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Low Social Mobility in Bolivia:
Causes and Consequences for Development

by
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Abstract:

This paper investigates social mobility in Bolivia and discusses its implications for poverty reduction and long-run growth. Regressions based on household survey data show that social mobility is very low in Bolivia, even by Latin American standards. This is mainly caused by an inadequate public education system, a high degree of assortative mating, and insufficient rural-urban migration. As a consequence, poverty tends to be fairly persistent over time. Moreover, low social mobility implies an inefficient use of innate talent and poor incentives for work and study. This prevents the Bolivian economy from reaching its potential growth rates. The paper provides several recommendations for policies to increase social mobility, thereby reducing poverty and increasing long-run growth.

Keywords: Social Mobility, Economic Growth, Public Policy, Bolivia.
JEL classification: E60, I32, J12, J13.

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1. INTRODUCTION

Bolivia has for 15 years been carrying out far-reaching structural reforms in almost all areas of the economy. Yet, all these reforms have had very little impact on the high level of poverty in the country (e.g. Vos, Lee & Mejía 1997). Why have the results been so disappointing? This paper suggests that we have been ignoring one very important aspect, namely social mobility.

Social mobility and income inequality together describe the „fairness" of an income distribution. If income is very unevenly distributed and social mobility is low, then there is a large gap between rich and poor and there is little chance of crossing that gap. This is clearly an „unfair" situation. However, an unequal income distribution becomes much less worrisome if social mobility is high, because then it is relatively easy for poor families to improve their situation over time and over generations.

Thus, income inequality in itself is not sufficient to describe an income distribution. If social mobility is low, high inequality may imply a lack of incentives to work hard, because the amount of effort supplied is unlikely to affect a person's situation. If social mobility is high, on the other hand, the incentives to work hard and be entrepreneurial are good in a country with a highly unequal income distribution, because the expected returns to effort are much higher.

While income inequality measures such as the GINI coefficient are used widely and frequently to characterize income distributions, the degree of mobility across the income distribution, which is potentially more important, is only rarely considered. The problem is that social mobility is very difficult to measure empirically since it requires repeated information on the same people at different points in time. Only a few highly developed countries have the kind of data that allow them to calculate transition matrices directly. Fortunately, some methods have been developed lately that allow the estimation of social mobility from standard household surveys. One such method will be employed in this paper in the case of Bolivia.

The remainder of this paper is organized as follows. Section 2 reviews the theoretical literature on social mobility. It shows that economies with high social mobility tend to experience higher growth rates than economies with low social mobility. Section 3 provides empirical estimates of social mobility in Bolivia and other Latin American countries. It is shown that Bolivia is clearly among the countries with the lowest social mobility. Section 4 uses Bolivian household survey data to explain why social mobility is so low in Bolivia. Section 5 explains the consequences of low social mobility, and Section 6 provides policy recommendations for improving social mobility.

2. SOCIAL MOBILITY IN THEORY

Two recent papers have theoretically analyzed the relationship between social mobility and economic growth (Raut 1996; Hassler & Mora 1998). They both arrive at the conclusion that high social mobility is associated with higher economic growth, but the direction of causality and the transmission mechanisms between mobility and growth differ slightly between the models.

Raut (1996) develops a signalling model of endogenous growth in which innate talents and education levels of workers drive the basic scientific knowledge accumulation in the economy. The innate talent of a worker is private knowledge and is distributed independently of the individual's family background. The education level of workers acts as a signalling device for talents and it improves productivity as well. The optimal education for each worker is determined by his talent and his family background. Whether talented individuals are properly educated and are employed in the appropriate technical sectors is determined by the perfectly competitive and unprejudiced employers' beliefs about the relationship between talent and education level.

The model generates multiple balanced growth paths, which differ in the degree of social mobility and the growth rate. If employers believe that education levels are determined primarily by family background and thus are a poor signal of innate talents, they will offer less attractive wage contracts, because their expected gain from the contract is lower than in the situation where education levels are perfect signals for innate talents. The lower wages induce young people to choose less education, which implies a less than optimal growth rate.

The optimal equilibrium is called a growth-enhancing separating equilibrium. In this situation all children get appropriately educated no matter what their family background, and the employer can trust that any person with a certain education also has the right innate talents to go with it. In this situation all the innate talent in the economy is used optimally and growth is maximized.

To move an economy from a low social mobility–low growth equilibrium to a high mobility–high growth equilibrium will require a change in the employers' self-fulfilling expectations about the importance of family background compared to the importance of innate talents. This can be done through government policy targeted at making the optimal education available for all children independent of their family background. This, in turn, requires a wide range of policy initiatives, ranging from pre-natal care to college loans.

The second study is by Hassler & Mora (1998). They analyze an economy with two types of individuals: workers and entrepreneurs. Entrepreneurs are the ones that generate new ideas and new technologies and make the economy grow. The more intelligent the entrepreneurs the higher the growth rate of the economy. Intelligence is randomly distributed among all people. With low social mobility the current generation of entrepreneurs mainly consists of the children of the previous generation of entrepreneurs. From an intellectual point of view, they are a random sample of society's entire population, and consequently, they have average levels of intelligence. The entrepreneurs are therefore not particularly innovative, and they do not change the world substantially. The entrepreneurs do, however, confront economic challenges, and they learn from these and pass this knowledge on to their children. This is sufficient to give the children of entrepreneurs the slight advantage that will make them the entrepreneurs of the next generation. Consequently, the intelligence of entrepreneurs in an economy with low social mobility will remain on an average level, and the economy will grow only slowly.

In an economy with high social mobility, on the other hand, the entrepreneurial class is formed by the most intelligent people irrespective of their family background. Since the entrepreneurs are very intelligent they can generate a lot of technological change and rapid growth. They thus make the world change rapidly, and the experience that they can pass on to their children thus depreciates so fast that it is of little or no value. The next generation of entrepreneurs will thus be formed by the intellectually gifted people rather than the children of entrepreneurs, since the children of entrepreneurs have no particular advantage in a rapidly changing world. This implies that the economy with high social mobility will enjoy consistently high growth.

Several other papers show how the allocation of talent in an economy is important for the level of growth. Murphy, Shleifer, and Vishny (1991), for example, show that when talented people are attracted to the productive sector, they create high growth, but if they instead are attracted to rent seeking activities, they create stagnation. Their model has an interesting implication regarding discrimination in a country where rent seeking is the most lucrative sector (which could be the case in Bolivia[1]). If talented people are attracted to the rent seeking sector because it offers the highest returns, then discrimination may actually cause higher growth. This is

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[1] Transparency International, a global coalition against corruption, monitors corruption perceptions around the world. According to their most recent figures (Transparency International (2000)), Bolivia is 71st out of 90 countries investigated. This is a relative improvement since 1997, where Bolivia was found to be the second most corrupt country in the world.

the case if a dominant group monopolizes access to the rent seeking sector, because then the intelligent people from the excluded population will have to work in the productive sector and thus generate at least some growth.

In a related paper, Baumol (1990) argues that while it may be difficult for economic policy to affect the supply and quality of entrepreneurs, it may be possible to affect the allocation of entrepreneurship between productive sectors and unproductive sectors, such as rent seeking and organized crime.

The implication of the above mentioned studies is that to achieve optimum growth it is important that people get to work in the sectors where they are most productive. This requires that young people's educational and occupational choices be determined by talent and not limited by family background. That is, it requires high social mobility. But this is not a sufficient condition. It also requires that productive activities yield higher returns to talent than unproductive rent seeking activities. If talent is attracted to rent seeking activities rather than productive activities, then no amount of social mobility can generate growth.

3.   EMPIRICAL ESTIMATES OF SOCIAL MOBILITY IN BOLIVIA

There have been three previous attempts at estimating social mobility in Bolivia (Behrman, Birdsall & Székely 1998; Dahan & Gaviria 2000; and Andersen 2001). All three studies use standard household surveys, since there are no panel data sets available that cover the same families in Bolivia over time.

The basic idea behind all three studies is to measure how important family background is in determining the educational outcomes of young people. If family background is important in determining young peoples' educational level (and through that future income levels) social mobility is considered low. If family background is unimportant, social mobility is high.

Behrman, Birdsall & Székely (1998) and Andersen (2001) measure the influence of family background directly in regressions with schooling gaps as the dependent variable and family background variables as explaining variables. Dahan & Gaviria (2000) measure the influence of family background indirectly by calculating the correlation of schooling gaps between siblings.

The advantage of the Dahan & Gaviria social mobility index is that it does not require the a priori definition of what family attributes are important (e.g. mother's education, family wealth, parental attitudes, etc.) Their index controls for all influences that are common to all children in the same family. The disadvantage is

that at least two siblings in the relevant age range are needed for each family. This implies a dramatic reduction in the sample of young people. Worse, the ones that are left out are unlikely to be similar to those that are included in the analysis, since teenagers with many siblings are much more likely to be included.

Andersen (2001) provides some refinements and improvements to the method proposed in Behrman, Birdsall & Székely (1998). First, the method for determining the importance of family background (Fields' decomposition (see Fields 1996)) is scale-independent, so results do not depend on, for example, the currency in which income is measured. This allows for easy comparison across countries and regions. Second, the method does not require the provision of weights for the different family background variables. Third, the method allows single parent households to be included in the analysis, because the maximum of mother's and father's years of education is used rather than both at the same time. Fourth, Andersen (2001) provides confidence intervals for all social mobility estimates, so that the reader can see whether different measures are actually statistically different. Fifth, in the case of Bolivia, Andersen (2001) provides national estimates, while Behrman, Birdsall & Székely (1998) only includes urban Bolivia.

Since Andersen (2001) is the only study that reports confidence intervals on the social mobility estimates, these are the ones that will be used in this paper. Figure 1 shows the social mobility estimates for 18 countries in Latin America. The index is defined as one minus the importance of family background, implying that higher values of the index is associated with higher social mobility. Appendix A provides an explanation of the use of the Fields' decomposition in the construction of the Social Mobility Index in Andersen (2001).

Figure 1 shows that Bolivia is among the least socially mobile countries in Latin America together with Guatemala, Brazil, Ecuador, and Nicaragua. Chile, Argentina, Uruguay, and Peru, on the other hand, are among the most socially mobile countries in Latin America.

