This document includes the following material associated with "Reshaping Adolescents' Gender Attitudes: Evidence from a School-Based Experiment in India," by Dhar, Jain, and Jayachandran.

- Pre-analysis plan for Endline 1
- Pre-analysis plan for Endline 2
- Explanation of deviations from the pre-analysis plans in our analysis

Pre-Analysis Plan for
"Evaluation of Breakthrough school-based gender sensitization campaign"

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This document pre-specifies analyses for our randomized evaluation of Breakthrough's school-based gender attitude-change intervention. Baseline data collection and randomization was completed in 2013-14. The endline data collection began in November 2016. The PIs had not accessed the first two weeks' data at the time this document was finalized.

<u>Sample</u>
The sample consists of 14,855 students in 314 schools in four districts of Haryana. Of these schools, 150 were treatment schools, and 164 were control schools. In addition, one parent of 5483 students (~40% of the sample) were surveyed at baseline.

<u>Hypotheses</u>
The intervention is hypothesized to
- Make participants' attitudes less gender discriminatory against females.
- Raise girls' aspirations.
- Increase gender-equitable behaviors.

Note behavior change could come about not just because someone's individual view on equality has changed, but also because he or she has better skills to negotiate/communicate with others and because his or her views about social norms have changed.

<u>Specifications</u>

1. Our primary outcomes are indices which have analogues at baseline, but not identical variables at baseline. We will use a data set with one observation per student and estimate the following regression basic specification:

$$Y_{ij} = \beta_o + \beta_1 Treat_j + \beta_2 Y_{0ij} + \beta_3 X_{ij} + \varepsilon_{ij} \qquad (1)$$

where Y_{ij} is the outcome of interest measured at endline for student *i* in school *j*. $Treat_j$ is the treatment indicator, Y_{0ij} is the baseline analogue of the outcome, X_{ij} are predetermined characteristics (specifically gender-grade fixed effects and), ε_{ij} is an error term, which we allow to be correlated at the school level. That is, we will cluster standard errors at the school level. The covariates X used in our main specification will be gender-grade and district-gender fixed and the school-gender average of Y_{0ij}. As a robustness check, we will also show results without controls; we expect beliefs to be fairly persistent so results without baseline controls to be less precise.

2. We will also add additional control variables to improve precision

$$Y_{ij} = \beta_o + \beta_1 Treat_j + \beta_2 Y_{0ij} + \beta_3 X_{ij} + \beta_4 Z_{ij} + \varepsilon_{ij} \qquad (2)$$

Z_j are baseline student or school characteristics that are predictive of the outcome in the control group or are unbalanced at baseline between treatment and control so either improve precision or could create bias. We will use LASSO to determine these, following Belloni, Chernozhukov, and Hansen (ReStud 2013). The set of variables we will use are listed at the end of this document.

3. Some outcomes will be measured at the school-grade-level, e.g., test scores, and we will use the following regression specification where covariates are averaged at the school-grade level:

$$Y_{gj} = \gamma_0 + \gamma_1 Treat_j + \gamma_2 Y_{0gj} + \gamma_3 X_{gj} + \varepsilon_{gj} \quad (3)$$

Primary Outcomes

We have three primary outcomes, which are each indices composed of several variables.

1. Attitudes index
2. Aspirations index (for girls only)
3. Behaviors index

Attitudes are statements normative assessments by the student. Aspirations are statements about intended future behaviors. Behaviors are contemporaneous gender-related behaviors. Note that the "attitudes" questions are often aimed at measuring intended behaviour, but it was often easier to elicit responses when asking the question in a general way (e.g., about others' fertility rather than own future fertility). Below is a detailed list of the variables that will be used to construct each index.

1. Attitudes Index
   Our hypothesis is that the Breakthrough program makes attitudes more supportive of gender equality, e.g., in education and gender roles.

   The underlying survey questions are asked on a 5-point scale. Each response will be converted to a binary variable and coded as 1 if the respondent Strongly Agrees or Agrees with a gender-progressive statement (or Strongly Disagrees or Disagrees with a gender-regressive statement) and 0 otherwise. One version of the index will be the simple average of these binary values. The primary outcome will be a variance-weighted average following Anderson (2008) and as used in Dhar, Jain, and Jayachandran (2016). Weights will be based on the control group.

   To reduce survey length, some questions were asked to a random 50% of respondents. For missing values, the value will be imputed as the sample average for the gender-district-treatment status. This applies to other indices too.

   a. (Q. 36.5) Wives should be less educated than their husbands (edu)
   b. (Q 36.10) It would be a good idea to elect a woman as the village Sarpanch (sub)
   c. (Q 36.8) Boys should be allowed to get more opportunities and resources for education than girls. (edu)

d. (Q 34.2) Education Vignette: If you were the head of the family whom would you have sent to the town for further studies?[1] (edu)
e. (Q 36.2) A man should have the final word about decisions in his home. (sub)
f. (Q 36.3) A woman should tolerate violence in order to keep her family together. (sub)
g. (Q 36.13) Parents should maintain stricter control over their daughters than their sons. (sub)
h. (Q 36.1) A woman's most important role is to take care of her home, feeding kids and cook for her family. (emp)
i. (Q 36.16) Men are better suited than women to work outside of the house. (emp)
j. (Q 36.7) Daughters should have a similar right to inherited property as sons. (sub)
k. (Q 36.18 and 36.20) A shy demeanour makes a boy a more suitable groom *less* A shy demeanour makes a girl a more suitable bride[2] (sub)
l. (Q 36.19 and 36.21) When a girl laughs, she should cover her mouth *less* When a boy laughs, he should cover his mouth (sub)
m. (Q 33.2.4) Work Vignette: Marriage is more important for Pooja than her job (emp)
n. (Q 33.2.7) Work Vignette: Being a teacher would be a more suitable job for Pooja (emp)
o. (Q 36.17 and 36.12) Girls should attain higher education so that they find better husbands *less* Boys should attain higher education so that they find better wives (sub)
p. (Q 44 and 45) At what age would you like your sister/female cousins/friends to get married *less* At what age would you like your brother/male cousins/friends to get married? (sub)[3]
q. (Q 46 and Q90) Suppose the first 2 children born to a husband and wife are both girls. Which of the following should they do? *less* Suppose the first 2 children born to a husband and wife are both boys. Which of the following should they do?[4] (fert)
r. (Q 80) Do you think women should be allowed to work outside home? (emp)

Excluding questions: Some of the above questions are new so have not been fielded on a large sample. We intend to diagnose whether a question failed to "work" and exclude those form the index. For each item on the above list, we will estimate, using the control group, its correlation with the index constructed excluding it. If the correlation is negative, we will exclude the variable. Of course, the point of using multiple measures to construct the index is that each measures a different dimension of or intensity of attitudes. However, we expect them all to be contributing to a latent variable of gender-progressivity, so to be at least slightly positively correlated with each other. A negative correlation would be indicative that the question was, for example, misunderstood by the respondents.

