

Does Gender Inequality Hinder Development and Economic Growth?

Evidence and Policy Implications

Oriana Bandiera

Ashwini Natraj

The World Bank
Development Economics Vice Presidency
Partnerships, Capacity Building Unit
February 2013



Abstract

Does the existing evidence support policies that foster growth by reducing gender inequality? The authors argue that the evidence based on differences across countries is of limited use for policy design because it does not identify the causal link from inequality to growth. This, however does not imply that inequality-reducing policies

are ineffective. In other words, the lack of evidence of a causal link is not in itself evidence that the causal link does not exist. Detailed micro studies that shed light on the mechanisms through which gender inequality affects development and growth are needed to inform the design of effective policies.

This paper is a product of the Partnerships, Capacity Building Unit, Development Economics Vice Presidency. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at O.Bandiera@lse.ac.uk.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

**Does Gender Inequality Hinder Development and Economic Growth? Evidence and Policy
Implications**

Oriana Bandiera¹ and Ashwini Natraj²

JEL codes: O40, J16, O15

¹ London School of Economics
² London School of Economics

1. Introduction

Gender inequality has been at the core of the policy debate concerning development for the past few decades. This policy concern has been matched by an equal level of scholarly interest, which has produced a large body of research intended to show that reducing gender inequality leads to development for individual women and for women in general. This evidence has been used to provide support for inequality-reducing policies as a valid and effective tool to directly and indirectly promote development.

In this paper, we review the existing evidence from cross-country studies of inequality-reducing policies to assess whether and how this evidence can be used to inform policy. Our analysis shows that, although it is helpful to identify and understand aggregate patterns, evidence from cross-country studies is of limited use for policy design.

Cross-country research designs have three features that limit their value and use for policy implications. First, the direction of causality has not been identified. For example, the fact that the gender gap in education is lower in richer countries is consistent with both equality fostering development and development fostering equality. Distinguishing between these alternative interpretations is central to effective policy because policies that promote gender equality do not foster development unless causality runs from equality to development rather than vice versa.

Second, cross-country studies are typically silent on the mechanisms that drive or affect the relationship between gender inequality and development, and identifying these mechanisms is critical for the design of more effective policies. For instance, whether a policy that promotes girls' schooling (e.g., with conditional cash transfers) directly fosters development through an increase in women's labor force participation depends on the reason girls' education was at a low level in the first place. If this situation is driven by social norms that limit women's participation in the labor market and hence also limit or reduce girls' return to schooling, exogenously increasing girls' return to schooling will not increase labor market participation and development or economic growth. An understanding of the values, social norms, and other mechanisms involved in the relationship between gender

equality and development is crucial to external validity, particularly to ensure that policies are effective in various contexts.

Third, most of the literature focuses on the effect of inequality on individual outcomes, such as schooling, rather than the effect of laws and institutions that generate disparities between the genders, such as laws that grant better property rights to men compared with women. This distinction has important policy implications because policies related to gender equality may affect laws and institutions directly, whereas these policies may only indirectly influence some of the determinants of individual outcomes.

It is important to clarify that although the macrolevel evidence cannot be used to justify inequality-reducing policies, it also cannot be used to argue that these policies are ineffective. In other words, the lack of evidence of a causal link is not in itself evidence that the causal link does not exist. Rather, we suggest that more detailed microlevel studies that shed light on the mechanisms through which gender inequality affects development are needed to inform the design of effective policies.

This paper is organized in five sections. The next section reviews the cross-country evidence on the link between different measures of inequality and development. Section 3 discusses the three main weaknesses of cross-country research and their implications for policy design. Section 4 presents the most recent statistics on gender inequality in education, health, labor force participation, and political participation to assess the validity of the predictions based on evidence from the cross-country literature within the past two decades. We illustrate the sensitivity of cross-country estimates to theory-based specifications and sample selection. We also show that although the gender-education gap has closed, the channels through which it was intended to increase income or other forms of economic growth (such as women's labor force participation and the average level of human capital) have largely failed. Section 5 concludes by discussing the possible reasons for low levels of women's representation in economic and political life, especially at the highest levels, in developed and developing countries. We suggest questions that future researchers must address to design effective policies that eliminate the root causes of gender inequality.

2. Evidence from cross-country studies

The macroeconomics literature on gender inequality and development has grown rapidly since the early 1990s, when cross-country income data for a large sample of developed and developing countries became available. The papers reviewed in this section identify the effect of gender inequality on both development and economic growth using cross-country (or, sometimes, cross-country and cross-time) variations in gender inequality. The following subsections summarize findings from a large body of literature that aims to identify the effect of gender inequality on educational attainment and economic outcomes for both development and economic growth.

2.1. Inequality in educational attainment

The seminal paper by Mankiw et al. (1992) highlights the cross-country correlation between human capital (measured by educational attainment), income, and growth. As a natural follow-up to this analysis, subsequent papers have attempted to separate the effect of male as compared with female educational attainment and to provide evidence on the relationship between gender inequality in schooling and economic growth.

Hill and King's (1993) study is among the first to estimate the correlation between female education and the gender gap in primary and secondary enrollment on GDP per capita between 1975 and 1985. The estimated correlation is statistically and economically significant. Controlling for capital stock, the level of female education and the size of the labor force, countries with a female/male enrollment ratio lower than 0.75 have up to 25 percent lower GNP compared with similar countries with a lower level of gender inequality.

Knowles et al. (2002) is one of the few cross-country studies to estimate theory-based specifications. Following Mankiw et al. (1992), the authors augment the Solow model to incorporate female and male human capital separately and to estimate the effect of these types of human capital and of the gender gap on the steady-state level of income using long averages between 1960 and 1990. Their findings indicate a negative correlation between the size of the gap and income: controlling for male educational attainment, a lower level of female educational attainment is associated with lower steady-state income.

In line with the cross-country growth regression boom of the 1990s, most studies estimate the relationship between gender inequality in education and the growth rather than the

level of income. The first estimates by Barro and Lee (1994) began a heated debate by identifying a positive relationship between gender inequality and economic growth. The authors estimate economic growth equations in a cross-section of 116 countries for the 1965–75 and 1975–85 periods and find that although male secondary-school attainment (defined as the fraction of the over-25 male population for whom some secondary school is the highest level of education) is positively correlated with economic growth, the correlation between female secondary-school attainment and economic growth is negative.

The relationship between gender inequality and economic growth has been subjected to further scrutiny using different samples and theory-based specifications, leading to diverse findings. Dollar and Gatti (1999) estimate five-year economic growth rates between 1975 and 1990 in a panel of 127 countries. In contrast to Barro and Lee (1994), they find a positive correlation between the growth of per-capita income and the initial level of female secondary school attainment, controlling for male secondary-school attainment.

Klasen (1999, 2002) estimates the determinants of long-run growth rates between 1960 and 1992 using a cross-section of 105 countries. He finds that both the initial female-male ratio and the growth rate of this ratio for completed years of schooling are positively correlated with economic growth. The effects are significant; Klasen suggests that 0.4 and 0.9 percentage points of the difference in annual per-capita income growth between East Asia and sub-Saharan Africa, South Asia, and the Middle East can be explained by gender differentials in education in these regions. Extending the sample to 2000, Klasen and Lamanna (2009) find very similar results.

