
Elizabeth M. King
World Bank

Claudio E. Montenegro
World Bank and
Department of Economics, Universidad de Chile

Peter F. Orazem
Iowa State University and IZA

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T.W. Schultz (1975) proposed that returns to human capital were highest in economic environments where technology, price or production shocks were common and managerial skills to adapt resource allocations to those shocks were most in need. We hypothesize that variation in returns to human capital across developing countries can be explained in part by government institutions that blunt the magnitude of those shocks or that limit individual abilities to respond to those shocks. Using estimated returns to schooling and experience from 122 household surveys from 86 developing countries, we demonstrate a strong positive correlation between economic freedom and returns to human capital. The positive effect is observed at all quantiles of the wage distribution. Economic freedom benefits the most skilled who get higher returns to schooling; but it also benefits the least skilled who get higher returns from experience.

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Corresponding author: Peter F. Orazem: (515) 294-8656  pfo@iastate.edu; Elizabeth M. King (202) 473-3289, eking@worldbank.org; Claudio E. Montenegro (202) 458-8143 cmontenegro@worldbank.org
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I. Introduction

Hundreds of studies measure returns to schooling, most focusing on a single country or on a small subset of countries. Following the empirical formulation developed by Jacob Mincer (1973), inference on returns to schooling and work experience are derived from the regression coefficients of log earnings on years of schooling and quadratic terms in age. A major focus of this research has been to correct for various presumed biases in estimated returns, including nonrandom selection into the labor market, endogenous choice of when to leave school, measurement errors in the schooling variable, and choice of control variables to include in the model. Nevertheless, these studies are remarkable in their consistency. Virtually all studies show that earnings rise with years of schooling and increase at a declining rate in age or work experience. In almost all data sets, the largest percentage annual wage gains are captured by the youngest workers. The wage gain from additional experience gets smaller and may even turn negative with age. Returns per year of schooling tend to vary within a narrow range, at least in developed countries. For example, returns estimated for the United States ranged narrowly around 10%, despite differences in data sets and methodologies employed. Returns to schooling in other developed countries are similar to the estimated returns in the United States.¹

A prominent literature in economic development has investigated whether capital flows easily across countries, leading to a common return to physical capital. Lucas (1990) and Caselli and Freyer (2007) argue that when measured properly, the marginal product of physical capital is nearly equal across rich and poor countries. The reason poorer countries have such low levels of physical capital per worker is that poor countries lack inputs complementary with capital and have higher costs of installation. Accounting for these factors explains virtually all the

¹ See Table 4 in Card (1999) for a summary of recent estimated returns to schooling.
difference in returns to capital across countries. There is no evidence that credit frictions are retarding investment in poor countries.

But while physical capital flows easily across countries, human capital does not. Returns to human capital could potentially vary more widely than do returns to physical capital. These differences in returns may be more important in developing countries than developed countries, as international migration flows more easily between rich countries than between poor and rich countries.

Due mainly to the work of George Psacharopolous and his colleagues (1973, 1985, 1994, 2004), we have compilations of returns to schooling across countries. These studies have focused on identifying similarities and common tendencies in returns to schooling across countries. Earnings in developing countries also rise with years of schooling and demonstrate a quadratic pattern in age or work experience. In addition, returns tend to decrease as years of schooling increase, and tend to be higher for women than men and higher for urban than rural residents.

Despite these regularities, estimated returns to an additional year of schooling or to an additional year of life vary widely across developing countries. Figure 1a shows the distribution of estimated returns to schooling across 122 data sets from 86 different developing countries. While the average return is 8%, reasonably consistent with returns estimated for developed countries, the variation is substantial. The 90th percentile return is more than 3 times the 10th percentile return. Figure 1b shows the corresponding distribution of returns to experience across the same sample of countries. The 90th percentile return to experience is over 7 times larger than the 10th percentile return! Given the important role that human capital plays in economic

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2 In our investigation of 122 data sets, 2 failed to generate positive returns to schooling and 7 failed to generate rising returns to age.
3 Recent reviews of returns to schooling in developing countries include Orazem and King (2008) and Patrinos Montenegro (2009).
development, it is important to understand why these differences in returns arise and persist across countries.