Sub-indices: We will also divide the attitude questions above into 4 mutually exclusive sub-indices as auxiliary analyses: gender equality in education (edu), gender equality in employment (emp), female subservience (sub), and sex composition preferences (fert).

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[1] This question is based on a vignette and is not coded on a 5-point scale. The variable will be coded as a 1 if the respondent says the daughter or both children, and a 0 if they say the son.
[2] This question will be coded as gender-regressive if the respondent says being demure makes a bride more suitable but does not say the same thing about a groom. The next question will be coded analogously.
[3] We will code 2 dummies from this. One for saying that the age for girls > 19 and the other that the gap between boys and girls is larger than the control group median response.
[4] This question will be coded as gender-regressive if the respondent says that after having 2 girls but does not say the same thing about a family with 2 boys.

2. Aspirations Index

    Our hypothesis is that the Breakthrough program positively impacts aspirations and intended behaviors among girls for further education, non-traditional occupations, etc. The responses will normalized based on their variance and averaged, as in Dhar, Jain, and Jayachandran (2016). We will test this outcome for female participants only. As an alternative specification, we will use the male participants as an additional comparison group in a difference-in-differences framework, although the Breakthrough program also encouraged educational attainment among boys, so boys are not a perfect control group.

    a. (Q 42) How many marks, according to you, will you score in the SSE 10th board examinations?
    b. (Q 39) Have you ever discussed your education goals with your parents or adult relatives?
    c. (Q 38) Suppose you were to get married right after school, would you want to continue your education after marriage?
    d. (Q 40) What is the highest level of education you would like to complete if finances and opportunity of the school/college are available?
    e. (Q 43) What occupation do you expect to have when you are 25 years old? [White collar occupations are more progressive]

3. Gender behaviour index

    Our hypothesis is that the intervention increased gender-equitable behaviour among students in the treatment schools. By that we mean that students' are more comfortable with and interact more with the opposite gender; girls' have more autonomy and engage in fewer traditional activities; boys engage is less gender-discriminatory actions; and both genders encourage girls/women in their lives to have progressive actions/aspirations.

    In creating the index, each response will be converted to a binary variable where 1 indicates a progressive response and 0 otherwise. The responses will then be averaged. The index is includes some questions only for boys or girls (as specified below). For this reason and because some questions are not about own specific behaviour, so we will not test heterogeneity by gender for this outcome. We will also use some questions (indicated with "dd") to test for changes in behaviour with a differences-in-differences approach to see if girls are less likely to engage in traditionally female behaviors relative to boys in treatment schools

    a. (Q 47) Are you comfortable talking to children of the opposite gender who are not related to you inside and outside school?
    b. (Q 49) How frequently have you been teased, whistled at or called names by someone of the opposite gender? (included in index for girls only)
    c. (Q 67) Do you sit next to students of the opposite gender in class?
    d. (Q 53) Do the boys in your class ever do the following to the girls? (Various instances of harassment)

e. (Q 68) In the past one week, did you... cook/clean/wash dishes, take care of young siblings/old people in the household, and went shopping for household provisions/paid bills? (included in index for boys only; dd)

f. (Q 59.1) I am able to talk to my parents about what work I would like to do in the future (included in the index for girls only; dd)

g. (Q 55) Who mostly makes decisions about the following, or if this is in the future for you, who do you expect will make this decision- Will you make the decision, make the decision jointly with parents or will parents make the decision for you? (included in the index for girls only; dd)
    - Whether or not you will continue in school past 10th grade
    - If you will work after you finish your studies
    - What type of work you will do after you finish your studies
    - What types of chores you do at home (for example, cooking, cleaning dishes, taking care of your siblings)

h. (Q 61) Are you allowed to go to the school alone or with friends? (included in the index for girls only; dd)

i. (Q 26) During last week how many days were you absent from school? (included in the index for girls only; dd)

j. (Q 27) In the past month, have you missed school due to household based responsibilities? (included in the index for girls only; dd)

k. (Q 83) Do you discourage your sister from working outside home?

l. (Q 88) Do you discourage your sister from studying in college if it is far away?

Secondary outcomes

We will test impacts on the following secondary outcomes.

1. Implicit Association Test
   Although an IAT does not test the same concept as explicit attitude questions, we will use gender-related implicit attitude tests as outcomes because they are not subject to survey bias. One IAT checks the association of female and male children with "good" and "bad" concepts, and the other that measures the association of women and men with gender-traditional occupations.

2. Awareness about gender based discrimination
   We anticipate that the intervention increases awareness about gender based discrimination, which could be a pathway for reducing actual discrimination when the students in intervention schools become parents.

   - (Q 71) Do you know about female foeticide and infanticide?
   - (Q 72) Are female foeticide and infanticide are practiced in Haryana?
   - (Q 73) According to you, what is the main reason for female foeticide and infanticide?[5]
   - (Q 37) In Haryana, are the number of girls less than the number of boys?

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[5] There is no "correct" answer to this question. We will code this as correct if they state a reason instead of saying "Don't know."

3. Self-esteem

A pathway for future impacts and a secondary impact per se might be to increase girls' self-esteem. We will test for girls a self-esteem index composed of the following questions.

- On the whole, I am satisfied with myself.
- I feel that I have a number of good qualities.
- I am able to do things as well as most other people.

