Bride Price and Female Education*

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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, perhaps 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.

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1 Introduction

It has become increasingly recognized that culture plays an important role in economic development. However, we have a much less clear understanding of what traditional practices imply for development policy and whether the efficacy of development policies depends on the cultural traits of societies. Development policies generally have not been tailored to the particular 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 practice typically referred to as bride price (or also as bride wealth). A bride price is a transfer at the time of marriage from the groom and/or his family to the bride's family. The payment is typically significant in size, often greater than a year's income, and takes the form of money, animals, or commodities. This cultural practice was (and is) widely practiced in many parts of the world, including Asia and sub-Saharan Africa (Anderson, 2007a). Recently, the custom has come under attack, receiving condemnation as a repugnant and harmful practice, and leading to calls for its abolishment (see e.g., Wendo, 2004; Mujuzi, 2010).

In this paper, we examine how the cultural practice of making bride price payments at marriage impacts the efficacy of policies aimed at increasing education. We document that for two countries with large school construction programs – Indonesia in the 1970s and Zambia in the 2000s – the cultural practice of bride price was a crucial determinant of whether the increased availability of schools resulted in increased school enrollment rates of girls. In areas where bride price has traditionally been practiced, school construction has a large and statistically significant impact on educational attainment for girls. However, in areas where the practice has been absent, school construction does not have a detectable impact on female education.

We begin our analysis 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 between 1974 and 1980. The seminal paper looking at the impacts of this project only examines a sample of males, 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 show that this average effect masks important heterogeneity that depends on a group's marriage customs. We only observe a positive

impact of the program on female education among girls from ethnic groups that traditionally engage in monetary bride price payments at the time of marriage. Our empirical analysis shows that these findings are not driven by other important cultural factors that may be correlated with bride price, such as women's role in agricultural production or matrilineality.

We verify the findings by studying another 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. Although the school construction experiment in Zambia is not as clean from an empirical point of view, a benefit of working in Zambia is that we have collected detailed, fine-grained data that help us to better understand the mechanisms underlying our basic finding. We discuss this in more detail below. Looking at the school building policy in Zambia, we observe the same patterns in the data. The school expansion had a substantially larger impact on female education among ethnic groups that engage in bride price payments at marriage.

Having documented this pattern in two countries, we then turn towards the goal of better understanding the exact reasons behind this finding. Motivated by first-hand accounts of education being an important determinant – actually, the most important determinant – of the bride price received at marriage, we put forth and test the following explanation. Groups that engaged in bride price payments at marriage are more likely to take advantage of the increased supply of schools by sending their girls to school because the returns for their parents to doing so are higher. Where bride price is traditionally practiced, increased investments in education by parents leads to an increase in the amount of bride price received by parents at the time of 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' investments in their daughters' education does not exist.[1]

A second, and closely related, reason why the bride price would influence parental investments in daughters is through 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

[1]This mechanism is 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). 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).

capital (Hayek, 1945).[2] If parents are uncertain about the returns to education for women, the 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.

Ultimately, both mechanisms serve to increase parents' incentives to invest in their daughter's education and to take advantage of the increased opportunities for schooling brought on by the school expansion policies considered here. We formalize this logic by developing a model that outlines the mechanism, and the assumptions needed to explain our results. In the model, the presence of the bride price provides an additional reward to parental investment in a daughter's education that is absent for non-bride price cultures.[3] For this reason, girls from ethnic groups that engage in bride price payments are more likely to be educated. We then show that as long as enrollment rates are sufficiently low and the returns to education are single-peaked, then ethnic groups that practice bride price will have higher responsiveness to a school construction program that reduces the cost of education. Interestingly, a number of additional hypotheses arise from the model. In particular, ethnic groups that practice bride price should have higher levels of average education overall. Despite higher *ex ante* levels of education, we still expect to see greater responsiveness of this group to the policy compared to ethnicities that do not practice bride price. In addition, because the average education level of girls belonging to bride price ethnicities is higher, the average inherent ability of girls belonging to bride price cultures is higher than for girls belonging to non-bride price cultures. In the Appendix, we study the assumptions of this framework in an equilibrium matching model that allows the bride price the returns to education in the marriage market and show that all assumptions needed for our propositions are met in that setup.

Guided by the structure of the model, we then turn to auxiliary analyses to verify the assump-

[2] 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, 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).

[3] The link between bride price and parental investments was first mentioned in Becker (1981):"Bride price then not only compensate parents for the transfer of their property, but also induce them to invest optimally in daughters if girls with appropriate accumulations of human capital command sufficiently high prices." (p.129).

tions that are necessary in the model and to test the predictions that arise from the model. First of all, we show that, both in Indonesia and Zambia, bride price is widely practiced and that the value of the bride price is quantitatively important. We then show that the value of the bride price increases significantly with the level of education of the bride. In Indonesia, completing primary school is associated with a 66% increase in the bride price payment, completing junior secondary is associated with a further 64% increase, and completing college with another 84% increase. These relationships are very robust and remain strong even when conditioning on a large set of observable characteristics, including the groom's education.

In Zambia, we find the same patterns in the data and also similar magnitudes. In addition, we are also able to examine information on individuals' perceptions of the reason behind the positive relationship between the bride price payment and the bride's education. The responses do not indicate that the association between bride price and education is spurious and due to another factor. Instead, the most common explanation was that the higher bride price was due to a moral obligation on the part of the groom's family to compensate the bride's family for the greater educational investments that they made in their daughter.[4]

We then test two additional predictions that emerge from the model, namely that the average level of education of women belonging to bride price cultures should be higher than for women that belong to culture that do not have bride price, and that the average ability of enrolled students from bride price cultures should be lower than the average ability of enrolled students from cultures that do not have bride price. We find that the first prediction holds in both Indonesia and Zambia. Looking at the cross-section, primary school completion rates are higher among bride price ethnic groups than non-bride price groups. We test the second prediction within Indonesia by examining student test scores. We find that, consistent with the model, the average test score among students belonging to bride price ethnicities is lower than among students belonging to ethnic groups that do not have bride price.

Lastly, we test a number of plausible alternative mechanisms that could also explain the differential response of cultures with different marriage customs to the school construction programs. In particular, we test whether there is evidence that families with a tradition of bride price are wealthier and therefore, have a greater ability to send their daughters to school in response to the

[4]See Dalton (1966) and Moore (2016).

government programs. We also test whether women from bride price ethnicities have higher returns to education, which could in turn generate the higher responsiveness to the programs. We find no evidence for either of these mechanisms. Bride price ethnic groups are not wealthier, and they do not appear to have higher returns to female education in the labor market.

Our findings build on and advances the literature that examines the impacts of gender-related cultural norms (e.g. Fernandez, 2007; Fernandez and Fogli, 2009; Fernandez, 2011). 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, such as 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 the cultural practice of bride price, particularly if it justifies abuse or lowers the status of women within marriage (Bishai and Grossbard, 2010), our results on the relationship between bride price and female education suggest that abolishing or discouraging these payments should likely be considered alongside additional policies to promote female education.

The paper is structured as follows. We begin in section 2 by providing context and an overview of the custom of bride price, focusing particularly on the specifics of Indonesia and Zambia. In section 3, we then turn to Indonesia's school construction program. We show that although the program had little effect female education on average, this masks significant heterogeneity. For women from bride price cultures, school construction is estimated to have had a large positive impact on education, while for women from cultures that do not practice bride price, there is no evidence of any increase in education. We then turn to Zambia and in section 4, document that one observes the same pattern there. In an attempt to propose a clear mechanism behind this

result, in section 5 we present a simple model that shows how the presence of a bride price (that is increasing in the bride's education) affects parent's investments in their daughter's education and their response to an increase in the supply of schools. The model is particularly useful in highlighting the assumptions that are necessary to obtain the comparative static that we see in the data, as well as deriving additional predictions that are not *ex ante* obvious. Therefore, in section 6, we use data from a variety of sources to verify the assumptions of the model and to test its auxiliary predictions. Lastly, in section 7, we provide concluding thoughts.

2 Context and Overview of Bride Price

The practice of paying a bride price at the time of marriage is a custom that is widespread throughout sub-Saharan Africa and many parts of Asia. The practice has a long history, dating at least as far back as 3000BCE, being used by the Ancient Egyptians, Mesopotamians, Hebrews, Aztecs, and the Incas (Anderson, 2007a, pp. 152-153).[5] Historically and today, the magnitude of the bride price is typically significant. Anderson (2007a) summarizes existing evidence on the magnitude of bride price payments (see Anderson, 2007a, table 4). Although there is significant heterogeneity, it not uncommon for bride price transfers to be in excess of a year's income and sometimes as large as seven or eight times annual income. Our evidence from modern Indonesia and Zambia is consistent with these numbers. As we discuss in more detail in section 6.1, in both countries bride price payments are very large, often in excess of a year's income.

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. The bride price in Indonesia is paid to the bride's parents and is linked to *adat* (a traditional culture that 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. In fact, in the nineteenth century, the *Ulama* (Islamic religious scholars) worked with the British colonial

[5]By contrast, the practice of dowry is much more recent, having likely been first practiced in ancient Greece and Rome.

government to try reduce the value of the bride price (Boomgaard, 2003, p. 201).

As in much of sub-Saharan Africa, in Zambia bride price is referred to as *lobola*, and is widely practiced among some ethnic groups. In data collected during the Zambia Fertility Preferences Survey (ZFPS) in peri-urban Lusaka (we discuss this source in more detail below), a bride price was paid in 86 percent of marriages. In Zambia, bride price also functions as legal proof of marriage, and some churches do not consider a couple married until a 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).

Traditionally, many groups, e.g., the Tonga people, negotiated bride price in terms of cows and continue to negotiate in terms of cows to this day. Since cows have grown greatly in value, it is believed that this explains why Tonga bride prices are relatively high today. 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.

A lively public debate has ensued over the past decades, particularly in Africa, on the negative consequences of the bride price custom. The objections arise due to the perceived commodification of women through a transaction, potentially leading to ill-treatment.[6] 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 negative consequences 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

[6]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).

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).

Instead of banning bride price, some governments have attempted to legislate particular aspects of the practice, such as banning refunds upon divorce or putting limits on the amount that can be paid for bride price. For example, 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).[7] 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).

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. Based on qualitative research, Vroklage (1952) rejects the notion that a bride price is the price paid for the purchase of a woman. Interviewees told him, "a bride is not a buffalo" and "a bride is not an animal."

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, p. 12).

Extensive focus groups conducted by our research team in Lusaka (Zambia) also suggest that the amount of bride price that a bride's family receives increases in the parents' educational expenditures on the daughter. One respondent told us that when a parent negotiates *lobola*, he or she calculates how much was spent on education. Parents also 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

[7]To combat the potential of early marriage due to bride price, the local government in Laikipia County, Kenya has also instituted a program to give cows to parents whose daughters graduate from high school.

"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 measures differences in the traditional marriage customs of ethnic groups using the *Ethnographic Atlas* (Murdock, 1957). The Atlas provides information on the transfers made at marriage. In the Atlas, groups are categorized as belonging to one of the following categories (Murdock, 1981, pp. 92–93):

1. **Bride price:** Also known as bride wealth. A transfer of a substantial consideration in the form of goods, livestock, or money from the groom or his relatives to the kinsmen of the bride.
2. **Token bride price:** A small or symbolic payment only.
3. **Bride service:** A substantive material consideration in which the principal element consists of labor or other services rendered by the groom to the bride's kinsmen.
4. **Gift exchange:** Reciprocal exchange of gifts of substantial value between the relatives of the bride and groom, or a continuing exchange of goods and services in approximately equal amounts between the groom or his kinsmen and the brides' relatives.
5. **Exchange:** Transfer of a sister or other female relative of the groom in exchange for the bride.
6. **Dowry:** Transfer of a substantial amount of property from the bride's relatives to the bride, the groom, or the kinsmen of the latter.
7. **No significant consideration:** Absence of any significant consideration, or giving of bridal gifts only.

Looking at traditional marriage customs globally using the *Ethnographic Atlas*, we finds that bride price is the most commonly practiced tradition, occurring in approximately 52% of the societies in the *Ethnographic Atlas*.[8] The next most common outcome is for there to be no dominant

[8]Note that this figure is an unweighted average across all ethnic groups in the *Ethnographic Atlas*.

practice, which is the case for about 22% of societies. At the aggregate level, dowry is uncommon, occurring in less than 3% of societies. The full distribution of marriage customs across all categories is reported in the first set of columns in table 1.

Table 1 also reports the distribution for the 28 ethnic groups that are part of our Indonesian analysis and for the 21 ethnic groups that are part of our Zambian analysis. It is important to note that none of the ethnic groups within Indonesia or Zambia engage in the practice of dowry transfer at the time of marriage. Thus, our estimates of differences between bride price cultures and non-bride price cultures do not reflect the effects of whether a group practices dowry or not. As we will see, this is also true for the sample from Zambia.

As a concrete example, the Javanese are one of the Indonesian ethnic group that does not pay bride price. Instead, there is no common universal practice, although it is customary for the man to give a present to the bride at the time of engagement and again another present at the time of marriage. The size of the present could be expensive or cheap, depending on the specific customs of the different social group, with wealthier groups giving more expensive presents (Geertz, 1961, p. 62–65). In the *Ethnographic Atlas*, the Javanese are categorizes as having an "no significant consideration," although "token bride price" is also listed as an alternate custom.

The general understanding is that bride price societies also tend to be societies that are patrilineal (e.g., the wife joins the husband's kinship group following marriage). For example, according to Vroklage (1952) "patriarchy", likely referring to patrilineality, is associated with bride price. While Vroklage (1952) notes that there are bride price groups that practice what he calls "matriarchy," (that are matrilineal). He explains that the bride price customs likely originated in nearby "patriarchal" societies and were then imitated by "matriarchal" societies.[9] Looking at a global sample from the *Ethnographic Atlas*, one observes that the practice bride price is positively associated with patrilinearity, with female participation in agriculture, with polygamy, and negatively associated with matrilinearity. These correlations are reported in table 2, which reports cross-ethnicity estimates of the relationship between each of the customs and the practice of bride price. Each cell in the reports estimates from one regression where the custom is the independent variable and a

[9]In using the term "matriarchy," Vroklage (1952) is likely referring to either (or both) matrilineality and matrilocality. These two practices often go hand-in-hand. While matrilineality means that the children join the kinship group of the bride, matrilocality means that the bride and her husband live with her parents after marriage. Matrilocality may affect the education decision of parents, incentivizing them 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 matrilocal societies have greater educational investment in daughters relative to sons.

bride price indicator is the independent variable. The table reports the number of observations, the coefficient on the constant (the non-bride price group) and the coefficient for an indicator variable that equals one if the ethnicity practices bride price. As shown, although the correlations are very strong in the global sample, in the Indonesian sample, they all become insignificant, and most become insignificant in the Zambian sample as well.

