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Bride Pricing and the Effect of Education on Child Marriage:

Evidence from Indonesia

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Abstract

This paper investigates if educational attainment among females when they are young affects the incidence of child marriage. There is a general agreement that education delays the time of marriage and thus works as a protective factor against child marriage. However, there is no causal estimate of education on age at marriage. By using educational variation induced from the Indonesian Sekolah Dasar INPRES program among ethnic groups engaged in bride pricing, and information about age at marriage from the Indonesian Intercensal Survey (SUPAS) in 1995, I estimate the effect of education on child marriage for females. Despite strong cross-sectional correlations, instrumental variable analysis estimates suggest that there is no causal effect of primary education on child marriage. Also, there is no evidence of educational spillovers from primary to secondary education, that could have a more important role in raising the age at marriage.

Keywords: bride pricing, education, child marriage, INPRES

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1. Introduction

In the developing world, certain cultural norms and traditional cultural practices are known to nourish gender inequality and to violate human rights of women. One highly condemned custom is child marriage, which is defined as a formal or informal marriage before the age of 18 (UNICEF, 2014). Another controversial custom is the practice of bride pricing, i.e. when the family of the bride receives a payment of the groom at the time of marriage (Ashraf et al 2014).

While there is a consensus that education works as a protective factor against child marriage, researchers have found contradictory results when it comes to the relationship between bride pricing and child marriage. On one hand there is evidence suggesting that bride pricing creates incentives for parents to marry girls at an early age. On the other hand bride pricing is an income generating activity, which might protect against child marriage (Global, 2007). Recently, Ashraf et al (2014) showed that ethnic groups involved in bride pricing are associated with increased female educational attainment. More specifically, higher female education is associated with a higher bride price payment which increases parental incentives to invest in girl's schooling. These rather ambiguous results raise a vital question, namely; does the bride price custom allow women to benefit from their increased education by delaying the time of marriage? If it does, it implies consistency of the interaction between bride pricing and educational policies to fight child marriage. If it does not, it means that bride pricing entails discriminating social norms and traditions against women which ultimately make their education worthless in the aspect of child marriage.

On this base, the purpose of this paper is to study the causal effect of education on child marriage in the context of bride pricing. To make it possible I take advantage of the Sekolah Dasar INPRES programme, a major school construction program that took place in Indonesia in the 1970s. It is widely recognized that education might be correlated with unobservable personal features such as parental preferences and cultural traditions. This creates a serious problem when trying to estimate the causal effect of education on child marriage. By exploiting the INPRES program however, the problem is solved since the unobserved features are uncorrelated with the change in educational attainment brought on by this program.

The INPRES program was initially studied by Duflo (2000) to estimate the effect of education on wages for men. Recently Ashraf et al (2014) estimated the impact of the

INPRES program on girls' educational attainment and showed that it was positively associated with girls' schooling, but only for girls whose parents engaged in the bride pricing custom. In contrast to Ashraf et al (2014) I am estimating the causal effect of education on child marriage for girls belonging to ethnic groups that make bride price payments at marriage. I do this by using a difference-in-difference technique and an instrumental variable approach. First I confirm that there only seems to be an effect of female education for girls from ethnic groups that practice bride pricing, as previously shown by Ashraf et al (2014). Then I use the exogenous variation in program exposure to estimate the causal effect of education on child marriage.

Aside from increasing our knowledge about the effect of education on child marriage, this paper provides with additional knowledge of how cultural traditions interact with development policies. The literature is scarce when it comes to the relationship between native family characteristics and age of marriage. Furthermore, due to the contradictory evidence concerning the relationship between bride pricing and child marriage, this knowledge is essential in order for educational policies to have a desired impact on child marriages. Without it policy actions with good intentions might wrongly stimulate a practice that is already discriminative by nature. Although I find a strong relationship between primary education and child marriage, I find no evidence that primary education has a causal effect on child marriage. Also I find no evidence of educational spillovers, in the sense that completion of primary school does not affect completion of secondary school. Finally the data suggests that the regions with the highest prevalence rates of child marriage in Indonesia are not characterized by bride pricing.

The paper proceeds as follows. Section 2 discusses related literature. Section 3 presents the institutional context and section 4 describes the INPRES program, data and the outcome variables of child marriage in detail. Section 5 describes the model specification and section 6 displays the results. The results are further discussed in section 7. Finally, section 8 concludes.

2. Related Literature

Various studies have discussed the phenomenon of child marriage in the developing world. In a broad sense these studies can be divided into two groups; one focusing on the negative consequences of child marriage and the other one focusing on means to reduce child

marriage. A dominant part of the research is focused on the consequences of marrying young, while much less is understood about factors protecting against child marriage. Although the consequences of child marriage is not the central target of the paper, this part of the research field will briefly be presented in order to portray the nature of child marriage.

