

GENDER AND POVERTY:
A LIFE CYCLE APPROACH TO THE ANALYSIS
OF THE DIFFERENCES IN GENDER OUTCOMES

Michael Lokshin*
Thomas A. Mroz

ABSTRACT

In this paper we study complex interactions between gender and poverty in postwar Bosnia and Herzegovina (BiH). The goal of our analysis is to uncover how a spectrum of gender differentials at different parts of the life cycle varies across income groups. Using the data from the 2001 BiH LSMS, we find strong gender-poverty interaction in the patterns of labor force participation, gender gap in earnings, individuals' school finances and school attendance. The main source of gender inequality seems to come from differences in investments in girls' and boys' educations that increase with declines in income levels. Short-term income shocks could lead to long-term increases in gender inequality in households with school age children, unless there is ready access to credit markets. We also find that the magnitude of the impact of economic development on gender differences in Bosnia will depend on where the growth is concentrated. If the poor capture at least some benefits of economic growth, the gender differences in household investment in human capital of their children will decline. If, on the other hand, growth is concentrated among the richest, then important gender disparities could remain pervasive.

World Bank Policy Research Working Paper 3153, October 2003

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 view of the World Bank, its Executive Directors, or the countries they represent. Policy Research Working Papers are available online at <http://econ.worldbank.org>.

* Michael Lokshin, World Bank, 1818 H Street, NW, Washington DC 20433, phone: 202-473-1772, email: mlokshin@worldbank.org; Thomas Mroz, University of North Carolina at Chapel Hill, Department of Economics, 107 Gardner Hall, CB 3305 University of North Carolina Chapel Hill, NC 27599, phone: 919-966-5395, email: tom_mroz@unc.edu;

The financial support of the World Bank ECA-PREM is greatly acknowledged.

We thank Ruslan Yemtsov (ECAPREM) and Martin Ravallion (DECRG) for useful comments and suggestions.

1. Introduction

In nearly all societies, one would expect to see the differences between genders in school enrolment rates, wages, labor force participation, and other labor market, education, and health outcomes. These differences could be determined by discrimination, biological differences, and individual and societal beliefs about appropriate gender roles. Additionally, one would expect to see differences in many outcomes depending on household wealth. Wealthy families, for example, might invest more in the children's schooling than poor families. The interactions between gender and poverty could be quite complex and empirically it is often difficult to disentangle the causal relations from proximate indicators.

The goal of this analysis is to uncover how a spectrum of gender differentials varies across income groups. Is there evidence of gender discrimination that varies with wealth? Are there reasons to consider interventions to affect these gender differentials? Could the social welfare be improved by allocating resources to offset the discriminatory practices? The analysis presented here is trying to provide key information needed to address these questions.

Gender equality existed *de jure* during the socialist era in the Former Republic of Yugoslavia, though *de facto* there were differences in the opportunities and outcomes for men and women. With the fall of the socialist regime and the start of the war in Bosnia and Herzegovina (BiH), there was no longer a strong central authority and new institutions had not yet arisen. Social protection was weak, and real incomes fell significantly. Over 250,000 people died or were missing. Over 50% of the population had been internally displaced, and ethnic cleansing forced many into poverty (Bisogno and Chong, 2002). In this environment many existing gender imbalances were exacerbated.

Understanding the interaction of gender and poverty can lead to better designed policies for both alleviating poverty and reducing gender discrimination. This context is especially important for BiH, given that its transition to a market economy was derailed by the five years of civil war. Policy makers in BiH need to understand the source of gender differentials in order to make informed policy decisions.

Equally important is the recognition that as BiH continues to recover from the war, increases in incomes and wealth will tend to mitigate some important gender differentials while at the same time exacerbating others. Our theoretical analysis indicates that gender differentials arising from differential investments in children by gender need not always increase or decrease with income. Nor do gender differentials always need to favor one gender over another. These theoretical ambiguities can only be resolved by a detailed empirical analysis like that presented in this paper.

Using the data from 2001 Bosnia Living Standard Monitoring Survey (BLSMS), we focus on a set of key indicators of gender differences and how they are related to a household's wealth. We develop a simple theoretical model of parents making investment decisions in their children's human capital. This model provides empirically testable predictions about the possible sources of the gender variations and their changes with income and allows us to trace out a rough path of how gender differences can vary over the life cycle.

The paper is organized as follows. The next section develops a theoretical model of parental decision about investments in their children's human capital. Section 3 describes the data and welfare indicators we use in our analysis. Section 4 presents the descriptive results of the empirical analysis. Section 5 discusses some methodological issues of measuring the differences in gender outcomes. Section 6 concludes.

2. Theoretical Models of Gender Differentials in Children's Human Capital Investments

The important question for both researchers and policy makers is what is the underlying cause of the observed gender differential and its changes with income. Strauss and Thomas (1995) and Alderman and King (1998) review a variety of optimizing models for why boys and girls might have different outcomes that can vary with the level of a household's resources. The simplest model assumes that households have strong preferences for children of a certain gender, but they are willing to make investments in the future earning capacity of their children through education (e.g., Hill and King, 1995; Alderman and Gertler, 1997). These models readily exhibit discrimination against one

gender and in favor of the other. At low levels of income, for example, investments in boys could be larger than investments in girls, even though the marginal rate of return to the investment in boys may be lower. In their model this would happen because the parent's place more value on the boy's well being. With diminishing returns to investments in boys, as income rises and boys receive relatively more schooling, the boy's marginal return to investments falls. Parents increase their investments in girls relative to boys leading to more equality at higher incomes. Alderman and King also discuss a model where intra-household gender equality by itself is a normal good, in addition to preferences for boys over girls. Here, one need not rely on the assumption of decreasing marginal returns in order to obtain gender convergence with income. Such models based on "tastes for discrimination" do not readily admit reversals in the direction of gender "biases" holding wealth constant.

There are many alternative formulations that can provide empirically testable predictions about the sources of aggregate gender differences and their variations with income. Such models, however, must make some assumptions about the constraints, opportunities, costs, and shocks that can give rise to gender differences. Models based purely on random shocks, for example, can give rise to gender differentials within a household, but they cannot explain persistent gender differentials within or across societies.

Non-discriminatory, maximizing models that imply gender differentials usually assume that differentials arise because of gains from the specialization of labor by gender (Becker 1981). For example, if women have a biological, relative advantage in raising and caring for children, then in many circumstances it would be efficient for women to specialize in child-raising/caring activities and any other activities that could be complementary with child-care activities. Since men are at a relative disadvantage in childrearing, they would tend to concentrate their activities on providing for the family through other means than caring for their children (Alderman and King 1998; Garg and Morduch 1998).

As the range of activities for work outside of the home expands, or as good substitutes for child-care arise, or as complementarities with child-care activities decrease, one would expect the relative disadvantage of men in home activities to

diminish. Any of these events would tend to lead to more equality between the sexes in labor force and home activities. One would expect more developed economies to have an expanded set of opportunities, so one would in general expect to find smaller differences between the outcomes for men and women in developed than in developing countries.

Even within a given society, gender differences may vary across wealth classes. The relative disadvantage of men in household activities, for example, could be a function of the household's wealth. Depending on the "scale economies" in household production, the relative advantage of women's work in the household could either rise or fall with changes in wealth, leading to a convergence or a divergence of women's and men's labor market outcomes with changes in wealth.

