture} \times I_i^{Female} \\ &\quad + \beta_7 I_i^{Female} + \beta_8 Age_i + \beta_9 Age_i^2 + \mathbf{\Gamma} \boldsymbol{X_{je}} \varepsilon_{ije}. \end{aligned} \tag{5}$$

where i indexes children aged 5–22, j indexes households, and e indexes ethnicity. The sample consists of all children from the 1995 Indonesia Intercensal Survey. The dependent variable $I_{ije}^{Enrolled}$ is an indicator variable that equals 1 if individual i from household j and ethnicity e is enrolled in school. I_i^{Female} is an indicator variable that equals 1 if individual i is female. As before, $I_e^{BridePrice}$ is an indicator variable that equals 1 if ethnicity e traditionally engages in the practice of bride price payments at marriage. The vector $\boldsymbol{X_{ije}}$ contains household-specific socioeconomic controls consisting of indicator variables for the ownership of television, car, radio, buffet, bicycle and boat, as well as controls for whether the household receives electricity, their water supply, sewage, fuel source, and whether a household lives in a rural area. The variable of interest is the interaction between the indicator for a bride price ethnicity and the individual being female $I_e^{BridePrice} \times I_i^{Female}$. The coefficient for the variable β_2 provides an estimate of the extent to which girls are more likely to be enrolled in school (relative to boys) in bride price ethnic groups relative to non-bride price groups.

An important concern is that an ethnic group's traditional marriage practices may be correlated with other ethnicity-level characteristics that also affect an ethnic group's education of girls relative to boys. Given this, we also include an indicator variable that equals 1 if an ethnic group was traditionally matrilocal $I_e^{Matrilocal}$, meaning that married couples customarily live with the bride's family rather than the groom's. As Bau (2014) shows, this custom is associated with increased female education (relative to male education). We also control for a measure of the extent to which women (relative to men) traditionally practiced agriculture, which may affect the incentives to educate daughters relative to sons. According to Boserup (1970), societies in which bride price is prevalent also tend to have more female-dominated agriculture, and Giuliano (2014) confirms this empirical association using data from Murdock's *Ethnographic Atlas*. Therefore, we include an indicator variable $I_e^{Agriculture}$ that is equal to 1 if ethnicity e is reported as traditionally having most or all agricultural work done by females in the *Ethnographic Atlas*. We also include the interaction of both variables with I_i^{Female}.

Estimates of equation (5) are reported in table 11. Columns 1 and 2 report the basic relationship between the ethnicity-level covariates (not interacted with gender) and enrollment, separately for females and males. Among females (column 1), there is a positive (though insignificant) relationship between bride price practices and enrollment in school. Among males (column 2), the positive relationship is much smaller in magnitude. This difference can be seen more clearly in column 3, which reports estimates of equation (5). Here it is shown that societies that practice bride price invest more in daughters' education (relative to sons' education) than societies that do not. This result is robust to controlling for differential effects of matrilocality and traditional participation of women in agricultural activities. Interestingly, the estimates also show that, consistent with Bau (2014), matrilocal ethnic groups educate daughters more (relative to sons). They also show that ethnic groups where women traditionally participate in agriculture also educate daughters more. This may be due to the fact that traditional female participation in agriculture is associated with increased female labor force participation today (Alesina et al., 2013), and therefore with higher returns to education.

Column 4 of table 11 reports a variant of equation (5) that include ethnicity fixed effects. Because these absorb the direct effect of $I_e^{BridePrice}$, $I_e^{Matrilocal}$, and $I_e^{Agriculture}$, these variables are no longer in the equation. We are only able to estimate the interaction between these variables and I_i^{Female} (i.e., the differential effect of these factors on the education of girls relative to boys). Column 5 reports the same specification but with finer household fixed effects in place of ethnicity fixed effects. Our result of interest remains robust. Families from ethnic groups that traditionally practice bride price payments at marriage have higher rates of female enrollment, relative to boys, than families from ethnic groups that do not.

4.4 Bride price and test scores

According to proposition 2, we should expect that bride price females should have lower academic ability on average conditional on attending school. We use self-reported test score data in rounds 3 and 4 of the IFLS to test whether this is the case for primary school students in Indonesia. We first restrict the data set to test-takers who took state exams between 1980 and 2001, during the Ebtanas exam system.[13] This sample includes 77 percent of primary-school test-takers. After normalizing total test scores to have a mean of 0 and a standard deviation of 1, we run the following regression for males and females separately:

$$total\ score_{iepst} = \beta_0 + age_{it} + \delta_{ps} + \beta_1 I_e^{BridePrice} + \beta_2 I_e^{NoBridePrice} + \epsilon_{iepst}. \quad (6)$$

Here, p denotes a province, s denotes the individual's self-reported testing year, and t denotes the IFLS survey year. Then age_{it} is an age by survey year fixed effect and δ_{ps} is a province by test year fixed effect. We include δ_{ps} since the Ebtanas was standardized at the province-level each year. We cluster standard errors at the ethnicity level. Since there are only 13 ethnicities with test score data in the IFLS, we also report confidence intervals from a wild bootstrap procedure.

Table A3 reports the estimates of these regressions. Column (1) reports the results for females, and column (2) reports them for males. Consistent with proposition 2, bride price females' test scores are 0.09 standard deviations lower than non-bride price females ($p < .05$), while there is no significant difference between the test scores of bride price and non-bride price males.

5 Evidence from Zambia

Having identified heterogeneous impacts of the 1970s Indonesian school construction project on female education, we then show that this finding is replicated in a very different context: Zambia in the late-1990s and early-2000s.

There are a number of reasons why Zambia provides the ideal setting to replicate the Indonesia finding. Like Indonesia, Zambia features a range of ethnic groups that practice bride price payments at marriage and a range of groups that do not. Also like Indonesia, Zambia had a large school construction program in the late 1990s and early 2000s. Although the school construction occurred over a longer timespan and the process of choosing the location and timing of school construction was more opaque than for Indonesia, the episode provides large-scale variation in school construction like that in Indonesia. As in Indonesia, data on bride price payments and their determinants are available in Zambia.

Within Africa, there are a number of other school expansion episodes that could potentially be used to examine the impacts of the increased provision of schooling on female education. These are

[13] Ebtanas was instituted in 1980, and it was replaced by UNAS in 2001.

available for Zimbabwe (Agüero and Bharadwaj, 2014), Sierra Leone (Cannonier and Mocan, 2012), and Nigeria (Osili and Long, 2008). However, for Sierra Leone and Nigeria, there is not sufficient variation in the practice of bride price payments across ethnic groups to undertake the necessary analysis. In both countries, the majority of people belong to an ethnic group that practices bride price payments at marriage. In Zimbabwe, sufficiently fine-grained data on individuals' ethnicities are not available from the existing data sources that could be used for the analysis.

Table 12 shows the distribution of marriage payments across the ethnic groups from the Zambian Demographic and Health Surveys (DHS). As reported, ethnic groups either practice bride price payments, token bride price, or bride service. The Zambian DHS reports 52 distinct ethnic groups for the respondents. Of the 52 ethnicities, we are able to match 48 of them to 20 related and representative groups in the *Ethnographic Atlas*. The remaining four groups are very small and they comprise less than 0.01 percent of the DHS sample.

To determine whether bride price is related to other norms that may influence female education in Zambia, we examine the relationship between the presence of a bride price norm and other gender-related norms in table 13. Many norms we expect to be related to gender preferences are homogeneous across Zambian ethnic groups. The plough is not aboriginal for *any* Zambian groups and *all* groups historically practice some form of polygamy. In contrast, matrilocality is strongly negatively correlated with bride price norms ($\rho = -0.694$, $p < 0.01$) consistent with the idea that matrilocality and bride price are substitutes. Within Zambia, there is no significant relationship between female dominance in agriculture and bride price ($\rho = -.083$), although data on gender differences in agriculture are only available for 15 of the 20 ethnic groups from the *Ethnographic Atlas*.

Since the female agriculture variable in the *Ethnographic Atlas* contains additional information about relative female involvement in agriculture, we also run an ordered logit of this variable on bride price, excluding ethnicities that are not involved in agriculture. The coefficient from this ordered logit is very close to zero and not statistically different from zero. In fact, there is little variation in female agricultural involvement in Zambia. In 11 of the 15 ethnicities for which we have data, females were traditionally "more involved" in agriculture than males. Looking at the census, 91 percent of individuals belong to an ethnic group in which females were traditionally "more involved" in agriculture than males.

5.1 Bride price and school construction policy

To examine the effect of a large school expansion program on enrollment by bride price customs, we use data provided by the Zambian Ministry of Education. Figure 6 graphs the number of schools built by year in Zambia between 1940 and 2013. Figure 7 reports the number of schools constructed by province. The data indicate that there was a large school construction boom between the mid-1990s and the early-2000s; a total of 5,649 schools were built between 1994 and 2007.

In replicating our findings from Indonesia in the Zambian context, we maintain specifications that are as similar as possible, given data availability, to the specifications we have used for Indonesia.

We begin by estimating a variant of equation (3) using a sample of children aged 5 to 12 available from the three rounds of the DHS that include ethnicity data. The earliest round is from 1996, a time period at the beginning of the school construction episode. The second round is from 2001, during the middle of the episode, and the third is from 2007, near the end of the episode. Unlike in the Indonesian setting, examined by Duflo (2001), construction in Zambia occurred over a longer period of time and the strategy for building the schools was less clear. Therefore, rather than examining variation arising from the interaction between pre-treatment and post-treatment cohorts with the spatial variation in treatment intensity, we estimate the relationship between the stock of schools in a district during a time period and the average enrollment of children aged 5 to 12 in the same district and time period in our panel setting. As before, we examine differences in the impacts of boys versus girls, and for girls, we examine differences in the ethnic groups that practice bride price and those that do not.

