Women's Fertility and their Education: Evidence from Indonesia

by

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A major paper submitted in the partial fulfilment
of the requirements for the degree of

MASTER'S OF ARTS

ECO 6999

uOttawa

Department of Economics

May 2017

Abstract: The contribution of education can extend beyond the individuals economic returns and influence their behavior when it comes to making personal decisions. The present study exploits the intensity of the *Sekolah Dasar INPRES* program in Indonesia to evaluate the effects of education on fertility and family decisions of women of Java island. Adopting a difference-in-differences approach, I compare cohorts of women that were potentially affected by the program to unaffected cohorts. I find evidence that girls who benefited from the program decreased their use of contraception by 4.6 percentage points at their maturity. The variables corresponding to their number of children before they reach 21, their age of first marriage, first intercourse and first birth remain unchanged and these results are robust to different specifications.

1 Introduction

Education has become undeniably necessary for an individual's welfare but also to fuel economic growth and explains why the access to education has been and remains a priority for the world economies. Yet, education indicators vary across countries and the least developed, despite their significant progress still lag behind in terms of basic education. The enrolment rate and the completion rate at the primary level of education in those countries were eighty percent and sixty seven percent in 2014, respectively, as opposed to above ninety five percent in the OECD countries (World Bank Indicators). Moreover, the gender parity achievement in education as one of the Millennium Development Goals was reached only recently in the least developed countries. In addition, developed countries are characterized by low population growth and fertility rates when compared to developing countries (0.6 and 1.7 versus 2.4 and 4.2 in 2014, respectively). An overall consideration of those figures raises an interest in the interplay between the reproductive behavior of a country's female population, individuals' education and economic performance. The primary question of this paper specifically relates to whether the returns to education extend beyond human capital accumulation and affects fertility.

The present paper precisely addresses this question by evaluating the potential future effects of increasing girls' enrolment in primary education for their fertility. Identifying the mechanisms through which socio-economic factors affect female fertility is a question still debated in the literature. Researchers usually agree on the existence of comovements between these factors and indicators of fertility such as the use of contraception and the num-

ber of pregnancies or abortion (**?**, **?**, **?**, **?**, **?**, **?**). For example, **?**'s model compares the economic returns of children contribution to the family agricultural activities to the returns of their schooling to explain the large size of rural families in the 1950s. Child labor returns and land size (later in their estimations) emerged as significant correlates of fertility. Yet, the experience of developed countries being characterized by decreasing population growth rates coupled with a rising portion of female labor hint at a causal relationship between schooling and fertility.

As such, the recent use of natural experiment allows the use of an exogenous variation for education, enabling researchers to establish causality of education on women's childbearing decisions and on their children's life. For example, the probability of female students giving birth by 20 years old decreases by 4 percentage points for those enrolled in the pilot program extending the vocational track by one year in Sweden (program used by **?** to construct an IV). The case of Turkey's change of compulsory schooling from five to eight years provides **?** (and **?**) with an instrumental variable for education. They conclude that the proportion of women knowing family planning methods and their ovulatory cycle increases with a 10 percentage points increase in the proportion of ever married women with eight years of schooling while the impact on the number of pregnancies and the number of children is 0.13 and 0.11, respectively. Similarly, **?** exploits the construction of primary school classrooms under the Universal Primary Education program in Nigeria and finds a decrease by 0.26 births for women under 25 years of age yielded by one more year of schooling. Basing their analysis on the *INPRES* program as in this study, **?** suggest that the difference between the two parents' education affects the number of children born before the

woman reaches 15 and 25 years of age; and only their average education matters in reducing child mortality. **?** use an approach which relies on a sample of cohorts affected differently by school entry policies in US. According to their results, the groups above and below the cut-off age have similar fertility indicators including the probability of becoming mother and the age of bearing child for the first time, and there is no difference in their infant's health.

For this study, the experience of Indonesia offers a natural experiment framework and allows me to isolate the effects of schooling decisions of young women on their future fertility decisions. In effect, the Government of Indonesia undertook in the early 1970s the implementation of a policy, the *Sekolah Darsar INPRES* program which consisted of a massive construction of primary schools. By extending the supply of education within the decade, the aim was to increase the access to school for children of age to attend the primary level (7-12 years of age in Indonesia). Therefore, by combining the exposure of individuals which depends on their age at the time the program to the intensity of school construction in the location, difference-in-differences can be applied to obtain the causal effect of education on later fertility choices and family decisions. The identification strategy relies on the year of birth of the women and the variation of the number of schools built in her area of schooling.