Most important for our analysis are households' decisions to invest in human capital. Since specialization in any activity typically implies costly and considerable investments, gender differentials in early investments can result in large gender differentials later in life. Consider a simple three period, life cycle economic model where parents make decisions about investments in the one boy and the one girl in the family at period one. The household gives up current consumption at period one for future utility flows that depend on the amounts invested in the boy and the girl during that time period. There are two kinds of investments the parents can make in their children: one is an investment in human capital that pays off in the formal labor market, the other is an investment in human capital that is valuable only in home production. During time period two, the prime adult years, the investments in both types of human capital begin to pay off. Period three constitutes the retirement years, and only home production human capital provides a direct return. The model we develop here is a simple extension of those in Behrman et al. (1982) and Garg and Morduch (1998).

At time period one the parents care about the utility flows their children receive in periods two and three. We assume, because of comparative advantages in childrearing for women, that in period two women will have a higher return to home production human capital and men will have a higher return to labor market human capital. The economic model we use, however, only requires that parents perceive gender-specific returns in different types of human capital investments. Let these returns be denoted by $r_{g,k}$ where g indicates gender (G or B) and k equal to H denotes the returns to home production human

capital and k equal to M denotes the return to formal labor market specific human capital. When retired, labor market human capital is no longer valued. Since both men and women specialize in home production during retirement, we assume that the returns to home production capital are identical for men and women in period three.

The human capital production functions are identical for men and women, as are the costs of inputs. The labor market human capital production function is $f(M_s)$, $s=G,B$. Let c_M be the per unit cost of inputs to this production function; $c_M M_s$, then, is the amount spent on the input M_s for the child of gender s for the production of labor market human capital. Similarly the production function for home human capital is $g(H_s)$ where $c_H H_s$ is the amount spent on the input H_s for the child of gender s . Each production function is increasing with higher inputs, with diminishing returns. Let the parent's current utility be given by $U(X)$, where parents can give up some consumption X for investments in their children's human capital.

The household discounts total production at time periods two and three using the value functions $V_2[\cdot]$ and $V_3[\cdot]$ and it considers labor market earnings to be perfectly substitutable with home production. We assume that the value functions $V_2[\cdot]$ and $V_3[\cdot]$ have positive first derivatives and negative second derivatives. The formal optimization model facing the parents at time period one is then:

$$\begin{aligned} \text{maximize: } & U(X) + V_2[r_{B,M}f(M_B) + r_{G,M}f(M_G) + r_{B,H}g(H_B) + r_{G,H}g(H_G)] \\ & + V_3[\tau(g(H_B) + g(H_G))] \\ \text{subject to: } & X = Y - c_M(M_B + M_G) - c_H(H_B + H_G) \end{aligned}$$

where Y is exogenously provided income to the household. Recall that we assumed gender specific differentials in the returns to the two types of human capital at time period two. Specifically, $r_{B,M} > r_{G,M}$ and $r_{B,H} < r_{G,H}$ ¹. These assumptions, along with the concavity assumptions on the human capital production functions and the future value functions are sufficient to generate important gender differences in investments. They

¹ These restrictions on the magnitudes of the "returns" need not be interpreted as differences in productivity per unit of time devoted to labor market and household activities. It could be the case that men and women would be equally productive per unit of time in an activity, provided there were identical investments in the men and the women. Then, if women had a comparative advantage in child-rearing, the perceived return to women in labor market activities would reflect their lower hours of work and result in these inequalities in overall returns.

also imply specific life-cycle profiles of gender differentials in earnings and home production. Throughout our discussion of the model's implications, we assume that it is always optimal to increase human capital investments of both types of human capital (for both genders) with increases in income (i.e., no corner solutions).

Solving the first order conditions for the choices of period-one investments in the two types of human capital for boys and girls, assuming an interior optimum, yields two important implications:

$$\frac{r_{B,M}f'(M_B)}{r_{G,M}f'(M_G)} = 1 \quad \text{and} \quad \frac{[r_{B,H}V_2' + \tau V_3']g'(H_B)}{[r_{G,H}V_2' + \tau V_3']g'(H_G)} = 1$$

Given the assumptions about concavity and the relationships of the gender specific rates of return to human capital in the two sectors, these relationships imply larger investments in labor market human capital for boys than girls (i.e., $M_B > M_G$) and larger investments in household human capital for girls than for boys (i.e., $H_G > H_B$). These differential investments in human capital during the first period have strong implications for analyzing the relative income effects.

Looking first at the conditions defining optimal investments in the labor market specific human capital, we find:

$$\frac{\partial M_G / \partial y}{\partial M_B / \partial y} = \frac{r_{B,M}[f''(M_G) + f'''(M^{***})(M_B - M_G)]}{r_{G,M}f''(M_G)} = \frac{r_{B,M}}{r_{G,M}} + \frac{r_{B,M}f'''(M^{***})(M_B - M_G)}{r_{G,M}f''(M_G)}$$

where M^{***} falls between M_G and M_H . Convergence in the investment in the labor market specific human capital between boys and girls will occur when the above expression is greater than 1. Since the ratio of the gender specific returns to human capital, $r_{B,M}/r_{G,M}$, is greater than 1 by assumption, the magnitude of the expression depends on the second term in this equation. If $f'''(M) \leq 0$, then increases in period one income will unambiguously result in a convergence in investments in labor market human capital for boys and girls. Even if $f'''(M) > 0$, as long as the third derivative is small relative to the second derivative then the overall expression will exceed one. This means that increases in income in period one will result typically in a convergence of the household's gender-specific investments in children's labor market human capital. A primary rationale behind this result of convergence for investments in boys and girls as income rises follows from

two factors. The first is diminishing returns in investments. This, in conjunction with the fact that the household invests less in girls' labor market human capital, makes it less costly at the margin to produce additional human capital for girls than it is to produce more labor market human capital for boys. The second factor follows from the second term of the above expression; the restrictions on the third derivatives ensure that the diminishing returns do not become less important at higher investment levels.

The comparative advantage of women in home production ensures that a household will invest more in girls' household human capital than in boys'. This simple economic model implies similar convergence results for the household's decisions to invest in the home production human capital of boys and girls. The results, however, are not as straightforward as they are for labor market human capital because household production human capital pays off differently in the prime aged years and the retirement years for both men and women. Differentiating the first order conditions with respect to the household's income level when the investment decisions are made and rearranging terms yields:

$$[r_{B,H}V_2'+\tau V_3']\frac{\partial H_B}{\partial y}g''(H_B) = [r_{G,H}V_2'+\tau V_3']\frac{\partial H_G}{\partial y}g''(H_G) +$$

$$[g'(H_G) - g'(H_B)][\tau V_3''\frac{\partial A_3}{\partial y}] + [g'(H_G)r_{G,H} - g'(H_B)r_{B,H}]V_2''\frac{\partial A_2}{\partial y}$$

Where V_t' and V_t'' are the first and second derivatives of period- t specific indirect utility functions, and the A_t are the points of evaluation (period specific incomes) for these indirect utility functions (i.e., $A_2 = r_{B,M}f(M_B) + r_{G,M}f(M_G) + r_{B,H}g(H_B) + r_{G,H}g(H_G)$ and $A_3 = \tau(g(H_B) + g(H_G))$ evaluated at the optimal choices).