Our estimating equation is:

$$\begin{aligned} y_{iedkt} &= \beta_1 Schools_{dt}/Area_d \times I_e^{NoBridePrice} + \beta_2 Schools_{dt}/Area_d \times I_e^{BridePrice} \\ &\quad + \alpha_{kt} I_e^{NoBridePrice} + \alpha_{kt} I_e^{BridePrice} + \alpha_{et} + \alpha_{ed} + \varepsilon_{iedkt} \end{aligned} \tag{7}$$

where i indexes children, e ethnic groups, d districts, k age of child at the time of the survey, and t the year of the survey (1996, 2001 or 2007). Our outcome of interest is an indicator variable that equals 1 if child i is enrolled in school at the time of the survey (year t): y_{iedkt}. Our measure of school construction is given by $Schools_{dt}/Area_d$, which is the number of schools in district d and year t. As before, $I_e^{BridePrice}$ is an indicator variable that equals 1 if ethnic group e practices bride price payments at marriage, while $I_e^{NoBridePrice}$ is an indicator variable that equals 1 if the ethnic group does not.

The specification also includes age by survey year fixed effects interacted with the bride price indicator variables, $\alpha_{kt} I_e^{NoBridePrice}$ and $\alpha_{kt} I_e^{BridePrice}$. These are the equivalent of the cohort fixed effects interacted with the bride price indicator variables in equation (3). We also include ethnicity-time period fixed effects, α_{et}, and ethnicity-district fixed effects, α_{ed}, which are the equivalent of the ethnicity fixed effects interacted with the post-treatment indicator variable, and the district fixed effects interacted with the bride price indicator variables in equation (3).

Estimates of equation (7) are reported in table 15. Columns 1–3 first estimate a variant of equation (7), where we do not allow for a differential effect by bride price customs. These estimates show that a similar story emerges for Zambia as for Indonesia. Among boys and girls, there is some weak evidence that school construction increases enrollment (column 1). This effect is concentrated among boys (column 2) and the estimated impact for girls is very close to zero (column 3).

Column 4 reports the estimate of equation (7). As in Indonesia and consistently with Proposition 3, the positive impacts of school construction are concentrated among girls from ethnic groups that traditionally practice bride price payments at marriage. Columns 5 and 6 confirm this finding by estimating equation (7) separately for the two sets of ethnic groups.

Table 16 tests whether the results in table 15 could be explained by pre-trends in districts that received more schools. Table 16 duplicates the regressions in table 15, but it includes the forward lag for the treatment, $Schools_{d,t+1}/Area_d$ and its interactions with $I_e^{BridePrice}$ and $I_e^{NoBridePrice}$. None of the forward lags positively predict enrollment. In fact, the negative coefficients for the forward lags suggest that schools may have been allocated to poorly performing districts.

Since bride price is likely to be related to other ethnic norms, we study whether our results are sensitive to controlling for the interaction between female agriculture and the school construction program, as we did for Indonesia. There are only 21 ethnicities in the *Ethnographic Atlas* for Zambia and female agriculture is only non-missing for 16, the coefficients are identified by little variation. In addition, since matrilocality and bride price are almost perfectly negatively correlated in Zambia, we cannot include the interaction between $Schools_{d,t+1}/Area_d$ and matrilocality. Table A2 reports the results of this regression. Both β_1 and β_2 become larger, and the effect of the school building program becomes positive and significant for non-bride price ethnicites. Nonetheless, an F-test shows that β_2 is significantly larger than β_1 ($F = 5.76, p < .05$).

5.2 Bride price amounts and educational attainment

We investigate the relationship between the amount of bride price paid at the time of marriage and the bride's characteristics and, in particular, her education, as postulated in assumption 1. To do so, we included a dedicated module in the first wave of the Zambia Fertility Preferences Survey (Fall 2014), in which 728 households from a poor suburb of peri-urban Lusaka were interviewed. Each spouse was asked a series of questions on the practice of *lobola*, leading to a total of 1,456 observations.[14]

Table 17 reports summary statistics for the key variables. 94 percent of wives have completed primary education, 50 percent have completed junior secondary education, and 27 percent haVe completed secondary education. Educational attainment is slightly higher among husbands, with 99 percent completing primary school, 73 percent completing junior secondary school and 47 percent secondary education. Almost no person interviewed had attended college.

To assess the empirical relationship between bride price payments and educational attainment, we estimate the following hedonic regressions for wife i, belonging to ethnic group e and married

[14]See Appendix A for further details of the sample.

in year t:

$$\begin{aligned} \ln BridePrice_{iet} &= \alpha_\tau + \beta_1 I(Primary)_i + \beta_2 I(JuniorSecondary)_i + \beta_3 I(Secondary)_i \\ &\quad + \mathbf{X}_{ie}\mathbf{\Gamma} + \varepsilon_{iet}. \end{aligned} \tag{8}$$

where the dependent variable, $\ln BridePrice_{iet}$, is the natural logarithm of the amount paid at marriage. We measure education using an indicator variable $I(Primary)_i$ that equals 1 if the bride has completed primary education (and 0 otherwise) and an indicator variable $I(JuniorSecondary)_i$ that equals 1 if the woman has completed junior secondary education and $I(Secondary)_i$ that equals 1 if the woman has completed secondary education or above. The excluded category is no education. The control vector $\mathbf{X}$ includes a quadratic in the wife's age and dummy for being of an ethnicity that practices bride price according to Murdock's *Ethnographic Atlas* (columns 1–4) and husband's characteristics (columns 1–5).

Estimates of equation (8) are reported in table 18, columns 1–4 . As in Indonesia, bride price payments increase with the education of the bride: completing primary school is associated with a 50 percentage point increase in the bride price payment, completing junior secondary school is associated with another 27 percentage point increase, and completing secondary school with another 40 percentage point increase.

We next include a vector of covariates related to the husband's characteristics. These include an indicator of whether the husband has completed primary school or junior secondary school and the husband's age at marriage and age squared. The estimates are reported in columns 5–8 of table 18. The coefficients for the education completion variables remain stable, although the coefficient for primary school completion, β_1, become less precisely estimated.

5.3 Bride price and school enrollment

To examine whether girls in ethnic groups that engage in bride price payments are more likely to be enrolled in school as predicted in proposition 1, we use the sample of all school-aged children (those aged 5–22) in the pooled 1996, 2001, and 2007 Zambia DHS.[15]

We estimate the following equation:

$$\begin{aligned} I_{ijet}^{Enrolled} &= \alpha_e + \alpha_t + \beta_1 I_i^{Female} + \beta_2 I_i^{Female} \times I_e^{BridePrice} \\ &\quad + \beta_3 I_i^{Female} + \mathbf{X}_{ije}\mathbf{\Gamma} + \varepsilon_{ijet} \end{aligned} \tag{9}$$

where $I_{ijet}^{Enrolled}$ is the dependent variable of interest: an indicator variable for whether an individual i from household j and ethnicity e was enrolled in school. I_i^{Female} is an indicator variable that equals 1 if individual i is female, and $I_e^{BridePrice}$ is an indicator variable that equals 1 if ethnicity e

[15] See Appendix A for further details.

traditionally engages in the practice of bride price. The vector $\mathbf{X}_{ije}$ includes an indicator variable for whether females traditionally had a dominant role in agriculture, an indicator variable equal to 1 if ethnicity e was traditionally matrilocal, an indicator variable for whether historical community size was greater than 50, and an indicator variable for their interactions with I_i^{Female}. $\mathbf{X}_{ije}$ also includes individual i's age, age squared, a gender indicator variable, and in some specifications, household fixed effects. α_e denotes ethnicity fixed effects, which absorb the direct effects of the ethnicity-specific variables $I_e^{BridePrice}$, $I_e^{Agriculture}$, and $I_e^{CommunitySize}$, and α_t denotes survey round fixed effects. The indicator variable $I_e^{Agriculture}$ equals one if, according to the *Ethnographic Atlas*, the ethnic group has "equal participation" or "female appreciably more" participation in agriculture. The remaining options present in Zambia are "missing data" and "males appreciably more." In Zambia, there is relatively little variation in agricultural practices, with 76 percent of the sample in the "female appreciably more" group. The indicator variable $I_e^{CommunitySize}$ equals one if the mean size of historical communities is greater than 50, and 0 otherwise. The relevant categories in the *Ethnographic Atlas* for Zambia are: "fewer than 50," "50-99," "100-199," and "200-399." While the *Ethnographic Atlas* codes for community sizes as great as "50,000 or more," there are no matched ethnic groups in Zambia with such large historical community sizes.[16]

Estimates are reported in table 19. Columns 1 and 2 report estimates of the relationship between bride price and enrollment for girls and boys separately. Belonging to an ethnic group that practices bride price is associated with a 4 percentage point increase in the probability of enrollment among girls, but no increase among boys. Columns 3 and 4 report estimates of equation (9), without and with ethnicity fixed effects. The positive and significant coefficients for $I_i^{Female} \times I_e^{BridePrice}$ confirm the differential relationship between boys and girls found in columns 1 and 2. In column 5, we replace ethnicity fixed effects with household fixed effects. The estimate of interest remains robust to this specification.

5.4 Qualitative survey evidence

The institution of bride price would influence educational investment to the extent that parents believe that bride price increases with education. To understand whether families perceive the association between education and bride price as causal, we included a dedicated module in the first wave of the Zambia Fertility Preferences Survey (Fall 2014), in which 728 households were interviewed. Each spouse was asked a series of questions on the practice of *lobola*, leading to a total of 1,456 observations.

In the first set of questions, respondents were unprompted and asked to indicate the factors

[16] Unlike our regressions of daughter preferences and school enrollment in Indonesia, this regression includes a control for an ethnicity's historical community size from the *Ethnographic Atlas*. In Indonesia, we cannot include the community size indicator variable since community size data are missing for 32 percent of the sample. Moreover, 82 percent of the sample for which community size is not missing belongs to the same historic community size category (towns of 5,000–50,000).

that affect bride price today in their community. The majority of them (36%) listed education as the primary determinant of bride price amounts. Overall, 62% of responders list education as one of the topmost important factors affecting bride price (table 20). Respondents were then asked to list all factors that lower bride price amounts. We coded these qualitative answers to identify those indicating that low education is a negative determinant of bride price.[17] Overall, 17% of respondents report lack of education as a negative determinant of bride price, with similar percentages among male and female respondents.

