

## **Shedding Light on the Gender Gap through Randomized Field Studies**

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In recent years, randomized field studies or field experiments have become increasingly popular in economic research related to the gender gap. Many of these studies have sought to investigate the factors underlying gender differentiated behavior, decision-making and access to resources, and the factors that lead to such differences.

The following review would like to provide an overview of this literature, starting with a brief introduction to the benefits and limitations of the method of randomized field studies, followed by a summary table of gender related findings from recent field experiments conducted across the developing world. It concludes with a brief discussion of the achievements and limitations of this literature and explores avenues by which randomized studies can be used to further examine the global gender gap.

### Why randomized field studies?

The primary advantage of the randomized experimental approach is that it allows the researcher to ascertain causality in evaluating how a given factor affects a situation. In comparison, in non-randomized datasets, causal evaluations are often very difficult to make in a clean way.

Say, for example, we wanted to study how the presence of women in community groups affects the efficacy of such groups. If we compared different community groups, some of which included more women than others, we might find for example that groups with more women work more efficiently. However, while it is possible that the inclusion of women really made these groups more efficient, it is also possible that the observed correlation actually resulted from women selectively joining those groups that work more efficiently. Alternately, a confounding factor could be influencing both the higher presence of women in and the efficiency of the groups. For example, higher standards of living within a region may lead to both more women participating actively in community organizations and higher organizational management skills.

The main objective of the method of randomized studies is to rule out such alternative explanations. Their basic approach is to apply the methods used in medical or laboratory research to the social sciences. An intervention is applied to a randomly selected group of people with the

non-selected group serving as the control group. By comparing the situation of the so-called treatment group with that of the control group, the researchers can assess the impact of the intervention.

Returning to the example of the community groups discussed above, Leino (2007) studies the impact of female participation through a randomized intervention in Kenya. This study involved the random selection of community groups responsible for water source management. Groups selected for treatment were presented with strong incentives to include more women while the remaining control groups did not receive such incentives. The random selection of treatment groups allowed determining whether an increased proportion of female leadership within community groups made them more effective at managing the water sources, while ruling out other confounding factors. As it turned out, the increased female participation did not affect the effectiveness of the groups.

A different study included in this review (Duflo and Topalova, 2004) analyzes the effect of reservation of local political positions in India for women on the provision of public goods. Duflo and Topalava found that in this context, having more women involved in the political process did improve the provision of public goods and drinking water infrastructure. These findings illustrate that the role of gender may be different in different contexts, and while the inclusion of women in political institutions or community organizations may be effective in some situations, it may not be so in others.

Randomized studies help us to evaluate very precisely the impact of specific factors on outcomes that are relevant to understanding the role gender plays, and the factors that may affect the gender gap. Rather than basing conclusions on correlations in the data, they allow for the identification of causal statements.

Though randomized field studies have shed light on many questions related to the gender gap, this approach is characterized by a number of limitations and drawbacks. Firstly, the gender itself is not a characteristic that can be randomized, so when observing differences in outcomes by gender, it is difficult to distinguish discrimination from other unobserved characteristics that may be affecting these differences. Secondly, due to the technical challenges involved in ensuring proper randomization and in administering interventions, randomized field studies tend to be

limited to relatively narrow and small-scale settings. Since results may be context specific, their external validity, or generalizability to other locales or time periods, may at times be uncertain. Future research should therefore attempt at replicating the studies in different context, in order to identify those findings which reflect relatively general patterns versus those which are more context specific.

The above discussion illustrates that the role of gender may be different in different contexts and that the details of institutions may be very important in understanding the both the causes and the consequences of the gender gap. The growing economics literature that is using randomized studies to evaluate these questions aims at shedding light on these issues.

Though the exact drivers of gender inequalities are not known, economic theories on gender inequality can be broadly classified into three main categories. Under the discrimination hypothesis, prejudices such as cultural norms bring about gender inequalities, suggesting a need for policy intervention. In contrast, under the preference hypothesis, gender-differentiated outcomes result from personal preferences rendering implications for public policy less clear. Finally, under the constraints theory, income and credit constrained households invest in sons' over daughters' education in order to maximize future earning potential in an environment where males have higher incomes than females.

The following table summarizes a selection of papers in this literature. It provides a brief description of the method applied, and the nature of randomization used in each study as well as a summary of the main gender related findings, conclusions and interpretations that each paper provides. The table is organized by topic, starting with education (panel A), followed by health (panel B), political empowerment and participation (panel C), and finally savings and investment (panel D). An overview of the studies by geographical region and country is provided in the appendix.