2.2 Gender Inequality in Economic Outcomes

The second strand of the literature aims to identify the link between gender inequality in economic outcomes and economic growth. Studies use different measures of economic inequality, including gender gaps in labor force participation, occupational structure, and wages.

Tzannatos (1999) documents the evolution of female labor force participation, employment segregation, and wage gaps across the developing world to the late 1980s. He computes the efficiency loss due to inequalities and finds that eliminating occupational or employment

segregation would significantly reduce the wage gap and increase total GDP. In contrast, Seguino (2000) finds that in semi-industrialized export-oriented economies where women provide most of the labor in traded goods, larger gender-wage gaps were associated with faster GDP growth through cheaper exports during 1975–95.

Cavalcanti and Tavares (2007) estimate a model with wage discrimination in which savings, fertility and labor-market participation are endogenously determined and calibrate this model to the U.S. economy. They then calculate the “output loss” for a cross-section of countries and find that an increase of 50 percent in the gender-wage gap leads to a per capita decrease in income of 25 percent. Finally, Klasen and Lamanna (2009) find a negative relationship between gender gaps in labor force participation and economic growth using cross-country growth regressions for 1960–90.

3. Policy implications of cross-country evidence

Although the balance of evidence suggests that gender disparities in educational and economic outcomes are negatively related to development and growth, this finding is of limited use to policy unless it can be proved that the link is causal and that reduced inequality determines an increase in growth rates. This section discusses three weaknesses of the cross-country research design and argues that cross-country regressions cannot provide causal evidence and hence cannot support the claim that policies aimed at reducing gender inequality promote economic growth.

To identify the effect of gender inequality on economic growth, cross-country growth regressions analyze the observed variation in gender inequality and economic growth across countries or, in the case of panel regressions, across both countries and time. To determine whether the estimates can be interpreted as the causal effect of gender inequality on economic growth, it is essential to understand why we observe variation in gender inequality across countries (and time) and whether the source of this variation is independent of or exogenous to economic growth. Below, we review evidence suggesting that cross-country data fail to meet this requirement. All of the observed variation in gender inequality is likely to be endogenous to growth because it directly affects gender disparities (i.e., an issue of reverse causality) or because gender inequality is correlated with other factors that affect economic growth (i.e., an issue of omitted variables). Reverse causality

and omitted variables are the two main weaknesses faced by cross-country research designs attempting to establish causality. However, causality is a necessary condition for inequality-reducing policies to promote economic growth. Even if researchers were able to establish the existence of a causal link between gender inequality and economic growth in a given sample, it is difficult to extrapolate to other samples if we do not know the social/cultural mechanisms through which this link operates. The issue of external validity is the third weakness of cross-country research designs. We will show that even the basic correlations are not robust or resistant to changes in the sample of countries or in time periods, and they vary erratically depending on the source of variation used.

3.1 Reverse Causality

The first weakness of cross-country research designs is that cross-country variation in gender inequality may be generated by cross-country differences in economic growth. In other words, different countries might exhibit different levels of gender inequality *because* they are at different stages of development. Economic theory has highlighted several reasons why development might reduce gender disparities. First, the process of development is associated with technological advances that reduce the value of men's comparative advantage in physical strength, thereby raising the returns to women's education and labor-market participation. The idea that technology determines gender roles is supported, for example, by Alesina et al.'s (2010) analysis of the relationship between historical agricultural techniques and contemporaneous gender disparities. These authors show that countries whose geographical characteristics allowed the use of the plough and whose operation required men's levels of physical strength tolerated a more unequal division of labor across genders as well as social norms that discriminate between genders.

The process of development is also associated with changes in relative prices that affect returns to women's education and labor force participation. Two recent microlevel studies lend support to this idea. Munshi and Rosenzweig (2006) examine the impact of gender-based division of labor in India on the returns to (specifically) English-language education and find that women benefit disproportionately because men already participate in lower-skilled sectors owing to caste networks and are channeled or directed into instruction in the vernacular language. Because women are not required to maintain these male networks

and therefore do not participate in the male labor market, they can take advantage of these new opportunities by switching to English-language education.

In the second study, Qian (2008) analyzes exogenous variation in agricultural income caused by post-Mao reforms leading to increased returns to cash crops. She finds that an increase in the income of female relatives led to an increase of the female survival rate as well as an increase in both male and female educational attainment in tea-producing areas, where women had a comparative advantage in production because of their smaller builds.

Conversely, the educational attainment and survival rates of females were lower in regions where orchards predominated and where men had a comparative advantage in production.

The process of development may also lead to the adoption of institutions that favor gender equality. Three recent papers model women's enfranchisement and the introduction of women's property rights. Bertocchi (2008) argues that development reduces men's cost to enfranchise women and eventually leads to the same political rights for women and men. In her model, women's franchise is costly to men because women are poorer and hence prefer higher taxes and more income redistribution. As industrialization raises the rewards of mental labor relative to physical labor, the relative wage of women increases, and their preferences for redistribution converge with those of men. Doepke and Tertilt (2010) study men's incentives to grant women legal rights before enfranchisement. They argue that men face a tradeoff between giving no rights—and hence no bargaining power—to their wives and increasing other women's rights. Men prefer women other than their wives to have rights because an expansion of women's rights increases educational investments in children. As technological change increases the importance of human capital, the latter effect prevails, and men voluntarily grant legal rights to women. Fernandez (2010) proposes another channel through which development promotes the adoption of women's property rights. Her model is based on the concept that men have conflicting interests as fathers and husbands; as fathers, they want their daughters to have property rights over their inheritance, but as husbands, they prefer their wives not to have property rights. As development brings more wealth, fathers' inability to share this wealth with their daughters dominates over husbands' desire to control the property of their wives, and women are granted property rights.

The prospect that development might lead to gender equality rather than vice versa is generally acknowledged in the macroeconomics literature. Some studies have attempted to estimate the causal effect of development on gender inequality using theory-based specifications similar to those used to estimate the causal effect of gender inequality on development. For instance, Easterly (1999) shows that a negative cross-country correlation exists between income and gender inequality in education, but there is no correlation within countries. In other words, richer countries are more equal, but as a given country becomes richer, gender gaps do not close. The fact that two different sources of variation provide different answers suggests that the causal relationship between gender inequality and economic growth, if any, is not stable across countries and time. We will return to this issue in section 3.3.

All of the cross-country studies that acknowledge reverse causality address this issue by using instrumental variables. The logic behind instrumental variables is the core of the reverse-causality problem. The problem arises because the observed variation in gender inequality is at least partially determined by variation in development. A good instrumental variable is capable of distinguishing the part of the observed variation in gender inequality that is not correlated with development.

