

Gender Equality, Poverty and Economic Growth

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Abstract

This paper reviews empirical findings from economic analyses of the role of gender equality and women's empowerment in reducing poverty and stimulating growth. Going beyond the large literature documenting the impact of female education on a range of development outcomes, the paper presents evidence on the impact of women's access to markets (labor, land, and credit) and women's decision-making power within households on poverty reduction and productivity at the individual and household level. The paper also summarizes evidence from studies examining the

relationship between gender equality and poverty reduction and growth at the macro level. Although micro level effects of gender equality on individual productivity and human development outcomes have been well documented and have important ramifications for aggregate economic performance, establishing an empirical relationship between gender equality and poverty reduction and growth at the macro level has proven to be more challenging. The paper concludes by identifying priority areas for future research.

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1. Introduction

This paper reviews empirical findings from economic analyses of the role of gender equality and women's empowerment in reducing poverty and stimulating economic growth. Gender equality is not equality of outcomes for men and women, but rather equality in the determinants of these outcomes—that is, equality in opportunities or resources, rights and voice (World Bank, 2001).¹

Education is an important component of opportunities and empowerment. A number of empirical studies find that increases in women's education boost their wages and that returns to education for women are frequently larger than the returns to education for men. Empirical evidence also shows that increases in female education improve human development outcomes such as child survival, health and schooling; the impacts on these outcomes are larger for a given increase in women's education than for an equal increase in men's education (World Bank 2001, Schultz 2002, Strauss and Thomas 1995, King and Hill, 1993).

Education, however, is just one element of opportunities and empowerment. This paper goes beyond education and presents evidence on the impact of two other types of opportunities and empowerment — women's access to markets (labor, land, and credit) and women's decision-making power within households—on poverty reduction and productivity at the individual and household level. The paper also presents results from studies examining the relationship between gender equality and poverty reduction and growth at the macro level. While micro level effects of gender equality on individual productivity and human development outcomes have been well documented and have important ramifications for aggregate economic performance, establishing an empirical relationship between gender equality and poverty reduction and growth at the macro level has proven to be more challenging.

What is the policy implication of the evidence reviewed here? Gender equality is a legitimate policy goal in and of itself, as evidenced by the existence of third Millennium Development Goal on gender equality and the empowerment of women. The evidence presented in this paper, however, suggests gender equality is also desirable from an efficiency perspective: increases in opportunities for women lead to improvements in human development outcomes, poverty reduction, and—although evidence on this last point is relatively weak—potentially accelerated rates of economic growth.

The remainder of the paper is organized as follows. Section 2 develops a conceptual framework that specifies the potential links between increases in gender equality and current and future poverty reduction and growth, highlighting the key roles of increases in women's labor force participation, productivity and earnings, as well as improvements in children's well-being. Section 3 presents and analyzes the evidence linking increases in gender equality with children's well-being. Sections 4, 5, 6 and 7 examine barriers to women's participation in key markets--

¹ Gender inequalities exist in almost all societies. Relative to men, women tend to have less access to resources, rights and voice. This disadvantage for women may exist even in cases where male outcomes are relatively poorer (e.g., school enrollment rates in much of Latin America and the Caribbean). Women's empowerment is closely linked with gender equality, because having the agency to choose among options is critically tied to having the options in the first place (World Development Report 2006).

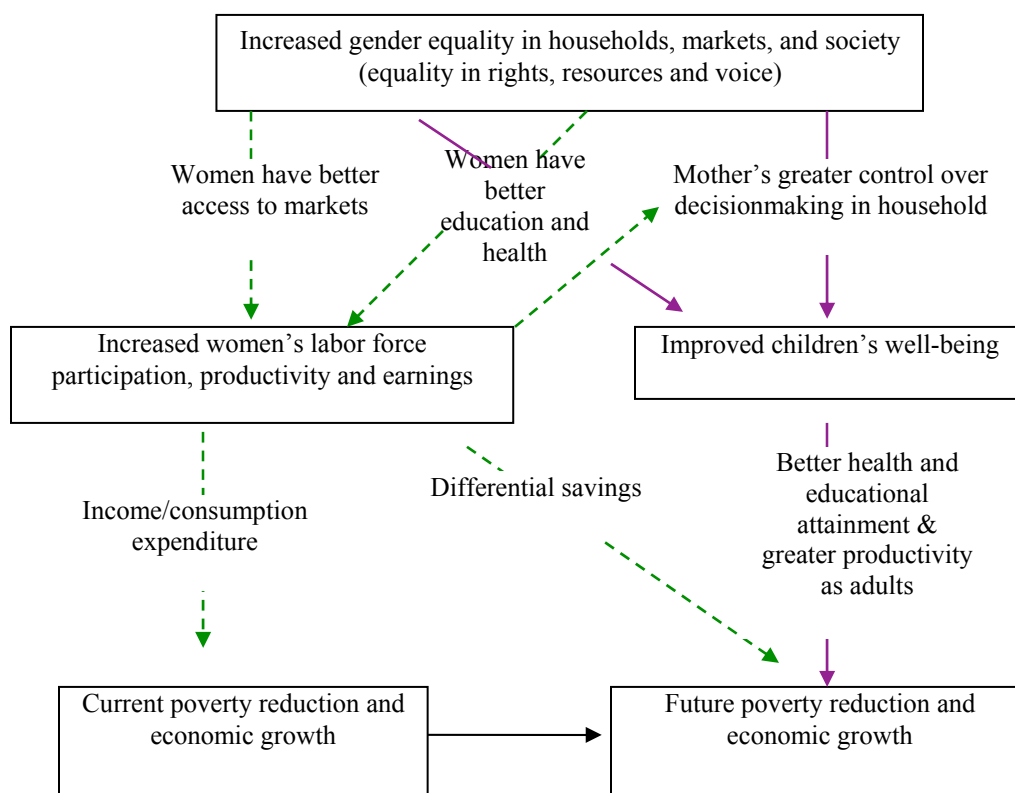
labor, credit, land, agricultural technology, respectively—that inhibit productivity and income growth. Section 8 looks at the macro evidence linking gender equality to poverty reduction, while Section 9 does the same for gender equality and economic growth. Section 10 summarizes the key messages and identifies priority areas for future research.

2. Linking gender equality and female empowerment at the micro level to aggregate poverty reduction and economic growth: A conceptual framework

While it is difficult to sort through the complex interactions and identify precisely how individual choices add up to macro outcomes, a framework linking the two that delineates the key relationships can be a helpful device to identify micro-level indicators of gender equality and female empowerment that are instrumental for aggregate poverty reduction and growth.

Figure 1 presents such a framework. For a given level of male earnings, improvements in women’s productivity and earnings and children’s wellbeing accelerate poverty reduction and economic growth, both contemporaneously and in future periods.

Figure 1. A framework for understanding the links between gender equality and growth/poverty reduction



As Figure 1 shows, *increases in female earnings* can, on the one hand, reduce current poverty and stimulate short-term growth through higher consumption expenditures, and, on the other hand, reduce future poverty and stimulate long-term growth through higher savings.² To the extent that increased female earnings leads to higher bargaining power for the woman in the household, increased earnings has an indirect effect of promoting increased child well-being.

Children's wellbeing is another pathway through which increased gender equality may be associated with poverty reduction and growth (see Figure 1). As discussed below in Section 3, increases in maternal education and control over household resource allocation improve child wellbeing, educational attainment and health. This, in turn, leads to increases in children's cognitive ability and productivity as adults (Hoddinott et al. 2005; Behrman and Alderman, 2006). Thus, increases in women's influence over decisionmaking in the household leads to an intergenerational transmission of earnings capability and this, in turn, improves prospects for poverty reduction and growth in the future.

In the next section, we present and analyze the evidence linking increased female schooling and control over household resources to improvements in children's health and schooling. We then turn to the issue of labor force participation, productivity and earnings; Sections 4-7 examine the determinants of women's productivity and earnings by examining conditions in labor, credit, land and technology markets that affect women's access to these markets and, consequently, their earnings and productivity.

3. Child wellbeing

Measuring bargaining power within the household and the consequent ability to influence household decision making (including resource allocation) is a difficult endeavor. In the 1990s, most studies relied on data on individual earnings and asset ownership obtained from household surveys. Yet current earnings and asset ownership are clearly endogenous: they both affect and are affected by women's bargaining power.

A second generation of studies attempted to deal with this endogeneity by using measures of the gaps in resources brought to marriage, which are arguably exogenous to decision-making after marriage.³ More recently, studies have examined the effect on resource allocation of receiving

² Note that this effect does not hinge on women having differential consumption and saving propensities than men: it simply refers to *levels* of consumption and saving, which will both rise as female earnings rise. As Floro and Seguino (2002) note, there are also several reasons why women and men may have different marginal propensities to save and consume. Relative to men, women might have a higher marginal propensity to consume out of current income in order to improve human development outcomes in the household. On the other hand, if women have a stronger preference than men for mitigating the effects of negative income shocks, they might have a higher marginal propensity to save. Since evidence for these propositions is not conclusive, Figure 1 does not incorporate any effects that hinge on differential marginal propensities to consume or save.

³ In a study examining trends in schooling, age, and assets at marriage for men and women in six countries (Ethiopia, South Africa, Mexico, Guatemala, the Philippines and Bangladesh), Quisumbing and Hallman (2003) find that, over time, husband-wife gaps in educational have decreased in three countries, remained unchanged in two, and increased only in Ethiopia. In terms of assets brought to marriage, on the other hand, they find that the gap between men and women has increased in three of the countries and remained unchanged in the other three.³ Regardless of

old-age pension benefits, conditional cash transfers, and loans from microcredit programs targeted at women (Duflo, 2003; Rubalcava et al., 2004; Pitt and Khandker, 1998). If participation in these programs is randomized or if a natural experiment can be designed, strong arguments can be made about the causal links between women's control over resources and subsequent household decisions about resource allocation.

Mother's control over resources and impact on child wellbeing

Studies from both developing and developed countries consistently show that when mothers' control over resources increases, households allocate more resources to children's health and education.⁴ One key empirical challenge in estimating the impact of spouses' relative control over resources on allocation of resources to children or other family members is the measurement of the control variable itself. The challenge is to identify an exogenous source of relative control over resource allocation – one which is not an outcome of decisionmaking within the household (see Lundberg and Pollak 1996 for a discussion). Early contributions to the literature used shares of income as a measure of relative control over resources (e.g., Phipps and Burton 1992). However, individual labor supply and earnings can be an outcome of negotiation among husbands and wives and also reflect their relative price of time (wages) and hence are not an independent indicator of relative control over resources.

A large literature relies on non-labor (unearned) income or asset ownership of each spouse. This measure too might not be independent of the hours of labor supplied by each spouse. For example, assets owned today might have been financed using past earnings. To address this concern, several papers have examined the impact of assets brought in upon marriage, arguing that these are less likely to be affected by decisionmaking within the marriage (Quisumbing and Maluccio 2003). Certain types of programs can bring about a relative increase in wives' resources and more recent studies have studied the impact of such programs, controlling for factors that affect participation in the program (Duflo 2003; Pitt and Khandker 1998). Another set of studies have exploited changes in laws that improve women's relative bargaining power in the household (Rangel 2006).

Impact of individual asset ownership and earnings. Using household survey data, a number of studies show that increases in women's control over household resources increase expenditures on family welfare, such as food and non-food items for children. Using household survey data from Ghana, Doss (1996) finds that the share of assets owned by women in urban households significantly affects household expenditure patterns. Among urban households, an increase in the share of assets held by women increases the budget share on food. Among both rural and urban women, the share of assets held by women has a positive effect on expenditures on schooling, while it has a negative effect on expenditures on alcohol, tobacco and recreation.

the trends in assets and education, men's educational and asset levels at marriage exceed women's levels in all six countries.

⁴ The evidence comes from studies seeking to testing the unitary model of household decisionmaking that assumes that all members in the household have the same preference for allocating resources. These papers test the underlying assumption of "income pooling", that is, that husbands and wives pool their resources and that the marginal impact of additional resources coming into the household is independent of the identity of the person who owns it (see reviews in Lundberg and Pollak, 1996; Haddad et al., 1997).

Hoddinott and Haddad (1995) show that, in Cote de Ivoire, increasing women's share of cash income significantly increases the share of household budget allocated to food, controlling for average per capita expenditure, household size and demographic characteristics. Increases in women's share of cash income are also associated with decreases in the share allocated to alcohol and cigarettes. In Brazil, Thomas (1997) finds that additional income in the hands of women results in greater share of household budget devoted to education, health and nutrition-related expenditures. For Ghana, Duflo and Udry (2004) show that households spend a larger share of budget on food and on private goods for women in years when the production of women's crops is higher; conversely, households spend a larger share of the budget on alcohol, tobacco and on goods consumed by men in years when the production of men's crops is higher.