T.W. Schultz (1975) proposed that human capital is most valuable in the presence of disequilibria: unforeseen price, productivity or technology shocks that require managerial decisions to reallocate time and resources. This paper explores that hypothesis by exploiting differences in economic and political institutions across countries which either blunt the impact of shocks or hinder individual ability to respond. A cursory inspection of the data yields support for the hypothesis. Figure 2a divides the 86 countries into three groups based on their relative ranking in the Heritage Foundation’s Economic Freedom Index, with 25% each placed in the least and most free economies and the rest being placed in the middle. We then plot the relationship between estimated returns to schooling and real gross domestic product per capita, a measure of the level of economic development. Returns for the freest economies average 9.7% per year of schooling, 3 percentage points higher than the average returns in the most restrictive economies. Returns for the middle group fall between the two extreme groups. We repeat the exercise in Figure 2b for returns to years of potential experience. Again, average returns are highest in countries rated as the most economically free (5%) versus the middle (4.7%) and least free (4.2%) countries. These results are broadly consistent with the proposition that freer economic institutions raise individual returns to human capital.

Schultz (1998) found that 80% of the income inequality in the world is due to country-specific fixed effects that would include the impacts of country-specific political and economic institutions on earnings. Acemoglu and Robinson (2005) argued that these institutions were formed in response to exogenous influences existing at the time of a country’s founding, and that

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4 Information on the Heritage Foundation Index is available at [http://www.heritage.org/research/features/index/chapters/pdfs/Index2006_Chap5.pdf](http://www.heritage.org/research/features/index/chapters/pdfs/Index2006_Chap5.pdf)
these institutions tend to persist across generations. We use measures on those economic and political institutions to determine if they alter returns to human capital across countries. We find that, consistent with the Schultz hypothesis, human capital is significantly more valuable in countries with greater economic freedom. Furthermore, the positive effect is observed at all wage quantiles. Economic freedom benefits the most skilled who get higher returns to schooling; but it also benefits the least skilled who get higher returns from experience.

I. **Government Institutions and Individual Returns**

T.W. Schultz (1975) argued that returns to human capital were greatest when there was a need for managerial decisions. Periods of disequilibrium in which input and output prices, technologies, or market opportunities are changing rapidly require an ability to assess opportunities and strategies to capitalize on those opportunities. As these unanticipated shocks increase in frequency, returns to managerial skills rise. Economic systems that blunt these shocks or that insure individuals against the consequences of these shocks will reduce the need for managerial skills. Economic or political institutions that restrict or delay necessary decisions to adapt to shocks such as limiting migration or transfers of capital will lower returns to skill as well. Schultz argued that in the steady state where there are no shocks, traditional rules of thumb are efficient and the need for schooling is minimal.

Schultz (1988) extended his argument by exploring the role of increasing returns as the source of higher returns to human capital. These returns accrue from the ability to specialize according to comparative advantage, an ability that depends on trading surplus production with other specialists. The greater the number of potential traders, the greater the increasing returns from specialization. Government policies can ease or retard trading opportunities by raising or lowering transaction costs. Government institutions that raise transaction costs will reduce the
extent of the market. As transaction costs rise, the number of profitable trades is reduced, as are
the returns to specialization for talented individuals. In the limit, institutions that raise
transaction costs sufficiently will eliminate all trades and drive the returns to specialized skills to
zero (Yang, 2003).