Figure 1 — Social Mobility Index for Teenagers (age 13-19 years)
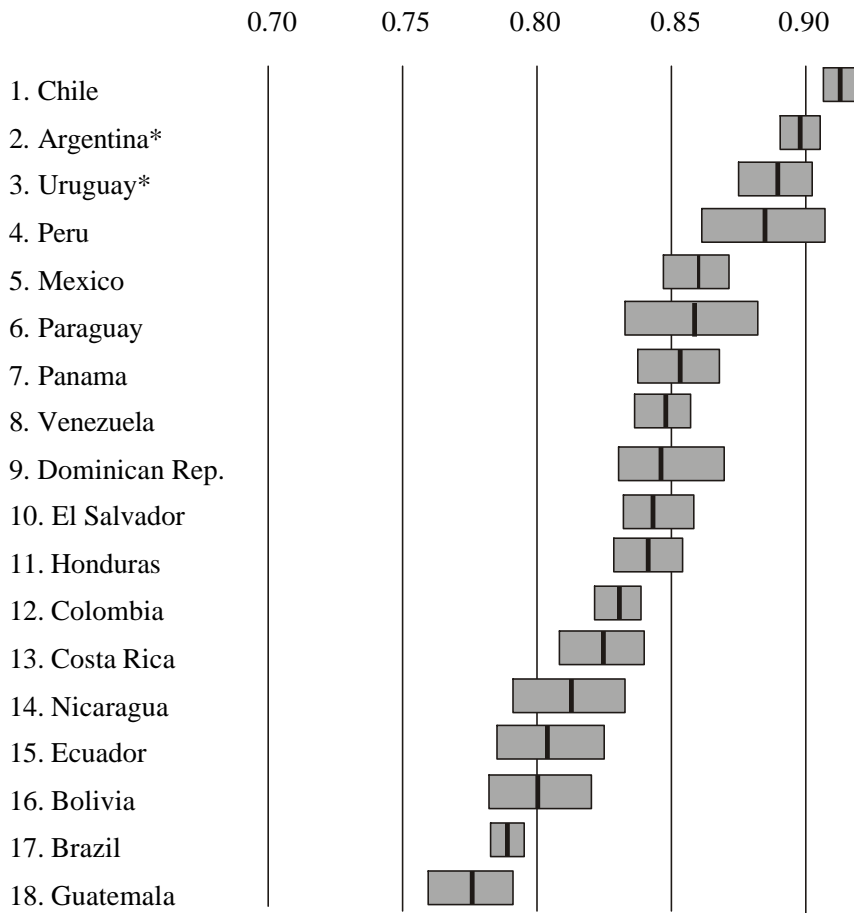
SMI for teenagers (point estimate and 95% confidence interval)

* Based on urban samples only.

Source: Andersen (2001).

The widths of the confidence intervals reflect the sample sizes used to estimate the index. The estimate for Brazil is based on 11761 teenagers, which implies a relatively precise estimate. The estimate for Peru is based on only 2800 teenagers, which implies a much wider confidence interval.

4. DETERMINANTS OF SOCIAL MOBILITY IN BOLIVIA

There are several factors that affect the level of social mobility in a country. The most important one is probably the education system, which will determine how equal opportunities are across different groups of teenagers. If opportunities are relatively equal, high social mobility will be observed, and vice versa if opportunities are very unequal. Another potentially important factor is the marriage market. If people tend to marry only within their own class, the marriage customs tend to dampen social mobility. A third factor that seems to affect the degree of social mobility is the level of urbanization. Across Latin America, the most urbanized countries seem to have the highest levels of social mobility. This suggests that urban teenagers may be more socially mobile than rural teenagers.

The remainder of this section will explore the importance of these three topics in determining the low level of social mobility in Bolivia.

4.1 The Education System

A free education system of high quality would seem the obvious way to increase social mobility. Theoretically, any teenager could then get the education he wants independently of family background. His idea of the ideal education may still depend on family background, though, so social mobility need not be perfect.

In this section, we will first analyze which groups of teenagers are most at risk of not receiving adequate schooling. Second, we will discuss the importance of the quality of schooling, and, third, we will discuss the importance of getting children to start school early.

4.1.1 Who Gets Educated, Who Does Not?

In Bolivia, the normal school entrance age is six years, so a teenager's schooling gap is defined as age minus six minus actual years of schooling. Thus, if an 18 year old teenager has 8 years of education, the schooling gap is 18 - 6 - 8 = 4 years.

To determine which types of teenagers are most likely to lag behind the norm in education, a simple regression is made for all teenagers (aged 13-19) in Bolivia. The dependent variable is the schooling gap which is determined by a list of variables that may affect the schooling gap systematically. This list includes: The log of adult household income per capita (*hhypc*)[2]; the maximum of mother's and father's

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[2] In order to avoid reverse causality between schooling gaps and household income, only adult income is included.

education (*maxedu*); the age of the head of household when the teenager was born (*hhhage*); a dummy if the head of household is female (*femhhh*); a dummy if the head of household is single (*single*); a dummy if the teenager has a younger sister (*kidsis*); a dummy if he has a younger brother (*kidbro*); a dummy if he has an older sister (*oldsis*); a dummy if he has an older brother (*oldbro*); a dummy if the teenager is female (*woman*); the age of the teenager (*edad*); a dummy if the teenager is indigenous (*indi*); a dummy if the teenager is adopted (*adopt*); a dummy if the head of household is self-employed in rural areas (*rurselfh*); a dummy if the head is self-employed in urban areas (*urbselfh*); the log of average adult household income per capita in the state (*avreginc*); average education level in the state (*evregedu*); a dummy if the teenager lives in an urban area (*urban*); and finally a dummy if part of the household income was imputed (*impyA_h*)[3].

The average schooling gap for teenagers in Bolivia is 2.33 years, but it is much higher in rural areas (3.76) than in urban areas (1.58) and much higher for teenagers from poor families than for those from richer families. The regression results and Fields decompositions (see Appendix B, Regression 1) show that the most important variable explaining the variation in schooling gaps is parents' education level (*maxedu*)[4]. A teenager whose most educated parent has 10 years of education will have a schooling gap that is 1.5 years lower than a teenager whose parents do not have any education, everything else being equal.

The second most important factor is residence (urban). Teenagers living in urban areas have, on average, a one year smaller schooling gap than teenagers living in rural areas, when everything else is held constant. This may be a reflection of both lower demand for education and lower supply.

The third most important factor is adult household income per capita (*hhypc*). Higher income significantly reduces schooling gaps.

These results were as expected, but the regressions also show a lot of unexpected results. For example, teenagers from female-headed households (*femhhh*) are not at a disadvantage in Bolivia. Actually there is a tendency for teenagers in female-headed households to be slightly better educated than teenagers from male-headed households, although this result is only significant at the 10% level for all teenagers.

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[3] See Andersen (2001) for justification of these variables. All regression results are given in Appendix B. Since some variables (e.g. *avreginc* and *avregedu*) are clustered at state level, we use the Huber/White/sandwich estimator to estimate cluster corrected (robust) standard errors (see Moulton 1986).

[4] Importance is judged by the Factor Inequality Weights (F.I.W.) generated by the Fields' decomposition. See Appendix A for details.

In rural areas, however, this unexpected result is highly significant. In rural areas teenagers from female-headed households have a 0.9 year smaller schooling gap than teenagers from male-headed households (See Appendix B, Regression 4).

Teenagers from households with single heads (*single*) are not at a significant disadvantage either. For all subgroups (rural, urban, male, female, poor, middle income, rich, indigenous, non-indigenous) the coefficient estimates on the single dummy were negative (indicating smaller schooling gaps), although none were significant at the 5% level.

Another surprising finding is that, on average, it is not a disadvantage to have more siblings in Bolivia (this is in contrast to most other Latin American countries, see Andersen (2001)). Only in urban areas, is it clearly a significant disadvantage to have smaller siblings and older brothers (See Appendix B, Regression 5). To have older sisters is never a disadvantage for any teenager. Older sisters tend to act as an additional mother in the family, providing both care and resources for the younger siblings.

Indigenous teenagers (*indi*) are not generally at a disadvantage, either. Only in urban areas is the indigenous dummy significantly positive, implying that indigenous teenagers have a 0.3 years higher schooling gap than non-indigenous teenagers, when maintaining all other variables constant. Of course, in the aggregate, indigenous teenagers have substantially higher schooling gaps, but that can be attributed to other factors, such as a higher probability of living in rural areas, and of having less educated parents and lower household incomes.

One further unexpected result is that female teenagers (*woman*) are not generally at a disadvantage. Andersen (2001) found that female teenagers are generally better educated than male teenagers in Latin America. One notable exception is rural (and poor) Bolivia, where females tend to have half a year higher schooling gap than the corresponding male teenagers (See Appendix B, Regressions 4 and 6).

The conclusions we can draw from the analysis of schooling gaps in Bolivia are the following: Female teenagers, teenagers from female headed households, teenagers from single headed households, and indigenous teenagers are not particularly at risk of not receiving adequate education. The big overarching problem is to be living in rural areas. There are two obvious solutions to this problem. The first is to migrate from rural to urban areas; the second is to vastly improve access to cheap, high quality schooling in rural areas. From a policy maker's perspective, the first solution would be the most feasible, since the second is immensely expensive in Bolivia due

to the thin scattering of the rural population across large expanses of mountains, valleys, and forests.

4.1.2 School Quality

The preceding analysis has used schooling gaps, or years of missing education, as a measure of educational performance. There is one major drawback with this measure, however: It does not take into account differences in school quality. This is an important consideration in Bolivia, where there are large variations in school quality, and these variations are systematic across different groups of teenagers.

Even if a poor teenager attends school as required at age six and advances one year every year, the public education he has received by the time he is 19 is substantially inferior to the education of a teenager who has been attending an expensive, private school. This means that the real, quality-adjusted schooling gap differences are much larger between rich and poor than the previous analysis suggests. It also means that the effect of household income on real schooling gaps is likely to be underestimated, which in turn means that the level of social mobility is likely to be overestimated.

The biases are likely to be relatively large in countries like Bolivia, where the public education system covers the population quite well, but is of very poor quality compared to private schools. Tests of fourth grade students in La Paz and El Alto in 1992 showed that students from private schools scored substantially better (average 50.90) than students from public schools (average 39.90) on a standardized math test. This was due to a variety of reasons, of which the most important one probably was the lower level of education amongst the parents of the children in public schools. Even when controlling for differences in input (teacher quality, student quality, number of students per teacher, etc) private schools are more efficient than public schools in producing capable students (Vera 1999).

4.1.3   School Starting Age

Andersen (2001) found that across Latin American countries, the countries where children start school at age seven instead of age six (i.e. Guatemala, Brazil, Nicaragua, and Honduras), are among the countries with the largest schooling gaps and the lowest social mobility (see Figure 2). The correlation across Latin American countries between school start age and social mobility is -0.54, and the correlation between school starting age and teenage schooling gaps is 0.66, indicating that it is an advantage to send children to school at age six rather than seven.