2.1 Consequences of Child Marriage

Due to the abundant literature reporting a strong association between child marriage and numerous negative consequences, child marriage is acknowledged as an obstacle to development and as a human rights violation (Global, 2007). Intuitively, marrying at a young age implies sexual activity at a young age. Some of the most outspoken negative outcomes associated with child marriage are poor maternal health and child morbidity. The reason is that there is evidence suggesting that girls within child marriages experience a pressure of having to prove their reproductive ability early after marriage. Furthermore, they often lack knowledge about reproductive health and the power to impact decisions about family planning (Mathur et al, 2003). Another severe consequence of child marriage is that it interrupts girls' schooling, leading to high levels of school drop outs and low educational attainment (Save the Children, 2004). Typically, married girls cannot benefit from neither education nor work opportunities because of restricted mobility, household duties and cultural limitations (Mathur et al., 2003). Due to the fact that young brides also have little access to resources, a strong relationship between child marriage and poverty has been reported (Singh and Samara, 1996). Finally, the lack of decision making power is associated with a greater risk of experiencing domestic violence and sexual abuse (UNICEF 2005; Jenson and Thornton 2003).

2.2 Means to Reduce Child Marriage

The means to reduce child marriage has also received some, although not far enough, attention throughout the economic development research field. Two important protective factors against child marriage have been defined. The first factor is for girls to engage in income generating activities. Previous research shows a strong correlation between poverty and child marriage. Child marriage is most common in countries with the lowest gross domestic product and subsequently, within the poorest households (ICRW, 2006; UNICEF, 2005). According to Mathur et al. (2003) the reason is that apart from marriage, parents do not feel like they have neither the resources nor the incentives to invest in other alternatives for their daughters. There are two different factors behind this perception. First, daughters may be

seen as an economic burden which alleviates through marriage. Second, the practice of dowry or bride price may create a monetary incentive to marrying daughters at an early age (Berhane-Selaisse 1993; Ensminger and Knight 1997). Thus when a girl earns income, parents may feel less obliged to marrying them at a young age (Jejeebhoy, 1995).

The second protective factor against child marriage is education. There is a strong correlation between higher levels of education and a reduced risk of child marriage. It has been shown that especially girls with secondary education are less likely to be exposed to child marriage (NRC/IOM, 2005). However, there is evidence suggesting that even primary education may protect against child marriage. In Senegal for example, 36 percent of women who did not complete primary school were married before the age of 18. For women who completed primary school, 20 percent were married before the age of 18 (UNICEF, 2005). The reason why education is seen as a protective factor against child marriage is because education increases girls' independence and the power to impact time of marriage as well as the selection of a partner (Lloyd and Mensch 1999; NRC/IOM 2005).

3. Institutional Context

In order to evaluate the effect of education on child marriage in the context of bride pricing, this study requires an understanding of the cultural practice of bride pricing as well as the history of child marriage in Indonesia.

3.1 Bride Pricing

First, it is important to note that the execution and meaning of bride pricing differs both within and across countries (Ashraf et al, 2014). This implies that the negative aspects of the bride pricing custom are conditional on the cultural context. As an illustration, the public debate of the downsides of the bride price custom is especially prevalent in Africa (Ashraf et al, 2014). The arguments against bride pricing typically lie in the commodification of women due to the monetary transaction between the family of the bride and the groom. In the case of Indonesia however, this idea is rejected since bride pricing is expressed as

“a compensation for the expenses, the care and the 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 an henceforth belongs to her husband's." (Vroklage 1952, 1891; cited by Ashraf et al, 2014).

Second, it is important to note the role played by religion. Today 82.7 percent of the total Indonesian population are Muslims. However, there is evidence rejecting the idea of Islam as the reason for bride pricing in Indonesia. Kressel (1977) states that the practice of bride pricing goes back to "adat" which developed prior to the conversion to Islam.¹ Third, many arguments have been made that bride pricing creates incentives for parents to educate girls, and thus represents a tradition of gratitude for women. Ashraf et al (2014) emphasize parents' awareness about bride pricing working as a future cash-flow which compensates for providence of the elderly. Furthermore, the mediators of bride pricing are aware of the fact that education increases the amount of bride price. This has led to media promoting brides in Indonesia to know that their price increases along with their increased level of schooling (Ashraf et al 2014).

3.2 Child marriage

Child marriage is highly prevalent in the developing world, as more than 30 percent of girls across developing countries are married under the age of 18. At the same time more than 10 percent are married before turning 15. South Asia and West and Central Africa experience the highest prevalence rates of child marriages. As for Indonesia, it is ranked as one of the top ten countries in the world with child brides, where one out of five girls is married before turning 18 (UNFPA, 2014). Indonesia was colonized by the Dutch in the seventeenth century. During that time, the Dutch allowed the contemporary customary and religious laws in Indonesia to coexist with their own law (Katz and Katz, 1975). The Indonesian population was ultimately divided into three groups; Europeans; Natives and Foreign Orientals. The latter two were contingent on their own customary law, whereas the Europeans were contingent on Dutch law. This implied that a superior part of the indigenous Indonesians were controlled by unwritten customary laws which concerned all marital affairs. The complexity of these unwritten laws was substantial, since they were divided into 19 different adat systems. To make matters even more complex, Islamic law influenced most of the adat systems (Katz and Katz, 1975).