4. School outcomes

We will test whether academic outcomes decreased in treatment schools due to the intervention crowding out other academic instruction. Our hypothesis is that it did not, but we plan to test this possible unintended consequence of the intervention using monthly academic outcomes (measured by in-school tests; monthly data at school-grade level). The two outcomes are

    a. Overall pass rate
    b. By subject test scores

Note that we also hypothesize that increased aspirations for girls could lead to better academic achievement or higher attendance (because of more motivation or mobility). However, because such effects are likely to be small and we do not have data disaggregated by gender to test these outcomes. For these reasons, we will be underpowered to test these hypotheses.

5. Social norms

The program might or might not affect the respondent's perception of social norms and the costs of deviating from social norm. It could also make participants perceive that the norm is more progressive than they thought, which would make attitude change more likely to convert to behaviour change. However, if own attitudes change but perceptions about social norms do not, then behaviour might be less likely to change. The questions used to construct this index are as follows:

Set 1 (students were randomized to receive either Set 1 questions or Set 2 questions)
- (Q 80) Do you think that people in your village/community think that women should be allowed to work outside home?
- (Q 81) Do you think that people in your village/community think that women should be allowed to work outside home?
- (Q 82) Do you think the community will oppose you since [if] you disagree with them?
- (Q 84) If the community did not oppose you, would you encourage your sister/cousin sister to work outside home after marriage?

Set 2
- (Q 85) Do you think that girls should be allowed to study in college even if it is far away
- (Q 86) Do you think that people in your village/community think that girls should be allowed to study in college even if it is far away?
- (Q 87) Do you think the community will oppose you since [if] you disagree with them?
- (Q 89) If the community did not oppose you, would you encourage your sister/cousin sister to study in college even if it is far away?

Heterogeneity analysis

1. By Gender. We do not have a directional hypothesis about how the program will affect girls' versus boys' attitudes. Girls' might be more receptive to attitude change messages that benefit them, but boys start out from a less progressive standpoint.
2. Parental attitudes at baseline.[6] We measured parent attitudes at baseline for 40% of the sample. If parent attitudes are more progressive, then greater impact of the intervention implies that parent attitudes and the intervention are complementary. Conversely, greater impact among children whose parents had more conservative attitudes suggests that parent attitudes and the attitude change program are substitutes.

    The parental attitude index will be created from the following variables:

    - Disagree: A woman's most important role is being a good homemaker
    - Disagree: A man should have the final word about decisions in home
    - Disagree: A woman should tolerate violence to keep family together
    - Disagree: Wives should be less educated than their husbands
    - Disagree: Boys should get more opportunities for education than girls
    - Men & women should get equal opportunities in all spheres
    - Girls should be allowed to study as far as they want
    - Daughters should have similar right to inherited property as sons
    - It would be a good idea to elect a woman as the village Sarpanch

Additional possible control variables

Using LASSO to select control variables, some of the below list will be included in our full-controls specification.

Student-level variables from baseline survey
    - Dummy for scheduled caste or scheduled tribe
    - Dummy for Muslim
    - Household size
    - Sibling gender composition
    - Resident father/mother
    - Place of residence: rural/urban
    - Asset variables[7]

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[6] This parent attitude index was developed and defined in Dhar, Jain and Jayachandran (2016) "Intergenerational Transmission of Gender Attitudes: Evidence from India", NBER Working Paper No. 21429

[7] Asset variables (all from baseline): House is pukka, House is connected to electricity, Flush toilet, No flush toilet, Family owns the house, Household owns Radio or Tape Recorder, Household owns TV/Cable TV/Satellite TV/Dish TV, Household owns refrigerator, Household gets newspapers daily, Tap water, Household owns water pump

- Self-efficacy index
  We will construct an index using binary responses to the following questions measured at baseline. Responses will be coded as 1 if a respondent answers "Strongly agree" or "agree" and 0 otherwise. The responses will averaged to create the index.
    i. On the whole, I am satisfied with myself.
    ii. I enjoy learning.
    iii. I feel that I have a number of good qualities.
    iv. I am able to do things as well as most other people.
    v. I help make my community a better place.
    vi. I am full of ideas.
    vii. I think about social problems.
    viii. I have parents who try to help me succeed.
    ix. Some people say that it is important to have definite opinions about lots of things, whereas other people think that it is better to remain neutral on most issues. I think it is better to have definite opinions.
- Social desirability index
  We will construct an index using the binary responses to the modified Crowne-Marlowe module used at baseline to measure "social desirability bias."

School-level variables from baseline parent survey
- Average mothers' gender attitude index
- Average fathers' gender attitude index

School and village characteristics from other data sources
- Woman sarpanch (both baseline and endline)
- Teacher strength (Full time, guest)
- Fraction female teachers
- Extracurricular, physical education teachers
- Presence of Counsellor
- PTA meetings
- Frequency of extracurricular activities
- School facility construction
- Coed versus single sex school
- Rural location
- Village-level adult literacy rate by gender
- Village-level female labor force participation

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I. Introduction

This document pre-specifies the analyses we will conduct with data from our second endline survey for a randomized evaluation of a school-based gender attitude-change intervention in 314 government schools across Rohtak, Jhajjar, Panipat and Sonipat districts in Haryana, India. The trial is registered at www.socialscienceregistry.org/trials/72.

The baseline data collection and randomization were conducted in 2013-14 while the students were in grades 6 or 7. The intervention ran from April 2014 to October 2016 when one cohort was in grades 7, 8 and half of 9, and the other cohort was in grades 8, 9 and half of 10. Our first endline survey was conducted in 2016-17. We conducted tracking exercises in 2015, 2016 and 2018, yielding tracking rates of 98.5%, 93.8% and 96.4%, respectively. The second endline survey is scheduled to launch in January 2019, about 2 years after program end and 5 years after baseline.

II. Sample for Second Endline

Our initial sample size was 14,853 students. We are missing baseline data for 44 of these students because one school was mistakenly not surveyed at baseline; we surveyed students in this school at endline 1. As of our latest tracking survey, 41 of the sample students are deceased, so we will re-survey a maximum of 14,812 students during our endline 2.[1] For the second endline, we will survey our sample students in their households, along with a truncated phone survey for students who move to another village/district far from the survey districts.

III. Primary Outcomes

With the first endline, we analysed program impacts on three pre-specified primary outcomes, each constructed as an index. We found that the program improved participants' **gender attitudes**, reduced **gender-biased/gender-stereotyped behavior**, and had no significant effect on **girls' aspirations**.