Given the evidence that women's control over resources affects expenditure patterns, it is not surprising that there is also evidence that mothers' greater control over resources improves child outcomes. Using data from rural northeast Brazil, Thomas (1990) shows that increases in women's unearned income (pensions, social security, workers' compensation, rent and assets and gifts) relative to that of men increase per capita caloric intake and children's nutritional status (weight-for-height z-scores). He also finds large impacts on the probability of child survival: the impact of an increase in unearned income owned by women is 20 times that of similar increases in unearned income owned by men. Using data on assets brought to the household upon marriage, Quisumbing and Maluccio (2003) find that in Ethiopia, Indonesia (Sumatra), and South Africa, mothers' assets tend to have a larger impact on children's educational attainment than do fathers' assets.

Impact of programs. Instead of relying on asset ownership data from household surveys, several papers have estimated the impact of participation in programs where women are the main beneficiaries of the program. Such programs increase women's relative contribution to household resources. This change in their control over household resources is free from the potential simultaneity associated with changes in earned income, unearned income or current assets. The only caveat is that certain households, for example those that are poor, might be more likely to participate in these programs; this may affect the estimates of how mothers' control over resources affects household expenditures.

Two papers, Pitt and Khandker (1998) and Pitt, Khandker, Chowdhury and Millimet (2003), examine the impact of male and female borrowing from microcredit programs in rural Bangladesh on school enrollment and children's nutritional status, controlling for self-selection in program participation. Pitt and Khandker (1998) find that female borrowing has a larger impact on children's school enrollment than male borrowing. Pitt et al (2003) find that female borrowing significantly increases children's height-for-age and arm circumference while male borrowing has no statistically significant effect on these measures of nutritional status. Duflo (2003) exploits a natural experiment in which older adults were given pensions in South Africa. The Old Age Pension program rapidly expanded between 1990 and 1993 when benefits received by blacks grew. In 1993, 80 percent of black women above age 60 and 77 percent of black men above age 65 received pension benefits. Nearly one-third of black children under the age of 5 lived with a pension recipient, most likely a grandparent. Exploiting information on the pension eligibility criteria, Duflo estimates the impact of receiving a pension on child health. She finds

that girls who live with a grandmother who receives pension benefits weigh more than those who live with a grandmother who is not eligible to receive pension benefits. She also finds that young girls who were born in recipient households were taller than those who live in non-recipient households. This suggests that pensions received by women translate into better nutrition for girls. In contrast, no effects of the pension were found in households where the pension was received by a man.

Rubalcava et al. (2004) offer evidence from a randomized social experiment. They investigate the impact of *Oportunidades*, a conditional cash transfer (CCT) program aimed at reducing present and long-term poverty. The transfers are provided to women directly and are conditioned on investments in children's human capital (education and health). Rubalcava et al. (2004) exploit the fact that the program was first introduced sequentially, communities were randomly assigned to the treatment or control group, and only households in treatment communities received the cash transfer. Since this cash transfer was provided to women, resources owned by women in the treatment group increased while no such change took place in the control group. Rubalcava et al. compare the marginal effect on household expenditure patterns of income received through the program with the marginal effect of other sources of household income. They find that controlling for total resources, additional cash transfers from the program resulted in higher shares of the household budget spent on education, children's clothing and meat. The share spent on adult male clothing, transport and other food (mainly staples) declined.

Changes in laws that improve women's relative bargaining power. Economic theory predicts that husbands' and wives' control over how household resources are allocated depends not only on conditions within the marriage (such as asset ownership), but also on legislation that affects their wellbeing were the marriage to dissolve. Such legislation includes rules governing settlement of marital property, child support, custody and alimony (McElroy 1990). A large literature examining the impact of the changes in divorce laws in the United States in the 1970s and 1980s finds that these changes affected married women's labor supply (see Mechoulam 2005; Stevenson 2007). In one of the few papers from a developing country setting, Rangel (2006) analyzes the impact of a 1994 change in Brazilian law that extended alimony rights to couples living in consensual unions or informal marriages; it did not change the rights of men or women living in formal unions. Combining data from the 1992, 1993 and 1995 rounds of the Brazilian Household Survey (PNAD) and using formally married couples as a comparison group, Rangel finds that the extension of alimony rights resulted in an increase in cohabiting women's hours of leisure and to an increase in school attendance by their oldest daughters.

Mother's health and education

Independent of any impact on earnings or control over resources, improvements in mothers' health and educational status is associated with better child development outcomes. Using data from Brazil, Thomas and Strauss (1992) show that maternal height has a large impact on infants' height (length), while paternal height has no impact. Underweight mothers and mothers with micronutrient deficiencies before pregnancy are more likely to give birth to low-birth-weight infants (Galloway and Anderson 1994). Alderman and Behrman (2004) summarize evidence

from several studies that show that low birth weight is associated with a number of adverse consequences for children including lower probability of survival and reduced cognitive abilities.

A large amount of evidence shows that mothers' education has a positive effect on child survival, education and nutritional status; moreover, the effects of maternal education tend to be larger than those for paternal education.⁵ Using data from rural China, Brown (2006) finds that mother's education had a large effect on educational investments; further, this effect was larger than that of father's education. A study from Central Java (Indonesia) finds that mother's schooling affects shorter-term measures of children's nutritional status (child weight), mainly through nutritional knowledge (Webb and Block, 2004). Using data from northeast Brazil, Thomas et al. (1991) find that children of mothers who have completed primary school were 2.5 percent taller than those of illiterate mothers. Since more educated women tend to live in households with higher incomes, it is theoretically possible that some or all the effects observed are attributable to higher household income; the studies reported here, however, control for woman's and household income.

There are a number of pathways through which maternal education benefits children. Better educated mothers adopt safer health and hygiene practices, which improve their children's health and survival (Glewwe 1999; Cebu Study Team 1991). Better educated mothers spend more time and resources on children's health and education (Brown, 2006). Educated mothers are more likely to be exposed to information from a wider range of sources, and to be better able to process and act on the information received (Thomas et al., 1991; Caldwell, 1979). They may also have greater bargaining power within the household and so are better able to act on their preference for investing in children. Finally, educated women tend to have fewer children, which reduces dependency ratios and thus increases per capita consumption expenditure.

But there is also evidence that better-educated women marry better-educated husbands. So, it is possible that the observed effect of women's education might also to some extent reflect unobserved preferences of their husbands for healthier or better-educated children (Schultz, 2002; Duflo, 2005). For example, a study from rural India found that in a setting where educated women do not participate in the labor market, better-educated men are more likely to marry better-educated women (Behrman et al, 1999). This same study also found that literate and better-educated mothers spent more time on children's school work. Thus, it appears that the observed impact of a woman's education may also include the unobserved preferences of her husband. No study, however, has successfully disentangled the two effects, and this remains an area for further research.

Evidence from comparisons of female-headed and male-headed households

The evidence presented thus far is based on an examination of couple households. Several studies have also compared outcomes for children living in female-headed versus male-headed households. This comparison, if factors such as earnings, asset ownership and education are

⁵ A number of papers summarize these findings. See for example Strauss and Thomas (1995), Schultz (1997), Schultz, (2002).

controlled for, can potentially shed some light on the impact of household headship on children's outcomes.

The results appear to be mixed, perhaps because of the differences in the composition of female-heads within and across regions. Controlling for household income, Barros et al. (1997) find in urban Brazil that children in female-headed households fare worse than their counterparts in male-headed households: they are less likely to attend school and are more likely to work. In contrast, Lloyd and Blanc (1996), using data from seven countries in Africa, find that children in female-headed households are more likely to have attended school and completed up to fourth grade than children in male-headed households. Similarly, Joshi (2003) finds in rural Bangladesh that certain types of female-headed households (those headed by married women in which husbands were not physically present) devote more resources to children, after controlling for a number of household and individual characteristics. She finds that children residing in these households are more likely to be currently enrolled in school and more likely to have finished at least two years of school.

Do better maternal education and control over household resources affect sons and daughters differently?

There are several reasons why mothers and fathers might favor children of one gender over the other. Thomas (1994) hypothesizes that gender-specific allocation of resources might arise because of the nature of the child wellbeing production function: it might be more efficient for mothers to spend time with daughters and for fathers with sons. Another factor could be the norms about provision of old age support. Mothers might favor boys in settings where sons provide old age support and favor girls in settings where daughters provide such support (Schultz 1997).

Using household survey data from the United States, Brazil and Ghana, Thomas (1994) shows that mothers' education has a larger effect on daughter's height, while father's education has a larger effect on son's height. In Brazil, mother's receipt of unearned income has a positive impact on daughter's health but not on son's health. In Rangel's (2006) study, also from Brazil, an increase in cohabiting women's bargaining power arising from provision of alimony benefits has a significant impact on schooling of older daughters but not sons. He argues that this evidence is consistent with the social norms in Brazil where daughters typically provide old age support to parents. In other settings, however, mothers appear to favor boys. For example, Quisumbing and Maluccio (2003) find that in Ethiopia, mothers with more assets invest more in boys while in South Africa, mother's assets has a negative effect on girls' schooling. Their analysis of data from Sumatra (Indonesia) shows that mothers with more assets (land) invest in sons' schooling, while better-educated fathers invest in their daughters' schooling.

4. Labor

Women's labor force participation rates lag men's participation rates in virtually all countries. The determinants of female labor force participation and earnings are complex; women's decisions to engage in paid or unpaid work are influenced by a host of factors, ranging from

prevailing wage rates, levels of occupational segregation and male-female wage/earnings differentials, household demographics, individual human capital characteristics, and—in the case of self-employment—availability of land, credit and productive technology.

This section examines levels and trends of female labor force participation, barriers to women's labor force participation, gender patterns of sectoral employment, male-female wage gaps, and the role of female labor force participation in protecting households from the effects of macroeconomic shocks.

Labor force participation: measurement issues and descriptive statistics

In general, five types of work merit attention: formal market work, informal market work, subsistence production, unpaid care work, and volunteer work (Beneria, 1993; UNIFEM, 2000; UNIFEM, 2005). Of these, only formal market work is adequately measured using conventional data collection methods (UNIFEM, 2005). We report data on labor force participation, informal employment and self-employment below, but it is important to note that both may be measured with significant error, especially in the case of women.⁶

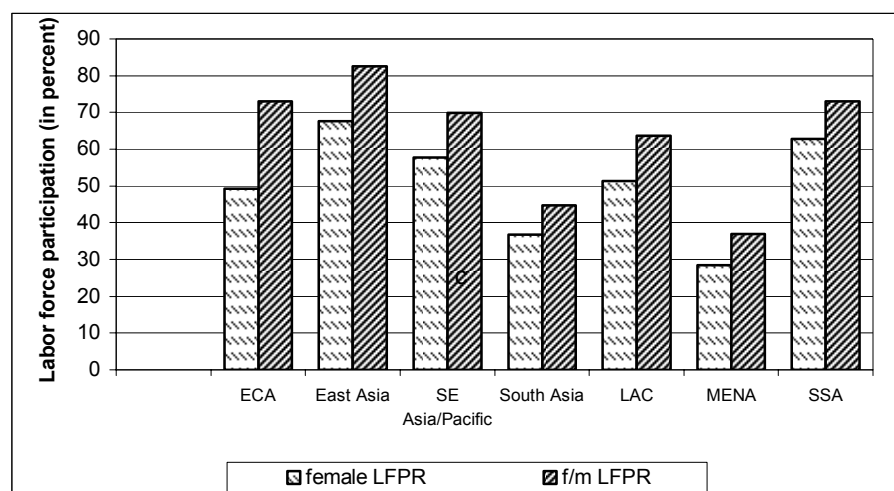
The broadest indicator of women's labor market activity is the female labor force participation rate. Female labor force participation rates vary significantly across regions and countries (see Figure 2 below). The Middle East and North Africa has the lowest female labor force participation rate of any developing region at 28.4 percent in 2004; East Asia had the highest rate at 67.7 percent. Of course, female participation rates may be low because overall participation rates are low, so it is important to look at the ratio of female-to-male participation rates. Female participation rates as a share of male rates range from a low of 37 percent in the Middle East and North Africa to a high of 83 percent in East Asia. Not surprisingly, regions with the highest female participation rates relative to male rates (East Asia, Sub-Saharan Africa, and Southeast Asia) are also those regions with the highest global participation rates (at 75.0, 74.1 and 70.2 percent, respectively). Central and Eastern Europe and the CIS region are exceptions, with relatively high ratios of female-to-male participation rates, but relatively low global participation rates.