In general it is not possible to sign unambiguously the difference in the income effects for the investments in boys' and girls' household production human capital. But under the assumption that the household maximizes lifetime income, $V_2'' = V_3'' = 0$, and the ratio of the income effects is:

$$\frac{\partial H_B / \partial y}{\partial H_G / \partial y} = \frac{[r_{G,H}V_2'+\tau V_3']}{[r_{B,H}V_2'+\tau V_3']} \cdot \frac{g''(H_G)}{g''(H_B)}$$

the first term on the right is unambiguously greater than one. The magnitude of the second term, while positive, again depends on the third derivative of the human capital production function. Similar to the examination of the differences in the income effects for the demands for labor market human capital,

$$\frac{\partial H_B / \partial y}{\partial H_G / \partial y} = \frac{[r_{G,H} V_2' + \tau V_3']}{[r_{B,H} V_2' + \tau V_3']} + \frac{r_{G,H} g'''(H^{***})(H_G - H_M)}{[r_{B,H} V_2' + \tau V_3'] g''(M_B)}$$

where H^{***} falls between H_G and H_B . If the third derivative of the production function is negative, or if the positive third derivative is small relative to the absolute magnitude of the second derivative, then there will be a convergence in the investments made in boys' and girls' household human capital at higher income levels².

In summary, this simple theoretical model gives rise to gender differentials in parents' investments in their children's labor market and household production human capital. Our formulation of the model relied upon different marginal returns to investments in boys' and girls' human capital, but it is important to note that it is only the parent's perceptions of these differences in returns that matter. Additionally, the model does not require there to be actual differences in returns for boys and girls in either the labor market or home production. For example, suppose parents believe that it is like for girls to spend less time in the labor market than boys when they are adults, and for them to expect just the opposite for home production. Such differences in the time inputs arise easily from the specialization of labor in household and labor market tasks due to women having only a minor biological advantage in child rearing (e.g., breastfeeding). These time-use differentials give rise to the types of differential rates of return we assumed, even though boys have no absolute advantage in the labor market. Boys could, in fact, have worse labor market prospects than girls. The comparative advantage of girls in

² In our model we make an implicit assumption that the rates of return on both types of human capital, $r_{s,M}$ and $r_{s,H}$, do not depend on the household income. Several studies examining differential returns to human capital investments by income level (e.g., MacIsaac and Patrinos 1995; van der Walle and Gunewardena 2000) found that the returns to schooling are lower for marginalized and usually poor groups in the population. Additionally, the returns in the labor market might depend on the connections and networks, which, in turn, could be related to household income (Filmer 2000). While such differences in one's ability to reap benefits from human capital investments are important, we have insufficient data to model gender differentials in the reasons for differences in rates of return with income, wealth, or class. Instead, we only trace out how outcomes related to gender differentials in investments vary with income level.

childrearing could easily tip the tables so that the perceived returns to investments in labor market skills for boys, recognizing the gains from specialization, are larger.

We also discuss how these gender differentials in investments vary with the household's wealth. In our model with parents only caring about the future earnings prospects of their children, the gender differentials in investments will depend on both the actual functional form of the parents' preferences over their children's future consumptions and, more importantly for investments in labor market human capital, on the actual functional form for the human capital production function.

Not surprisingly, it is impossible to describe the direction of change in gender differentials as parents' wealth increases without stronger assumptions than concavity in the human capital production functions. However, if diminishing returns to human capital investments are not too much smaller at higher investment levels (e.g., as for an approximately quadratic production function), then this model predicts that the gender differential in labor market human capital investments will decline with increases in incomes. Furthermore, if parents attempt to maximize the present value of the sum of their children's real incomes, then one would also expect to see a convergence in household human capital investments at higher wealth levels. In the remainder of this paper we test whether these restrictions appear to be valid.

3. Data and definitions

Our analysis is based on Bosnia Living Standard Monitoring Survey (BLSMS) – the first nation-wide regionally representative survey to measure both monetary and non-monetary components of household welfare in Bosnia-Herzegovina. The survey was conducted in September-November 2001 by three statistical organizations in Bosnia with financial and technical support from Department for International Development of England (DfID), United Nations Development Programme (UNDP), the Japanese Government, and the World Bank. The survey sample comprises 5,397 households in two entities: 2,395 households in the Republica Serbska, and 3,002 in the Federation of Bosnia and Herzegovina. The survey is representative at the national and entity level as

well as by the type of municipality³. BLSMS questionnaire collected information on a wide range of individual and household level indicators that included data on household consumption, migration, access to and use of government services, information about individual characteristics of the household members, and other important indicators. In addition, price data covering 37 essential commodities were collected in the selected enumeration areas.

As the primary indicator of household wealth we use the value of the total household expenditures. Total household expenditure consists of food consumption (including purchased, home-produced, and food received as a gift) plus non-food consumption that includes imputed values for housing, expenditures on utilities, health, education and other types of non-food consumptions of goods and services. Summary statistics for the main variables used in our analysis are shown in Table 1.

4. An Empirical Investigation of the Impacts of Income on Gender Differentials in Human Capital Accumulation.

In this section we examine a range of early life-cycle investments outcomes to determine whether the convergence of gender differentials extends to a wide range of outcomes and to uncover the magnitude of these effects. Our theoretical model, in its most general form, yields ambiguous predictions whether increases in income should lead to convergence or divergence in investments in the human capitals of boys and girls. In a wide variety of configurations, however, the economic model does imply a convergence of investment outcomes for boys and girls with increases in parental income. We use these model implications as a compelling reason to test for the presence of gender-wealth interactions for investments and outcome over the life cycle. Another reason for suspecting that the gender convergence with higher incomes is a likely outcome comes from the existing literature examining gender inequality in school attendance. The evidence presented in that literature finds diminishing gender differences at higher wealth levels (e.g., Jacoby 1994; Berhmen and Knowles 1997; Lloyd Mete and Zathar 2002). A

³ Further details on the survey design and field methods used can be found in the Word Bank (2002).

paper by Deaton (1997) suggests a possible gender convergence with wealth in nutritional status for boys and girls in Bangladesh.

Before examining the implications of the economic model, we analyze outcomes associated for pre-school age children. This serves as a baseline for our analysis of more investment-oriented outcomes. Then, following our economic model, the empirical analysis in this paper focuses on three distinct phases of the life cycle. We first investigate gender-wealth differentials for children, at those ages when significant human capital investments take place. Next, we look at the gender-wealth interactions in outcomes for prime aged adults. We assume that these differentials would reflect differences in investments made when these adults were children. Third, we examine gender-wealth outcomes for retirement-aged individuals, under the assumption that these outcomes also reflect early life cycle investments.

Pre-school years

Prior to age seven, there are also no obvious gender differentials in schooling or childcare arrangements in Bosnia. Few children attend kindergartens, and household members provide most childcare. Wealthier families are somewhat more likely to use non-household member care for their children, but the number of children attending kindergartens are too small to make any statistically sound inferences (World Bank 2002). These activities have only slight investment components, and the evidence suggests no gender differences or discrimination along these dimensions.

We start off our empirical analysis by examining gender differentials in spending on young children (ages 0 to 6) by households for less investment-related goods. This exploration is important, as it can provide key information about whether one might consider the gender differentials in investments to be determined by discrimination or by perceptions about differential returns to the investments by gender. The next section examines in detail the household wealth variations in school attendance by gender.

Our first outcome of interest is a household's consumption of fruits and sweets. While these are not directly "children" goods and cannot be explicitly linked to the consumption of these items by a particular household member, we expect that children's

consumption would comprise a significant fraction of the household's overall expenditure on fruits and sweets. Table 2 presents the mean per capita expenditures on fruits and sweets by expenditure quintiles, gender, and entity⁴. The cross-tabulation analysis shown in the top part of Table 2 indicates that better-off household with children ages 0 to 6 spend more on sweets and fruits than poorer households. Households residing in FBiH spend on average more of these goods than the households from RS. However, there seem to be no differences between expenditures on sweets and fruits between boys and girls both in either RS or FBiH.