We will examine 5 primary outcomes using the second endline. The first three are as in the first endline. The final two are new revealed-preference measures of behavior.

1. Attitudes index
2. Girls' aspirations index
3. Behavior index
4. Girls' applications to a college scholarship program
5. Endorsement of a petition advocating for a pro-gender-equality position

1. Attitudes Index

Our hypothesis is that the program makes attitudes more supportive of gender equality. The underlying survey questions will be asked on a 5-point Likert scale (in most cases). Each response will be converted to a binary variable and coded as 1 if the respondent strongly agrees or agrees with a

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[1] We also surveyed a subset of parents at baseline, but did not re-survey them in the first endline and will not re-survey them in the second endline.

gender-progressive statement (or strongly disagrees or disagrees with a gender-regressive statement), and 0 otherwise. The attitudes index is the weighted average value of the individual variables. It will be constructed with identical questions and weights as were used with the first endline. The weights were constructed following Anderson (2008) based on the variance of endline 1 variables.

As in our analysis of endline 1, the attitudes index will be further divided into 4 mutually exclusive sub-indices about opportunity for education, employment outside the home, women's roles in society, and fertility behavior. Details of the questions included in in the attitudes index (as well as the aspirations and self-reported behaviour indices) are in Appendix A.1.

2. Aspirations Index

Our hypothesis is that the Breakthrough program positively impacts girls' aspirations and intended behaviors for further education and employment etc. This index includes additional questions not included in the endline 1 data, so we will construct new weights following Anderson (2008). For completeness, we will also analyze this outcome for male participants, but our hypothesis is exclusively about female participants' aspirations.

Excluding questions: Some of the questions in this index will be new and have only been pretested on a small sample. For each new variable intended for this index, we will estimate, using the control group, its correlation with the index constructed excluding it. If the correlation is negative, we will exclude the variable from the index. A negative correlation would be indicative that the question was, for example, misunderstood by the respondents. This applies to Gender Behavior Index too.

Aspirations about fertility and marriage will be examined separately as a secondary outcome.

3. Gender Behavior Index

Our hypothesis is that the intervention increased gender-equitable behavior among participants. Each response will be converted to a binary variable where 1 indicates a progressive response, and the variables will then be weighted-averaged. Most of the questions are repeats from endline 1, but there are also some new behavior questions added. The index will include some questions only for boys or for girls. Some variables will be coded in opposite directions for boys and girls. We will thus examine separate indices for girls and boys, and a pooled index using both genders.

4. Revealed Preference Measure of Behavior: Scholarship program application

We will offer scholarships to our female subsample that can be used to pursue either college or vocational training. The proportion of girls submitting the scholarship application forms will be the outcome measure. We will randomly assign one of two forms to girls, stratified by treatment status:
1. Form requiring information to be filled by student along with a basic declaration signed by her parent(s).
2. Same as above but with an extra section to be completed by the parent(s) along with a weightier declaration to be signed by the parent(s).

Since the intervention aimed at increasing girls' aspirations and agency, we hypothesize that the application rate will be higher in the treatment group than control group. We will pool the two variants to test this hypothesis (and compare the two variants in secondary analysis described below).

5. Revealed Preference Measure of Behavior: Petition endorsing gender-equitable position

As a revealed preference measure of support for gender equality, we will administer a petition to both boys and girls about abolishing the dowry system in India and will ask them to pledge their support by

calling a phone number that we set up.[2] Whether the student called will be our outcome measure. Our hypothesis is that treatment group will support the petition more than the control group.

IV. Secondary Outcomes

We will also test impacts on the following secondary outcomes:

1. Girls' Self-Esteem
2. Perceptions of Social Norms
3. Girls' Educational Attainment Index
4. Marriage and Fertility Aspirations
5. Sexual Harassment

The details of the indices based on these outcomes are in Appendix A.2.

1. Girls' Self-Esteem Index: We will examine if the program increased girls' self-esteem in the treatment schools. We will construct a self-esteem index using the questions in Appendix A.2.

2. Social Norms: We will analyse how participants perceive the social norms around gender and how they influence their actions.

3. Girls' Educational Attainment Index: We will analyse girls' school enrollment status, current field of study, whether they are enrolled in after-school tuitions/tutoring, and whether they have enrolled in computer, English, or vocational skills classes.

4. Marriage and Fertility Aspirations Index: We will analyse whether respondents from the treatment group want to delay their age of marriage, and ask a series of questions on attitudes and behavior around family planning.

5. Sexual Harassment/Assault: We will measure boys' self-reported engagement in sexual harassment/assault (through list randomization) and girls' self-reported experience of sexual harassment/assault. We expect boys' engagement to decrease and perhaps girls' experience of it to decrease. However, the program could increase the reporting rate due to more awareness, leading to the opposite-signed findings.

#1 and #2 are secondary hypotheses because affecting these outcomes was not a main program focus. Re: #3, educational attainment is very important, but the gender gap seems to widen in Haryana after standard 12, not by participants' current age. Also, because few females enroll in outside-of-school classes, we expect low statistical power. #4 is a domain that received relatively little attention in the intervention. #5 has measurement challenges; reporting sexual harassment/assault depends on both awareness and experience.

V. Specifications
Our primary outcomes are indices which have analogues at baseline. We will use a data set with one observation per student and estimate the following ordinary least squares regression specification:

$$Y_{ij} = \beta_0 + \beta_1 Treat_j + \beta_2 Y_{ij}^0 + \beta_3 \mathbf{X}_{ij} + \varepsilon_{ij} \qquad (1)$$

where Y_{ij} is the outcome variable measured at endline for student i in school j. $Treat_j$ is the treatment indicator. Thus, β_1 represents the average effect of the intervention on the outcome. We control for Y_{ij}^0, the baseline analogue of the outcome. The vector $\mathbf{X}_{ij}$ comprises other control variables, which in our basic specification are grade-gender fixed effects and district-gender fixed

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[2] We ask them to phone starting the next day to reduce social desirability bias that might be present if the signature was on the spot.

effects. We will cluster standard errors ε_{ij} at the school level. For cases of missing baseline data or elements of the index, we impute the value with the gender-grade-district average.