The results suggest that the program caused a decrease of 4.6 percentage points in the use of contraception for the affected women in the four provinces of Java. These findings are robust to the inclusion of covariates and to the changes in the specification approach. Subsequently, the contribution of this study is twofold; it firstly contributes to the stream of literature

on female fertility socio-economic determinants. In effect, whereas various attempts were made to distinguish the potential variables (family planning, career, political environment...) correlated to women's fertility, this paper focuses on the education causality and offers channels' perspective through which female fertility can be influenced. It also innovates by including the number of health centers in an attempt to control for the variation in health services available to the women in our sample and uses solely a difference-in-differences estimation method. The second contribution can be linked to the assessment of education policy results over a medium/long term. More specifically, it complements the previous evaluation by **?** who found considerable economic returns of the potential medium/long term gains yielded by the intensive schools construction program in Indonesia. As such, it expands the ground of social externalities brought by the program, which are necessary to be taken into account in an evaluation of cost and benefits of policy implementation.

In order to conduct this analysis, the rest of the paper will be structured as follows: section 2 describes the conceptual framework, section 3 provides descriptive characteristics of the data before giving the details of the identification strategy. The last two parts, section 4 and section 5, discuss the results and conclude, respectively.

2 Conceptual Framework

The current analysis uses a policy in Indonesia which supplied education in a relatively short time period. The *INPRES* program was the origin of such policy. In effect, the increase in oil prices in the early 1970s allowed

Indonesia to make surpluses on oil sales, hence enhancing its government decentralization by increasing financial capacity at all levels. Gaps of many sectors of the economy were also to be filled, including environment, health and education. Specifically for the latter, the objective was to achieve universal schooling for Indonesian children. More than 500 million 1990 US dollars were allocated to the construction of over 61,000 schools all over the country from 1973/1974 to 1978/1979. Within the same decade, teachers of schools were trained and primary school fees were abolished so that the program could be fully implemented. This investment dedicated to the building of primary schools (*Sekolah Dasar*) depended on the number of children aged 7 to 12 years and the number of elementary school facilities available to them in their living areas.

? found that the program resulted in an increase of 0.12 to 0.19 in education attainment and 1.5 to 2.7 percent increase in wages for each school constructed per 1000 children. In this respect, the increase in education supplied received by children that could benefit from it might have yielded returns above the individual's gains related to labor. Especially for women, the educational surplus could induce their fertility and family plan decisions through more than a single channel.

Firstly, female fertility and family decisions may be closely connected to education upon admitting that education can be a forerunner of female labor participation. A perspective is that education may lead to better knowledge and more skills, hence providing women with more employment opportunities especially with the growth of the service sector. Indeed, women constitute more than half of the global working population in the services sector (ILO; Women at Work. Trends 2016). Another perspective of women's

education is the increased awareness among women with a relatively high education of their role in society, as promoted by pro-gender-equality defenders. Such awareness might encourage them to acquire more knowledge and to postpone the step of starting a family to a later stage. More education may also induce them to seek for more equality with their husband, more independence and more ambition. In this context, the traditional housewife trades her apron for more intellectual activity and would be left with less amount of time to devote to child rearing. In other words, women who have the possibility to work out of their house would tend to seize such opportunity to the detriment of a full commitment to their family life and would have less reason to bear many children in the prospects of having less house duties. However, such mechanism should be taken with caution. As **?** point out, the opportunity cost of childbearing varies with the type of employment and is higher for woman with formal employment opportunity. For those with informal jobs, there might be more flexibility in terms of work schedule and independence, hence more way to allocate time for children and not necessarily a downward revision of their fertility decisions.

A second channel is the decrease in child mortality. The literature suggests that parents' education reduces child mortality (**?**) and that mothers play a determining role in infant health (**?** and **?**). On the one hand, the additional household income brought by the mother may increase their means of improving care of their child. **?**'s evidence of the positive impact of additional education on wages confirms the likelihood that women who were exposed to the program have higher wages. On the other hand, acquiring an understanding of the "do and don't s" enabled by maternal education can influence the child bearer to adopt healthier behavior. An increase in the

expected survival of the child can thus result in an update of wanted pregnancies, reducing lifetime number of children of the mother.

Increase contraceptive methods knowledge can constitute the fourth pathway through which education affects reproductive behavior. **?** point out that a minimum of education is required to understand and use contraceptive methods. The role of schooling in seizing the importance of births number and spacing for the welfare of the family is a plausible hypothesis, especially when correlates of education are accounted in the specification. Furthermore, mother's education and consciousness on contraception's importance can play a role not only for the concerned individual but also for her peers in terms of externalities. According to **?** estimates, community level education of women has higher correlation with uneducated women's use of contraception than male's education.