¹ Adat is a customary law practices by the indigenous people from Indonesia and Malaysia (Davidson and Henley, 2007)

The tension between adat and Islamic leadership groups led to the establishment of separate courts, where marital questions were under the jurisdiction of Islamic court. In the beginning of the nineteenth century, the Muslim marriage law was challenged by women due to the lack of certainty of their human rights. In 1945 a larger movement for independence of women succeeded in guaranteeing equal right for men and women regarding the right to work, the right for education and the right to civil liberties. For almost twenty years, various marriage law reforms were proposed yet never implemented due to the failure of reconciliation between the conflicting government groups. In 1974, the National Marriage Act was implemented which was the first jurisdictional amendment of Indonesia's marriage and divorce law. To this day, and in line with the Marriage Law, the minimum age of marriage for girls is 16 with parental consent and 18 for boys (Cammack et al 1996).

4. Empirical strategy

4.1 The School Construction Program

The Sekolah Dasar INPRES program was implemented across districts in the 1970s Indonesia. INPRES stands for "presidential instructions" and it has been the institutional apparatus that redistributes aggregate revenues from the central government to the provincial government since 1973 (Ravaillon, 1993). Today it makes grants to numerous societal projects and has evolved into a detailed and elaborated system (Duflo, 2000). The Sekolah Dasar INPRES program was launched in 1973. During the second year of the five year program, emphasis changed from sectoral and infrastructure development to regional development. As a result, regional development was assigned 15 percent of the national budget in 1973 and 12 percent of the regional development budget was in turn allocated to the Sekolah Dasar INPRES program. This is to be compared with health expenditures which only represented 3.4 percent of the national budget in 1973 (Hoffman, 2013). Thus the Sekolah Dasar INPRES program was one of the first and largest INPRES programs ever launched.

As a result of the program, 61,807 schools were built between 1973-1974 and 1978-1979, doubling the number of existing schools in Indonesia. This represented one school per every 500 children aged 5-14 in 1971 (Duflo, 2000). Each school was planned identically with 120 students and 3 teachers per school. The central government employed teachers and paid their wages as soon as an INPRES school was built. Children whom were not previously enrolled in primary school were the central target of the program. Therefore the allocation rule

explicitly stated that the number of constructed schools per district was to be proportional to the number of primary school aged children not enrolled in school (Hoffman, 2013).

4.2 Identification strategy

From the program description above, two factors affecting the intensity of the program are identified; year of birth and region of birth. This represents the difference-in-difference estimation and the first stage of the IV approach. The normal age of attending primary school in Indonesia is 6-12. Children born in 1962 or earlier (age 12 or older in 1974) were thus not exposed to the program and form the control group in the analysis. Consequently, children born in 1968 or later (age 6 or younger in 1974) were fully exposed to the program and form the treatment group. In line with Duflo (2000) and Asharf et al (2014), children partially exposed to the program are dropped from the analysis.

According to Duflo (2000) there was a very strong correlation between region of birth and the region where children aged 12 went to school, which implies that most children at age 12 were still living in the region they were born. However, migration could introduce a problem. If caring parents move to a high program region between the birth of their child and his (her) age of education, and this goes by unnoticed, it will look like there is a smaller effect of the program on the child's schooling than it actually is. Thus, migration will underestimate the effect of the program and lead to a downward bias. Yet Duflo (2000) shows that region of birth cannot be endogenous with regard to the program. Since the program started *after* all children in the sample were born, parents could not have moved to a high program region prior to the birth of their child since they could not possibly have been aware of the program at the time.

4.3 Data

To identify program exposure, I need to know in which year and in which district individuals are born. I use data on year of birth and district of birth from the 1995 Indonesia Intercensal Survey (SUPAS). SUPAS is a national wide population survey covering over 200,000 individuals and it is provided by the Minnesota Population Center. Individuals born between 1968 and 1972 form the treatment group since they are guaranteed full program exposure. Individuals born between 1950 and 1962 form the control group. I drop individuals born between 1963 and 1967 from the analysis.

I also need to know how the intensity of the program varied across districts. For this I use data on the number of INPRES schools constructed per 1,000 school-aged children in 1971. In line with Duflo (2000) and Ashraf et al. (2014) I use control variables comprising information about the enrolment rate in 1971, the number of school-aged children in 1971 and the exposure to a water and sanitation program which was the second largest INPRES program.²

In order to identify females that engage in bride pricing, I use information on ethnic groups' traditional bride price customs from the Ethnographic Atlas. The Ethnographic Atlas contains traditional bride price information on over 1,100 pre-industrial societies (Murdock, 1967). Ethnic groups are typically defined through a local mother tongue. The SUPAS contains information on 174 local mother tongues. In line with Ashraf et al (2014) I manually match these languages in SUPAS to the ethnic groups in the Ethnographic Atlas. However, due to the extensive time lag between SUPAS and the Ethnographic Atlas, as well as the less precise categorization of ethnic groups in the Ethnographic Atlas, not all mother tongues from SUPAS could be matched to the corresponding ethnic groups. More specifically, 12 of the 174 mother tongues from the SUPAS could not be matched to the Ethnographic Atlas. Also, due to the fact that SUPAS contain languages not listed in the Ethnographic Atlas, each language in SUPAS was matched to the Ethnologue: Languages of the World (Gordon, 2005), which comprises information about over 7,000 language groups. A final note worth mentioning is that multiple mother tongues are matched to one single ethnic group in the Ethnographic Atlas (Ashraf et al, 2014). The manual matching procedure results in 27 final ethnic groups in SUPAS.³ Table 1 displays the distribution and definition of the various marriage customs for these 27 final groups. Like Ashraf et al (2014) I generate a dummy variable equal to 1 if an ethnic group engages in bride pricing and/or bride service. In order to identify educational attainment, I use data from SUPAS which comprises information on highest completed educational degree. This I use to ascribe number of years of schooling. I also use this information to construct a dummy variable equal to one if the number of years of schooling is equal or greater than 6, which represents completion of primary school.

