THE CAUSES AND CONSEQUENCES OF INCREASED FEMALE EDUCATION
AND LABOR FORCE PARTICIPATION IN DEVELOPING COUNTRIES

Rachel Heath
Seema Jayachandran

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Rachel Heath and Seema Jayachandran
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ABSTRACT

This article describes recent trends in female education and labor force participation in developing countries. It also reviews the literature on the causes and effects of the recent changes in female education and employment levels.

Rachel Heath
Department of Economics
University of Washington
Box 353330
Seattle, WA 98103
rmheath@uw.edu

Seema Jayachandran
Department of Economics
Northwestern University
2001 Sheridan Road
Evanston, IL 60208
and NBER
seema@northwestern.edu

1. Introduction

Two important recent trends in most developing countries have been the rise in female labor force participation and the closing of gender gaps in school enrollment. In this article, we explore both the causes and the effects that they have had on the lives of women. A central theme that emerges is the relationship between the two phenomena: as increases in education have prompted more women to enter the labor force, improved labor market opportunities have also prompted increases in female education.

We begin by exploring the causes of the increases in female education. In addition to the role of greater job availability, we also discuss policy interventions that have promoted girls' education. Recent evidence indicates that providing cash or in-kind benefits to parents who keep their daughters in school, building schools or improving facilities, and programs to reduce general gender disparities can all lead to increases in girls' education.

We then turn to the causes of increased female employment. Against the backdrop of the well-known theory that female labor supply is U-shaped in development (Boserup, 1970; Goldin, 1995), we provide evidence both that poor countries are moving along the U-shaped curve as they develop and that the curve has shifted over time. Low-income countries are on the downward-sloping portion of the empirically-estimated U-shaped curve, which would suggest that their female employment rate would be declining as their economies grow. However, we show that the U-shaped curve has been shifting upward in recent decades: female labor force participation has increased, conditional on a country's income. The net effect of movement along the curve and the shift in the curve is that even the poorest countries in the world have generally experienced rising female employment. Some of the employment growth has been generated by a sectoral shift from "brawn" to services, which is occurring earlier in the development trajectory than predicted by the U-shape. We also argue that policies that have increased girls' education have contributed to the upwards shift. Furthermore, we cite evidence that programs seeking to improve women's earning potential (such as microfinance or business skills training) or to reduce the burdens of home production (such as free child care) have had some success in increasing female labor supply. If these programs are adopted on a large-scale, they could contribute to a further shift upwards.

In the second half of the article, we document the effects of these increases in education and labor supply. In addition to increased labor supply, there is also considerable evidence that female education delays fertility and leads to healthier children once a woman has them. There is some evidence, although it is less extensive, that women with more education marry later and on better terms, and are healthier themselves.

We conclude by discussing the effects of increased labor supply on women. We present research that shows that job availability increases women's bargaining power, even if they do not work themselves. At the same time, holding constant job availability, working itself leads to even greater increases in women's bargaining power and children's health. While these outcomes both represent improvements in women's utility and are frequent policy goals, we also discuss evidence that there may also be concurrent increases in domestic violence or reductions in women's leisure time that make the net effect for women's welfare less clear.

2. Determinants of female education and labor supply

2a. Determinants of increases in education

There is a pronounced male bias in educational attainment at low levels of economic development, which is absent among richer societies. Figure 1 shows the relationship between gender gaps in education and development by plotting the female-to-male ratio in secondary school enrollment rates in countries around the world against GDP per capita. The ratio is below 1 in most poor countries – meaning that female enrollment is lower than male enrollment -- but in richer countries there is gender parity or, in fact, female enrollment exceeds male enrollment.

The pattern seen in the cross-section of countries is also seen over time in most poor countries as their economies grow: girls' education increases at a faster rate than boys', narrowing the gender gap. Figure 2 plots the trend in secondary school completion rate for females relative to males among low-income countries in Sub-Saharan Africa and Asia. While education levels for both genders have been rising over time (not depicted in the figure), the growth is more rapid for females as indicated by the increasing ratio female-to-male education ratio.

Economic forces affecting female education
There are several potential reasons for the rise in female education and, more specifically, the faster rise in female than male education. First, if the female employment rate is rising and education confers benefits in the labor market, then forward-looking families will invest more in girls' education over time. Should families in developing countries be anticipating a rising female employment rate? There are many reasons that female employment could increase with development, as discussed in Jayachandran (2015) and briefly reviewed here. As economic activity shifts away from "brawn-based" work and toward "brain-based" work, such as in the services sector, female workers gain a comparative advantage (Pitt, Rosenzweig, and Hassan, 2012). Reductions in fertility, better control over the timing of fertility, and improvements in maternal health also increase women's time in the labor market (Jayachandran and Lleras-Muney, 2009; Miller, 2010). While there are also some potential channels through which female employment might instead decrease with development -- as discussed in the next section -- we

also show that the positive channels have dominated negative channels in a majority of countries, so that female employment has indeed risen in most countries over the past 20 years.

There are also other channels besides female employment that could be driving the rise in girls' education that accompanies economic development. The opportunity cost of schooling might fall due to decreases in parents' fertility and in the time-intensity of home production: girls' time that they had spent caring for siblings or doing household chores is freed up, enabling them to stay in school longer.

The above explanations do not rest on any societal favoritism toward boys. However, part of the gender gap in education may very well reflect favoritism. Thus, another potential explanation for the rising education of girls is that educating children has consumption value for parents, with girls' education more of a luxury good than boys' education; with rising family incomes, spending on girls begins to catch up to spending on boys. In addition, economic development might alter preferences and reduce gender-biased attitudes. Stated gender bias tends to be negatively correlated with economic development, although we do not have causal evidence that economic development systematically ameliorates gender-biased attitudes (Jayachandran, 2015).

Gender-focused policies affecting female education
In addition to the economic forces that accompany development leading to more female education, there are also many policies directed at increasing female education that have been put in place in recent decades. One type of policy involves school infrastructure. Building more schools could be a girl-friendly policy if parents are more sensitive to travel distance when deciding to send girls to schools (Burde and Linden, 2013). Similarly, building toilets in schools might be more important for girls' enrollment than boys' (Adukia, forthcoming). Many developing countries have eliminated school fees for primary schools, and such a policy might especially help girls if parents were reluctant to invest money in their education.