Although the logic is impeccable, valid instrumental variables are difficult to find because most macroeconomic variables that predict gender inequality are also correlated with economic growth. Dollar and Gatti (1999) used two instrumental variables that would theoretically enable them to compare the secondary-school attainment of men within the fraction of the population professing a religious affiliation with the secondary-school attainment of women and their score on the Gastil Civil Liberties Index. However, the fact that both religion and civil liberties may directly affect development makes them invalid as instrumental variables. The correlation between religion and economic growth has been highlighted in several macrolevel contributions, such as Barro and McCleary (2003), Cavalcanti et al. (2007), and Guiso et al. (2003).^{1, 2}

How can causality be assessed with macrodata? Taking theory seriously and calibrating a model that encompasses both directions of causality can help us attempt to establish which direction of causality explains most of the cross-country variation. The weakness of this

approach is that its validity relies entirely on the validity of the model, which cannot be tested. Using this approach, Bils and Klenow (2000) show that the causality from growth to schooling explains more than half the observed cross-country relationship between schooling and growth. To the best of our knowledge, an equivalent exercise on gender inequality and growth has not been attempted, but this exercise would be very informative.

3.2 Omitted Variables

Another problematic source of variation in gender inequality is variation driven by or correlated with the variation of other variables that directly affect economic growth. If these variables are omitted when estimating the relationship between gender inequality and economic growth, the estimated coefficient of inequality “picks up” the effect of all the omitted variables and may be severely overstated.

Economic theory and the microlevel evidence suggest several troublesome candidates, such as health status, which can affect both gender inequality and economic growth.

Two recent randomized-control trials (Kremer and Miguel 2004, Maluccio et al 2009), both evaluating treatments (i.e., deworming and nutritional supplements) that exogenously increase the health of children, show that these treatments have a stronger impact on the schooling outcomes of girls than of boys. Pitt et al. (2010) develop a model based on the biological fact that improvements in health increase the physical strength of men more than that of women. In an economy where most activities require brawn, health improvements increase the returns to brawn for men and the returns to intellectual or non-brawn-based skills for women. Consequently, the returns to schooling increase for women but decrease for men, closing the gender gap in education. The predictions of the model are consistent with the evolution of male and female schooling and wages in Bangladesh during the last 25 years.

Reductions in maternal mortality are also likely to close the gender gap while simultaneously directly affecting economic growth. Jayachandran and Lleras-Muney (2009) show that girls’ education in Sri Lanka increased sharply after a sudden increase in life expectancy due to a 70 percent drop in maternal mortality in the late 1940s.

Taken together, these studies indicate that changes in the gender gap may be generated by a third variable, such as health status, that may have a direct and independent effect on economic growth. Therefore, the estimated coefficient of gender inequality on economic growth is biased because it captures both its own effect and the effect of health status, with which it is correlated.

The cross-country literature shows that gender inequality is correlated with several other determinants of economic growth, including fertility, health, savings, trade liberalization, and “good institutions.”³

In contrast with the reverse-causality problem discussed in section 3.1, in principle, the bias due to omitted variables can be eliminated by including all relevant variables in the analysis. In practice, however, this approach is unfeasible because standard cross-country data sets do not contain information on most of the relevant omitted variables. Moreover, because each country is an observation, adding several controls quickly exhausts the available degrees of freedom. Finally, to estimate the effect of gender inequality and its correlates separately, one must observe a sufficient amount of independent variation in the two variables. This method is not available for the most important omitted variables, namely, those that are strongly correlated with gender inequality.

Short of creating exogenous shocks to determinants of gender inequality or analyzing exogenous variation created by natural experiments, such as the spike in female labor force participation during WWII used by Fernandez et al. (2004), the estimated coefficient of gender inequality in cross-country regressions inevitably captures the effect of other determinants of economic growth. Therefore, its use as a policy parameter is limited because reducing inequality does not lead to the desired increase in economic growth if the other determinants are not changed at the same time.

3.3. Mechanisms and External Validity

A crucial but often implicit assumption made by most cross-country studies is that the relationship between gender inequality and economic growth is the same across countries and across time periods. Thus, the variation in inequality and economic growth across all available countries and time periods is used to estimate one universal coefficient that is

supposed to capture the causal effect of inequality on economic growth across time and space.

If this parameter existed, it would indeed be very useful for policy purposes. Unfortunately, even if we abstract from the issues of reverse causality and omitted variables discussed in sections 3.1 and 3.2 and somehow manage to use cross-country data to estimate the causal relationship between gender inequality and economic growth in a sample of countries for a given time period, this method would be of limited use if we were unable to show that the same causal relationship would hold in other samples. Specifically, internal validity, the fact that the estimate captures a causal link, does not guarantee external validity.

In fact, the cross-country literature offers evidence to support the fact that the estimated relationship between gender inequality and economic growth varies across countries and time periods, making external validity a primary concern.

The best-known example comes from the debate that originated from Barro and Lee's (1994) finding that female education has a negative effect on economic growth. Shortly after, Caselli et al. (1996) showed that the inclusion of country-fixed effects reversed the result; they analyzed the variation within countries instead of across countries and found that female education was positively and significantly correlated with economic growth. Similarly, Dollar and Gatti (1999) showed that the inclusion of regional (instead of country) dummies produced opposite results. Knowles et al. (2002) provide a full account of the different correlations found using different sources of variation across countries and time. The clear message that emerges from this debate is that if there is a correlation between gender inequality in education and economic growth, its sign and magnitude vary considerably across countries and time.⁴

A lack of theory is at the core of the external validity problem. Most cross-country research designs aim to estimate the relationship between gender inequality and economic growth without attempting to provide evidence on the mechanism that links these two elements. Without this evidence, it is impossible to consider whether a similar mechanism could operate in other settings or to identify the settings in which it is more likely to operate so that the estimates obtained in one context can be "exported" to another. Without exportability, even the cleanest causal estimate is of very limited use.

4. Gender Inequality and Development Today

With a few exceptions, most of the cross-country literature reviewed in section 2 uses data on gender inequality that date back at least 10 years. This lack of recent data has occurred because the topic has been at the heart of the policy debate for decades, so academic researchers have been accumulating evidence since the late 1980s. Another contributing factor is that cross-country growth regressions analyze economic growth over long periods of time, typically since the 1960s or 1970s, and gender inequality must be measured at the beginning of the period to study its role as a determinant of economic growth.

The 2012 World Development Report presents a detailed account of the state of gender inequality today. Strikingly, health and education gaps have substantially narrowed and, in most cases, have closed altogether. However, these improvements have not been accompanied by economic and political parity or equality. This finding suggests that different policies are needed to promote economic and political parity indicative of the process of development, at least as it has been observed in today's richest nations, because previous gender-equality policies have not automatically produced this parity.⁵

In this section, we provide evidence on the state of gender-education gaps that have been the focus of most of the macroeconomics literature. The main purpose of this section is to illustrate the sensitivity of cross-country estimates to the choice of theory-related specification and of the sample. Readers interested in exploring gaps in other dimensions are referred to the World Bank's 2012 World Development Report.