SUPAS also asks about a woman's age at the time of her first marriage. I use this information to construct a dummy variable equal to one if a woman was younger than 18

² Data on the INPRES program was generously provided by prof. Duflo.

³ Despite multiple efforts, I was not able to replicate Ashraf et al (2014) match of 28 final ethnic groups.

when she first got married and zero otherwise. As the Indonesian Marriage Law is not in line with the international definition of child marriage, I also construct a dummy variable equal to one if a woman was younger than 16 when she first got married..

Summary statistics are provided in table 2. As illustrated, males went to school on average 1.2 years longer than females in 1995. Furthermore, on average 2 INPRES schools were built per district. Finally, the mean bride pricing female is almost 2 years older than the mean non-bride pricing female.

5. Model Specification

The model specification is based on a two-staged least squares estimation of the impact of education on child marriage. In order to define the first stage equation however, the baseline equation of Duflo (2000) and Ashraf et al (2014) need first be presented. The baseline equation of Duflo (2000) is:

$$Y_{idk} = \alpha_k + \alpha_d + \beta_1 I_k^{Post} * Intensity_d + \sum_j X'_d I_k^j T_j + \varepsilon_{idk} \quad (1)$$

where Y_{idk} is either the number of completed school years or the completion of primary school by individual i in birth district d and birth year k . α_k and α_d are birth cohort and district fixed effects. I_k^{Post} is a dummy variable equal to 1 if an individual is born between 1968-1972 and thus fully benefits from the program. $Intensity_d$ is the number of schools per 1,000 school-aged children in birth district d . $\sum_j X'_d I_k^j T_j$ controls for birth cohort fixed effect interacted with the number of school aged children in the district in 1971, the enrolment rate in 1971 and the exposure to an INPRES water and sanitation program.

The baseline equation of Ashraf et al (2014) is:

$$Y_{iedk} = \beta_1 I_k^{Post} * Intensity_d * I_e^{NoBridePrice} + \beta_2 I_k^{Post} * Intensity_d * I_e^{BridePrice} + \alpha_k I_e^{NoBridePrice} + \alpha_k I_e^{BridePrice} + \alpha_e + \alpha_e I_k^{Post} + \alpha_e Intensity_d + \alpha_d I_e^{NoBridePrice} + \alpha_d I_e^{BridePrice} + I_e^{NoBridePrice} \sum_j X'_d I_k^j T_j + I_e^{BridePrice} \sum_j X'_d I_k^j T_j + \varepsilon_{iedk}, \quad (2)$$

where Y_{iedk} is a dummy variable equal to 1 for primary school completion or years of schooling of female i in ethnic group e within birth district d born in year k . All variables are constructed as in equation 1. $I_e^{NoBridePrice}$ is a dummy variable equal to 1 if the ethnic group does not make bride price payments at marriage. Respectively, $I_e^{BridePrice}$ is a dummy variable equal to 1 if the ethnic group does make bride price payments at marriage. The interaction

variables $\beta_1 I_k^{\text{Post}} * \text{Intensity}_d * I_e^{\text{NoBridePrice}}$ and $\beta_2 I_k^{\text{Post}} * \text{Intensity}_d * I_e^{\text{BridePrice}}$ thus measure the influence of the school construction program independently for ethnic groups that make bride price payments at marriage and for those that do not. $\alpha_d I_e^{\text{NoBridePrice}}$, $\alpha_d I_e^{\text{BridePrice}}$, $\alpha_k I_e^{\text{NoBridePrice}}$ and $\alpha_k I_e^{\text{BridePrice}}$ denote district fixed effect and birth cohort fixed effect varying depending on ethnic groups. Ethnicity fixed effect is further interacted with the dummy variable for the treatment group: $\alpha_e I_k^{\text{Post}}$ and also with the intensity of the school construction program: $\alpha_e \text{Intensity}_d$. Finally, the control variables from equation 1 are interacted with the dummy variables for bride pricing and no bride pricing.

The first stage equation is:

$$Y_{iedk} = \alpha_k + \alpha_d + \alpha_e + \beta_1 I_k^{\text{Post}} * \text{Intensity}_d + \alpha_e I_k^{\text{Post}} + \alpha_e \text{Intensity}_d + \sum_j X'_d I_k^j T_j + \varepsilon_{idk}, \quad (3)$$

which is a reduced form of equation 2. The sample comprises only females from ethnic groups that practice bride pricing. Bear in mind how the school construction program was only positively associated with school enrolment for females whose parents engaged in the bride price custom. Thus, the first stage generates an instrument for variation in education for ethnic groups that practice bride pricing.