We also ask respondents to indicate the reason why bride price increases with education. Respondents, again unprompted, indicated several reasons that were categorized and are reported in table A4. The vast majority of respondents (90%) indicated that the payment was a compensation for parental investments.[18]

6 Conclusion

Our analysis has documented a (perhaps surprising) economic consequence of the traditional practice of bride price payments, which is prevalent in many parts of the world including most of sub-Saharan Africa and many parts of Asia.

Revisiting one of the best-studied historical development projects – the Sekolah Dasar INPRES school construction program in Indonesia – we have shown that the impacts of the school-building project on female education depended critically on this cultural practice. For ethnic groups that traditionally make bride price payments at marriage, the increased supply of schools resulted in a significant increase in female education. However, for those without this custom, the increase in the number of schools had no impact on female education.

To better understand the mechanisms behind this differential effect, we documented that for groups practicing bride price payments, higher female education at marriage is associated with a significantly higher bride price payment received. Thus, the bride price provides a greater incentive for parents to invest in girls' education. Furthermore, it is these parents that are more likely to take advantage of the increased supply of schools by educating their daughters.

We also replicated these same findings in Zambia, where we exploit a similar school expansion program that took place in the early 2000s. We find effects in Zambia to be qualitatively identical to the effects in Indonesia. The impact of the school building program on female education is concentrated among ethnic groups that traditionally make bride price payments at the time of marriage. As in Indonesia, the value of the bride price received at marriage increases with the

[17] Examples of these qualitative answers are "Lack of education," "Not going to school," "The woman is uneducated," "Education level of the girl," "If a woman hasn't been to school."

[18] To improve our understanding of the *lobola* practice, we also asked two general questions. In particular, 86.77% of respondents indicate that, in the case of a marriage between two different tribes, the custom of the bride's tribe would be followed. Also, 63.40% of respondents say that the family does not have to pay back lobola in case of divorce, 31.63% say it has to, and 4.98% do not know the answer.

education of the bride. Household survey data from Zambia reveals that parents believe that bride price increases with education, which they attribute mainly to providing compensation for parental investment in girl children.

We believe that our finding provides a number of important lessons. First, while there may be significant downsides to a bride price tradition, our results suggest that any change to this cultural custom should likely be considered alongside additional policies to promote female education. Second, our findings also highlight the importance of the cultural and social norms of a society, and how such norms can be critical in determining the success of large-scale development policies.

7 Tables

Table 1: Distribution of Customs in the Ethnographic Atlas

	Number of ethnic groups	Percent of non-missing observations
Marriage Customs		
Bride Price	646	0.522
Bride Service	122	0.099
Token Bride Price	67	0.054
Gift Exchange	62	0.050
Sister Exchange	39	0.032
No Custom	269	0.217
Dowry	33	0.027
Other Customs		
Matrilocal	196	0.159
Plow	141	0.112
Female Agriculture	259	0.275
Polygamy	1032	0.845

This table counts the number of ethnicities that practice different traditional customs in the *Ethnographic Atlas*, which lists traditional customs for $1,265$ societies.

Table 2: Correlations Between Bride Price and Other Customs in the Ethnographic Atlas

	Indicator variable for bride price practice			
Matrilocal	-0.177***			
	(0.034)			
Plow		-0.093		
		(0.060)		
Female Agriculture			0.042	
			(0.035)	
Polygamy				0.198***
				(0.038)
Constant	0.548***	0.532***	0.452***	0.352***
	(0.012)	(0.012)	(0.016)	(0.032)
Number of observations	1,221	1,238	938	1,211
Adjusted R^2	0.491	0.484	0.448	0.499

This table regresses an indicator variable for whether an ethnicity practices non-token bride price on indicator variables for practicing matrilocality, traditional plow use, female dominated agriculture, and polygamy, controlling for region of the world fixed effects.

Table 3: Distribution of Customs Practiced in Indonesia

	Number of ethnic groups	Percent of non-missing observations
Marriage Customs		
Bride Price	13	0.464
Bride Service	2	0.071
Token Bride Price	2	0.071
Gift Exchange	3	0.107
Sister Exchange	4	0.143
No Custom	4	0.143
Dowry	0	0.000
Other Customs		
Matrilocal	4	0.143
Plow	9	0.321
Female Agriculture	4	0.174
Polygamy	19	0.679

This table counts the number of ethnicities that practice different traditional customs in the *Ethnographic Atlas*, which contains 28 ethnicities that are matched to Indonesian data. P

Table 4: Correlations Between Bride Price and Other Customs in Indonesia

	Indicator variable for bride price practice			
Matrilocal	-0.000			
	(0.283)			
Plow		-0.029		
		(0.209)		
Female Agriculture			-0.276	
			(0.256)	
Polygamy				0.029
				(0.209)
Constant	0.500***	0.474***	0.526***	0.444***
	(0.111)	(0.119)	(0.120)	(0.172)
Number of observations	26	28	23	28
Adjusted R^2	-0.042	-0.038	-0.002	-0.038

This table regresses an indicator variable for whether an ethnicity practices non-token bride price on indicator variables for practicing matrilocality, traditional plow use, female dominated agriculture, and polygamy.

Table 5: Summary Statistics by Bride Price Status for the 1995 Indonesia Intercensal Data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Bride Price		Non-Bride Price			Full Sample		
	Mean	SD	Mean	SD	Difference	SE	Coefficient	SE
					Enrolled Sample (Ages 5-22)			
Female Enrollment	0.610	0.488	0.577	0.494	0.033***	0.004	0.006	0.015
Male Enrollment	0.635	0.481	0.619	0.486	0.016***	0.004	-0.009	0.011
Matrilocal	0.107	0.310	0.043	0.203	0.064***	0.001	0.021	0.033
Female Agriculture	0.035	0.184	0.045	0.208	-0.010***	0.001	-0.054*	0.029
					School Construction Sample			
Age	12.750	4.930	13.234	4.990	-0.484***	0.029	0.186	0.145
Female Primary Completion	0.639	0.480	0.605	0.489	0.034***	0.005	0.048*	0.027
Male Primary Completion	0.745	0.436	0.722	0.448	0.023***	0.005	0.032	0.020
Schools per 1000 School-Aged Children	2.220	1.089	1.991	0.790	0.229***	0.006	–	–
Matrilocal	0.123	0.329	0.035	0.184	0.088***	0.002	0.013	0.036
Female Agriculture	0.036	0.185	0.034	0.182	0.001	0.001	-0.074**	0.034
Age	34.451	7.041	34.414	7.131	0.036	0.055	0.036	0.052

This table presents summary statistics for the 1995 Indonesia Intercensal data. Columns 1 and 2 present means and standard deviations for ethnicities that traditionally practice bride price. Columns 3 and 4 present summary statistics for non-bride price ethnicities. Column 5 presents the difference in means and column 6 presents the standard error of the difference. Column 7 presents the coefficient on bride price in a regression of the row-name variables on bride price status, district of birth fixed effects, and in the case of the school construction sample, treated or non-treated cohort fixed effects. Column 8 presents the standard error of the bride price coefficient, clustered at the district level.

Table 6: Bride Price Status and the INPRES School Expansion in the 1995 Indonesia Intercensal Data

	(1)	(2)	(3)	(4)	(5)
	Indicator variable for completion of primary school				
	Males	Females	Females	B.P. Females	Non B.P. Females
$I_k^{Post} \times Intensity_d$	0.012*	-0.002		0.023**	-0.001
	(0.006)	(0.007)		(0.012)	(0.010)
$I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$			0.024**		
			(0.012)		
$I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$			-0.001		
			(0.010)		
Ethnicity FEs $\times I_k^{Post}$	N	N	Y	Y	Y
Ethnicity FEs	N	N	Y	Y	Y
Ethnicity FEs $\times Intensity_d$	N	N	Y	Y	Y
District FEs $\times I_e^{BridePrice}$	N	N	Y	N	N
Duflo Controls $\times I_e^{BridePrice}$	N	N	Y	N	N
Duflo Controls	Y	Y	Y	Y	Y
District FEs	Y	Y	Y	Y	Y
Cohort FEs $\times I_e^{BridePrice}$	N	N	Y	N	N
Cohort FEs	Y	Y	Y	Y	Y
Number of observations	75,286	76,959	64,426	9,707	55,696
Number of clusters	258	255	239	155	217
Adjusted R^2	0.124	0.179	0.185	0.174	0.185

Notes: Education attainment data are taken from the 1995 Indonesia Intercensal Survey and merged with ethnicity level norm data from Murdock's (1967) *Ethnographic Atlas*. I_k^{Post} refers to the treated cohort, born between 1968 and 1972. The untreated cohort is born between 1950 and 1962. $Intensity_d$ is the number of schools built in a district per 1,000 people in the school-aged population. All regressions include district-of-birth fixed effects, cohort fixed effects, and the interaction of cohort fixed effects with number of school-aged children in the district in 1971, with enrollment rate in 1971 and with the regency level implementation of a water and sanitation program under INPRES. The subscript d indexes districts, i individuals, k cohorts, and e ethnic groups. Standard errors are clustered at the birth-district level.