The regression analysis on the bottom part of Table 2 reconfirms these findings in a somewhat simpler framework. The coefficient on the household expenditure variable is positive and statistically significant indicating that higher expenditure households spend more on fruits and sweets. The coefficient on the entity dummy shows a negative and statistically significant effect of living in RS on expenditures on sweets and fruits.

Of most importance for this study, both the gender indicator and the variable that represents the interaction between the gender and household per capita expenditure are small. Neither is statistically significant and we fail to reject the hypothesis that both are zero at conventional significance levels. There is apparently no difference in the household spending on fruits and sweets between families with only boys and families with only girls at all levels of total household expenditure. A simple extension of our economic model to incorporate children's consumption as a separable component of utility, with the parents' only reasons for treating boys and girls differently arising from investment considerations, would imply no gender differentials for such pure consumption goods. We take this empirical finding to mean that gender discrimination does not exist for this set of expenditures.

Table 3 shows the mean per child expenditure on children's shoes and clothing by entity and expenditure quintile⁵. Focusing first on the cross-tabulation results, we see that typically households with small children in FBiH spend more on their children's shoes

⁴ Table 2 is based on the sample to the households that have as children only boys or only girls age 0 to 6. The regression results presented in these and all other tables in this section are estimated taking into account the complex survey design of BLSMS. In the tables where we examine the relationship between the household expenditures on children goods and household welfare, we use a total household expenditure net of the corresponding expenditures as a household welfare indicator.

⁵ Again, we focus on households with only pre-school boys or only pre-school girls.

and clothing than do households in RS. In RS households from all expenditures quintile spend more on boys than on girls, except at the lowest expenditure levels. In FBiH the picture is less clear. The poorest households seem to spend much more on boys' clothing and shoes than on girls', but at the same time, households from the second and fourth quintiles of the expenditure distribution spend more on girls.

The results of the regression analysis shown in bottom part of Table 3 can help to clarify the relationship between the expenditures on children' shoes and clothing and the household wealth. Expenditures on boys are higher, but the interaction effect of household expenditure and gender shows strong negative effect that is significant at over a 5% significance level against the primary alternative of a decline in the gender differential with wealth. This indicates that less of additional income is spent on boys' goods than on girls'. Given the earlier results, it is somewhat surprising to find a gender differential favoring boys at these young ages, unless there is an investment component to these clothing expenditures. It is important to note, however, that a joint test of no gender differentials would not be rejected at any standard significance level (p-value of 0.72).

Education

When the children enter school, substantive gender and wealth differences begin to arise. The school attendance patterns of children age 7-15 are shown on Table 4. In FBiH almost all children 7-15 were attending school during this year. The rate of school attendance in RS is slightly lower than in FBiH. The probit estimates in the bottom panel of Table 4 show the relationship between the wealth of the household, gender, and the probability that its children are in school. The negative coefficient on the interaction term between expenditure and gender indicates that the gap between the boys and girls in attendance rates is decreasing with higher levels of household per capita expenditures. This effect is significant at the five percent level against the alternative of gender convergence with income. Unlike the two outcomes examined for pre-school children, here the joint hypothesis of no gender effects is resoundingly rejected. There does appear to be a significant gender gap in investments in human capital that has a strong labor market aspect, and this gap diminishes in families with higher levels of expenditures.

Looking at the proportion of students among the respondents age 15 to 30 (Table 5), males in this age group are more likely to attend school than females. Young adults from the poor households attend school at significantly lower rates than males and females of the same age group from the wealthier families. It is, however, important to note that the interpretation of these absolute income effects could be contaminated by the fact that some young people have chosen to live separately from their parents because they are no longer in school. One would expect such individuals to have lower incomes.⁶ The gender difference in the fraction in school declines with higher per capita expenditure.

The bottom panel of the Table 5 demonstrates the results of the probit estimation for the probability of being a student. The results in this table confirm the conclusion of the cross-tabulation. The negative sign and significance of the coefficient on the interaction between household per capita expenditure and gender indicates the declining with wealth differential between males and females in this age category. Again, there is a significant convergence of young men's and young women's school enrollment rates at higher levels of income.

Labor market outcomes.

One of the predictions of our economic model implies more gender inequality in labor market outcomes among those who grew up in poorer families than among those who grew up in wealthier families. This would happen because of the larger gender differentials in labor market human capital investments by the poor. With cross-sectional data like that available in the BLSMS, measures of wealth when an adult was a child are typically not available. But if there is much inter-generational persistence in wealth and positive assortative mating by household wealth, then current measures of a household's income could provide a good proxy for income in one's family when early investment decisions were made. Such an approach, however, does suffer from the fact that several of the individual, gender specific outcomes we examine are related to both a household's

⁶ For example, in RS only 20% of males and 8% of females age 15 to 30 from the poorest households are students, while among the richest households that proportion reaches 42% for males and 45% for females.

income and individuals' labor market outcomes. This could potentially cause serious interpretation problems when we examine how variations in wealth appear related to the outcomes from earlier investments. To partially overcome this shortcoming, we examine gender variations in the prime-aged adult outcomes as functions of one's own and/or one's spouse's education level. This removes the direct link, say, between a household's income and the working status of an adult female in the household and makes it easier for one to interpret the changes in gender effects with wealth. In this next set of tables, we use the term "welfare" to signify that we are using one of these alternative approaches to proxy for household income when a youth.

We start the analysis of labor market outcomes by looking at the changes in the levels of labor force participation among men and women. Table 6 shows the results of estimation of the probability of being in the labor force by various proxies of wealth (along with the squares of the proxies) when an adult was a child. The first column of estimates is based on the position (percentile) of the individual in the educational distribution in his/her own age and gender group⁷. Using this variable as a proxy for past household wealth, the probit results show that the rate of labor force participation (LFP) among prime-age adults is higher among men than among women. The negative and statistically significant coefficient on the interaction term of wealth and gender indicates that the differential in male and females rates of LFP is declining with higher wealth.

A similar picture emerges when we use educational percentiles of the spouse as a proxy of household wealth for when the individual was a child. The negative and significant coefficient on the Male-Welfare interaction term suggests that the gender gap in the levels of LFP is smaller for the individuals who grew up in the richer households. The last set of coefficients in Table 6 is based on an instrumental-variable (IV) linear probability model where we instrument the current wealth (total household expenditure per capita) with the both own and the spouse's education. In this specification we assume that all three variables that involve household wealth (per capita expenditure, per capita expenditure squared, and the interaction term) are endogenous. Again, as in the previous two estimations we observe higher rates of LFP among males (the coefficient is positive

⁷ The percentiles of education distribution were calculated for 5-year age group separately for males and females.

and statistically significant) and among adults living in FBiH. While the coefficient on the interaction term is statistically insignificant, its sign does imply the same negative correlation between the gender gap in employment rates and household wealth.

Table 7 shows the effects of past household wealth on the level of wages using the same three approaches. For all three estimations, based on one's own education, and spouse education, and IV regression estimation, males earn significantly higher wages than females. At the same time, the statistical significance of the negative coefficients on the interaction term in these regressions suggests that the wage gender differential declines for the higher levels of wealth.

Retirement years

The theoretical model also has predictions about gender differentials that would become apparent during retirement years. Since at these later ages labor market human capital has become much less important, many of the outcomes one could observe would be due to differences in investments in household production human capital. We examine two sets of outcomes to assess whether there appears to be evidence of gender differentials in household production human capital that varies by level of wealth. The first set concerns health related issues, and the second set attempts to capture the ability of an elderly person to take care of their own home.