Figures 1 and 2 review two measures of the education gap: the female/male literacy ratio and the female/male secondary-education attainment for people over the age of 25. Both measures indicate that gender inequality in education had almost disappeared as of 2010. The median female-male literacy ratio was 0.99; over half of the sample countries had achieved gender parity, and only a handful had ratios below 0.80. The median of the female-male secondary-education attainment ratio was 0.93, and the ratio was one to one or higher in over half the sample countries, indicating that women had higher attainment than men.

In line with much of the previous cross-country literature, figures 1 and 2 also reveal that the correlation between gender inequality and GDP is negative and is precisely estimated at conventional levels. A closer inspection of the scatter plots, however, illustrates the perils of relying on cross-country variation to estimate the effect of gender inequality on GDP. The case is similar for both measures, but it is starker for the literacy ratio. First, the correlation is driven by the handful of observations below one; for over 60 percent of the sample, there is no meaningful variation in gender inequality and hence no possible causal mechanism from inequality to development. Second, the large set of countries that have achieved gender parity is located at every point of the development spectrum, from Botswana to the United States. In other words, gender inequality is only found in poor countries today, but many countries remain poor despite having achieved gender equality.

5. Policy Implications and Open Questions

The discrepancy among different dimensions of gender inequality has important implications for the link between gender inequality and development. A common claim that underpins the causal interpretation of the inequality-development link is that gender inequality leads to a less-educated workforce and to the misallocation of talent, which, in turn, reduce income and economic growth. The first link is mechanical, and the second is based on the assumption that talent is sufficiently equally distributed across genders. Together, they limit the educational achievement of half of the population and mechanically reduce the pool of talent. However, both links presuppose that, if equally educated, women will join the labor force and have access to the same opportunities as men. The fact that they do not disrupts the crucial mechanisms that are supposed to link gender equality in educational attainment to development and economic growth.

What breaks the link between equality in educational attainment and equality in economic and political representation or participation? One possibility is that although female schooling is acceptable, social customs and institutions effectively limit or prevent women's access to most economic and political opportunities. In an influential set of papers, Fernandez et al. (2004), Fernandez and Fogli (2005), and Fernandez (2010) show that culture is an important determinant of female labor-force participation. To identify the effect of culture, they analyze the fact that migrants to the United States or their parents

are exposed to different levels of female labor-force participation than in their country of origin. This situation has strong predictive power for female labor-force participation in the United States and for men's acceptance of this participation.

Cross-country analyses are challenging because comparable and meaningful measures of customs and institutions are difficult to find. Following the recent practice in cross-country studies (e.g., Branisa et al. 2009), we now describe customs and institutions that relate to gender inequality using the OECD gender-linked institution and development database.

Figure 3 illustrates considerable variation in "discriminatory practices" across the sample countries. Some of the components of this index, such as restrictions on freedom of movement, have clear implications for women's participation in economic and political life. The correlation between the incidence of discriminatory practices and GDP is negative and precisely estimated, with the usual caveat that causality is impossible to establish. A recent paper by Field et al. (2010) provides some microlevel evidence for the effect of social norms on returns to human capital. The authors design and implement a field experiment in which a random selection of poor, self-employed women is provided with lessons on financial literacy and investments. In their sample, Muslim women face the most social restrictions on mobility, followed by Hindu upper classes and Hindu scheduled castes, although the difference between the first two is four times as large as the difference between the last two. They find evidence suggesting that social restrictions on mobility reduce returns to financial training because treated upper-caste Hindu women are most likely to take out loans (13 percentage points) and are significantly more likely to funnel loans into their own microenterprises and to discuss business plans with their families. Although this situation suggests that social norms slow women's economic participation, the three groups differ along other characteristics that might correlate with business decisions. Additional studies on this subject are needed to consolidate the findings.

Next, we move from social norms to institutions. Figure 4 describes the variation in a composite index of various women's property and inheritance rights. Interestingly, the cross-country distribution is bimodal, suggesting that rights are correlated or bundled within countries. These rights are directly linked to women's economic opportunities, and institutions that discriminate against women are likely to reduce returns to female

education because they restrict investment opportunities. As expected, the correlation between female property rights and GDP is positive and precisely estimated. As discussed in section 3, however, theory suggests several reasons why causality might run from GDP to property-rights parity. Credible recent microlevel evidence indicates that, at least in some settings, inequality in property rights reduces economic efficiency. Goldstein and Udry (2008) show that weak property rights for women reduce output in Ghana. In their setting, the security of land tenure derives from individuals in positions of power in the region. Because women are invariably less likely to be central to the local power structure, their land tenure is less secure, and they invest less in land fertility, fallow their land less, and have lower land productivity and lower output.

What lies ahead? Systematic microlevel evidence of the effects of gender inequality driven by customs and institutions should aid the design of effective policies aimed at eliminating these disparities and promoting efficiency by rewarding female talent in the economic and political spheres. The fact that developed countries do not fare particularly well on either dimension suggests that eliminating the existing disparities in discriminatory customs and property rights is unlikely to be sufficient to achieve gender parity.

Even in the most developed countries, women continue to be systematically underrepresented in the workplace (particularly among the highest-paying positions in their professions) and in political life. Recent microlevel evidence indicates that gender stereotypes may hamper women's participation in politics. In a field experiment in West Bengal, Beaman et al. (2009) find evidence that men have a strong prior bias against the effectiveness of women politicians; female-elected politicians were evaluated significantly worse for the same overall performance as male politicians. Reassuringly, however, men who had previously been exposed to women politicians through seat reservations were much less biased.

There is a growing body of literature that examines whether women sort themselves into lower-paying occupations for reasons such as risk aversion, attitudes toward competition, and social preferences. Although significant differences are observed in the laboratory, these traits fail to explain different outcomes in real workplaces (Bertrand 2010).

Another strand of the literature examines the idea that disparities are due to social norms and institutions. Although developed countries do not have social customs that limit freedom or inferior property rights such as those described in figures 3 and 4, norms regarding the division of labor in the household, especially those regarding child rearing, may be a limiting factor. In her analysis of the World Value Surveys, Fortin (2005) finds a strong correlation between “traditional family norms” and both female labor-force participation and a wage gap. Ganguli et al. (2010) find that marriage and motherhood are important factors in explaining the correlation between reduced education inequality and female labor-force participation. Using historical microlevel census data, they show that the reduction in education inequality is not matched by a reduction in marriage and the motherhood gap (that is, the difference in labor force participation between married and single women and between women with and without children). Evidence on historical patterns of female labor force participation in the United States is consistent with the idea that gender differences in the production function for children play an important role in explaining gender disparities in economic outcomes. For instance, Albanesi and Olivetti (2009) show that the introduction of formula milk, which reduces gender differences in child-feeding skills, has played a crucial role in explaining the increase in labor-force participation by married women in the United States over the last century.

There is no doubt that technological progress (e.g., formula milk, the contraceptive pill) has reduced women’s comparative advantage in child rearing, but important differences remain in the division of housework and child care. The recent evidence presented in the 2012 World Development Report indicates that, compared with men, women devote much more time to housework and child care at the expense of “market time” in both developed and developing countries.