There are many ways that returns to skill will increase with specialization. Rosen (1983)
pointed out that returns to rare skills increase with the intensity of their use so in the limit, the
rarest skills can claim very large returns. Murphy, Schleifer and Vishny (1991) demonstrated
that if the society does not expropriate earnings excessively, the most able will become
entrepreneurs and capture rising returns to their ability, even as their entrepreneurship raises the
total productivity of the society. These spillovers from one person’s skill or knowledge to that of
others in society raises the productivity of all (Romer, 1986, 1990; Lucas, 2002). The common
feature in these models is that individuals are responding to incentives to develop and/or utilize
skills because they can trade surplus. If the trade opportunities are removed, the returns to the
skills and the incentives to invest are removed. Furthermore, as Lucas emphasized, these trade
opportunities have to be incorporated broadly in the expectations of the citizenry.

“Growth in the stock of useful knowledge does not generate sustained improvement in
living standards unless it raises the return to investing in human capital in most families.
… For income growth to occur in a society, a large fraction of people must experience
changes in the possible lives they imagine for themselves and their children, and these
new visions of possible futures must have enough force to lead them to change the way
they behave, the number of children they have, and the hopes they invest in their
children.” (Lucas, 2002: p. 17)

Economic and political institutions are critical to forming and perpetuating these
expectations. The studies by Acemoglu and his colleagues show that current political and
economic institutions in developing countries have roots that go back centuries. Once installed,
these institutions have had a strong tendency to persist, even as the countries face changing economic and political circumstances. That suggests that a test of the Schultz hypothesis would be to establish whether returns to human capital were greatest in countries whose economic or political institutions expose their citizens to more shocks and/or provide the citizens with more freedom to adjust their time or resource allocations in response to those shocks.

Several theoretical models have explicitly linked returns to skill and institutions. Murphy et al (1991) show that strong property rights, ease of firm entry, and larger markets will cause the most able to become entrepreneurs, simultaneously increasing overall growth and returns to skill. Rosen (1983) demonstrates that returns to specialized applications of skill to an activity increase as transaction costs fall and the size of the market increases. In the Appendix, we show how a variant of the Pissarides (2000) search model results in rising returns to skill in the presence of more efficient matching institutions. The common feature in these models is that more efficient gains from trade among agents create increasing returns to skill.

A compelling clue that institutions affect returns to human capital comes from the large increases in returns to education observed in the countries that transited from centrally planned to market systems. Fleisher et al. (2005) found that returns to schooling more than doubled from before to after the transition. By 2000, returns in the transition economies were similar to those estimated for Western Europe and North America. McMillan and Woodruff (2002) argued that the successful transition economies were those that fostered the entrepreneurial skills necessary to adapt to the economic shocks. If the change from a more to a less regulated economy increases the return to managerial skills because of the increased need to adapt to shocks (Schultz, 1975),

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6 Orazem and Vodopivec (1995) used the Schultz hypothesis to explain rising returns to schooling in Slovenia and for transition economies more generally.
then we should find similar evidence of the role of economic institutions in explaining the variation in returns to schooling across all countries and not just those in transition.\textsuperscript{7}

Virtually all of the empirical work on the role of institutions has examined data aggregated to the country level. Results are inconclusive, and so there is no accepted menu of factors that should be used to measure economic institutions. In fact, Durlauf et al (2005) reported that 145 different variables had been shown to explain the cross-country pattern of growth in at least one analysis. Therefore, we will need to be somewhat judicious in selecting our measures of the institutions that could explain returns to human capital.

One reason for the large number of variables that have helped to explain economic growth is the tendency to use institutional measures one at a time in separate growth equations.\textsuperscript{8} Because institutions may be highly correlated with one another, the coefficient attached to any given individual measure may reflect the correlation between that measure and the excluded institutions.

Countries may change their political or economic rules in response to economic performance, and so some studies have considered possible reverse causality between growth and institutions. By necessity, these researchers have to limit the number of institutions they include in the analysis. Because the number of plausible instruments is small, studies that want to control for endogeneity can only accommodate a small number of institutions.\textsuperscript{9} Consequently, studies that aim to correct for endogeneity have to accept a higher probability of missing variables bias.

\textsuperscript{7} The transition economy experience cannot tell us which institutions are important for returns to human capital because many of these institutions such as rule of law, protection of property rights, wage flexibility, monetary reforms, exposure to international trade, were changing simultaneously.