We use a common regression framework for examining how gender differentials in these outcomes vary with wealth. In particular, we regress, either by probit or OLS, an outcome of interest on a second degree polynomial in household per capita income, the elderly person's age, an dummy variable indicating whether the person lived in RS, and a male dummy variable and an interaction between the male dummy variable and per capita income. We interpret the coefficient on the interaction between the male dummy and the income measure as an indicator of how investments in household human capital variable vary by income level. It is important to note that in this part of the analysis we use the household's current income as a proxy for the wealth of the family in which the elderly person grew up.

Table 8 contains the coefficients for the male dummy variable and the interaction of the male dummy variable and per capita income for seven different outcomes⁸. We focus on persons aged 61-74. The first outcome we examine is a dummy variable for whether the elderly person suffered from any chronic disease. We hypothesize that higher level of household human capital would lead to better health investments, so a lower incidence of chronic diseases would be indicative of higher levels of household human capital. From the first row of Table 8 we see that at low income levels men are more likely than women to suffer from a chronic disease, but as income rises the female advantage in household human capital declines. We consider this weak support for the notion suggested by the theoretical model that wealthier families made more equal investments in their children's human capital investments, across genders, than did poor families.

The second row of Table 8 examines whether an elderly person visited a general practitioner during the past four weeks. We posit two interpretations for an increased incidence of doctor visits. In the first, we consider doctor visits to be substitutes for household human capital in the production of health, and in the second, higher levels of doctor visits indicate worse health. For either scenario, lower levels of doctor's visits would indicate higher levels of household human capital. Both the male effect and the male-income interaction operate to support the notion that women have higher levels of household human capital at low income levels and their advantage diminishes at higher income levels. The statistical significance levels of the separate effects, however, are smaller than their joint significance level. The third row of Table 8 examines whether an elderly person, on his or her own initiative, purchased any drugs to treat a health problem. Again, the two coefficients of interest suggest higher levels of household human capital for poor women than for poor men, with this advantage diminishing at higher income levels.

The next set of issues we attempt to examine is the ability of an elderly person to take care of household chores. We have no direct evidence on this type of outcome, but we consider a single, widowed, or divorced elderly individuals who lives on his or her own as one possible measure of higher levels of household human capital. The point

⁸ Complete regressions for these outcomes are available from authors on request.

estimates presented in the fourth row of Table 8 support the notion that women's advantage in household human capital diminishes with income levels, but the results are not statistically significant.

Finally we examine purchases of particular goods by elderly persons living alone as indicators of the level of their household human capital. The fifth row in Table 8 examines the amount spent on meals purchased outside the home during the past seven days. While the pattern of the gender coefficients for expenditures on purchased meals suggest that the gender differential declines with income, none of these effects are statistically significant. The last two rows of Table 8 look at expenditures on cleaning products during the past month and ownership of a clothes washer among those living alone. We interpret higher levels of these outcomes to indicate higher levels of household human capital. The point estimates suggest a convergence of household human capital levels at higher income levels, but the evidence is not as strong as it is for the health related outcomes.

The implication of the theoretical model that there would be a convergence in the levels of household human capital investments between boys and girls with household income does receive some support from this examination of elderly persons' health and abilities to care for a separate household. Women appear to have an advantage in outcomes associated with household production human capital at low income levels, and this advantage declines as income rises. The strongest evidence is for health related outcomes, but there is also some weak evidence in support of the theoretical model when we examined the determinants of living alone and household chore-related purchases among those living alone.

5. Ambiguities in Ascertaining the Direction and Magnitude of Changes in Gender Inequality

When examining changes in inequality for a particular economic outcome, researchers almost always focus on only a single way of measuring the economic outcome. The choice of how to measure is arbitrary, yet simple monotonic transformations of the measure of the outcome of interest can often reverse one's decision about whether a set

of observed changes should be considered a convergence or a divergence in inequality or outcomes. This implies that how one perceives the “value” of particular economic outcomes can have a profound impact on whether one considers a particular set of observed changes as indicative of an increase in inequality, a decrease in inequality, or an inequality neutral set of changes.

In this section we use a simple example to demonstrate how researchers could reach different conclusions about convergence or divergence in inequality even when examining exactly the same data. Such ambiguities can arise from something as simple as changing the method of measuring inequality from an absolute measure to a proportional measure. This is an important issue because it means that an analyst cannot provide appropriate information to policy makers without knowing precisely the metric for measuring inequality that the policy maker believes is correct.

To examine gender-poverty interactions one might compare how investments in education for young boys and girls vary as a function of household income. As a hypothetical example, suppose one observes that at all household income levels boys always have a 10-percentage points higher school enrollment rate than girls. This situation is graphed in Figure 1(A).

If an absolute difference in school enrollments is the appropriate inequality measure to use, then the horizontal line labeled “Gap” on Figure 1(B) describes society’s perception of the differential between boys’ and girls’ enrollment rates. This specification implies that the absolute level of enrollment at different incomes has no impact on how society perceives the gender differential in rates of enrollment. Given this way of valuing school enrollment, the observed differential at various income levels is a pure gender effect with no income interaction. Society in this instance considers a 20-10 differential in enrollment rates (i.e. a 100% relative differential) the same as a 90-80 differential (a 12.5% relative differential).

Instead, one could specify that the appropriate way to measure inequality is in a relative sense, namely the enrollment rate for girls as a fraction of the enrollment rate for boys. The line labeled “Ratio” on Figure 1(B) graphs this inequality measure for the gender specific enrollment rates displayed in Figure 1(A) as a function of income. The above 20-10 differential (with girls having only half the enrollment rate of boys) is

perceived to be a substantially larger differential than the 90-80 differential where the relative enrollment rate for girls is only 11.1% lower than it is for boys. With this method of measuring inequality, there is now strong evidence of gender inequality decreasing with income, even though the same observed differential implied income neutrality of the gender gap for the same “data” with a reasonable, alternative measure of inequality.

As a real-world example, consider the differential in levels of LFP between males and females in Bosnia, shown in Figure 2. This picture is very similar to the one on Figure 1. Given the precision of our estimates, the gender gap in the levels of LFP is almost constant across the income percentiles. The gender ratio dynamics, however, indicates a strong gender-poverty interaction. If one would focus on the relative measure of gender inequality, policy measures that target poor households in Bosnia would be more effective in reducing labor force participation gender differential. On the other hand, a policymaker concerned with absolute measures of inequality would find no reason for such interventions.

The absolute and relative inequality measures just examined are only two of a wide variety of measures one could deem appropriate for specifying the level of inequality. In general, as long as the observed outcomes for both groups experience trends in the same direction, it is likely that different, reasonable measures of inequality could yield different conclusions about the direction of the trend in inequality. This is clearly a serious shortcoming. As researchers, we typically have no reason to select one way to measure gender differences over another without a clear theoretical justification for why one measure is preferable.

It is, however, necessary for one to pick an inequality metric for displaying how the between group outcomes vary across another dimension. One might be able to uncover instances of income neutrality in gender differences, for example, but it is important to recognize that a policy maker’s preferences might correspond to a different metric with different implications about the relationship of gender differences to wealth. The evidences on the differences in gender differentials by poverty status that we presented in the previous section are clearly subject to this criticism. Without more precise knowledge of the social valuations of the characteristics we examined, it is

typically impossible to state unambiguously even the direction of the change in inequality.