There is substantial evidence that female labor force participation rates have a U-shaped relationship with respect to national income levels across countries. At low levels of per capita income, participation rates are rather high (on the order of 45-60 percent). Participation rates fall as per capita income rises, reaching a minimum of about 35 percent at per capita income levels of about US\$2,500, and then participation rates rise again with per capita income (Goldin, 1995; Mammen and Paxson, 2000). Goldin (1995) and Mammen and Paxson (2000) hypothesize that the U-shape results from a situation in which, at low levels of economic development, women are engaged in large numbers in agriculture and non-farm household enterprise activities. As a

⁶ At the level of data collection, there are several challenges. First, the line agricultural and domestic work may be particularly hard to establish for women (fetching wood, caring for animals, etc. See Beneria, 2001). Second, identifying homeworkers and enumerating live-in domestic servants presents serious challenges for household surveys.

country develops, increases in employment opportunities for men as well as increases in earnings lead to a decline in female labor force participation. As the country further develops, the nature of jobs available to women may change; increasing women's education may also make them competitive for white-collar jobs for which they previously did not possess the required educational qualifications (Mammen and Paxson, 2000).⁷

Figure 2: Female labor force participation rates and female-male ratios, 2004



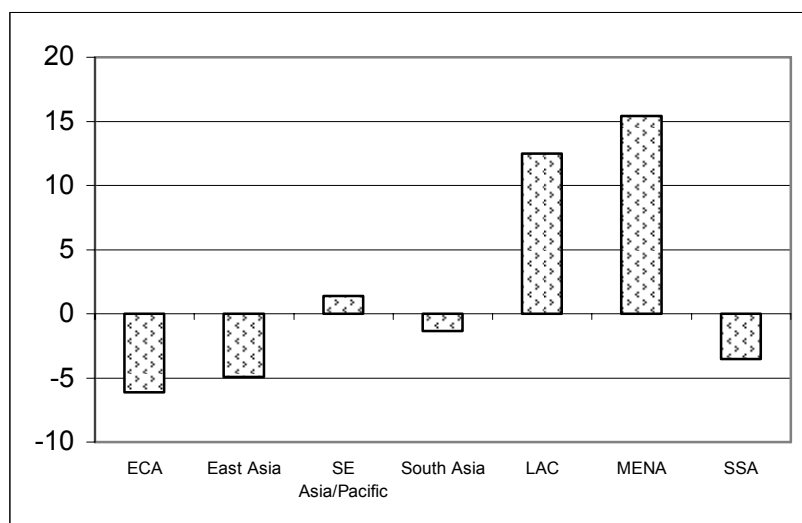
Source: Key Indicators of the Labor Market, 4th edition

Globally, female labor force participation rates have not changed much in the past decade. For the world as a whole, 53.2 percent of women participated in 1994; this percentage declined slightly to 52.5 percent in 2004. This global picture hides significant regional variation: female labor force participation rates rose substantially in Latin America and the Caribbean and the Middle East and North Africa (by 12.5 and 15.5 percent, respectively), and declined in Europe and Central Asia and East Asia (by 6.1 and 4.9 percent, respectively—see Figure 3).

Does increased female labor force participation spur economic growth? In a limited accounting sense, increased employment will lead to increases in output and a one-time increase in growth rates. But the more interesting question of potential long-run impacts on growth rates is seldom quantified. Using panel data for 16 Indian states over the 1961-1991 period, Esteve-Volart examines the impact of sex ratios in employment (both in total and managerial employment) on per capita state domestic product. She finds that increases in both ratios are associated with increased levels of per capita output, but that the impact of the total ratio is larger: an increase of 10 percent in the female-to-male ratio of total workers will raise per capita state product by eight percent, while a ten percent increase in the female-to-male ratio of managers will increase per capita output by only 2 percent (Esteve-Volart, 2004)

⁷ There is also some evidence that female labor force participation has a U-shaped relation to household income levels within countries (when household income is measured as per-capita household expenditure). In the two countries examined (Thailand and India), both the degree of convexity and the absolute participation rates vary substantially (Mammen and Paxson, 2000).

Figure 3: Percentage change in female labor force participation rate, 1994-2004



Source: Key Indicators of the Labor Market, 4th edition.

Barriers to female labor force participation

What are the barriers to women engaging in paid market work, whether it be formal or informal work?⁸ Numerous empirical studies find that women’s probability of working for pay increases with age (up to the mid 40s, at least in Latin America), urban residence, and increased schooling; it declines with family responsibilities (proxied by the number of children living at home) and family income and wealth (Duryea et al., 2004). These studies point to the importance of fertility and women’s reproductive role (and lack of child care) as a factor limiting work for pay. When women and men are questioned directly about reasons for not participating in the labor market, child care responsibilities are a much more frequent response for women than for men. In the Kyrgyz Republic, for example but not atypically, 24.8 percent of all women reported that “housekeeping, taking care of children, sick persons or the elderly” kept them from working outside the home, but only 1.5 percent of men reported this reason (Morrison and Lamana, 2006).

The importance of education in explaining women’s work for pay means that, in countries and regions where women still have lower educational attainment than men, women’s labor force participation will be lower than it otherwise would have been.

Another important barrier to women working for pay in many low-income countries is the time burden imposed by domestic tasks, especially the collection of water and firewood. A study of rural areas in Burkina Faso, Uganda and Zambia found that potential time savings from locating a potable water source within 400 meters of all households would result in time savings ranging from 125 to 664 hours per household per year (Barwell, 1996). More recent estimates show that women spend 273 hours per year gathering water in Benin (1998) and 164 in Madagascar

⁸ The emphasis is on remunerative work—rather than subsistence production, unpaid work in family enterprises, or volunteer work—because of the evidence that increased women’s control over resources is fundamental in reducing household poverty and improving children’s health and education outcomes.

(2001), but only 48 hours in South Africa (Blackden and Wodon, 2006). Clearly, this time could potentially be reallocated to market work if water sources were located in closer proximity to households.

Wage gaps and discrimination against women in labor markets may themselves lower labor force participation, both contemporaneously and for future generations. The contemporaneous effect occurs as the wage loss due to discrimination convinces some women to stay at home; without this wage loss, more women would have their reservation wage for engaging in market work met and labor force participation rates would be higher. The wage loss due to discrimination will also cause parents to systematically under-invest in the education of girls relative to boys. Given the link between education and labor force participation, the labor force participation rates of these girls in the future will be lower than it would have been in the absence of wage discrimination that took place when they were children. Occupational segregation of women into low-paying occupations may be another important driver of under-investment in girls' education.

The impact of law and custom on women's ability to work for pay is difficult to quantify. One of the few papers to quantify the impact of culture examines the work and fertility behavior of women aged 30-40 who were born in the United States but whose parents were born elsewhere. Historical labor force participation rates and fertility rates in the country of origin of the parents are significant determinants of the labor force participation and fertility decisions of these women. The authors interpret these variables as proxies for culture, and find that their effect persists even after controlling for possible indirect effects of culture that are transmitted through educational levels and spousal characteristics (Fernandez and Fogli, 2005).⁹

Finally, it is important to underline the fact that for self-employment, imperfections and discrimination in other markets constitute barriers to self-employment for women. If access to inputs such as credit, capital, technology is limited for non-economic reasons (see subsequent sections of this paper for this discussion), women's productivity and earnings in self-employment will be lower than equivalent men. These lower potential earnings may discourage women from entering self-employment.

Wage employment, self-employment and informal work

When women are employed, it is frequently claimed that, relative to men, they are more likely to be: i) self-employed rather than work for wages; ii) working in the informal rather than the formal sector; and iii) working as own-account workers, domestic workers and contributing family workers, while men are more likely to work as employers and wage and salaried workers. (UNIFEM, 2005)

By and large, cross-country evidence does not support these contentions. Among 91 developing countries with recent data, the average share of women in self-employment is lower than the

⁹ Evidence on the role of culture in determining labor force participation in developing countries is not abundant; inserting dummy variables for ethnicity or country of origin in labor force participation equations is not sufficient, since these variables may pick up many other factors besides culture.

corresponding average share for employed men (KILM, 4th edition). Overall, men are more likely to be self-employed (34.4 versus 27.8 percent), and women are more likely to be working as unpaid family labor (14.6 versus 7.0 percent). The shares of employed men and women in wage employment are roughly identical (see Table 1).¹⁰

Table 1. Distribution of male and female workers by type of employment: 91 countries, most recent year

	Wage and salaried workers	Self-employed workers	Contributing family workers	Total*
Women	57.3	27.8	14.6	99.7
Men	57.7	34.4	7.0	99.1

Notes: * Totals do not sum to 100 because of rounding. Shares are unweighted cross-country averages. The sample is restricted to developing countries.

Source: Authors' calculations based on KILM, 4th edition.

In terms of the likelihood of being engaged in informal employment, a World Bank (2001) report notes that there are countries in which women's share in informal employment is less than their share in total employment (Burundi, Costa Rica, Egypt, Kenya, Korea, Mali, Panama, Tanzania and Vietnam), countries in which women's share in informal employment is greater than their share in total employment (Botswana, Brazil, Colombia, Ghana, Honduras, Indonesia, Jamaica, Malaysia, Peru, Philippines, Zambia and Zimbabwe), and countries in which the two shares are roughly similar (Congo, Fiji, Gambia, Mexico, Thailand, Uruguay and Venezuela). For the 80 developing countries in the KILM database that provide data on own-account workers, on average, 29 percent of male workers are own-account workers versus 23.6 percent of female workers.

Finally, it is true that women are more likely than men to work as domestic workers and unpaid workers in family enterprises, and that men are more likely to work as employers.¹¹ On average, 14.6 percent of employed women work as unpaid family workers, while only 7 percent of men do so. A key question is whether women prefer to work at home or in family-owned businesses because of the location or the flexibility of work hours, which allows women to more easily combine work, domestic chores and care work. Or, on the other hand, do prevailing gender norms condition women to assume this triple workload and/or to restrict their mobility (Carr and Chen, 2004)? Alternatively, is this pattern a result not of supply considerations, but rather of the gendered demand for labor, which presumably reflects existing societal gender norms?

¹⁰ All reported shares are unweighted mean shares across the developing countries in the sample.

¹¹ Employed men are more than twice as likely as employed women to work as employers: 4.6 percent of employed men do so, versus 2.1 percent of employed women (KILM, 4th edition)

Male-female wage gaps

Although there is evidence that male-female earnings gaps have declined in recent years (UNIFEM, 2005; Duryea et al. 1999), women in developing countries earn on average only 73 percent as much as men (World Bank, 2001).¹² How can these gaps be explained?

The traditional explanation is that observed gender wage gaps can be partially explained by differential endowments of human capital (although this explanation is difficult to sustain in regions such as Latin America and the Caribbean, where women's educational attainment now exceeds that of men) and is partially unexplained. This unexplained component is frequently attributed to discrimination, although it may also be due to unobserved heterogeneity. The Oaxaca-Blinder decomposition has been used to quantify the size of these two components in a vast number of national case studies. In the example in the preceding paragraph, of the 27 percent difference in hourly earnings between men and women in a set of 42 developing countries, more than 80 percent cannot be explained by differences in the levels of human capital between men and women.

Occupational segregation has been proposed as a candidate to explain persistent wage gaps, but when it has been included in extended Oaxaca-Blinder-type decompositions, it typically explains a very low percentage of observed gaps (Fluckinger and Silber, 1999). Occupational segregation is clearly a more important issue in middle-income developing countries, since in low-income countries the majority of men and women alike are engaged in subsistence agriculture.

Overall wage structure matters as well. Evidence suggests that national wage distributions characterized by wide variation in wages are associated with larger gender wage gaps (Blau and Kahn, 1996 and 2001).

Women's labor supply as a buffer to macro shocks

Women's ability to supply labor acts as a critical "buffer" for households. Poor households have to prevent and mitigate risk (i.e., reduce the risk of negative income shocks through measures such as crop diversification, migration to locations with more remunerative and secure employment opportunities, and savings) and cope with the adverse effects of negative income shocks (by, e.g., drawing down savings, distress sales of physical assets, utilizing formal and informal sources of credit for consumption, and accessing social networks). Of all these available strategies, the ability to increase labor supply is the most critical for poor households, given that they tend to have low savings, own few physical assets, and are credit-constrained.

¹² These are hourly earnings gaps. Wage gaps per se have little meaning in economies where wage employment is unimportant. Even if wage gaps are recast as hourly earnings gaps, this is of little help in family enterprises, where neither the differential productivity of family members nor the distribution of profits across individuals is directly observed (Mammen and Paxson, 2000). In countries where the overwhelming majority of workers are engaged in small scale family or subsistence farming, earnings gaps may not be a useful indicator. This conclusion must be nuanced for those cases in which men and women farm different plots and for which it is consequently feasible to measure gender-disaggregated productivity and earnings.

Evidence from households' response to macroeconomic shocks where the male household head becomes unemployed offers an example of how women's ability to enter the labor market helps households avert poverty and smooth consumption during severe downturns. Fallon and Lucas (2002) synthesize the findings from several studies that examine how financial crises affect labor market outcomes (employment, unemployment, and wages or earnings), and other outcomes (such as human capital outcomes). The studies reviewed report experiences from Argentina, Indonesia, Korea, Malaysia, Mexico, Thailand, and Turkey—countries that experienced similar macroeconomic shocks (currency devaluation, short-term capital flight, and sharp declines in gross national product) in the 1990s. These shocks led to a decline in real wages and evidence suggests that households smoothed their consumption by increasing women's labor force participation. This was particularly true of households' response to the financial crisis in Indonesia. Notwithstanding, cultural norms that discourage paid work by women, such as in South Asia, might constrain such as a response from women (Amin, 1997).