Recent papers using randomized evaluations to shed light on the gender gap

An overview over of the papers by country can be found in the appendix

**Panel A: Education**

Authors and title of study	Country	Research question and nature of random assignment	Main gender related findings	Conclusions and Interpretation
Angrist, Bettinger, Bloom, King and Kremer (2002) <i>Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment</i>	Colombia	PACES Program –Bogota school vouchers covering half the cost of private secondary school were randomly distributed by lottery to 125,000 poor children	From a baseline of 7.4 years, the scholarship led to 0.12 more years of school for girls due both to reduced grade repetition and additional time spent in school. Female voucher winners exhibited a 0.26 s.d. increase in test scores and spent 2.1 fewer hours per week working in the labor market. All effects for boys were smaller and only marginally significant.	The PACES voucher program vouchers had a stronger effect on the years of education and test scores for girls than for boys.
Angrist, Bettinger and Kremer (2004) <i>Long-term Consequences of Secondary School Vouchers: Evidence from Administrative Records in Columbia</i>	Colombia	PACES Program (see above). The vouchers were renewable annually conditional on adequate academic progress.	The paper finds a differential impact of the voucher program on college admission test scores for boys and girls. One of the main specifications, correcting with a Tobit model for increased college admission of voucher recipients, finds that vouchers improve scores in the language section for boys by 3.8 points from a baseline of 37.0, compared to an increase of 2.9 points from a baseline of 37.6 for girls. In the math section, scores of boys increased by 3.0 points from a baseline of 34.8, compared to an increase of 1.8 points from a baseline of 35.9 among girls.	Correcting for the greater percentage of lottery winners taking college admissions tests, the study finds somewhat larger voucher effects on scores in college admission tests for boys than for girls, especially in math. Because boys have lower test scores than girls, this implies that the program reduces the male-female score gap.
Duflo, Dupas, Kremer and Sinei (2006) <i>Education and HIV/AIDS Prevention:</i>	Kenya	Three HIV/AIDS interventions were randomized across schools: 1)	While the teacher training and critical thinking interventions had no impact on dropout rates, reducing the cost of	Reducing the cost of education has been found to reduce dropout

<p><i>Evidence from a Randomized Evaluation in Western Kenya</i></p> <p>(For a discussion of the impacts on health outcomes studied in this paper, see the health section of this table.)</p>		<p>training teachers in an HIV/AIDS curriculum, 2) critical thinking: encouraging students to debate and write about the role of condoms, and 3) reducing the out-of-pocket cost of education via distribution of a free school uniform for each child.</p>	<p>education through provision of uniforms helped students stay in school longer. When children in grade six were given a free school uniform, dropout rates of girls fell by 2.5 percentage points and of boys by 2 percentage points. This represented about a 15% relative reduction for both groups from baseline dropout rates of 18.5% for girls and 12% for boys.</p> <p>Helping students stay in school longer decreased the likelihood that they got married and had children. Girls in schools where free uniforms were provided were 1.5 percentage points less likely to have started childbearing (a 10% decrease), 2.3 percentage points less likely to report having ever had sex (13%), and 1.4 percentage points (or 12%) less likely to be married. Boys in such schools were 0.8 percentage points (or 40%) less likely to be married.</p>	<p>rates significantly, and this in turn has been found to reduce the number of teenage pregnancies. In rural Western Kenya, social pressures are such that pregnant or married teenagers are stigmatized at school. The ability to remain in school appears to be an effective incentive for teenagers to avoid teen pregnancy and postpone marriage.</p>
<p>Kremer, Miguel and Thornton (2007) <i>Incentives to Learn</i></p>	<p>Kenya</p>	<p>Girls Scholarship Program – randomized at the school level: In each district, the girls with the highest scores on the 6<sup>th</sup> grade national academic exam received funding for school fees and school supplies for next 2 years</p>	<p>The scholarship program increased test scores for girls, but also for boys, who were not eligible for the scholarship. In the main sample, test scores of girls improved by 0.14 s.d. and those of boys by 0.07 s.d. In Busia district, the program effect was 0.25 s.d. for girls and 0.13 s.d. for boys. The study finds additional evidence that the scholarship program had lasting effects on learning, increasing girls test scores also in the following years, though program effects fall somewhat over time. School attendance was 4.5 percentage points higher in</p>	<p>Even though scholarships are often thought to benefit relatively advantaged students the most, in this program girls with low baseline test scores and poorly educated parents still benefited greatly from the merit scholarship program. Schools enrolled in the scholarship program</p>

			<p>treatment school (30% reduction in absenteeism).</p> <p>Intrinsic motivation, study habits and household chores done by girls and boys in program schools were not found to differ from that of their peers in control schools.</p>	<p>also experienced statistically significant increases in teacher attendance, which led to positive educational spillovers to boys as well.</p>
<p>Schulz (2004) <i>School subsidies for the poor: evaluating the Mexican Progresa poverty program</i></p>	<p>Mexico</p>	<p>PROGRESA Program – Among communities designated as “rural and poor”, a subsection of families qualifying for inclusion under a “proxy-means test” was selected to participate in an incremental scale-up of random order of the program. The program involved two separate cash transfers to mothers, 1) if children, pregnant women and adults in the family attended the requisite number of health check-ups and 2) if children between the grades of 3-9 had an at least an 85% school attendance rate.</p>	<p>Cash transfers conditional on child’s school attendance and participation in health promotion activities resulted in a 3.4% increase in average enrollment for all students in grades 1 through 8. The largest increase was seen among girls who had completed grade 6 (14.8 percentage points) and girls who had completed grade 9 or more prior to the program (11.1 percentage points).</p> <p>Increases in junior high (grades 7-9) enrollment among boys were lower at 6.5 percentage points. Secondary school females in the treatment group worked 4.1 percentage points less in household and market work while secondary males work 2.6 percentage points less.</p>	<p>In areas where public schooling is free, education costs result primarily from the opportunity cost of lost income from child labor. Cash transfers can then help to offset the private costs of education.</p> <p>Program effects were on average larger among girls, suggesting that cash transfers may be particularly effective in incentivizing parents to invest in the education of female children.</p>