Table 7: Placebo Test of Bride Price Status and the INPRES School Expansion Results in the 1995 Indonesia Intercensal Data

	(1)	(2)	(3)	(4)	(5)
	Indicator variable for completion of primary school				
	Males	Females	Females	B.P. Females	Non B.P. Females
$I_k^{PlaceboPost} \times Intensity_d$	-0.004	-0.006		0.015	-0.004
	(0.006)	(0.005)		(0.014)	(0.007)
$I_k^{PlaceboPost} \times Intensity_d \times I_e^{BridePrice}$			0.015		
			(0.014)		
$I_k^{PlaceboPost} \times Intensity_d \times I_e^{NoBridePrice}$			-0.005		
			(0.007)		
Ethnicity-cohort FEs $\times Intensity_d$	N	N	Y	Y	Y
Ethnicity FEs $\times Indensity_d$	N	N	Y	Y	Y
District FEs $\times I_e^{BridePrice}$	N	N	Y	Y	Y
Duflo Controls $\times I_e^{BridePrice}$	N	N	Y	N	N
Duflo Controls	Y	Y	Y	Y	Y
District FEs	Y	Y	Y	Y	Y
Cohort FEs	Y	Y	Y	Y	Y
Number of observations	54,812	53,640	45,102	6,833	38,966
Number of clusters	254	247	232	140	210
Adjusted R^2	0.100	0.137	0.135	0.158	0.128

Notes: Education attainment data are taken from the 1995 Indonesia Intercensal Survey and merged with ethnicity level norm data from Murdock's (1967) *Ethnographic Atlas*. $I_k^{PlaceboPost}$ refers to the placebo treated cohort, who are aged 12-17 in 1974. The placebo untreated cohort is aged 17-24 in 1974. $Intensity_d$ is the number of schools built in a district per 1,000 people in the school-aged population. All regressions include district-of-birth fixed effects, cohort fixed effects, and the interaction of cohort fixed effects with number of school- aged children in the district in 1971, with enrollment rate in 1971 and with the regency level implementation of a water and sanitation program under INPRES. The subscript d indexes districts, i individuals, k cohorts, and e ethnic groups. Standard errors are clustered at the birth-district level.

Table 8: Bride Price Status and the INPRES School Expansion in the 2010 Census Data

	(1)	(2)	(3)	(4)	(5)
	Indicator variable for completion of primary school				
	Males	Females	Females	B.P. Females	Non B.P. Females
$I_k^{Post} \times Intensity_d$	0.016*	0.011		0.017**	-0.015
	(0.009)	(0.010)		(0.008)	(0.011)
$I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$			0.017**		
			(0.008)		
$I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$			-0.015		
			(0.011)		
Ethnicity-cohort FEs $\times Intensity_d$	N	N	Y	Y	Y
Ethnicity FEs $\times Indensity_d$	N	N	Y	Y	Y
District FEs $\times I_e^{BridePrice}$	N	N	Y	Y	Y
Duflo Controls $\times I_e^{BridePrice}$	N	N	Y	N	N
Duflo Controls	Y	Y	Y	Y	Y
District FEs	Y	Y	Y	Y	Y
Cohort FEs	Y	Y	Y	Y	Y
Number of observations	1,747,727	1,700,856	1,700,436	476,176	1,224,260
Adjusted R^2	0.116	0.176	0.194	0.196	0.183
Clusters	263	263	263	263	259

Notes: Education attainment data are a ten percent sample of the 2010 Indonesia Census and merged with ethnicity level norm data from Murdock's (1967) *Ethnographic Atlas*. I_k^{Post} refers to the treated cohort, born between 1968 and 1972. The untreated cohort is born between 1950 and 1962. The treatment level is the number of schools built in a district per 1,000 people in the school-aged population. All regressions include district-of-birth fixed effects, cohort fixed effects, and the interaction of cohort fixed effects with number of school-aged children in the district in 1971, with enrollment rate in 1971 and with the regency level implementation of a water and sanitation program under INPRES. The subscript d indexes districts, i individuals, k cohorts, and e ethnic groups. Standard errors are clustered at the birth-district level.

Table 9: Summary Statistics for Adults Aged 25-45 in the Indonesia Family Life Survey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Bride Price		Non-Bride Price			Full Sample		
	Mean	SD	Mean	SD	Difference	SE	Coefficient	Se
				All Respondents Aged 25 to 45				
Probability a Female Attended Junior Secondary School	0.633	0.482	0.571	0.495	0.062***	0.010	0.041**	0.016
Probability a Female Attended Upper Secondary School	0.485	0.500	0.439	0.496	0.046***	0.010	0.044**	0.018
Probability a Female Attended College	0.100	0.300	0.108	0.311	-0.008	0.006	-0.021	0.013
Probability a Male Attended Junior Secondary School	0.724	0.447	0.640	0.480	0.0847***	0.010	0.013	0.016
Probability a Male Attended Upper Secondary School	0.566	0.496	0.495	0.500	0.070***	0.011	0.022	0.017
Probability a Male Attended College	0.146	0.353	0.124	0.330	0.021***	0.007	0.028**	0.014
Household Assets	-0.015	1.371	0.097	1.359	-0.111***	0.020	-0.194***	0.034
				All Married Couples				
Female Marriage Age	22.472	6.067	22.480	6.564	-0.009	0.191	0.189	0.315
Male Marriage Age	26.875	7.219	27.038	7.778	-0.163	0.222	0.494	0.334
Log(Bride Price)	13.465	2.347	12.633	1.888	0.832	0.061	0.306**	0.106

This table presents summary statistics for either adult respondents aged 25-45 to rounds 3 and 4 of the Indonesia Family Life Survey or couples who responded to questions regarding a recent marriage. Columns 1 and 2 present the mean and standard deviations of the row-name variables for individuals belonging to ethnic groups with a bride price tradition. Columns 3 and 4 do the same for individuals from non-bride price traditions. Column 4 presents the difference and column 5 presents the standard error of the difference. Column 6 presents the coefficient on bride price status in a regression of the row-name variable on bride price status and year and district fixed effects. Column 7 presents the standard error of the bride price coefficient adjusted for heteroskedasticity. Bride price value was converted into 2013 kwachas using the World Bank's Zambian CPI data. The full data set of adults 25-45 contains 37,410 observations. The data set of recent marriages, which includes data on bride price and husband and wives' marriage ages contains 6,987 observations.

Table 10: Determinants of Bride Price in the IFLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: Log Bride Price Amount							
$I(Completed\ Primary)_i$	0.654***	0.621***	0.592***	0.544***	0.436***	0.470***	0.458***	0.414***
	(0.073)	(0.077)	(0.079)	(0.073)	(0.079)	(0.079)	(0.081)	(0.074)
$I(Completed\ Junior\ Secondary)_i$	0.644***	0.653***	0.617***	0.620***	0.451***	0.488***	0.473***	0.461***
	(0.073)	(0.077)	(0.079)	(0.072)	(0.078)	(0.077)	(0.079)	(0.072)
$I(College)_i$	0.838***	0.826***	0.824***	0.887***	0.400***	0.371***	0.389***	0.476***
	(0.081)	(0.083)	(0.087)	(0.080)	(0.094)	(0.094)	(0.098)	(0.090)
$MarriageAge_i$		0.014	0.016	0.006	0.002	-0.001	0.007	-0.008
		(0.014)	(0.014)	(0.013)	(0.014)	(0.014)	(0.013)	(0.014)
$MarriageAge_i^2$		-0.000	-0.000	-0.000	-0.000	0.000	-0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$I(BridePrice)_e$			0.730***				0.652***	
			(0.067)				(0.066)	
$I(Husband\ Completed\ Primary)_i$					0.297***	0.234***	0.245***	0.194**
					(0.090)	(0.088)	(0.090)	(0.082)
$I(Husband\ Completed\ Junior\ Secondary)_i$					0.339***	0.330***	0.294***	0.354***
					(0.082)	(0.081)	(0.083)	(0.075)
$I(Husband\ College)_i$					0.645***	0.631***	0.617***	0.554***
					(0.081)	(0.080)	(0.082)	(0.075)
$HusbandMarriageAge_i$						0.009	-0.013	0.014
						(0.015)	(0.015)	(0.014)
$HusbandMarriageAge_i^2$						-0.000	0.000	-0.000
						(0.000)	(0.000)	(0.000)
Year of Marriage f.e.	Y	Y	Y	Y	Y	Y	Y	Y
Ethnicity f.e.	N	N	N	Y	N	N	N	Y
Survey Round f.e.	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,403	5,076	4,647	5,076	5,064	4,934	4,520	4,934
Adjusted R-Squared	0.426	0.426	0.450	0.490	0.441	0.418	0.435	0.485

Columns regress the natural log of bride price payments at the time of marriage on various covariates. The measures are taken from rounds 3 and 4 of the Indonesia Family Life Survey. Robust standard errors are reported in parentheses.

Table 11: Bride Price and Female Enrollment in the Indonesia 1995 Intercensal Data

	(1)	(2)	(3)	(4)	(5)
	Dep var: School enrollment indicator				
	Females	Males	Both	Both	Both
$I(BridePrice)_e$	0.038*	0.023	0.023		
	(0.022)	(0.021)	(0.021)		
$I(Matrilocal)_e$	0.023	0.009	0.008		
	(0.024)	(0.024)	(0.025)		
$I(FemaleAgriculture)_e$	0.045***	0.032***	0.027***		
	(0.007)	(0.010)	(0.009)		
$I(BridePrice)_e \times I(Female)_i$			0.017***	0.017***	0.015*
			(0.005)	(0.005)	(0.009)
$I(Matrilocal)_e \times I(Female)_i$			0.016***	0.014***	0.018**
			(0.003)	(0.003)	(0.007)
$I(FemaleAgriculture)_e \times I(Female)_i$			0.022***	0.021***	0.021**
			(0.004)	(0.004)	(0.009)
$I(Female)_i$			-0.031***	-0.031***	-0.034***
			(0.004)	(0.004)	(0.005)
Age, Age squared	Y	Y	Y	Y	Y
Language FEs	N	N	N	Y	N
Household FEs	N	N	N	N	Y
Household SES Controls	Y	Y	Y	Y	N
Urban Indicator	Y	Y	Y	Y	N
Number of observations	93,826	94,212	188,038	188,038	188,038
Number of clusters	20	19	20	20	20
Adjusted R^2	0.413	0.396	0.404	0.406	0.472

Notes: This table examines the effect of belonging to an ethnicity with a bride price norm on enrollment. Each column is a different regression specification: the first estimates the mean effect of the bride price norm on males and females; the second and third include the interaction of being female with belonging to an ethnicity with a bride price norm. All columns include controls for age and age squared, socioeconomic status controls and an indicator variable for whether the household is urban (when they are not collinear with household FE). Socioeconomic status controls include indicator variables for tv-ownership, car ownership, radio ownership, buffet ownership, bike ownership, and boat ownership, as well as controls for whether the household receives electricity, their water supply, sewage, and fuel source. Column 2 also includes language fixed effects and column 3 also includes household fixed effects. The data are from the Indonesia 1995 Intercensal Population Survey. Ethnic norms are inferred from a match between languages in the Intercensal data and Murdock's (1967) *Ethnographic Atlas*. The sample consists of all children of the household head between the ages of 5 and 22. Standard errors are clustered at the ethnicity level. e indexes ethnic groups and i individuals.