5. Credit

Credit is widely regarded as an important instrument for improving the present and long-term economic welfare of households. In the presence of low savings and liquidity constraints, credit is often required as start-up or working capital for income-generating activities. Credit is also often required for smoothing consumption over time, especially in the context of fluctuations in incomes which can arise due to anticipated negative shocks such as seasonal fluctuations in agricultural employment and production or due to unanticipated shocks such as illness. Access to credit can also increase the risk-bearing capacity of households, motivating them to invest in more uncertain but higher return activities, such as the adoption of new technologies.

Gender discrimination in the credit market

Differential treatment in the credit market by gender might arise due to some combination of the following two factors: (1) gender differences in the individual characteristics that are relevant for loan qualification and (2) gender differences due to prejudicial tastes (Becker 1957), or statistical discrimination, where information on the relevant *average* characteristics of the group is used to infer the quality of the individual applicant. Compared to the literature on measuring gender discrimination in the labor market, there is a significantly smaller literature attempting to estimate gender discrimination in the credit market; moreover, this literature is primarily developed country-based.

Differential treatment in the credit market is typically studied in relation to two variables: the loan denial rate and the interest charged on the loan. With respect to these variables, after conditioning on relevant covariates, most studies find little or no evidence of gender discrimination in the small business and housing loan markets (see, *e.g.*, Blanchflower et al. 1998, Blanchard et al. 2005, and Coleman 2002).¹³ The sparse literature examining differential treatment in credit markets in developing countries also arrives at the same conclusion (see

¹³ See also Dymski (2006) for a review of the evidence from studies in the United States.

Storey 2004 for Trinidad and Tobago, Raturi and Swamy 1999 for Zimbabwe, Buvinic and Berger 1990 for Peru, and Baydas et al. 1994 for Ecuador).

Credit constraints

Based on these limited studies, while gender discrimination by lenders does not appear to an important phenomenon in credit markets, most of them find that women are less likely to apply for loans than men. Non-participation in credit markets can arise for two reasons: women might want a loan but may not satisfy the loan eligibility criteria (e.g., they might lack the appropriate physical collateral for obtaining a loan) or women may meet the loan eligibility criteria but they have no need for a loan, so they voluntarily opt out. The former group is likely to be credit-constrained.

Credit constraints have been typically analyzed by examining the determinants of household or individual reports of loan applications and loan rejections within a multiple regression framework. However, Diagne et al. (2000) argue that these outcome indicators confuse participation in credit programs with credit constraints. They instead examine the maximum amount individuals (borrowers and non-borrowers) report they can borrow from informal and formal sources (which they term the credit limit variable). Based on an unconditional examination of credit limits and unused credit lines (the difference between the credit limit and amounts borrowed), they find that women in Bangladesh and Malawi are more likely to face a binding credit constraint than men.

Microcredit

One institution that has had a major impact on relaxing credit constraints for the poor in general and for poor women in particular has been microcredit. Microcredit programs, by providing small loans mainly for non-agricultural microenterprise activities, have had a significant positive effect on household incomes and assets, child schooling, child and maternal health, and the empowerment of female borrowers (see Littlefield et al. 2003 for a review of the evidence). Consequently, microcredit programs are found widely around the developing world and are considered to be an important cost-effective instrument for helping the poor transform their economic circumstances by enabling them to pursue more lucrative livelihood opportunities.

Three important features have made microcredit accessible to poor households. First, microcredit programs typically replace the standard collateral requirement with innovative contracting arrangements which provide strong incentives for loan repayment.¹⁴ These arrangements include group lending with joint liability and individual progressive lending (Armendariz de Aghion and Morduch 2003). Second, microcredit programs have greatly simplified and streamlined loan application, decision, and disbursement processes. Third, microcredit programs frequently couple the provision of credit with microenterprise development and management training services (World Bank 2001). These three features are probably

¹⁴ See Ghatak (2000), Armendariz de Aghion and Gollier (2000), Besley and Coate (1995), and Stiglitz (1990) for how group lending can successfully address the issues of adverse selection and *ex ante* and *ex post* moral hazard.

especially beneficial to women as they tend to be less-educated, lack appropriate forms of collateral, and have less work experience, among other things.

Targeting women

In many cases, microcredit institutions explicitly target poor women. Largely as a result of this choice, women constitute over 80 percent of the client membership for the 34 largest microcredit institutions around the world (Mody 2002 as cited in Armendariz de Aghion and Morduch 2003). The reasons why microlenders target women are myriad but, as discussed by McKernan et al. (2005), they typically consist of some combination of the following four reasons. First, women appear to be better clients rather than men (at least unconditionally) as demonstrated by their higher repayment rates (see, e.g., Hossain 1988, Khandker et al. 1995, and Hulme 1991 for specific examples). This may be related to the fact that, relative to men, women often have fewer alternative options and may be more sensitive to the social consequences of defaulting on their loans under group lending contracts (see Johnson 2004 for a discussion of shame and repayment in rotating savings and credit associations in Kenya). Second, as women are often more credit-constrained than men, women are considered to be relatively more economically disadvantaged and vulnerable to negative shocks. Third, the provision of microcredit directly to women is considered to increase their economic and social empowerment both within the household and in the community at large, which is valued both intrinsically and instrumentally. Fourth, consistent with a collective household model characterization of intrahousehold decisionmaking, the preferences of women are thought to be more in line with the microlender's social objectives; thus, targeting women is considered to have a greater positive impact on household welfare outcomes.

Differential welfare effects by gender

As mentioned before, a large number of studies find that microcredit programs, many of them who provide most, if not all, their loans to women, have significant positive effects on a range of welfare outcomes. While these studies do not directly answer the question of whether the effect of credit differs by the gender of the direct beneficiary, a growing number of studies show that when women are the direct beneficiaries of credit rather than men, the impact of credit on various measures of household welfare is greater, suggesting that credit may not be perfectly fungible within the household.

The most reliable evidence of these differential effects come from careful studies of Grameen Bank and other microcredit programs in Bangladesh. Using a quasi-experimental design where they correct for non-random program placement and self-selection in program participation, Pitt and Khandker (1998) find that when credit is provided directly to the woman, it has a significant positive effect on consumption expenditure, children's schooling, and her labor supply; when credit is provided directly to the man, it only has a significant positive effect on male children's schooling. Specifically, they find that, at the mean, an additional 100 taka of credit provided to the woman increases total annual per capita household consumption expenditure by 18 taka, while the corresponding increase when credit is provided to the man is 11 taka. Given the positive albeit small effect of the woman's credit on her labor supply, the authors posit that the

increase in consumption expenditure is largely the result of her increased labor productivity. Using the same data as Pitt and Khandker (1998) and correcting for the potential sources of bias mentioned earlier, Pitt et al. (2003) find that credit to women has a significant positive effect on children's health, while credit to men does not have an effect. These positive effects on children's education and health from providing credit to women increases the likelihood of higher future (adult) labor productivity and earnings.

Effects on empowerment

The positive welfare effects of providing credit to women could arise either due to standard income and substitution effects or due to empowerment where there is a rebalancing of intrahousehold decisionmaking power (or agency) over resources in favor of women. Several studies, virtually all of them with respect to microcredit programs in rural Bangladesh, find that the provision of credit to women has a positive effect on various self-reported empowerment measures (see, e.g., Mizan 1993, Hashemi et al. 1996, Zaman 1999, Schuler and Hashemi 1994, Kabeer 2001).¹⁵ For example, Hashemi et al. 1996 find that, controlling for various relevant factors, microcredit has a significant positive effect on empowerment, where empowerment is measured using eight different indicators ranging from physical mobility to participation in mass political activities. They also find that the effect is independent of women's contribution to household income, that is, the effect of microcredit on empowerment comes from just participating in microcredit programs.

Pitt et al. (2006) provide the most reliable estimates of the positive effect of credit on empowerment. Controlling for non-random program placement, self-selection in program participation, and choice-based sampling, they find that when women were the direct beneficiaries of credit, it had a positive effect on virtually all of the women's latent empowerment factors examined; when men were the direct beneficiaries of credit, it either did not have an effect or had a negative effect on these same factors for women.

6. Land

Other than their labor, land often serves as the most important productive asset for households dependent on agriculture. It is also often the primary source of transferable and inheritable wealth for these households (Deininger and Binswanger 1999). Furthermore, in many cases, access to water and other natural resources is contingent on having access to land (FAO 2002). Consequently, access to arable land, the quantity and quality of land, and the strength and extent of rights over land have strong implications for both the present and long-term economic welfare of rural households. Numerous empirical studies across the developing world show a significant positive association between the possession and size of arable land and household income and

¹⁵ Although they do not explicitly examine the issue of empowerment, Goetz and Sen Gupta (1996) stand as an exception. Using an index of credit control, they find that most women (63 percent) cede control over loans to male members of the household. They also find that loan control is higher among women who are divorced, separated, or widowed, when loans are invested in traditional women's income-generating activities, and when the loan amounts are small.

consumption levels, both conditionally and unconditionally (REFS). Though relatively fewer, studies also show that land can serve as an important instrument for poverty reduction for rural households, a reasoning that has motivated much of the redistributive land reform programs around the world (see, e.g., Finan et al. 2002 for evidence from Mexico).

The efficiency argument. Well-defined and secure individual rights over land are widely considered as instrumental for increasing household welfare via enhanced production efficiency, both static and dynamic. Several channels through which land rights encourage investment in land sustainability and improvement – and, hence, output and income – have been formalized in the theoretical literature. These channels include reducing the risk of expropriation, using land as collateral in obtaining credit (at lower cost), and lowering transaction costs in the land market and thus increasing trade as well as the gains from trade (Besley 1995). A growing number of empirical studies – many of which have attempted to correct for the potential endogeneity of the possession (or acquisition) of informal or formal land rights through alternative empirical strategies such as natural experiments – provide strong statistical support for this causal relationship. Specifically, increased land tenure security appears to promote, inter alia, greater agricultural investment and productivity (see, e.g., Besley 1995 for Ghana, Banerjee et al. 2002 for India, Goldstein and Udry 2005 for Ghana; Do and Iyer 2003 for Vietnam, Antle et al. 2003 for Peru, and de Laiglesia 2003 for Nicaragua), increased labor force participation (see Field 2006 for Peru), and increased investments in housing quality (see Galiani and Schargrodsky 2006 for Argentina).

Gender differences in customary land laws

In much of the developing world, women's land rights are significantly circumscribed, if not in principle, then in practice. For example, under customary law in much of sub-Saharan Africa, permanent land rights are held by men, typically male household heads. In contrast, women traditionally held (strong) usufruct rights to individual plots offered by men, though social norms regarding women's household obligations often constrained their crop choices to food crops (Kevane and Gary 1999). In patrilineal systems, women obtain usufruct rights from their husbands. These rights, however, are typically lost upon divorce, widowhood, or physical relocation. Even in matrilineal systems, where inheritance is through the mother's line, land is owned and controlled by men. Here women obtain usufruct rights from their fathers (or husbands). In neither system do women typically possess inheritance rights, though sometimes discretionary land gifts with strong individual rights are offered to women (Lastarria-Cornheil 1997). While initial land rights are typically acquired through allocations by the community, land rights are also obtained from clearing forests. In many African societies, however, this is exclusively a male task (Quisumbing et al. 2001).

Similarly, in South Asia, women typically do not own land and, when they do, they typically do not control it. Patrilineal systems exhibit the strongest gender disparities in this respect (Agarwal 1994). As in sub-Saharan Africa, while matrilineal and bilateral inheritance systems in South Asia often conferred land ownership rights to women, effective control rights were held by men. Agarwal (1994) argues that this gap between female ownership and control is due to a mix of interrelated factors including, among other things, norms which circumscribe women's mobility

and social interactions, illiteracy, and male control over (access to) technology, information, and labor. In Latin America, although many cultures historically possessed parallel and bilateral inheritance systems, the gender division of labor which defined agriculture as a man's occupation often meant that men inherited land while women inherited other assets (Deere and Leon 2003). Land rights for women in many parts of the developing world are typically stronger in cultures where inheritance is regulated by Islamic law (World Bank 2001). However, here too, practice sometimes deviates from principle to the detriment of women (see Agarwal 1994 for South Asia).

Gender differences in modes of land acquisition

In general, the organization and functioning of the key modes of acquiring land, namely inheritance, marriage, *inter vivos* transfers, land titling and registration programs, and market purchases in developing countries, put women at a disadvantage, perpetuating and sometimes exacerbating existing gender disparities in land ownership and accumulation.

Inheritance. The inheritance bias against women is especially acute in the context of strong patrilineal, patri- or virilocal, and exogamic traditions which typify most of the developing world.¹⁶ Fafchamps and Quisumbing (2005) find in Ethiopia that, while marriage serves as an important event for the substantial transfer of assets intergenerationally, grooms bring 10 times more assets than brides, with brides bringing little or no land. Quisumbing (1994) finds that in the Philippines—an example of the bilateral inheritance systems that exist in Southeast Asia—sons inherit on average double the quantity of land as daughters. Moreover, she finds the value of per-unit land was higher for sons than daughters owing to differences in the quality of land in terms of irrigation.¹⁷

Nonetheless, inheritance appears to be primary means through which women acquire land in general. For example, Deere and Leone (2003) find that in five out of the six Latin American countries they examine, the majority of female landowners inherited their land – the corresponding shares for male landowners in these six countries were often substantially lower, often less than half.