**Panel B: Health**

Authors and title of study	Country	Research question and nature of random assignment	Main gender related findings	Conclusions and Interpretation
Ashraf, Berry and Shapiro (2007) <i>Can Higher Prices Stimulate Product Use? Evidence from a Field Experiment in Zambia</i>	Zambia	Water purification solution (chlorine) was provided at randomly varying cost levels to a random selection of female heads of households excluding those near the main waterline and those already being provided chlorine by NGOs	An increase in the price of chlorine led to a slight change of the population who purchased it, as well as to a change of reported usage among those who purchased it: An increase of 100 Kw (over a retail price of 800 Kw) in the price for chlorine led to a 7 percentage point decrease in the probability of buying and to a 3.7 percentage point increase in reported use among buyers.	Female heads of households agreeing to buy chlorine at a higher price are more likely to use the product after purchasing it with some evidence that the act of paying influences use over and above the selection effects induced by price increases.
Ashraf, Field and Lee (2007) <i>Gender, Intrahousehold Decisionmaking, and the Demand for Children</i>	Zambia	Women were randomly selected from a roster of women registered at a large government clinic to receive a voucher for a free family planning appointment. Vouchers were for either “wife-only” or “couples together” appointments.	Overall take-up of the voucher was 47%, however take-up among women assigned to receive vouchers for an appointment with their husbands was 9 percentage points lower than among women assigned to receive the vouchers alone. For the couples only treatment, a 12 percentage point reduction in take-up is seen in the subsample of women whose husbands want more children than they currently have.	The basic finding indicates that sharing information about family planning services with husbands reduces the women’s propensity to utilize these services. Different treatment effects for husbands or wives who want more children suggest that the overall effect may reflect differential demand for children rather than negative male attitudes towards family planning.
Bobonis, Miguel and Sharma (2006) <i>Anemia and School Participation</i>	India	Preschools were randomly assigned to “health camps” held at treatment schools every three months for children ages 2-6,	Prior to intervention, boys exhibited better health with only 42.4% of boys anemic compared to 60% of girls. Gains in weight	Baseline health scores were lower for girls, who in turn displayed larger gains in health outcomes and in school participation following the

		where they were treated with deworming drugs and given iron supplements and vitamins.	were significantly greater for girls than for boys (0.67 weight-for-height z-score for girls versus 0.29 for boys). Preschool attendance rates increased among girls, while for boys, effects were small and statistically insignificant.	intervention.
Cohen and Dupas (2007) <i>Free Distribution or Cost Sharing? Evidence from a Randomized Malaria Prevention Experiment</i>	Kenya	The price charged for insecticide treated bed nets (ITNs) was randomized among pregnant women at 20 prenatal clinics	Demand for ITNs decreased by 60% as price increased from 0 Ksh to 40 Ksh (80% of the prevailing local NGO cost-sharing price). An increase of 10 Ksh in price had no statistically significant impact on ITN usage, monitored through random house visits (statistically insignificant increase of 4 percentage points from a baseline usage rate of 62% at the prevailing NGO price prior to the intervention). These minor gains in usage due to increased prices did not offset decreased willingness of individuals to pay money for an ITN in the first place. Because this decreased demand effect was so large, at the 40 Ksh price level, only 14% of prenatal clients used an ITN, compared to 63% of prenatal clients under the free distribution scheme.	Overall, higher prices lead to decreased ITN utilization among women, an effect that is most pronounced among women who already have to travel long distances. Results from this paper suggest that affordability is key to promoting access to ITNs for the most vulnerable populations such as pregnant women.
Duflo, Dupas, Kremer and Sinei (2006)	Kenya	Three HIV/AIDS interventions were randomized across schools:	Teacher training had minimal impact on students' knowledge	Training teachers in the Kenyan HIV/AIDS curriculum did not