Table 12: Distribution of Customs in Zambia

	Number of ethnic groups	Percent of non-missing observations
Marriage Customs		
Bride Price	8	0.381
Bride Service	6	0.286
Token Bride Price	7	0.333
Gift Exchange	0	0.000
Sister Exchange	0	0.000
No Custom	0	0.000
Dowry	0	0.000
Other Customs		
Matrilocal	12	0.571
Plow	0	0.000
Female Agriculture	12	0.750
Polygamy	21	1.000

This table counts the number of ethnicities that practice different traditional customs in the *Ethnographic Atlas*, which lists traditional customs for 21 societies.

Table 13: Correlations Between Bride Price and Other Customs in Zambia

	Indicator variable for bride price practice	
Matrilocal	-0.792***	
	(0.149)	
Female Agriculture		-0.045
		(0.313)
Constant	0.875***	0.500*
	(0.123)	(0.269)
Number of observations	20	15
Adjusted R^2	0.606	-0.075

This table regresses an indicator variable for whether an ethnicity practices non-token bride price on indicator variables for practicing matrilocality, traditional plow use, female dominated agriculture, and polygamy, controlling for region of the world fixed effects.

Table 14: Summary Statistics from the 1996, 2001, and 2007 Zambia Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Bride Price		Non-Bride Price			Full Sample		
	Mean	SD	Mean	SD	Difference	Se	Coefficient	Se
					School Enrollment Sample (Ages 5 to 22)			
Female Enrollment	0.507	0.500	0.489	0.500	0.018**	0.004	0.013*	0.007
Male Enrollment	0.560	0.496	0.576	0.494	-0.016	0.004	0.004	0.007
Age	12.550	5.100	12.472	5.054	0.078	0.116	0.004	0.122
Schools/Area	0.086	0.217	0.087	0.222	-0.001	0.002	-0.007	0.006
Female Agriculture	0.902	0.298	0.918	0.274	-0.016***	0.002	-0.037	0.022
Wealth Index	3.099	1.410	3.139	1.383	-0.041***	0.017	-0.004	0.098
					School Construction Sample (Ages 5 to 12)			
Female Enrollment	0.578	0.494	0.558	0.497	0.021**	0.004	0.013*	0.007
Male Enrollment	0.555	0.497	0.556	0.497	-0.001	0.004	0.004	0.007
Age	8.369	2.273	8.382	2.279	-0.014	0.116	0.004	0.122
Schools/Area	0.084	0.215	0.083	0.215	0.001	0.002	-0.007	0.006
Female Agriculture	0.904	0.295	0.914	0.280	-0.011***	0.002	-0.037	0.022
Wealth Index	2.947	1.408	2.983	1.364	-0.036***	0.017	-0.004	0.098
Female Employment Rate (All Adults 25-45)	0.613	0.487	0.672	0.469	-0.059***	0.007	-0.014	0.013

This table presents summary statistics by bride price status in the pooled 1996, 2001, and 2007 rounds of the Zambia DHS. The first panel of the table presents summary statistics for the sample of children aged 5-22 used in the enrollment analysis and the second panel presents summary statistics for the sample of children aged 5-12 used in the school construction analysis. Columns 1 and 2 present means and standard errors for the bride price group, and columns 3 and 4 present means and standard errors for the non-bride price group. Column 5 presents the difference in the means and column 6 gives the standard error of the difference. Column 7 is the coefficient on bride price status in a regression of the row-name variable on bride price status and district and year fixed effects. Column 8 is the standard error of this coefficient clustered at the district level.

Table 15: School Construction and Primary School Enrollment in the Pooled Zambia DHS (1996, 2001, and 2007)

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: School enrollment indicator					
	All	Males	Females	Females	B.P. Females	Non B.P. Females
$Schools_{dt}/Area_d$	0.024	0.030	0.010		0.071**	-0.016
	(0.020)	(0.020)	(0.026)		(0.033)	(0.035)
$Schools_{dt}/Area_d \times I_e^{BridePrice}$				0.071**		
				(0.035)		
$Schools_{dt}/Area_d \times I_e^{NoBridePrice}$				-0.016		
				(0.035)		
Age by Bride Price FE	Y	Y	Y	Y	Y	Y
Ethnicity by Round FE	Y	Y	Y	Y	Y	Y
Ethnicity by District FE	Y	Y	Y	Y	Y	Y
Number of observations	24,273	11,996	12,277	12,277	3,514	8,763
Number of clusters	70	70	70	70	64	69
Adjusted R^2	0.400	0.405	0.394	0.394	0.434	0.378

Notes: This table examines the differential impact of school building in Zambia on bride price and non-bride price females. The sample consists of children aged 5–12 at the time of the survey in the 1996, 2001, and 2007 rounds of the DHS. The treatment variable, $Schools_{dt}$ is the number of schools built in a district d by year t (the survey round of the DHS). This is normalized by the area of the district, calculated using ArcGIS, $Area_d$. Standard errors are clustered at the district level.

Table 16: Placebo Test of School Construction and Primary School Enrollment by Bride Price Status in the Pooled Zambia DHS (1996, 2001, and 2007)

	(1)	(2)	(3)	(4)	(5)	(6)
			Dep var: School enrollment indicator			
	All	Male	Females	Females	B.P. Females	Non B.P. Females
$Schools_{d,t+1}/Area_d$	-0.009	0.030	-0.093		-0.215*	-0.050
	(0.054)	(0.061)	(0.077)		(0.122)	(0.100)
$Schools_{d,t+1}/Area_d \times I_e^{BridePrice}$				-0.217*		
				(0.123)		
$Schools_{d,t+1}/Area_d \times I_e^{NoBridePrice}$				-0.046		
				(0.105)		
$Schools_{d,t}/Area_d$	0.032	0.002	0.098		0.278**	0.031
	(0.055)	(0.066)	(0.076)		(0.121)	(0.102)
$Schools_{d,t}/Area_d \times I_e^{BridePrice}$				0.277**		
				(0.120)		
$Schools_{d,t}/Area_d \times I_e^{NoBridePrice}$				0.021		
				(0.107)		
Number of observations	24,273	11,996	12,277	12,277	3,514	8,763
Adjusted R^2	0.400	0.404	0.394	0.393	0.434	0.378
Clusters	70	70	70	70	64	69

Notes: This table examines the differential impact of present and future school building in Zambia on bride price and non-bride price females. The sample consists of children aged 5–12 at the time of the survey in the 1996, 2001, and 2007 rounds of the DHS. The treatment variable, $Schools_{dt}$ is the number of schools built in a district d by year t (the survey round of the DHS). This is normalized by the area of the district, calculated using ArcGIS, $Area_d$. $Schools_{d,t+1}$ is the number of schools built by 2001 in 1996, the number of schools built by 2007 in 2001, and the number of schools built by 2012 in 2007. Standard errors are clustered at the district level.

Table 17: Summary Statistics for ZFPS Data

	Mean	SD	N
$\ln BridePrice_{ie}$	7.510	1.196	442
$I(Primary)_i$	0.943	0.231	442
$I(JuniorSecondary)_i$	0.507	0.501	442
$I(Secondary)_i$	0.267	0.443	442
$MarriageAge_i$	20.446	4.115	442
$I(HusbandPrimary)_i$	0.986	0.116	442
$I(HusbandJuniorSecondary)_i$	0.731	0.444	442
$I(HusbandSecondary)_i$	0.468	0.500	442
$HusbandMarriageAge_i$	25.937	6.495	441

Notes: This table contains summary statistics for all couples in the ZFPS data.

Table 18: Determinants of Bride Prices in the ZFPS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Log Bride Price Amount							
$I(Primary)_i$	0.497*	0.525*	0.536*	0.489	0.474	0.473	0.473	0.420
	(0.295)	(0.303)	(0.297)	(0.316)	(0.297)	(0.323)	(0.317)	(0.335)
$I(JuniorSecondary)_i$	0.279**	0.270**	0.271**	0.262**	0.273**	0.264**	0.265**	0.267**
	(0.123)	(0.124)	(0.123)	(0.127)	(0.123)	(0.126)	(0.125)	(0.130)
$I(Secondary)_i$	0.409***	0.454***	0.404***	0.402***	0.431***	0.479***	0.438***	0.446***
	(0.117)	(0.124)	(0.125)	(0.130)	(0.125)	(0.136)	(0.135)	(0.143)
$I(MarriageAge)_i$		-0.0336	-0.0245	-0.0287		-0.0702	-0.0633	-0.0626
		(0.120)	(0.122)	(0.130)		(0.122)	(0.122)	(0.128)
$I(MarriageAge)_i^2$		0.000	-0.000	-0.000		0.001	0.001	0.001
		(0.00251)	(0.003)	(0.003)		(0.003)	(0.003)	(0.003)
$I(BridePrice)_e$			0.303***				0.315***	
			(0.0975)				(0.101)	
$I(HusbandPrimary)_i$					0.932***	0.847***	0.924***	1.135***
					(0.303)	(0.317)	(0.284)	(0.278)
$I(HusbandJuniorSecondary)_i$					-0.180	-0.144	-0.146	-0.199
					(0.156)	(0.158)	(0.156)	(0.166)
$I(HusbandSecondary)_i$					0.088	0.084	0.054	0.074
					(0.120)	(0.121)	(0.121)	(0.128)
$I(HusbandMarriageAge)_i$						-0.001	-0.001	-0.001
						(0.001)	(0.001)	(0.001)
$I(HusbandMarriageAge)_i^2$						0.000	0.000	0.000
						(0.000)	(0.000)	(0.000)
Year of marriage f.e.	Y	Y	Y	Y	Y	Y	Y	Y
Ethnicity f.e.	N	N	N	Y	N	N	N	Y
Observations	442	442	439	439	442	430	427	427
R-squared	0.351	0.360	0.368	0.391	0.360	0.372	0.382	0.406

Notes: Columns regress the natural log of bride price payments at the time of marriage on various covariates. The measures are taken from the ZFPS. Robust standard errors are reported in parentheses.