For our primary outcomes, we will also estimate a specification with "extended control variables" as a robustness check:

$$Y_{ij} = \beta_0 + \beta_1 Treat_j + \beta_2 Y_{ij}^0 + \beta_3 \mathbf{X}_{ij} + \beta_4 Z_{ij} + \varepsilon_{ij} \qquad (2)$$

For our first endline, we chose the vector of baseline student and school extended controls, Z_{ij}, using LASSO, following Belloni, Chernozhukov, and Hansen (2014), with a separate set of controls for each primary outcome. Rather than re-running LASSO, for consistency with our first endline analysis, we will use the exact same extended controls for the first 3 primary outcomes. We will run the LASSO procedure to choose the control variables for the 4th and 5th primary outcomes, using the same set of possible control variables pre-specified for our first endline.

VI. Additional Analyses

1. **Heterogeneous effects:** We will analyse heterogeneity of effects along one dimension: participant gender. For our first endline, we found that attitude change was similar by gender, but behavior change was larger for boys. Using endline 2 data, we will analyze heterogeneity by gender for the attitudes index, behavior index, and signing of the petition. (The other two primary outcomes are focus exclusively on girls -- girls' aspirations and girls' scholarship applications). Based on our endline 1 findings, we expect that impacts on behavior will be larger for boys.[3]

2. **Parents as mediators of scholarship application:** One of the two variants of the scholarship application requires more input and support from parents. As an exploratory analysis, we will examine if the treatment effect for the scholarship differs between these variants. The proportional increase in take-up could be higher in either variant, depending on whether the intervention's bigger impact was on what girls want to do or on their ability to convince their parents to support their plans.

References

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[3] For the first endline, we pre-specified a second dimension for heterogeneity analysis: parent attitudes. (We surveyed a parent at baseline for about 40% of the sample.) We will not examine this dimension of heterogeneity with our second endline data given the smaller sample size and null results with the first endline.

APPENDIX

A. List of variables that will be used to construct each index

A.1 Primary Outcomes

1. **Attitudes Index:** The index aggregates the following questions:

Education Attitudes
- Wives should be less educated than their husbands.
- Boys should be allowed to get more opportunities and resources for education than girls.
- Education Vignette: If you were the head of the family whom would you have sent to the town for further studies?[4]

Employment Attitudes
- A woman's most important role is to take care of her home, feeding kids and cook for her family.
- Men are better suited than women to work outside of the house.
- Work Vignette: Marriage is more important for Pooja than her job.
- Work Vignette: Being a teacher would be a more suitable job for Pooja.
- Do you think women should be allowed to work outside of their home?

Women's Roles/Female Subservience Attitudes
- Daughters should have a similar right to inherited property as sons.
- It would be a good idea to elect a woman as the village sarpanch.
- A man should have the final word about decisions in his home.
- A woman should tolerate violence in order to keep her family together.
- Parents should maintain stricter control over their daughters than their sons.
- The main reason girls should attain higher education is so that they can find better husbands *minus* The main reason boys should attain higher education is so that they can find better wives.
- A shy demeanor makes a boy a more suitable groom *less* A shy demeanor makes a girl a more suitable bride.[5]
- When a girl laughs, she should cover her mouth *minus* When a boy laughs, he should cover his mouth.
- At what age would you like your sister/female cousins/friends to get married *minus* At what age would you like your brother/male cousins/friends to get married?[6]

Fertility Attitudes
- Suppose the first two children born to a husband and wife are both girls. Which of the following should they do? *minus* Suppose the first two children born to a husband and wife are both boys. Which of the following should they do? [7]

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[4] This question is based on a vignette and is not coded on a 5-point scale. The variable will be coded as 1 if the respondent says the daughter or both children, and 0 if they say the son.

[5] Only one of these two questions will be asked to each respondent (determined by randomizing). We thus will use the school-gender average rather than the individual's response. We will code the question as gender-regressive if the value for demure bride is greater than a demure groom.

[6] We will code 2 dummies from this. One for saying that the age for girls > 19 and the other that the gap between boys and girls is larger than the control group median response.

[7] The question will be coded as -1 (gender regressive) if the respondent says 'have no more children' after having two boys but not after having two girls, 1 (gender progressive) if respondent says 'have no more children' after two girls but not two boys, and 0 otherwise.

2. **Aspirations Index:** The index consists of the following questions. New questions not included in endline 1 are indicated with **:

- How many marks, according to you, will you score in the SSE 12th board examinations?[8]
- Have you ever discussed your education goals with your parents or adult relatives?
- Suppose you were to get married right after school, would you want to continue your education after marriage?[9]
- What is the highest level of education you would like to complete if finances and opportunity of the school/college are available?[10]
- What occupation do you expect to have when you are 25 years old?[11]
- Do you plan to go to college/pursue a vocational course/professional course/join civil services or army?[12] **
- What course would you like to pursue for higher studies?[13] **
- I would like to have a job outside the home that I continue to pursue when I am married and have children **

3. **Behavior Index:** The index will be constructed using the following questions:

The **girls' behavior index** will include the following questions not included for boys:

- Is able to talk to parents about what work she would do in the future (DEC)
- Takes decision[14]: Whether or not you will continue in school past 12th grade (DEC)
- Takes decision: If you will work after you finish your studies (DEC)
- Takes decision: What type of work will you do after you finish your studies (DEC)
- Is allowed to go to the school alone or with friends (MOB)
- During last week, was not absent from school (DEC)
- Has gone to the market within his/her village to buy personal items alone** (MOB)
- Has attended community events without guardians present (either alone or with friends) ** (MOB)
- In the past one week, has gone out of his/her house alone for any kind of purpose** (MOB)
- In the past one week, has gone to school alone or with friends?** [15] (MOB)

We will code the following questions in opposite directions for boys and girls:

- In the past one week, did you cook/clean/wash dishes?[16] (HH)
- In the past month, have you missed school due to household based responsibilities? (HH)

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[8] The question will be coded as gender-progressive if the value is greater than the control group median. Question will be asked only if the student is currently enrolled in grade 11 or 12.

[9] This question is only applicable to students enrolled in schools and not married.

[10] The question will be coded as gender-progressive if the value is greater than the control group median.

[11] The question will be coded as 1 if the respondent is able to report her expectations about having a job irrespective of the nature/type and 0 otherwise.