Figure 2 — Social Mobility and Schooling Gaps
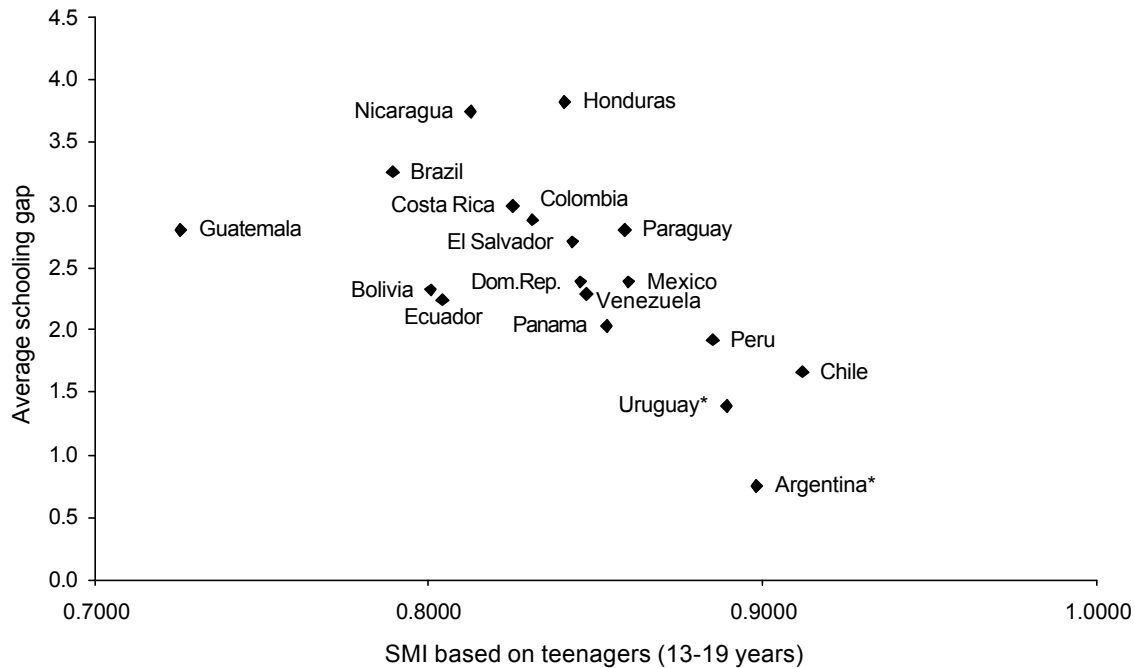
Note: Argentina and Uruguay estimates are based on urban populations only.

Source: Andersen (2001).

Although we do not present empirical evidence for it, we suggest that it may be an advantage to send children to school even earlier than age six. Most rich families in Bolivia already send their children to pre-school around age three, implying that these children develop a firm habit of going to school, a habit of studying and learning, which will make it unlikely that they drop out of school prematurely. The children who have attended pre-school have a three or four year advantage over the

poor children that are not allowed to enter the public education system until after their sixth birthday.

In rural Bolivia, many children delay starting school until they are seven or eight (Urquiola 2000). This is too late an age to establish a solid habit of studying, and the probability that these late starters will drop out early is very high.

This suggests two necessary initiatives for Bolivian policy makers. First, they should offer pre-school facilities in public schools. Second, they should make sure that children do not start school too late.

4.2 Gender Differences

Even though the differences in education levels between male and female teenagers are not statistically significant at the overall level, male teenagers are significantly more socially mobile than female teenagers in Bolivia. The SMI for male teenagers is 0.8282 compared to only 0.7696 for female teenagers (see Appendix B, Regressions 2 and 3).

The real, quality adjusted-difference between male and female social mobility may be even larger than these numbers suggest, if families show a tendency to send their male children to better and more expensive schools than their female children. We do not have the data to support this presumption, but casual observation suggests that it may be true. Parents still expect education to be more useful to boys, since girls probably will get married and spend a lot of time on child rearing.

The fact that women are less mobile in Bolivia, suggests that there may be a lot of talent among women that is not being used optimally from a growth perspective.

4.3 The Marriage Market

The marriage market can work either to increase or to decrease social mobility, depending on the degree of assortative mating in the country. If people tend to marry only people from their own class, then social mobility is restrained by marriage customs. If, on the other hand, people often marry outside their class, then social mobility is promoted by the marriage market. In addition, inequality will be lower, since resources are spread out more evenly across households.

A simple measure of the degree of assortative mating is the correlation between spouses' education levels, ρ_m. This correlation is generally high in Latin America – ranging from 0.67 in Costa Rica to 0.79 in Bolivia. The corresponding figure for the United States in 1990 is 0.62 (Kremer 1996).

In Bolivia, the marriage market contributes to low social mobility as the correlation between spouses' education levels is extremely high (see Figure 3).

Figure 3 — Social Mobility and Assortative Mating
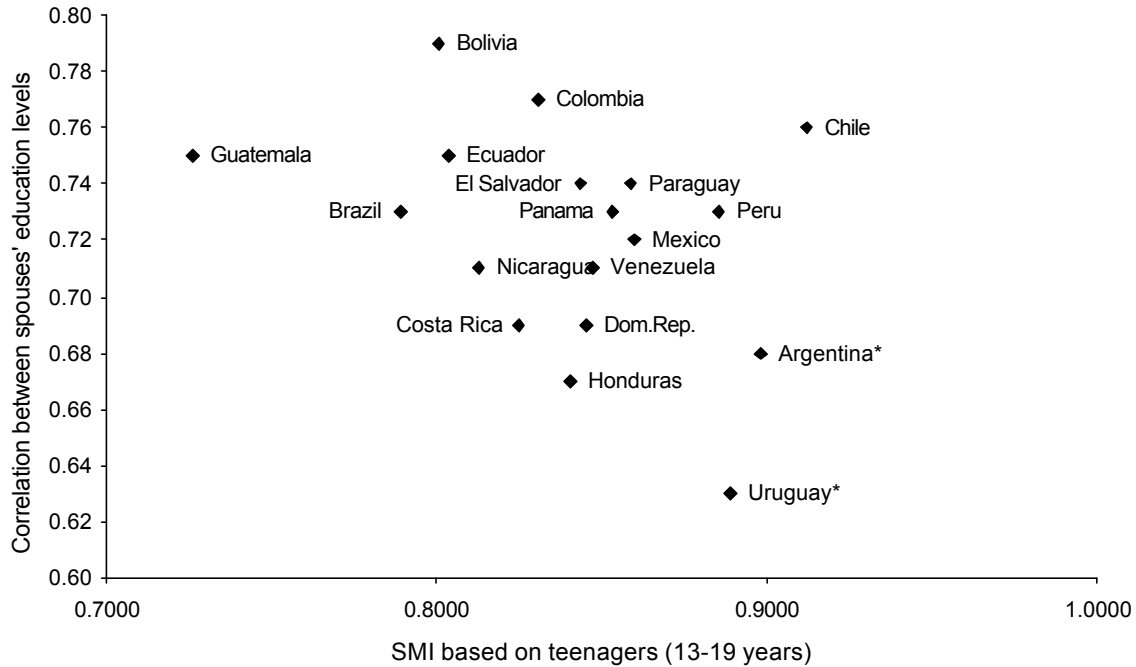
Note: Argentina and Uruguay estimates are based on urban populations only.

Source: Andersen (2001).

While a high degree of assortative mating has a negative impact on equality and lowers social mobility, the situation also has a positive side. Becker (1991) argues that parents have a greater incentive to invest in their childrens' education if this increases the child's chance of marrying a desirable spouse. Kremer (1996) finds that an increase in ρ_m from 0.6 to 0.8 will increase the returns to investment in education by 12.5 percent. In effect, imperfectly assortative marriage can be seen as a tax on parents' investment in their children, with the proceeds going to the children-in-law (Kremer 1996).

While it is clear that the marriage customs in Bolivia contribute to low social mobility, public policy cannot do much to change this situation.

4.4 Urbanization

There is a tendency for highly urbanized countries to have higher social mobility than less urbanized countries, probably because it is easier for the governments to provide decent education for everybody if the children are clustered together in urban centers. Figure 4 shows the relationship between urbanization rates and social mobility, with Argentina and Uruguay having 100% urbanization rates as in the samples used to calculate social mobility.

Figure 4 — Social Mobility and Urbanization Rates
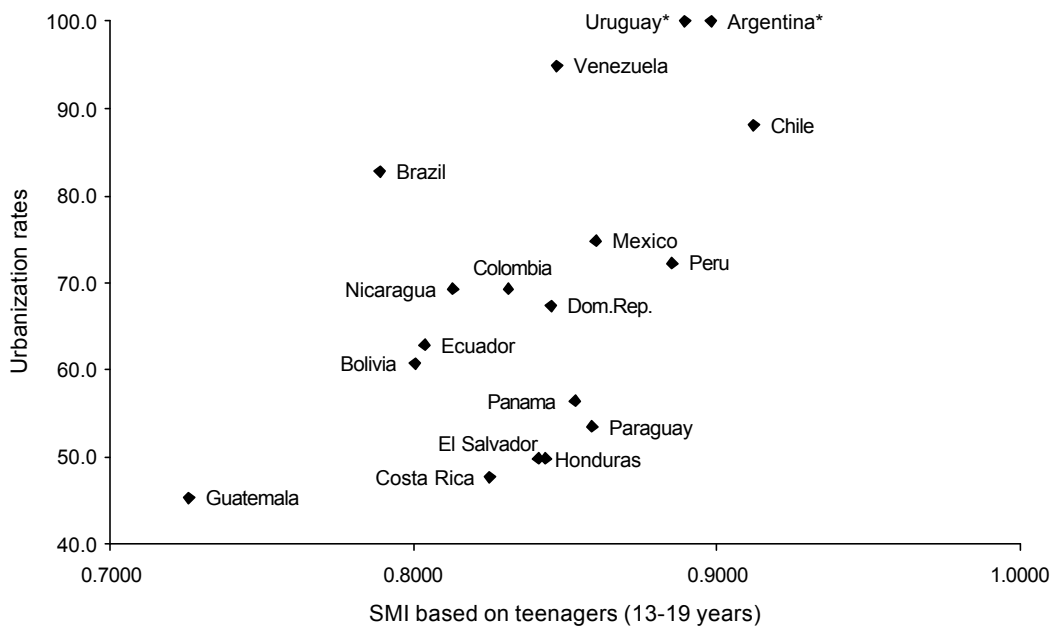
Note: Argentina and Uruguay estimates are based on urban populations only.