Another type of policy to increase girls' education is conditional cash transfers (CCTs). Prominent programs such as Oportunidades in Mexico pay families a larger amount to keep their daughters in school than their sons, under the view that a larger amount is needed to induce them to educate a daughter than a son, and some CCTs only target girls (Schultz, 2004). An in-kind CCT in India gives bicycles to girls who remained in secondary school; such a policy both provides an incentive to remain in school and makes traveling to school faster and safer. This program increased female secondary school enrollment by 30% in the state of Bihar, and the authors attribute most of the effect to the reduced travel time and increased safety, rather than the cash-equivalent incentive effect (Muralidharan and Prakash, 2013) .

In other cases, policies aimed at improving female welfare, though not directly increasing female education, might have positive spillovers onto education. For example, there is evidence that the granting of land inheritance rights to women in India increased girls' schooling. This might have been due to either newly empowered mothers pushing for greater education of their daughters or a complementarity between land ownership and education, with an increase in perceived returns to education for girls in anticipation of their future inheritance (Deininger, Goyal, and Nagarajan, 2013; Roy, 2013). In addition, quotas that increased female representation in elected positions in India led to more education for girls, presumably by raising girls' own aspirations and their parents' aspirations for them (Beaman et al., 2012). Policies to ban or discourage early marriage of girls might also increase girls' schooling by decreasing the opportunity cost of schooling; Field and Ambrus (2008) present evidence from Bangladesh consistent with such a channel.

2b. Determinants of increases in labor supply

A well-known theory of female employment and development posits that there is a U-shaped relationship between female employment and economic development (Boserup, 1970; Goldin, 1995). At early stages of development, women do unpaid work on family farms and in family businesses. With development, economic activity migrates to factories and firms, and women tend to withdraw from the labor force. This could be due to both households being less economically dependent on two incomes and social stigma about women working in these outside jobs. Working outside the home is also harder to combine with caring for children than is home-based work, and child-care responsibilities typically lie with women. Then, with higher levels of development, female employment swings back up again. The increase in female employment is driven by a sectoral shift toward light manufacturing and services, among other factors. Women have a comparative advantage in mentally-intensive services (as compared to physically-intensive agriculture, for example), and service jobs might also be deemed more socially acceptable than other jobs.

Figure 3 plots the relationship between GDP and the female labor force participation rate across countries using the most current available data. In addition to the data point for each country, the figure plots the best-fit quadratic relation. While there is considerable dispersion across countries, the best-fit relationship is indeed a U-shape.

Under this U-shaped model of female employment and development, depending on whether a society is on the declining or rising part of the U, economic development could either increase or decrease female employment. "Developing" or "low-income" country are, by and large, on the decreasing part of the curve. This means that among developing countries, the richer ones tend to have a lower female employment rate. (While the definition of developing countries is

arbitrary, one grouping is the World Bank's low-income and lower-middle-income countries, which are those with GDP per capita below about $4000 in 2014 U.S. constant dollars. One could also classify upper-middle-income countries as developing countries, in which case those with GDP per capita below about $12,500 are included, which is roughly the bottom of the U).

While Figure 3 examines the relationship in a cross-section, Figure 4 looks for within-country evidence of the U-shape by plotting changes in women's employment between 1991 and 2011 by the country's GDP in 1991. In line with the U-shape, which has a slope that is increasing with GDP, there is on average more positive growth in female employment among countries with higher GDP in 1991. However, there no evidence for downward movement along the downward part of the U: the best fit line never predicts negative growth in female employment.

Indeed, there is evidence that in many countries, female labor force participation has been rising, conditional on income (World Bank, 2012). Figure 5 plots the best fit U-shape over time, in 5 years intervals from 1991 to 2011. In panel A, which weights each country equally, there is a steady rise in the curve across each 5-year increment. Panel B, which weights each country by population, shows more of a stagnation from 1996 onwards, suggesting that female employment has stagnated or fallen in several populous countries, such as India (Klasen and Pieters, 2015).

To summarize, female employment levels have been rising in most developing countries, but how dramatic this trend has been depends on some important nuances of how one defines the question. First, it matters whether one examines trends unconditionally or conditional on income: while in poor countries, unconditional increases in female employment have been quite modest, this trend represents a large boost in female employment relative to a benchmark where these countries were predicted to have decreasing female employment as they moved along the downward part of the U. Second, it matters whether one weights by country or by person: female employment has been steadily rising if one weights each country equally, but has been stagnant recently when one weights each person equally.

Economic forces affecting female employment
Increases in female education have been an important factor in the increased female labor force participation, particularly into relatively high-paying jobs. Economists have long noted a positive correlation between education and female labor force participation in most (although not all) developing countries (see Psacharopoulos and Tzannatos, 1989 for a summary), and recent natural experiments confirm that this relationship appears to be causal. Each year of education induced by the Zimbabwean reform studied by Grepin and Bharadwaj (2015) led to 3 percentage point increase in the probability that the woman works outside the home and lives in an urban area. Similarly, women induced to get more education by a 1997 law that increased

compulsory schooling in Turkey from five to eight years were more likely to work outside the home and in jobs that give social security (Erten and Keskin, 2015). While the Ugandan reform studied by Keats (2014) did not change women's labor force participation on the extensive margin, it did increase the likelihood that women had migrated to the capital city and were working for cash. One interesting channel behind the shift to higher paying jobs is increased mobility: education increases the probability of living in an urban area in Zimbabwe (Grepin and Bharadwaj, 2015) and in Kampala (Uganda's capital) in Keats (2014).

However, increased education does not universally translate into a higher probability of working. The increased education among women in Pakistan generated by the presence of a sex-specific school that Andrabi, Das, and Khwaja (2013) documented did not lead to greater labor force participation. A similar context of low female labor supply is the Zomba district in Malawi studied by Baird, McIntosh, and Ozler (2016), where only 6% of women work outside the home. They show that many girls who had dropped out of school in rural Malawi were prompted to reenter school by a cash transfer but were not more likely to be working two years after the transfers ended. These findings suggest that the presence of jobs that reward education is a necessary condition for education to result in increased labor force participation.

Intertwined with these increases in female education is the sectoral shift toward services and light manufacturing that generally accompanies development. Two examples of job growth in developing countries that has disproportionately increased female employment are back-office processing in India, as studied by Jensen (2012), and the garment industry in Bangladesh, as studied by Heath and Mobarak (2015).