To sum up, the increase in the number of schools through the *INPRES* program, beyond potentially boosting girls' schooling could affect their fertility decisions and family plans in the medium/long term. Women with more education can be expected to embrace a family life (marriage and childbearing) at a later stage and to have smaller family. This can be possible via their preferences being revised and leaning towards labor activities external to family life and/or having more ability for better childcare and more understanding of birth control methods and importance, as outcomes of additional education by the time they reach adulthood.

3 Data and Descriptive Statistics

3.1 Datasets

The present paper uses data from administrative records at the district level and the Indonesian Demographic and Health Survey (IDHS) for fertility indicators on women. The surveys are administered in Indonesia by local institutions including the Ministry of health. The collection process covers a 5-year period of time. The respondents are women of eligible households who have ever been married and aged between 15 and 49 years and give information on their husband when applicable. Information on their demographics, maternity, children birth characteristics, reproduction and marriage, among others was collected for more than 55,000 women in both urban and rural areas.

For the purpose of this study, the sample is obtained from the 1994 and 1997 IDHS. Women from the sample are identified by their current district of residence and their year of birth. In total 82 districts from the most populous island of Indonesia, Java, are considered for matching purpose to the administrative data. Java island has four provinces where more than 60 percent of the population of Indonesia lives. The year of birth of respondents is used to assign them to two cohorts of birth: individuals that were 2-6 years in 1974 and; those who were 12-17 years old in 1974. More details about the identification strategy will be provided in the next section.

The variables of interest include the respondent's declared age at first marriage and first sexual intercourse, their number of children before age 21, age when they first gave birth for those who have one or more children and

whether they use contraception methods at the time of the interview. The last variable is a dummy, taking the value of one for modern (pill or condom) and 0 if the respondent uses traditional (abstinence or withdrawal) contraception or folkloric contraceptive methods or does not use any contraception. Other characteristics of individuals like religion, age, education attainment and literacy are also retained for the analysis.

District administrative data was obtained from the dataset provided for **?**. The author's data originate from several waves of the Indonesian Village Census produced by the Central Bureau of Statistics of Indonesia, which records characteristics of Indonesian villages including health, road and education infrastructures every 3-4 years with different focus in each wave. Note that Indonesia is a country island administratively divided into provinces, than districts, subdistricts and finally villages. Martinez-Bravo uses the information for 9,855 villages of the 14,569 villages whose information she was able to retrieve using their names, for the lack of consistency of village identifier across waves. Among other reasons for her sample selection are the missing information (368 villages dropped) or the large size of the villages characterized by more than 10,000 inhabitants or receiving more than 2 *INPRES* schools (1,091 villages dropped); which she deemed likely to influence the outcomes. The resulting sample correspond to a distribution of schools constructed by province as presented in Figure 1.

The current study is conducted at the district level to overcome the lack of village identifier encountered by Martinez-Bravo in her data collection. For each district, the sum of all available data at the village level is computed, using the classification by district. Then, according to the province-district identifier verified to be the same in both datasets, I merged the cur-

rent dataset to the IDHS. The administrative dataset gives the number of INPRES schools that were already constructed in 1980. Among other variables, health subcentres, population and the number of household are also provided by the same source. The same technique as described previously is applied to obtain district level indicators. Because of differences in years of data collection, the numbers of health centres refer to 1993 while the other variables are considered for the year 1986. Note that their numbers vary only marginally across years of records.

3.2 Descriptive statistics

After all manipulations, I obtain a final sample of 3970 women which can be divided in two cohorts of birth: the old cohort for women who were 12-17 years at the beginning of the program and the young cohort for those aged 2-6 years at the same time. The descriptive statistics in Table 1 shows that the average age is 25 and 35 years for the young and the old cohort, respectively at the time of the interview. The women from the young cohort on average have a level of education slightly higher than the primary level and face less difficulty to read when compared to the older cohort of women. Very few of the women of the sample have post-secondary education hinting that education attainment remained low among Indonesian mature women in the 1990s. The majority of women were married only once and were still married when the interview was conducted. Moreover, respondents in my sample are characterized by their age when they got married, above 17 years which also corresponds to their first sexual intercourse age. They had their first child on average within 2 years after their marriage. The average

number of children for each woman is two and the maximum number is 12.

Furthermore, an observation common to both cohorts is the very low number of children under 5 years old, slightly higher among younger women (42 percent of the sample doesn't have any young children whereas 52 percent has one or two children under 5). This can be viewed as if women were having their lifetime children before reaching 30 years old, a relatively young age for stopping childbearing; a possible large spacing between births would also be a plausible inference. Interestingly, limiting their number of children for women of the sample might be voluntary given the knowledge of contraception methods prevailing among all respondents of my sample. It represents a large proportion and may suggests that their low level of education did not constrain the women's knowledge on contraceptives, regardless of their age. Finally, the majority of the individuals is Muslim with a proportion of 97 percent.