Land reform and titling programs. Land redistribution reforms and land titling and registration programs around the developing world have had mixed effects on women's access to land and land rights. In a number of cases, these interventions have not strengthened women's land rights, though the potential exists, given that in many settings customary laws exhibit strong biases against women (Meinzen-Dick et al. 1997). In some cases, these programs have in fact weakened women's rights (Jacobs 2002). In South Asia, the person who "tills the land" was

¹⁶ Patrilocality refers to the custom of men remaining in their father's home or village even after marriage. Virilocality refers to the custom of the bride relocating to the home of the bridegroom. Exogamy refers to the custom of marrying outside your village community.

¹⁷ There is of course the possibility that parents might compensate by providing girls with other assets or more schooling exists (Quisumbing 1994). Note that there are exceptions to patrilineal, patri- or viri-local systems. Sumatera, for example, has a traditional matrilineal inheritance system (Quisumbing, 1994). In some cases, these matrilineal systems have increasingly become like patrilineal systems (see Agarwal 1994 for evidence from South Asia).

designated as the direct beneficiary of land reforms. However, given the gender division of labor, women rarely undertook this task. In addition, perceptions of men as breadwinners and more capable farmers and women as essentially dependents, as well as concerns regarding male resistance, resulted in reforms designed to maintain the gender status quo (Agarwal 1994, 2003).

In Sub-Saharan Africa, while men and women traditionally possessed differing (at times overlapping) rights to land, formal titling and registration programs typically conferred complete and exclusive rights to a single individual: the male household head. Given a confluence of social and economic forces which contributed to the increasing scarcity and commodification of land, these programs had a negative effect on women's land rights (Lastarria-Cornheil 1997).

While Latin American agrarian reforms and land titling programs historically were biased against women (as the sole beneficiary was designated as the household head), this began to change in the 1990s. A number of Latin American countries rewrote their legislation to recognize dual-headed households and mandated joint adjudication and titling. Many of these countries also explicitly targeted female-headed households. These legal changes have had a dramatic positive effect on the female share of beneficiaries compared to previous episodes of land reforms (Deere and Leon 2001).

Gender differences in land ownership: The empirical evidence

Relatively little research has been carried out on the distribution of ownership of land or other productive assets by gender, primarily because most analyses have studied asset holdings at the level of the household (typically attributing the assets to the household head) rather than at the level of the individual. The scant existing evidence appears to show that the distribution of land ownership is heavily skewed towards men. For example, using household survey data from the last decade for a sample of Latin American countries, Deere and Leon (2003) find that, depending on the country, roughly between 70 and 90 percent of formal owners of farmland were exclusively men. Furthermore, conditional on land ownership, men owned more farmland on average than women.¹⁸ Similarly, in Ghana, Doss (2005) finds that 60-70 percent of landowners were men. Further, conditional on ownership, the mean value of land for men was almost 3 times higher than the corresponding statistic for women. In Burkina Faso, Udry (1996) finds that the mean size of male-controlled plots is almost 8 times higher than the corresponding statistic for female-controlled plots. Synthesizing findings from other studies, Quisumbing et al. (2004) report that the area cultivated by women range from one-third to two-thirds of the area cultivated by men in sample of four Sub-Saharan African countries.

Economic effects of weaker land tenure security for women

Direct empirical evidence on the gender-disaggregated effects of land tenure insecurity on investment and other economic behavior is largely lacking. The fact that careful studies show that tenure insecurity impairs investment incentives in general, coupled with higher levels of tenure insecurity for women in many settings, suggests that women's agricultural productivity

¹⁸ In several countries, however, this difference was not statistically significant.

(measured in terms of yields) relative to men's is likely to be lower due to higher tenure insecurity. Several studies in Sub-Saharan Africa show that women have lower agricultural productivity than men on same-sized plots growing the same crops (see Quisumbing 1996 for a review). Moreover, some studies find this difference within households, suggesting substantial inefficiencies in the intrahousehold allocation of labor and other inputs between female and male-controlled plots (see, e.g., Udry et al. 1995 and Udry 1996).¹⁹ By and large, whether these productivity differences arise due to gender differences in land tenure security has not been examined. However, Kevane and Gray (1999) argue that tenure insecurity may be an important factor – whatever limited land rights women possess maybe precisely because men do not work on women's individual plots, and that the reallocation of labor and other inputs from men's plots to women's plots may threaten these rights.

While, as mentioned before, studies on gender differences in land security and agricultural productivity are largely unavailable, Goldstein and Udry (2005) provide some evidence that ties the two. They find in Ghana that individuals in positions of power in the local political hierarchy have more secure land rights. As a result, these individuals invest more in land fertility through fallowing for longer periods and obtain substantially higher yields and revenues. As women are rarely in positions of power, they face more insecure property rights, and leaving plots fallow further undermines their limited rights. Consequently, women fallow their plots for shorter periods of time and obtain significantly lower yields. The authors estimate the loss in output due to insecure land rights to be one-third of total output.

Some recent research examines the link between bargaining power of women (as measured by land and livestock assets brought to marriage) on efficiency in household production. Using a stochastic frontier production function approach for Ethiopia, Seebens and Sauer (2006) find that when bargaining power is highly asymmetric, relative efficiency (relative to the efficiency frontier) is about 55%; when bargaining power is highly symmetric, relative efficiency reaches 95%. As noted by DFID (2007), however, it is important to note that efficiency in household production is probably more about cooperation between spouses rather than women's bargaining power per se.

Economic effects of strengthening land tenure security for women

Most studies of the effects of increased tenure security on investment and participation decisions—such as through land titling and registration schemes—have not examined how these effects differ by gender. One exception is Field (2006), who finds in Peru that increased tenure security for urban squatters through formal housing land titling freed up household hours formerly devoted to ensuring housing land security through informal means to employment, increasing the likelihood of market work outside the home and the number of hours worked.

¹⁹ O'Laughlin argues that the inter- and intra-household gender differences in yields and input usage that Udry (1996) finds may be spurious. She states that separating individual plots from collective plots under the control of male household heads, which Udry does not do due to data limitations, may reveal that male and female *individual* plots are the same in terms of size, use of inputs, and output. She also states that the male-female difference in yields may actually be driven by male heads rather than males as a whole, citing Udry's estimate that male household heads achieved a 18 percent higher yield than other men in the same households.

This effect was stronger for men. For women, the size of the effect varies by family size and residential tenure; while increased tenure security did not produce a significant labor supply effect for women in the average household, it did have a large and significant positive effect on women who reside in small households with long residential tenures.

7. Agricultural technology

Technological innovation and adoption have undoubtedly been key drivers of economic development and growth. While technological change has impacted a wide range of economic activities, one of the main sectors where technology and its effects have been studied extensively, particularly in the developing world, is agriculture. The focus has been largely deliberate—with the majority of the developing world’s population, and particularly the poor, reliant on agricultural production and employment for their livelihoods, growth in agricultural productivity continues to be viewed as paramount for raising incomes and reducing poverty among agricultural households (see Thirtle et al. 2003 for a summary of the cross-country and microdata evidence). Much of the productivity and production growth that has occurred in this sector has been due to the introduction of new technologies such as high-yielding varieties, chemical fertilizers, herbicides and pesticides, mechanization, and improved soil and crop management techniques. Here, the Green Revolution stands out as the most prominent example of the success of these interventions.

Technology adoption and use

Motivated principally by the importance of identifying and addressing constraints to technology adoption and use (hereafter referred to as just adoption), the individual-, household-, and community-level determinants of technology adoption and diffusion have been an area of longstanding research in agricultural economics. However, whether technology adoption behavior differs systematically between female and male farmers, what the key factors behind this difference are, and whether (and how) technology adoption affects women’s economic roles (both absolutely and relative to men’s) have been less studied, although these gaps are rapidly being filled as a result of increased empirical research in recent years. Nevertheless, much more research is needed as what is presently known remains about the nature of gender disparities in the use and impacts of technology remains far from conclusive.

Examining technology adoption and gender: The typical approach

Most empirical studies of the determinants of technology adoption and diffusion in developing countries examine the adoption decision at the level of the household. Consequently, when studies do examine how gender affects adoption, they typically do so by including an indicator variable for female-headed household as an additional covariate in multiple regression analyses. The implicit assumption here is that the adoption decision is made by the household head and not by individual (male and female) farmers within the household, and that this decision applies broadly within the household.

The limited evidence that exists appears to support this assumption, at least with respect to gender. For example, Doss and Morris (2001) find in Ghana that female farmers residing in male-headed households are just as likely to adopt new technologies as male farmers, while female farmers in female-headed households are less likely to adopt than male farmers, *ceteris paribus*. Similarly, Chirwa (2003) finds that while being a female farmer is not a significant negative determinant of technology adoption in Malawi, being a female farmer in a female-headed household is. It is, however, probably premature to generalize based on these two studies. Many more studies that look within the household to female and male farmers – especially in contexts where female members manage separate agricultural plots from male members and have individual decision-making authority – are needed.

The empirical evidence on the conditional relationship between the gender of the household head and technology adoption is decidedly mixed. Most studies find that, controlling for differing sets of pertinent household head-, household-, and community-level characteristics, female-headed households are either less likely than or as likely as male-headed households to adopt new technologies (see, e.g., Asfaw and Admassie 2002, Paolisso et al. 2002, Wier and Knight 2000, Chirwa 2003, and Doss and Morris 2001). However, a smaller number of studies have found that, *ceteris paribus*, female-headed households are more likely to adopt than male-headed households, and, further, that this effect is large (see, e.g., Bandiera and Rasul 2005). The reasons why the gender of the household head matters conditionally remain an open question. In many studies, the data are not sufficiently rich to capture most of the factors theorized to either positively or negatively affect the technology adoption decision, with many of these omitted (or imperfectly measured) factors potentially correlated with the gender of the household head.²⁰

In light of this, the question of whether or not gender is a statistically and practically significant determinant of technology adoption is perhaps secondary to the question of which factors are key socioeconomic determinants of the adoption decision, and whether women are systematically disadvantaged relative to men with respect to these factors. Here, unfortunately, evidence is limited—most studies of the determinants of technology adoption have not examined how female farmers fare relative to male farmers in terms of schooling and literacy (considered to be critical for processing relevant new information), access to information (through social networks and agricultural extension services), access to credit, labor, and commodity markets, risk exposure and risk aversion, and land size and land rights. The scant evidence that does exist in the technology adoption literature, combined with studies that have looked at whether these factors are correlated with gender in other topics, provide some (extrapolable) insights into possible explanations for the differential adoption rates often found between women and men.

Potential barriers to technology adoption

Most of the evidence appears to suggest that many of the barriers to adoption are not related to the characteristics of the technology *per se* but instead originate in other markets that are relevant for the adoption decision, such as land, labor, credit, and information. These and other potential barriers to technological adoption have been discussed in general by Feder et al. (1985) and

²⁰ See Doss (2006) for a discussion of the shortcomings of microstudies on technology adoption in general.

Sunding and Zilberman (2001); their relevance for female farmers has been discussed by Doss (2001).

Constraints related to land, information, and credit and how they are particularly salient for women are discussed below. This selective focus is motivated primarily by where most of the limited evidence lies. These factors, however, may not be the most important ones in every setting. For example, Doss (2001) discusses the importance of cultural norms in Sub-Saharan Africa in dictating the choice of crop by gender, where food crops are considered to be “women’s crops,” while cash or export crops are considered to be “men’s crops.” To the extent that this is the case and that new technologies are related more to cash crops (or are in fact the cash crops themselves), these cultural norms could play an important role in explaining differential adoption rates by gender, though cause and effect are likely to be confounded here.

Land. The decision whether to adopt a new technology (as well as the timing and the intensity of use) depends crucially on whether the prospective adopter has access to land, the size of the landholding, and the nature of the rights the farmer has over the land and output. Whether the farmer has long-term tenure security is particularly important given that the returns to the technological investment often appear in the future and over time (Feder et al. 1985). The evidence seems to show that women tend to be relatively disadvantaged along all three dimensions (see the land section for general evidence on this). In Ethiopia, Croppenstedt et al. (2003) find that female-headed households have significantly lower endowments of land, and that land size is a significant positive determinant of fertilizer use. In Ghana, Doss and Morris (2001) find that women tend to own (and cultivate) smaller plots than men, that a greater proportion of women than men are landless, and that these gender differences are larger for female-headed households than female farmers in male-headed households. They also find that land size is a significant positive determinant of the decision to adopt high-yielding maize varieties and chemical fertilizers.

Gender disparities in land rights have in many cases worsened over time due to a confluence of institutional and socioeconomic factors, including ill-designed land titling and registration schemes that have acted against the interests of women, particularly women residing in male-headed households (see, e.g., Agarwal 1994 for South Asia and Lastarria-Cornheil 1997 for sub-Saharan Africa). Additionally, Doss (2001) argues that the causality also sometimes operates in the reverse direction, specifically that the introduction of new technologies has acted to weaken women’s access to land as men have consolidated land to take fuller advantage of these technologies. This process has clear implications for the future adoption behavior by gender, potentially leading to a divergent pattern in adoption rates as the distribution of land becomes increasingly skewed in favor of men.