Both back-office processing and growth in the garment industries are born of globalization and trade liberalization. Trade liberalization could affect gender gaps in employment and wages through many channels, so the net effect is theoretically ambiguous. One channel through which it could promote gender equality is by increasing competitive pressure on firms and, thus, driving out "taste-based discrimination" (Becker, 1957). There is some evidence of such an effect in the United States (Black and Brainerd, 2004). In addition, trade can induce technological change and lead to sectoral reallocation, which could either widen or narrow gender gaps. For example, if, with trade openness, a country has a comparative advantage in female-intensive industries, then trade could help women relative to men. The evidence in developing countries is mixed. AlAzzawi (2014) finds that, in Egypt, trade liberalization increased female employment only in initially uncompetitive industries, while Gaddis and Pieters (2016) find that trade liberalization in Brazil reduces men's and women's employment by the same proportional amount; because men had an initially higher employment rate, trade thus narrowed the percentage point gap in male-female employment, but not the male-female employment ratio. There is also evidence that trade openness can widen the gender wage gap in

some settings (Menon and Van der Meulen Rodgers, 2009). Thus far, no systematic pattern has emerged regarding the impact of trade liberalization on female labor market outcomes.

Gender-focused policies affecting female employment
In addition, there are many policies and interventions aimed at encouraging female employment. Many of these have the twin goals of increasing household income, but also increasing the female share of income and therefore women's bargaining power in the household.

One prominent type of policy is microfinance, and especially microcredit, which gives small loans to poor business owners. While microfinance is not inherently a gendered policy, many microfinance organizations target female entrepreneurs. There have recently been several high-quality randomized evaluations of microcredit. Most find some evidence of positive impacts on the opening of female-owned businesses or revenue generated in female-owned businesses, but the impacts tend to be quite modest in size (Angelucci, Karlan, and Zinman, 2015; Banerjee et al., 2015).

Another approach, often bundled with microfinance, is business skills training, which has been shown to improve women's business knowledge and success (De Mel, McKenzie, and Woodruff, 2014; Valdivia, 2015). Field, Jayachandran, and Pande (2010) argue that formal business training can be especially helpful in socially conservative communities where women are less free to casually interact with others and learn business tips informally. In addition, female entrepreneurs often have thinner business networks, so strengthening these peer interactions can also improve women's success (Field et al., 2016).

Another type of policy that has been deployed and studied extensively in developed countries (but is less widespread and studied in developing countries) is child care subsidies that free up mothers to re-enter the labor force. Most of the work in developing countries is in Latin America. Barros et al. (2011) find that access to free child-care services in Rio de Janeiro, Brazil, almost doubled the employment rate of mothers who were not working prior to receiving this benefit (from 9 to 17 percent). However, the increase in household income (from both this extensive margin and the intensive margin) was less than the monthly cost of service per child estimated. One would hypothesize that more generous maternity leave policies would also increase female employment, but such policies are rarely in place in developing countries and, in any case, many women work in the informal sector.

Many developing countries have gender-unequal laws and regulations that inhibit female employment such as restrictions on women working night shifts and barriers to women initiating legal proceedings. There is cross-country correlational evidence that lifting these

discriminatory laws increases female employment (Gonzales et al., 2015); testing the causal impact of these laws on female employment would be a valuable area for further research.

3. Consequences of increased female education and labor supply

3a. Consequences of increased female education

The increases in education documented in Figure 2 have had wide-ranging consequences on women and their children. One of the strongest empirical relationships is between education and early fertility: there is considerable evidence from a wide variety of settings that exogenous increases in women's education delay fertility. The INPRES school-building program in Indonesia (Breierova and Duflo, 2004), the Universal Primary Education program in Nigeria (Osili and Long, 2008), the elimination of primary schools fees in Uganda (Keats, 2014), and a school subsidy in Kenya (Duflo, Dupas, and Kremer, forthcoming) all increased education and lowered rates of teen pregnancy. While the variation in these studies is driven by primary education, Ozier (2015) also finds large decreases in teen pregnancy among women just above the test score cutoff for secondary school in Kenya.

The extent to which delays in fertility translate into lower lifetime fertility is more limited. In the Breierova and Duflo (2004) Indonesian sample, the effects of education on a woman's fertility had disappeared by age 25. By contrast, Osili and Long (2008) find that an additional year of schooling induced by the UPE program in Nigeria leads to 0.26 fewer births to a woman by age 25. The long-run evidence comes from Lavy and Zablotsky (2010), who study the effects of the 1963 revocation of a military government that relaxed constraints on schooling for Arab women in Israel. The reform lead to an average of 1.0 years of education for girls age 4 to 8 at the time of the reform and a corresponding 0.68 fewer children over her life. Thus it did not appear that education merely postponed fertility in their case.

Several potential mechanisms underlie the relationship between education and fertility. Broadly, education can change women's desired number of children (through exposure to more "liberal" ideals or through an increased opportunity cost of time spent out of the labor force), or allow them to better achieve their desired fertility in environments where women typically end up with more children than they report wanting. While it typically is difficult to cleanly identify one particular channel, there is suggestive evidence both of these channels are relevant. Across eight developing countries in the World Fertility Survey, more educated women report lower desired fertility (Schultz, 1993), and the relationship appears causal when examining exogenous variation in women's education in Uganda (Keats, 2014), Sierra Leone (Cannonier and Mocan, 2014), and Arab communities of Israel (Lavy and Zablotsky, 2011). Lavy and Zablotsky argue that the fact that their environment has very low female labor force participation suggests that

decreases in desired fertility are not entirely driven by the increased opportunity cost of time spent not working.

Other studies find that better-educated women can come closer to their desired fertility. If women on average desire fewer children than men (Rasul, 2008; Ashraf, Field, and Lee, 2014; Doepke and Kinderman, 2016), then increases in bargaining power due to increased education will lower fertility. Indeed, in the Indonesian context studied by Breierova and Duflo where the woman's own education no longer had an effect on fertility by age 25, increases in her education relative to her husband did still decreased fertility, suggesting a role for household bargaining. Or even if parents agree on the desired number of children, Rosenzweig and Schultz (1989) argue that more educated women in the U.S. are more effective at using complex contraceptive methods, such as the rhythm method, and can thus more effectively control fertility.