6. Conclusions

The goal of this study was to examine how a spectrum of gender differentials varies across income groups over the life cycle. We intentionally refrained from using the term “discrimination” because it is very hard to capture from the household expenditure surveys and because we thought it useful to examine whether simple, household utility-maximizing models could produce testable implications. This is clearly a first step towards an understanding of why gender differences in outcomes vary with the level of household income. We found rather convincing evidence of declining gender differentials for household investments in labor market human capital and labor market outcomes for men and women when household income rises. At the same time, our findings about the trends for investments in home production capital are less compelling. The limitations of this study to a large degree come from insufficient data. Our results would be much more robust if information about family backgrounds, parent’s socio-economic status, and place of residence before age of 15 is available for each member of the household. Clearly, more research and better data are needed to investigate the important phenomenon of the relation of gender and poverty.

The theoretical model developed in this paper provides only ambiguous predictions about the direction of the changes in gender differentials when household income rises. At the same time, the model indicates that in many situations outcomes for male and females should converge for the households with higher incomes. Our empirical analysis found evidence consistent with this hypothesis. In BiH gender inequality across a wide range of outcomes is decreasing with household income. Focusing on primary socioeconomic outcomes that highlight the interactions of gender and poverty throughout the lifecycle, we uncover strong gender-poverty effects in the patterns of labor force participation, differences in earnings, individuals’ school finances and school attendance. Not in all cases are women in BiH at a disadvantage.

In pointing out the strong connection between parental investment in human capital of the children and household income, this paper suggests that early life experiences can have lasting impact on gender inequality. The main source of gender inequality seems to come from different investments in girls' and boys' educations that increase with declines in income levels. Because of this, short-term income shocks could lead to long-term increases in gender inequality in households with school age children, unless there is ready access to credit markets. In Bosnia interventions such as student loans or stipends, similar to Mexican Progresa Poverty Program (e.g., Schultz 2001), could be effective in decreasing gender inequality in educational achievements and future gender inequality in the labor market.

Our analysis found clear evidence of gender differentials even for primary school-aged children, suggesting that such interventions might need to include households with pre-teenaged children. We also found evidence that girls in poor households are less likely to finish secondary school than boys, while at ages 19-21 the gender differential reverses for those who finished secondary school. To reduce future labor market inequality, programs will need to convince girls to finish secondary school. Rewards for graduating might be effective. It might also be necessary to subsidize on post-secondary schooling for men, perhaps in the form of low cost loans. At the same time, income fluctuations in the households with preschool children do not seem to affect the gender differences, as important gender differentials appear to arise only when the children reach school age.

Single adults, especially the single elderly, should be of concern. Single women that come from poor households could be at a great risk of poverty. Lack of labor market human capital would not allow them to succeed on their own, and the low levels of household income would adversely affect the life prospects of children growing up in the family with a low educated single mother (Rosenzweig and Wolpin 1994). Single men and widowers living alone, given the lack of experience in the home activities, could be at great risk. It may be important to construct programs to assist older men living alone or to institute programs that induce these older men to move in with relatives.

Does gender equality affect growth, or economic growth cause greater gender equality, or both? Most of the literature on this topic uses macro data to determine the

direction of causality (e.g., Barro and Lee 1994; Dollar and Gatti 1999; Klasen 1999). Our micro-level findings indicate that economic growth could lead to greater gender equality. The magnitude of the impact of economic development on gender differences will depend on where the growth is concentrated. If the poor capture at least some benefits of economic growth, the gender differences in household investment in human capital of their children will decline. This could have a profound effect on well-being of population on all stages of a life cycle. If, on the other hand, growth is concentrated among the richest, then important gender disparities could remain pervasive.

BiH experienced a substantial economic growth during the last several years. Its economy has almost recovered from the war, and life of Bosnian population is normalizing. The economic development in Bosnia can open many channels for increasing the gender equality. Whether this potential is realized depends on the ability of Bosnian Government to promote economic growth among all groups of population.

References

- Alderman, H., and E. King, (1998) "Gender Differences in Parental Investment in Education." *Structural Change and Economic Dynamics*, Vol. 9(4): 453-68
- Alderman, H., Gertler, P., (1997) "Family Resources and Gender Differences in Human Capital Investments: The Demand for Children's Medical Care in Pakistan." Intra-household resource allocation in developing countries: Models, methods, and policy, Johns Hopkins University Press for the International Food Policy Research Institute, Baltimore and London
- Barro, R., and J. Lee, (1994) "Sources of Economic Growth." *Carnegie-Rochester Conference Series on Public Policy* Vol. 40(0): 1-46
- Becker, G. (1981) "A Treatise on the Family." Harvard University Press, Cambridge, MA
- Berhman, J., (1988) "Intra-household Allocation of Nutrients in Rural India: Are Bays Favored? Do Parent Exhibit Inequality Aversion?" *Oxford Economic Papers*, Vol. 40(1): 32-54
- Berhman, J., Knowles, J., (1999) "Household income and child schooling in Vietnam." *World Bank Economic Review*, Vol. 13: 211-56,
- Berhmen, J., and J. Knowles, (1997) "How strongly is child schooling associated with household income?" University of Pennsylvania and Abt Associates. Mimeo.
- Behrman, J., Pollak, R., and P. Taubman, (1982) "Parental Preferences and Provision for Progeny." *Journal of Political Economy*, Vol. 90(1): 52-73
- Bisogno, M., Chong, A., (2002) "Poverty and Inequality in Bosnia and Herzegovina After the Civil War." *World Development*, Vol. 30(1): 61-75
- Chen, L., Huq, E., and S., D'Souza, (1981) "Sex Bias in the Family Allocation of Food and Health Care in Rural Bangladesh." *Population and Development Review* Vol. 7(1): 55-70
- Coale, A., and J. Banister, (1994) "Five decades of missing females in China." *Demography*, Vol. 31(3) 459-479
- Cox-Edwards, A., (1999) "A Close Look at the Living Standards of Chilean Elderly Men and Women." Paper prepared for the World Bank research project on Gender and Social Security. World Bank, Washington, D.C.
- Dollar, D., and R. Gatti (2000) "Gender Inequality, Income and Growth: Are Good times Good for Women?" Background paper for E. King and A. Mason, eds, *Engendering Development*, World Bank, Washington, D.C.
- Filmer, D., (2000) "Gender and Wealth Disparities in Education: Evidence from 44 Countries," World Bank Policy Research Working Paper No. 2268, The World Bank, Washington, DC.
- Filmer, D., King, E., and L. Pritchett (1998) "Gender Disparity in South Asia: Comparison between and within Countries." Working Paper Series #1867, The World Bank, Washington, DC
- Garg, A., Morduch, J., (1998) "Sibling Rivalry." Harvard Institute for International Development, Development Discussion Paper #630 March 1998
- Hill, A., King, E., (1995) "Women's Education and Economic Well-Being" *Feminist Economics*, Vol.1(2): 21-46