Table 19: Bride Price and Enrollment in Pooled Zambia DHS Data

	(1)	(2)	(3)	(4)	(5)
	Dependent variable: School enrollment indicator				
	Female	Male	All	All	All
$I(BridePrice)_e$	0.040**	0.007	0.006		
	(0.018)	(0.028)	(0.028)		
$I(FemaleAgriculture)_e$	-0.016***	-0.029**	-0.034**		
	(0.005)	(0.014)	(0.015)		
$I(CommunitySize > 50)_e$	0.008	-0.026	-0.024		
	(0.018)	(0.030)	(0.030)		
$I(BridePrice)_e \times I(Female)_i$			0.033**	0.036***	0.040**
			(0.015)	(0.014)	(0.016)
$I(FemaleAgriculture)_e \times I(Female)_i$			0.017	0.015	0.022
			(0.012)	(0.013)	(0.016)
$I(CommunitySize > 50)_e \times I(Female)_i$			0.031*	0.028*	0.020
			(0.016)	(0.015)	(0.017)
$I(Female)_i$			-0.116***	-0.113***	-0.116***
			(0.016)	(0.017)	(0.021)
Age, Age Squared	Y	Y	Y	Y	Y
Survey Year Fixed Effects	Y	Y	Y	Y	Y
Ethnicity FE	N	N	N	Y	N
Household FE	N	N	N	N	Y
Number of observations	16,848	15,840	32,688	32,688	32,688
Number of clusters	34	34	34	34	34
Adjusted R^2	0.325	0.306	0.314	0.321	0.449

Notes: This table shows the differential effect of bride price on enrollment for males and females. The data is drawn from the Zambia DHS surveys from 2007, 2001, and 1996. Bride price, female agriculture, and community size norms come from a match between ethnicity in the DHS data and the *Ethnographic Atlas*. Standard errors are clustered at the DHS ethnicity level. The sample consists of those aged 5–22 at the time of the survey.

Table 20: Determinant of bride price in qualitative survey answers to ZFPS (2014)

Think about the factors that affect bride price today: what is the ... most important factor?					
		first	*second*	*third*	*not listed*
Education	obs	543	223	152	538
		37.29%	15.32%	10.44%	36.95%
Good morals	obs	191	283	216	766
		13.12%	19.44%	14.84%	52.61%
Family values	obs	214	272	206	764
		14.70%	18.68%	14.15%	52.47%
Virginity	obs	137	186	179	954
		9.41%	12.77%	12.29%	65.52%
Age	obs	41	94	141	1180
		2.82%	6.46%	9.68%	81.04%
Tribe	obs	104	117	190	1045
		7.14%	8.04%	13.05%	71.77%
Other	obs	144	118	85	1109
		9.89%	8.10%	5.84%	76.17%

Notes: Data from the first wave of ZFPS (Fall 2014).

8 Figures

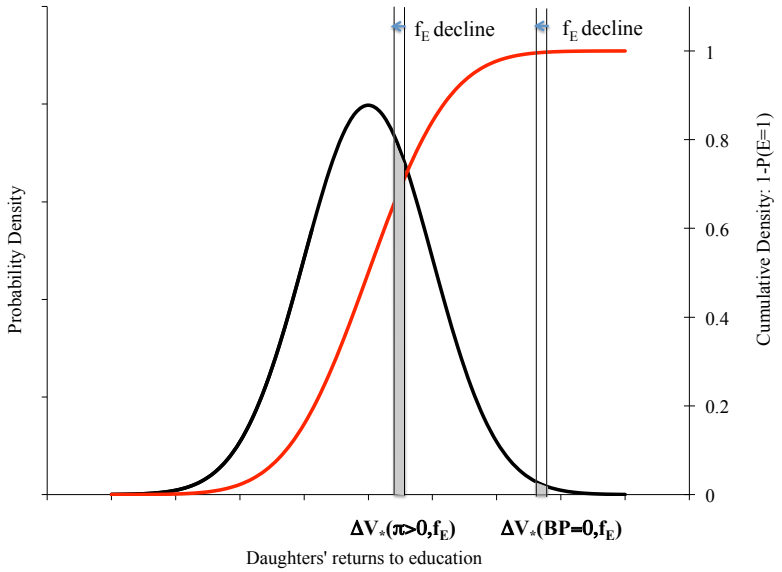

Figure 1: Distribution of girls' returns to education and declines in the cost of education

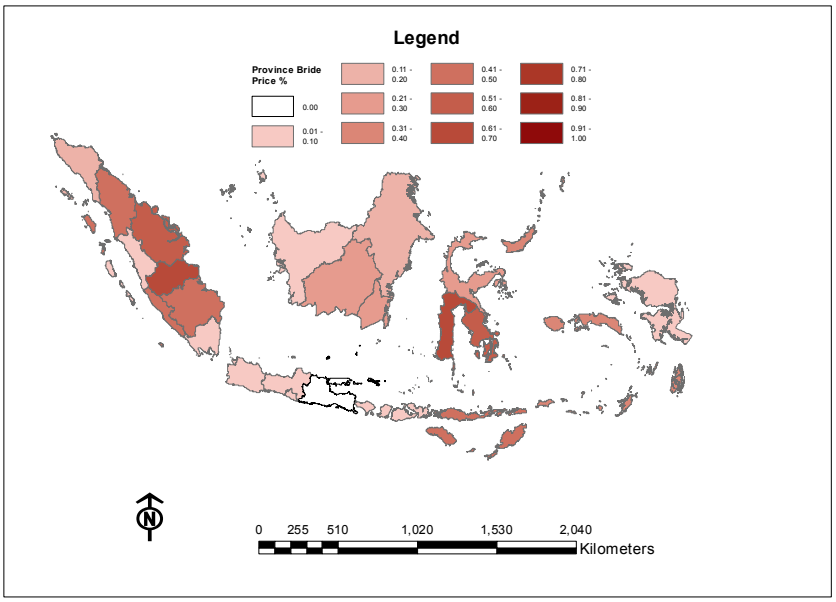

Figure 2: Geographic distribution of bride price customs in Indonesia

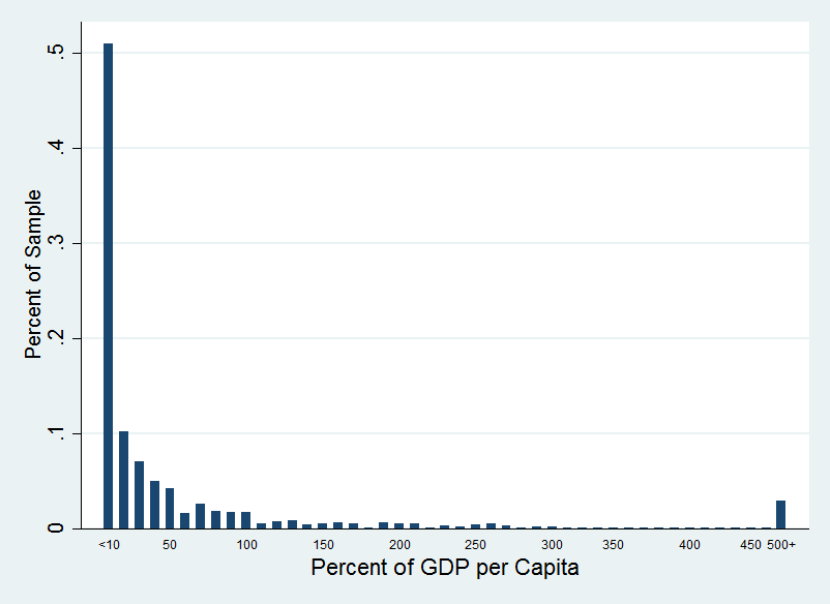

Figure 3: The distribution of bride price payments as percent of GDP per capita for bride price ethnicities in the 2000 and 2007 rounds of the Indonesia Family Life Survey.

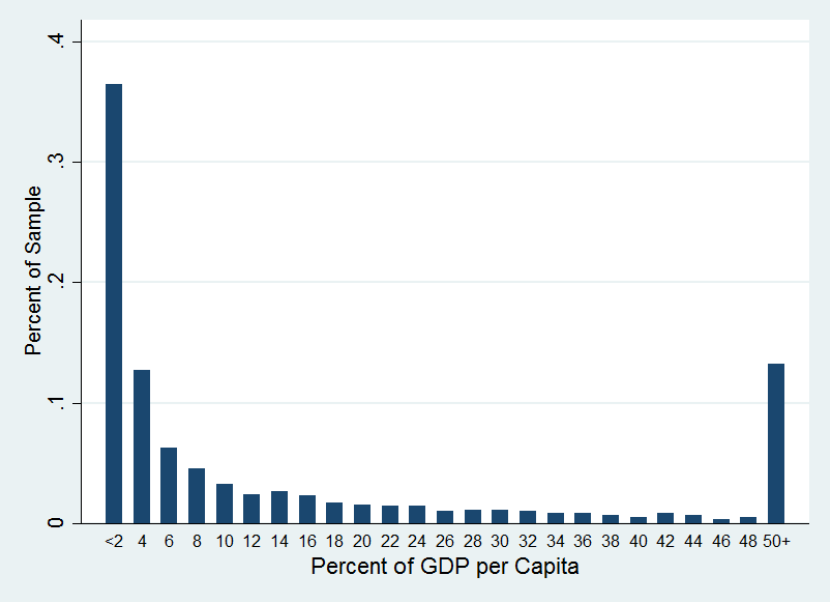

Figure 4: The distribution of bride price payments as percent of GDP per capita for all couples in the 2000 and 2007 rounds of the Indonesia Family Life Survey.