Once these educated women have children, their children are also healthier. Early papers point out that the positive association between women's education and children's health generally statistically survives controls for husband characteristics and household socioeconomic status (Schultz, 1980; Thomas, Strauss, and Henriques, 1990), but not necessarily controls for community level factors (Desai and Alva, 1998) or family background (Wolfe and Berhman, 1987). One possible theory uniting these disparate findings is that the relationship between women's education and children's health depends on the availability of public health infrastructure (Rosenzweig and Schultz, 1982a; Wolfe and Berhman, 1982; Barrera, 1990).

Subsequent studies have isolated exogenous variation in education to confirm that on average a causal relationship exists between mother's education and reductions in child mortality. The relationship appears at many levels of education: primary school in Indonesia (Breierova and Duflo, 2004), junior high schools in Taiwan (Chou et al., 2010), and secondary schools in Zimbabwe (Grepin and Bharadwaj, 2015). Using a different identification strategy to separate intergenerational ability transmission from causal effects of education, Chen and Li (2009) document a relationship between adoptive mother's education and children's health in China, which persists after controlling for the income of the adoptive family. They find roughly constant marginal effects of education, providing further evidence that increases in mother's education at all levels improves children's health.

Several potential mechanisms underlie these health improvements. Glewwe (1999) points out that educated women in Morocco know more about health, and Thomas, Strauss, and Henriques (1990) further show that in Brazil this correlation can be entirely explained by access to information, such as newspapers and television. Agüero and Bharadwaj (2014) use a 1980 reform that relaxed constraints on black Zimbabweans' access to secondary school to argue that

the relationship is causal: education increases a woman's knowledge about how HIV is transmitted. The relationship between mother's education and the use of health inputs is more mixed. Grépin and Bharadwaj (2015) find no evidence that the tendency for mother's education to reduce infant mortality in Zimbabwe is driven by a greater use of preventative health care services. Keats (2014), by contrast, finds that more educated women in Uganda are more likely to immunize their children and finds improvements in child nutrition status but not reductions in child mortality. Güneş (2009) also finds that Turkish women induced to get more education by the 1997 compulsory schooling law increased their use of preventative care and smoked less while pregnant, which lead to improved infant health.

There is some, although not considerable, evidence that mother's education improves children's educational outcomes. De Walque (2009) examines the relationship between adoptive parents' and adopted children's schooling in Rwanda. While acknowledging the possibility of selection, de Walque finds that adoptive mothers' education is strongly related to their children's schooling, more so than the biological mother's. Tsai et al. (2011) use the same Taiwanese reform as Chou et al. (2011) to show that exogenous increases in either mother's or father's schooling increased by 10 percent the probability that their child attended a top-6 college. Behrman et al. (1999) and Andrabi et al. (2012) find that the relevant margin is not necessarily years of education but rather time investments at home. Andrabi et al. (2012) instrument mother's education in Pakistan with the availability of a sex-specific school in her hometown, and find that children of mothers with some education spend 72 more minutes per day in educational activities at home than those whose mothers have no education and as a result have higher tests scores.

The evidence on the relationship between women's education and their own health is also more limited. Bhalhotra and Cochrane (2013) show that exogenous increases in education decrease maternal mortality in Nigeria and Zimbabwe but not Kenya. De Neve et al. (2015) find that exogenous increases in secondary schooling decrease HIV risk in Botswana, and they find particularly large effects for women: an additional year of schooling reduces cumulative risk of HIV by 11.6 percentage points. Cannonier and Mocan (2014) further show that education increases the probability that a woman has been tested for HIV.

Delayed marriage is another potential effect of female education. There is some evidence pointing to such an effect, although this phenomenon does not appear to be universal. Breierova and Duflo (2004) find that an additional year of education in Indonesia delays marriage by an average of 0.38 years. Duflo, Dupas, and Kremer (forthcoming) also find that schooling delays marriage. By contrast, Keats (2014), Erten and Keskin (2016), and Lavy and Zablotzky (2011) find no effect of education on marriage timing in Uganda, and among Arab women in Israel, respectively. The fact that the relationship between education and fertility is more widespread

than the relationship between education and marriage timing is unsurprising, given that the latter hinges on marriage market responses, such as the extent to which potential husbands are also treated by the education reform (which would depend on age gaps between spouses and whether boys were affected by a particular education reform). Relatedly, the evidence on whether women entering the marriage market with exogenously more education marry more educated husbands is also mixed: Keats (2014) and Erten and Keskin (2016) find no effects on husband's education in Uganda and Turkey, respectively, while Lavy and Zablotzky (2011) do find evidence of increases in husband's education among their Israeli Arab sample.

Education can also change a woman's status within her household. Thomas (1990) points out that women's education displays a stronger correlation with daughters' health than sons', consistent with a relationship between women's education and bargaining power and mothers favoring daughters more or disfavoring them less than fathers do. Other studies, however, find a limited role for education in increasing a woman's bargaining power, as proxied by self-reported participation in household decisions (Andrabi, Das, and Khwaja, 2012; Keats, 2014). Erten and Keskin (2015) show that women induced to get more education by the Turkish reform face greater incidence of psychological violence or financial control, but the same rates of physical and sexual violence, as women with less education. Given that these women were also more likely to work outside the home, Erten and Keskin interpret these results in light of an instrumental violence model where men use coercion to capture women's wages.

Finally, it has been hypothesized that education can increase women's "liberal" beliefs in realms such as gender equality. The evidence here is again mixed. Education reduces acceptance of domestic violence in Sierra Leone (Cannonier and Mocan, 2014) and Kenya (Friedman et al., 2011) but has no effect in Turkey (Erten and Keskin, 2015). Gulesci and Meyersson (2013) find that the same Turkish reform studied by Erten and Keskin does lead to lower measured religiosity, such as a lower likelihood of wearing a headscarf. Friedman et al. (2011) further find that education increased political knowledge and reduced acceptance of political authority, but did not lead to corresponding increases in perceived efficacy or participation in community-level political events.

3b. Consequences of increased job availability

The increased job opportunities for women in developing countries caused by sectoral shifts and trade openness have also had large effects on women's lives. These work opportunities increase the opportunity cost of marriage and childbearing, and indeed, there is evidence that job opportunities lead women to delay marriage and fertility. Jensen (2012) reports the results of an experiment that sent business process outsourcing (BPO) recruiters to rural villages in India. After three years of recruiting services, women in treatment villages between ages 15 and 21 at

the baseline were 5 to 6 percentage points less likely to be married or have had their first child. He also documents evidence that knowledge of these job opportunities changed aspirations: women also reported greater desire to continue working after marriage and children.