Source: Andersen (2001).

The positive relationship between urbanization rates and social mobility ($\rho = 0.55$) leads us to suspect that urban teenagers might be more socially mobile than rural teenagers. This is indeed the case in Bolivia where the SMI index is 0.8841 for urban teenagers and only 0.8239 for rural teenagers. The difference is statistically significant at the 5 percent level. (See Appendix B, Regressions 4 and 5).

The evidence presented on the relationship between urbanization and social mobility suggests one additional reason for encouraging rural-urban migration in Bolivia. It

is much cheaper for the government to provide good quality schooling when students are gathered in urban centers with economies of scale.

5. CONSEQUENCES OF LOW SOCIAL MOBILITY

The theoretical studies of social mobility discussed in section 2 explained one of the main problems with low social mobility, which is inefficient use of innate talent and thus lower than optimal growth rates. Another related problem is one of incentives. Poor people have very little incentive to study hard and work hard, if they know that the likelihood that it will improve their socio-economic status is low. Rich people do not have very good incentives either, since they were born rich and know that they will remain rich no matter how they spend their time. In order to provide good incentives for hard work and entrepreneurial activity, countries need a certain level of social mobility and numerous examples of poor people who have made great advances due to hard work and ingenuity.

5.1 Economic Growth Rates

Andersen (2001) finds a relatively strong positive correlation between Social Mobility and GDP per capita across 18 countries in Latin America, thus lending some empirical evidence to the theoretical arguments presented above.

Figure 5 suggests that Argentina, Chile, and Uruguay are located in high growth – high social mobility equilibria, while Guatemala, Bolivia, Nicaragua, and Colombia are stuck in low growth – low social mobility equilibria (assuming that the higher GDPs are caused by higher long term growth rates).

The correlation between GDP per capita and the Social Mobility Index is 0.53 across Latin American countries. The relatively strong correlation, however, does not imply anything about the direction of causality. It may be that low social mobility causes low growth, or it may be that low growth causes low social mobility. Low growth and low mobility may also be jointly determined as the theoretical models discussed in section 2 indicate.

Figure 5 — Social Mobility and GDP Per Capita
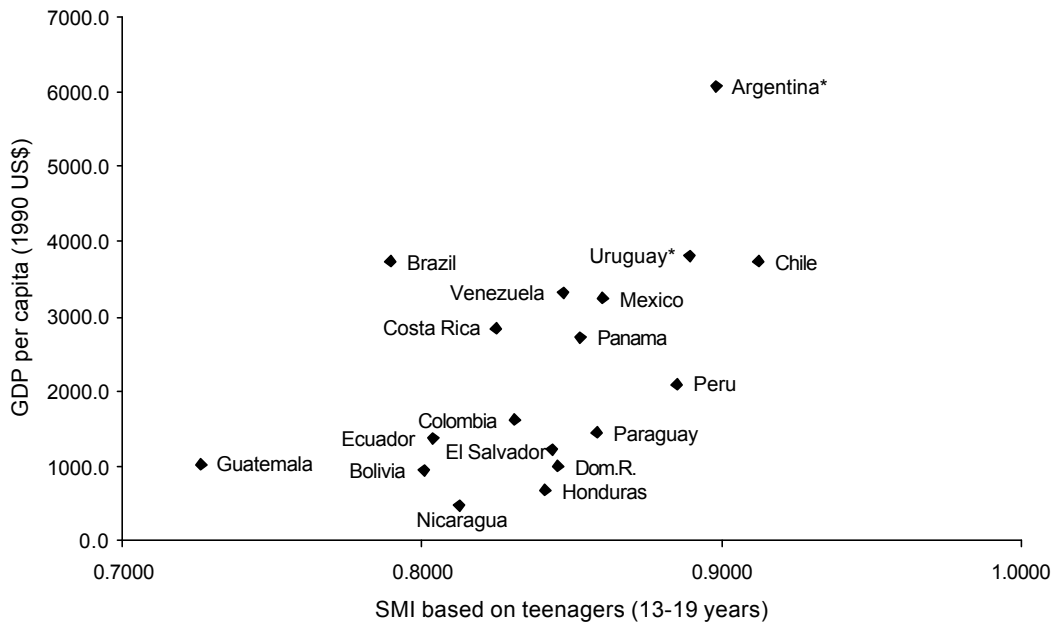
Note: Argentina and Uruguay estimates are based on urban populations only.

Source: Andersen (2001).

Getting out of that low growth – low social mobility equilibrium should be a high priority. Not only would Bolivia likely experience higher growth rates if social mobility is increased, it would probably be good quality growth in the sense that it would have a relatively large impact on inequality and poverty.

5.2 Inequality and Poverty

In countries where social mobility is high and people often marry outside their own class, consumption patterns are likely to be more equal than in countries with low social mobility. This is so because people who have become rich either through education or through marriage are likely to help support their poorer relatives. If the rich and the poor are separated through low social mobility, such sharing is less likely to occur and consumption patters will be more unequal.

Figure 6 shows that there is a very weak negative correlation between social mobility and income inequality ($r = –0.12$). Guatemala, Ecuador, Brazil, and Bolivia all have low social mobility and high income inequality. In these countries there is a large gap between rich and poor and there is little chance of crossing that gap.

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Figure 6 — Social Mobility and Income Inequality
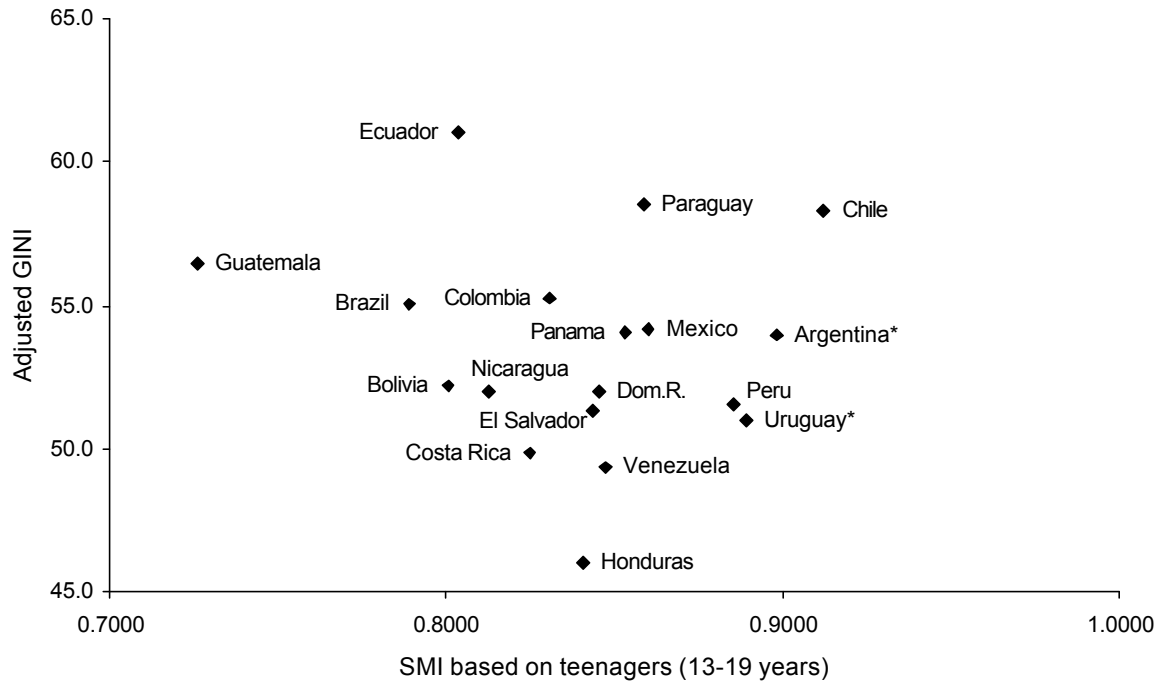
Note: Argentina and Uruguay estimates are based on urban populations only. The GINI coefficients are from Székely and Hilgert (1999), and they are adjusted to be reasonably comparable across countries.

Source: Andersen (2001).

Chile, Paraguay, and Argentina also have high gaps between rich and poor, but the chance of crossing the gap is substantially higher. This implies that the incentive structure in these countries is much better.

While low mobility and high income inequality is clearly the worst combination, high mobility and low income inequality is not necessarily the best. High income inequality and high mobility (as in the case of Chile) may provide better incentives for people to study hard, work hard, be innovative, and take risks, because the returns are higher. Better incentives may lead to greater growth in the long run because the work force is better motivated, better educated, more innovative, and less dependent on social safety nets.

Poverty levels in Bolivia are very high (63 percent by official statistics) and unsustainable. It is of high priority that poverty be reduced substantially and rapidly if Bolivia is to remain a peaceful and democratic country. However, the low degree of social mobility makes this difficult. Not only does Bolivia experience much lower

growth rates than expected, partly due to the low level of social mobility, but the impact of growth on poverty is also very low compared to other developing countries. Nina & Rubio (2001) show that the elasticity of poverty with respect to growth was only -0.75 during the period 1989-1997. This low effect of growth on poverty may be partly explained by the low level of social mobility in Bolivia.

It is thus very important for economic policies to address the problem of low social mobility. Policies targeted at improving social mobility are likely to improve conditions for the poor in the short and medium term and improve economic growth in the long run.

6. CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper has shown that Bolivia has very low social mobility, even by Latin American standards. This low social mobility is likely to constrain long-run growth because human capital is not used efficiently. Increasing social mobility should therefore be a high priority. Not only would it facilitate higher long-run growth rates, but it would likely be a higher quality growth, since the policies needed to improve social mobility are very pro-poor.

The specific policy recommendations that arise from this study are the following:

First, the quality of public education needs to be improved so that publicly educated children can compete with privately educated children. Otherwise, public education is just a waste of time, and poor children will quite rationally drop out and do something more productive. It is important that low family income does not prevent a child from getting a decent education.

Second, it is very important to establish good studying habits in children at an early age. Public schools should therefore offer pre-school facilities, so that poor children are not at a disadvantage right from the beginning. In rural communities and small towns, where there is no choice of schools, children should be automatically inscribed at age six, so that parents are not tempted to delay school enrollment.