These patterns, however, are not without exceptions. For example, in Ghana, where women traditionally did not inherit land, Quisumbing et al. (2001) find that, with the introduction of cocoa, the demand for women’s labor in cocoa cultivation increased substantially. In return for this labor, husbands often gifted land with strong individual rights to their wives.

Schooling. Most of the available evidence seems to suggest that education (usually defined in the literature in terms of formal schooling or literacy), by increasing the ability of the individual

to process relevant (new) information, is an important and highly robust determinant of the decision to adopt new technologies (see, e.g., Feder et al. 1985 and Strauss et al. 1991), as well as of the decision to adopt new technologies early (see, e.g., Wier and Knight 2000). To the extent that women are less educated than men, which is generally the case in the poorer parts of the developing world, the more likely women are to delay adoption or to forgo adoption entirely.

The importance of own-schooling for adoption is probably greater in the case of female-headed households, where the potential for positive education spillovers from better-educated adult (male) members are limited or non-existent. Doss and Morris (2001), for example, find in their study of maize farmers in Ghana that female farmers in male-headed households tend to have less formal schooling than male farmers, and that female farmers in female-headed households have even less. They also find that education is an important positive determinant of the adoption decision. Similarly, Croppenstedt et al. 2003 find that literacy and schooling are important determinants of fertilizer use in Ethiopia, with the effect on intensity of use particularly strong when the farmer has four or more years of schooling. They find that very few female-headed households are literate, and virtually none have four or more years of formal schooling.

Social networks and social learning. Learning about a new technology and its use from other farmers in the community (via imitation or information exchange within social networks) has been shown to be an important determinant of the adoption decision (see, e.g., Munshi 2004, Foster and Rosenzweig 1995, Conley and Udry 2001, Conley and Udry 2004, and Bandiera and Rasul 2005). The ability and the extent of learning from others is also shown to be positively correlated with the level of formal schooling, suggesting an indirect pathway through which formal schooling again impacts the adoption decision.

Studies also find that farmers learn from farmers of similar type, particularly in terms of demographic characteristics. For example, Conley and Udry (2004), in their study of pineapple farming technologies in Ghana, find that farmers are more likely to have information links with other farmers of the same gender, clan, and age, and that these links were important for technology diffusion. Similarly, Wier and Knight (2000) find that 88 percent of adopters indicated that their decision was influenced by somebody of the same gender. Disaggregating this statistic by gender, they find that 53 percent of female-headed households were influenced by other female-headed households, though the share of female-headed households in the sample was only 22 percent. To the extent that female farmers have less-extensive or poorer-quality information networks, knowledge transfer through these networks are more likely to be impaired.

Agricultural extension. Agricultural extension services are also seen as an important instrument for the provision of information on new technologies and their use (Evenson 2001 and Anderson and Feder 2003). For example, in reviewing 22 studies of the determinants of the adoption of improved varieties and fertilizer in East Africa, Doss et al. (2003) find that extension services, in terms of frequency, appear to be the single-most important positive determinant of the adoption decision. For various reasons, however, extension services often fail to reach female farmers, in particular female-headed farming households, even though female farmers often indicate a strong demand for such services (Saito et al. 1994). Summarizing evidence from 6 studies in Sub-Saharan Africa in the 1980s, Quisumbing (1994) reports that male-headed households were

roughly 30-220 percent more likely to have ever had contact with an extension agent than female-headed households. Similarly, Doss and Morris (2001) find in their study of Ghana that, on average, female farmers reported significantly fewer contacts with extension agents than male farmers; at the same time, they find that extension visits are a significant positive determinant of decision to adopt new technologies.

Doss and Morris (2001) argue, however, that the differential pattern of extension contact by gender may have less to do with gender per se and more to do with the fact that extension agents tend to approach farmers who are relatively better-off in terms of access to and/or endowments of land, labor, and capital (both human and financial), and who might already have a history of adopting technological innovations, given that these factors are often important for the decision to adopt new technologies. To the extent that women are under-represented among these better-off farmers, the more likely extension agents are to overlook them in their extension programs.

In addition, the standard extension models used to provide information and training on new technologies to farmers are often not explicitly designed to reach women. In recent years, however, many countries in sub-Saharan Africa have intensified their efforts to reach female farmers, oftentimes with success. For example, Due et al. (1997) find in Tanzania that the hiring of female extension officers contributed to increased extension contact with female farmers. Furthermore, they find that, with the hiring of female extension agents, male extension agents became more effective in reaching female farmers. The use of female extension agents might be particularly important in settings where cultural or social norms restrict the interaction of unrelated men and women.

Credit. The lack of credit also often acts as an important constraint to technology adoption for poor households, given that they may not be able to afford the investment costs associated with introducing a new technology and/or the often higher working capital requirements associated with its use. In many cases, the ability of the farmer to obtain (sufficient) credit depends on land tenure status and land size, as land often is the main collateralizable asset in the hands of farmers. To the extent that farmers have weaker land tenure rights or possess small or less-productive lands, obtaining credit, particularly from institutional sources, might be more difficult (or costlier). Careful studies of differential adoption rates owing to differential access to credit based on gender are largely unavailable. As Section 6 discusses, however, women are often more likely to be credit-constrained than men, which allows us to infer that the adoption rate among women is more likely to be lower as a result.

Effects of technology adoption on women's individual agricultural production

Several studies in sub-Saharan Africa find that women's individual agricultural productivity and control over resources and decision-making have declined as households have increasingly adopted new technologies and shifted to commercial crop production. For example, Kumar (1994) finds in Zambia that women either independently or jointly managed 60 percent of the area under local maize cultivation but only 25 percent of the area under hybrid maize cultivation, with women's involvement in decision-making related to agricultural production lower in households that adopted hybrid maize. Similarly, von Braun and Webb (1989) find that with the

introduction of new technologies for rice production in the Gambia, rice, which was traditionally a crop grown by women on their individual plots increasingly became a crop grown on communal plots under the authority of the (male) head of the extended household. Interestingly however, the shift was accompanied by an increase in cash crop (groundnut and cotton) production on female-controlled plots. Lilja and Sanders (1998) find in Mali that the introduction of cotton cultivation led to the reallocation of female labor from their individual plots to male-controlled communal plots, negatively impacting income under the control of women. Doss (2001) also discusses how work tasks and crops considered traditionally to be predominately “women’s” or predominately “men’s” have changed in large part due to the introduction of new agricultural technologies. Specifically, she discusses how more profitable agricultural activities and crops have shifted from female to male control.

Effect of technology adoption on women’s labor supply

The effect of adoption of commercial crops on women’s labor hours appears to be mixed. For example, consistent with a dominant income effect, Hallman and Hoque (2001) find in Bangladesh that women and men in adopting households observed an increase in leisure relative to women and men in non-adopting households. On the other hand, von Braun and Webb (1989) find in the Gambia that the adoption of new technologies led to increased work on communal plots for both men and women, with relatively larger increases for women than men. Similarly, Paolisso et al. (2002) find in Nepal that participation in a commercial vegetable and fruit production program lead to an increase in time allocated towards vegetable and fruit cultivation by both male- and female-heads. They find that this increase in labor hours did not come at the expense of leisure hours, but rather, at the expense of time allocated towards the care of young children.

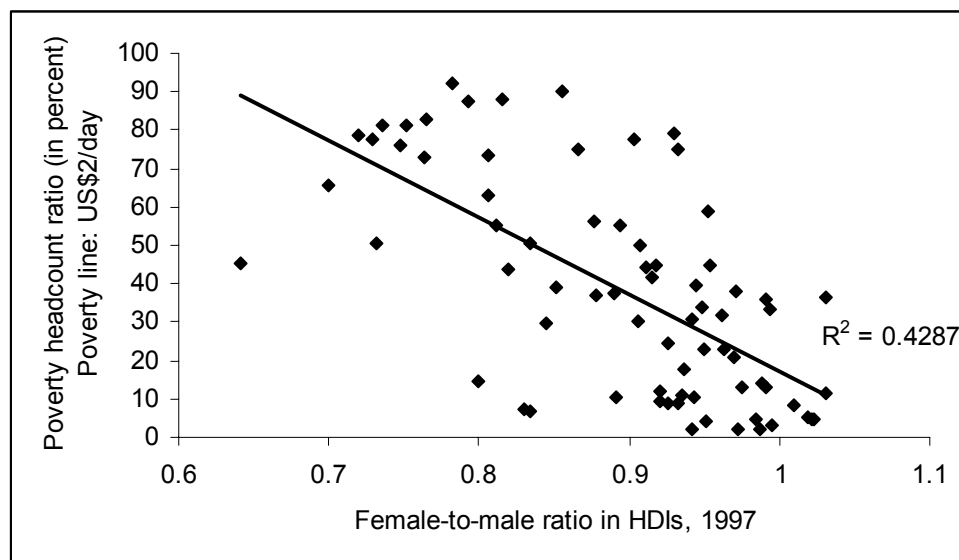
8. Gender equality and poverty: macro links

The preceding sections have examined the microeconomic evidence linking increases in gender equality to reductions in poverty and gains in productivity. We now turn to evidence of the macroeconomic links between gender equality and poverty (in this section) and growth (in the next section).

The relationship between the incidence of poverty and the level of gender equality as measured by various alternative indices suggests that developing countries with higher gender equality tend to have lower poverty rates. Figure 4 presents a scatter plot of poverty headcount ratio (U.S. \$2/day) and gender equality, as measured by the female-to-male ratio of sex-specific Human Development Indices for a set of 73 countries circa 1997. The inverse relationship between gender equality and poverty shown in this scatter plot is quite robust to other measures of poverty and other measures of gender equality.²¹ Bivariate correlations, of course, cannot establish causality.

²¹ The correlation coefficient in Figure 4 is -0.67 and is highly statistically significant. The gender-specific HDIs are calculated based on the UNDP’s formula for obtaining the total HDI using the gender-specific information for obtaining the GDI (see Klasen 2006 for details, as well for an explanation of why this HDI ratio is preferred to the

Figure 4. Poverty and gender equality



Note: Scatter plot for 73 developing countries. Poverty headcount ratio statistics are based on the international poverty line of \$2.16 per day (1993 PPP \$) and are obtained from the World Bank's World Development Indicators database. Male and female HDIs were calculated using data from the 1999 HDR statistical database. See Klasen (2006) for the formula used to obtain the gender-specific HDIs. When the poverty headcount ratio statistic for a given country is unavailable for 1997, the closest year to 1997 with available data (in the 1998-2003 period) is used.

Within countries, a comparison of poor and rich households measured using consumption expenditures shows that gender inequality in at least two key resources – education and health – are greater among the poor than among the rich. This correlation between household poverty and gender inequality has been found across the developing world (Filmer, 1999; World Bank, 2001; Strauss and Thomas, 1995).

Headship and household poverty

Because there are gender inequalities in resources, rights and voice, it is often expected that female-headed households are more likely to be poor than male-headed households (Buvinic and Gupta, 1997). However, the empirical evidence on this is mixed. Buvinic and Gupta (1997) review 61 studies on headship and poverty and find female-headed households to be

more commonly used UNDP Gender-related Development Index; UNDP, in its 2006 Human Development Report, proposed the use of gender-disaggregated HDIs to more accurately measure gender equality). As robustness checks, we examine the relationship between poverty and gender equality when gender equality is measured using the ratio of the gender-related development index to the human development index (the GDI-HDI ratio, another measure developed to replace the GDI as a measure of gender equality—see Klasen, 2006 for details) or the gender empowerment measure (the GEM) and when poverty is measured using the lower international poverty line of \$1.08 dollars per day (1993 PPP \$). When we do this, the relationship becomes weaker, with the correlation coefficient falling into the range of -0.34 to -0.55, but it remains consistently statistically significant. Note that the GEM as a measure of gender equality has serious weaknesses, limiting its usefulness in comparing gender equality across countries (see footnote 3 below and Klasen 2006 for a discussion).

disproportionately represented among the poor in only 38 cases. Quisumbing et al. (2001) find that the relationship between female headship and poverty is strong in only two out of ten countries they examine.

The ambiguous findings on the strength of the relationship between the gender of the household head and the household's poverty status can be attributed to at least two factors: (1) differences in how studies classify a household as a female-headed household and (2) substantial compositional heterogeneity among female-headed households.

It is not easy to define headship, and this might influence the comparisons of the incidence of poverty between male-headed and female-headed households. Studies apply a variety of techniques including definitions of headship used by national surveys, self-reported headship status by respondents in household surveys, and definitions based on contributions to household income (Rosenhouse, 1989; Kennedy and Haddad, 1994; Handa, 1993). Rosenhouse (1989), for example, applies the definition of the "working head", the household member most intensively engaged in income-generating activities. Studies from Brazil, Jamaica and Ghana suggest that female heads are usually the main workers or earners in their households, but the finding for male heads is less clear (Barros et al., 1997; Handa, 1993; Lloyd and Gage-Brandon, 1993). For example, Barros et al (1997) show in Brazil that both self-reported female and male heads are also the main income earners. Using data from Ghana, Lloyd and Gage-Brandon (1993) find that the correspondence between headship status and main worker status is stronger for female heads than male heads. Specifically, about 70 percent of female-heads aged 15-60 are sole or main workers in their households. In contrast, only 50 percent of male-heads are sole workers in their households.