Heath and Mobarak (2015) show that lower-skilled garment sector jobs in Bangladesh have had similar effects. They examine marriage and fertility rates in Bangladesh in villages after a garment factory opened within commuting distance, estimating that the median exposure to the garment industry in their sample had led to a 28 percent decrease in the probability that an unmarried girl marries and a 29 percent decrease in the probability of first birth. Sivansankaran (2014) demonstrates that textile factories in India had similar effects. She finds that plausibly random increases in employment duration from exposure to a fixed term contract (versus a daily contract) lead to later marriage and increases in the likelihood that a girl had a say in choosing her husband.

Jobs for women have also led to increased investment in girls' human capital. One potential mechanism is that jobs raise the return to girls and their human capital. Early evidence for this hypothesis comes from Rosenzweig and Schultz (1982b), who document that girls' survival rates are higher in Indian districts in which expected female labor supply is greater. Jensen (2012) finds that younger girls (ages 5 to 11) in villages newly aware of BPO jobs were better nourished and more likely to be enrolled in school. Heath and Mobarak (2015) also find that the opening of garment factories have led to increases in girls' education. They argue that garment sector jobs reward basic numeracy and literacy, and point out that the fact that they find education gains among girls whose mother or older sister never worked outside the home indeed suggests that these effects are not due solely to income or time-reallocation effects.

Improved bargaining power is another mechanism linking jobs opportunities for women to human capital investments in girls, by allowing a woman to direct resources to goods for which she has a stronger preference than other household members. A seminal paper by Duflo (2003) shows that unearned income given to women improves girls' health, and several subsequent papers have shown that the same intuition holds for (potential) earned income. Intrahousehold bargaining models point out that jobs which improve a woman's outside option increase her bargaining power, even if she doesn't take up the job herself. Indeed, Qian (2008) finds that counties in China that grow tea displayed greater survival rates of female children after post-Mao agricultural reforms raised the value of agricultural production. Consistent with an intrahousehold bargaining model in which mothers have a stronger preference for equalizing spending on sons and daughters, she also finds that while increasing potential female income increases education of both genders, increasing potential male income decreases girls' education. Majlesi (2016) also finds that positive shocks to female labor demand in Mexico increase women's participation in household decisions and improve children's health.

By comparing workers to non-workers in the same labor market, other papers present evidence that working itself further increases a woman's bargaining power and children's health. Atkin (2009) exploits variation in the number of factory jobs available at the age when a woman in Mexico can leave school, showing that this availability predicts whether they are working later in life. Women induced to work by jobs available at school-leaving age have children that are one standard deviation taller than other women, and also display greater participation in household decisions. Such improvements could come because earnings potential increases with experience, or because working itself increases a woman's willingness or ability to bargain. Anderson and Eswaran (2009) argue further that working outside the home (versus inside the home or on a husband's farm) can increase a woman's outside option if it requires some irreversible investment, such as building a poultry shed in the rural Bangladeshi context they study. They indeed find that women induced to work by rainfall or health shocks are also more likely to participate in household decisions.

Despite evidence of these positive effects, the net effect of job availability on women's welfare remains ambiguous, because relatively less is known about potential negative consequences of labor supply. One concern is reduced leisure time. Thus, while there is evidence that women's labor supply increases men's (Skoufias, 1993; Newman, 2002) and children's (Skoufias, 1997) time in housework, these increases may not compensate for women's entire increased labor supply, especially if there are strong social norms that women do most or all of the housework. Indeed, Skoufias (1993) finds that increased female wages decrease women's leisure time. By contrast, Newman (2002) finds that women in an area of Ecuador where the cut flower industry has expanded do less housework relative to women in an otherwise similar control area, while men do more housework. Since Newman finds overall female labor supply is not higher in flower areas (but women do work in better-paying jobs), she argues that her findings are driven by women's increased bargaining power.

Another potential negative consequence of job availability for women is intimate partner violence. While standard bargaining models predict that an improved outside option allows a household member to demand better outcomes (such as less violence), certain extensions predict that when violence is used as a tool in bargaining, a better bargaining position for women can indeed lead to more violence. Eswaran and Malhotra (2011) formalize such a model, which predicts that women with low bargaining power face a low risk of violence because the mere threat of violence allows the husband to get his way. But if women gain power, the husband does need to use actual violence to get his way. Heath (2014) finds descriptive evidence in line with this model. The greater prevalence of violence among women who work outside the home in Bangladesh is entirely driven by women with very low education or a young age at marriage, whom she argues are exactly the women whose baseline bargaining

power is low, and are thus at increased risk of violence when beginning work in the Eswaran and Malhotra framework.

Causal evidence on this relationship is relatively limited and has mixed findings (in line with the theoretically ambiguous relationship in bargaining models). Potential psychological mechanisms also yield theoretically ambiguous predictions. Psychological backlash – men feel threatened and lash out when their women gain economic independence – could increase violence when women begin working (Gelles, 1972), whereas increased total household income from women's wage can reduce economic stress, which tends to lead to violence (Ellsberg et al., 1999; Martin et al., 1999). Krishnan et al. (2010) examine panel data in Bangalore, India and show that women who begin working between rounds face 80% higher odds of domestic violence compared to women who did not begin working. Chin (2012) and Luke and Munshi (2012) look at temporary changes to women's employment induced by weather shocks in India. While Chin (2012) finds that women induced to work by rainfall shocks that favor female crops face less violence, Luke and Munshi (2012) find that women on tea plantations face greater violence when their income increases. Chin proposes "exposure reduction" – the fact that women working spend less time in proximity with their husbands – as a further mechanism and argues that the fact that she finds effects among women with negligible compensation whose husbands don't work in agriculture is evidence for this channel.

4. Conclusion

We have documented two trends in developing countries over the past 30 years: rising female education levels and rising female labor force participation. We argue that these trends are interrelated, with gains in female education contributing to the increases in female labor force participation. As a result, even though most countries are on the downward-sloping part of the U-shaped female labor supply curve, the curve has shifted upwards enough that female labor supply has increased even in a majority of low-income countries. As economic conditions continue to change in ways that promote female labor supply – both directly, as countries enact policies to end legal discrimination against female workers or reduce the time cost of home production and childcare, and indirectly, as reductions in trade costs accelerate the shift away from brawn-based activities to light manufacturing or services – a fruitful area of future research will be to document the additional effects of these new policies on female labor supply.