<p><i>Education and HIV/AIDS Prevention: Evidence from a Randomized Evaluation in Western Kenya</i></p> <p>(For a discussion of the impacts on educational outcomes studied in this paper, see the above in the education section of this table.)</p>		<p>1) training teachers in an HIV/AIDS curriculum, 2) critical thinking: encouraging students to debate and write about the role of condoms, and 3) reducing the out-of-pocket cost of education via distribution of a free school uniform for each child.</p>	<p>and behavior and no impact on teenage child-bearing rates, but girls who had children were 4.3% more likely to be married in treatment schools than in control schools.</p> <p>Participation in a debate on condoms increased condom knowledge among both girls and boys. Girls in condom debate schools were 7.9 percentage points (25%) more likely to mention condom use as a HIV prevention method compared to a 6.1 percentage points (or 13%) increase among boys. Condom debates and essays also increased the likelihood that boys reported having used a condom at their last encounter by 5.6 percentage points (a 20% increase).</p> <p>The impacts of school uniforms discussed in the education section above are not only relevant for prolonged school attendance. The resulting reduction of risky sexual behavior has significant bearing on health outcomes as well, given the risks of disease transmission in unprotected sex as well as the possibility of pregnancy.</p>	<p>reduce teen pregnancy rates but did increase the likelihood that teen pregnancies occur within marriage.</p> <p>However, this could result from either more stable partnerships with similarly aged males, which would lead to lower HIV contagion, or increased partnerships with older men (who are more ready to marry but have higher HIV rates).</p> <p>Discussions about the role of condoms increased knowledge about them, which may potentially lead to less risky behavior. Reducing the cost of schooling through provision of free uniforms lead to a decrease in pregnancies, which is likely to reflect a decrease in unprotected sex.</p>
<p>Dupas (2007) <i>Relative Risks and the Market</i></p>	<p>Kenya</p>	<p>Random assignment of 71 secondary schools for</p>	<p>The information campaign reduced the incidence of</p>	<p>HIV prevalence in Kenya is higher in older men than in younger men.</p>

<p><i>for Sex: Teenage Pregnancy, HIV, and Partner Selection in Kenya</i></p>		<p>participation in the “Relative Risks Information Campaign”, in which students were given information on the distribution of HIV by age and gender, especially about the fact that HIV prevalence in Kenyan men increases substantially with their age, with the aim to discourage risky behavior of young girls with older men</p>	<p>childbearing by 1.7 percentage points (baseline of 5.4% in non-treatment group). The largest decreases were seen in childbearing outside of marriage (60% decrease from a baseline unmarried childbearing rate of 2.2 percentage points).</p> <p>Among the treatment group, baby’s fathers were 23 percentage points less likely to be more than 5 years older than the teenage mother (a 64.8% decrease in cross-generational pregnancy). At the same time, from a baseline of 16%, girls in the treatment group were 50% more likely to be sexually active.</p>	<p>Sharing this information with high school aged girls decreases the perceived riskiness of sex with teenage boys while increasing knowledge of the dangers of intergenerational sex, as reflected in corresponding behavioral changes.</p> <p>Policies that focus only on the elimination of a risky activity, and do not address risk reduction strategies, such as choosing younger men as partners, may be ignoring a dimension along which they could have substantial impact.</p>
<p>Hoffman (2007) <i>Mental accounts, gender or both? The intrahousehold allocation of free and purchased mosquito nets</i></p>	<p>Uganda</p>	<p>From a random selection of households with pregnant women or young children either the husband or wife was randomly selected to receive either an in-kind transfer of an insecticide treated bed net or a cash transfer equivalent to the full price of a bed net (the transfer was unrestricted in usage, but individuals were educated about the importance of bed nets in malaria prevention and able to purchase an ITN at the experiment site)</p>	<p>66% of children 5 years and younger use a net if a female guardian purchases one, whereas 83% of children use a net if a she is given one. The corresponding numbers for male guardians are 75.5% if the guardian purchased nets, versus 78.7% if he receives one. However, the difference between male and female guardians disappears when looking only at married guardians: When nets are given for free to married men, the share of children using them is 76.7%, compared to 77.3% when given to</p>	<p>The difference between usage of ITNs between in-kind and cash transfers suggests a stronger responsibility-inducing effect of an in-kind transfer on women. Even though no statistically significant difference in ITN usage was noted between married men and women overall, female and male guardians responded to the treatments (in-kind ITN vs. cash transfer) differently in the intensity of ITN usage. This may result from parents having heterogeneous preferences and women may be more concerned with bed net usage due to their role</p>

			married women (difference not statistically significant).	of caring for children in the household.
Thornton (2005) <i>The Demand for and Impact of Learning HIV Status: Evidence from a Field Experiment</i>	Malawi	Men and women from 125 villages are randomly assigned a monetary incentive to return to a testing site to pick up their HIV and STI test results	From a baseline of 39%, respondents were 39 percentage points more likely to return for their HIV test results when given a monetary voucher. There were no differential gender impacts of the incentive on returns except in Balaka province, where due to historical gender restrictions in Islam, women were 25 percentage points less likely than men to return to pick up their results, a gap that was completely closed when financial incentives were offered.	Though historical and religious gender norms have traditionally restricted female health seeking behavior in Balaka, even very small financial incentives appear sufficient to close this gap.