The seminal work on polygyny by Tertilt (2005) and Tertilt (2006) indicates that, in economies where polygyny is prevalent, high bride price are necessary to clear the marriage market and are likely to distort fertility and savings patterns. In our context, however, polygyny is rare. In the 1995 Intercensal Survey of Indonesia, all couples report being monogamous. In the pooled 1996, 2001 and 2007 Zambia Demographic and Health Surveys in 1996, 19.44% of women live in polygynous relationships, impliying that at most one tenth of marriages are polygynous.

Relative to bride price, the dowry has received much more attention in the modern economic development literature. This is likely due to the fact that this is the dominant marriage payment in South Asia (Anderson, 2007a) and has historically been prevalent in Europe. One might be tempted to apply our analysis to countries with variation in whether dowry is practiced or not. While we feel this is a fruitful line of inquiry, one should not simply view the dowry as the flip-side of the bride price and vice versa. As Goody and Tambiah (1973) put it: "Bridewealth and dowry then are very far from being mirror opposites" (p. 6). There are important differences between the two practices beside the direction of the payment. With bride price, the payment is made from the groom's parents to the bride's parents. However, with dowry, the payment is made from the bride's family to the bride. Thus, the transfer is given to the new couple and not to the bride's parents (Anderson, 2007a). This has led many scholars to view the dowry as having an important pre-mortem bequest motive (e.g., Goody and Tambiah, 1973; Botticini and Siow, 2003). In constrast, this is not true for the bride price. In addition, the existing evidence does not appear to indicate that the amount that the bride's parents pay as a dowry decreases in the education of their daughter (e.g., Rao, 1993).

In bride price cultures, an interesting dynamic emerges, that has potentially important implications for female education. Typically, bride price payments are sizeable and go to the father of the bride (or male kinsmen), who then decide which males of the family can use the bride price for payment of their marriage. Thus, the bride price has a number of effects. It serves to increase the

authority of the father (he effectively decides who marries when); it emphasize a brother's tie with his sister; and it generates a system whereby all males in the family have aligned incentives and want to receive the largest bride price possible from their sister's marriage (Goody and Tambiah, 1973, p. 5). Note that these effects will be particularly strong when the currency that is used is used solely for bride price. This is in fact the practice in many parts of Africa where the bride price (i.e., lobola) is paid using livestock. An example is the Lovedu of Southern Africa who only buy and sell cows as part of marriage. Otherwise, families do not keep stock of cattle. Krig (1964) write that "cattle coming in as bride-price are not supposed to be used for any other purpose than marriage... most Lobedu families do not possess cattle except for short periods of time" (p. 160).

The use of cattle in much of Africa in general, and Zambia in particular, can be contrasted with Indonesia, where bride price typically takes the form of goods, money and resources that have value and use outside of the circular sphere of marriage payments.

3 Differential Effects of Education Policies: Evidence from Indonesia

We begin our empirical analysis by examining data from Indonesia. As we document in full detail in section 6.1, within Indonesia, the practice of bride price at marriage is common and the value of the transfer made is significant. For example, in 2000, 87 percent of marriages that were recorded in the IFLS reported that a bride price was paid. In the 2007 IFLS, this figure was 85 percent. Among those ethnicities that traditionally practice bride price, the median value of the bride price transfer is 9 percent of average annual per capita GDP and the mean value of the transfer is 82 percent of average annual per capita GDP.

To examine whether education-oriented development policies have differential effects based on this cultural practice, we exploit the same quasi-experimental variation in number of schools built by birth district in Indonesia as in Duflo (2001). We use the 1995 Indonesia Intercensal Survey, and study the differential effect of school construction policy on schooling by bride price custom.

We link individuals in the Intercensal Survey to their traditional marriage customs using their self-reported language (i.e., mother tongue). In total, 174 different languages spoken are recorded as being spoken in the Intercensal Survey, which we manually match to ethnic groups in the

Ethnographic Atlas. In the end, the 174 language groups are matched to 28 distinct ethnic groups from the *Ethnographic Atlas*.[10]

The education intervention policy we examine is Indonesia's 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 increased years of schooling completed by male students by 0.27 years.

We start with the baseline estimating equation from Duflo (2001):

$$y_{idk} = \alpha_k + \alpha_d + \beta_1 I_k^{Post} \times Intensity_d + \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j + \varepsilon_{idk} \quad (1)$$

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.[11] 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 (and were already out of school by the time of the intervention). The partial treatment cohort, born between 1963 and 1967 is omitted from the sample. 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.

Panel A of table 3 presents summary statistics from the sample.

[10] All but 11 of the 174 language groups in the Indonesia Intercensal survey could be matched to an ethnicity in the *Ethnographic Atlas*. These comprise 0.43 percent of the observations with non-missing language data.

[11] 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.

Estimates of equation (1) are reported in table 4. 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. This finding on female schooling is consistent with Hertz and Jayasundera (2007).

We next show that this average masks significant heterogeneity. To do this, we estimate an extension of equation (1) that allows for a differential impact of the school construction program depending on whether an ethnic group traditionally practices bride price payments:

$$\begin{aligned} y_{iedk} &= \beta_1 I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice} + \beta_2 I_k^{Post} \times Intensity_d \times I_e^{BridePrice} \\ &+\alpha_k I_e^{NoBridePrice} + \alpha_k I_e^{BridePrice} + \alpha_e + \alpha_e I_k^{Post} + \alpha_e Intensity_d + \alpha_d I_e^{NoBridePrice} \\ &+\alpha_d I_e^{BridePrice} + I_e^{NoBridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j + I_e^{BridePrice} \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Upsilon}_j + \varepsilon_{iedk}, \end{aligned} \tag{2}$$

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 specification. 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 $I_k^{Post} \times I_e^{BridePrice}$. 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 practices 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

$I_e^{BridePrice} \sum_j \mathbf{X'}_d \mathbf{\Gamma}_k^j \mathbf{\Gamma}_j$.

The estimates of equation (2) are reported in column 3 of table 4. As shown, we find a significant, positive effect of the school construction program on elementary school completion rates for bride price females but not non-bride price females. 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 (2) separately for girls belonging to ethnic groups with bride price (column 4) and for ethnic groups without bride price (column 5).

Given that the practice of bride price is potentially correlated with other cultural characteristics that may themselves be related to gender outcomes, we investigate the robustness of our estimates to accounting for heterogeneity in the impacts of the school construction program due to other cultural characteristics. The first cultural characteristic we consider is the role women traditionally played in agriculture. Boserup (1970) argues that female participation is strongly associated with the practice of bride price. Giuliano (2014) confirms this empirically, showing a correlation between bride price and female participation in agriculture across all ethnicities in the *Ethnographic Atlas*. Thus, we also account for traditional female participation in agriculture using variable $v54$ from the *Ethnographic Atlas*. The measure classifies ethnicities as being in one of eight categories: no information available, males only, males appreciably more, differentiated but equal participation, equal participation, females appreciably more, females only, agriculture is absent or unimportant. Using this coding, we create an indicator variable that equals one if the ethnicity is coded as having 'females appreciably more' or 'females only' traditionally engaged in agriculture.

Anthropologists commonly view bride price, or bridewealth, as a transfer the husband makes to the wife's family to compensate them for the loss of their daughter (Dalton, 1966). Thus, we would expect bride price to be more widely practiced among ethnic groups that are patrilineal (i.e., the bride joins the kinship group of the groom and his family at the time of marriage). In addition, Bau (2014) provides evidence that matrilocality, which is often associated with matrilineality, is related with greater parental investment in daughters relative to sons. Using information from variable $v43$ of the *Ethnographic Atlas*, we create an indicator variable that equals one if the ethnicity is identified as being matrilineal.

For female agriculture, some ethnic groups are coded as having no information available. Thus,

we also create an indicator variable that equals one if we do not have information to categorize the ethnicity in question. Using these constructed covariates, we test for heterogeneity in the effects of school construction by traditional female participation in agriculture and by traditional matrilineality. This is done by including the analogous interactions as for bride price, namely the newly constructed variables are interacted with $Intensity_d \times I_k^{post}$ with all of the appropriate double interactions also included.

The estimates are reported in table 5. The coefficients on the bride price and non-bride price interactions are virtually unchanged. Column 1 reports the baseline estimates for comparison, column 2 includes the matrilocality interactions, column 3 includes the female agricultural interactions, and column 4 includes both sets simultaneously. The estimated differential effect by bride price remains robust to the inclusion of these additional covariates. For bride price girls, a one standard deviation increase in school construction increases primary school completion by 2.0 percentage points.

An alternative data source to the 1995 Indonesian Intercensal Survey is the 2010 Indonesian Census, which also reports elementary school completion. A benefit of the 2010 data over the 1995 data is a sample size that is much larger. The estimates, which are reported in appendix table A1, show results that are qualitatively similar to the estimates using the 1995 data.

As a placebo test, one can estimate equations (1) and (2), but assigning children aged 12–17 at the time of the school construction to be the placebo treated cohort and children aged 18–24 at the time to be the placebo untreated cohort. The estimates show no statistically significant effects of placebo treatment on males, female, bride price females, and non-bride price females. See appendix table A3 for the estimates.

As in Duflo (2001), we can also allow the effect of the school construction to vary by cohort, but restrict the effect of the construction to be zero for those that were older than 12 in 1974 and therefore would be too old to attend primary school in 1974. Doing this, we find that the effect of school construction for bride price females is generally positive, and the coefficients on the interactions between the cohort indicator variables and the intensity of treatment are jointly significant (F-stat = 7.58, $p < .01$). In contrast, the coefficients for non-bride price females are typically small and negative. The estimates are reported in appendix table A3.

In table A4, we test whether our Indonesia results are driven by Muslim bride price traditions. Muslim bride price, called *mehr* differs from the bride price we study, which is paid to the parents

of the bride at the time of marriage. *Mehr* serves as divorce insurance, and is paid to the bride if a marriage ends in divorce. Ambrus et al. (2010), who study the interaction of *mehr* and dowries in Bangladesh, provide a more complete discussion of mehr. In appendix table A4, we allow the effects of school construction to differ by whether an individual reports being a Muslim, as well as the traditional bride price practices of their ethnic group. We find that the effect of bride price status is larger and more significant among non-Muslims, suggesting that neither an Islam effect nor the practice of *mehr* is driving our results.

4 Replicating the Finding in Zambia

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

There are a number of reasons why Zambia provides a very good 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 in 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.[12]

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.

Recall that table 1 reports the distribution of marriage payments across the ethnic groups in our Zambian sample. Ethnic groups either practice bride price payments, token bride price, or

[12]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 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.

bride service. A benefit of the Zambian sample is that many of the cultural traits that may be correlated with marriage payments do not vary across Zambian ethnic groups. As we saw in table 2, within Zambia there is no variation in traditional practice of polygamy, which was practiced by all groups.

Table 6 provides additional summary statistics for the two subsamples of the pooled 1996, 2001, and 2007 rounds of the Zambian DHS that we use to analyze the effects of bride price and its interaction with the school construction program on enrollment.

To examine the effect of a large school expansion program on enrollment by bride price customs, we combine the pooled Zambia 1996, 2001, and 2007 DHS data with 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 (2) 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. Because exposed cohorts may not have completed primary school by 2007, our outcome variable is enrollment in primary school.

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 impact of the program on boys versus girls, and for girls, we examine differences in the impact for ethnic groups that practice bride price and those that do not.

Our estimating equation is:

$$\begin{aligned} y_{iedkt} &= \beta_1 Schools_{dt}/Area_d \times I_e^{NoBridePrice} + \beta_2 Schools_{dt}/Area_d \times I_e^{BridePrice} \\ &\quad + \alpha_{kt} I_e^{NoBridePrice} + \alpha_{kt} I_e^{BridePrice} + \alpha_{et} + \alpha_{ed} + \varepsilon_{iedkt}, \end{aligned} \tag{3}$$

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 stock of schools in district d and year t, normalized by the district area in squared kilometers. 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 (2). 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 (2).

Estimates of equation (3) are reported in table 7. Columns 1–3 report estimates of a variant of equation (3) that does not allow for a differential effect depending on an ethnic group's marriage customs. We see that in Zambia a similar pattern emerges as in 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). In particular, for bride price girls, a one standard deviation increase in school construction increases primary school completion by 1.5 percentage points.

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

Table 8 tests whether the results in table 7 can be explained by pre-trends in districts that received more schools. Table 8 duplicates the regressions in table 7, 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 characteristics, we study whether our results are sensitive to controlling for the interaction between female agriculture and matrilineality 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. As a result, the coefficients are identified by little variation. Appendix table A7 reports the results of the Zambia school construction regressions including interactions between the treatment $Schools_{d,t+1}/Area_d$ and an indicator variable for whether agriculture is female-dominated and whether matrilineality is practiced, as well as its interaction with an indicator variable for whether data on female participation in agricultural is missing. When female agriculture controls are included, 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 as well. Nonetheless, a F-test for the final column of appendix table A7 shows that β_2 is significantly larger than β_1 ($F = 6.22, p < .05$).

5 Model

Having provided evidence that school construction policies in both Indonesia and Zambia exhibit different impacts on girls' education depending on whether the ethnic group practices bride price or not, we now turn towards providing a theoretical underpinning to what in our opinion is the most natural explanation for this pattern: the returns to parents of educating daughters are higher in bride price ethnicities.

We present a simple model of parents' decisions to educate their daughters in response to increased access to schooling. 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, under some assumptions that are suitable to our context, we can expect that reducing the cost of schooling would have 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. In Appendix A, we develop a simple model of matching in the marriage market with bride price, in

which spouses sort on education. The equilibrium model is a special case of the type of matching setups that our basic framework can accommodate, and we show that all our assumptions are strightforwardly satisfied in that context.

5.1 Setup

Parents live for two periods, and receive utility from consumption c_t and through the well-being of their daughter v^f via an altruism parameter $\gamma \in (0,1)$. Let r be the discount rate. Daughters are characterized by ability a_i, which is distributed according to a unimodal probability density function g and a cumulative distribution function G. Daughters are also characterized by preferences for marriage θ_i, distributed according to a pdf f and a cdf F. These preference distributions F and G are independent.