This chapter also discussed the effects of increased education and employment on the lives of women and their children. There is considerable evidence of outcomes that both benefit women and achieve policy relevant goals. In particular, both education and labor force participation have been shown to delay fertility and lead to healthier children once a woman does have children. However, effects over the life course (such as completed fertility) or that depend on

general equilibrium adjustments (such as the timing of marriage or partner choice) are less clearly established and probably context-dependent. A valuable area for future research would be to characterize the factors that determine the heterogeneity in these relationships. Less is known about potential negative consequences of labor supply on women, such as decreased leisure or increased domestic violence. More research in this area too will ideally help in the design of policies that allow women and society at large to enjoy the benefits of increased job opportunities while minimizing the potential costs.

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Figure 1
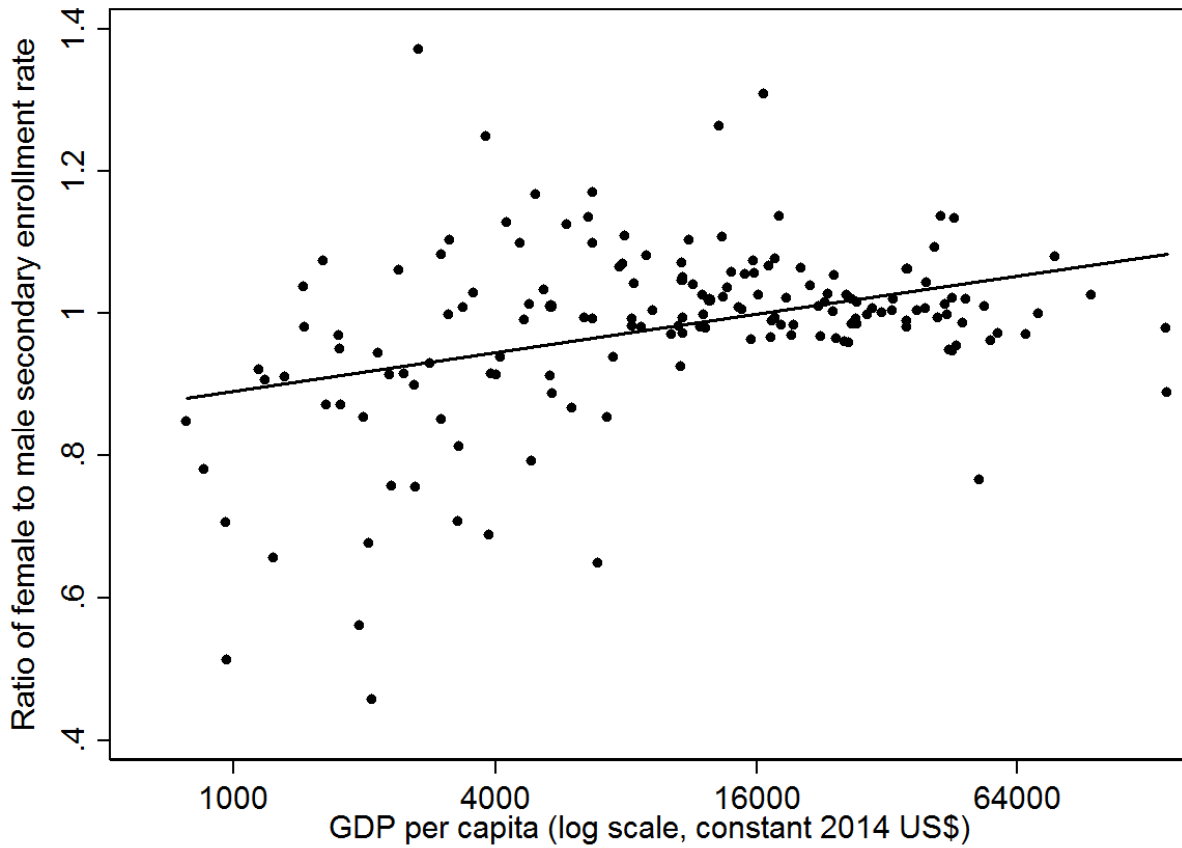
Notes: GDP per capita is the purchasing power parity-adjusted value in the year in which secondary school enrollment data is measured (the latest available); school enrollment data are from the World Bank's World Development Indicators.

Figure 2

Female-male ratio in secondary school completion
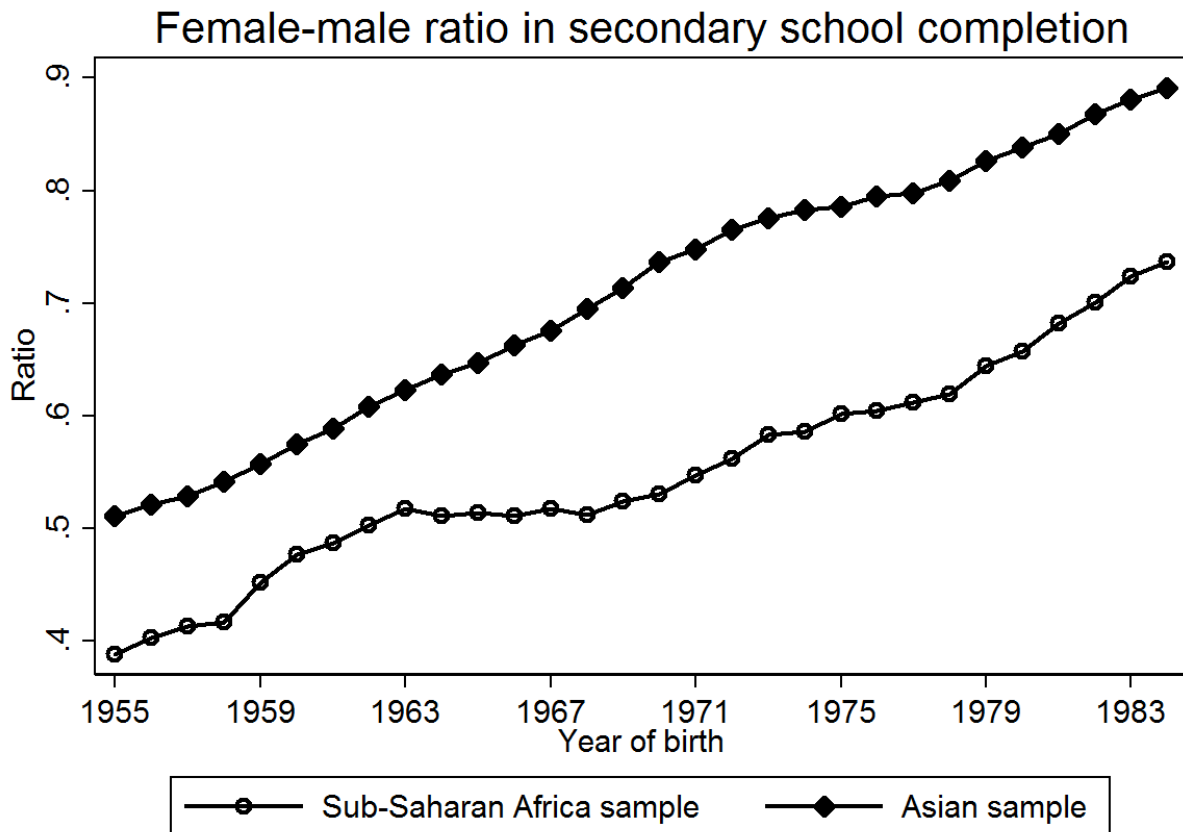
Notes: Data are from the International Public Use Microdata (IPUMS) database. Countries included are those classified by the World Bank as low-income or lower-middle-income, with an IPUMS sample available for 2005 or later. In cases of multiple IPUMS samples meeting the criterion, the most recent one is used. In aggregating to regions, samples are re-weighted such that each observed individual within a region is weighted equally.