\textsuperscript{8} Botero et al (2004) and Djankov et al (2002) are prominent examples of this strategy.

\textsuperscript{9} For examples, see the papers by Acemoglu and his colleagues (2001, 2003, 2005).
Studies of institutional effects on labor market outcomes have tended toward the opposite extreme: including an entire menu of labor market institutions as regressors. For example, Nickell and Layard (1999) employ ten measures of unionization, unemployment insurance, employment protection, tax distortions and other labor market policies to explain cross country variation in unemployment rates. Despite the possible problems of endogeneity bias, results using other data sets, additional institutional measures, or different time periods have generally corroborated the findings that more interventionist labor market policies exacerbate unemployment.\textsuperscript{10} Some, including Nickell and Layard (1999) and Heckman and Pages (2004) instrument for some but not all labor market institutions, but it would be virtually impossible to fully instrument for all institutions in this strategy.

In this study, we employ the strategy of including many measures of labor market institutions at once without correcting for endogeneity. First, because political and economic institutions in developing countries persist, individuals could form accurate expectations of the institutions and incorporate them expectations in their human capital investment decisions. Consequently, endogeneity should be of less concern than would be the bias caused by excluding important institutions. Second, the absence of a consensus on which institutions are important to individual decision making suggests using a menu of possible factors that could affect economic or political freedom and letting the data speak.

An additional advantage to our strategy lies in our reliance on returns to schooling estimated over samples of individuals. All of the theoretical models tying freer economic institutions to growth presume that individuals are making optimal individual time and resource allocation decisions in response to perceived incentives. Therefore, the effects of these institutions should be most apparent in individual decisions and returns. It is plausible, for

\textsuperscript{10} Examples include Blau and Kahn (2002), Heckman and Pages (2004), and Nickel et al (2005).
example, that a poor country lacking an abundant resource base but with institutions favorable to individual investment will nevertheless have few citizens who can invest intensively in skill acquisition. Those citizens may face rapidly rising returns to schooling compared to their less schooled neighbors, even as the country as a whole struggles to make up for its poor resource base.

III. Empirical Measures of Economic and Political Institutions

There are many ways that government regulations or policies may affect an individual’s expectations regarding returns to investment or the trend or variation in future economic variables. Because there is no consensus on which institutions matter and which do not, we utilize several different measures that capture different themes in the literature. We provide a general introduction into the measures in the text and provide additional details and summary statistics in Appendix A.

A. Economic Institutions.

The closest conceptual measure of the economic environment that an individual confronts comes under the umbrella of economic freedom. There are many potential mechanisms that a government can use to suppress economic shocks in ways that lower the need for managerial decisions. Similarly, there are many government policies that restrict the scope of individual economic decisions. The impact of these policies are often studied individually, including the effects of corruption (Bardhan, 2005; Murphy et al, 1991, 1993; Schleifer and Vishny, 1993); property rights (Acemoglu, Johnson and Robinson, 2001, 2005; Acemoglu and Johnson, 2005); rule of law or contract enforcement (Bardhan, 2005; Acemoglu and Johnson, 2005) constraints on entry (Djankov et al, 2002); privatization of state enterprises (Frydman et al, 1999; Djankov and Murrell, 2002); or monetary policy (Acemoglu et al, 2003). However, these policies are
plausibly mutually reinforcing, suggesting that they work more in conjunction with one another than in isolation. For that reason, it may be more convincing to look at an aggregation of policies affecting economic freedom rather than only one or two.

We use the Heritage Foundation’s Index of Economic Freedom as our measure of the institutions governing individual economic decisions. The Heritage Foundation has generated a consistent annual series since 1994 across 163 countries on various aspects of economic freedom: the ease with which the team can open or close a business; openness to trade; taxes relative to income; the importance of government in the economy; the quality of monetary policy; openness to foreign investment; the lack of government restrictions on financial or credit markets; protection of property rights; and the lack of corruption in government. Although we do investigate the individual effects of the subcomponents of the index, it seems clear that they are not independent. A single factor loading from a factor analysis of the subcomponents of the Heritage Index explains 92% of the common variance among the components. Nevertheless, we can test whether the individual subcomponents have an effect on returns to skill that differs from the aggregate index.