Parallel to the fertility indicators of the women in my sample, respondents belong to relatively small households, having on average four members. For three quarter of the respondents, the household is situated in rural locations in the countryside and all in the province of Java. This province had an average population of more than 350,000 people in 1986 per district. Its districts also counted above 78,000 households and for each 1,000 of households, around five health posts and four primary healthcare centres were available in 1993. Regarding the *INPRES* program, 107 schools had been built in each district on average by 1980, i.e. 1.36 per 1,000 of households.

4 Identification Strategy

Many factors can affect individuals' choices of education and the failure to account for all might raise an issue of omitted variable bias in estimation results. The policy of schools construction implemented at different intensity at the district level allows the use of a difference-in-differences strategy. Based on **?**, the strategy relies on the comparison between presumably exposed and unexposed cohorts to the program and on its intensity across districts.

In Indonesia, the age interval of primary schooling for children correspond to 7-12 year. As aforementioned, the *Sekolah Dasar INPRES* program targeted these children in early 1970s so that the first wave of schools being constructed was in 1974. Consequently, respondents from the IDHS who were likely to be affected by the program were old enough for primary school attendance at the beginning of its implementation and young enough to still benefit from the supply of schools in 1979, corresponding to the end of the program. Following this logic, women who were 2 to 6 years old, i.e. born between 1968 and 1972, constitute the group of beneficiaries whereas those born before 1962 and being likely to have completed primary education would be less exposed to the program and gain only marginally from it if anything. It follows that the control group is the cohort aged 12 to 17 years, which was already too old to benefit from the school construction.

For both survey rounds, the studied cohorts are old enough to be at the stage of making or having already made fertility decisions. Note that the mean age for first marriage of the respondents is between 17-18 years and the minimum age is 21 year (from the young cohort). For this reason, I choose to compare the number of children of women of each cohorts before

the age 21. Furthermore, the exposure of each cohort depends, in our strategy on the intensity of the program in the childhood place of residence. Unfortunately, we only have the current place of residence. I use this indicator to define the intensity program, which is measured by the number of schools constructed per hundred of households to allow the comparability among locations of different size and population. "Low" and "high" intensity levels of the program are defined as below and above the cut-off point, respectively. The cut-off represents the median of the overall number of *INPRES* schools built in the 82 districts, 0.135 schools per hundred households.

Before turning to the specification, I provide descriptive statistics by comparing averages of the fertility variables. Those include the woman's age of first birth, her age when she got married for the first time (some women in the sample have experienced divorce or widowhood) and had her first sexual intercourse, the number of children she had when she was under 21 and whether the respondent uses a contraception method. As Table 2 shows, women in districts with high construction schemes, on average, give birth for the first time at a younger age and have more children before they reach 21 years old than their counterpart in districts which received fewer schools. When comparing the cohorts, the old reach their 21^{st} year having slightly more children, irrespective of the intensity of the program in districts. On the other hand, the number of children before 21 years old differs by only 0.15 within the younger cohort of women. Unsurprisingly, this group tends to use contraception slightly more than the latter. Furthermore, women from districts having lower intensity of program get married on average with almost a year of delay and the pattern is similar for their first intercourse with a man. For the same indicators, the old cohort has a slight advance. As **?** un-

derlined, the number of schools supplied was high for locations with smaller enrolment rates. Therefore, women in these districts on average would be less educated than the ones in the other districts, which would explain the mean outcomes obtained for their fertility behavior.

While the previous analysis hints at correlations between school construction and fertility, establishing a causal impact of the program on these fertility indicators requires a more formal analysis. Using the two levels of the *INPRES* program intensity, this impact can be evaluated with the following difference-in-difference specification:

$$Fertility_{idt} = \alpha_0 + \beta_1 Intensity_d + \beta_2 Birth_t + \beta_3 (Intensity_d * Birth_t) + \beta_4 \mathbf{X}_i + \beta_5 \mathbf{Z}_d + \epsilon_{idt} \quad (1)$$

where $Fertility_{idt}$ is one of the fertility indicators: age at first birth, total number of children, age at first marriage, age when having first sexual intercourse and use of contraceptive method. The latter is a dummy variable for a woman i living in district d and born in year t, $Birth_t$ is a dummy variable showing the cohort the individual belongs to, $Intensity_d$ indicates the level of intensity of the program and is equal to 1 if above the cut off, otherwise it takes the value 0. $\mathbf{X}_i$ and $\mathbf{Z}_d$ are vectors of individual and district control variables. An indicator for the religion of the respondents are added to control for the women social affiliation that might influence their decision with respect to fertility. The number of health posts and the number of primary health care centres at the district-level are included and represent Indonesian smallest unit of decentralized health system. These infrastructures are intended to provide to the village communities basic health services espe-