Figure 3
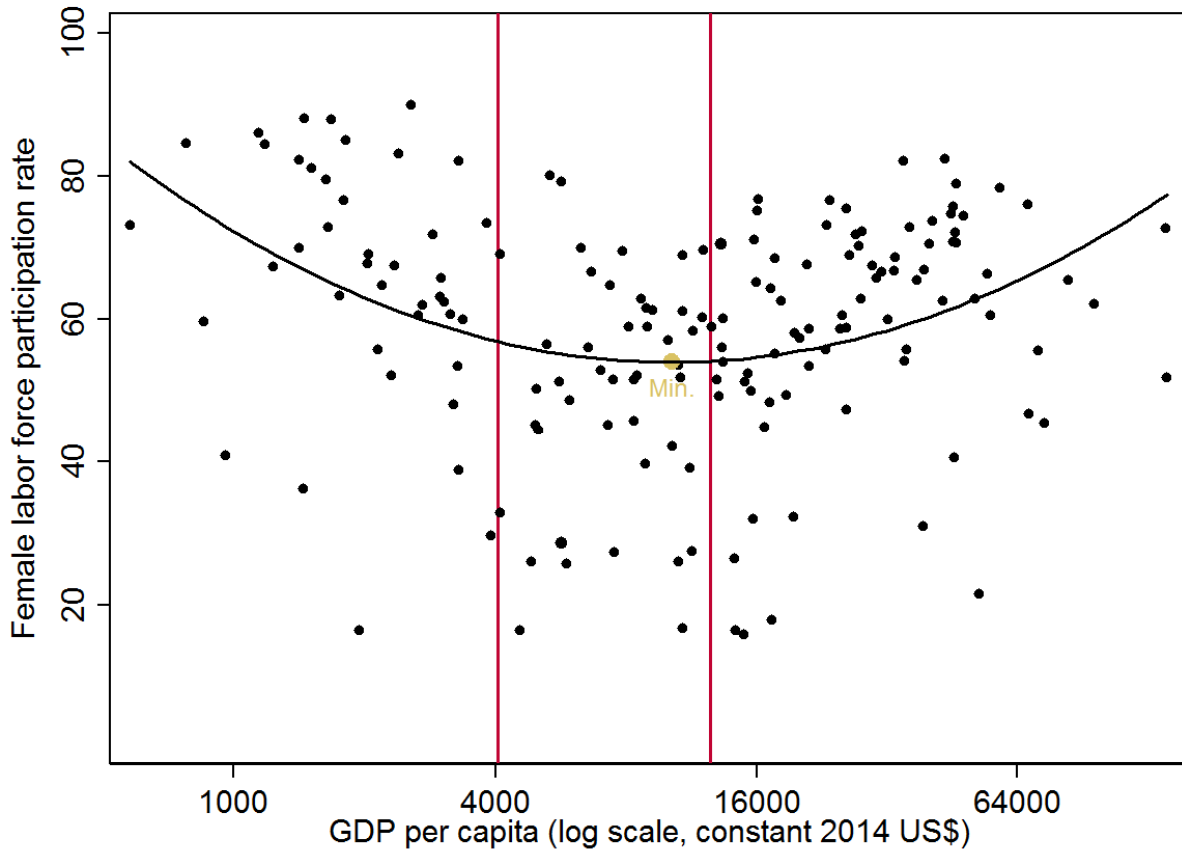
Notes: GDP per capita is the purchasing power parity-adjusted value in 2014; female labor force participation is for females age 15-64 and is from the World Bank's World Development Indicators. The vertical lines represent the thresholds between lower and lower-middle-income countries ($4000 in 2014 dollars), and between lower-middle or upper-middle-income countries (about $12,500). Two possible definitions of "developing countries" are those below these thresholds.
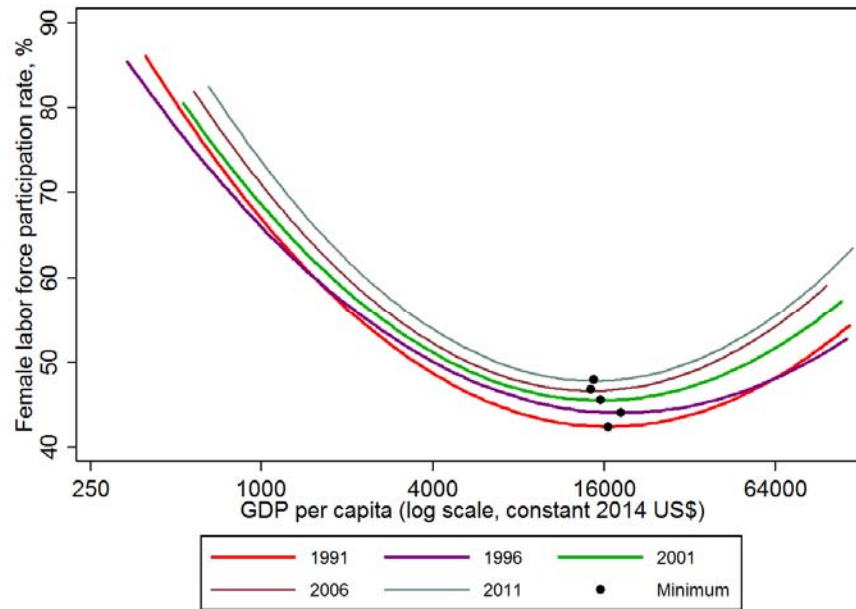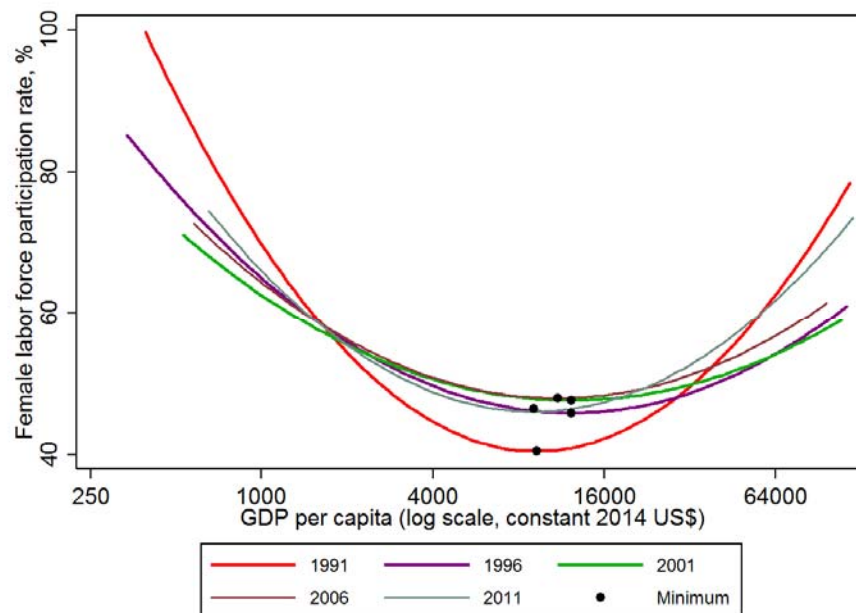
Figure 4