In the first period, parents decide how much to consume (c_1) and whether or not to educate their daughter ($S \in \{0,1\}$) at the cost k. In the second period, they only decide how much to consume (c_2) and may receive a bride price if they belong to an ethnic group that engages in these payments.

Hence, household i solves the following problem:

$$\begin{aligned} max_{S\in\{0,1\},c\geq 0} \quad & c_1 + \frac{c_2}{1+r} + \gamma[v^f(S_i, I_e, a_i, k, \theta_i)] \\ s.t. \quad & c_1 + k \cdot S_i \leq y_1 \\ & c_2 \leq y_2 + BP(I_e, S_i). \end{aligned} \tag{4}$$

The utility of the daughter $v^f(S_i, I_e, a_i, k, \theta_i)$ depends on her educational attainment S, on whether she belongs to an ethnic group that engage in bride price payments ($I_e = 1$) or one that does not ($I_e = 0$), on her ability a_i, on her taste for marriage θ_i and on the cost of schooling k. Ability increases the daughter's utility of going to school, but will have no impact on her utility in the second period (this is a common separability assumption, see Noldeke and Samuelson (2015)). All women marry.[13]

[13] In the Appendix, we describe under which assumptions we obtain an equilibrium in which everyone marries. In both countries, marriage rates are high. In the Indonesia 1995 Intercensal Survey (SUPAS), 91.99% of women aged 25-45 have been or are married. In the pooled Zambia DHS from 1996, 2001 and 2007, that rate is equal to 95.15%. Importantly, primary school completion is not associated with a statistically significant change in the marriage probability in Zambia, and with a slightly *higher* probability of marriage in Indonesia, which would reinforce our interpretation.

Define $v_{S_i}(I_e, k)$ as the material utility that the daughter obtains from the labor and the marriage market in the second period, as a function of her education, her ethnicity and the cost of schooling. This is an equilibrium object and is determined in the labor and the marriage market. Thus, the daughter's utility can be decomposed as:

$$v^f(S_i, I_e, a_i, k, \theta_i) = a_i S_i + \frac{v_{S_i}(I_e, k) + \theta_i}{1 + r}.$$

The relationship between v_{S_i} and the cost of schooling k is meant to capture any potential general equilibrium effect of school construction on the daughter's value and on the returns to schooling. Define such returns to schooling for a woman as

$$\Delta v_e(k) = v_1(I_e, k) - v_0(I_e, k).$$

Hence, the returns are $\Delta v_{BP}(k)$ for bride price groups and $\Delta v_{NoBP}(k)$ for the other groups. There is no borrowing nor saving, but as long as $y_1 > k$, the household does not need to borrow to finance the education of the daughter. Note that the same household could have multiple daughters and sons, and as long as borrowing constraints do not bind, their problems can be separated.

In line with the prevailing interpretation of bride price, we consider it as a payment from the groom to the parents of the bride to compensate them for the loss of the flow of services that the daughter would provide if she remained in her parents' household. Hence, the parents appropriate a portion of the marital surplus, but the bride price is not the only transfer that takes place within marriage. In Appendix A, we show how the bride price affects the allocation of resources inside the household in an equilibrium model of marriage. The bride price payment takes the form:

$$BP(I_e, S) = I_e \left[b + \pi S \right].$$

Assumption 1 (A1): Bride price amounts are increasing in a woman's educational attainment: $\pi > 0$.

5.2 Bride price and the education decision

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

$$a_i > \frac{1}{\gamma}\left[k - I_e \cdot \frac{\pi}{1+r}\right] - \frac{\Delta v_e(k)}{1+r}.$$

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 k, has a daughter with ability $a^*_{I_e}(k)$ equal to

$$a^*_{I_e}(k) \equiv \frac{1}{\gamma}\left[k - I_e \frac{\pi}{1+r}\right] - \frac{\Delta v_e(k)}{1+r}.$$

Household i makes the educational investment as long as the utility gains for the daughter are higher than the ones of the marginal girl ($a^*_{I_e}(k)$). Hence, the probability that household i educates the daughter is:

$$Pr(S_i = 1 | I_e, k, \theta_i) = Pr(a_i \geq a^*_{I_e}(k)) = 1 - G(a^*_{I_e}(k)).$$

To obtain testable implications, we impose some restrictions on the relationship between the returns to schooling across ethnic groups.

Assumption 2 (A2): $\pi > \gamma[\Delta v_{BP}(k) - \Delta v_{NoBP}(k)]$.

This assumption has two main implications. The first one is that parents value the bride price payment more than they dislike the cost that this payment imposes on their daughter. Clearly, imperfect altruism ($\gamma < 1$) plays a key role here. The second implication is that, while the returns to education are allowed to differ between ethnic groups, the differences may not be large enough to eliminate the incentive coming from the bride price education premium.

Assumption 3 (A3): $\Delta v'_e(k) < \frac{1+r}{\gamma}$.

This assumption tells us that, in any ethnic group, a decline in the cost of schooling does not generate general equilibrium effects large enough to induce the parents to not respond. Because $\frac{1+r}{\gamma} > 1$, we allow for some decline in the return to schooling following the school construction, but we impose an upper bound in assumption 3.

Proposition 1. *Under assumptions **A1-A3**, the probability of education $Pr(S_i = 1)$ is:*

(i) higher among ethnicities that engage in bride price payments;

(ii) decreasing in the cost of education.

Proof. See Appendix A. □

Proposition 1 simply tells us that, if general equilibrium effects are small and if parents are not perfectly altruistic, we should observe higher rates of enrollment among ethnicities that practice bride price. This result is intuitive: bride price provides an additional incentive for parents to educate their daughter. 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.[14]

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. □

While this model rules out unobservable traits that are correlated with bride price payments and with education, it is important to remember cases in which heterogeneity in the returns to education Δv or ability a_i enter bride price payments, bride price will be higher for educated women whether or not $\pi > 0$. If women who command higher bride price are also more likely to be educated, hedonic regressions of bride price payments do not have a causal interpretation, as mincerian regressions cannot typically identify the labor market returns to education when educational attainment is endogenous (Griliches, 1977; Card, 1994; Heckman et al., 2006).

5.3 Bride price and response to education policies

We now examine how a change in the cost of education k affects the probability of education depending on the bride price custom. In this model, ethnic groups that engage in bride price respond more to school construction than the other groups if and only if:

$$g\left(a_{BP}^{*}\right) - g\left(a_{NoBP}^{*}\right) > \frac{\gamma}{1+r}\left[\Delta v'_{BP}(k) g\left(a_{BP}^{*}\right) - \Delta v'_{NoBP}(k) g\left(a_{NoBP}^{*}\right)\right]. \tag{5}$$

[14] From an intergenerational perspective, efficient investment in schooling implies $a_i > \left[k - \frac{\Delta v_e(k)}{1+r}\right]$. Because altruism is imperfect, the bride price custom can help overcoming underinvestments in daughters' schooling due to imperfect commitment across generations.

We define our context to have low rates of female schooling if the girl with modal ability does not get educated. Because of unimodality of the distribution of ability, when female schooling is low, $g\left(a^*_{BP}\right) - g\left(a^*_{NoBP}\right) > 0$.

To explain our empirical results, we need an additional assumption: if school construction reduces the returns to education, bride price groups cannot experience declines in returns to education that are too large relative to those experienced by the other ethnic groups. Formally:

Assumption 4 (A4): $\left[\Delta v'_{BP}(k) + \frac{g\left(a^*_{NoBP}\right)}{g\left(a^*_{BP}\right) - g\left(a^*_{NoBP}\right)}\left(\Delta v'_{BP}(k) - \Delta v'_{NoBP}(k)\right)\right] < \frac{1+r}{\gamma}$.

Under this assumption, the empirical results follow directly.[15]

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.*

Proof. See Appendix A. □

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 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 such high 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.

[15]The unimodality 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 related argument to explain why women's education rates have overtaken those of men in developed countries.

6 Additional Evidence

In this section, we examine the main assumption and implications to our model and bring additional datasets to show consistent evidence from both Indonesia and Zambia in support of our interpretation that the bride price custom can explain the heterogeneous effects of school expansion that we have documented across ethnic groups.

6.1 Are bride price transfers large enough to affect parent's decisions?

An important implication of the model is that, in order for there to be an effect of the bride price custom on parental decisions regarding their daughters' education, the bride price payment does not have to be particularly large. Whether or not an ethnic group traditionally engages in bride price payments will contribute to determining which households are on the margin of educating their daughter or not. Thus, even if the amount of the bride price is small, it can still affect those on the margins. However, the larger the bride price and the more strongly it increases with education, the larger we expect the effects to be. Thus, here we document that bride price transfers are sizable in both Indonesia and Zambia.

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 bride price and in 2007, 85 percent of marriages included a bride price.[16] Appendix table A6 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 4 percent of GDP per capita and the mean bride price is 45 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 9 percent of GDP per capita and the mean is 82 percent.[17] Therefore, bride price

[16]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).

[17]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.

payments are significant, particularly compared to a family's annual income.

In Zambia, bride price (*lobola*) is widespread. In the data from the Zambia Fertility Study (ZFPS - see the data appendix for a description of the data) in peri-urban Lusaka, a bride price transfer was made in 87.5% of marriage in which the wife belong to an ethnic group that traditionally engages in bride price. Among these marriages, the mean payment corresponds to 122% of the per capita GDP in the year of marriage, the median to 58%. Among ethnic groups that traditionally engage in bride price, the mean payment was 182% of the per capita GDP in the year of marriage, the median was 72%.

6.2 Are traditional bride price norms related to modern bride price payments?

In the school-construction analysis, we use historical marriage payments norms form the *Ethnographic Atlas* to differentiate between ethnic groups that engage in bride price payments from those that don't. In this subsection, we show that these historical norms are highly correlated with present bride price practices.

In the round 3 and 4 IFLS data, a positive bride price payment is reported for 91% of couples that belong to groups that do not practice bride price in the *Ethnographic Atlas* ($I_e^{BrPr} = 1$) and for 90% of the other couples ($I_e^{BrPr} = 0$). The small difference on the extensive margin is expected, since groups that do not have actual bride price often engage in token bride price practices or other forms of symbolic transfer. The differences on the intensive margins are much more substantial: the median bride price payment equals 15% of the per capita GDP in the year of marriage for traditional bride price marriages and 1.6% for the other couples, while the mean bride price payment equals 55% of the per capita GDP in the year of marriage for traditional bride price marriages and 5% for the other couples.

In peri-urban Lusaka, the differences are smaller, as one may expect with large amounts of migration and proximity between many groups. Nevertheless, similar patterns emerge. In the ZFPS, a positive bride price payment is reported for 88% of couples that belong to groups that do not practice bride price in the *Ethnographic Atlas* ($I_e^{BrPr} = 1$) and for 85% of the other couples ($I_e^{BrPr} = 0$). The small difference on the extensive margin is expected, since groups that do not have actual bride price often engage in token bride price practices or other forms of symbolic transfer. The differences on the intensive margins are much more substantial: the median bride

price payment equals 69% of the per capita GDP in the year of marriage for traditional bride price marriages and 52% for the other couples, while the mean bride price payment equals 179% of the per capita GDP in the year of marriage for traditional bride price marriages and 102% for the other couples.

6.3 Are bride price transfers increasing with the bride's education?

A crucial assumption in the mechanism of the model is that bride price transfers are increasing in the educational attainment of the bride. This is Assumption A1 of the model. We now verify that there is a positive correlation between a woman's educational attainment and the bride price payment in both Indonesia and Zambia.

Evidence from Indonesia

In Indonesia, we examine this relationship using the Indonesia Family Life Survey (2000 and 2007). The survey reports information about the value of bride price transfers at marriage. We link individuals to their traditional marriage practices using their self-reported ethnicity. The 2007 IFLS contains information on 28 ethnicities that were matched manually to the ethnic groups listed in the *Ethnographic Atlas*.[18]

We begin by estimating the following hedonic regression:

$$\begin{aligned} \ln(BP)_{iekt} &= \alpha_t + \phi_k + \beta_1 I(PrimarySchool)_i + \beta_2 I(JuniorSecondary)_i \\ &\quad + \beta_3 I(College)_i + \mathbf{X}_i \mathbf{\Gamma} + \varepsilon_{iekt} \end{aligned} \tag{6}$$

where i indexes a marriage, e the ethnicity of the bride, k the year of the marriage, and t the survey year (2000 or 2007). $BridePrice_{iekt}$ 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, $I(JuniorSecondary)_i$ 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

[18] Of the ethnic groups listed in the IFLS, six cannot be matched to the *Ethnographic Atlas*. This comprises 5.6 percent of the sample of recently married couples who were asked questions about their bride price payments and had a recorded ethnicity.

and ϕ_k is a marriage-year fixed effect. $\mathbf{X}_i$ varies across specifications, but always includes controls for the bride's age and her age squared at the time of marriage. Depending on the specification, it also includes either ethnicity effects or an indicator variable for belonging to a bride price ethnicity, as well as controls for the husband's education, and the husband's age at marriage.

Estimates of equation (6) are reported in table 9.[19] Column 1 reports the returns to different education levels controlling for 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 transfer at marriage. According to the estimates reported in column 4, completion of primary school is associated with a 54% increase in the value of the bride price (relative to no schooling), completion of junior secondary school is associated with an additional 62% increase in the bride price, 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 who did not complete primary education.

The remaining columns in table 9 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 9 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 9, 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.

While the correlations report in table 9 cannot be interpreted as causal, we can alternatively

[19]Summary statistics for rounds 3 and 4 of the Indonesia Family Life Survey (IFLS) are reported in appendix table A6.

follow Duflo (2001) and instrument for primary school completion among females belonging to bride price ethnicities using the number of schools built in a female's birth district in rounds 3 and 4 of the IFLS.[20] In line with Duflo (2001), we allow the effect of school construction to vary by a child's age in 1974, restricting the effect to 0 if a child was older than 12 in 1974. Following Duflo (2001), we also restrict the sample to those born between 1950 and 1972. Unfortunately, the resulting sample of couples from bride price ethnicities who were asked questions about bride price is quite small (258). This results in the first stage estimating equation:

$$I(Completed\,Primary)_{idkt} = \alpha_d + \alpha_k + \alpha_t + \sum_{a=2}^{12} \beta_a\, Intensity_d \times I(age_{1974} = a)_i + \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j + \epsilon_{idkt}, \quad (7)$$

where d denotes the district, i denotes the individual, t denotes the survey year, and k denotes the cohort. α_d denotes district fixed effects, α_k cohort fixed effect, and α_t survey-round fixed effects. $\sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j$ are the cohort-specific controls for the INPRES sanitation program, the enrollment rate in 1971, and the total number of school-aged children in 1971.