Parental-leave policies are likely to be a factor in these stark differences in time use. For instance, parental-leave policies in all OECD countries clearly place the mother in charge of caring for newborns. In 2007, the average duration of maternal leave at full pay in OECD countries was just under 20 weeks, and all countries except the United States and Australia had a minimum leave of five weeks. In contrast, full-pay paternal leave for at least five weeks is only allowed in three of the 30 OECD countries.⁶ Progress toward gender parity in child care may not have an immediate effect on cultural norms, but there is evidence that

shocks can change the range of acceptable behaviors. Fernandez et al. (2004) show that the exogenous surge in female labor force participation in the United States during World War II had persistent effects on the female labor force participation of future generations and on men's acceptance of working wives.

Conclusions

Although considerable progress has been made in recent decades toward closing the gender gap in education within most countries, gender gaps in economic and political participation have remained across the developed and developing world. The promised higher income and faster economic growth due to harnessing women's talent has not ensued. Cross-country evidence is helpful to identify aggregate patterns, but the use of this evidence is not well suited to inform or guide policy design, which requires precise information on mechanisms at work at the microlevel.

A new generation of microlevel studies based on randomized-controlled trials or clever uses of natural and field experiments is providing some of this much-needed evidence.⁷ In contrast to the macrolevel evidence, most microlevel studies are designed to provide evidence on the mechanisms by which gender equality improves economic efficiency. Therefore, microlevel studies are more useful to provide precise policy guidance. Future research may shed light on additional mechanisms and on the applicability of the findings to different contexts, which is essential to develop credible estimates of the effect of gender equality on economic growth. We hope that this research will guide a new generation of policies that will truly eliminate gender disparities and will help to fulfill the potential for women's talent to promote both development and economic growth.

References

Albanesi, S., and C. Olivetti. 2009. "Gender Roles and Medical Progress." NBER Working Papers 14873, National Bureau of Economic Research, Inc.

Alesina, A., P. Giuliano, and N. Nunn. 2010. "Fertility and the Plough." NBER Working Papers 16718, National Bureau of Economic Research, Inc.

Barro, R., and J. Lee. 1994. "Sources of Economic Growth." *Carnegie-Rochester Conference Series on Public Policy* 40 (1): 1-46.

Barro, R. 1996. "Determinants of Economic Growth: A Cross-Country Empirical Study." NBER Working Papers 6317, National Bureau of Economic Research.

Barro, R., and R. McCleary. 2003. "Religion and Economic Growth." NBER Working Papers 9682, National Bureau of Economic Research, Inc.

Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topolova. 2009. "Powerful Women: Does Exposure Reduce Bias?" *Quarterly Journal of Economics* 124 (4): 1497-540.

Bertocchi, G. 2008. "The Enfranchisement of Women and the Welfare State." Center for Economic Research (RECent) 018, University of Modena and Reggio E., Dept. of Economics.

Bertrand, M. 2010. "New Perspectives on Gender." In *Handbook of Labor Economics*, ed. by Orley Ashenfelter and David Card, chapter 17. Amsterdam: North Holland Press.

Bils, M., and P. Klenow. 2000. "Does Schooling Cause Growth?" *American Economic Review* 90 (5): 1160–83.

Branisa, B., S. Klasen, and M. Ziegler. 2009. "Why we should all care about social institutions related to gender inequality." Courant Research Centre: Poverty, Equity and Growth - Discussion Papers 15, Courant Research Centre PEG.

Caselli, F., G. Esquivel, and F. Lefort, 1996. "Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics." *Journal of Economic Growth* 1 (3): 363-8.

Cavalcanti, T.S. Parente, and R. Zhao, 2007. "Religion in Macroeconomics: A Quantitative Analysis of Weber's Thesis." *Economic Theory* 32 (1): 105-23.

Cavalcanti, T., and J. Tavares. 2007. "The Output Cost of Gender Discrimination: A Model-Based Macroeconomic Estimate." CEPR Discussion Papers 6477, C.E.P.R. Discussion Papers.

Doepke, M., and M. Tertilt. 2010. "Does Female Empowerment Promote Economic Development?" BREAD Working Paper 281, Bureau for Research and Economic Analysis of Development.

Dollar, D., and R. Gatti. 1999. "Gender, Inequality, Income, and Growth: Are Good Times Good for Women?" Background paper for Engendering Development. World Bank, Washington, D.C.

Drèze, J., and M. Murthi. 2001. "Fertility, Education, and Development: Evidence from India." *Population and Development Review* 27: 33–63.

Duflo, E. 2012. "Women Empowerment and Economic Development." CEPR Discussion Paper No. DP8734.

Easterly, W. 1999. "Life During Growth." *Journal of Economic Growth* 4 (3): 239-75.

Fernandez, R., A. Fogli, and C. Olivetti. 2004. "Preference Formation and the Rise of Women's Labour Force Participation: Evidence from WWII." NBER Working Paper 10589, National Bureau of Economic Research Inc.

Fernandez, R., and A. Fogli, 2005, "Fertility: the Role of Culture and Family Experience." *Journal of the European Economic Association* 4 (2-3): 552-61.

Fernandez, R. 2010. "Women's Rights and Development." Working Papers, Department of Economics, New York University.

Field, E., S. Jayachandran, and R. Pande. 2010. "Do Traditional Institutions Constrain Female Entrepreneurship? A Field Experiment on Business Training in India." *American Economic Review* 100 (2): 125-29.

Fortin, N.M. 2005. "Gender Role Attitudes and the Labour Market Outcomes of Women Across OECD Countries." *Oxford Review of Economic Policy* 21(3): 416-438.

Ganguli, I., R. Hausmann, and M. Viarengo. 2010. "Schooling Can't Buy Me Love": Marriage, Work and the Gender Education Gap in Latin America." CID Working Paper 197, Centre for International Development, Harvard University.

Goldstein, M., and C. Udry, 2008. "The Profits of Power: Land Rights and Agricultural Investment in Ghana." *Journal of Political Economy* 116 (6): 981-1022.

Guiso, L., P. Sapienza, and L. Zingales. 2003. "People's opium? Religion and Economic Attitudes." *Journal of Monetary Economics* 50 (1): 225-82.

Hassan, N., M. Pitt, and M. R. Rosenzweig. 2010. "Human Capital Investment and the Gender Division of Labor in a Brawn-Based Economy." Economic Growth Center Working Paper 989, Yale University.

Hill, A., and E. King. 1993. "Women's Education in Developing Countries: an Overview" in *Women's Education in Developing Countries*. Ed. Elizabeth M. King and M. Anne Hill, 1-50. Baltimore, MD: The John Hopkins University Press.

Jayachandran, S., A. Lleras-Muney, and K. V. Smith. 2010. "Modern Medicine and the Twentieth Century Decline in Mortality: Evidence on the Impact of Sulfa Drugs." *American Economic Journal: Applied Economics* 2 (2): 118-46.