- Ilahi, N., (1999) "Children's Work and Schooling: Does Gender Matter? Evidence from the Peru LSMS Panel Data." World Bank, Latin American and Caribbean Region, Poverty Reduction and Economic Management Unit, Washington, DC
- Jacoby, H., (1994) "Borrowing Constraints and Progress through School: Evidence from Peru" *Review of Economics and Statistics*. 76:151-60
- Klasen, S., (1999) "Does Gender Inequality Reduce Growth and Development? Evidence from Cross-country Regressions," Background paper for E. King and A. Mason, eds, *Engendering Development*, World Bank, Washington, D.C.
- Lloyd, C., Mete, C., and Z. Sathar (2002) "The Effect of Gender Differences in Primary School Acces, Type, and Quality on the Decision to Enroll in Rural Pakistan" Working Paper No. 164, Population Council, Policy Research Division.
- Lokshin, M., (1999) "Household Childcare Choices and Women's Work Behavior in Russia." Research Working Paper #2206, The World Bank, Washington, DC
- Lokshin, M., Glinskaya, E., and M. Garcia (2001) "The Effect of Early Childhood Development Programs on Women's Labor Force Participation and Older Children's Schooling in Kenya." World Bank Policy Research Working Paper No. 2376, The World Bank, Washington, D.C.
- MacIsaac, D. and H. Patrinos (1995) "Labour Market Discrimination Against Indigenous People in Peru." *Journal of Development Studies*, Vol. 32: 218-33
- Pitt, M., Rosenzweig, M., (1990) "Estimating the Intrahousehold Incidence of Illness: Child Health and Gender-Inequality in the Allocation of Time." *International Economic Review*, Vol. 31(4): 969-80
- Strauss, J., and D. Thomas, (1995) "Human Resources: Empirical Modeling of Household and Family Decisions," in Behrman, Jere and T.N. Srinivasan eds., *Handbook of Development Economics Volume 3*, Amsterdam: Elsevier Science.
- Schultz, P., (1987) "School Expenditures and Enrollments, 1960-1980: The Effects of Income, Prices and Population Growth." In D. Gale Johnson and R. Lee, eds., *Population Growth and Economic Development*. Madison: University of Wisconsin Press.
- _____, (2001) "School Subsidies For The Poor: Evaluating The Mexican Progresa Poverty Program." Center Discussion Paper #834, Economic Growth Center, Yale University, New Haven.
- Van de Walle, D., and D. Gunewardena, (2000) "Sources of ethnic inequality in Vietnam." World Bank Policy Research Working Paper No. 2297, The World Bank, Washington, D.C.
- World Bank, (2000) "World Bank Development Indicators", The World Bank, Washington

Table 1: Summary statistics

	RS			FBiH								
	Mean		N*	Mean		N						
Household characteristics	Weighted	Unweighted		Weighted	Unweighted							
Household size	4.09	3.23	2381	4.02	3.07		3001					
Per capita expenditure	2769.30	3161.84	2381	3125.10	3262.43		3001					
Proportion of poor	0.31	0.19	449	0.21	0.17		505					
Proportion of urban	0.19	0.42	1009	0.30	0.66		1981					
Households with children 0-7	0.30	0.20	2381	0.34	0.21		3001					
Households with children 8-14	0.29	0.20	484	0.35	0.22		669					
Households with children 15-21	0.33	0.26	630	0.36	0.26		785					
	Male		Female		Male		Female					
	Mean		Mean		Mean		Mean					
	N		N		N		N					
Individual characteristics	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted				
Age	37.18	37.47	3750	40.24	39.36	3939	35.10	35.77	4406	37.40	38.54	4814
Years of education	10.30	10.76	2241	9.57	10.20	2242	10.62	10.88	2657	9.28	9.69	2768
Children 8-14 in school	0.98	0.97	302	0.97	0.97	329	0.99	0.98	860	0.99	0.98	866
Young adults 15-30 continuing education	0.22	0.30	278	0.19	0.22	151	0.32	0.35	383	0.18	0.21	166
Employment	0.64	0.61	1448	0.36	0.39	864	0.53	0.53	1490	0.29	0.30	843
Hourly wage	1.82	2.18	1197	1.51	1.81	753	2.65	2.58	1312	2.44	2.35	750
Elderly living alone	0.06	0.07	51	0.18	0.18	173	0.05	0.07	54	0.21	0.23	242

Note: N is the number of observations in the sample

Table 2: Expenditure on sweets and fruits, by entity, gender and poverty status. Households with children younger than 7 years of age.

Expenditure		RS				FBiH			
Per capita	Boys	Girls	Gap	Ratio	Boys	Girls	Gap	Ratio	
1	27.98	30.13	-2.15	0.93	32.33	33.28	-0.95	0.97	
2	45.60	44.77	0.83	1.02	53.63	53.73	-0.10	1.00	
3	53.24	55.67	-2.43	0.96	60.88	55.80	5.08	1.09	
4	69.76	69.97	-0.21	1.00	68.36	81.10	-12.74	0.84	
5	89.05	88.47	0.58	1.01	97.25	99.12	-1.87	0.98	

Expenditure on sweets and fruits (OLS)	Coefficient	Std. Error
Boys	-1.556	7.448
Interaction: Expenditure*Boys	-0.002	0.369
Expenditure per capita	3.197	0.491
Expenditure per capita ²	-0.019	0.006
Republica Serbska	-5.484	3.410
Constant	-3.305	7.679
P-value for an adjusted joint Wald test that coefficients on boys and Interaction = 0	0.608	

Table 3: Expenditure on children's clothing and shoes, by entity, gender and poverty status. Households with children younger than 7 years of age.

Expenditure		RS				FBiH			
Per capita	Boys	Girls	Gap	Ratio	Boys	Girls	Gap	Ratio	
1	73.04	85.37	-12.33	0.86	271.33	82.3	189.03	3.30	
2	146.82	115.14	31.68	1.28	109.41	168.77	-59.36	0.65	
3	161.84	152.83	9.01	1.06	175.83	153.98	21.85	1.14	
4	252.72	205.65	47.07	1.23	209.33	324.04	-114.71	0.65	
5	306.6	276.82	29.78	1.11	353.12	359.07	-5.95	0.98	

Expenditure on shoes and clothing (OLS)	Coefficient	Std. Error
Boys	59.930	39.448
Interaction: Expenditure*Boys	-3.219	1.677
Expenditure per capita	16.116	3.270
Expenditure per capita ²	-0.112	0.038
Republica Serbska	-15.426	24.021
Constant	-102.624	49.171
P-value for an adjusted joint Wald test	0.718	

Table 4: Proportion of children age 7-15 attending school during the year 2000/2001 by gender, entity and expenditure per capita quintiles.

Expenditure		RS				FBiH			
Per capita	Boys	Girls	Gap	Ratio	Boys	Girls	Gap	Ratio	
1	0.94	0.94	0.00	1.00	0.96	0.96	0.00	1.00	
2	0.95	0.94	0.01	1.01	0.97	0.95	0.02	1.02	
3	0.97	0.97	0.00	1.00	0.99	0.99	0.00	1.00	
4	1.00	0.97	0.03	1.03	0.95	0.99	-0.04	0.96	
5	0.99	0.99	0.00	0.00	1.00	0.99	0.01	1.01	

Probability of being in school (Probit)	Coefficient	Std. Error
Boys	0.292	0.239
Interaction: Expenditure*Boys	-0.154	0.091
Expenditure per capita	0.378	0.201
Expenditure per capita ²	-0.032	0.026
Republica Serbska	-1.812	0.186
Constant	1.301	0.343
P-value for an adjusted joint Wald test	0.000	

Table 5: Proportion of students among the respondents age 15 to 30 by gender, entity and expenditure per capita quintiles.