The second-stage equation is given by:

$$y_{idkt} = \alpha_d + \alpha_k + \alpha_t + \gamma I(CompletedPrimary)_i + \sum_j \mathbf{X'}_d \mathbf{I}_k^j \mathbf{\Gamma}_j + \mu_{idkt}, \quad (8)$$

where the outcome variable y_{idk} is either the value of the bride price paid or the natural log of the bride price.

Appendix table A7 reports the results of these regressions. Column 1 shows that the instruments jointly significantly predict primary school completion among bride price females in the IFLS (F-statistic of 5.99). Columns 2 and 3 of the table, which report the effect of primary schooling on bride price and log bride price values, are imprecisely estimated but appear to corroborate the results in the hedonic regressions: completing elementary school increases bride price payments by 180 percent ($p < .10$). However, self-reported bride prices in the IFLS are likely to be in nominal terms. Therefore, in columns 4-6, we duplicate the regressions in columns 1-3 including marriage year fixed effects. The new first stage is quite weak, with an F-statistic of 1.72. The effect

[20] As we have shown in table 4, the school construction does not strongly effect primary completion for females who do not belong to ethnicities that practice bride price.

of primary school completion on bride price values in column 5 is large and significant at the 5 percent level. Column 6 indicates that primary completion leads to an 80 percent increase in bride price payments, but this effect size is imprecise and statistically insignificant. In general, given the weak first stage, these results should be interpreted with caution.

Evidence from Zambia

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 **??**. 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.[21]

Appendix table A8 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 in year t:

$$\begin{aligned} \ln(BP)_{iet} &= \alpha_t + \beta_1 I(Primary)_i + \beta_2 I(JuniorSecondary)_i + \beta_3 I(Secondary)_i \\ &\quad + \mathbf{X}_{ie}\mathbf{\Gamma} + \varepsilon_{iet}, \end{aligned} \tag{9}$$

where the dependent variable, $\ln(BP)_{iet}$, 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 $\mathbf{X}_{ie}$ includes a quadratic in the wife's age, an indicator variable that equals one

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

if an ethnicity traditionally practices bride price, a marriage-year fixed effect, and the husband's characteristics.

Estimates of equation (9) are reported in table 10, 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 at marriage squared. The estimates are reported in columns 5–8 of table 10. The coefficients for the education completion variables remain stable, although the coefficient for primary school completion, β_1, become less precisely estimated.

These results are consistent with qualitative evidence from focus groups. From these discussions, it is clear that bride price transfers increase with the education of the bride and that this is well known. For example, one respondent told us that when a parent negotiates *lobola*, he or she calculates how much was spent on education. Parents are well aware of bride price as a future income stream and view it as a substitute for old age support. For example, one respondent explained to us that "a girl child is business and we all need money" and "for girl children you benefit from charging [lobola], while with boys support comes from them when you old."

We also used the ZFPS survey to try and gain a better understanding of why bride price is increasing with the education of women (or at least why it is perceived to increase). Thus, we asked respondents to indicate the reason why, in their view, bride price for more educated brides is higher. Respondents, again unprompted, indicated several reasons that were categorized and are reported in column 1 of table 11. The most common answer given was that parents should be compensated for the educational investments made in their daughter. This is consistent with the common anthropological interpretation of the bride price as compensation for the parents' investments made in the bride (e.g., Vroklage, 1952). Other common explanations attributed the higher bride price to increased productivity of the bride, either in relation to earnings in the labor market, improved skills within the household, increased ability to maintain the health and education of her children.

An important point is that these results, in general suggest a causal interpretation of the positive relationship between education and bride price. Either due to a culture-based moral obligation, or due to a perceived increase in the productivity of the bride, her increased education causes her to receive a higher bride price. An alternative set of explanations are that the estimated relationship is driven by omitted factors, the most obvious being that more educated brides tend to have richer parents, and if the bride's parents are wealthier, then they will demand a higher bride price. We were particularly careful to look for explanations of this nature. Though some respondents did provide an explanation along these lines, it was only chosen by less than 8% of the sample, making it one of the least popular explanations.

After allowing respondents to answer unprompted, they were then prompted and asked directly about each potential explanation listed in table 11. Due to the well-known acquiescent response bias, we must interpret the prompted responses with caution and we expect respondents' agreement frequencies to be upward biased and their disagreement frequencies to be downward biased. However, the relative differences are likely still informative. The responses to the prompted questions, reported in columns 2 and 3, show that most people believe that the increase in bride price from education is due to the belief that parents should be compensated for their investments in their daughter. When asked about this explanation, only 12% said that they felt this was not a reason. By contrast, 56% said that education being associated with a bride's parents being wealthy was not a reason.

6.4 Do bride price cultures have higher levels of female educational attainment?

We next turn to an examination of the relationship between an ethnic group's bride price practices and the level of female schooling. We do this by examining variation in schooling enrollment across ethnic groups (first in Indonesia and then in Zambia) and asking 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.

Our estimating equation is:

$$I_{ijedt}^{Enrolled} = \alpha_{dt} + \beta_1 I_e^{BridePrice} + \mathbf{X}_i\mathbf{\Gamma} + \mathbf{X}_j\mathbf{\Omega} + \mathbf{X}_e\mathbf{\Pi} + \varepsilon_{ijedt}, \tag{10}$$

where i indexes girls aged 5–22, j indexes households, e indexes ethnic groups, and t the year of

the survey. For Indonesia, we examine all girls from the 1995 Indonesia Intercensal Survey. For Zambia, we examine all girls from the pooled 1996, 2001, and 2007 Zambian DHS.

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. 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. α_{dt} denotes district fixed effects interacted with survey-year fixed effects. For Indonesia, we have only one survey-year so these are simply district fixed effects. The vector $\mathbf{X}_i$ consists of the age of the girl as well as her age squared. The vector $\mathbf{X}_e$ also includes our set of ethnicity-level controls. This is the same set as included in tables 5: an indicator that equals one if ethnicity e traditionally was matrilineal and a measure of the traditional participation of women in agriculture. We cluster standard errors at the ethnicity level. Since there are as few as 16 ethnicities in our sample, we also report confidence intervals from a wild bootstrap procedure (Cameron and Miller, 2015).

Estimates of equation (10) are reported in table 12. Columns 1 and 2 report estimates for Indonesia, while columns 3 and 4 report estimates for Zambia. The even numbered columns include the ethnographic covariates, while the odd numbered columns do not. In all four specifications, we estimate a positive and significant relationship between bride price and the probability that a girl is enrolled in school. The point estimates are large. Bride price is associated with between a 3.4 to 6.8 percentage point increase in the probability of school enrollment. These correlations are consistent with proposition 1 of the model.

6.5 Do bride price cultures have lower test scores?

One of the predictions to emerge from the model states that bride price females should have lower academic ability on average conditional on attending school (proposition 2). 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.[22] 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 bride price females who reported primary school

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

test scores:

$$TestScore_{iekpst} = \alpha_{kt} + \delta_{ps} + age_{it} + \beta_1 I_e^{BridePrice} + \beta_2 I_e^{NoBridePrice} + \mathbf{X}_e\mathbf{\Pi} + \epsilon_{iekpst}. \quad (11)$$

where i denotes a female primary school student, e an ethnicity, k is the year of birth, p a province, s the year the test was taken, and t denotes the IFLS survey year. The variable α_{kt} is a year-of-birth by survey-year fixed effect and δ_{ps} is a province by test year fixed effect. We include δ_{ps} since the Ebtanas exam system was standardized at the province-level each year. The vector $\mathbf{X}_e$ includes our set of ethnicity-level controls. This is again the same set as included in table 5: an indicator that equals one if ethnicity e traditionally was matrilineal and a measure of the traditional participation of women in agriculture. 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 (Cameron and Miller, 2015).

Table 13 reports the estimates of equation (11). Column 1 reports estimates without the ethnographic controls and column 2 reports estimates including the controls. Consistent with proposition 2, bride price females' test scores are estimated to be 0.08–0.09 standard deviations lower than those of non-bride price females.

6.6 Qualitative survey evidence from Zambia

The institution of bride price can only 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 that affect bride price in their community today. The responses are summarized in table 14. The majority of respondents (37%) listed education as the primary determinant of the value of the bride price at marriage. The next most commonly listed first determinant was family values (15%) and good morals (13%). Overall, 63% of respondents listed education as one of the three most important factors affecting bride price.

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.[23] Overall, 17% of respondents report lack of education as a negative determinant of bride price, with similar percentages among male and female respondents.

6.7 Testing other explanations for the differential schooling response by bride price cultures

Below, we examine two categories of potential alternative explanations for our findings, which involve possible differences in economic behavior across ethnic groups that are systematically correlated with the bride price custom. Overall, we find no evidence that such systematic differences exist.

Differences in the responsiveness to school construction for males

To examine whether school construction affects bride price ethnic groups in a systematically differential manner, we replicate our analysis on school construction by bride price ethnicity on a sample of males. The results are reported in table 15. In column 1, we replicate the specification of column 3 of table 4 on Indonesian males. Only the coefficient in groups that do not practice bride price, the largest set, is statistically significant and positive,while the estimate for males in bride price groups is imprecise. In column 2, we replicate column 3 of table 7 on a sample of Zambian males. The opposite pattern arises: the response of males in bride price groups is marginally significant (10 percent level), but not the one of the other males. Overall, these findings do not suggest that bride price groups are systematically more responsive to school construction, but rather than the systematic differences are concentrated among females. In Appendix A, we develop an equilibrium matching model that shows that we can expect men in bride price ethnic groups to not respond differently to school construction than other males, in line with these estimates. We also show that, consistently with the model, schooling levels in the data are similar for males across these marriage payment norms.

[23] 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."

Higher returns to education for bride price cultures

One potential explanation for our findings is that the labor market returns to education are higher for females from bride price cultures and this is why parents are more likely to educated their daughters in response to the school-building programs. We test whether the data are consistent with this alternative explanation. Using the 1995 Indonesia Intercensal data, we check whether the relationship between a women's level of education and either her employment status or her income is stronger for women from bride price cultures than women that are not.

In practice, we estimate the following equation:

$$\begin{aligned} y_{iked} &= \alpha_d + \alpha_k + \beta_1 I(PrimarySchool)_i + \beta_2 I(PrimarySchool)_i \times I_e^{BridePrice} \\ &\quad + \beta_3 I(Junior\,Secondary)_i + \beta_4 I(Junior\,Secondary)_i \times I_e^{BridePrice} \\ &\quad + \beta_5 I(College)_i + \beta_6 I(College)_i \times I_e^{BridePrice} + \varepsilon_{kied} \end{aligned} \tag{12}$$

where i indexes a woman between the ages of 25 and 45, e her ethnicity, d her district, and k her age. y_{iked} is either an indicator variable that equals one if the individual is employed, the natural log of the wage among women employed in the formal sector[24], or the wealth index of a woman's household.[25] $I(PrimarySchool)_i$ 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_d denotes district fixed effects, which are intended to capture district-level differences in the labor market, and α_k denotes age fixed effects.

The estimates are reported in table 16. Unsurprisingly, we find that more education is associated with more employment, higher wages, and greater household wealth. However, we find no evidence that the relationship between education and employment or wages is stronger for women from bride price cultures. In fact, in agreement with our prediction that educated women in bride price ethnic groups have worse unobserved quality, we find somewhat lower coefficients in terms of marital wealth associated with education for these women. Thus, it is unlikely that the differential policy

[24]The Indonesia Intercensal data only reports wages for formal sector employees.

[25]The wealth index is constructed by a principal components analysis of indicator variables for owing an automobile, tv, radio, stove, buffet, bicycle boat, and motorboat. The wealth index is the first component of this analysis.

response we document can be explained by higher returns to education for women from bride price cultures.

Evidence from Zambia confirms our findings for Indonesia. We estimate a variant of equation (12) using the three available rounds of the Zambian DHS. As in Indonesia, we examine female employment and a wealth index[26]. These estimates are reported in columns 1 and 2 of table 17. As in Indonesia, we find no evidence of a differential return to education for women belonging to bride price cultures.

Because the DHS does not include information on wages and therefore we are unable to examine the wages of employed women, we instead use alternative measures of well-being that are available from the DHS and likely correlated with female income (and household income). Specifically, we also examine an indicator variable that equal one if a woman's child is categorized as being stunted (having a height that is below three standard deviations below the mean of the growth distribution for health children based on a study of six baseline countries chosen by the WHO – Brazil, India,Oman, Ghana, Norway and the USA) and an indicator that equals one if a woman's child is categorized as being malnourished (having a weight that is below three standard deviations below the mean). We estimate equation (12), looking at children aged 0-5 in the sample. The estimates are reported in columns 3 and 4 of table 17. Again, we see no evidence of a differential return to education for women belonging to bride price cultures.

Higher ability to pay for schooling for bride price cultures

An alternative explanation for our finding is that cultures that engage in bride price payments at the time of marriage have higher incomes and therefore are better able to send their daughters to school in response to the large school construction programs. We test for this by estimating the determinants of the wealth index in Indonesia and Zambia. In particular, we are interested in whether households that belong to bride price ethnic groups (defined as the ethnicity of the household head) have greater wealth. The specification also includes district fixed effects and survey year fixed effects (for Zambia).

Estimates are reported in columns 1 and 3 of table 18. We find no significant difference in the wealth of bride price and non-bride price households in either Indonesia and Zambia. Thus, it is

[26]The Zambia wealth index is constructed by the Demographic and Health Surveys based on answers to a large number of questions about asset ownership and housing characteristics.

unlikely that differences in wealth levels explain our findings.

Even if household wealth is the same between bride price and non-bride price groups, it is still possible that bride price societies have less children and thus are more easily able to send their children to school, including their daughters. For example, in Indonesia, it has been hypothesized that historically the bride price has led to delayed marriage (and to many women not marrying) and therefore to lower rates of fertility (Boomgaard, 2003).

To test for this, we look at a cross-section of women, aged 25–45, in both Indonesia and Zambia, and examine the correlates of the number of living children the women has at the time of the survey. In addition to a bride price indicator variable, the specification also includes age fixed effects, district fixed effects, and survey-year fixed effects (for Zambia).