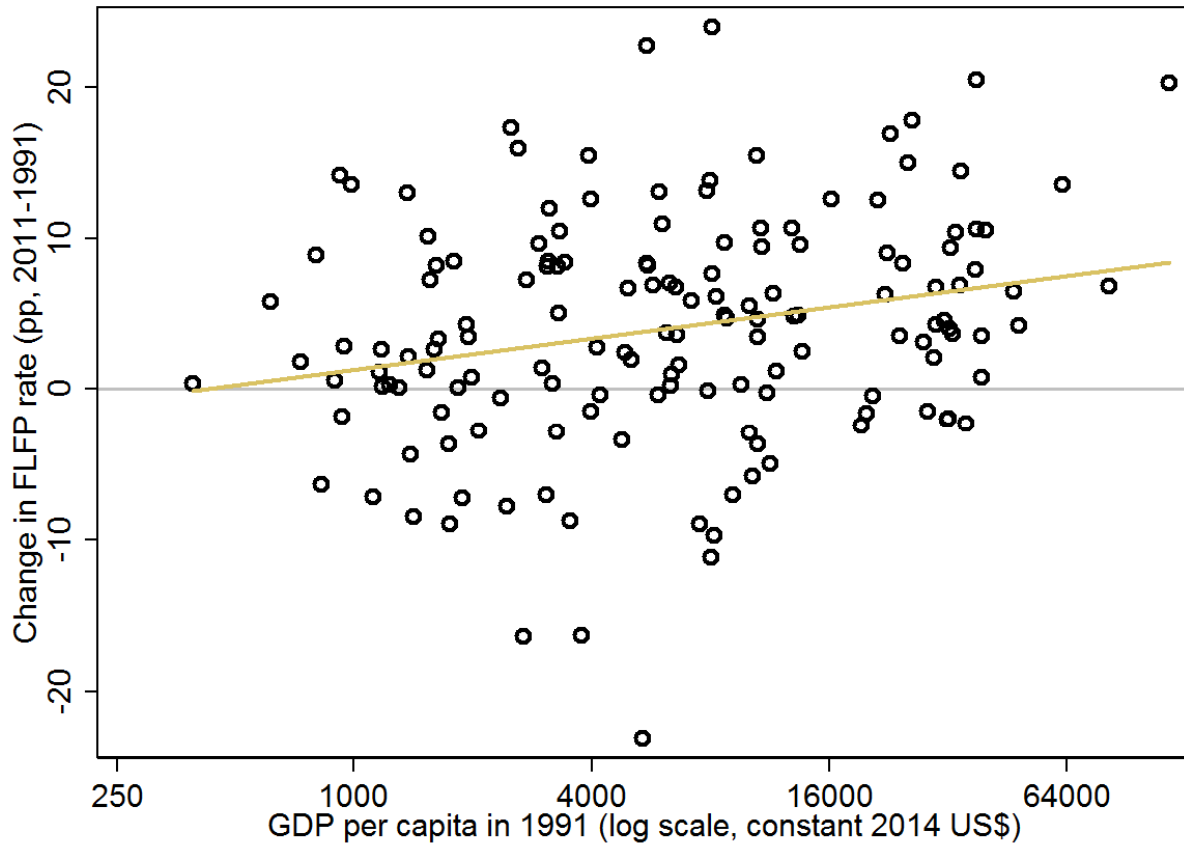
Notes: GDP per capita is the purchasing power parity-adjusted value. Female labor force participation (FLFP) data are from the World Bank's World Development Indicators. Data for all years are three-year averages centered on the indicated year.

Figure 5

Panel A: Each country weighted equally

Panel B: Weighted by population size

Notes: GDP per capita is the purchasing power parity-adjusted value. Female labor force participation data are from the World Bank's World Development Indicators. Data for all years are three-year averages centered on the indicated year.