Expenditure		RS				FBiH			
Per capita	Males	Females	Gap	Ratio	Males	Females	Gap	Ratio	
1	0.20	0.08	0.12	2.50	0.33	0.07	0.26	4.71	
2	0.24	0.18	0.06	1.33	0.34	0.12	0.22	2.83	
3	0.28	0.20	0.08	1.40	0.36	0.22	0.14	1.64	
4	0.43	0.38	0.05	1.13	0.34	0.29	0.05	1.17	
5	0.42	0.45	-0.03	0.93	0.46	0.42	0.04	1.10	

Probability of being a student (Probit)	Coefficient	Std. Error
Male	0.192	0.042
Interaction: Expenditure*Male	-0.036	0.013
Expenditure per capita	0.100	0.019
Expenditure per capita ²	-0.006	0.001
Republica Serbska	-0.046	0.027
Constant	-0.013	0.047
P-value for an adjusted joint Wald test that coefficients on Male and Interaction = 0	0.000	

Table 6: Probability of Being in the Labor Force by welfare indicator, gender and type of locality. Sample of individuals 15 to 55 years old.

Welfare Measure:	Own education rank with Probit		Spouse's education rank with Probit		Household income with IV LPM estimation	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Male	1.354	0.148	1.275	0.149	0.832	0.141
Interaction: Welfare*Male	-0.709	0.238	-0.660	0.250	-0.151	0.173
Welfare indicator	0.483	0.552	1.084	0.452	0.460	0.022
Welfare indicator ²	0.073	0.039	-0.529	0.410	-0.035	0.141
Republica Serbska	0.255	0.095	0.285	0.094	0.120	0.039
Years of education	0.014	0.027	0.097	0.016	0.024	0.006
Constant	-1.159	0.233	-1.721	0.202	-0.904	0.278
P-value for an adjusted Wald test	0.000		0.000		0.000	

Table 7: Wage by welfare indicator, gender and type of locality. Sample of individuals 15 to 55 years old.

Welfare measure	Own education rank		Spouse education rank		Household income with IV estimation	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Wage (OLS)						
Male	0.477	0.089	0.392	0.109	0.052	0.009
Interaction: Welfare*Male	-0.494	0.152	-0.360	0.184	-0.121	0.065
Welfare indicator	-0.870	0.245	-0.042	0.437	0.034	0.256
Welfare indicator ²	0.113	0.015	0.453	0.345	0.027	0.032
Republica Serbska	-0.399	0.055	-0.397	0.054	0.658	0.216
Years of education	0.029	0.016	0.073	0.006	-0.327	0.055
Constant	-0.005	0.117	-0.333	0.140	-0.516	0.484
P-value for an adjusted Wald test	0.000		0.000		0.000	

Table 8: Male and Male-Income Interaction Coefficients for Elderly Outcomes

	Male Dummy		Male Dummy times per capita expenditure		p-value for Wald test that both equal 0
	Coeff.	Std. Err.	Coeff.	Std. Err.	
<i>Health outcomes</i>					
Chronic Disease (probit)	0.107	0.149	-0.093	0.034	0.000
Visit a General Practitioner (probit)	0.134	0.169	-0.071	0.041	0.031
Purchase Non-Prescription Drugs (Probit)	0.156	0.142	-0.078	0.037	0.023
<i>Household chores</i>					
Live Alone (probit)	-0.179	0.408	0.018	0.123	0.701
Spending on Meals (OLS)	3.194	5.294	-0.478	1.218	0.378
Purchases of Cleaning Products (OLS)	-4.4661	2.248	0.999	0.549	0.099
Ownership of Clothes Washer (probit)	-0.572	0.554	0.121	0.098	0.456

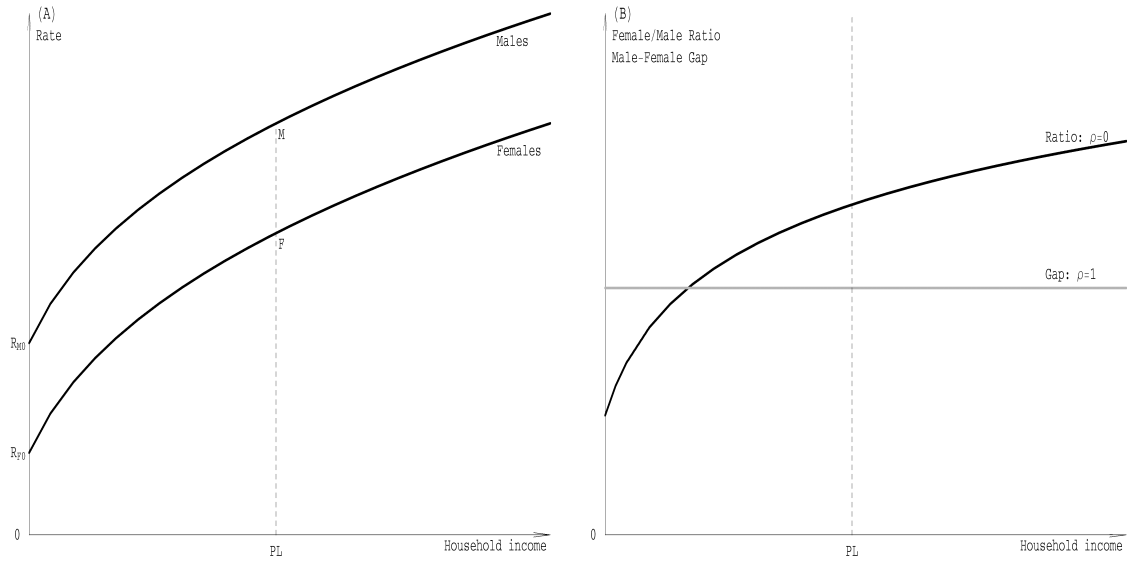


Figure 1: Different measures of gender inequality

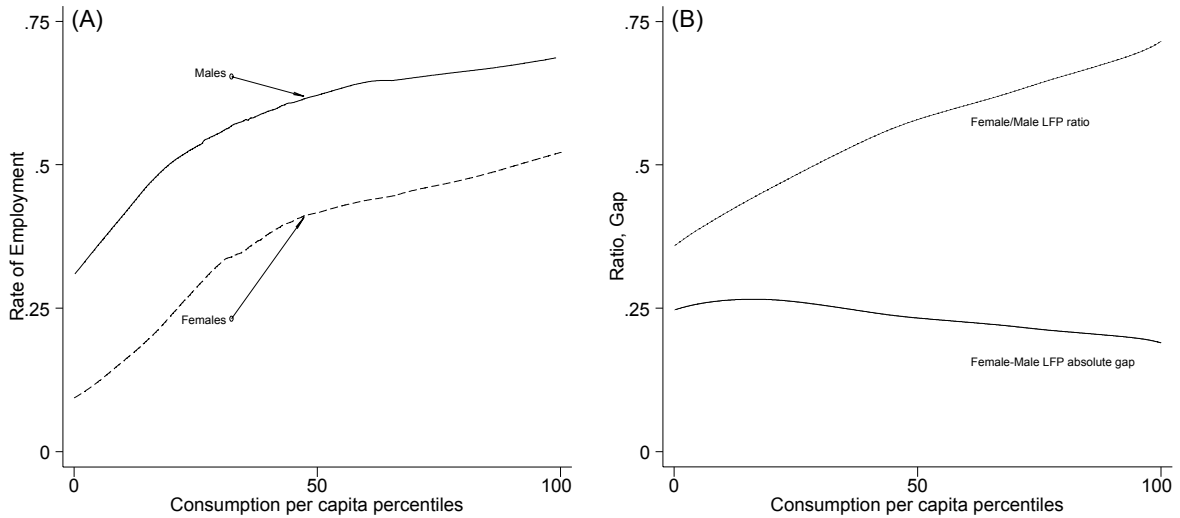


Figure 2: (Panel A) Rates of Employment for men and women age 15-59 by consumption per capita percentiles. (Panel B) Ratio of women's to men's Employment rates and Absolute Gap between women and men's Employment rates by expenditure percentiles.