The estimates are reported in columns 2 and 4 of table 18. We find no evidence that bride price families have fewer children, and thus are more easily able to send daughters to school. In Zambia, we find that there is no statistically significant difference between bride price and non-bride price groups. In Indonesia, we do see a significant difference, but we find that bride price families actually have more children than non-bride price families, not less. Thus, it is unlikely that differences in fertility rates explain our findings.

7 Conclusions

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 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 culture of a society, and how this can be critical in determining the success of large-scale development policies.

8 Tables

Table 1: Distribution of Marriage Customs

	Global		Indonesia		Zambia	
	Number	Share	Number	Share	Number	Share
Bride Price	646	0.52	13	0.46	8	0.38
Bride Service	123	0.10	2	0.07	6	0.29
Token Bride Price	68	0.05	2	0.07	7	0.33
Gift Exchange	62	0.05	3	0.11	0	0.00
Female Relative Exchange	39	0.03	4	0.14	0	0.00
Absence of Consideration	275	0.22	4	0.14	0	0.00
Dowry	33	0.03	0	0.00	0	0.00
Total	1246	1.00	28	1.00	21	1.00

Notes: This table reports the number of ethnicities that practice different traditional customs. Data are from the *Ethnographic Atlas*.

Table 2: Correlations Between Bride Price and Other Customs

	Global		**Indonesia**		**Zambia**	
	Baseline: Constant	Difference: Bride Price	Baseline: Constant	Difference: Bride Price	Baseline: Constant	Difference: Bride Price
Patrilineal	0.234***	0.457***	0.467***	-0.159	0.000	0.375***
	(0.018)	(0.018)	(0.129)	(0.190)	(0.087)	(0.141)
	N = 1,229		N = 28		N = 21	
Matrilineal	0.156***	-0.052***	0.200**	-0.123	0.769***	-0.394*
	(0.014)	(0.019)	(0.092)	(0.135)	(0.030)	(0.211)
	N = 1,229		N = 28		N = 21	
Female Participation in Agriculture, 1-5	1.530***	0.532***	1.750***	0.250	3.440***	0.270
	(0.140)	(0.141)	(0.510)	(0.730)	(0.350)	(0.532)
	N = 716		N = 23		N = 16	
Polygamy	0.761***	0.169***	0.667***	0.026	1.000	0.000
	(0.144)	(0.020)	(0.125)	(0.184)	(...)	(...)
	N = 1,219		N = 28		N = 21	

Notes: The table reports cross-ethnicity estimates of the relationship between the listed customs and the practice of bride price. Each cell reports estimates from one regression. Reported are the number of observations, the coefficient on the constant (the non-bride price group) and the coefficient for an indicator variable that equals one if the ethnicity practices bride price.

Table 3: 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		Pooled Sample			
					Without Controls		With Controls	
	Mean	SD	Mean	SD	Difference	SE	Difference	SE
					Panel A. 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	–	–
Matrilineal	0.093	0.290	0.109	0.312	-0.017***	0.002	-0.185**	0.048
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
					Panel B. School Enrollment 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
Matrilineal	0.084	0.277	0.126	0.333	-0.042***	0.002	-0.176**	0.043
Female Agriculture	0.036	0.185	0.034	0.182	0.001	0.001	-0.074**	0.034

Notes: 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 4: 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
$I_k^{Post} \times Intensity_d$	0.0118*	-0.0022		0.0235**	-0.0011
	(0.0063)	(0.0068)		(0.0120)	(0.0102)
$I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$			0.0239**		
			(0.0116)		
$I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$			-0.0012		
			(0.0103)		
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	240	155	217
Adjusted R^2	0.124	0.179	0.184	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 the 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 5: Indonesia School Construction Regressions, Accounting for Other Cultural Traits

	(1)	(2)	(3)	(4)
	Indicator variable for the completion of primary school			
	Baseline Regression	Matrilineal	Female Agriculture	Both
$I_k^{Post} \times Intensity_d \times I_e^{BridePrice}$	0.0239**	0.0240**	0.0239**	0.0239**
	(0.0116)	(0.0116)	(0.0116)	(0.0116)
$I_k^{Post} \times Intensity_d \times I_e^{NoBridePrice}$	-0.0012	0.0004	-0.0028	-0.0015
	(0.0103)	(0.0105)	(0.0105)	(0.0109)
Ethnicity FEs $\times I_k^{Post}$	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

Notes: The table re-estimates the pooled Indonesia school construction 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 6: Summary Statistics from the 1996, 2001, 2007, and 2012 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	0.559	0.497	0.550	0.498	0.009*	0.005	0.014	0.010
Male Enrollment	0.603	0.489	0.612	0.487	-0.0008	0.005	0.003	0.010
Age	12.448	5.078	12.384	5.027	0.064*	0.038	0.069	0.068
Schools/Area	0.099	0.287	0.101	0.289	-0.003	0.002	-0.004	0.004
Matrilineal	0.582	0.493	0.488	0.500	0.094***	0.004	0.075	0.068
Female Agriculture	0.780	0.415	0.763	0.425	0.016***	0.003	0.016	0.049
Wealth Index	3.083	1.340	3.035	1.380	0.048***	0.013	0.039	0.073
					School Construction Sample (Ages 5 to 12)			
Female Enrollment	0.628	0.483	0.613	0.487	0.015**	0.007	0.011	0.013
Male Enrollment	0.595	0.491	0.595	0.491	-0.001	0.007	0.003	0.014
Age	8.328	2.251	8.359	2.263	-0.031	0.024	-0.010	0.026
Schools/Area	0.093	0.278	0.094	0.277	-0.001	0.003	-0.006	0.005
Matrilineal	0.587	0.492	0.493	0.500	0.094***	0.005	0.079	0.070
Female Agriculture	0.781	0.414	0.761	0.427	0.020***	0.004	0.030	0.049
Wealth Index	2.948	1.321	2.875	1.355	0.072***	0.018	0.045	0.071
Female Employment Rate (All Adults 25-45)	0.637	0.481	0.680	0.466	-0.044***	0.007	-0.031**	0.011

Notes: This table presents summary statistics by bride price status in the pooled 1996, 2001, 2007, and 2012 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 7: School Construction and Primary School Enrollment in the Pooled Zambia DHS (1996, 2001, 2007, and 2013)

	(1)	(2)	(3)	(4)	(5)
	Dep var: Indicator for primary school enrollment				
	Males	Females	Females	B.P. Females	Non B.P. Females
$Schools_{dt}/Area_d$	0.017	0.010		0.042**	-0.005
	(0.013)	(0.010)		(0.014)	(0.015)
$Schools_{dt}/Area_d \times I_e^{BridePrice}$			0.042**		
			(0.014)		
$Schools_{dt}/Area_d \times I_e^{NoBridePrice}$			-0.005		
			(0.015)		
Age FE $\times I_e^{BridePrice}$	Y	Y	Y	Y	Y
Ethnicity $\times$ Year FE	Y	Y	Y	Y	Y
Ethnicity $\times$ District FE	Y	Y	Y	Y	Y
Number of observations	21,772	22,189	22,189	6,443	15,746
Number of clusters	71	71	71	69	71
Adjusted R^2	0.397	0.399	0.399	0.433	0.385

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, 2007, and 2013 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 8: 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)
		Dep var: School enrollment indicator			
	Male	Females	Females	B.P. Females	Non B.P. Females
$Schools_{d,t+1}/Area_d$	0.029	-0.106		-0.227*	-0.062
	(0.063)	(0.079)		(0.116)	(0.105)
$Schools_{d,t+1}/Area_d \times I_e^{BridePrice}$			-0.230**		
			(0.116)		
$Schools_{d,t+1}/Area_d \times I_e^{NoBridePrice}$			-0.061		
			(0.109)		
$Schools_{d,t}/Area_d$	0.009	0.113		0.294**	0.044
	(0.071)	(0.079)		(0.119)	(0.109)
$Schools_{d,t}/Area_d \times I_e^{BridePrice}$			0.295**		
			(0.117)		
$Schools_{d,t}/Area_d \times I_e^{NoBridePrice}$			0.037		
			(0.113)		
Number of observations	12,071	12,369	12,369	3,554	8,815
Adjusted R^2	0.403	0.393	0.393	0.438	0.375
Clusters	70	70	70	63	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. We cannot include the 2013 DHS, since we do not know how many schools will be built in the future. 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 2013 in 2007. Standard errors are clustered at the district level.

Table 9: 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)
$I(College)_i$	0.837***	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***
					(0.081)	(0.080)	(0.082)	(0.075)
$I(Husband\ College)_i$					0.655***	0.638***	0.624***	0.560***
					(0.094)	(0.093)	(0.097)	(0.090)
$HusbandMarriageAge_i$						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

Notes: 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 10: Determinants of Bride Price in Zambia

	(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 11: Reasons why Bride Price Increases with Education in Zambia

Reasons why bride price increases with education		(1) Unprompted reason	(2) Prompted reason	(3) Not a reason
Improves the bride's skills in the house	obs.	217	485	728
		15.17%	33.92%	50.91%
Improves the bride's knowledge and skills as a mother	obs.	177	613	631
		12.46%	43.14%	44.41%
Improves the woman's earning potential	obs.	213	720	481
		15.06%	50.92%	34.02%
Improves the literacy of children	obs.	89	740	580
		6.32%	52.52%	41.16%
Bride's parents should to be compensated for investments	obs.	793	461	178
		55.38%	32.19%	12.43%
Is associated with her parents being rich	obs.	110	521	789
		7.75%	36.69%	55.56%
Other reasons	obs.	27	-	-
		3.96%	-	-

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

Table 12: Relationship Between Bride Price and Enrollment for Females in Indonesia and Zambia

	(1)	(2)	(3)	(4)
	Indicator variable equal to 1 if enrolled			
	Indonesia		Zambia	
$I_e^{BridePrice}$	0.042***	0.068***	0.027**	0.025*
	(0.013)	(0.014)	(0.013)	(0.014)
	[0.000]	[0.000]	[0.092]	[0.276]
Age Controls	Y	Y	Y	Y
District by Survey Year FE	N	N	Y	Y
Ethnicity Controls	N	Y	N	Y
Number of observations	103,067	101,241	42,246	35,846
Adjusted R^2	0.412	0.413	0.356	0.358
Clusters	26	22	21	16

The table regresses an indicator variable for whether a child between the ages of 5 and 22 is enrolled in school on an indicator variable for whether the child is a member of an ethnicity with non-token bride price norms. The Indonesia regressions use the 1995 Indonesia Intercensal data, and the Zambia regressions use the pooled 1996, 2001, 2007, and 2013 Zambia DHS data. Age controls consist of age and age squared, and cultural norm controls consist of indicator variables for belonging to a matrilineal ethnicity and belonging to an ethnicity with a tradition of female agriculture. Standard errors, which are reported in parentheses, are clustered at the ethnicity level. P-values from a wild boostrap procedure are reported in square brackets.

Table 13: The Relationship between Bride Price Status and Test Scores for Primary-School Females in Indonesia

	(1)	(2)
	Total Test Score	
$I_e^{BridePrice}$	-0.089**	-0.079**
	(0.036)	(0.033)
	[0.128]	[0.144]
Cultural Norms Controls	N	Y
Age by Survey Year FE	Y	Y
Province by Year-Tested FE	Y	Y
Number of observations	2,923	2,901
Clusters	13	11
Adjusted R^2	0.092	0.092

Notes: This table tests whether belonging to a bride price ethnicity predicts lower test scores for 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. Cultural norm controls consist of indicator variables for female-dominated agriculture and matrilineality. P-values obtained using the wild bootstrap proceedure with 500 draws appear in square brackets.

Table 14: Determinants 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).

Table 15: Effects of school construction on male schooling

	(1) Indonesia **Primary school completion**	(2) Zambia **Primary school enrollment**
$I_k^{Post} \times Intensity_d \times I_e^{BrPr}$	0.008	
	(0.010)	
$I_k^{Post} \times Intensity_d \times (1 - I_e^{BrPr})$	0.019***	
	(0.007)	
$Schools_{dt}/Area_d \times I_e^{BrPr}$		0.034*
		(0.017)
$Schools_{dt}/Area_d \times (1 - I_e^{BrPr})$		0.008
		(0.016)
Controls as in female specification	Y	Y
Number of observations	63,717	21,772
R-squared	0.130	0.397
Number of clusters	247	70

Notes: This table replicates the specifications of table 4 (col. 3) and of table 7 (col. 3) on a sample of males. Data for Indonesia from SUPAS95. Data for Zambia from the pooled 1996, 2001, 2007 and 2013 Zambia DHS.

Table 16: The Relationship between Education and Wages for Bride Price and Non-Bride Price Females in Indonesia

	(1) Employed	(2) ln (Wage)	(3) Wealth Index
$I_e^{BridePrice}$	-0.031	0.011	0.001
	(0.030)	(0.032)	(0.092)
	[0.504]	[0.640]	[1.052]
$I(PrimarySchool)_i$	-0.059***	0.281***	0.738***
	(0.004)	(0.015)	(0.013)
	[0.004]	[0.000]	[0.000]
$I(PrimarySchool)_i \times I_e^{BridePrice}$	0.002	0.083	-0.120**
	(0.018)	(0.058)	(0.052)
	[1.000]	[0.352]	[0.124]
$I(Junior\ Secondary)_i$	0.092***	0.827***	0.991***
	(0.010)	(0.021)	(0.031)
	[0.000]	[0.000]	[0.000]
$I(Junior\ Secondary)_i \times I_e^{BridePrice}$	0.045	-0.106	-0.137**
	(0.031)	(0.071)	(0.061)
	[0.402]	[0.452]	[0.044]
$I(College)_i$	0.179***	0.184***	0.315***
	(0.007)	(0.016)	(0.060)
	[0.000]	[0.000]	[0.000]
$I(College)_i \times I_e^{BridePrice}$	-0.036	-0.032	-0.196
	(0.050)	(0.045)	(0.130)
	[0.496]	[0.476]	[0.344]
District FE	Y	Y	Y
Number of observations	84,501	12,423	84,491
Clusters	26	23	26
Adjusted R^2	0.108	0.503	0.375

Notes: This table regresses employment status, formal sector wages, and an index of household assets from the 1995 Indonesia Intercensual data on educational attainment, allowing the returns to education to differ for bride price and non-bride price females. Wage or salary was only reported for formal sector employees. The standard errors are clustered at the ethnicity level. The sample consists of women between the ages of 25 and 45. P-values from a wild bootstrap procedure are presented in square brackets.