cially family planning, maternal and child care services in health posts and primary healthcare centers having doctors and nurses with formal training. β_3 is the coefficient of interest and gives the impact of the program on women fertility indicators, under the assumption that the amount of education they received was due solely to the increased supply of school and that no other policy that could affect their fertility was being implemented simultaneously. Potential spatial auto-correlation is corrected when estimating the model by clustering at the district level (**?**. In addition, the analysis is extended by different estimation approach.

5 Results

5.1 Average treatment effects of the program

Tables 3-7 summarize different estimation results for each of the variables of interest. For each table, column (1) presents the baseline results while the other columns give estimation output when different covariates are added. Precisely, column (2) controls for the number of primary health centers in the district of the woman, column (3) for the number of health posts number, column (4) for both health subcenters and column (5) adds the religion of the individual.

The primary estimation outcome testing the effects of the program is summarized in Panel A of each table. As described in the previous section, the first difference implies comparing the younger cohort aged 2-6 years at the beginning of the program in 1974 to the old one aged 12-17 years. The second difference compares the two groups at the level of schools varying with

respects to the median of school constructed in the districts of Java, being 0.135 schools per 100 households per district. The number of children before 21 years decreases marginally by 0.027 for each school constructed per 100 households, equivalent to a 0.03 standard deviation decrease as presented in Table 3 (Column 1). This number increases by more than 0.01 when controlling for the number of health subcenters and religion (column 5). However, these effects are never statistically significant.

As expected, the use of contraception is affected by women's education, though in the direction opposite to my hypothesis. The findings from Table 4 suggest that for respondents of my sample, the use of modern birth control methods decreased by 4.6 percentage points (column (1)). This coefficient is 0.1 percentage point lower when all controls included and represents a decrease of 0.12 standard deviation. As opposed to the mechanism hypothesized, women that were potentially affected by the *INPRES* program revised downward their use of modern contraception. Taking into account the fact that 98 percent of the respondents knows modern contraceptive, a possible explanation could lie in either the level of sexual activity of these women or their attitude towards the use of contraception being affected by some confounding factors. The latter presumption would be less compatible with my main assumption that no other program affected women's fertility simultaneously with the school construction program. Moreover, the findings of **?** indicate that socio-economic factors like education are more important correlates to modern contraception use than religion; this might also justify the absence of variation in my estimates when the religion of the individual is added to the regression. In other words, having a lower sexual activity and/or their age (31 years old on average) could explain the unexpected

negative sign of the coefficient on contraception use.

I also study the effect of school construction on outcomes related to women's age which characterize specific steps of her fertility. The results reported in panel A shows that the impact on the age corresponding to the first marriage of the respondent in Table 5 is very small; the magnitude of the coefficients is larger for the age of first sexual intercourse and first birth in Table 6 and Table 7, respectively. Those coefficients vary in magnitude across specifications, are negative in general and are not statistically significant.

5.2 Robustness checks

The school construction program was found to have significant effects on one fertility indicator, yet these results should be considered with caution. In this sense, it will be reassuring that this impact is valid only for the group of respondents that was more likely to benefit from the additional supply of schools. The impact on other cohorts should be null or marginal if any. To test this hypothesis, I run a placebo experiment with "unaffected" cohorts. Similar to **?**, I compare two groups of women that were likely to have passed the primary level of education; individuals 12-17 years old against these aged 18-24 years in 1974. The results are summarized in Panel B of Table 3-7 and for each of the variables; the effect is statistically insignificant for most indicators. A puzzle remains in the positive effect of the program on the number of children women before 21 shown in Table 3, panel C. It represents 0.12-0.13 children more for girls who were 12-17 years old at the beginning of the program compared to the cohort of 18-24 year-old women. This outcome may traduce a change in the perception of the group of women

close to embrace a family life. The program could arise as a relief from their concern about their future children's education, thus putting less pressure on them to control their births.

Another experiment consisted on determining the intensity of school construction according to a province level cut-off, bearing in mind that the island of Java is divided in four provinces. "High" intensity program denotes a number of school constructed higher than the island provincial mean which is 0.134 per 100 of hundred of households and lower when the number is below the mean. The findings are shown in Panel C of Table 3-7 and are consistent with my main results. For women in provinces where more schools were built the use of modern contraception was negatively affected and was characterized by a 4.4-4.6 percentage effect reduction (Table 4, Panel C). The other indicators, namely the age at first intercourse, the age corresponding to the first birth and to the first marriage of the respondent as well as the number of children she gave birth to before 21 all remain unaffected, with statistically insignificant estimates. Therefore, defining the intensity of the program at the province level does not alter my results and the magnitude of the impact is larger for the lifetime number of children.