Kaufmann, D., A. Kraay, and M. Mastruzzi. 2008. "Governance matters VII: Aggregate and individual governance indicators, 1996-2007." World Bank Policy Research Working Paper 4654, World Bank, Washington D.C.

Klasen, S. 1999. "Does Gender Inequality Reduce Growth and Development? Evidence From Cross-Country Regressions." Background paper for Engendering Development, World Bank, Washington D.C.

Klasen, S. 2002. "Low Schooling for Girls, Slower Growth for All? Cross-Country Evidence on the Effect of Gender Inequality in Education on Economic Development." *World Bank Economic Review* 16 (3): 345-73.

Klasen, S., and F. Lamanna. 2009. "The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries." *Feminist Economics* 15 (3): 91-132.

Knowles, S., P.K. Lorgelly, and P. D. Owen. 2002. "Are educational gender gaps a brake on economic development? Some cross-country empirical evidence." *Oxford Economic Papers* 54 (1): 118-49.

- Kremer, M., and E. Miguel. 2004. "Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities." *Econometrica* 72 (1): 159–217.
- Mankiw, G.N., D. Romer, and D. N. Weil. 1992. "A Contribution to the Empirics of Economic Growth." *Quarterly Journal of Economics* 107 (2): 407-37.
- Munshi, K., and M. Rosenzweig. 2006. "Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy." *American Economic Review* 96 (4): 1225-52.
- Pritchett, L., and L. Summers. 1996. "Wealthier is Healthier." *Journal of Human Resources* 31 (4): 841-68.
- Qian, N. 2008. "Missing Women and the Price of Tea in China: The Effect of Sex-Specific Income on Sex Imbalance." *The Quarterly Journal of Economics* 123 (3): 1251-85.
- Schultz, P.T. 2006. "Does the Liberalization of Trade Advance Gender Equality in Schooling and Health?" Yale University Economic Growth Centre Discussion Paper 935.
- Seguino, S. 2000. "Gender Inequality and Economic Growth: A Cross-Country Analysis." *World Development* 28(7):1211-1230.
- Seguino, S., and M. S. Floro, 2003. "Does Gender Have Any Effect on Aggregate Saving? An Empirical Analysis." *International Review of Applied Economics* 17(2): 147-166.
- Tzannatos, Z. 1999. "Women and Labor Market Changes in the Global Economy: Growth Helps: Inequalities Hurt and Public Policy Matters." *World Development* 27 (3): 1010-46.
- World Bank. 2011. *World Development Report 2012: Gender Equality and Development*. Washington DC: The World Bank.

Notes

¹ Klasen (1999) uses spending on education as a share of GDP and uses initial fertility levels and the change in total fertility rates as instruments for the change in the female-to-male ratio of educational attainment. As in the previous examples, these are invalid instrumental variables because they are likely to be directly correlated with economic growth, as established, for instance, in the large body of literature on fertility and economic growth (e.g., Barro 1996).

² This illustrates the difficulty of finding valid instruments because most macrolevel variables are correlated with economic growth. Several authors attempt to test the validity of their instruments using overidentification tests. The idea behind these tests is that one instrument can be used to test the validity of another, and vice versa. Instrumental variable estimation requires only one instrument for each endogenous variable; when more than one instrument is available, the model is said to be “overidentified.” Overidentification tests are developed by estimating as many “just-identified” models as there are instruments and comparing the estimates obtained in each case. If these are consistent, they should be similar to each other. This is the null hypothesis tested by the overidentification test. Unfortunately, however, most instrumental variable estimates are not very precise, so the null of equality is not rejected even when the point estimates differ significantly from one another. In other words, overidentification tests are typically quite weak, and it is unwise to quell reverse causality concerns simply by showing that instruments pass the overidentification test if there is good reason to believe that they do not satisfy the exclusion restrictions.

³ In one of the earliest studies of gender inequality and growth, Hill and King (1995) find that higher female education is correlated with higher average life expectancy for both males and females. Klasen (1999) finds a positive correlation between gender gaps in education and fertility: one additional year of female education is correlated with a drop of the total fertility rate of 0.23 births. In line with this finding, Drèze and Murthi (2001) find a negative and significant correlation between fertility and female literacy at the district level in India. Seguino and Floro (2003) show that their measures of education and economic gender inequality (the gap between female and male secondary school completion and the male wage-bill share) are negatively correlated with domestic savings. Schultz (2006) shows that trade liberalization is positively correlated with reductions in gender inequality in both health (life expectancy gap) and education (attainment gap). Finally,

recent evidence suggests that gender equality is correlated with good governance and institutions. For instance, Kaufmann et al. (2008) find a positive correlation between a control-of-corruption index and the World Bank's (2004) measure of gender equality. Branisa et al. (2009) find that social institutions that reduce gender inequality are correlated with institutions that reduce corruption, strengthen the rule of law, and offer good protection for property rights.

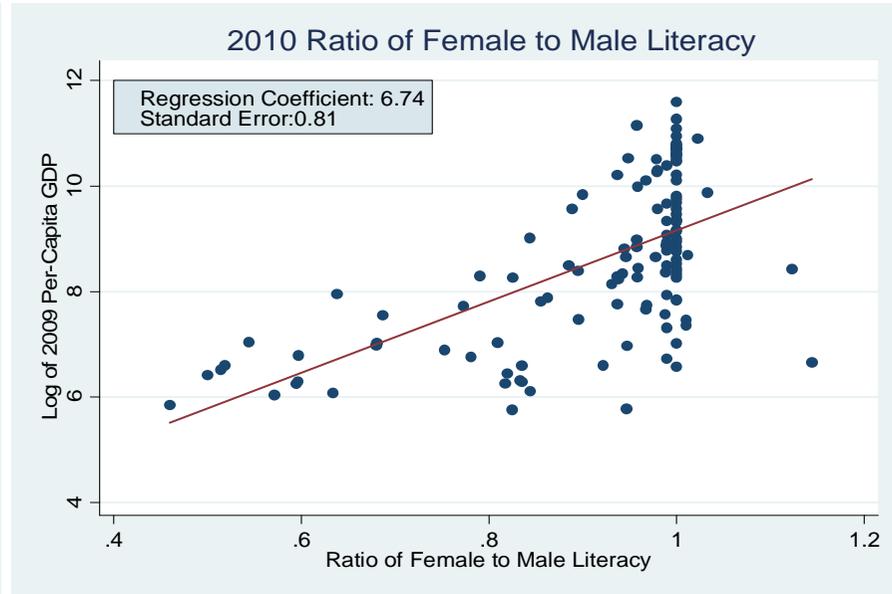
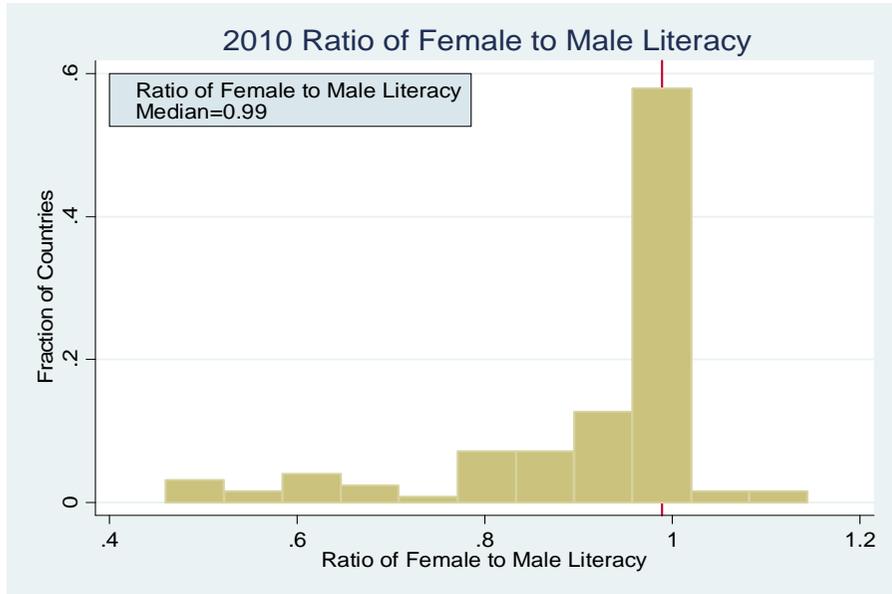
⁴ Other examples include Dollar and Gatti (1999), who find that gender inequality is negatively correlated with growth only in the sample of countries with high female secondary attainment (more than 10.35 percent of the population). In contrast, Klasen (2002) finds that the effects are stronger in sub-Saharan Africa, that is, among the poorest countries in the world. Heterogeneity across time appears to be equally problematic. For instance, Klasen (2002) shows that the correlation between gender inequality and growth disappears when using data from the 1980–90 period instead of the 1960–90 period.