[12] The question will be coded as gender-progressive if the respondent plans to pursue further education/training.

[13] We hypothesize that girls in the treatment schools will be more likely to report a course of their choice indicating that they have a plan for future/have set a goal for themselves. The question will be coded as 1 if the respondent reports wanting to pursue a particular course and 0 otherwise. We also hypothesize that girls in the treatment schools will be more likely to pursue a course in STEM field than girls in the treatment schools. The questions will be coded as gender-progressive if the girls report wanting to pursue Engineering; Medicine; Bachelors of Science.

[14] The questions will be coded as progressive if the respondent takes the decision herself.

[15] Question to be asked if the student does not report going to school alone in the previous question "In the past one week, have you gone out of your house alone for any kind of purpose?"

[16] The question will be coded as progressive (regressive) if boys (girls) respond yes.

The pooled behavior index uses the following questions present in both the boys' and girls' behavior indices. As before, we will code boys and girls in the opposite direction for participating in household chores and missing school for chores.

- Child is comfortable talking to children of the opposite gender inside and outside school? (INT)
- Child sits next to students of the opposite gender in class[17] (INT)
- Child is friends with the opposite gender/has friends from the opposite gender** [18] (INT)
- Child plays with the opposite gender (who are not related to him/her) inside or outside of school. ** (INT)
- In the past one week, child spoke with children (not related to him/her) of the opposite gender inside or outside of school. ** (INT)
- In the past one week, boy/girl did/did not cook/clean/wash dishes (HH)
- In the past month, boy/girl did/did not miss school due to household based responsibilities? (HH)
- Disagree: Do you discourage your sister/cousin sister to work outside home? (SUPP)
- Disagree: Do you discourage your sister from studying in college if it is far away. (SUPP)

Sub-indices: We will also divide the behavior questions above into 5 mutually exclusive sub-indices as auxiliary analyses: interaction with the opposite sex (INT), participation in household chores (HH), supporting female relatives' ambitions (SUPP), girls' decision-making (DEC), girls' mobility (MOB).

A.2 Secondary Outcomes

1. **Self-Esteem:** The index comprises the following questions:
   - On the whole, I am satisfied with myself.
   - I feel that I have a number of good qualities.
   - I am able to do things as well as most other people.

2. **Social Norms:** The questions that will be analysed are as follows:
Set 1 (students will be randomized to receive either Set 1 questions or Set 2 questions)
   - Do you think that women should be allowed to work outside of home?
   - Do you think that people in your village/community think that women should be allowed to work outside of home?
   - Do you think the community will oppose you since [if] you disagree with them?

Set 2
   - Do you think that girls should be allowed to study in college even if it is far away?
   - Do you think that people in your village/community think that girls should be allowed to study in college even if it is far away?
   - Do you think the community will oppose you since [if] you disagree with them?

3. **Girls' Educational Attainment Index****:
   - Which school are you enrolled in?[19] **

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[17] This question will be not asked in single-sex schools. The value will be imputed as the gender-treatment status-district average for these students.

[18] The response will be coded as gender-progressive if the respondent reports having opposite-gender friends.

[19] We hypothesize that girls in the treatment schools will be more likely to be currently enrolled in school. The question will also be coded 1 if a girl is pursuing schooling through an "open school."

- What stream are you currently following?[20] **
- In the past one year, have you enrolled for an English speaking, computer training, or vocational class?[21] **
- Do you take after-school/college tuitions?[22] **

4. **Marriage and Fertility Aspirations**** The questions included in the index are:
    - At what age do you want to marry?[23] **
    - At what age do you want to have your first child?[24] **
    - How many children do you want to have? **
    - How many of these children would you like to be boys, how many would you like to be girls, and for how many the gender doesn't matter? **
    - Suppose your spouse and you are going to have N children, how many of them would you want to be boys?[25] **
    - If instead of X boys and N-X girls, you could either have X-1 boys and N-X+1 girls OR X+1 boys and N-X-1 girls, which would you prefer?[26] **

5. Sexual harassment/assault**

Boys' engagement in sexual harassment/assault: We will ask boys about sexual harassment using list randomization. Stratified by treatment status, a random half of the sample will be shown the list below including the sensitive question (in bold) and the other half will be asked about the list without that question. They will be asked to state how many of the statements are true.
   i.   In the past year, I have made new friends.
   ii.   **In the past year, I have passed dirty comments about a girl; made dirty gestures in a girl's presence or inappropriately touched or groped a girl.**
   iii. In the past year, I have gone on a vacation with my parents (to a relative's place etc.)
   iv.   In the past year, I have scolded my friend/cousin.
   v.   In the past year, I have watched a program (sports, cultural etc.) on television.

Girls' experience of sexual harassment/assault: We will create an index based on the following questions.

- In the past one year, have you ever been slapped, hit, or otherwise physically hurt by a boy in a way you did not want? **
- How frequently have you been teased, whistled at, or called names by boys in school in a way you did not want? **
- How frequently have you been teased, whistled at, or called names by boys outside of school in your village/town in a way you did not want? **

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[20] The question will be coded as 1 if the student is pursuing a Science, Commerce with Math, or Arts with Math stream and 0 otherwise.

[21] This variable will be constructed by combining responses to three separate survey questions.

[22] We expect higher participation in tuitions (tutoring) in the treatment group because of better negotiation, more awareness, or higher aspirations.

[23] Question will be coded as 1 if the age reported by the respondent is greater than the control group median response.

[24] Question will be asked to unmarried students and to students who are not parents yet.

[25] We will ask this question with only one value of N randomly chosen, with equal likelihood from the integers between 1 and 5.

[26] The response options of the questions are as follows: (a) Prefer X-1 boys, and N-X+1 girl or (b) Prefer X+1 boys, and N-X-1 girls. The question will be coded as gender progressive if the respondent chooses response option 1 and 0 otherwise.

- How frequently have you been touched or groped by boys in school in a way you did not want?[27] ++
- How frequently have you been touched or groped by boys in your village/town in a way you did not want? ++

B. Set of variables from which extended control variables will be chosen

Below is the set of baseline variables that we will select extended controls from, using LASSO.