The second stage equation and the equation of interest is:

$$\text{Child}_{iedk} = \gamma_0 + \gamma_1 Y_{iedk} + \gamma_2 X_{iedk} + \mu_{idk}, \quad (4)$$

where Child_{iedk} is a dummy variable equal to one if a girl is married before the age of 18 or 16, and zero otherwise. The model-estimated values from the first stage are now used in the second stage to instrument for the increased education. Thus, γ_1 is the main parameter of interest since it reflects the causal effect of education on child marriage. Furthermore, X_{iedk} is a vector of the same control variables stated in equation 3.

6. Results

6.1 First stage

First, the relationship between program exposure and years of schooling as well as program exposure and completion of primary school is analysed. Table 4 presents the replicated results of Ashraf et al (2014) and thus displays the results from equation 1. Arbitrary autocorrelation across cohort and heteroscedasticity are permitted through the clustering of standard errors at

the district level. All columns include birth cohort fixed effect, district fixed effects and the control variables of Duflo (2000). In line with Ashraf et al (2014) I find that program exposure increased years of schooling and completion of primary school for males, but not for females. More formally, program exposure increased education by 0.197 years for men. The results from the first stage are presented in columns (3) and (4) in table 5 and thus represent the results from equation 3. Table 5 also adds controls for female agriculture and matrilocality. The reason for including these controls is that ethnic groups involved in bride pricing may be associated with specific ethnicity-level characteristics that affect their exposure to the school construction program. Boserup (1970) have argued that ethnic groups practising bride pricing are characterized by agriculture where women play a dominant role. There might be a relationship between female dominated agriculture and high female labor force participation, which increases returns to education and thus affects program exposure. (Alesina et al 2013). Furthermore, high agricultural participation is particularly prevalent in rural areas, which might also affect program exposure. Another potential characteristic is matrilocality, i.e. when a couple is living with the bride's family (Ashraf et al, 2104). There is evidence suggesting that matrilocality is associated with increased female education, which in turn might also affect program exposure. (Bau, 2014). The Ethnographic Atlas comprises information about matrilocality and female dominated agriculture. Therefore I create a dummy variable equal to 1 if an ethnic group was traditionally characterized by female dominated agriculture and matrilocality. The dummies are then separately interacted with ethnicity fixed effects.

As illustrated, the estimate for females is positive and highly significant for females engaged in bride pricing, while it is much smaller and insignificant for females not engaged in bride pricing.

6.2 Second stage

The causal effect of completion of primary school on child marriage is presented in table 6. All estimates are presented for females from ethnic groups engaged in bride pricing, since they were the only females who benefitted from the program. Column (1) in table 6 shows the estimate of the OLS relationship between completion of primary school and child marriage. In line with the evidence from the literature, primary education has a negative and highly significant effect on child marriage. The coefficient estimate in column (1) implies that completion of primary school is associated with a 10.9 percentage point decrease in the

probability of child marriage exposure. However, the IV estimates in column (2)-(5) are not significantly different from zero, suggesting that completion of primary school does not affect child marriage. In column (2) and (3) the benchmark specification is presented, which is the international definition of child marriage according to UNICEF (2014). Surprisingly, the IV estimate suggests that completion of primary school has no significant effect on child marriage. This is in great contrast to the OLS estimate. In column (4) and (5) the dependent variable is the Indonesian legal age of marriage, which is 16 for girls with parental consent. Also in this case the estimate is insignificant.

OLS estimates the relationship between education and child marriage, without taking program exposure into account. IV analysis estimates the causal effect of education on child marriage, by using program exposure as an instrument for education. The difference between the OLS results and the IV results can be referred to the local average treatment effect (LATE). It has been shown that when the evaluated treatment does not have the same effect for all individuals, we can only be certain that the IV method measures the *average* treatment effect among individuals who react to an instrument and, subsequently, change their treatment status because of it (Oreopoulos, 2006).

7. Discussion

It is very important not to confuse the insignificant results from the second stage with accepting the null hypothesis. The reason is that it is practically impossible to tell the difference between a null effect and a very small effect. So how should one interpret the results? The correct answer is that there is no plausible indication that female primary education, brought on by the Sekolah Dasar INPRES program, reduced the risk of child marriage in Indonesia for this particular time period. However, at the same time there is no evidence that female primary education *did not* reduce the risk of child marriage. To prove the negativity is beyond our reach.

By looking at table 2 we notice that females engaged in bride pricing do get married later than females not engaged in bride pricing; the mean age of marriage is 19.96 for bride pricing females compared to 18.15 for non-bride pricing females. Yet, the difference is not significant. This implies that the marital age difference between the two groups might be induced by something other than education. Furthermore, table 3 provides with some other very important information. That is, the reason for the insignificant results is not because

child marriages do not occur, because they do. More specifically 2,351 girls involved in bride pricing are married before turning 18, which is 27 percent of all females involved in bride pricing from the sample. These statistics are representative for the country as a whole; recall that one out of five girls is married before turning 18 in Indonesia.