### Panel C: Political Empowerment and Social Participation

Authors and title of study	Country	Research question and nature of random assignment	Main gender related findings	Conclusions and Interpretation
<p>Chattopadhyay and Duflo (2004) <i>Women as Policy Makers: Evidence from a Randomized Policy Experiment in India</i></p>	<p>India</p>	<p>By national law, 1/3 of all local Village Council seats as well as head positions (chiefs) must be reserved for women.</p> <p>Implementation varies by district. In both Rajasthan and West Bengal a random rotation system is used to select administrative districts for reservation.</p>	<p>In West Bengal, villages that had a reservation of their chief seat for a woman saw female representation at the biannual village general assembly increase from 6.9% to 9.8% and doubled the likelihood of a woman filing a formal complaint with the chief. In these reserved villages, investment in public goods increased by 0.16-0.23 s.d. But controlling for the average preference of women in the district shows that female chiefs are not more responsive to the needs of women in their communities, rather their own preferences happen to be more aligned with the average preferences of women.</p> <p>Female chiefs on average had lower wealth, education, experience and re-election prospects than their male counterparts in non-reserved districts. However, in regression analysis, the coefficients on the differences in the above background characteristics were uniformly statistically insignificant, suggesting that</p>	<p>The increase in political participation and communication by female voters in female-headed villages suggests that low political engagement by women may result not from personal preferences to avoid politics but instead from barriers to connecting with male leaders.</p>

			divergent policy preferences between female and male chiefs were driven by differences in their experience level and socio-economic status.	
Duflo and Topalova (2004) <i>Unappreciated Service: Performance, Perceptions, and Women Leaders in India</i>	India	By national law, 1/3 of all local Village Council head positions are randomly reserved for women (see above)	Reservations for female chiefs lead to a 0.08 s.d. increase in overall investment in public goods and a 0.19 s.d increase in drinking water infrastructure. Villagers are 0.02 s.d. less likely to pay bribes to female chiefs. In male-headed villages, the number of public taps and hand pumps is positively correlated with satisfaction with water infrastructure but not in female-headed villages. In female headed villages, satisfaction is on average 2 percentage points lower (equivalent to a 25% increase in dissatisfaction); this dissatisfaction extends even to areas over which the chief has no control (such as health services).	Voters are biased in their appraisal of the competence and performance of women. Base level of satisfaction with women leaders is lower to start with and women are not credited for investment they are making as much as men are. Though it is possible that women leaders perform worse along unobservable dimensions, it is likely that villagers are prejudiced and have low expectations for women, given that women are less favorably evaluated than men even in areas they do not control.
Gugerty and Kremer (2006) <i>Outside Funding and the Dynamics of Participation in Community Associations</i>	Kenya	Rural self-help women's groups were randomly selected to receive agricultural training and inputs	The groups that received training and input saw increased entry into their group by more educated women (12% compared to a baseline of 8%) and by women employed in the formal sector (11% compared to a baseline of 9%). Men and better educated women were each 4 percentage	These findings suggest that financial support may have undesired effects, changing the very characteristics of organizations or groups that it aims at strengthening, as it may lead to gentrification by attracting higher social status individuals and crowding out more marginalized peoples. Though NGO financial

			<p>points more likely to hold executive positions in treatment groups than in controls (at baseline, 3% of executives were male less than 40% of females had secondary education). At the same time, women over the age of 50 (who represented the most marginalized group) were 14 percentage points more likely to exit or become inactive due to conflict in the treatment group compared to a baseline exit rate of 18% among controls.</p>	<p>support did lead to increased female leadership, the women were younger and wealthier and did not represent rural women as a whole.</p>
<p>Leino (2007) <i>Gender and the Community Management of Water Infrastructure in Kenya</i></p>	<p>Kenya</p>	<p>Among communities receiving NGO-based water infrastructure support, half were randomly selected for a female participant intervention, in which women were strongly encouraged to join community management committees overseeing maintenance of spring water protection.</p>	<p>The intervention had a strong effect at increasing female participation in the committees, and this in turn had no effect on the quality of services delivered by the committees. On average, there was one more woman in committees that were subject to the intervention than on others, which represents an increase of 21 percentage points from a baseline of 54% female participation. Among treated committees, 96% were female-majority and 64% female-headed; among the control committees, 58% were female-majority and 27% female led. Even though turnover among committee members was around 16% per year, increased female</p>	<p>Mandatory reservation policies may not be needed to achieve long-term increases in female community leadership. Simple advocacy techniques appear sufficient to increasing local female leadership participation.</p> <p>While increased gender participation does not seem to improve public goods outcomes, there appears to be no trade-off in average quality of committee members.</p>

			<p>participation was stable over the 3 years of follow-up. There were no significant differences between the characteristics of both women and men in the treatment and control committees.</p> <p>Increased female participation has not been found to affect measured spring maintenance quality nor other beneficial community activities.</p>	
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**Panel D: Savings and Investment**