Table 17: The Relationship between Education and Wages for Bride Price and Non-Bride Price Females in Zambia

	(1) Employment	(2) Wealth Index	(3) Child Stunting	(4) Child Malnutrition
$I(Primary)_i$	0.045***	0.348***	-0.038***	-0.001
	(0.010)	(0.039)	(0.008)	(0.002)
	[0.000]	[0.000]	[0.004]	[0.772]
$I(Primary)_i \times I_e^{BridePrice}$	-0.004	0.000	0.045**	-0.003
	(0.030)	(0.078)	(0.020)	(0.006)
	[0.952]	[1.028]	[0.132]	[0.616]
$I(Secondary)_i$	0.031***	0.968***	-0.055***	-0.003
	(0.011)	(0.030)	(0.004)	(0.003)
	[0.000]	[0.000]	[0.004]	[0.344]
$I(Secondary)_i \times I_e^{BridePrice}$	0.013	-0.100*	0.007	0.002
	(0.016)	(0.060)	(0.014)	(0.003)
	[0.464]	[0.240]	[0.664]	[0.576]
$I(SecondaryPlus)_i$	0.222***	0.716***	-0.075***	0.001
	(0.018)	(0.056)	(0.011)	(0.005)
	[0.000]	[0.000]	[0.004]	[0.860]
$I(SecondaryPlus)_i \times I_e^{BridePrice}$	0.013	-0.014	-0.022	-0.000
	(0.025)	(0.123)	(0.021)	(0.011)
	[0.620]	[0.900]	[0.356]	[1.008]
$I_e^{BridePrice}$	-0.033	0.026	-0.044***	0.005
	(0.040)	(0.087)	(0.017)	(0.006)
	[0.464]	[0.772]	[0.024]	[0.400]
District × Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
F-test of Bride Price Interact Coefficients	0.87	1.71	5.18	0.23
Number of observations	19,669	13,252	27,402	27,402
Clusters	21	21	21	21
Adjusted R^2	0.151	0.510	0.067	0.016

Notes: This table regresses whether a female works, the household wealth index, child stunting (having a height 3 standard deviations below the average for a healthy child according to a study in six baseline countries chosen by the WHO) and child malnutrition (having a height 3 standard deviations below the healthy-child average in six baseline countries chosen by the WHO) on a female's education, allow the effects of education to differ for bride price and non-bride price females. An observation in columns 1 and 2 is a women over 25 years of age and less than or equal to 45. An observation in columns 2 and 3 is a child aged 0 to 5. The table uses data from the 1996, 2001, 2007, and 2013 rounds of the Zambia DHS. The standard errors are clustered at the ethnicity level. Wild bootstrapped p-values appear below in brackets.

Table 18: Tests for Alternative Drivers of the Bride Price Effect in Zambia and Indonesia

	(1)	(2)	(3)	(4)
	Indonesia		**Zambia**	
	Wealth Index	Number of Children Born	Wealth Index	Number of Children Born
$I_e^{BridePrice}$	-0.006	0.223***	0.020	0.009
	(0.059)	(0.065)	(0.109)	(0.088)
	[0.936]	[0.128]	[0.884]	[0.872]
Age FE	N	Y	N	Y
District FE	Y	Y	Y	Y
Survey Year FE	N	N	Y	Y
Number of observations	132,511	79,140	20,082	19.713
Clusters	26	26	21	21
Adjusted R^2	0.224	0.283	0.328	0.351

This table uses data from the Indonesia 1995 Intercensal survey and the pooled 1996, 2001, 2007, and 2013 Demographic and Health Surveys to investigate the relationship between bride price norms and other household or individual characteristics. In Indonesia, we construct the wealth index as the first factor of a principal components analysis of indicator variables for owning a tv, radio, stove, buffet, bicycle boat, and motor boat. In Zambia, the wealth index is constructed by the DHS using a variety of asset ownership data in each survey year. In columns 1 and 3, an observation is a household. Columns 2 and 4 include all women aged 25-45. Standard errors are clustered at the ethnicity level. Wild bootstrapped p-values appear in square brackets.

9 Figures

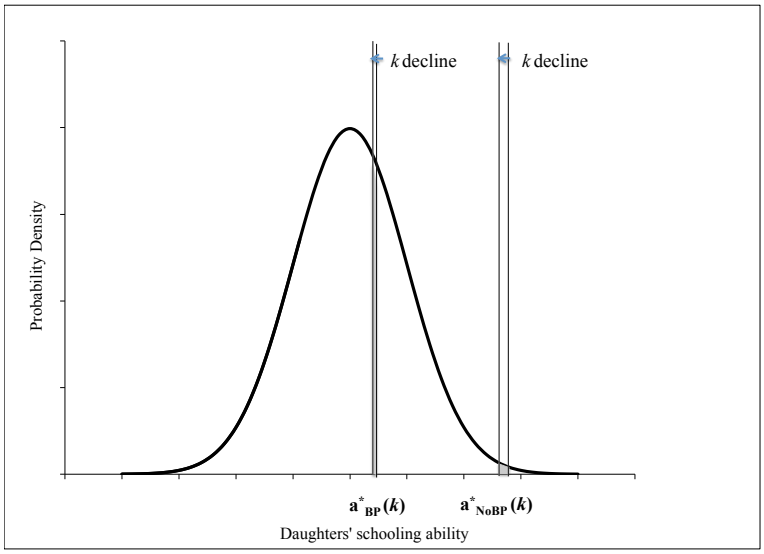

Figure 1: Distribution of girls' returns to education and declines in the cost of education

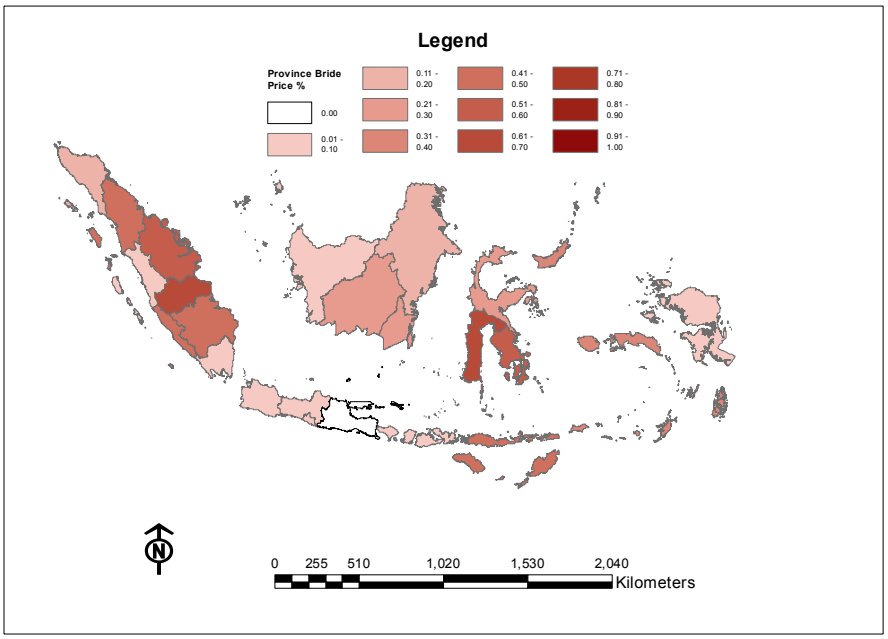

Figure 2: Geographic distribution of bride price customs in Indonesia

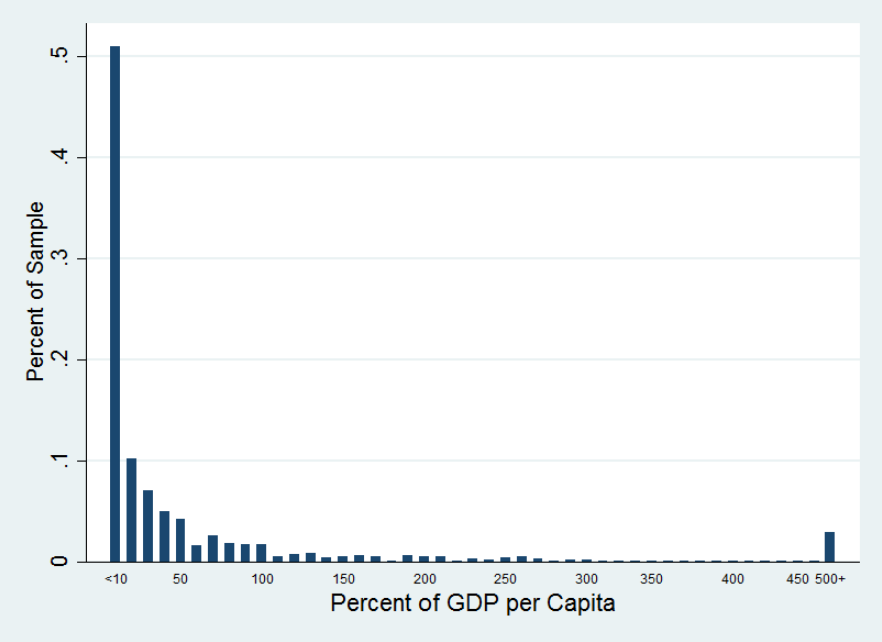

Figure 3: The distribution of bride price payments as percent of GDP per capita for bride price ethnicities in the 2000 and 2007 rounds of the Indonesia Family Life Survey.

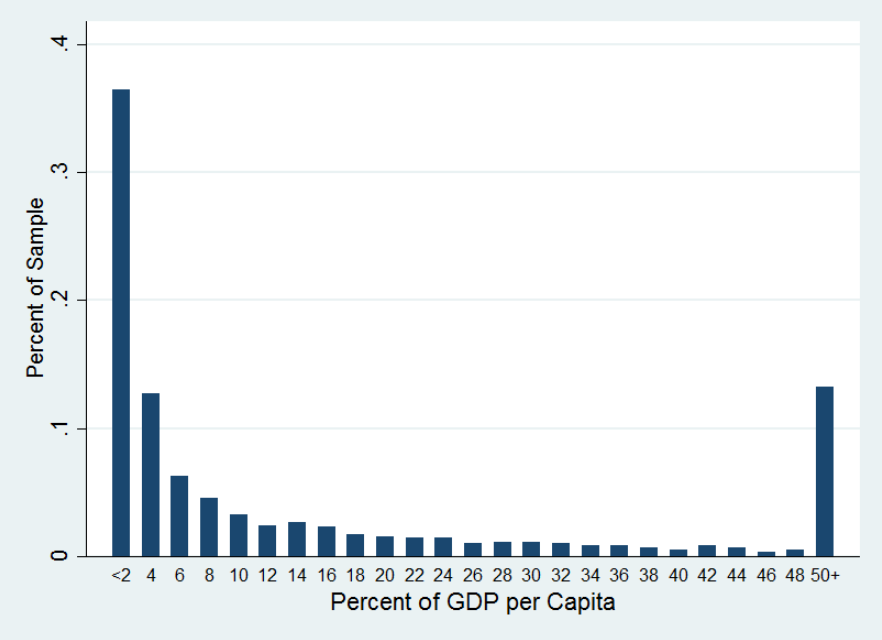

Figure 4: The distribution of bride price payments as percent of GDP per capita for all couples in the 2000 and 2007 rounds of the Indonesia Family Life Survey.

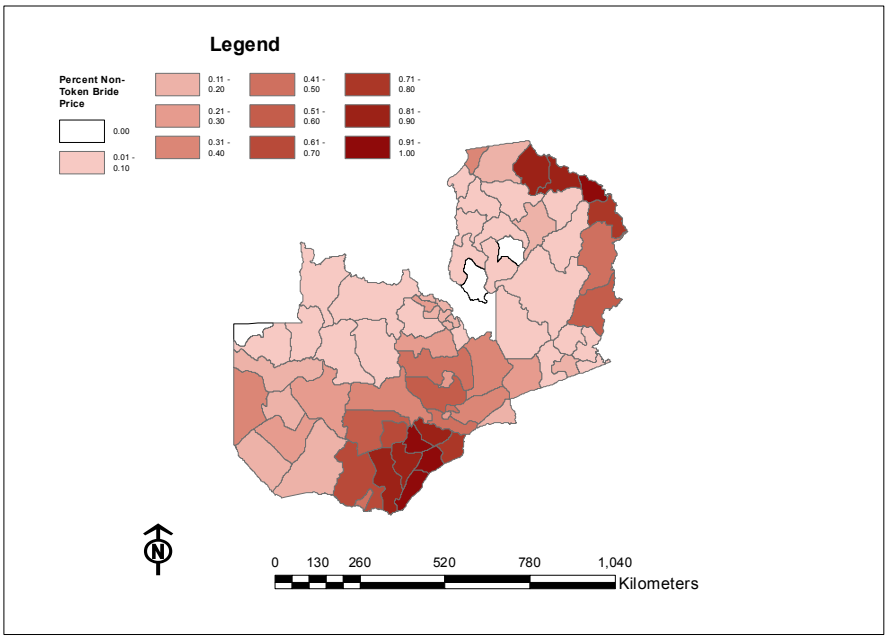

Figure 5: Geographic distribution of bride price customs in Zambia

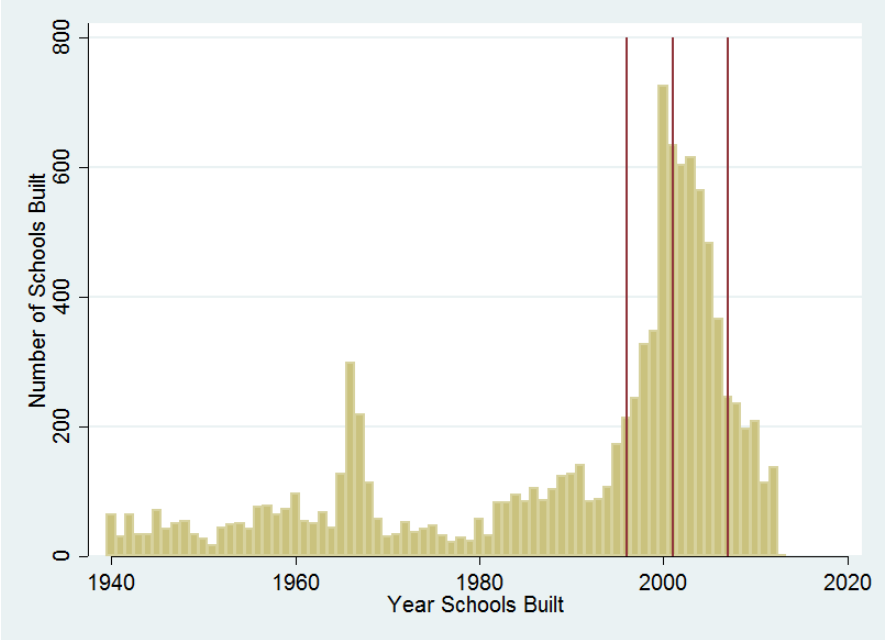

Figure 6: Number of schools constructed each year in Zambia (Ministry of Education, Government of Zambia).