7.1 Educational Spillovers

Based on these findings, the next step is to observe at what age child marriage actually takes place in Indonesia. From the data in table 3 we notice that female child marriage most frequently occurs between the age of 13 and 17. In educational levels this corresponds to junior- and senior high school. Up until now I have only examined the effect of completion of primary school on child marriage. However, it may be that girls' primary education influence higher educational levels. Therefore I am estimating the causal effect of primary schooling on secondary schooling to control for potential educational spillovers. The results are presented in table 7. In column (1) the dependent variable is completion of junior high school and in column (2) the dependent variable is completion of secondary high school. As illustrated, there are no signs that completion of primary education affects completion of secondary education.

If one were to speculate, there are two possible explanations for why the Sekolah Dasar INPRES program did not lead to higher educational levels for girls. One, after completion of primary school, there were no secondary schools available. Two, after completion of primary school, parents choose not to send their daughters to secondary school. The first explanation would imply that the large supply of primary schools, on behalf of the Sekolah Dasar INPRES program, was not accompanied by the equal supply of secondary schools. Bjork (2003) reports that the transition between primary to secondary schooling began to decline in 1981, just 2 years after the Sekolah Dasar INPRES program was completed. He also states that nearly 8 percent of all students in junior high school dropped out per year. Furthermore, the World Bank (1989) reports that the graduates of primary school grew rapidly, exceeding the growth rate of secondary school capacity during the 1970s Indonesia.

However, when looking at the effect of program exposure on completion of junior high school, there is a positive and significant effect for males, yet not for any females. This is illustrated in table 8, where column (1) shows the estimate for males which is positive and significant at the five percent level, whereas the estimates for females divided into bride pricing females and non-bride pricing females are not significantly different from zero. Given

the fact that public schools are co-ed in Indonesia, the implication of these findings suggests that secondary schools were in fact available, although the program only had an effect on higher levels of education for males (Bedi and Garg, 2000).

This leads us to the second explanation which concerns parent's incentives to invest in girls' education. Using a hedonic regression, Ashraf et al (2014) show that higher education is associated with a higher bride price. More specifically, the bride price payment is associated with a 100 percent increase if a girl completes primary school, an additional 40 percent if she finishes junior secondary high and another 100 percent if she finishes college. On condition that secondary schools were available, it may be that parents value getting a 100 percent increase in the bride price payment from primary school completion more than to obtain an additional 40 percent increase in the bride price payment by letting their daughters continue to study for another three years.

7.2 Provincial differences

Another important implication from the results in table 3 is that the bride pricing custom may not be equivalent to more frequent child marriages. According to Jones and Gubhaju (2008) there are great interprovincial differences regarding the prevalence of child marriage in Indonesia. More specifically, they report that South Kalimantan, Central Sulawesi, Papua, Bangka-Belitung, West Nusa Tenggara, Gorontalo and East Java have the highest prevalence rates of child marriages. When observing the data, it is clear that although bride pricing and child marriages exist in the same provinces, there are great interprovincial differences in the frequency of bride pricing and child marriages. The greatest differences occurs in Central, West and East Java, which have the highest numbers of female child marriage and at the same time, the lowest numbers of females engaged in bride pricing for the entire sample. In East and Central Java for example, the bride pricing females which are also married before turning 18 make up for less than 0.1 percent of the total number of female child marriages. This implies that the provinces with the strongest need for preventable actions against child marriages are not characterized by bride pricing.

8. Conclusion

I take advantage of the Sekolah Dasar INRES program, and use the increased educational attainment brought on by this program, to estimate the causal effect of completion of primary schooling on child marriage for females engaged in bride pricing. I find no evidence of a

causal effect of primary school completion on child marriage. Also I find no evidence of educational spillovers; completion of primary school does not affect completion of secondary school.

These findings do not necessarily imply that child marriage is not partly determined by educational policies. I have studied a primary school construction program. Children finish primary school at age 12. The girls suffering from child marriage in Indonesia are particularly aged 13-17. For primary school to decrease the probability of child marriage exposure, it implies that girls typically get married when they are supposed to be in primary school. Girls aged 13-17 are in junior and senior high school. This indicates that educational policies should be targeted towards the most prevalent child marriage ages for education to work as a protective factor against child marriage. Thus, in the case of Indonesia, a secondary school program might have had a greater chance to impact the prevalence of child marriage than a primary school program. Furthermore, the data suggests that the regions with the highest prevalence rates of child marriage in Indonesia are not characterized by bride pricing. Thus, females engaged in bride pricing are not in most need of preventable actions against child marriages in Indonesia.

Finally, the fact that there is a marital age difference between bride pricing females and non-bride pricing females requires further investigation. It might be the case that the difference is induced by something other than education. Stronger decision making power within the household is one potential outcome of increased education, which might lead to a girl being able to bargain with her parents and delay the time of her marriage. Due to absence of data on decision-making power in SUPAS, it is unfortunately beyond the scope of the paper to examine this relationship. However, the study of this question is strongly encouraged for future investigation.