Authors and title of study	Country	Research question and nature of random assignment	Main gender related findings	Conclusions and Interpretation
<p>Ashraf (2007) <i>Spousal Control and Intra-Household Decision Making: An Experimental Study in the Philippines</i></p>	<p>Philippines</p>	<p>Couples were randomly selected among Green Bank clients to receive an amount of money which they could either dedicate to their own consumption, save in their own account or save in their spouse's account. For this the decision-making process, they were randomly assigned to one of three conditions: private, public and joint negotiation decision making. In the private condition, the spouse did not learn about their choice, in the public condition, the spouse would learn about it afterwards and in the joint negotiation condition, spouses negotiated the choice together.</p>	<p>In the private condition, 51% of men directly deposited the money into their own account, 23% deposited the money into their spouse's account and 25% dedicated it to consumption. In contrast, in the public condition, only 21% of men directly deposited the money into their own account, 19% deposited the money into their spouse's account and 60% dedicated it to consumption. A majority of women in contrast chose to deposit money into their own account rather than committing it to consumption or to their spouses account regardless of the treatment condition.</p> <p>Women who indicated that their husbands control the savings decisions in their household were 65 percentage points more likely to dedicate money to consumption than to put money into their own savings account in the public condition. However, in the private condition, they were 63 percentage points more likely to put money into their own accounts than commit it to consumption. Similarly, men who indicated that their wives control savings decisions were 61 percentage points more likely to dedicate money to consumption in the public condition and 68 percentage points more likely to put money into their own accounts in the private condition than men who controlled their own household savings.</p>	<p>Even though making information public moves men away from putting money into their own accounts towards committing it to consumption, the effect appears to be driven more by control over savings decisions than by gender. Men whose wives control savings decisions in the household are much more likely to exhibit the treatment effect, consistent with a framework in which information serves a monitoring role in enforcing a contract in which one spouse controls the finances.</p> <p>Gender differences may not be immutable nor based on gender alone; instead, one might consider gender outcomes as a result of the roles the genders have taken on, and the structure of household financial management that have created incentives for current behavior patterns.</p>



<p>Ashraf, Karlan and Yin (2006a) <i>Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines</i></p>	<p>Philippines</p>	<p>Random assignment of clients of the Green Bank to be eligible for a “SEED” account, an individual account with a commitment device, in which participants commit to restricting access to their savings for a defined time period or until they have accumulated a defined amount</p>	<p>No gender difference is found with regards to “impatience”, measured as a preference for receiving less money now versus more money in a month. Married women were found to be more impatient than unmarried women. Women exhibiting impatient preferences were 15.8% more likely to sign up for the commitment savings product compared to other women. No statistically significant difference has been found between patient and impatient men. Women with low or high income were less likely to take up the product than those in the middle of the income distribution.</p>	<p>Commitment savings products represent a forced savings mechanism that women can impose upon their households if women have more intra-household bargaining power. Wives in the Philippines often manage the household finances, so take-up of the savings product may represent their solution to temptation or savings problems.</p> <p>The fact that single women appear more likely to take up the product may be because single women often live in extended households prior to marriage, so they may be in need of an outside savings mechanism to escape familial control.</p>
<p>Ashraf, Karlan and Yin (2006b) <i>Female Empowerment: Impact of a Commitment Savings Product in the Philippines</i></p>	<p>Philippines</p>	<p>SEED Account (see above) - Follow up of participants in the Green Bank commitment savings product study after 2.5 years</p>	<p>Among married women who had received an offer for a SEED account, household decision making power increased by 0.14 to 0.25 s.d compared to women who were in the control group that did not receive a SEED account. The largest increases in decision making power were seen among women below the median of household decision making power prior to the intervention. For women below the median, having access to a SEED account resulted in a positive impact on their ability to purchase expensive items and to assist family members.</p> <p>In contrast, women above the median exhibited</p>	<p>The commitment device had the greatest effect on decision making power among married women who had below-median household decision making power prior to the intervention. These results suggest that lower financial savings and control over committed assets is at least partially responsible for low empowerment among women. However, the effect of such savings products might wane over longer-time periods if</p>

			positive treatment impacts with regards to number of children and schooling for children but no impact on their ability to purchase expensive items and to assist family members. Both the number of items purchased and the total expenditures for traditionally female-oriented consumer durables increased among married women below the median; this effect was smaller, and not statistically significant, for married women above the median. Among men who were offered a SEED, there was no change in purchase of durables	spouses find ways of regaining control.
Bertrand, Karlan, Mullainathan, Shafir and Zinman (2005) <i>What's Psychology Worth? A Field Experiment in the Consumer Credit Market</i>	South Africa	Clients of a commercial bank were sent letters offering them large short-term loans. The offers had different randomly varied interest rates, and independently randomized psychological "features" such as including information on how the offered interest rate compared to market benchmarks or varying the race and gender of the person depicted in a photo incorporated in the letter.	Including a photo of the opposite gender on the letter increased take-up as much as dropping the interest rate by 1.3 percentage points. For men, receiving a letter with a photo of a woman rather than of a man increased take-up of the loan by as much as a drop in the interest rate of 4.5 percentage points.  Female customers exhibited adverse selection on the interest rate margin: increasing the interest rate led to a 1.5 fold increase on the amount past due on the loan (after 2 months) as a percentage of total loan amount; among men, interest rate increases led to only a 0.5 fold increase in late repayment rates, which was not statistically significantly different from 0.	Including a picture of a women in a letter advertising loans increases take-up of the loan significantly, particularly among men. The increase in loan take-up may result from the association of females with friendlier lenders.  Female customers appear to exhibit adverse selection on the interest rate margin.
De Mel, McKenzie and Woodruff (2007) <i>Who does Microfinance</i>	Sri Lanka	Self-employed microenterprise owners with no paid employees who were clients of a microcredit institution were randomly selected to	While the average male microenterprise has returns to capital in excess of 9% per month, the average returns on the grant received are found to be zero or negative for female owners. The low returns do not appear to be a result of differences in ability of male and female owners.	The economic argument for microfinance's focus on female-owned businesses is that female owners are likely to be poorer, more credit constrained, and use resources more efficiently. This