There is also substantial heterogeneity among female headed households. Depending on the region, the population of female-headed households include elderly women, widows, divorced women, single women with children, and women whose husbands are migrants (Schultz 2001; Buvinic and Anriquez 2003). Some women in this population, such as the elderly and widows, are more vulnerable to falling into poverty than others such as women who receive remittances from migrant husbands.

Why might female-headed households might be more likely to be poor than male-headed households? Barros et al. (1997) examine three factors that could explain why consumption expenditures might be lower in a household: (1) few adults have positive income, (2) the labor income of earners is low, and (3) the dependency ratio is high. Their comparison of the relative contribution of each of these factors for female-headed versus male-headed households suggests that the low labor income of the main earners in the household is the primary reason why female-headed households are poorer. Simulations show that if the earners in female-headed households had the average incomes of earners in male-headed households, their average per capita expenditure would be higher than that of male-headed households. This is primarily because female-heads are more likely to participate in the labor market relative to male-heads.

Are female-headed households more likely to be chronically poor than male-headed households? The answer to this question will be determined by the differences in male-heads' and female-heads' ability to adopt risk prevention and risk-coping strategies. Lipton and Ravallion (1995)

note that “..an important way in which poverty is feminized is that male-dominated societies make the escape from poverty harder for women. This suggests that poverty is more likely to be chronic for women and transient for men” (Lipton and Ravallion, 1995, p. 2590). Empirical analysis of poverty dynamics shows that household head’s education, household demographics and average wealth are important determinants of chronic poverty (Jalan and Ravallion 1998; Baulch and Hoddinott 2000).²² Few studies of poverty dynamics and determinants of chronic poverty examine female-headed households separately from male-headed households, so it is difficult to generalize findings. To the extent that female household heads tend to have less education and their households contain a higher proportion of dependents, their households are more likely to be chronically poor than male headed households. Studies that include a dummy for sex of the household head among the determinants of chronic and transient poverty find some evidence that this variable matters in addition to human capital and average wealth of the household. For example, using panel data from Uganda, Lawson, McKay and Okidi (2006) find that female headship is associated with higher likelihood of being chronically poor.

9. Gender equality and economic growth

Theory and cross-country patterns

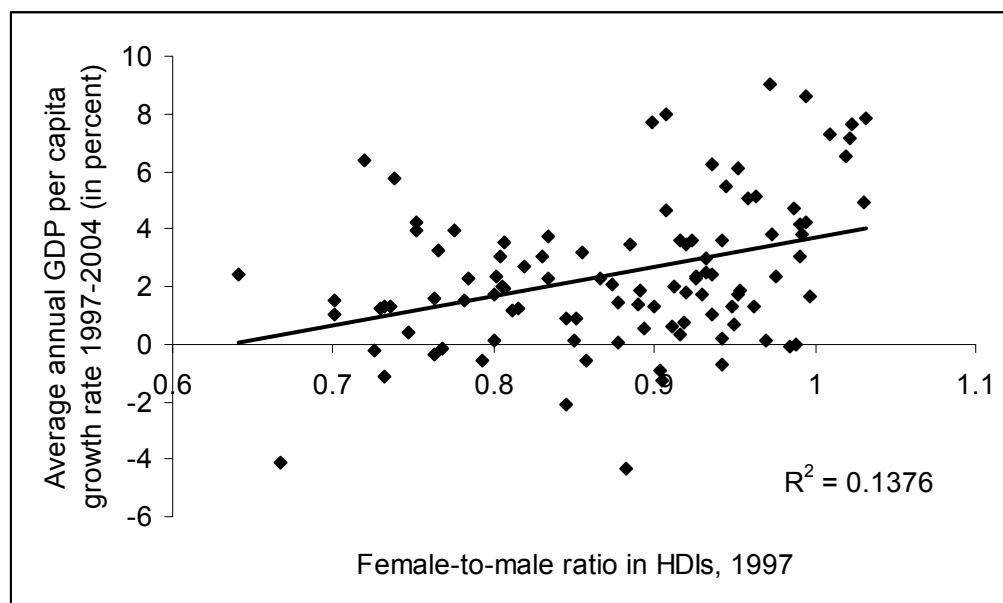
Gender equality potentially affects economic growth through various channels. A first potential link is via increased quality of human capital inputs, which is reflected in the increased productivity of labor and other complementary inputs to the production process. Many studies have noted that the marginal returns to schooling for women frequently exceed those for men (Schultz, 2002; DFID, 2007); this suggests that the growth impacts of education for girls may be greater than the impact for boys. A second potential link is via increased efficiency in the allocation of different inputs. If—as is likely—barriers to women’s employment in certain sectors or occupations prevent labor from being put to its most productive use, allocative inefficiency results. A similar inefficiency results if land, capital and other productive inputs are allocated on the basis of non-economic criteria that reflect culturally- or legally-sanctioned discrimination against women. A third link may between gender equality and growth may be via differential marginal propensities to save, although the empirical evidence on this score is relatively weak.²³ Seguino and Floro (2003) and Stotsky (2006) note that women may have greater incentives to save than men, reflecting: i) women’s role as “principal home builders” (Slotzky’s term); ii) the fact that men may have greater recourse to social insurance, thus reducing the need to save in order to smooth consumption expenditures; and iii) women’s stronger bequest motives and intergenerational altruism. Seguino and Floro (2003), in a cross-country panel study of semi-industrialized countries, find that an increase in women’s wage share relative to men is associated with increase in the domestic savings rate.

²² Barrientos, Hulme and Shepherd (2005) identify three main empirical approaches to measuring chronic poverty in literature: (i) the consumption shortfall approach of Jalan and Ravallion (1998) where a household is considered to be chronically poor if its constant or permanent consumption is at or below the poverty line; (ii) the duration approach where a chronically poor household is one whose per capita consumption is at or below the poverty line at each or most observation points (Baulch and Hoddinott 2000); (iii) the probability of deficient future consumption approach (Chaudhuri 2003).

²³ A recent review by Stotsky finds only four studies (Goetz and Gupta, 1996; Seguino and Floro, 2003; Floro, 2001; and Razavi, 1996); results are not consistent across all four studies.

Economic growth appears to be positively correlated with gender equality (Figure 5).²⁴ This latter finding is robust to changes in the length of the period over which per capita GDP growth rates are averaged and to one alternative measure of gender equality (the GDI-HDI ratio). When gender equality is measured by the gender empowerment measure (the GEM), however, the relationship is not statistically significant.²⁵

Figure 5: Per capita GDP growth rates and gender equality



Note: Scatter plot for 103 countries. The sample of countries is restricted to Bank client countries. GDP per capita growth rate statistics are obtained from the World Bank's World Development Indicators (WDI) database. Male and female HDIs were calculated using data from the 1999 HDR statistical database. See Klasen (2006) for the formula used to obtain the gender-specific HDIs.

In the remainder of this section, we summarize what is known about the link between gender equality under the law (rights), political voice, and access to and control over resources (opportunity), on the one hand, and rates of economic growth, on the other.

Gender equality under the law and growth

²⁴ The correlation coefficient is 0.35 and is highly statistically significant.

²⁵ In theory, the GEM—a measure of equality in agency—captures “women’s and men’s abilities to participate actively in economic and political life and their command over resources” (HDR 2006, p. 280). The three indicators on which the index is based are: (1) the male and female shares in parliamentary seats; (2) the male and female shares in administrative, professional, technical, and managerial occupations; and (3) male and female earned income levels. As a result of the way income disparities are incorporated in the index (levels instead of shares), a poor country is constrained to obtain a low GEM value, even if earned income shares are equal across genders. By the same token, a rich country with unequal earned income shares can obtain a high GEM value by virtue of its higher earned income. The GEM has been criticized because of this characteristic (HDR 2006).

Greater gender equality under the law, including legal rights of women to own assets such as land and property, the right to move freely outside the home and to participate in various markets, and women's rights within marriage might be expected to boost growth by increasing women's productivity. A growing body of literature, for example, rigorously documents the links between more secure property rights in general and increased investment, whether these rights are over land or housing (Goldstein and Udry, 2005; Besley, 1995). Especially given the well-documented biases against women of many traditional and customary forms of enforcing and transferring title to assets (Deininger et al., 2006; Khadiagala, 2001; Tripp, 2004; Deere and Leon, 2001), one might expect large returns in the form of increased output, productivity and incomes in response to more secure property rights for women. Unfortunately, apart from general documentation of the barriers encountered by women in securing property rights, there has been little research on the impact of improving women's property rights on productivity and output.

Similarly, research on mobility restrictions and female seclusion in India has not focused on identifying the productivity and growth impacts of these mobility restrictions, but rather has focused on the determinants of mobility restrictions and of labor force participation. Clearly, the relationship between mobility restrictions and women's employment is a complex one: on the one hand, increased demand for female labor may cause a loosening of mobility restrictions (Bardhan, 1974, cited in Rahman and Rao, 2004); on the other hand, mobility restrictions themselves limit female labor supply. Additionally, the cultural norms that support these mobility restrictions may also restrict demand for female labor. At the household level, female autonomy and ability to bargain for increased mobility may depend both on women's productivity and earnings outside the home, and on cultural norms which delimit permissible bargaining outcomes (Rahman and Rao, 2004).

A final element of gender equality under the law is the status of legislation regulating reproductive health generally and on fertility more specifically. Lower fertility is strongly associated with higher rates of female labor force participation, both within and across countries. Less clear is the link between legislation on reproductive health/reproductive rights and fertility rates.

In sum, there is little evidence documenting that increased gender equality under the law translates into more rapid economic growth. The reverse causal argument—that economic growth, with a concomitant increase in wealth and development of specialized markets leading to greater potential gains from human capital investment, makes restrictions of women's rights increasingly costly—has been used to explain the progressive expansion of women's rights in the United States in the 19th century (Geddes and Lueck, 2002). Dollar and Gatti (1999), however, found no relationship between increases in per capita GDP and an index of women's rights within marriage in a cross-country study of over 100 countries.

Gender equality of voice and growth

Greater gender equality of voice, in terms of ability to influence and contribute to the development process, can take place at two levels. The first is in the arena of participation in

political processes. This is commonly measured by the share of parliamentarians or ministers who are women. A second area is within the household, where the degree of women's bargaining power can influence household decisions and resource allocations.

In the area of political voice, there is no empirical evidence that increased female participation affects growth.²⁶ While some recent research, for example, documents that women elected to village councils in India have systematically different preferences about the types of public goods which should be provided than do men—women prefer to invest in water, fuel and roads, while men prefer to invest in education (Chattopadhyay and Duflo, 2004)—the consequences of these differential patterns of public investment for growth and poverty alleviation have not been explored.²⁷

At the household level, there is ample evidence of the impact of greater female bargaining power (proxied for by own-labor earnings or own-assets) translating into better health and nutritional outcomes for children. The impact of this type of voice is discussed later in the Section 9.

Gender equality of opportunity and growth

The effect on growth of increased gender equality of opportunity has received far more attention than either equality of voice or equality under the law. Equality of opportunity in education has received particular attention, for two simple reasons. First, education—and, more broadly human capital—is easily incorporated into two frequently-used econometric models of economic growth: the augmented Solow model and endogenous growth models.²⁸ Second, educational inequalities are both easily measurable and these measures are widely available.²⁹

The first generation of panel regression studies examining the relationship between gender-disaggregated measures of educational attainment and growth in per capita GDP find little difference between the effect of male and female education. Two well-known studies (Barro, 1991; Barro and Lee, 1994) even find that base-period female educational attainment is negatively related to subsequent rates of growth.

²⁶ The reverse causality—that growth may affect voice—was examined by Dollar and Gatti (1999), who, in a panel study of more than 100 countries, found a convex relationship between increases in per capita GDP and political voice. As countries move from low-income to middle-income, there is little increase in voice, but as income levels increase beyond middle-income, there is a rapid increase in political voice.

²⁷ In contrast, Ban and Rao (2006) find in South India that female leaders in village councils are no more likely than male leaders to make decisions in favor of women's concerns.

²⁸ In the original Solow model (and other neoclassical growth models), the long run rate of economic growth is exogenously determined by rates of technological change and labor force growth. Augmented Solow models add other exogenous determinants of growth rates. In contrast, endogenous growth models treat technological progress as an endogenous variable determined within the model. Feminist scholars have criticized the Solow model's assumption of the exogeneity of labor force growth, arguing that any growth of the labor force requires inputs from the reproductive sector, *i.e.*, households (Walters, 1995).

²⁹ Note that greater equality in educational opportunities does not map solely to equality of opportunity; it also facilitates exercising rights and voice.