Third, since it is substantially cheaper to provide decent education in urban areas, rural-urban migration should be encouraged in order to make more efficient use of the funds available. Although it sounds harsh and anti-poor, it would probably be most efficient to spend relatively little in rural areas and concentrate on providing good facilities (water, electricity, sanitation, health service, and education) for newly arrived migrants in towns and cities. This will encourage an exodus from poor rural areas, which will benefit both those who leave and those who stay and consolidate.

Fourth, the state should offer state-guaranteed educational loans at reasonable interest rates to promising students. The returns to university education are generally high in Bolivia, but not as high as the rates charged in most banks, and most banks will not give credit without collateral so borrowing is usually not an option for poor students.

Fifth, private educational establishments can help by offering scholarships to promising students.

Finally it should be pointed out that while high growth requires high social mobility, this is not a sufficient condition. It also requires that productive activities yield higher returns to talent than unproductive rent seeking activities. If talent is attracted to rent seeking activities rather than productive activities, then no amount of social mobility can generate growth. It is therefore of very high priority that corruption be reduced so that productive activities become attractive.

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APPENDIX A

THE FIELDS' DECOMPOSITION METHODOLOGY

In this appendix we will first provide a theoretical derivation of the Fields' Decomposition methodology, and then we will explain with an example how it is used to calculate the Social Mobility Index.

A.1　A Theoretical Derivation of the Fields' Decomposition

Consider a standard earnings regression:

$$Y = \sum_j a_j Z_j$$

where Y is a vector of log wages for all individuals in the sample and Z is a matrix with j explanatory variables, including an intercept, years of education, experience, experience squared, gender, etc for each individual.

A simple measure of inequality is the variance of the log wage. We therefore take the variance on both sides of the earnings equation. The right hand side can be manipulated using the following theorem:

> **Theorem (Mood, Graybill, and Boes):** Let $Z_1,\ldots,Z_J$ and $Y_1,\ldots,Y_M$ be two sets of random variables and $a_1,\ldots,a_J$ and $b_1,\ldots,b_M$ be two sets of constants. Then
>
> $$\mathrm{cov}\left[\sum_{j=1}^{J} a_j Z_j; \sum_{m=1}^{M} b_m Y_m\right] = \sum_{j=1}^{J}\sum_{m=1}^{M} a_j b_m\, \mathrm{cov}\left[Z_j, Y_m\right]$$

Applying the theorem in the context of a single random variable $Y=\sum_j a_j Z_j$, we have

$$\mathrm{cov}\left[\sum_{j=1}^{J} a_j Z_j; Y\right] = \sum_{j=1}^{J} \mathrm{cov}\left[a_j Z; Y\right]$$

But since the left-hand side of this expression is the covariance between Y and itself, it is simply the variance of Y. Thus,

$$s^2(Y) = \sum_{j=1}^{J} \text{cov}\left[a_j Z_j; Y\right]$$

Or, upon dividing through by $s^2(Y)$,

$$1 = \frac{\sum_{j=1}^{J} \text{cov}\left[a_j Z_j; Y\right]}{s^2(Y)} \equiv \sum_{j=1}^{J} s_j,$$

Where each s_j is given by

$$s_j = \frac{\text{cov}\left[a_j Z_j; Y\right]}{s^2(Y)} = \frac{a_j \cdot s(Z_j) \cdot cor\left[Z_j; Y\right]}{s(Y)}.$$

The s_j's are the factor inequality weights (F.I.W.) and they add to 1 over all explanatory factors. Each s_j is decomposable in an intuitively appealing manner. For example, years of education (edu) explains a larger share of income inequality

- the higher the regression coefficient on education (a_{edu}) in the earnings regression is,
- the higher the standard deviation of years of education (s_{edu}) is, and
- the higher the correlation between education and earnings (cor(edu,Y)) is.

Fields (1996) also shows that this decomposition carries over to other commonly used inequality measures, such as the Gini coefficient, the Atkinson index, the generalized entropy family, as well as the log variance.

A.2 Using the Fields' Decomposition for Calculating the Social Mobility Index

The Fields' Decomposition allows us to judge the importance of each explanatory variable by its factor inequality weights (F.I.W.). For example, the Fields' Decomposition for Regression 1 in Appendix B, shows a F.I.W. for *maxedu* (the maximum of parents' years of education) of $s_{maxedu} = 0.1316$, which means that *maxedu* explains 13.16 percent of the total variation in education gaps for teenagers. The F.I.W. for *hhypc* (adult household income per capita) is $s_{hhypc} = 0.0680$, implying that *hhypc* explains 6.8 percent of the total variation in education gaps. Together, these two family background variables explain 19.96 percent of the total variation in education gaps.

These two variables (adult household income per capita and the maximum years of education of the parents) are chosen to represent family background. If family background is important we will say that social mobility is low, and vice versa. We therefore define the Social Mobility Index as:

$$SMI = 1 - (s_{maxedu} + s_{hhypc}).$$

For the example above, this results in a $SMI = 1 - (0.0680 + 0.1316) = 0.8004$.

If we divide the whole teenage population into subgroups, for example teenagers from poor, middle income, and rich households, respectively, we cannot expect the three resulting subgroup estimates of Social Mobility to average to the estimate for the whole group. This is quite obvious, since by dividing into sub-groups we reduce the variation in some of the explanatory variables. For example, the *hhypc* and the *maxedu* variables will have lower explanatory power for homogeneous subgroups than they will for the whole sample. This means that the importance of family background in general would be smaller for the subgroups, and it is thus possible that the SMI estimates for all subgroups are higher than for the whole group.

Care should therefore be taken in the interpretation of SMIs for subgroups. While we can compare the SMIs between rich and poor, we cannot compare the SMI estimate for rich teenagers to the SMI estimate for all teenagers.

The same holds for other subgroups. For example, if we divide the population into rural and urban teenagers, we are likely to take out some of the explanatory power of *hhypc* and *maxedu*, since rural households generally earn less than urban households and since rural parents are generally much less educated. This means

that the SMI estimates for rural and urban teenagers may both be higher than for the whole group. This again means that while we can compare SMI estimates for rural and urban teenagers, we cannot compare the SMI estimate for rural teenagers with the SMI estimate for all teenagers.

APPENDIX B

REGRESSION RESULTS AND FIELDS DECOMPOSITIONS FOR BOLIVIA 1997

REGRESSION 1:   FIELDS DECOMPOSITION FOR TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi
  adopt rurselfh urbselfh avreginc avregedu urban impyA_h if teen==1

Regression with robust standard errors

Number of obs   =   5444
F(7,   8)   =   36.29
Prob > F   =   0.0000
R-squared   =   0.3773

Number of clusters (region) = 9   Root MSE   =   2.0214

```
------------------------------------------------------------------------------
             |               Robust
     edugap  |     Coef.    Std. Err.       t      P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      hhypc  |  -.316826    .0432022     -7.334    0.000    -.4164505   -.2172016
     maxedu  |  -.147658    .0101576    -14.537    0.000    -.1710814   -.1242347
     hhhage  | -.0055892    .0037234     -1.501    0.172    -.0141753    .002997
     femhhh  |  -.357662    .1738904     -2.057    0.074    -.7586539    .0433299
     single  | -.2484492    .1430467     -1.737    0.121    -.5783155    .081417
     kidsis  |  .1249404    .0842932      1.482    0.177      -.06944    .3193208
     kidbro  |  .1272927    .0798303      1.595    0.149    -.0567963    .3113818
     oldsis  |  .0017617    .0467524      0.038    0.971    -.1060496    .109573
     oldbro  |  .1153901    .0547652      2.107    0.068    -.0108986    .2416789
      woman  |  .1179128    .0766911      1.538    0.163    -.0589371    .2947627
       edad  |   .355573    .0421096      8.444    0.000     .2584681    .4526779
       indi  |  -.025555     .146361     -0.175    0.866     -.363064    .3119541
      adopt  |   .350004    .1473414      2.375    0.045     .0102342    .6897738
   rurselfh  | -.8796557    .3543126     -2.483    0.038    -1.696702   -.0626094
   urbselfh  | -.0759208    .1091731     -0.695    0.506    -.3276744    .1758328
   avreginc  |  .7471495    .3271741      2.284    0.052    -.0073152    1.501614
   avregedu  | -.4406741    .2270024     -1.941    0.088    -.9641426    .0827944
      urban  | -1.014207    .2602072     -3.898    0.005    -1.614246    -.414168
    impyA_h  |   1.13518    .1358325      8.357    0.000     .8219493    1.44841
      _cons  | -1.243444    .9937423     -1.251    0.246    -3.535018    1.048129
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.3168	1.3696	-0.4007	0.0680
maxedu	-0.1477	4.9618	-0.4593	0.1316
hhhage	-0.0056	10.9252	0.1087	-0.0026
femhhh	-0.3577	0.3678	-0.0372	0.0019
single	-0.2484	0.3850	-0.0198	0.0007
kidsis	0.1249	0.4864	0.0898	0.0021
kidbro	0.1273	0.4761	0.0977	0.0023
oldsis	0.0018	0.4700	-0.0656	0.0000
oldbro	0.1154	0.4820	-0.0228	-0.0005
woman	0.1179	0.4997	0.0069	0.0002
edad	0.3556	1.8926	0.2299	0.0605
indi	-0.0256	0.4584	0.2163	-0.0010
adopt	0.3500	0.3090	0.0227	0.0010
rurselfh	-0.8797	0.1735	0.0106	-0.0006
urbselfh	-0.0759	0.3408	-0.1029	0.0010
avreginc	0.7471	0.4186	-0.1212	-0.0148
avregedu	-0.4407	0.6844	-0.1717	0.0203
urban	-1.0142	0.4753	-0.4053	0.0764
impyA_h	1.1352	0.2674	0.2598	0.0308

Sum of Factor Inequality Weights = 0.3773

Social Mobility Index = 0.8004 (SD = 0.0095; 95% confidence interval:
[0.7819:0.8202]).

REGRESSION 2: FIELDS DECOMPOSITION FOR MALE TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro e dad indi adopt rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(sexo==1)

```
Regression with robust standard errors          Number of obs  =    2821
                                                F( 7,    8)    =   25.95
                                                Prob > F       =  0.0001
                                                R-squared      =  0.3348
Number of clusters (region) = 9                 Root MSE       =  2.0397