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Table 1. Distribution of Marriage Customs

	Number of ethnic groups
Bride Price	13
Bride Service	2
Token Bride Price	2
Gift Exchange	2
Exchange of Sister or Female Relative	4
Nothing	4

Notes: According to Murdock (1957) the marriage customs are defined as follows:

(1) "Bride price, i.e., marriages normally involving a material consideration of which the principal element is a substantial property payment by the groom or his relatives to the kinsmen of the bride," (2) "Bride-service, i.e., marriages normally involving a substantial material consideration of which the principal element consists of labor or other service rendered by the groom to the bride's kinsmen," (3) Token bride-price, i.e., marriages normally involving only a small or symbolic bride-price as a consideration." (4) "Gift exchange, i.e., marriages normally involving a reciprocal exchange of gifts of substantial amount between the relatives of the bride and groom or else entailing a continuing exchange of goods and services in approximately equal amounts between the groom or his kinsmen and the bride's relatives." (5) "Exchange, i.e., marriages normally involving a consideration in the form of a sister or other female relative of the groom given in exchange for the bride." (6) "Absence of any significant material consideration in marriage."

Table 2. Summary Statistics

<i>Panel A</i>						
	<i>Males</i>			<i>Females</i>		
Individual level	Mean	Standard Deviation	Obs	Mean	Standard Deviation	Obs
Age in year 1995	34.187	7.094	69,800	33.694	7.155	71,925
Education	7.499	4.031	69,800	6.248	4.012	71,925
<i>Panel B</i>						
	<i>B.P. Females</i>			<i>Non B.P. Females</i>		
	Mean	Standard Deviation	Obs	Mean	Standard Deviation	Obs
Age in year 1995	34.604	6.825	8,679	34.339	6.958	48,080
Education	6.290	3.718	8,679	5.647	3.703	48,080
Marriage age	19.962	3.940	8,679	18.149	3.564	48,080
<i>Panel C</i>						
District level	Mean	Standard Deviation	Obs			
Intensity*	2.043	0.875	141,725			
Intensity low** program region	1.507	0.296	82,399			
Intensity high*** program region	2.785	0.869	59,326			

Notes: Panel A displays individual descriptive statistics for males and females, separately. Panel B displays individual descriptive statistics for females from ethnic groups engaged in bride pricing and for females from ethnic groups not engaged in bride pricing, separately. Panel C displays descriptive statistics of the INPRES program exposure on the district level. *Intensity denotes the number of INPRES schools built per 1,000 school-aged children. **Intensity low denotes the number of INPRES schools built per 1,000 school-aged children for districts below the average district mean. *** Intensity high denotes the number of INPRES schools built per 1,000 school-aged children for district above the average district mean.

Table 3. Number of female child marriages

Marriage age	B. P. Females	Non B.P. Females
10	7	160
11	16	278
12	42	746
13	128	1,746
14	232	3,231
15	489	4,661
16	639	6,012
17	798	6,118

Notes: This table shows the exact number of girls that are married for different ages prior to the age of 18 from the first stage sample. B.P. females denote females from ethnic groups that are involved in bride pricing. Non B.P. females denote females from ethnic groups that are not involved in bride pricing.

Table 4. Replicated results from Ashraf et al (2014)

	(1)	(2)	(3)	(4)
	<u>Years of schooling</u>		<u>Completion of primary school</u>	
	Males	Females	Males	Females
$I_k^{\text{Post}} * \text{Intensity}_d$	0.197*** (0.070)	0.101 (0.077)	0.015** (0.006)	0.002 (0.007)
$I_k^{\text{Post}} * \text{Intensity}_d * I_e^{\text{BridePrice}}$				
$I_k^{\text{Post}} * \text{Intensity}_d * I_e^{\text{NoBridePrice}}$				
Ethnicity FEs * I_k^{Post}	N	N	N	N
Ethnicity FEs	N	N	N	N
Ethnicity FEs * Intensity_d	N	N	N	N
District FEs * $I_e^{\text{BridePrice}}$	N	N	N	N
Duflo Controls * $I_e^{\text{BridePrice}}$	N	N	N	N
Duflo Controls	Y	Y	Y	Y
District FEs	Y	Y	Y	Y
Cohort FEs * $I_e^{\text{BridePrice}}$	N	N	N	N
Cohort FEs	Y	Y	Y	Y
Number of observations	68,714	70,802	68,714	70,802
Number of clusters	256	248	256	248
Adjusted R^2	0.173	0.244	0.125	0.181

Notes: Column (1) and (3) shows the effect of program exposure and schooling for males. Column (2) and (4) shows the relationship between program exposure and schooling for females. All regressions include district of birth fixed effects, year of birth fixed effects and the interacted controls of Duflo (2000). Standard errors are clustered at the district level. ***p<0.01, **p<0.05, *p<0.1.