Student-level variables from baseline survey

- Dummy for scheduled caste or scheduled tribe
- Dummy for Muslim
- Household size
- Sibling gender composition
- Resident father/mother
- Place of residence: rural/urban
- Asset variables[28]

- **Self-efficacy index:** We will construct an index using binary responses to the following questions measured at baseline. Responses will be coded as 1 if a respondent answers "Strongly agree" or "agree" and 0 otherwise. The responses will be averaged to create the index.
  - i.   On the whole I am satisfied with myself.
  - ii.   I enjoy learning.
  - iii.   I feel that I have a number of good qualities.
  - iv.   I am able to do things as well as most other people.
  - v.   I help make my community a better place.
  - vi.   I am full of ideas.
  - vii.   I think about social problems.
  - viii. I have parents who try to help me succeed.
  - ix.   Some people say that it is important to have definite opinions about lots of things, whereas other people think that it is better to remain neutral on most issues. I think it is better to have definite opinions.

- **Social desirability index:** We measured social desirability bias using a 13-question Crowne-Marlowe module.
  - i.   It is sometimes hard for me to go on with my work if I am not encouraged.
  - ii.   I sometimes feel resentful when I don't get my way.
  - iii.   On a few occasions, I have given up doing something because I thought too little of my ability.
  - iv.   There have been times when I felt like rebelling against people in positions of authority even though I knew they were right.
  - v.   No matter who I'm talking to, I'm always a good listener.
  - vi.   There have been occasions when I took advantage of someone.

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[27] The questions marked with ++ will be added to the questionnaire partway through data collection, once (and if) we have IRB approval to do so. We will include them in the sub-index on girls' experience of sexual harassment/assault if we are able to collect them for a large enough subsample that is representative of the full sample.

[28] Asset variables (all from baseline): House is pukka, House is connected to electricity, Flush toilet, No flush toilet, Family owns the house, Household owns radio or tape recorder, Household owns TV/cable TV/satellite TV/Dish TV, Household owns refrigerator, Household gets newspapers daily, Tap water, Household owns water pump.

vii. I'm always willing to admit it when I make a mistake.
viii. I sometimes try to get even rather than forgive and forget.
ix. I am always courteous, even to people who are disagreeable.
x. I have never been irked when people expressed ideas very different from my own.
xi. There have been times when I was quite jealous of the good fortune of others.
xii. I am sometimes irritated by people who ask favours of me.
xiii. I have deliberately said something that hurt someone's feelings.

School-level variables from baseline parent survey
- Average mothers' gender attitude index
- Average fathers' gender attitude index

School and village characteristics from other data sources
- Woman sarpanch (both baseline and endline)
- Teacher strength (full time, guest)
- Fraction female teachers
- Extracurricular, physical education teachers
- Presence of Counsellor
- PTA meetings
- Frequency of extracurricular activities
- School facility construction
- Co-ed versus single sex school
- Rural location
- Village-level adult literacy rate by gender
- Village-level female labour force participation

Deviations from the Pre-Analysis Plan

Dhar, Jain, and Jayachandran (2021), "Reshaping Gender Attitudes"

July 2021

This document lists the ways we deviate in our analysis from our Endline 1 and Endline 2 pre-analysis plans (PaPs). The Endline 1 was posted at the AEA registry in November 2016 and the Endline 2 PaP was posted at the registry in December 2018. This document also lays out the output of data-driven procedures to construct indices that we pre-specified.

1. Missing baseline data for one school

At baseline, due to a misunderstanding in the field, one sample school was not surveyed. We discovered during endline data collection that we mistakenly conducted the baseline survey in a different school in the village, one not in our study sample. We do not use these data (45 students). The valid sample size from the baseline is 14,809 students.[1]

The missing school (ID 2711) was randomized to receive the treatment, and the treatment was indeed given to the correct school. At endline, we surveyed the correct school (44 students), and did not survey the incorrect one. Baseline data for these 44 students from school 2711 are missing. In the analysis, baseline variables for them are imputed with the gender-specific sample average among other schools in their district (Sonipat).

To choose the sample students in school 2711, we distributed consent forms to students present during a visit to the school just before the endline survey. We then randomly chose 44 sample students from among those whose parent provided consent and who personally assented to participate.

2. Construction of weighted indices

When constructing indices as variance-weighted averages of variables, we calculate the weights using the entire sample, not the control group as specified.

By (survey) design, some questions in our indices are only asked to half the sample, or are skipped based on an answer to a previous question due to relevance. We pre-specified that we would impute values, but we reconsidered and decided that it was better not to impute missing components. We exclude the missing components, rescale the weights according, and include missing flags in the regressions for each component with missing values.

3. Validation of the gender attitudes indices

We pre-specified that we would diagnose whether a question failed to "work" and, if so, exclude it from the gender attitudes index. As pre-specified, for each component variable, we estimated its correlation with the index constructed excluding it, using the control group. If the correlation was negative, we excluded the variable. The following questions were excluded from the attitudes index based on this procedure:

a.   (Q 36.18 and 36.20) A shy demeanour makes a boy a more suitable groom less A shy demeanour makes a girl a more suitable bride,

b. (Q 36.19 and 36.21) When a girl laughs, she should cover her mouth less When a boy laughs, he should cover his mouth

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[1] The PaP for Endline 1 mentions 14,855 students. We excluded an additional respondent, who had a disability and should not have been enrolled, from the final baseline sample.

4. Construction of gender attitudes index

For the variable that uses the questions, "Suppose the first 2 children born to a husband and wife are both girls [boys]. Which of the following should they do?" we changed the pre-specified -1/0/1 coding to a binary coding; the response is coded as gender regressive if the person said the couple should continue to have children if they only have girls but should not continue if they only have boys. The rationale for changing was that, first, the pre-specified coding would have counted discrimination against boys as desirable (and even more desirable than equal treatment of the genders). Second, the change makes all of the variables binary variables, and we viewed consistency as desirable. Also, a binary coding was necessary for calculating a persuasion rate. (Note: Footnote 4 of the EL1 PaP mistakenly omitted the words "they should keep trying" after "if the respondent says that.")

For similar reasons, we changed the -1/0/1 coding for the variable based on "Girls [boys] should attain higher education so that they find better husbands [wives]" to a binary that is gender progressive if they give the same response to the questions about girls and boys.