------------------------------------------------------------------------------
             |               Robust
    edugap   |     Coef.   Std. Err.       t     P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
    hhypc  | -.2768058   .0533526    -5.188   0.001    -.3998371   -.1537744
   maxedu  | -.1396912   .0135312   -10.324   0.000    -.1708942   -.1084883
   hhhage  | -.0051077   .0039164    -1.304   0.228    -.0141389    .0039235
   femhhh  | -.2485245   .1885753    -1.318   0.224    -.6833798    .1863309
   single  |  -.245431   .1836548    -1.336   0.218    -.6689397    .1780778
   kidsis  |  .0824528   .0887091     0.929   0.380    -.1221108    .2870163
   kidbro  |  .2163328   .0835768     2.588   0.032     .0236044    .4090613
   oldsis  |  .0464192    .059834     0.776   0.460    -.0915582    .1843966
   oldbro  |  .1323363    .068617     1.929   0.090    -.0258948    .2905674
     edad  |  .3493098   .0503461     6.938   0.000     .2332114    .4654082
     indi  | -.1290657   .1692059    -0.763   0.467    -.5192552    .2611238
    adopt  |  .0548292   .2228311     0.246   0.812    -.4590201    .5686786
  rurselfh |  -.714306   .2876617    -2.483   0.038    -1.377655    -.050957
  urbselfh | -.1102016   .1401337    -0.786   0.454    -.4333505    .2129474
  avreginc |  .8149473   .4172041     1.953   0.087    -.1471271    1.777022
  avregedu |  -.529859    .253545    -2.090   0.070    -1.114535    .0548168
    urban  | -.8205197   .2629242    -3.121   0.014    -1.426824   -.2142155
  impyA_h  |  1.125172   .2278769     4.938   0.001     .5996866    1.650657
    _cons  | -1.389097   1.302369    -1.067   0.317    -4.392366    1.614172
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.2768	1.3846	-0.3589	0.0552
maxedu	-0.1397	4.8985	-0.4249	0.1166
hhhage	-0.0051	10.8425	0.0936	-0.0021
femhhh	-0.2485	0.3666	-0.0350	0.0013
single	-0.2454	0.3872	-0.0284	0.0011
kidsis	0.0825	0.4881	0.0892	0.0014
kidbro	0.2163	0.4790	0.1134	0.0047
oldsis	0.0464	0.4669	-0.0460	-0.0004
oldbro	0.1323	0.4812	-0.0381	-0.0010
edad	0.3493	1.9085	0.2316	0.0619
indi	-0.1291	0.4542	0.1669	-0.0039
adopt	0.0548	0.3005	-0.0245	-0.0002
rurselfh	-0.7143	0.1680	0.0042	-0.0002
urbselfh	-0.1102	0.3396	-0.1022	0.0015
avreginc	0.8149	0.4205	-0.0947	-0.0130
avregedu	-0.5299	0.6855	-0.1723	0.0251
urban	-0.8205	0.4803	-0.3589	0.0567
impyA_h	1.1252	0.2704	0.2456	0.0300

Sum of Factor Inequality Weights = 0.3348

Social Mobility Index = 0.8282 (SD = 0.0133; 95% confidence interval: [0.8019:0.8529]).

REGRESSION 3: FIELDS DECOMPOSITION FOR FEMALE TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro e dad indi adopt rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(sexo==2)

```
Regression with robust standard errors          Number of obs =    2623
                                                F( 7,   8)   =   58.03
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4319
Number of clusters (region) = 9                 Root MSE      =  1.9851


------------------------------------------------------------------------------
            |               Robust
     edugap |     Coef.   Std. Err.       t     P>|t|    [95% Conf. Interval]
------------+-----------------------------------------------------------------
      hhypc | -.3658696   .0496511     -7.369   0.000   -.4803652   -.251374
     maxedu | -.1546924   .0096201    -16.080   0.000   -.1768765  -.1325084
     hhhage | -.0060756   .0040664     -1.494   0.174   -.0154527   .0033015
     femhhh | -.5025975   .2627501     -1.913   0.092     -1.1085   .1033053
     single | -.2171451   .1964845     -1.105   0.301   -.6702393   .2359491
     kidsis |  .1734059   .1045005      1.659   0.136   -.0675728   .4143845
     kidbro |  .0280516   .1082498      0.259   0.802   -.2215728   .2776759
     oldsis | -.0436004   .0730273     -0.597   0.567   -.2120016   .1248008
     oldbro |  .0667858   .1042736      0.640   0.540   -.1736695   .3072411
       edad |   .356593   .0363161      9.819   0.000    .2728479    .440338
       indi |  .0714358    .132904      0.537   0.606   -.2350415    .377913
      adopt |  .6240256   .1702746      3.665   0.006    .2313716    1.01668
   rurselfh | -1.072602    .457056     -2.347   0.047   -2.126575  -.0186291
   urbselfh | -.0591388    .095777     -0.617   0.554   -.2800009   .1617233
   avreginc |  .7123416   .2378548      2.995   0.017    .1638475   1.260836
   avregedu |  -.357764   .1962581     -1.823   0.106    -.810336    .094808
      urban | -1.237952   .2770018     -4.469   0.002    -1.87672  -.5991851
    impyA_h |   1.13622   .1678426      6.770   0.000    .7491745   1.523266
      _cons | -.9398751   .6477772     -1.451   0.185   -2.433652   .5539019
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

```
X             Coeff.     Sd(X)   Corr(X,Y)     F.I.W.

hhypc        -0.3659    1.3534    -0.4452      0.0840
maxedu       -0.1547    5.0267    -0.4943      0.1464
hhhage       -0.0061   11.0154     0.1239     -0.0032
femhhh       -0.5026    0.3692    -0.0396      0.0028
single       -0.2171    0.3826    -0.0109      0.0003
kidsis        0.1734    0.4846     0.0904      0.0029
kidbro        0.0281    0.4728     0.0814      0.0004
oldsis       -0.0436    0.4732    -0.0856      0.0007
oldbro        0.0668    0.4829    -0.0073     -0.0001
edad          0.3566    1.8758     0.2284      0.0582
indi          0.0714    0.4629     0.2658      0.0033
adopt         0.6240    0.3179     0.0679      0.0051
rurselfh     -1.0726    0.1791     0.0165     -0.0012
urbselfh     -0.0591    0.3422    -0.1037      0.0008
avreginc      0.7123    0.4166    -0.1487     -0.0168
avregedu     -0.3578    0.6833    -0.1715      0.0160
urban        -1.2380    0.4692    -0.4553      0.1008
impyA_h       1.1362    0.2642     0.2751      0.0315
```

Sum of Factor Inequality Weights = 0.4319

Social Mobility Index = 0.7696 (SD = 0.0139; 95% confidence interval:
                        [0.7369:0.7890]).

REGRESSION 4: FIELDS DECOMPOSITION FOR RURAL TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi adopt
  selfemp avreginc avregedu impyA_h if (urban==0)&(teen==1)

```
Regression with robust standard errors          Number of obs =    1876
                                                F( 6,    7)   =    4.58
                                                Prob > F      =  0.0331
                                                R-squared     =  0.4253
Number of clusters (region) = 8                 Root MSE      =  2.1755


------------------------------------------------------------------------------
          |               Robust
   edugap |    Coef.    Std. Err.       t      P>|t|     [95% Conf. Interval]
----------+-------------------------------------------------------------------
    hhypc | -.3381568    .052894     -6.393    0.000    -.4632312   -.2130824
   maxedu | -.2690185   .0248655    -10.819    0.000    -.3278161   -.2102208
   hhhage | -.0084525   .0069615     -1.214    0.264    -.0249139    .0080089
   femhhh | -.9104976   .2090022     -4.356    0.003    -1.404709    -.416286
   single | -.1897753   .2517062     -0.754    0.475    -.7849659    .4054152
   kidsis |  .1541764   .1586966      0.972    0.364    -.2210814    .5294341
   kidbro | -.1643277   .1698819     -0.967    0.366    -.5660345    .2373791
   oldsis |  .0259648   .1511989      0.172    0.869    -.3315637    .3834933
   oldbro |  .1103368   .1260697      0.875    0.410    -.1877706    .4084443
    woman |  .5018089   .1526727      3.287    0.013     .1407953    .8628225
     edad |  .6601181   .0758944      8.698    0.000     .4806562    .8395799
     indi | -.2383335   .2768436     -0.861    0.418    -.8929644    .4162975
    adopt |   .479204   .2275345      2.106    0.073    -.0588297    1.017238
  selfemp |  .4816764   .7858344      0.613    0.559    -1.376527    2.33988
 avreginc |  .7286362   .5683031      1.282    0.241     -.615187    2.07246
 avregedu | -.4950101   .3148645     -1.572    0.160    -1.239546    .249526
  impyA_h |  1.044581    .142057      7.353    0.000     .7086699    1.380493
    _cons |  -4.81857   1.565307     -3.078    0.018    -8.519933   -1.117207
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.3382	1.4177	-0.2685	0.0451
maxedu	-0.2690	3.3803	-0.4117	0.1310
hhhage	-0.0085	11.2042	0.1697	-0.0056
femhhh	-0.9105	0.3256	-0.0594	0.0062
single	-0.1898	0.3611	-0.0060	0.0001
kidsis	0.1542	0.4760	0.0122	0.0003
kidbro	-0.1643	0.4680	-0.0074	0.0002
oldsis	0.0260	0.4365	-0.0250	-0.0001
oldbro	0.1103	0.4733	-0.0342	-0.0006
woman	0.5018	0.4983	0.0974	0.0085
edad	0.6601	1.8808	0.4545	0.1975
indi	-0.2383	0.4966	0.0122	-0.0005
adopt	0.4792	0.2817	0.0554	0.0026
selfemp	0.4817	0.1027	0.0522	0.0009
avreginc	0.7286	0.4366	-0.1398	-0.0156
avregedu	-0.4950	0.7430	-0.1957	0.0252
impyA_h	1.0446	0.3862	0.2127	0.0300

Sum of Factor Inequality Weights = 0.4253

Social Mobility Index = 0.8239 (SD = 0.0134; 95% confidence interval: [0.7975:0.8515]).