6 Conclusion

The government of Indonesia undertook a program of massive construction of primary schools. In this paper, I use a difference-in-differences strategy to exploit the sudden upward change of education supply to evaluate the causal effect of education on women's fertility decisions. According to the main findings, solely the use of contraception of women who benefited from

the program was impacted. The main outcome is a decrease of 4.6 percentage points in the use of contraception for its beneficiaries in the four provinces of Java. These results are robust when different specifications are estimated: different controls included, change in the studied cohorts and in the administrative level of the program intensity. However, the unexpected direction of the change in contraception use signals the heterogeneity and limited generalizability that might be embedded in the implementation of policies. The study could be enriched in this sense by extending its geographical coverage and gauging the costs and benefits associated with the change in women fertility decisions as induced by the program.

Furthermore, the study raises important considerations to be included in the design and the implementation of education policies. Indeed, the study has shown that programs intended to affect education can lead to some updates in individual life decisions. In addition, the direction of the change of birth control methods used following the increase in education reveals a potential heterogeneity in education policy effects; in the context of populations (of Java Island) with a low fertility level, such effects were demonstrated to be reverse. In light of the findings of this paper, this outcome can be associated and contrasted to the policies in the countries emphasizing for a long time female education. Their experience emerges as a precursor of the long term effects of such campaign and reinforce the need for precise and quantifiable outcomes in the blueprint of reforms, especially for the economies that strive to slow down their population growth.

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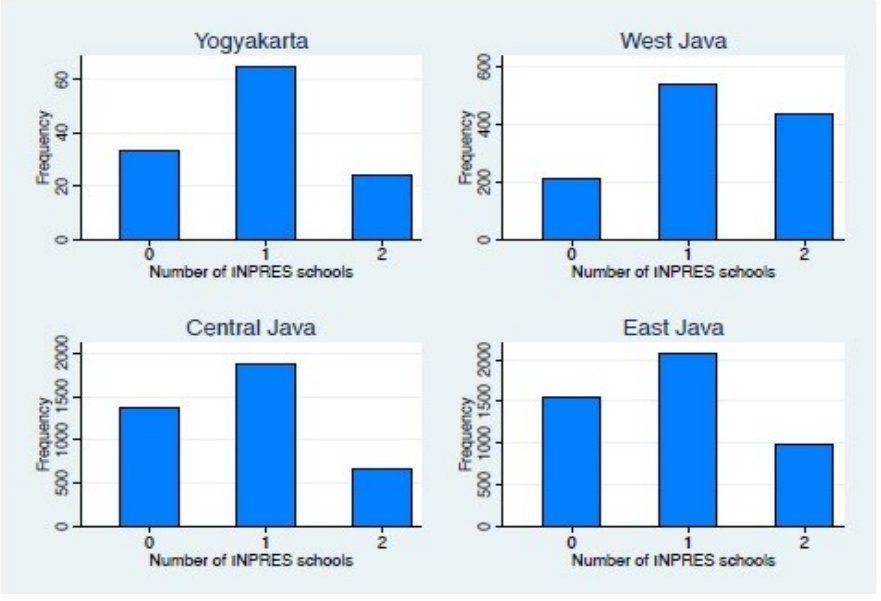
Figure 1: Frequency of the number of INPRES schools by province



Source:? Online Appendix Figure 1

Variable name	N	Mean	St. Dev.	Min	Max
Individuals					
Current age	3970	31.16	5.52	21	40
young cohort	1744	25.43	2.04	21	29
old cohort	2226	35.65	2.26	31	40
Number of years of education	3970	7.54	5.18	0	21
young cohort	1744	8.4	4.54	0	21
old cohort	2226	6.86	5.54	0	21
Literacy	3969	1.46	0.82	0	2
young cohort	1743	1.69	0.67	0	2
old cohort	2226	1.28	0.88	0	2
Number of children 5 and under	3970	0.72	0.73	0	5
young cohort	1744	0.98	0.69	0	4
old cohort	2226	0.53	0.69	0	5
Knowledge of contraception method	3970	0.98	0.12	0	1
young cohort	1744	2.96	0.33	0	3
old cohort	2226	2.95	0.39	0	3
Religion	3969	1.06	0.35	1	5
Age at first intercourse	3959	17.83	3.72	10	36
Age at first marriage	3970	17.79	3.76	10	36
Age at first birth	3755	19.66	3.66	11	37
Number of children 5 and under	3970	0.81	0.91	0	7
Number of children before 21	3970	0.81	0.91	0	7
Total number of children ever born	3970	2.46	1.65	0	12
Use of contraception methods	3970	0.84	0.37	0	1
Marital status	3970	0.95	0.22	0	1
Number of household members	3970	4.7	1.71	1	14
Type of place of residence	3970	0.76	0.43	0	1
Districts					
Number of INPRES schools	82	107	58	11	278
Population	82	352465	185970	41694	790041
Number of Households	82	78487	40891	8653	191223
Number of health posts	82	466	249	57	1122
Number of primary healthcare centre	82	378	198	55	1045