Table 5. First stage result

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Completion of primary school</u>					
	Females	Females	B.P. Females	B.P. Females	Non B.P. Females	Non B.P. Females
$I_k^{Post} * Intensity_d$			0.027*** (0.010)	0.027*** (0.010)	-0.006 (0.010)	-0.006 (0.010)
$I_k^{Post} * Intensity_d * I_e^{BridePrice}$	0.027*** (0.010)	0.027*** (0.010)				
$I_k^{Post} * Intensity_d * I_e^{NoBridePrice}$	-0.006 (0.010)	-0.006 (0.010)				
Ethnicity FEs * I_k^{Post}	Y	Y	Y	Y	Y	Y
Ethnicity FEs	Y	Y	Y	Y	Y	Y
Ethnicity FEs * $Intensity_d$	Y	Y	Y	Y	Y	Y
District FEs * $I_e^{BridePrice}$	Y	Y	N	N	N	N
Duflo Controls * $I_e^{BridePrice}$	Y	Y	N	N	N	N
Duflo Controls	Y	Y	Y	Y	Y	Y
District FEs	Y	Y	Y	Y	Y	Y
Cohort FEs * $I_e^{BridePrice}$	Y	Y	N	N	N	N
Cohort FEs	Y	Y	Y	Y	Y	Y
Female Agriculture	Y	N	Y	N	Y	N
Matrilocality	N	Y	N	Y	N	Y
Number of observations	61,954	61,954	9,906	9,906	52,048	52,048
Number of clusters	244	244	156	156	217	217
Adjusted R ²	0.192	0.192	0.193	0.193	0.192	0.192

Notes: This table shows the effect of program exposure on completion of primary school for (1)-(2) all females; (3)-(4) females from ethnic groups engaged in bride pricing ; (5)-(6) females from ethnic groups not engaged in bride pricing. Standard errors are clusters at the district level. ***p<0.01, **p<0.05, *p<0.1.

Table 6. The effect of education on child marriage

	(1)	(2)	(3)	(4)	(5)
Completion of primary school	-0.109*** (0.017)	0.335 (0.412)	0.334 (0.412)	-0.066 (0.354)	-0.066 (0.355)
Ethnicity FEs * I_k^{Post}	Y	Y	Y	Y	Y
Ethnicity FEs	Y	Y	Y	Y	Y
Ethnicity FEs * $Intensity_d$	Y	Y	Y	Y	Y
District FEs * $I_e^{BridePrice}$	N	N	N	N	N
Duflo Controls * $I_e^{BridePrice}$	N	N	N	N	N
Duflo Controls	Y	Y	Y	Y	Y
District FEs	Y	Y	Y	Y	Y
Cohort FEs * $I_e^{BridePrice}$	N	N	N	N	N
Cohort FEs	Y	Y	Y	Y	Y
Female agriculture	N	Y	N	Y	N
Matrilocality	N	N	Y	N	Y
Number of observations	8,619	8,619	8,619	8,619	8,619
Number of clusters	145	145	145	145	145

Notes: Column (1) shows the OLS relationship on the relationship between completion of primary school and child marriage. Column (2)-(5) show the IV estimate of the effect of completion of primary school on (2)-(3) child marriage; (4)-(5) Indonesian legal age of marriage for females. Standard errors are clustered at the district level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7. The effect of primary education on secondary education

	(1)	(2)
Completion of primary school	-0.517 (0.512)	-0.855 (0.642)
Ethnicity FEs * I_k^{Post}	Y	Y
Ethnicity FEs	Y	Y
Ethnicity FEs * $Intensity_d$	Y	Y
District FEs * $I_e^{BridePrice}$	N	N
Duflo Controls * $I_e^{BridePrice}$	N	N
Duflo Controls	Y	Y
District FEs	Y	Y
Cohort FEs * $I_e^{BridePrice}$	N	N
Cohort FEs	Y	Y
Number of observations	8,619	8,619
Number of clusters	145	145

Notes: The table shows the effect of completion of primary schooling on secondary schooling. Column 1 shows the effect of primary school completion on junior high school completion. Column 2 shows the effect of primary school completion on secondary high school completion. Standard errors are clustered at the district level. *** $p < 0.01$ ** $p < 0.05$, * $p < 0.1$.

Table 8. The effect of program exposure on junior high school

	(1)	(2)	(3)	(4)
	<u>Completion of junior high school</u>			
	Males	Females	B.P. Females	Non B.P. Females
$I_k^{Post} * Intensity_d$	0.020** (0.009)	0.004 (0.009)	-0.016 (0.011)	-0.006 (0.011)
$I_k^{Post} * Intensity_d * I_e^{BridePrice}$				
$I_k^{Post} * Intensity_d * I_e^{NoBridePrice}$				
Ethnicity FEs * I_k^{Post}	N	N	Y	Y
Ethnicity FEs	N	N	Y	Y
Ethnicity FEs * $Intensity_d$	N	N	Y	Y
District FEs * $I_e^{BridePrice}$	N	N	N	N
Duflo Controls * $I_e^{BridePrice}$	N	N	N	N
Duflo Controls	Y	Y	Y	Y
District FEs	Y	Y	Y	Y
Cohort FEs * $I_e^{BridePrice}$	N	N	N	N
Cohort FEs	Y	Y	Y	Y
Number of observations	68,714	70,802	9,906	52,048
Number of clusters	256	248	156	217
Adjusted R ²	0.150	0.177	0.257	0.161

Notes: This table show the effect of the INPRES program exposure on completion of junior high school. Column (1) shows the effect for males and column (2)-(4) shows the effect for (2) all females; (3) females from ethnic groups engaged in bride pricing; (4) females from ethnic groups not engaged in bride pricing. Standard errors are clustered at the district level. ***p<0.01 **p<0.05, *p<0.1.