<p><i>Fail to Reach? Experimental Evidence on Gender and Microenterprise Returns</i></p>		<p>receive grants of cash or free equipment for their business.</p>	<p>A large part of the effect appears to result from females working in different industries than males.</p>	<p>paper provides evidence against this view. There is large heterogeneity of returns to the grants among female owners.</p> <p>Permanently raising the income of women running small microenterprises may be more difficult than raising the income of men in similar positions.</p>
<p>Karlan and Zinman (2006) <i>Expanding Credit Access: Using Randomized Supply Decisions To Estimate the Impacts</i></p>	<p>South Africa</p>	<p>Some new loan applicants who fell just below the normal threshold of creditworthiness were randomly selected for credit approval.</p>	<p>No statistically significant differences are found between borrowing behavior of male and females after receipt of loan. Treated women were 21.3% more likely than the control group to report that they would borrow from a microlender and 14.9% less likely to borrow from informal sources if they needed a loan. Effects on men were much smaller and not statistically significant. For both men and women, increased access to consumer credit increased decision-making power (as measured by an index compiled from answers regarding how household purchasing and borrowing decisions are made). For females, the coefficient on the decision-making index though positive was somewhat smaller and not statistically different than 0.</p>	<p>Interestingly, women were not found to exhibit different borrowing behavior than men. A differential impact by gender was noted on reported use of alternative sources of credit.</p> <p>For both men and women, increased access to consumer credit increased reported decision-making power in the household. For policy makers aiming at increasing female decision-making power in the household, increased access to credit sources may therefore be an avenue to investigate.</p>

## What have we learned, and what is the role of future research avenues?<sup>1</sup>

The above table summarizes some recent studies that try to understand different aspects of the gender gap through randomized field studies throughout the developed world. The following discussion tries to take stock of what this literature has taught us so far and discuss some possible future research avenues.

Reviewing the economics literature about the gender gap, three categories of research questions emerge:

- 1) In what dimensions do we observe differences in behavior between men and women? To what degree do these different behaviors result from discrimination or other constraints that affect men and women differently, and to what degree do they reflect differences in preferences?
- 2) In what ways can women be agents of economics development? Will reducing the gender gap and putting more economic and political power into the hands of women lead generally to more economic development in their societies?
- 3) What measure can reduce the gender gap, and allow women increasingly to realize their own preferences and be less subject to constraints due to their gender?

Considering the first category of questions, concerning differences in behavior resulting from different constraints or preferences, many of the discussed studies find significant differences in outcomes between men and women. A large variety of factors, from access to microfinance to reductions of the cost of education have been found to have substantially different impacts on men and women. Distinguishing whether these differences stem from differences in preferences or in constraints between the genders is often not easy.

This is particularly the case when preferences themselves are potentially endogenous to constraints. This endogeneity of preferences may come about in two ways: one way results from optimization with fixed preferences but changing constraints. An example would be if girls or their parents anticipate future discrimination, e.g. a lower return to education than for boys, they may prefer to invest less in their education, or invest in a type of education that is expected to

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<sup>1</sup> The following discussion is based in part on conversations with Nava Ashraf, Pascaline Dupas, and Erica Field.

cause less exposure to discrimination in the future. Another way may be truly endogenous preferences, in the sense that the discrimination affect and change the preferences themselves. This may happen for example if repeated confrontation with gendered stereotypes and discrimination at an early age leads girls and boys to internalize such gendered norms, affecting their auto-esteem and preferences independently of future constraints that they may be facing.

One result that has become clear from this research is that in many contexts, the simplifying assumption of treating the household as one unit is inadequate. Identical interventions, when directed at different individuals within the same family unit, can produce very divergent outcomes. For example, Ashraf (2007) in her study on intrahousehold decision-making and savings behavior in the Philippines finds that not only does it make a difference for asset allocation whether the husband or the wife of a household gets to choose how a given amount of money is allocated, it also matters whether the spouse is subsequently informed about that decision. More research is now needed to further elucidate such dynamics, which currently to a large extent remain a black box to economists. How do decisions and behaviors result from implicit negotiations and explicit conflicts of interest within the household? And how do the access to information and resources, and the outside options of each spouse affect these intra-household dynamics?

A growing body of evidence appears to suggest that women and men may have different preferences with respect to health, savings, education, and the number of children they would like to have. Future research will hopefully continue to map out the details and dimensions along which gender preferences differ, as well as the ways in which women can be empowered to affect family decisions in ways that correspond to their own preferences, particularly in those areas where the male preferences dominate.

The second category of research questions outlined above relates to the claim, often heard in the context of international development agencies, that empowering women will lead to increased economic development with spillovers onto the whole society. This may well be true in many circumstances. However, there remains relatively little scientific evidence to underlie this claim. Additional scientific evaluations may allow determining the impacts of increasing women's access to resources, information, and decision-making power, and to identify the economic areas

and social contexts in which there can be positive spillovers from women's empowerment onto economic development of a society. As referenced in the above discussion on the effect of female leadership on public goods provision, evidence on many of these questions is not as clear-cut as often assumed.