Table 1: Descriptive Statistics

	Low Construction Intensity	High Construction Intensity	Difference Within Cohort	
Age at first birth				
	19.624	18.919	-0.704	Young cohort
	(2.981)	(3.118)	(0.152)	
	19.585	19.014	-0.571	Old cohort
	(3.924)	(3.889)	(0.168)	
Difference Between	0.0388	-0.0947	-0.134	
Cohort	(0.152)	(0.182)	(0.288)	
Number of children before 21				
	0.665	0.818	0.153	Young cohort
	(0.769)	(0.817)	(0.0380)	
	0.907	1.087	0.180	Old cohort
	(0.942)	(1.093)	(0.0433)	
Difference Between	-0.242	-0.269	-0.0271	
Cohort	(0.0361)	(0.0484)	(0.0786)	
Use of Contraception				
	0.845	0.812	-0.0331	Young cohort
	(0.362)	(0.391)	(0.0180)	
	0.820	0.833	0.0126	Old cohort
	(0.384)	(0.373)	(0.0161)	
Difference Between	0.0253	-0.0204	-0.0457	
Cohort	(0.0156)	(0.0189)	(0.0264)	
Age at first marriage				
	17.968	17.282	-0.686	Young cohort
	(3.237)	(3.409)	(0.159)	
	17.367	16.706	-0.661	Old cohort
	(3.878)	(3.655)	(0.160)	
Difference Between	0.601	0.576	-0.0244	
Cohort	(0.150)	(0.176)	(0.324)	
Age at first sexual intercourse				
	17.971	17.302	-0.669	Young cohort
	(3.199)	(3.368)	(0.157)	
	17.392	16.790	-0.602	Old cohort
	(3.846)	(3.600)	(0.158)	
Difference Between	0.579	0.512	-0.0666	
Cohort	(0.148)	(0.174)	(0.307)	

Table 2: Means of differences within cohorts according to program intensity in districts

Dependent Variable: Number of children before 21					
	(1)	(2)	(3)	(4)	(5)
Panel A: Experiment 1[a] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0271	-0.0311	-0.0358	-0.0337	-0.0381
	(0.0786)	(0.0795)	(0.0797)	(0.0789)	(0.0776)
N	3970	3970	3970	3970	3969
Panel B: Experiment 2[b] - old cohort (12-17 years old) versus old cohort (18-24 years old)					
birth*intensity	0.118*	0.117*	0.120*	0.128*	0.129*
	(0.0697)	(0.0699)	(0.0706)	(0.0716)	(0.0713)
N	4192	4192	4192	4192	4190
Panel C: Experiment 3[c] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0267	-0.0315	-0.0390	-0.0363	-0.0411
	(0.0750)	(0.0760)	(0.0763)	(0.0754)	(0.0742)
N	3970	3970	3970	3970	3969
Control Variables					
Primary health centers	No	Yes	No	Yes	Yes
Health posts	No	No	Yes	Yes	Yes
Religion	No	No	No	No	Yes

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors clustered at the district level in parentheses.

[a, b] Intensity defined by median (0.135) of school constructed per 100 households in each district.

[c] Intensity defined by mean at the province level (0.134 schools per 100 households).

Table 3: Effects of the number of constructed schools on the number of children before mother reaches 21 years

Dependent Variable: Use of contraception (Dummy variable)					
	(1)	(2)	(3)	(4)	(5)
Panel A: Experiment 1[a] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0457*	-0.0457*	-0.0448*	-0.0452*	-0.0447*
	(0.0264)	(0.0264)	(0.0263)	(0.0265)	(0.0266)
N	3970	3970	3970	3970	3969
Panel B: Experiment 2[b] - old cohort (12-17 years old) versus old cohort (18-24 years old)					
birth*intensity	0.0254	0.0249	0.0254	0.0214	0.0207
	(0.0329)	(0.0331)	(0.0329)	(0.0322)	(0.0322)
N	4192	4192	4192	4192	4190
Panel C: Experiment 3[c] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0456*	-0.0457*	-0.0444*	-0.0449*	-0.0445
	(0.0264)	(0.0265)	(0.0265)	(0.0267)	(0.0267)
N	3970	3970	3970	3970	3969
Control Variables					
Primary health centers	No	Yes	No	Yes	Yes
Health posts	No	No	Yes	Yes	Yes
Religion	No	No	No	No	Yes

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors clustered at the district level in parentheses.