**B. Globalization**

International trade and exposure to international capital flows increases the country’s exposure to shocks. That alone could have an impact on the returns to schooling. However, there are other avenues through which integration into the international community could affect returns to schooling. Foreign Direct Investment provides access to new technologies that can complement domestic human capital. Xu (2000) argues that countries can only attract foreign

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11 We used the Heritage Foundation indices that matched most closely the date of each country household survey. For five countries which were not covered in the Heritage Foundation Index, we use the fitted values from regressions of the index on the six measures included in the World Bank’s Governance Indicators (Kauffman, Kraay and Mastruzzi, 2008).
direct investment if they have a sufficient base of human capital. Acemoglu, Johnson and Robinson (2005) argued that openness to trade strengthened the property rights of merchants in Europe, increasing their incentives to invest. Hanushek and Woessman (2008) provide evidence that openness to foreign trade raises the impact of average cognitive skills on economic growth. It is plausible that openness to trade may also raise returns to human capital.

We use the Index of Globalization developed by Dreher (2006) and Dreher et al (2008) for 155 countries from 1970-2006. There were 11 countries that were not covered in this index, although the same source has an index of Political Globalization which includes more countries. We filled in the missing values with the fitted values based on the index of Political Globalization and on the Heritage Foundation’s Trade Index. The Index of Globalization is positively correlated with Economic Freedom ($\rho=0.58$) but there is sufficient independent variation to capture a separate effect of openness to international product and capital markets.

**C. Personal Rights**

Individual returns to schooling may also depend on the protection of individual political rights. These freedoms can be viewed as the right to act without fear of political retribution as opposed to the economic retribution that would be generated by the country’s economic institutions. The Human Rights Dataset by Cingranelli and Richards (2005) provides measures of personal freedoms for 198 countries from 1981-2004.\footnote{We use the data for the year that matches most closely the date of the country household survey.} We use the Empowerment Rights Index which is constructed from measures of the extent to which individuals in the country had freedom of movement within or out of the country; freedom of speech; freedom to participate in politics; freedom of religion; and worker rights. This index is positively correlated with the Economic Freedom Index, but at 0.44, the correlation suggests that the two indexes are not identical. Again we will examine how the subcomponents of the index perform relative to the
aggregate index, but a single factor loading explains virtually all of the common variation among the subcomponents.

Individual political freedoms are not as clearly related to the pursuit of the highest return to human capital as are individual economic freedoms, and yet these freedoms could contribute to a climate of creativity and innovation. Richard Florida (2007) emphasizes that acceptance of individual differences fosters innovation and a climate of entrepreneurship.

**D. Democracy**

Acemoglu and Robinson (2005) present theory and evidence on the development of democracy. They view economies first developing with elites controlling resource allocations and the masses lacking political power or economic rewards. However, with economic growth comes improved education and economic circumstances for the disenfranchised who will be tempted to take control by force. The elite relinquish power by extending political concessions to the middle and lower classes because they want to avoid violent overthrow. Democracy is therefore associated with broad dispersion of the benefits of the economy and greater political freedom. How this affects returns to schooling is unclear. While democracy is positively correlated with rising per capita incomes, the effect is not causal. Furthermore, democracy leads to rising taxation of land and capital and so in relative terms, it is the elite who lose and the lower classes who gain. If the elite are the most educated, then democracy would actually lower returns to schooling.