REGRESSION 5:   FIELDS DECOMPOSITION FOR URBAN TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi adopt
  selfemp avreginc avregedu impyA_h if (urban==1)&(teen==1)

```
Regression with robust standard errors              Number of obs =    3568
                                                    F( 7,    8)   = 153.17
                                                    Prob > F      = 0.0000
                                                    R-squared     = 0.1932
Number of clusters (region) = 9                     Root MSE      = 1.8119


------------------------------------------------------------------------------
         |               Robust
  edugap |     Coef.    Std. Err.      t      P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
   hhypc |  -.226436    .0828563    -2.733    0.026     -.417503    -.035369
  maxedu |  -.1096005   .0112288    -9.761    0.000     -.1354941   -.0837069
  hhhage |  -.0075496   .0033249    -2.271    0.053     -.0152169    .0001177
  femhhh |  -.079577    .1982048    -0.401    0.699     -.5366381    .3774842
  single |  -.2312364   .1603748    -1.442    0.187     -.6010613    .1385886
  kidsis |   .191877    .0865648     2.217    0.057     -.0077418    .3914959
  kidbro |   .3672052   .0738127     4.975    0.001      .1969927    .5374176
  oldsis |   .0022145   .0753552     0.029    0.977     -.1715548    .1759838
  oldbro |   .1602877   .0406068     3.947    0.004      .0666484    .2539271
   woman |  -.1186238   .0612536    -1.937    0.089     -.2598749    .0226273
    edad |   .1851434   .0173276    10.685    0.000      .1451859    .225101
    indi |   .2902827   .1170226     2.481    0.038      .0204282    .5601373
   adopt |   .280706    .1690673     1.660    0.135     -.1091638    .6705759
 selfemp |  1.099076    .2453844     4.479    0.002      .5332188   1.664934
avreginc |   .7609878   .2005806     3.794    0.005      .2984481   1.223528
avregedu |  -.3228416   .1629968    -1.981    0.083     -.6987129    .0530297
 impyA_h |   .9466468   .5929131     1.597    0.149     -.4206132   2.313907
   _cons |  -1.247762   .7338498    -1.700    0.127     -2.940023    .4444985
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.2264	1.0432	-0.2312	0.0271
maxedu	-0.1096	4.8973	-0.3327	0.0887
hhhage	-0.0075	10.7252	0.0197	-0.0008
femhhh	-0.0796	0.3865	0.0288	-0.0004
single	-0.2312	0.3963	0.0054	-0.0002
kidsis	0.1919	0.4907	0.1201	0.0056
kidbro	0.3672	0.4799	0.1656	0.0145
oldsis	0.0022	0.4823	-0.0205	0.0000
oldbro	0.1603	0.4859	0.0145	0.0006
woman	-0.1186	0.5000	-0.0312	0.0009
edad	0.1851	1.8939	0.1557	0.0271
indi	0.2903	0.3703	0.1080	0.0058
adopt	0.2807	0.3220	0.0414	0.0019
selfemp	1.0991	0.1254	0.1097	0.0075
avreginc	0.7610	0.3969	0.0238	0.0036
avregedu	-0.3228	0.6365	-0.0484	0.0049
impyA_h	0.9466	0.1481	0.0925	0.0064

Sum of Factor Inequality Weights = 0.1932

Social Mobility Index = 0.8841 (SD = 0.0094; 95% confidence interval: [0.8638:0.8998]).

REGRESSION 6: FIELDS DECOMPOSITION FOR TEENAGERS FROM POOR HOUSEHOLDS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi adopt rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(inclevel==1)

Regression with robust standard errors

Number of obs =	1818
F(7, 8) =	49.99
Prob > F =	0.0000
R-squared =	0.4005
Root MSE =	2.2098

Number of clusters (region) = 9

edugap	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
hhypc	-.3072771	.0603126	-5.095	0.001	-.4463582	-.1681961
maxedu	-.2370502	.0198976	-11.914	0.000	-.282934	-.1911663
hhhage	-.0099933	.00262	-3.814	0.005	-.016035	-.0039516
femhhh	-.5022603	.2455886	-2.045	0.075	-1.068589	.064068
single	-.5236802	.2514279	-2.083	0.071	-1.103474	.0561136
kidsis	.1339907	.1316244	1.018	0.338	-.1695359	.4375172
kidbro	.0779731	.1573632	0.495	0.634	-.284907	.4408532
oldsis	-.0177386	.1245419	-0.142	0.890	-.3049328	.2694557
oldbro	.1871659	.1196951	1.564	0.157	-.0888515	.4631834
woman	.4807173	.1015102	4.736	0.001	.2466345	.7148001
edad	.6040197	.0740406	8.158	0.000	.4332816	.7747577
indi	-.2185866	.2546128	-0.859	0.416	-.8057248	.3685517
adopt	.3175135	.1648464	1.926	0.090	-.062623	.69765
rurselfh	-.7604849	.3320438	-2.290	0.051	-1.526179	.0052095
urbselfh	.2227582	.3395619	0.656	0.530	-.5602731	1.005789
avreginc	.828583	.5513002	1.503	0.171	-.4427176	2.099884
avregedu	-.4611181	.3559812	-1.295	0.231	-1.282012	.3597759
urban	-1.056208	.4048872	-2.609	0.031	-1.98988	-.1225369
impyA_h	.9935682	.1635634	6.075	0.000	.6163903	1.370746
_cons	-4.798739	1.504621	-3.189	0.013	-8.268401	-1.329078

Fields Decomposition and Social Mobility Index

```
X            Coeff.     Sd(X)   Corr(X,Y)    F.I.W.

hhypc       -0.3073    1.0204   -0.2422     0.0267
maxedu      -0.2371    3.5121   -0.3914     0.1148
hhhage      -0.0100   11.6594    0.1665    -0.0068
femhhh      -0.5023    0.3563   -0.1035     0.0065
single      -0.5237    0.3747   -0.0801     0.0055
kidsis       0.1340    0.4556   -0.0011     0.0000
kidbro       0.0780    0.4379   -0.0037     0.0000
oldsis      -0.0177    0.4583   -0.0817     0.0002
oldbro       0.1872    0.4742   -0.0439    -0.0014
woman        0.4807    0.4992    0.0756     0.0064
edad         0.6040    1.8795    0.4121     0.1648
indi        -0.2186    0.5001    0.1068    -0.0041
adopt        0.3175    0.2965    0.0077     0.0003
rurselfh    -0.7605    0.1964   -0.0555     0.0029
urbselfh     0.2228    0.2693   -0.1207    -0.0025
avreginc     0.8286    0.4098   -0.1046    -0.0125
avregedu    -0.4611    0.7048   -0.1476     0.0169
urban       -1.0562    0.4708   -0.3074     0.0538
impyA_h      0.9936    0.3502    0.2367     0.0290
```

Sum of Factor Inequality Weights = 0.4005

Social Mobility Index = 0.8585 (SD = 0.0126; 95% confidence interval:
                           [0.8311:0.8796]).

REGRESSION 7: FIELDS DECOMPOSITION FOR TEENAGERS FROM MIDDLE HOUSEHOLDS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi adopt
  rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(inclevel==2)

```
Regression with robust standard errors            Number of obs =    1903
                                                  F( 7,    8)   =   20.68
                                                  Prob > F      =  0.0002
                                                  R-squared     =  0.2390
Number of clusters (region) = 9                   Root MSE      =  1.9419
```

```
------------------------------------------------------------------------------
            |               Robust
    edugap  |     Coef.    Std. Err.       t      P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
     hhypc  | -.2206632    .2486392     -0.887    0.401    -.7940263    .3526999
    maxedu  | -.1362229    .0116915    -11.651    0.000    -.1631835   -.1092622
    hhhage  |  -.008544    .0071103     -1.202    0.264    -.0249404    .0078524
    femhhh  | -.4596812    .2551161     -1.802    0.109     -1.04798    .1286176
    single  |  .0043214    .1939846      0.022    0.983    -.4430079    .4516507
    kidsis  |  .2501144    .1042943      2.398    0.043     .0096113    .4906174
    kidbro  |    .13813    .0795864      1.736    0.121    -.0453966    .3216567
    oldsis  |  .0527748    .0958106      0.551    0.597    -.1681649    .2737145
    oldbro  |  .1753298    .1264862      1.386    0.203    -.1163479    .4670075
     woman  | -.0406185    .0728053     -0.558    0.592    -.2085079    .1272709
      edad  |  .2498934    .0154725     16.151    0.000     .2142138     .285573
      indi  |  .1220423    .1415081      0.862    0.414    -.2042759    .4483605
     adopt  |  .3313881    .2072473      1.599    0.148    -.1465252    .8093013
   rurselfh | -.7671149    .4104735     -1.869    0.099     -1.713668    .1794386
   urbselfh | -.0459134     .141391     -0.325    0.754    -.3719615    .2801348
   avreginc |  1.082617    .3845837      2.815    0.023     .1957657    1.969469
   avregedu | -.5275736    .2194854     -2.404    0.043     -1.033708   -.0214393
     urban  | -.7876196    .2346472     -3.357    0.010     -1.328717   -.2465221
    impyA_h |  1.705945    .2877329      5.929    0.000     1.042432    2.369458
     _cons  | -1.625811    1.883412     -0.863    0.413     -5.968966    2.717344
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

```
X              Coeff.     Sd(X)   Corr(X,Y)     F.I.W.

hhypc         -0.2207    0.2781   -0.0896      0.0025
maxedu        -0.1362    4.4992   -0.3326      0.0920
hhhage        -0.0085   10.6348    0.0723     -0.0030
femhhh        -0.4597    0.3871   -0.0349      0.0028
single         0.0043    0.4007   -0.0101      0.0000
kidsis         0.2501    0.4836    0.0883      0.0048
kidbro         0.1381    0.4648    0.0549      0.0016
oldsis         0.0528    0.4795   -0.0509     -0.0006
oldbro         0.1753    0.4815    0.0065      0.0002
woman         -0.0406    0.5000   -0.0126      0.0001
edad           0.2499    1.8613    0.1872      0.0393
indi           0.1220    0.4377    0.1045      0.0025
adopt          0.3314    0.3108    0.0202      0.0009
rurselfh      -0.7671    0.1883    0.0237     -0.0015
urbselfh      -0.0459    0.3722   -0.0560      0.0004
avreginc       1.0826    0.3996    0.0400      0.0078
avregedu      -0.5276    0.6596   -0.0757      0.0119
urban         -0.7876    0.4217   -0.2560      0.0384
impyA_h        1.7059    0.2134    0.2355      0.0387
```

Sum of Factor Inequality Weights = 0.2390

Social Mobility Index = 0.9055 (SD = 0.0111; 95% confidence interval:
                                   [0.8790:0.9245]).