Within the household, women have often been found to behave "better" from a development perspective, investing more in their children, education and health (e.g. Chattopadhyay and Duflo, 2004; Duflo and Topalava, 2004; Hoffman, 2007). However, within complex institutions, evidence is more mixed. The outcomes and whether women will behave in ways that are more conducive to economic and social development may depend on the specific incentives and structures of such institutions. If incentives within an institution are poorly aligned with the social planner's preferences, there is not necessarily a reason why we should expect women to behave better than men. This may explain some of the differences found by different studies. More research is needed in order to identify the types of institutions in which women's behavior tends to be more aligned with development goals than men's.

Concerning the third category of questions, about measures that can reduce the gender gap, studies like Thornton (2005) on demand for HIV test results, and Dupas (2007) on risky sexual behavior are particularly encouraging, in that they show that in some contexts, small changes in financial incentives, or the dissemination of key information on the benefits of certain behavior changes, can affect women's position substantially. Future studies will hopefully determine to what extent such findings are generalizable to other contexts, as well as identify other areas in which small policy changes can have large impacts on the gender gap. This will in turn assist policy makers in focusing their efforts on areas where pay-offs to policy changes are expected to be high. This search for policy interventions with a high return in terms of reduction of the gender gap may be an area for which the method of randomized evaluations may be particularly suitable.

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## Appendix: Overview of studies by region and country

Region	Country	Authors and title of study	Panel
Asia	India	Bobonis, Miguel and Sharma (2006) <i>Anemia and School Participation</i>	Health
	India	Chattopadhyay and Duflo (2004) <i>Women as Policy Makers: Evidence from a Randomized Policy Experiment in India</i>	Political Empowerment and Social Participation
	India	Duflo and Topalova (2004) <i>Unappreciated Service: Performance, Perceptions, and Women Leaders in India</i>	Political Empowerment and Social Participation
	Philippines	Ashraf (2007) <i>Spousal Control and Intra-Household Decision Making: An Experimental Study in the Philippines</i>	Savings and Investment
	Philippines	Ashraf, Karlan and Yin (2006a) <i>Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines</i>	Savings and Investment
	Philippines	Ashraf, Karlan and Yin (2006b) <i>Female Empowerment: Impact of a Commitment Savings Product in the Philippines</i>	Savings and Investment
	Sri Lanka	De Mel, McKenzie and Woodruff (2007) <i>Who does Microfinance Fail to Reach? Experimental Evidence on Gender and Microenterprise Returns</i>	Savings and Investment
Africa	Kenya	Cohen and Dupas (2007) <i>Free Distribution or Cost Sharing? Evidence from a Randomized Malaria Prevention Experiment</i>	Health
	Kenya	Duflo, Dupas, Kremer and Sinei (2006) <i>Education and HIV/AIDS Prevention: Evidence from a Randomized Evaluation in Western Kenya</i>	Education/ Health
	Kenya	Dupas (2007) <i>Relative Risks and the Market for Sex: Teenage Pregnancy, HIV, and Partner Selection in Kenya</i>	Health
	Kenya	Gugerty and Kremer (2006) <i>Outside Funding and the Dynamics of Participation in Community Associations</i>	Political Empowerment and Social Participation
	Kenya	Kremer, Miguel and Thornton (2007) <i>Incentives to Learn</i>	Education
	Kenya	Leino (2007) <i>Gender and the Community Management of Water Infrastructure in Kenya</i>	Political Empowerment and Social Participation
	Malawi	Thornton (2005) <i>The Demand for and Impact of Learning HIV Status: Evidence from a Field Experiment</i>	Health
	South Africa	Bertrand, Karlan, Mullainathan, Shafir and Zinman (2005) <i>What's Psychology Worth? A Field Experiment in the Consumer Credit Market</i>	Savings and Investment
	South Africa	Karlan and Zinman (2006) <i>Expanding Credit Access: Using Randomized Supply Decisions to Estimate the Impacts</i>	Savings and Investment

	Uganda	Hoffman (2007) <i>Mental accounts, gender or both? The intrahousehold allocation of free and purchased mosquito nets</i>	Health
	Zambia	Ashraf, Berry and Shapiro (2007) <i>Can Higher Prices Stimulate Product Use? Evidence from a Field Experiment in Zambia</i>	Health
	Zambia	Ashraf, Field and Lee (2007) <i>Gender, Intrahousehold Decisionmaking, and the Demand for Children</i>	Health
Latin America	Colombia	Angrist, Bettinger, Bloom, King and Kremer (2002) <i>Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment</i>	Education
	Colombia	Angrist, Bettinger and Kremer (2004) <i>Long-term Consequences of Secondary School Vouchers: Evidence from Administrative Records in Columbia</i>	Education
	Mexico	Schulz (2004) <i>School subsidies for the poor: evaluating the Mexican Progresa poverty program</i>	Education