⁵ We note that this is not because gender equality in educational attainment is a recent phenomenon and that newly educated women need time to gain economic and political parity. In their historical account of gender inequality using microlevel census data, Ganguli et al. (2010) show that for the two-thirds of their sample countries in which the gender gap (defined as the difference in years of education) was reversed, this reversal occurred for the cohort born in 1975 at the very latest. These women are past the age when occupational choices are made.

⁶ Data from the OECD family database (www.oecd.org/els/social/family/database), accessed October 6, 2011. The only countries that offer full-pay paternal leave for more than five weeks are Iceland (10 weeks), Sweden (nine weeks), and Norway (six weeks).

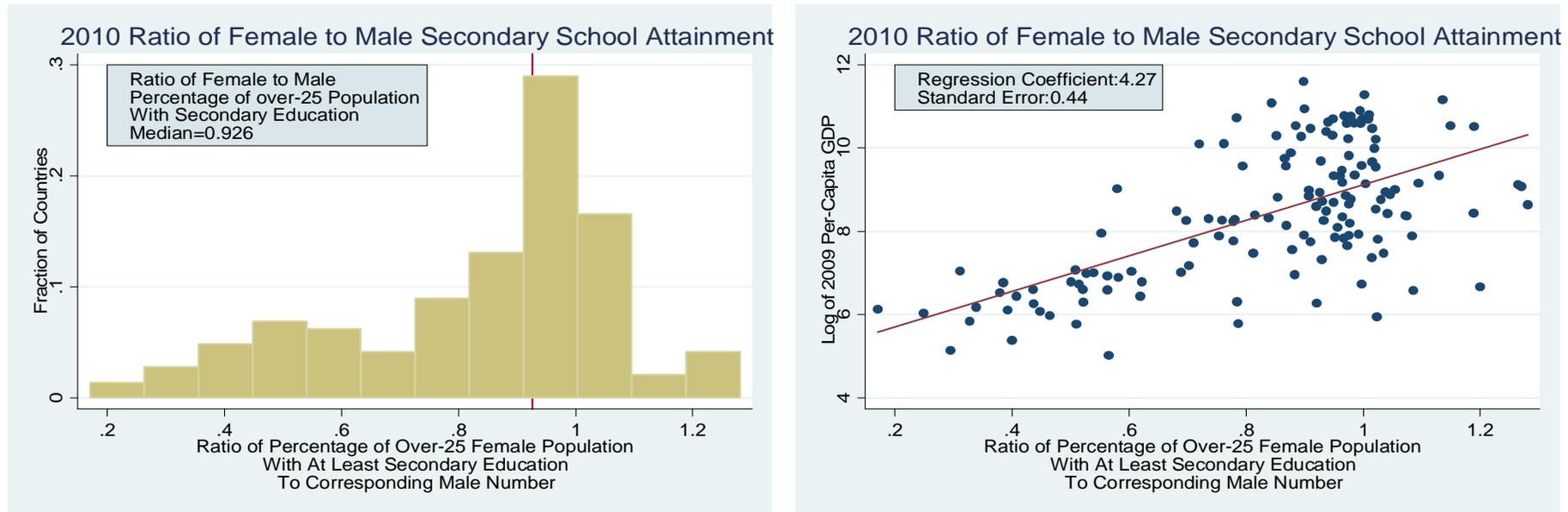
⁷ Duflo (2012) provides a comprehensive review.