[a, b] Intensity defined by median (0.135) of school constructed per 100 households in each district (0.135).

[c] Intensity defined by mean at the province level (0.134 per 100 households).

Table 4: Effects of the number of constructed schools on the use of modern contraception

Dependent Variable: Age at first marriage					
	(1)	(2)	(3)	(4)	(5)
Panel A: Experiment 1[a] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0244	-0.0221	0.00876	-0.00641	-0.000132
	(0.324)	(0.329)	(0.329)	(0.322)	(0.321)
N	3970	3970	3970	3970	3969
Panel B: Experiment 2[b] - old cohort (12-17 years old) versus old cohort (18-24 years old)					
birth*intensity	-0.137	-0.142	-0.140	-0.206	-0.208
	(0.244)	(0.244)	(0.244)	(0.246)	(0.246)
N	4192	4192	4192	4192	4190
Panel C: Experiment 3[c] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0597	-0.0614	-0.0136	-0.0331	-0.0263
	(0.315)	(0.321)	(0.323)	(0.314)	(0.313)
N	3970	3970	3970	3970	3969
Control Variables					
Primary health centers	No	Yes	No	Yes	Yes
Health posts	No	No	Yes	Yes	Yes
Religion	No	No	No	No	Yes

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors clustered at the district level in parentheses.

[a, b] Intensity defined by median (0.135) of school constructed per 100 households in each district.

[c] Intensity defined by mean at the province level (0.134 schools per 100 households).

Table 5: Effects of the number of constructed schools on women's age at first marriage

Dependent Variable: Age at first intercourse					
	(1)	(2)	(3)	(4)	(5)
Panel A: Experiment 1[a] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.0666	-0.0624	-0.0328	-0.0472	-0.0371
	(0.307)	(0.311)	(0.312)	(0.303)	(0.301)
N	3959	3959	3959	3959	3958
Panel C: Experiment 2[b] - old cohort (12-17 years old) versus old cohort (18-24 years old)					
birth*intensity	-0.114	-0.116	-0.119	-0.186	-0.188
	(0.234)	(0.233)	(0.233)	(0.233)	(0.232)
N	4176	4176	4176	4176	4174
Panel B: Experiment 3[c] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.170	-0.184	-0.136	-0.157	-0.149
	(0.318)	(0.322)	(0.322)	(0.313)	(0.316)
N	3969	3969	3969	3969	3968
Control Variables					
Primary health centers	No	Yes	No	Yes	Yes
Health posts	No	No	Yes	Yes	Yes
Religion	No	No	No	No	Yes

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors clustered at the district level in parentheses.

[a, b] Intensity defined by median (0.135) of school constructed per 100 households in each district.

[c] Intensity defined by mean at the province level (0.134 schools per 100 households).

Table 6: Effects of the number of constructed schools on women's age at first intercourse

Dependent Variable: Age at First Birth					
	(1)	(2)	(3)	(4)	(5)
Panel A: Experiment 1[a] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.134	-0.120	-0.0928	-0.107	-0.0875
	(0.288)	(0.294)	(0.296)	(0.292)	(0.290)
N	3755	3755	3755	3755	3754
Panel B: Experiment 2[b] - old cohort (12-17 years old) versus old cohort (18-24 years old)					
birth*intensity	-0.246	-0.246	-0.249	-0.279	-0.285
	(0.286)	(0.286)	(0.286)	(0.291)	(0.289)
N	4054	4054	4054	4054	4052
Panel C: Experiment 3[c] - young cohort (2-6 years old) versus old cohort (12-17 years old)					
birth*intensity	-0.111	-0.0989	-0.0619	-0.0821	-0.0461
	(0.280)	(0.287)	(0.290)	(0.285)	(0.281)
N	3755	3755	3755	3755	3741
Control Variables					
Primary health centers	No	Yes	No	Yes	Yes
Health posts	No	No	Yes	Yes	Yes
Religion	No	No	No	No	Yes

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors clustered at the district level in parentheses.

[a, b] Intensity defined by median (135) of school constructed per 100 households in each district.

[c] Intensity defined by mean at the province level (0.134 schools per 100 households).

Table 7: Effects of the number of constructed schools on women's age at first birth