More recent studies have addressed the econometric and specification problems in this first generation of studies, and typically find a larger impact of female education on growth than of male education on growth (Abu-Ghaida and Klasen, 2004). Dollar and Gatti (1999), for example, find that negative returns to female education disappear once regional dummy variables are included in the specification; they hypothesize that the earlier result was driven by the low growth and high educational for women that characterized Latin America for the period of the study.³⁰ Klasen (2002) estimates the effect of the gender gap in years of total schooling in the adult population on per capita income growth, using cross-country and panel regressions for the 1960-1992 period for 109 industrial and developing countries.³¹ He estimates both a structural model (which includes a direct impact of education on growth, an indirect effect via increased investment, an indirect effect via lower population growth, an indirect effect via the interaction of population growth and investment, an indirect effect via labor force growth, and an indirect effect via the interaction of labor force growth and investment) and a reduced form model. His findings are striking: the direct and indirect effects of gender inequality in educational attainment account for 0.95 percentage points of the 2.5 percentage point gap in growth rates between South Asia and East Asia, 0.56 percentage points of the 3.3 percentage point gap between sub-Saharan Africa and East Asia, and 0.85 percentage points of the 1.9 percentage point gap between the Middle East/North Africa and East Asia.

What is the intuition behind these results? Klasen (2002) argues that assuming that boys and girls have a similar distribution of innate abilities, gender inequality in education implies that less able boys will have access to education. If human capital is some combination of innate ability and education, this means that the overall level of human capital in society will be lower than it would be in the absence of gender inequality in education—and overall economic growth rates would suffer.^{32 33} A simulation assuming a 70-30 percent male-female split of those children receiving education—as opposed to a 50-50 percent split—leads to a decline of 12 percent in average human capital, assuming innate ability is normally distributed and assuming that 50 percent of all children go to school. Using the estimated relationship between human capital and GDP growth from a well-known panel study yields a 0.3 percentage point decline in annual growth (Klasen, 2002).

³⁰ See Knowles et al. (2002) and Lorgelly (2000) for careful reviews of this literature.

³¹ Klasen uses a variety of techniques to deal with potential simultaneity between economic growth rates and educational attainment, including instrumental variables and using only initial levels of educational attainment which are not affected by growth in the subsequent period.

³² Given Klasen's argument, raising the average level of human capital in society would at an extreme imply increasing gender equality in schooling by removing boys with lower innate abilities from the schooling system until the distributions of innate abilities of school-going children of both genders are equalized. Equalization can also come about by raising the ability cut-off for boys and reducing the ability cut-off for girls. The result of such a change on average human capital accumulation of children who attend school is however ambiguous.

³³ There are other, less direct links between female education and growth. Higher female education leads to better educational outcomes for children—this increase in human capital should increase worker productivity and promote economic growth in the future. Economic growth may also be boosted because more educated workers increase the returns to physical investment, which raises investment and hence growth. Finally, higher female education will result in lower fertility rates. Lower fertility, in turn, may stimulate growth by promoting capital deepening and by lowering the dependency ratio. A lower dependency ratio, in turn, will boost savings rates and per capita incomes (Klasen, 2002).

Growth regressions have serious limitations, and those that use gender-disaggregated data are no exception. One serious limitation is the ad hoc nature of extensions to the augmented Solow model. Variables have been added to capture economic openness, levels of government spending, political instability, ethnic diversity, and a host of other potential determinants of growth—frequently with little or no justification in economic theory. A second weakness is the problem of endogeneity: gender equality affects growth, but growth presumably also affects gender equality. Finding valid instrumental variables to correct for this endogeneity is challenging to say the least. Only one empirical paper employing growth regressions explicitly addresses this simultaneity by instrumenting. In a cross-country panel regression of over 100 countries for the 1975-1990 period, Dollar and Gatti (1999) find that increases in per capita income are associated with increases in gender equality along three dimensions: secondary attainment, wage gaps and women in parliament. The effect of income on gender equality becomes stronger as countries move from low-middle income to high income.

Inequalities in opportunities are not limited to education. Numerous studies document large gaps in wages or hourly earnings between men and women, even after controlling for education and other forms of human capital.³⁴ One explanation frequently given for these wage gaps is the occupational segregation of women into low-paying and precarious employment.

What are the impacts of wage/hourly earnings gaps and occupational segregation on growth? The allocation of talent and entrepreneurial skills to productive activities is a powerful source of growth; conversely, if this talent is dedicated to rent-seeking behavior, long-run growth will suffer (Murphy et al., 1991). An analogous argument can be applied to occupational segregation by gender: to the extent that the concentration of women in low productivity occupations is non-voluntary, the misallocation of talent may have large growth costs via efficiency losses.

Surprisingly, only one study has looked at the impact of occupational segregation on growth rates. Tzannatos (1999), using data from the 1980s, performs a simple simulation for 11 Latin American and Caribbean countries in which he calculates the impact on women's wages, men's wages and output of the elimination of occupational differentials within industries. While men's wages fall by between 6 and 13 percent, women's wages rise by significantly more: from 24 to 96 percent. Output increases range from 2 to 9 percent of GDP. Tzannatos interprets these impacts as what "can happen in the long run when: a) women and men are equally endowed with human capital; b) there is no employer discrimination; c) family constraints are no more binding upon women than men; and d) the gender specific effects of social norms and other institutional factors have withered away. (Tzannatos, 1999: 559)."

Gender wage gaps per se have an ambiguous relationship with growth rates. On the one hand, one analysis based on panel data found that gender wage inequality in export-oriented middle-income countries boosts economic growth presumably via its effect on firm profits and investment (Seguino, 2000). On the other hand, greater wage inequality may be associated with lower aggregate saving in these countries, which is likely to hamper long-run growth rates (Seguino and Floro, 2003). Both these results should be viewed as tentative and preliminary,

³⁴ Wage gaps are both an opportunity and an outcome measure. To the extent that they are signals from labor markets about returns to investment in human capital, they measure opportunities. To the extent that they are concrete labor market outcomes for women, they measure outcomes.

given that the robustness of these results has not been tested with other model specifications and a larger sample of countries.

In sum, the evidence linking greater gender equality in rights, voice and opportunity to more rapid growth at the cross-country level is not overwhelmingly strong. There are several cross-country growth regression studies that suggest that greater equality in access to education may pay growth dividends, but growth regressions suffer from several important weaknesses. Evidence for the impact of greater equality in labor markets is suggestive but far from conclusive. And evidence for the role of more equal rights and voice in generating more rapid economic growth simply does not exist.

Might there be indirect effects of gender equality on growth that are transmitted via the impact of gender equality on poverty alleviation? A recent World Bank report (Perry et al., 2006) enumerated the channels by which poverty impedes growth. Some of these channels with important gender elements include:

- “Poor people often have limited access to financial markets or other necessary complements to private investment (such as property rights and infrastructure) essential to the accumulation of physical and knowledge capital and participation in the growth process.
- Poor people are often in poor health, which reduces their productivity...
- Poor people attend low-quality schools and the low and late returns to education and diminished prospects for mobility deter the accumulation of human capital essential for growth...
- Poor people may face more labor market risk, or may be less able to hedge against it, and thus find returns to investing in human capital adjusted for risk to be less attractive...”

To the extent that gender inequalities reinforce the human capital disadvantages of poor women, it is likely that they also hinder growth—but this hypothesis remains to be tested empirically.

10. Gaps in knowledge and promising areas for future research

This paper has attempted to distill the state of knowledge about the links between gender equality, on the one hand, and poverty reduction and economic growth on the other. The relationships are far from simple, and our knowledge is far from complete.

At the macro level, there has been significant work done exploring the links between gender equality and economic growth. The simple scatter plots presented in this paper hint at a positive relationship, as do (somewhat) more sophisticated cross-country regressions. Yet there is abundant reason to be skeptical of these results: one should never take simple correlations very seriously, and cross country regressions are plagued by a number of shortcomings that are described above in some detail. When we disaggregate gender equality into its components of rights, resources and voice, we find surprisingly little evidence—indeed, surprisingly little research at all—that specifically models or measures the impact of greater gender equality on

economic growth. Especially lacking is work on the impact of equality in rights and voice on growth.

With regard to the macro level links between gender equality and poverty reduction, the macro correlations are stronger than those for gender equality and growth and more robust to different measures of gender equality, but the same caveat applies: cross country correlations simply are not very enlightening. Here, not surprisingly given the easier applicability of the concept of poverty at the micro (household) level, there is more micro research buttressing this link. Ample evidence suggests that greater gender equality in resources such as education and access to employment can reduce the likelihood of a household being poor. Female labor force participation, in particular, has been shown to play a key role in cushioning households from the impact of macroeconomic shocks and keeping households from falling into poverty.

There is also a voluminous literature on the links between female-headship and poverty—a literature which is far too voluminous to summarize in the confines of this section. Suffice to say that female headship is statistically associated with household poverty in some countries, but not in others. A far more interesting question is whether, in Lipton and Ravallion's (1995) words, "poverty is more likely to be chronic for women and transient for men." There have been relatively few carefully done studies which look at the gender aspects of poverty dynamics, but a few studies have documented that female-headed households are more likely to be chronically poor. For policy, of course, the key question is why female-headed households are more likely to be chronically poor. Is it because women have more limited access to decently-paid employment, or because limited access to complementary inputs limits their productivity (and hence earnings) in self-employment? Or is it for the far more simple explanation that female-headed households are far more likely to have fewer adult potential earners, and thus less of a probability of encountering work that permits the household to escape poverty? We return to some of these questions below.

Before turning to the micro-foundations of gender equality in key markets, it is worthwhile to take stock. Where is more research needed on the macro links between gender equality, poverty and growth? For all the reasons discussed above, correlations and cross-country regressions do not seem the way forward. One promising one promising approach is to use micro-simulations, as recently used by Ferreira (2005) for Brazil and Orlando et al. (2006) for Chile. In the latter study, Orlando et al. simulates the impact of increased female labor force participation on rates of household poverty, endogenizing wages as a function of labor force participation rates. Microsimulations for a given country have the added advantage of generating estimates that are tailored to a given economy, rather than importing coefficients generated by a cross-sectional or panel regression with a number of countries.

Much of this paper has been devoted to a detailed discussion of conditions in labor, land, credit and technology markets, and to documenting the state of economic research on the barriers women potentially face in these markets. In labor markets, barriers frequently identified include the time burden associated with child-rearing and other domestic tasks, low educational levels vis-a-vis men (only in some regions of the developing world) that make women less competitive for quality jobs, the role of existing wage male-female wage gaps in generating an "under-investment" in female education and lower female labor force participation rates than would be

the case in the absence of such wage gaps, and the role of law and custom in shaping women's labor force participation decisions. More research is urgently needed in almost all of these areas. With respect to the time burden of domestic tasks, the most immediately policy-relevant work is on the impact of the provision of time-burden-reducing public goods (such as standpipes in the African context) on the labor force participation of women. Experimental design of project interventions would help in this regard. Research on the impact of wage gaps on parents' human capital investments in girls and boys suffers from a host of conceptual and empirical challenges—but these challenges are worthy of our attention.

The existing research on credit markets in developing countries—admittedly scarce—suggests that by and large women receive unfavorable treatment not because of discriminatory treatment per se, but rather because of gender differences in individual characteristics that are relevant for loan qualification (e.g., holding land title). The first priority is thus to expand the body of research to determine whether this initial conclusion holds up to additional research.

What current research does show is that women are less likely to apply for loans than are men. More research is needed on this topic in order to identify, for particular countries or regions, the reasons for women's non-participation in credit markets. As noted in the text above, non-participation can arise for two reasons: women might want a loan but may not satisfy the loan eligibility criteria or women may meet the loan eligibility criteria but they have no need for a loan. If women systematically are disadvantaged with respect to men in terms of satisfying loan eligibility criteria, research should focus on identifying the relative importance of these unsatisfied criteria as a way of prioritizing policy interventions.

There is a rich and unexplored territory in research on gender equality and land markets. As noted in the text, data on landholdings disaggregated by sex are woefully lacking in many regions of the world; this information is a sine qua non for intelligent policy making in this area. Other policy-relevant research should focus on the impact of secure tenure on time use (and in particular, on female labor force participation). As many countries move from customary forms of land holding to more market-based systems, the impact of this change for both men and women must be explored—to the extent possible, ex ante.

With respect to the adoption of agriculture technology, the research priority is to “open-up the household”, much as has been done in intra-household models of resource allocation. Most models of technological adoption continue to use unitary household models; gender, if considered at all, is introduced via a dummy for female-headed households. By simplifying the issue in this way, interesting intra-household bargaining processes are (unrealistically, we think) assumed away. While intra-household models can be used to examine the determinants of adoption, they can also be used to explore its consequences. How does adoption influence the control over resources and a series of related household outcomes such as children's health and education?

This paper has attempted to show that there are a host of interesting issues related to gender equality, poverty reduction and growth. For some of these issues, the accumulated body of research is impressive; for others it is scant indeed. Surprisingly, there are many areas of crucial importance to policy (such as gender issues in the functioning of credit and land markets) where

quite basic questions remained to be answered. Our hope is that this paper will serve as a catalyst to stimulate research in these areas.

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