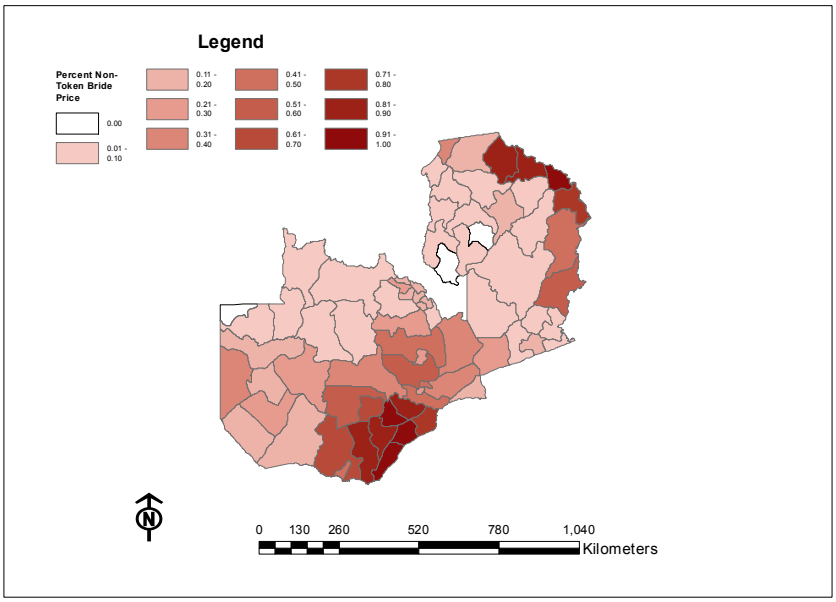

Figure 5: Geographic distribution of bride price customs in Zambia

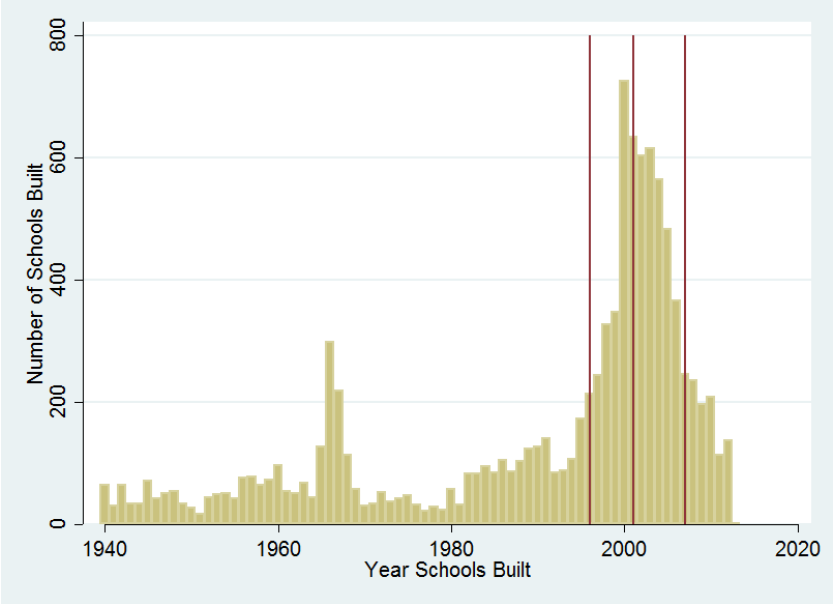

Figure 6: Number of schools constructed each year in Zambia (Ministry of Education, Government of Zambia).

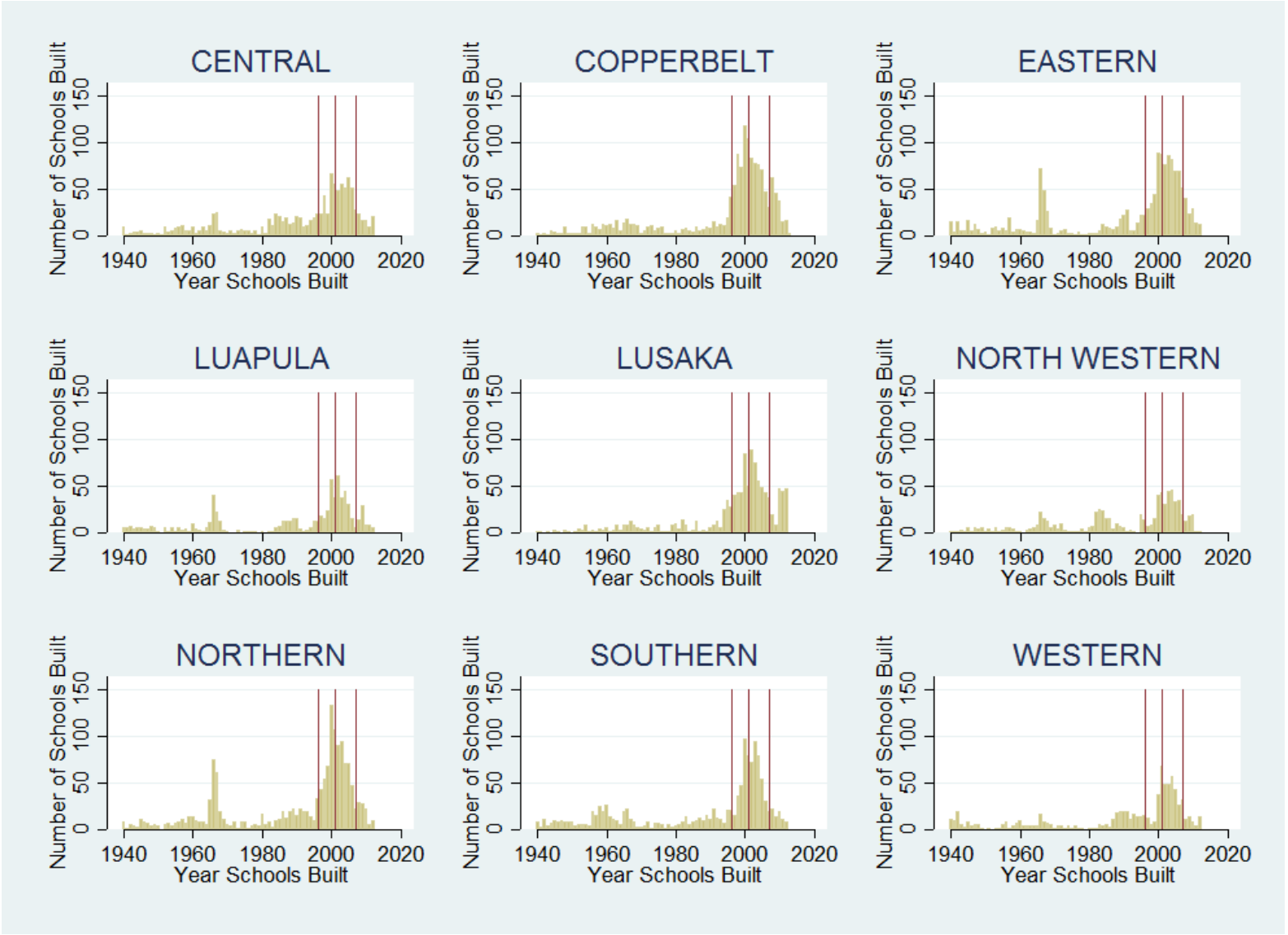

Figure 7: Number of schools constructed each year for each province in Zambia (Ministry of Education, Government of Zambia).

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Appendix A: Proofs of the propositions in section 3

Proof of proposition 1

Proof. (i) By the chain rule

$$\frac{\partial P(E_i = 1|BP, f_E)}{\partial f_E} = -G'(\Delta V_*(BP, f_E))\frac{\partial \Delta V_*(BP, f_E)}{\partial f_E} = -\frac{g(\Delta V_*(BP, f_E))}{\gamma} < 0. \tag{10}$$

(ii) Since the cumulative distribution function $G(\ )$ is increasing and

$$\Delta V_*(BP = 0, f_E)) = \frac{f_E}{\gamma} > \Delta V_*(\pi > 0, f_E)) = \frac{f_E - \beta\pi}{\gamma}, \tag{11}$$

we have that

$$\begin{aligned} P(E_i = 1|\pi > 0, f_E) - P(E_i = 1|BP = 0, f_E) \\ =& G(\Delta V_*(BP = 0, f_E)) - G(\Delta V_*(\pi > 0, f_E)) \geq 0. \end{aligned}$$

□

Proof of proposition 2

Proof. Given the probability density function of ability $f(a_i)$, average ability of educated girls is equal to:

$$E[a_i|E = 1] = E[a_i|a_i > a_*(BP, f_E)] = \int_{a_*(BP, f_E)}^{\infty} a_i f(a_i|a_i > a_*(BP, f_E))da_i.$$

By Leibniz integral rule, $\frac{\partial E[a_i|a_i > a_*]}{\partial a_*} = \frac{f(a_*)}{1-F(a_*)}\{E[a_i|a_i > a_*] - a_*\} > 0$.

Now, $a_*(BP = 0, f_E) > a_*(\pi > 0, f_E)$ because of equation 11 and the fact that $\Delta V(\ )$ is strictly increasing. This implies that

$$E[a_i|E = 1; BP = 0, f_E] > E[a_i|E = 1; \pi > 0, f_E].$$

□

Proof of proposition 3

Proof. Equation 10 implies that

$$\frac{\partial P(E_i = 1|\pi > 0, f_E)}{\partial f_E} < \frac{\partial P(E_i = 1|BP = 0, f_E)}{\partial f_E}$$

if and only if

$$g(\Delta V_*(\pi > 0, f_E)) > g(\Delta V_*(BP = 0, f_E)).$$

Because of the relationship in equation 11, this then implies that the probability density function $g(\ )$ ought to be locally decreasing and hence the cumulative distribution function concave. For unimodal distributions, the probability density function is decreasing for values of the return to schooling greater than the modal return. □

9 Appendix B: Data description

9.1 Ethnographic Atlas

Ethnic norm information on bride price, bride service, matrilocality, female dominated agriculture, and community size is drawn from Murdock's (1967) *Ethnographic Atlas*, which provides ethnographic information for 1,265 pre-industrial societies. However, survey and census data often contain ethnicities or languages associated with ethnicities that are not listed in the *Ethnographic Atlas*. To match these ethnicities/languages to societies in the *Ethnographic Atlas*, each ethnicity/language in the IFLS/Indonesia Intercensal Survey was matched to one of 7,612 language groups in the *Ethnologue: Languages of the World* (Gordon, 2005). These language groups were then matched to societies in the *Ethnographic Atlas* where information on bride price norms was non-missing.