Democracy has been associated with a general presumption that decentralized allocation of resources improves the efficiency of government services ranging from education, health care, sanitation, and irrigation. Evaluations find that decentralized decision making does alter the allocation of resources (Alderman, 2001; Faguet, 2004; Galasso and Ravallion, 2005). However
it is less clear that the resources are allocated in ways that improve desired outcomes. There are numerous reasons why local control may yield poor outcomes. Bardhan (2002, 2005) argues that decentralized decisions are particularly prone to fail in developing countries where local officials may be subjected to undue influence by prominent local families, there may be no tradition of monitoring of local officials by local residents, and local officials may lack the necessary experience or skills to manage resources effectively.

We utilize the Freedom House Imputed Polity measure which rates countries by their democratic institutions. The scale varies from 0 to 10 with 0 being least democratic and 10 being most democratic. One concern is that we will have trouble distinguishing the effects of democratic institutions from those of economic and individual freedoms. In fact, democracies are more likely to have more economic freedoms ($\rho = 0.45$) and are more likely to protect individual political rights ($\rho = 0.74$). Nevertheless, there are countries that provide exceptions. Democratic countries with below average protection of individual rights include Indonesia, Kenya, Turkey. Sierra Leone, Gambia and Haiti are examples of relatively nondemocratic countries that offer above average levels of individual rights. Bahrain and the United Arab Emirates score low on democracy and individual rights, but offer high levels of economic freedom. The Ukraine offers high levels of democracy and individual rights, but below average economic freedoms. The variation across these countries should be sufficient to enable us to identify the independent effects of democratic institutions from those of economic freedom or individual rights.

\textbf{E. Equal Rights}

Returns to education may also depend on how equally the opportunities or personal freedoms are distributed among demographic groups. Countries may have policies that provide economic or political freedoms generally to the populace and yet deny those freedoms to ethnic,
racial or religious minority groups or to women. Unequal access to economic mobility would certainly lower returns to schooling for members of the disadvantaged group, as has been shown in many studies of the effect of discrimination on labor market earnings. The unequal access could even limit returns to schooling for members of the majority to the extent that the limitations on economic freedom lower the efficiency of resource allocation in the economy as a whole. The magnitude of this inefficiency due to the misallocation of resources increases with the size of the group that faces discriminatory access. Clark (2007) points to England’s broad distribution of human capital and its relatively egalitarian society as why it, and not the more unequal China, India or Japan, was first to foster an Industrial Revolution.

Our measure of equal rights protection and access to economic opportunity focuses on the rights of women. Representing half the population, if women face restricted economic mobility, they are a sufficiently large group to alter average returns to schooling for the country as a whole. In addition, unlike ethnic or racial groups, measures of economic or political power that focus on women can be easily compared across countries. We use the percentage of women in the national legislature as our indication of equal access. Since 1997, the Inter-Parliamentary Union provides a continuous measure of the percentage of seats in the lower house parliament held by women for 188 countries. Melander (2005) has a slightly different measure that includes women in the upper house that begins in 1965 and covers 175 countries. For the years for which we do not have data from the Inter-Parliamentary Union, we use the Melander data with an adjustment made for the differences in measurement.

There is little correlation between this measure of equal access and the other measures of institutions. For example, there is virtually zero correlation between the Heritage Foundation Index of Economic Freedom and the fraction of women in parliament.
**F. Foreign aid**

There are sharp differences of opinion on the role of foreign aid in economic development. Some have argued that increased levels of foreign aid are critically necessary to foster economic development (Sachs, 2005) while others have suggested that foreign aid has been ineffective (Easterly, 2006, 2009). Still others emphasize the need for internally or externally generated political stabilization (Collier, 2007) or a culture of capitalism (Clark, 2007) before any economic development can occur.

To our knowledge, the debate on foreign aid has not dealt greatly with how or whether aid benefits or hinders economic mobility within the country. Aid may be critical to the expansion of schooling opportunities and to the improvement of existing schools, in which case it should raise returns to schooling. Furthermore, to the extent that the aid is accompanied by technical assistance on setting and implementing good policies, we might expect that aid would improve economic institutions that could support higher returns. Foreign aid could also insulate the country from shocks which would lower the returns to schooling in a Schultz world. Finally, foreign aid could be misused, in which case its impact would be negligible. We use the log of real net foreign aid per capita provided by the World Development Indicators as our measure of the importance of foreign aid in the economy.