Figure 1: Literacy Inequality and GDP



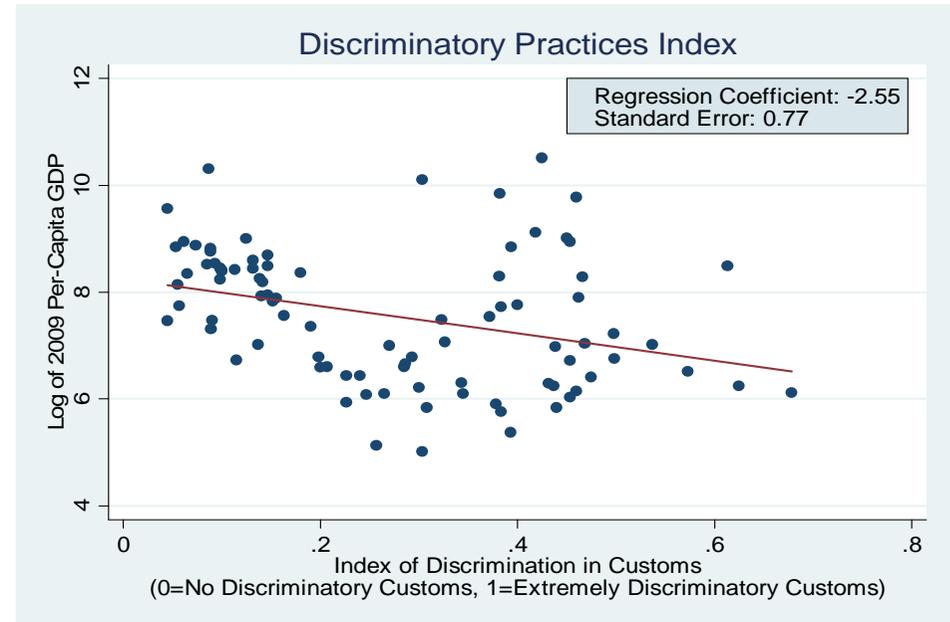
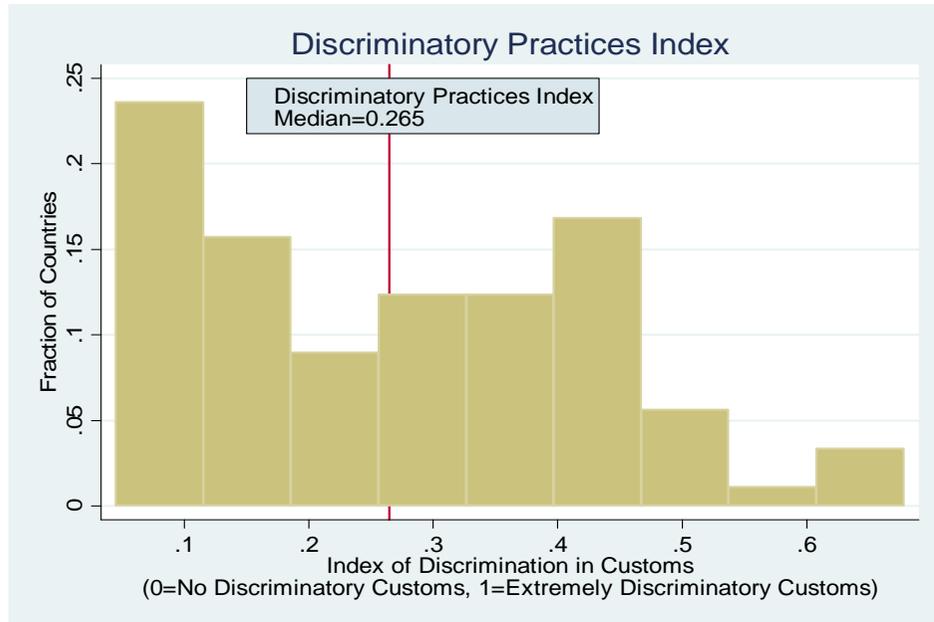
Literacy rates taken from the 2010 World Economic Forum Gender Equality Report

Figure 2: Secondary Education Inequality and GDP



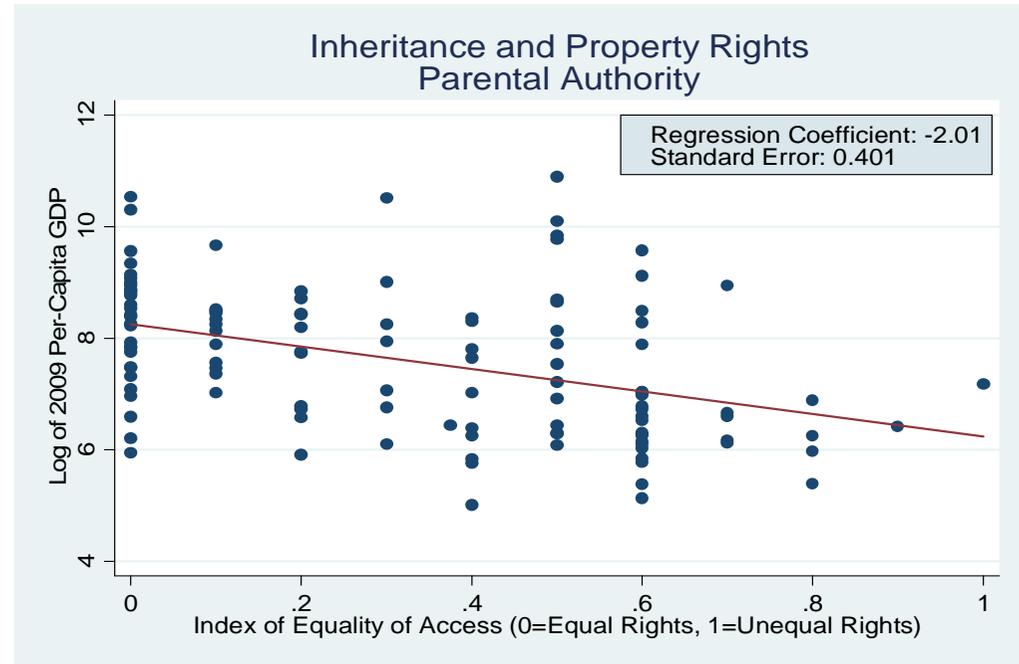
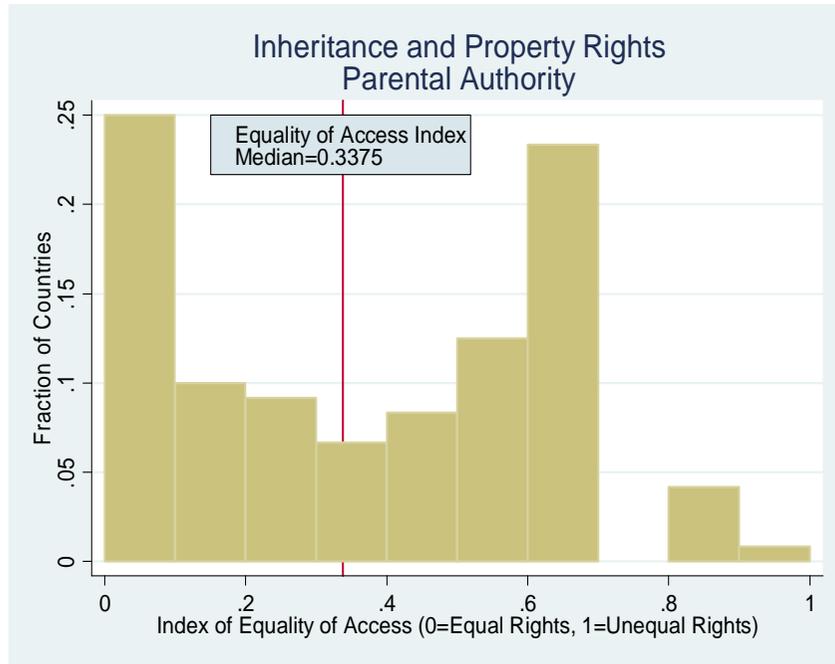
From the 2010 United Nations Development Programme Human Development Report: we find the female(male) secondary school attainment, equal to the percentage of the over-25 female(male) population with at least secondary school. We then take the ratio of female to male secondary school attainment.

Figure 3: Discriminatory Practices and GDP



Index of Discrimination in Customs is an average of the values of the following subindices from the 2009 OECD's Social Institutions and Gender Inequality (SIGI) Index: Early Marriage (Women); Acceptance/Legality of Polygamy; Freedom of Movement; Obligation to Wear a Veil; Violence against Women; Female Genital Mutilation

Figure 4: Property Rights and GDP



Index of Equality of Access: Average of values of the following subindices from the 2009 OECD Social Institutions and Gender Inequality (SIGI) Index: Parental Authority (Rights of custody accorded to male and female prents); Inheritance Rights (to widows, daughters etc.); Women's Access to land; Women's Access to Loans; Women's Access to Nonland Property