Despite this matching procedure, the number of missing variables for historical community size variable in Indonesia is very high, which is why it is not used as a control in the following regressions. The "mode of marriage (primary)" variable in the *Ethnographic Atlas* provides information on whether the primary mode of marriage is: (1) bride price or bride wealth, (2) bride service, (3) token bride price, (4) gift exchange, (5) sister or female relative exchanged for bride, (6) absence of consideration, or (7) dowry. The bride price indicator variable was coded 1 only if bride price or bride wealth was listed as the primary mode of marriage and 0 otherwise for non-missing values. Similarly, the bride service indicator variable was coded 1 if the primary mode was listed as bride service and 0 otherwise. The "transfer of residence at marriage: after first years" variable is divided into 3 categories: (1) wife to husband's group, (2) couple to either group or neolocal, and (3) husband to wife's group. The matrilocality indicator variable was only coded 1 in the 3rd case. Finally, the female agriculture variable was coded using the "sex differences: agriculture" variable from the *Ethnographic Atlas*. This variable consists of the categories (1) males only, (2) males appreciably more, (3) differentiated but equal participation, (4) equal participation, (5) female appreciably more, (6) females only, and (7) absent or unimportant activity. The female agriculture indicator is coded as 1 for categories 5 and 6 and 0 otherwise.

Table 3 provides a breakdown of the customs surrounding marriage practiced by the different ethnicities that the languages in the 1995 intercensal survey were matched to in the *Ethnographic*

Atlas.

9.2 Indonesia

9.2.1 Indonesia Family Life Survey

The Indonesia Family Life Survey (IFLS) is an ongoing longitudinal study of households in Indonesia covering over 30,000 individuals. Data is gathered from 13 of Indonesia's 27 provinces and the study is considered representative of 83 percent of the Indonesian population. This paper uses data from rounds 3 and 4 of the IFLS (Strauss et al. (2004), Strauss et al. (2009)), which, unlike previous rounds of the IFLS, includes questions about individuals' ethnicities. The first panel of table 9 presents summary statistics on bride price, bride education, husband education, and bride and husband age at time of marriage for approximately 2,400 marriages documented in the round 3 IFLS and 3,200 marriages in the round 4 IFLS where bride price was paid. The second panel of table 9 presents summary statistics on child preferences, bride price, and other important covariates from the sample of adult male and female individuals who were asked how many additional children of each gender they wanted.

9.2.2 Intercensal Population Survey

The Indonesia Intercensal Survey is a large-scale, nationally representative population survey of Indonesia carried out between the 1990 and 2000 censuses. It is housed by the Minnesota Population Center (1995). Importantly, it includes data on primary language spoken which can be linked to ethnicity and matched to an ethnic group's bride price norm in *The Ethnographic Atlas*. It also contains information on educational attainment, birth year, and birth district which, following Duflo (2001), can be combined with data on the number of schools built in 1974 as part of a large-scale school construction program. Table 5 presents summary statistics for the two sub-samples of this data set that we analyze in this paper. The first sample, which is used to compare the enrollment patterns of school-aged females and males in bride price and non-bride price ethnicities, consists of all individuals between the ages of 5 and 22. The second sample is used to estimate the impact of school construction for bride price and non-bride price females. As in Duflo (2001), this sample is composed of a treated group of individuals who were 2–6 at the time of school construction (1974) and an un-treated group of individuals who were 12–18 at the time of school construction.

9.3 Zambia

9.3.1 Data from the Zambia Fertility Preferences Study

Data on bride price amounts and beliefs about bride price and education is drawn from unique survey data collected in Lusaka in the Fall 2014 as part of an experimental study on family planning.

The study involves 728 couples living in the catchment area of Chipata clinic, a poor peri-urban segment of Lusaka. Each spouse of these couples was interviewed in private and was asked a series of questions on the practice of *lobola*, leading to a total of 1,456 observations. Table 17 reports summary statistics for the key variables.

9.3.2 Demographic and Health Survey

To study preferences for daughters versus sons, differential enrollment of daughters and sons, and the effect of school construction on enrollment, we pool the 1996, 2001, and 2007 rounds of the *Demographic and Health Survey* (DHS). Each round of the DHS is a nationally representative survey. All three rounds of the DHS contain data on the district and ethnicity of the surveyed individual, which allows the data to be combined with a district-year level school construction data set and the ethnicity-level norms data in the *Ethnographic Atlas*. Importantly for our study of the impact of bride price norms on the ideal sex composition of children, the survey contains information about the desired fertility of both the male and the female head of the household. Adult respondents answered the question "How many of these children [your ideal number of children] would you like to be boys, how many would you like to be girls and for how many would the sex not matter?" The first panel of table 14 presents summary statistics on ideal number of children and ideal sex composition. Mothers report a slightly higher ideal number of daughters than sons (2.267 vs. 2.151), while fathers report a slightly higher ideal number of sons than daughters (2.251 vs. 2.145). Both differences are statistically significant at the 1 percent level.

All three rounds of the DHS also contain current enrollment data for school-aged children. When we analyze whether daughters are more likely to be enrolled relative to their brothers in bride price versus non-bride price ethnicities, we use a sample of all school-aged children in the pooled DHS (ages 5-22). When we analyze how school construction impacts school enrollment, we limit the sample to primary-school aged children (5-12), since most new schools are primary schools. The second panel of table 14 presents summary statistics for enrollment and the pervasiveness of different ethnic norms in both samples by gender. Unsurprisingly, the first sample is older on average and is less likely to be enrolled in school.

10 Appendix C: Tables

Table A1: Indonesia School Construction Regressions with Ethnic Norm Controls

	(1)	(2)	(3)	(4)
	Indicator variable for the completion of primary school			
	Baseline Regression	Matrilocal	Female Agriculture	Both
$I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$	0.024**	0.025**	0.024**	0.025**
	(0.012)	(0.012)	(0.012)	(0.012)
$I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$	-0.001	-0.001	-0.001	-0.001
	(0.010)	(0.010)	(0.010)	(0.010)
Ethnicity-cohort FEs $\times Intensity_d$	Y	Y	Y	Y
Ethnicity FEs $\times Intensity_d$	Y	Y	Y	Y
District FEs $\times I_e^{BridePrice}$	Y	Y	Y	Y
Duflo Controls $\times I_e^{BridePrice}$	Y	Y	Y	Y
Duflo Controls	Y	Y	Y	Y
District FEs	Y	Y	Y	Y
Cohort FEs	Y	Y	Y	Y
Number of observations	65,403	65,403	65,403	65,403
Clusters	240	240	240	240
Adjusted R^2	0.184	0.184	0.184	0.184

The table re-estimates the pooled Indonesia regressions for females including controls for triple interactions of ethnic norms, $Intensity_d$ and I_k^{Post}. We also include triple interactions with indicator variables for missing ethnic norm data. Standard errors are clustered at the district of birth level.

Table A2: Zambia School Construction Regressions with Ethnic Norm Controls

	(1)	(2)
	Indicator variable for enrolled	
	Baseline	Female Agriculture
$Schools_{dt}/Area_d \times I_e^{BridePrice}$	0.069**	0.414***
	(0.032)	(0.144)
$Schools_{dt}/Area_d \times I_e^{NoBridePrice}$	-0.021	0.308**
	(0.036)	(0.123)
Age by Round by Bride Price FE	Y	Y
Ethnicity by Round FE	Y	Y
Ethnicity by District FE	Y	Y
Number of observations	12,277	12,277
Clusters	70	70
Adjusted R Squared	0.393	0.394

This table re-estimates the Zambia school construction regression including the interaction of an indicator variable for female-dominant agriculture with the treatment variable $Schools_{dt}/Area_d$. Standard errors are clustered at the district level. Note that there is no variation in Zambia in aboriginal plow (none) or historical polygamy (everyone). Bride price is strongly negatively correlated with matrilocality, so including a matrilocality interaction is infeasible.

Table A3: Relationship Between Bride Price Status and Test-Scores for Primary-School Males and Females in Indonesia

	(1) Total Test Score Females	(2) Total Test Score Males
$I_e^{BridePrice} \times I(Primary)_i$	-0.089**	-0.047
	(0.036)	(0.035)
	[-0.143,-0.0272]	[-0.109, 0.010]
Age by Survey Year FE	Y	Y
Province by Year-Tested FE	Y	Y
Number of observations	6,279	5,914
Clusters	13	12
Adjusted R Squared	0.140	0.097

This table tests whether belonging to a bride price ethnicity predicts lower test scores for males and females. The table uses self-reported data on test scores from the IFLS rounds 3 and 4 and restricts the sample to test-takers who took the Ebtanas (the testing regime prior to 2001). Since the Ebtanas was standardized at the province level, the table includes province by year-tested fixed effects. The outcome variable is the respondent's self-reported total test score, normalized to have a mean of 0 and a standard deviation of 1. Standard errors, in parentheses, are clustered at the ethnicity level. Confidence intervals obtained using the wild bootstrap proceedure with 100 draws appear in square brackets.

Table A4: Reasons why bride price increases with education in ZFPS (2014)

Reasons why bride price increases with education		Unprompted reason	Prompted reason	Not a reason
a) Education improves the bride's skills in the house	obs.	217	485	728
		15.17%	33.92%	50.91%
b) Education improves the bride's skills as a mother	obs.	177	613	631
		12.46%	43.14%	44.41%
c) The family invested in the woman and should be compensated	obs.	1,288	0	144
		89.94%	0.00%	10.06%
d) Education enables the woman to bring more money into the home	obs.	213	720	481
		15.06%	50.92%	34.02%
e) Increase literacy in the household	obs.	89	740	580
		6.32%	52.52%	41.16%
f) Other reason (specify)	obs.	27	-	-
		3.96%	-	-

Notes: Data from the first wave of ZFPS (Fall 2014).