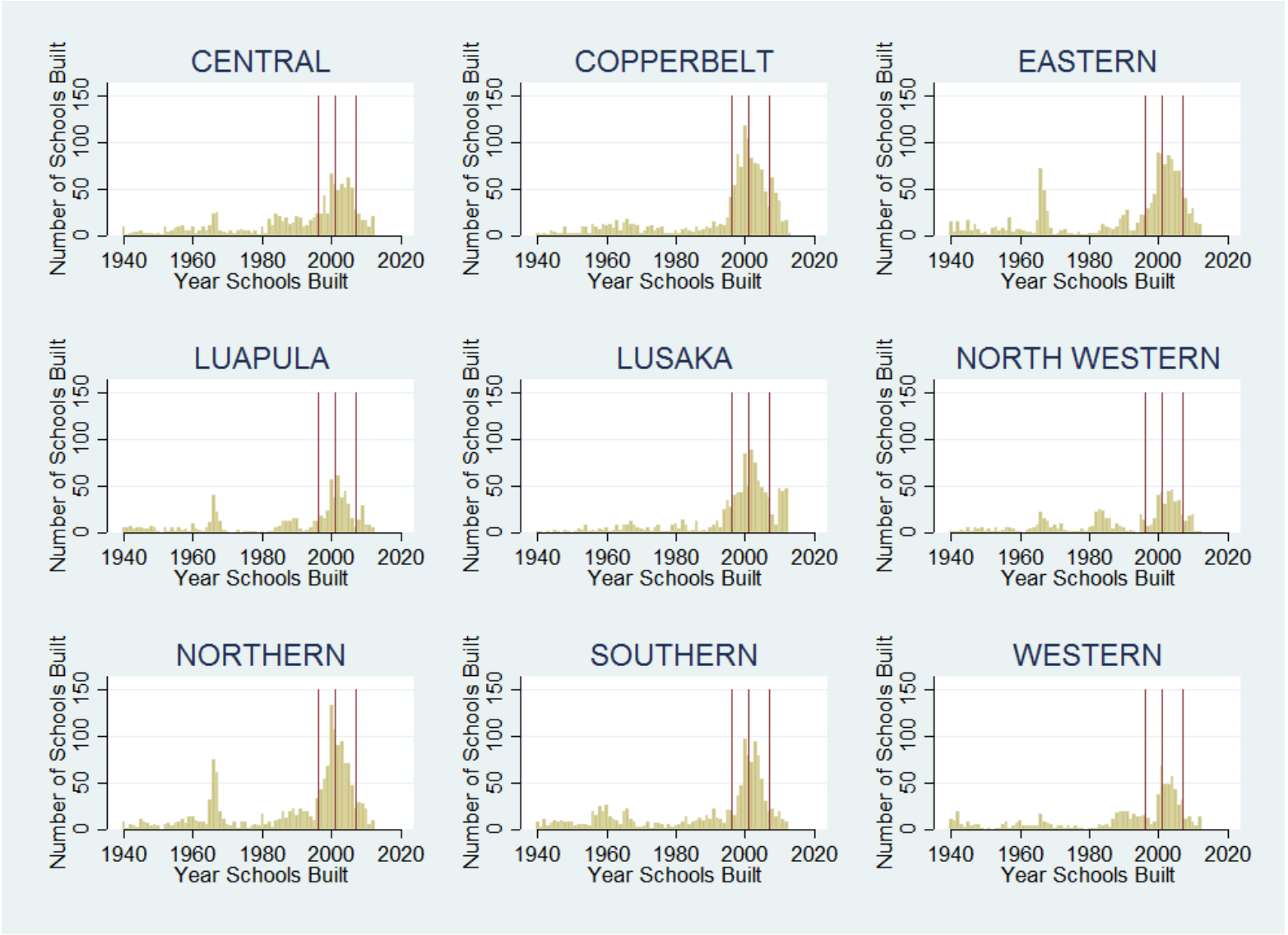

Figure 7: Number of schools constructed each year for each province in Zambia (Ministry of Education, Government of Zambia).

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Appendix for

Bride Price and Female Education

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Appendix A: Extensions to the model and proofs

Bride price and male education

The impact of bride price on male education is ambiguous and more assumptions would be needed to determine its sign compared to women. In addition, who makes the payment may be important in this problem, and it varies greatly across societies and contexts. In some cases, it is the groom himself who makes the payment. In other cases, it is the groom's family. We begin by assuming that the groom pays the bride price. The problem for the parents of a boy is the following:

$$\begin{aligned} max_{P\in\{0,1\},c\geq 0} \quad & c_1 + \frac{c_2}{1+r} + \delta \cdot u^m(a_j,P_j,I_e,\theta_j) \\ s.t. \quad & c_1 + k \cdot P_j \leq y_1 \\ & c_2 \leq y_2 \end{aligned} \tag{1}$$

with δ capturing the parents' altruism towards a son and with $u^m(a_j,P_j,I_e,\theta_j) = P_j a_j + \frac{u(P_j,I_e)+\theta_j}{1+r}$ as in the female problem.

The condition for educating a male is hence:

$$Pr(P_j = 1|k,I_e) = 1 - G\left(\frac{1}{\delta}k - \frac{\Delta u_{I_e}(k)}{1+r}\right).$$

In this setup, the only reason why parents in bride price groups may decide differently about a son's education between bride price ethnic groups and the other groups is if the returns to education $\Delta u_{I_e}(k)$ differ systematically according to I_e. If for instance there are complementarities between spouses' education and more girls are educated in bride price groups, that could be a reason to expect $\Delta u_{BP}(k) \geq \Delta u_{NoBP}(k)$. On the contrary, if labor market returns are lowered by the larger fraction of educated women, $\Delta u_{BP}(k) \leq \Delta u_{NoBP}(k)$.

This problem becomes substantially more ambiguous if one allows the parents themselves to be paying the bride price, particularly if educating a son means he will be more likely to marry an educated woman. If the son is the one choosing a spouse, parents may prefer underinvesting in their son's education if they do not value an educated bride enough to justify paying the bride price education premium. If the parents choose the bride, they may a lower quality (and cheaper) bride but still invest in their son schooling, leaving education rates unchanged.

Data from both Indonesia and Zambia show that the levels of male education across ethnic groups do not vary as systematically as the levels of female education. In the Indonesian 1995 Intercensal Survey, male primary school completion is 2.3 percentage points higher in bride price ethnicities. However, such a difference is not statistically significant after controlling for district fixed effects (t-stat of 1.6). In the pooled Zambia DHS, male primary school enrollment is 1.6 percentage points lower in bride price ethnicities and such a difference is not statistically significant whether or not we control for district fixed effects.

In the IFLS, we do not find any statistically significant difference in test scores for males in bride price groups compared to other ethnic groups. This is consistent with the fact that there is no systematic difference in the marginal boy that can be induced into schooling by a school construction program.

For school construction to vary across ethnic groups, condition 5 for boys is no longer implied by assumption **A4**. The assumption, in the case of boys, is not sufficient to sign the effect of school construction, because we cannot sign $g\left(a_{BP}^{*}\right) - g\left(a_{NoBP}^{*}\right)$ for boys under **A1-A3** alone. Any difference in the responses would then be driven by differences between $\frac{\partial \Delta u_{BP}(k)}{\partial k}$ and $\frac{\partial \Delta u_{NoBP}(k)}{\partial k}$. As shown in table 15, the impact of school construction on male schooling also does not vary in a systematic way between ethnic groups that do or do not traditionally practice bride price. This is in line with the lack of systematic variation in the levels of schooling.

An equilibrium model of investment in education with and without bride price

In the model, we examine comparative statics that take the daughter's value v^f as given. In this appendix, we allow v^f, and the corresponding u^m for men, to be equilibrium objects which are determined on the marriage market. We consider a special case in which spouses only care about their partner's education and apply the framework developed in the seminal paper by Chiappori, Iyigun and Weiss (2009) incorporate the bride price custom.

Define ζ_i^f and ζ_j^m to be the agents' values if they remain single, i.e. their labor market earnings. Define V_i the material output that women receive in marriage, and U_j the one that men receive. Schooling abilities, as in the main model, are a_i and a_j distributed as $G(a)$. Preferences for marriage are θ_i and θ_j and are distributed as $F(\theta)$ on support $[\underline{\theta},\bar{\theta}]$. F and G are independent

and identical across genders. Hence, we have that

$$v^f(S_i,I_e,a_i,\theta_i) = a_i S_i + \frac{\zeta_i^f + max\{V_i + \theta_i,0\}}{1+r}$$
$$u^m(P_j,I_e,a_j,\theta_j) = a_j P_j + \frac{\zeta_j^m + max\{U_j + \theta_j,0\}}{1+r}.$$

The marriage market

There is no intermarriage between ethnic groups.[1] Each ethnic group features identical masses of women i and men j. Marriage output is defined as

$$z_{ij} = \zeta_{ij} - \zeta_i - \zeta_j.$$

Total marriage surplus is then defined as

$$s_{ij} = z_{ij} + \theta_i + \theta_j - I_e \cdot [b + \pi S].$$

Agents' value when single and marital output only depend on their education:

$$\zeta_{ij} = \zeta_{S_i P_j}, \qquad \zeta_i = \zeta_{S_i}, \qquad \zeta_j = \zeta_{P_j}, \qquad z_{ij} = z_{S_i P_j}.$$

Education leads to labor market return to schooling (R), which varies by gender:

$$R^f \equiv \zeta_1^f - \zeta_0^f \quad \text{and} \quad R^m \equiv \zeta_1^m - \zeta_0^m.$$

Because different ethnic groups often live in the same area and are likely to face the same labor markets, we do not allow these returns to vary across ethnic groups. This model focuses on the role of bride price on the portion of the returns to education $\Delta v_e = R^f + \Delta V_e$ and $\Delta u_{I_e} = R^m + \Delta U_e$ that accrues in the marriage, hence on ΔV_e and ΔU_e.

The surplus gains from a woman's education exceed the bride price cost and there are complementarities of education in marriage:

$$z_{10} - z_{00} > \pi, \qquad z_{11} - z_{01} > \pi, \qquad z_{00} + z_{11} > z_{10} + z_{01}.$$

Last, the output from the marriage of low educated people is high enough that even a couple in which each spouse has the lowest value of marriage produces positive surplus:

$$z_{00} - I_e \cdot b + 2\underline{\theta} > 0.$$

[1] In the Indonesian 1995 Intercensal Survey, 1.50% of married household heads aged 25-45 are in a marriage in which the bride price status of the husband and wife differ. That ratio is 16.80% in the pooled Zambia DHS.

A stable equilibrium maximizes aggregate surplus (Shapley and Shubik, 1971, Becker, 1973). Note that because of the condition on the support of θ, everyone marries in equilibrium.

Consistently with the data, we consider the case in which more men than women are educated. Later, we will examine which assumptions generate this outcome in equilibrium. Chiappori et al. (2009) show that the unique stable equilibrium in this marriage market is one in which everyone marries and educated women only marry educated men. Moreover, men of the same education all obtain the same share of marital output, and the same is true for women.

This implies that there exist shares of marital output U_S,V_P such that:

$$V_0 + U_0 = z_{00} - I_e \cdot b, \qquad V_1 + U_1 = z_{11} - I_e \cdot [b + \pi],$$
$$V_0 + U_1 = z_{01} - I_e \cdot b.$$

Subtracting these conditions, we have the following findings on the returns to education in the marriage market:

$$\begin{aligned} (V_0 + U_1) - (V_0 + U_0) &= \Delta U_e = z_{01} - z_{00} \\ (V_0 + U_1) - (V_1 + U_1) &= \Delta V_e = z_{11} - z_{01} - I_e \pi. \end{aligned} \tag{2}$$

As in Chiappori et al. (2009), educated women, who are the side in *short* supply, receive their marginal contribution in marriage with an educated man. Educated men, the side in *excess* supply, receive their marginal contribution to a marriage with an uneducated woman. More importantly in our context, the bride price erodes the contribution of a woman's education to total output, and hence will reduce her marriage market return to education.

The investment stage

Education choice problems for females and males are stated above. We have imposed that more men than women are educated. Exploiting the fact that the distribution of ability $G(a)$ is the same for men and women, we have that more men than women are educated in equilibrium if and only if

$$\left(\frac{1}{\gamma} - \frac{1}{\delta}\right) k + \frac{R^m - R^f}{1+r} + \frac{\Delta U_e - \Delta V_e}{1+r} - I_e \frac{\pi}{\gamma(1+r)} > 0. \tag{3}$$

The first term $\left(\frac{1}{\gamma} - \frac{1}{\delta}\right) k$ is driven by the gender preferences of parents: if they care more about sons than about daughters, they are more willing to educate their sons. The second terms captures

differential labor market returns, and it is likely to be positive in this context in which women have lower employment rates than men. The third term, which is equal to $\frac{2z_{01}+I_e\pi-z_{11}-z_{00}}{1+r}$, captures differential returns in the marriage markets, and its sign depends on the relative contribution of an educated woman compared to an educated man to the marital surplus.[2] Finally, the last term $I_e\frac{\pi}{\gamma(1+r)}$ is the impact of the bride price education premium on the parents' budget constraint, which alone should increase female schooling relative to male schooling.

As long as condition 3 holds before and after the school construction, the equilibrium described above holds. Ignoring the changes in labor market returns caused by the school construction and assuming that the school construction does not affect the technology of home production (z_{ij}), we can also easily verify that, under this model based on Chiappori et al. (2009), assumptions **A2**-**A4** are all met. In particular,

$$\Delta_{BP}v(k) - \Delta_{NoBP}v(k) = \Delta V(I_e = 1) - \Delta V(I_e = 0) = \pi < \frac{\pi}{\gamma},$$

and so **A2** is satisfied. Moreover,

$$\Delta v'_{BP}(k) = \Delta v'_{NoBP}(k) = 0 < \frac{1+r}{\gamma},$$

and so **A3** and **A4** are both satisfied. In addition, this model implies that the bride price is incident on the wife, and hence that grooms's education is not affected by this custom.