5. Construction of aspirations index

For the questions on educational aspirations, we coded the dummy variable as 1 if it was greater than the gender-specific control group median, not the overall control group median as specified in the EL2 PaP. This is because we are only interested in the change in aspirations for the girls. Also, we specified that we would use the male participants as an additional comparison group in a differences-in-differences framework. However, we do not do this because we decided boys are not a good comparison group.

6. Construction of behavior index

A. We exclude variables that did not appear to capture what we intended, as follows:

1. Questions on sexual harassment (How frequently have you been "Eve teased" [harrassed], whistled at, or called names by someone of the opposite gender? Do the boys in your class ever do the following to the girls? (asked about various instances of harassment))

    -   Reason: These are not about one's own behaviour. Also, they could be (and seem to be) picking up higher awareness of teasing after the intervention.

2. Whether the student takes care of elders and younger siblings in the family.

    -   Reason: Boys report a higher rate of this activity (in the control group), even though by all accounts, girls play more of this role than boys in Haryana. We were concerned this question was misinterpreted or there was misreporting.

3. Whether the student takes any decision regarding what chores to do at home.

    -   Reason: Boys report a lower rate of this activity (in the control group). The reason is probably that boys do many fewer chores at home.

4. Whether the student goes shopping for household provisions/pay bills.

    -   Reason: This is not a chore that girls often do; this question blurs the burden of doing a chore with the freedom to move about the community.

B. Question on sitting next to students of the opposite gender in class is applicable and asked only to students in co-ed schools.

C. The Endline 1 PaP was not thorough enough in describing how to construct the behavior index. Some behaviors are only applicable for girls. Some variables are coded in opposite

directions for boys and girls. We focus on an index with questions relevant for both boys and girls (and separately look at subindices only applicable to girls).

The following questions were not asked for boys so are not included in the behavior index.

- Child is able to talk to parents about what work she would do in the future
- Child takes decision: Whether or not you will continue in school past 10th grade
- Child takes decision: If you will work after you finish your studies
- Child takes decision: What type of work you will do after you finish your studies
- Child is allowed to go to the school alone or with friends
- During last week, child was not absent from school

We code the following questions in opposite directions for boys and girls.

- In the past week, child cooked/cleaned/washed dishes
- In the past month, child missed school due to household based responsibilities?

7. Controls chosen using LASSO

a. As suggested by a referee, we allow all covariates to be selected by double LASSO. We include the basic controls (baseline value of the attitudes, aspirations, and self-reported behavior indices, grade-gender and district-gender fixed effects, indicators for missing components of outcome index) to the set considered by LASSO. (We had pre-specified that we would instead always include the basic controls in the treatment effect regression and add LASSO-selected controls to that specification.)

b. We used the parent attitude index instead of the school-average as a potential control variable in our LASSO extended controls procedure, given that we included in the LASSO set missing flags for all potential regressors in the LASSO set.

c. The control variable 'place of residence' (rural/urban) was never collected from students at baseline. We instead used the school's location from the school survey.

d. We could not collate data on whether the village had a woman Sarpanch.

e. We impute missing values and include missing flags in the set of potential controls fed into the double LASSO procedure.

8. Social norms (secondary outcome)

We asked respondents questions about either perceived social norms towards work or perceived norms about education (by randomizing). How the questions within each set were asked was conditional on the answers to the previous questions. To present the results in a clear and concise way, we construct three outcomes for each of the two sets of questions:

- Child agrees that women should be allowed to work/study in college even if it far away
- Child agrees that community thinks women should be allowed to work/ study in college even if is far away
- Child agrees that women should allowed to work/study in college, and thinks community will not oppose them

9. Girls' education index (Endline 2 secondary outcome)

Footnote 19 of EL2 PaP mentions that we code those respondents currently enrolled in school as 1. We also code those who completed school but were not enrolled in a college at the time of the survey as 1, since the survey occurred in the break between school years

before those who completed secondary school would have enrolled in college. Respondents pursuing vocational/diploma coures are coded as 0.

10. Marriage and fertility aspirations (Endline 2 secondary outcome)

A. We code these variable as gender progressive if the age is greater than the gender-control median, as opposed to the control median as specified in the PaP:

      i. At what age do you want to marry?

      ii. At what age do you want to have your first child?

b. The questions included in the PaP, "How many children do you want to have?" is not in a variable we intended to include in our index; it was just an aid in calculating the variable pertaining to the question "How many of these children would you like to be boys, how many would you like to be girls, and for how many the gender doesn't matter?"

c. For the question "How many of these children would you like to be boys, how many would you like to be girls, and for how many the gender doesn't matter?", we code it as 1 (gender progressive) if the respondent does not list more boys than girls, and 0 otherwise. We do not account for total number of children as suggested in the PaP.

d. For the question "Suppose your spouse and you are going to have N children, how many of them would you want to be boys?", we were not clear about how this would be coded. We calculate the fraction of children desired to be boys and code the variable as gender progressive (i.e., 1) if the fraction is less than the control group median.

11. Girls' experience of sexual harassment (Endline 2 secondary outcome)

In the Endline 2 PaP, we specified that we would check that the subsample that we have the data for are representative of the full sample before including them:

      a. How frequently have you been touched or groped by boys in school in a way you did not want?
      b. How frequently have you been touched or groped by boys in your village/town in a way you did not want?

The subsample is similar to the full sample, so these questions are included in our index. The questions asking how frequently the female respondent experienced a certain act of harassment are coded as 0 if they never experienced it, and 1 otherwise.

12. Sample size for parent survey

The Endline 1 PaP mistakenly stated that we surveyed 5483 parents at baseline. We completed 6022 parent surveys.

13. Controlling for school-gender mean of baseline outcome

The Endline 1 PaP stated that the basic controls would include the school-gender average baseline outcome. The Endline 2 omitted this statement. We always intended to keep the same specification across endlines and use the specification stated at Endline 1, and we did so in our working paper. However, a referee was skeptical of this control variable, which was pre-specified as one of the basic controls because we expected it to be correlated with the outcome and thus to improve precision. Because it is not strongly correlated with the outcome or Treated, and thus all the results are virtually identical with or without it, we excluded it from the main specification throughout the paper, as requested by the referee.