REGRESSION 8:   FIELDS DECOMPOSITION FOR TEENAGERS FROM RICH HOUSEHOLDS

```
. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad indi adopt
  rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(inclevel==3)
```

Regression with robust standard errors

Number of obs =   1723
F(7,   8)   =   7.39
Prob > F   = 0.0057
R-squared   = 0.2413
Number of clusters (region) = 9
Root MSE   = 1.7445

```
------------------------------------------------------------------------------
             |               Robust
     edugap  |    Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hhypc | -.2084986   .1309509    -1.592   0.150    -.510472    .0934747
      maxedu | -.1285679   .0129373    -9.938   0.000    -.1584015  -.0987343
      hhhage | -.0109841   .0074563    -1.473   0.179    -.0281783   .0062101
      femhhh  | -.1450464   .1978219    -0.733   0.484    -.6012244   .3111317
      single | -.0542191   .2525164    -0.215   0.835    -.6365229   .5280847
      kidsis  |  .0243527   .0845115     0.288   0.781    -.1705312   .2192367
      kidbro  |  .2482318   .0793901     3.127   0.014     .0651579   .4313057
      oldsis  |  .0127824   .0610137     0.210   0.839    -.1279154   .1534803
      oldbro  |  .0837698    .082458     1.016   0.339    -.1063787   .2739183
       woman | -.1206002   .1280929    -0.942   0.374     -.415983   .1747825
        edad |  .2031607   .0142706    14.236   0.000     .1702527   .2360687
        indi |  .1904279   .1781908     1.069   0.316    -.2204807   .6013365
       adopt |  .4512782   .2103302     2.146   0.064     -.033744   .9363004
     rurselfh | -.4983707   .4432253    -1.124   0.293     -1.52045   .5237086
     urbselfh | -.2790649   .0811198    -3.440   0.009    -.4661275  -.0920023
     avreginc |  .4688785    .173753     2.699   0.027     .0682034   .8695536
     avregedu | -.3109208   .0881794    -3.526   0.008     -.514263  -.1075787
        urban | -.8594206   .2237503    -3.841   0.005     -1.37539  -.3434514
      impyA_h |  .3726476   .2850075     1.308   0.227    -.2845809   1.029876
        _cons |  1.219556   1.119087     1.090   0.308    -1.361064   3.800176
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.2085	0.6022	-0.1493	0.0094
maxedu	-0.1286	4.9987	-0.3910	0.1262
hhhage	-0.0110	10.3798	0.0055	-0.0003
femhhh	-0.1450	0.3569	0.0648	-0.0017
single	-0.0542	0.3773	0.0701	-0.0007
kidsis	0.0244	0.5001	0.0278	0.0002
kidbro	0.2482	0.4995	0.0865	0.0054
oldsis	0.0128	0.4698	-0.0300	-0.0001
oldbro	0.0838	0.4894	0.0299	0.0006
woman	-0.1206	0.4999	-0.0478	0.0014
edad	0.2032	1.9226	0.1971	0.0387
indi	0.1904	0.3523	0.1508	0.0051
adopt	0.4513	0.3197	0.0880	0.0064
rurselfh	-0.4984	0.1219	0.0446	-0.0014
urbselfh	-0.2791	0.3642	-0.0363	0.0019
avreginc	0.4689	0.3973	0.0248	0.0023
avregedu	-0.3109	0.6362	-0.0575	0.0057
urban	-0.8594	0.3338	-0.2568	0.0370
impyA_h	0.3726	0.1988	0.1415	0.0053

Sum of Factor Inequality Weights = 0.2413

Social Mobility Index = 0.8644 (SD = 0.0146; 95% confidence interval: [0.8277:0.8914]).

REGRESSION 9: FIELDS DECOMPOSITION FOR INDIGENOUS TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad adopt
  rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(indi==1)

Regression with robust standard errors

Number of clusters (region) = 8

Number of obs	=	1635
F(6, 7)	=	15.09
Prob > F	=	0.0011
R-squared	=	0.3990
Root MSE	=	2.1621

```
--------------------------------------------------------------------------
          |             Robust
  edugap  |    Coef.   Std. Err.      t     P>|t|    [95% Conf. Interval]
----------+---------------------------------------------------------------
    hhypc | -.3036522    .067082    -4.527   0.003    -.462276   -.1450284
   maxedu | -.2173628   .0202799   -10.718   0.000   -.2653172   -.1694084
   hhhage | -.0176293   .0066857    -2.637   0.034   -.0334385   -.0018202
   femhhh |   -1.0462   .2186525    -4.785   0.002   -1.563231   -.5291687
   single | -.0942016    .178996    -0.526   0.615     -.51746    .3290568
   kidsis |  .0430215   .1586303     0.271   0.794   -.3320796    .4181226
   kidbro |  .0587601   .0588865     0.998   0.352   -.0804843    .1980045
   oldsis | -.0114072   .1538573    -0.074   0.943    -.375222    .3524076
   oldbro |  .1107833   .1753019     0.632   0.547   -.3037398    .5253064
    woman |  .4834748   .0858774     5.630   0.001    .2804071    .6865425
     edad |  .5289539    .045197    11.703   0.000    .4220801    .6358278
    adopt |  .5262692   .1952007     2.696   0.031    .0646929    .9878454
 rurselfh | -1.071488      .4644    -2.307   0.054    -2.16962    .0266436
 urbselfh |  .3514555   .2680063     1.311   0.231   -.2822786    .9851897
 avreginc |  .1600204   1.036646     0.154   0.882   -2.291257    2.611298
 avregedu | -.1964804   .5448994    -0.361   0.729   -1.484963    1.092002
    urban | -.8223623   .3406478    -2.414   0.046   -1.627866   -.0168582
  impyA_h |   1.09428   .2128889     5.140   0.001    .5908777    1.597682
    _cons | -1.823118   2.111286    -0.864   0.416   -6.815516    3.169281
--------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

X	Coeff.	Sd(X)	Corr(X,Y)	F.I.W.
hhypc	-0.3037	1.4010	-0.3301	0.0506
maxedu	-0.2174	3.8434	-0.3907	0.1177
hhhage	-0.0176	10.8264	0.0990	-0.0068
femhhh	-1.0462	0.3558	-0.0902	0.0121
single	-0.0942	0.3681	-0.0151	0.0002
kidsis	0.0430	0.4897	0.0263	0.0002
kidbro	0.0588	0.4778	0.0406	0.0004
oldsis	-0.0114	0.4477	-0.0763	0.0001
oldbro	0.1108	0.4666	-0.0323	-0.0006
woman	0.4835	0.5002	0.0765	0.0067
edad	0.5290	1.9096	0.3441	0.1253
adopt	0.5263	0.2905	0.0394	0.0022
rurselfh	-1.0715	0.1850	-0.0744	0.0053
urbselfh	0.3515	0.2844	-0.0961	-0.0035
avreginc	0.1600	0.3743	-0.1242	-0.0027
avregedu	-0.1965	0.7111	-0.1599	0.0081
urban	-0.8224	0.4795	-0.2975	0.0423
impyA_h	1.0943	0.3811	0.2754	0.0414

Sum of Factor Inequality Weights = 0.3990

Social Mobility Index = 0.8317 (SD = 0.0148; 95% confidence interval: [0.7771:0.8390]).

REGRESSION 10: FIELDS DECOMPOSITION FOR NON-INDIGENOUS TEENAGERS

. fields edugap hhypc maxedu hhhage femhhh single kidsis kidbro oldsis oldbro woman edad adopt rurselfh urbselfh avreginc avregedu urban impyA_h if (teen==1)&(indi==0)

```
Regression with robust standard errors        Number of obs =     3809
                                              F( 7,    8)   =    38.52
                                              Prob > F      =   0.0000
                                              R-squared     =   0.3444
Number of clusters (region) = 9               Root MSE      =   1.9221

------------------------------------------------------------------------------
             |               Robust
     edugap  |     Coef.   Std. Err.       t     P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
      hhypc  | -.3120438   .0369573    -8.443   0.000    -.3972675   -.2268202
     maxedu  | -.1255625   .0124174   -10.112   0.000    -.1541971    -.096928
     hhhage  | -.0008148   .0034527    -0.236   0.819    -.0087767    .0071471
     femhhh  | -.0651318    .191873    -0.339   0.743    -.5075918    .3773282
     single  | -.3304832    .166267    -1.988   0.082    -.7138955    .0529292
     kidsis  |  .1736303   .0832374     2.086   0.070    -.0183155    .3655762
     kidbro  |  .1750436   .1082421     1.617   0.145    -.0745631    .4246503
     oldsis  |  .0088086   .0295423     0.298   0.773    -.0593161    .0769333
     oldbro  |  .1039773   .0564314     1.843   0.103    -.0261538    .2341084
      woman  | -.0523484   .0588758    -0.889   0.400    -.1881162    .0834194
       edad  |  .2750557   .0556736     4.941   0.001      .146672    .4034393
      adopt  |  .2652457   .1870352     1.418   0.194    -.1660582    .6965496
    rurselfh | -.7993827    .440922    -1.813   0.107    -1.816151    .2173853
    urbselfh | -.1832849   .0940205    -1.949   0.087    -.4000965    .0335266
    avreginc |  .9052063   .1830675     4.945   0.001     .4830519    1.327361
    avregedu |  -.475562   .1214384    -3.916   0.004    -.7555995   -.1955245
      urban  | -1.176111   .3041452    -3.867   0.005    -1.877471   -.4747505
     impyA_h |  1.278766   .3223029     3.968   0.004     .5355346    2.021998
       _cons | -.8686575   .9742266    -0.892   0.399    -3.115228    1.377913
------------------------------------------------------------------------------
```

Fields Decomposition and Social Mobility Index

```
X              Coeff.    Sd(X)   Corr(X,Y)    F.I.W.


hhypc         -0.3120   1.2423   -0.3725     0.0610
maxedu        -0.1256   5.0017   -0.4430     0.1175
hhhage        -0.0008  10.9637    0.1096    -0.0004
femhhh        -0.0651   0.3728   -0.0060     0.0001
single        -0.3305   0.3918   -0.0121     0.0007
kidsis         0.1736   0.4850    0.1321     0.0047
kidbro         0.1750   0.4753    0.1330     0.0047
oldsis         0.0088   0.4775   -0.0398    -0.0001
oldbro         0.1040   0.4872    0.0019     0.0000
woman         -0.0523   0.4994   -0.0351     0.0004
edad           0.2751   1.8852    0.1859     0.0407
adopt          0.2652   0.3165    0.0256     0.0009
rurselfh      -0.7994   0.1682    0.0522    -0.0030
urbselfh      -0.1833   0.3606   -0.0844     0.0024
avreginc       0.9052   0.4208   -0.0541    -0.0087
avregedu      -0.4756   0.6724   -0.1933     0.0261
urban         -1.1761   0.4122   -0.3894     0.0797
impyA_h        1.2788   0.1843    0.1786     0.0178
```

Sum of Factor Inequality Weights = 0.3444

Social Mobility Index = 0.8215 (SD = 0.0114; 95% confidence interval:
                                   [0.7586:0.8014]).