Proof of proposition 1

Proof (i) Compare $1 - G(a^*_{BP}(k))$ and $1 - G(a^*_{NoBP}(k))$. We have that the threshold equals

$$a^*_{BP}(k) = \left(\frac{1}{\gamma}\left[k - \frac{\pi}{1+r}\right] - \frac{\Delta v_{BP}(k)}{1+r}\right) \tag{4}$$

for bride price girls and

$$a^*_{NoBP}(k) = \left(\frac{1}{\gamma}k - \frac{\Delta v_{NoBP}(k)}{1+r}\right) \tag{5}$$

for non-bride price girls. Under **A2**, the threshold in (4) is lower than the threshold in (5).

(ii) By the chain rule

$$\frac{\partial Pr(S_i = 1|I_e,a_i,k,\theta_i)}{\partial k} = -g\left(a^*_{I_e}(k)\right) \cdot \left[\frac{1}{\gamma} - \frac{1}{1+r}\frac{\partial \Delta v_e(k)}{\partial k}\right]. \tag{6}$$

The second term is positive under assumption **A3**. □

[2]We have imposed a standard supermodularity assumption, which implies that $z_{01} + z_{10} - z_{11} - z_{00} < 0$. Hence, the sign of $\frac{2z_{01}-z_{11}-z_{00}+I_e\pi}{1+r}$ depends on how z_{01} and $z_{10} - I_e\pi$ compare.

Proof of proposition 2

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

$$E[a_i|S=1] = E[a_i|a_i > a^*_{I_e}(k)] = \int_{a^*_{I_e}(k)}^{\infty} a_i g(a_i|a_i > a^*_{I_e}(k))da_i$$

By Leibniz integral rule, $\frac{\partial E[a_i|a_i>a^*]}{\partial a^*} = \frac{g(a^*)}{1-G(a^*)}\left\{E[a_i|a_i > a^*] - a^*\right\} > 0$.

Now, $a^*_{NoBP}(k) > a^*_{BP}(k)$ under assumption **A2**. This implies that

$$E[a_i|S=1; I_e=0,k] > E[a_i|S=1; I_e=1,k].$$

□

Proof of proposition 3

Proof Compare the two partial derivatives:

$$\frac{\partial Pr(S_i=1|k,I_e=1,\theta_i)}{\partial k} = -g\left(a^*_{BP}(k)\right)\cdot\left[\frac{1}{\gamma} - \frac{1}{1+r}\Delta v'_{BP}(k)\right]$$

v.s.

$$\frac{\partial Pr(S_i=1|k,I_e=0,\theta_i)}{\partial k} = -g\left(a^*_{NoBP}(k)\right)\cdot\left[\frac{1}{\gamma} - \frac{1}{1+r}\Delta v'_{NoBP}(k)\right]$$

It has to be the case that

$$g\left(a^*_{BP}\right) - g\left(a^*_{NoBP}\right) > \frac{\gamma}{1+r}\left[g\left(a^*_{BP}\right)\Delta v'_{BP}(k) - g\left(a^*_{NoBP}\right)\Delta v'_{NoBP}(k)\right].$$

Under unimodality of $g()$ and low education rates and assumption **A2**, we have that $g\left(a^*_{BP}(k)\right) - g\left(a^*_{NoBP}(k)\right) > 0$. Thanks to **A4**, we have that:

$$-g\left(a^*_{BP}(k)\right)\cdot\left[\frac{1}{\gamma} - \frac{1}{1+r}\Delta v'_{BP}(k)\right] < -g\left(a^*_{NoBP}(k)\right)\cdot\left[\frac{1}{\gamma} - \frac{1}{1+r}\Delta v'_{NoBP}(k)\right].$$

□

Appendix B: Data description

A. *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*.

B. *Indonesia*

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, Beegle, Sikoki, Dwiyanto, Herawati and Witoelar, 2004, Strauss, Witoelar, Sikoki and Wattie, 2009), which, unlike previous rounds of the IFLS, includes questions about individuals' ethnicities. The first panel of table 9 presents summary statistics on educational attainment for males and females, as well as household wealth, for all respondents aged 25-45. The second panel reports summary statistics on female and male marriage age and ln(bride price) 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. While marriage ages do not differ by whether the groom or bride belonged to a bride price ethnicity, average bride prices are significant higher in bride price ethnic groups.

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. 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 12–24 at the time of school construction.

C. *Zambia*

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.

Demographic and Health Survey

To study the effect of school construction on the enrollment of bride price and non-bride price children in Zambia, we pool the 1996, 2001, and 2007 rounds of the Zambia *Demographic and Health Survey*. 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). Summary statistics for this group are presented in the first panel of table 14. The summary statistics show that bride price females are more likely on average to be enrolled in primary school. 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, wealth, and local female employment rates for these groups. Once we control for district (column 7), the only significant difference between the bride price and non-bride price groups is the female enrollment rate.

Appendix C: Tables

Table A1: 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 FEs $\times I_k^{Post}$	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 the 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 A2: 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 FEs $\times I_k^{Post}$	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 the 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 A3: Indonesia School Construction Results with Effect of School Construction by Age in 1974

	(1)	(2)	(3)
	Indicator variable equal to 1 if completed primary		
	All Females	BP Females	Non-BP Females
$Intensity_d \times I(Age_{1974} = 2) \times I_e^{BridePrice}$	0.009	0.009	
	(0.014)	(0.014)	
$Intensity_d \times I(Age_{1974} = 3) \times I_e^{BridePrice}$	0.043*	0.043*	
	(0.024)	(0.025)	
$Intensity_d \times I(Age_{1974} = 4) \times I_e^{BridePrice}$	0.009	0.009	
	(0.017)	(0.018)	
$Intensity_d \times I(Age_{1974} = 5) \times I_e^{BridePrice}$	0.043***	0.043***	
	(0.015)	(0.015)	
$Intensity_d \times I(Age_{1974} = 6) \times I_e^{BridePrice}$	0.018	0.018	
	(0.013)	(0.013)	
$Intensity_d \times I(Age_{1974} = 7) \times I_e^{BridePrice}$	-0.017	-0.017	
	(0.021)	(0.021)	
$Intensity_d \times I(Age_{1974} = 8) \times I_e^{BridePrice}$	-0.025**	-0.025*	
	(0.013)	(0.013)	
$Intensity_d \times I(Age_{1974} = 9) \times I_e^{BridePrice}$	0.027*	0.027*	
	(0.015)	(0.015)	
$Intensity_d \times I(Age_{1974} = 10) \times I_e^{BridePrice}$	-0.009	-0.009	
	(0.014)	(0.014)	
$Intensity_d \times I(Age_{1974} = 11) \times I_e^{BridePrice}$	0.065***	0.065***	
	(0.021)	(0.021)	
$Intensity_d \times I(Age_{1974} = 12) \times I_e^{BridePrice}$	0.015	0.015	
	(0.025)	(0.026)	
$Intensity_d \times I(Age_{1974} = 2) \times I_e^{NoBridePrice}$	-0.002		-0.002
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 3) \times I_e^{NoBridePrice}$	-0.005		-0.005
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 4) \times I_e^{NoBridePrice}$	0.009		0.009
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 5) \times I_e^{NoBridePrice}$	-0.010		-0.010
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 6) \times I_e^{NoBridePrice}$	-0.033***		-0.033***
	(0.011)		(0.011)
$Intensity_d \times I(Age_{1974} = 7) \times I_e^{NoBridePrice}$	-0.014		-0.014
	(0.014)		(0.014)
$Intensity_d \times I(Age_{1974} = 8) \times I_e^{NoBridePrice}$	-0.008		-0.008
	(0.014)		(0.014)
$Intensity_d \times I(Age_{1974} = 9) \times I_e^{NoBridePrice}$	-0.000		-0.000
	(0.012)		(0.012)
$Intensity_d \times I(Age_{1974} = 10) \times I_e^{NoBridePrice}$	-0.006		-0.006
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 11) \times I_e^{NoBridePrice}$	-0.003		-0.003
	(0.013)		(0.013)
$Intensity_d \times I(Age_{1974} = 12) \times I_e^{NoBridePrice}$	-0.001		-0.001
	(0.014)		(0.014)
F-test of BP Coefficients	7.58		
F-test of non-BP Coefficients	1.84		
Number of observations	92,325	13,700	78,625
Clusters	249	183	222
Adjusted R^2	0.170	0.167	0.171

Notes: This table estimates the effect of the triple interaction of age in 1974 with number of schools built per 100,000 school-aged children in a district and whether an ethnicity practices non-token bride price or not according to the *Ethnographic Atlas*. The effect of school construction on children aged 12 or greater in 1974 is restricted to be 0. This specification is similar to one used by Duflo (2001). Standard errors are clustered at the district level.

Table A4: Effect of Bride Price by Religious Status in Full Indonesia School Construction Sample

	Completed Primary
$I_k^{Post} \times Intensity_d \times I(Muslim)_i \times I_e^{BridePrice}$	0.019
	(0.019)
$I_k^{Post} \times Intensity_d \times I(Muslim)_i$	-0.002
	(0.013)
$I_k^{Post} \times Intensity_d \times I(NonMuslim)_i \times I_e^{BridePrice}$	0.041**
	(0.018)
$I_k^{Post} \times Intensity_d \times I(NonMuslim)_i$	-0.012
	(0.012)
Ethnicity FEs $\times I_k^{Post}$	Y
Ethnicity FEs $\times Intensity_d$	Y
District FEs $\times I_e^{BridePrice}$	Y
Duflo Controls $\times I_e^{BridePrice}$	Y
Muslim	Y
Muslim $\times I_k^{BridePrice}$	Y
Muslim $\times Intensity_d \times I_k^{Post}$	Y
Duflo Controls	Y
District FEs	Y
Cohort FEs	Y
Number of observations	65,403
Adjusted R^2	0.187
Clusters	240

Notes: This table investigates the effect of the INPRES school construction program on bride price and non-bride females, allowing the effect to vary by self-reported religious status. Standard errors are clustered at the birth district level.

Table A5: Instrumented Effect of Primary School Completion on Bride Price Values in Rounds 3 and 4 of the IFLS

	(1) $I(Completed\,Primary)_i$	(2) $BridePrice_i$	(3) $Ln(BridePrice)_i$	(4) $I(Completed\,Primary)_i$	(5) $BridePrice_i$	(6) $Ln(BridePrice)_i$
$Intensity_d \times I(Age_{1974} = 2)_i$	0.130			0.156		
	(0.427)			(0.660)		
$Intensity_d \times I(Age_{1974} = 3)_i$	-0.432			-0.219		
	(0.620)			(0.830)		
$Intensity_d \times I(Age_{1974} = 4)_i$	0.114			0.220		
	(0.450)			(0.689)		
$Intensity_d \times I(Age_{1974} = 5)_i$	0.042			0.017		
	(0.494)			(0.638)		
$Intensity_d \times I(Age_{1974} = 6)_i$	0.598			0.407		
	(0.644)			(0.913)		
$Intensity_d \times I(Age_{1974} = 7)_i$	0.021			0.182		
	(0.442)			(0.767)		
$Intensity_d \times I(Age_{1974} = 8)_i$	0.069			0.126		
	(0.514)			(0.830)		
$Intensity_d \times I(Age_{1974} = 9)_i$	0.755*			1.480		
	(0.439)			(0.909)		
$Intensity_d \times I(Age_{1974} = 10)_i$	-0.157			0.526		
	(0.514)			(1.494)		
$Intensity_d \times I(Age_{1974} = 11)_i$	0.900			0.008		
	(0.569)			(0.990)		
$Intensity_d \times I(Age_{1974} = 12)_i$	-0.043			0.122		
	(0.474)			(0.917)		
$I(Completed\,Primary)_i$		1,307,379.779*	1.822*		3,668,903.543**	0.805
		(742,361.629)	(1.103)		(1,430,017.172)	(1.071)
Survey Year FE	Y	Y	Y	Y	Y	Y
District FE	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y
Duflo Controls	Y	Y	Y	Y	Y	Y
Marriage Year FE	N	N	N	Y	Y	Y
F-stat	5.99			1.72		
Number of observations	258	258	227	256	256	225
Adjusted R^2	-0.069	-0.011	0.251	-0.000	-1.184	0.264
Clusters	82	82	78	82	82	78

Notes: Following the specification used in Duflo (2001), this table instruments for primary completion in the IFLS with the interactions of treatment intensity and age in 1974 fixed effects. The effect of school construction on cohorts 12 or greater in 1974 is restricted to be 0. The sample consists of couples from ethnicities with non-token bride price who responded to questions about bride price payment values in rounds 3 and 4 of the IFLS. Treatment is assigned based on district of birth. When district of birth is missing, it is assigned based on current district of residence. Columns 4, 5, and 6 include year of marriage fixed effects. Standard errors are clustered at the district level.

Table A6: 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	0.085***	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	7.779	-0.162	0.222	0.496	0.334
Log(Bride Price)	13.465	2.347	12.633	1.888	0.833	0.061	0.309**	0.106

Notes: 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 5 presents the difference and column 6 presents the standard error of the difference. Column 7 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 8 presents the standard error of the bride price coefficient adjusted for heteroskedasticity. 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 A7: Zambia School Construction Regressions with Ethnic Norm Controls

	(1)	(2)		
	Indicator variable for enrolled			
	Baseline	Female Agriculture	Matrilineal	Both
$Schools_{dt}/Area_d \times I_e^{BridePrice}$	0.042***	0.042***	0.135**	0.169**
	(0.014)	(0.014)	(0.066)	(0.070)
$Schools_{dt}/Area_d \times I_e^{NoBridePrice}$	-0.005	-0.011	0.080	0.109*
	(0.015)	(0.021)	(0.057)	(0.058)
Age by Round by Bride Price FE	Y	Y	Y	Y
Ethnicity by Round FE	Y	Y	Y	Y
Ethnicity by District FE	Y	Y	Y	Y
Number of observations	22,189	22,189	22,189	22,189
Clusters	71	71	71	71
Adjusted R Squared	0.399	0.399	0.399	0.399

Notes: This table re-estimates the Zambia school construction regression including the interaction of an indicator variable for female-dominant agriculture and an indicator variable for matrilineality with the treatment variable $Schools_{dt}/Area_d$. Standard errors are clustered at the district level.

Table A8: Summary Statistics for ZFPS Data

	Mean	SD	N
$\ln BP_{ie}$	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.

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