**G. Controls for the extent of the market, growth, and life expectancy**

There are conflicting predictions of how the level or pace of economic development will affect the returns to schooling. In the models of Schultz (1988), Rosen (1983) and Murphy et al (1991, 1993), the extent of the market raises the returns to entrepreneurial skills. Indeed, in the endogenous growth literature more generally, agglomeration of skills or knowledge generates
increased productivity and returns to the innovator. Consequently, we would expect returns to schooling to be greatest in the most technologically advanced societies.

However, there is an alternative view that suggests poorer societies will underinvest in human capital which will lead to a higher return to skill for those who are able to afford the investments. In the formulation of Becker and Tomes (1979, 1986), wealthier households will invest in their children’s schooling up to the point where the rate of growth of returns to human capital investments equals the rate of return on capital while poorer households are constrained to cut off schooling at levels where returns to human capital exceed the rate of return on capital. That suggests that poorer economies will have higher returns.

Either view suggests that we must control for the level and pace of economic development to capture the true return to economic institutions. Furthermore, there is an additional complication that as economies develop, they can better afford liberal institutions such as democracy, redistributive taxes and transfers, rule of law, protection of property rights and from corrupt governments, and so on. Because the level and pace of economic development will be correlated with the levels of economic or political freedom, democratic institutions, we must include controls for economic development to avoid missing variables bias.

We use the log of real gross domestic product per capita as our measure of economic development and the growth rate of real GDP per capita to reflect the pace of economic development. These measures are available for all our countries from the national accounts compiled by the United Nations Statistics Division.

Another factor that will affect the pattern of estimated returns to human capital will be cross-country variation in life expectancy. Other things equal, annual returns per year of schooling will be lower in countries with greater life expectancy. In Becker’s (1994)
formulation of the theory of human capital investment, individuals will continue to specialize in schooling as long as the net present value of the investment is positive. That implies that an individual who expects to live longer will optimally spend more time in school and, if human capital investments are subject to diminishing returns, will get a lower annual return per year of schooling. To understand why, consider two otherwise identical individuals with different life expectancies who complete the same year of schooling. Both will generate the same marginal increase in human capital product after completing that year, generating the same resulting marginal change in annual earnings. However, the present value of the returns from that year of schooling will be greater for the individual with greater longevity. As a result, the longer-lived individual will spend more time in school, generating successively lower annual increments in earnings from the additional time investing in human capital. Life expectancy at birth is available for all countries through the World Development Indicators.\textsuperscript{13,14}

Correlations between these three control variables and the policy measures are reported in Table 1. It is immediately apparent why we need to incorporate these controls because of their correlations with the institutional measures. Measures of economic freedom, globalization, empowerment and democracy are all correlated with these measures of economic development. On the other hand, all these institutions are similarly correlated with returns to schooling. We next turn to the question of whether any of these institutions retain a significant correlation with returns to schooling in a regression analysis.

IV. **Do Economic and Political Freedoms Raise Returns to Schooling?**

\textsuperscript{13} When exact matches on years were not available, we interpolated between years. \\
\textsuperscript{14} We also experimented with using average years of schooling. Results are similar—years of schooling is negatively correlated with average returns to schooling, consistent with the hypothesis of diminishing returns. However, years of schooling responds to other factors besides life expectancy including expectations of returns to schooling, and so life expectancy can more plausibly be viewed as a factor shifting outward the country’s demand for schooling rather than a response to returns to schooling.
We intend to explain variation in returns to schooling across a sample of developing countries, where the returns are derived from standard Mincerian earnings function estimated over 122 different household data sets. The data sets come from 86 countries, and so we have repeated observations for some countries at different points in time. Four data sets are from Chile, three each from Bulgaria, El Salvador, Guatemala and Uruguay. We have two data sets from 25 other countries. The data sets are dated in various years between 1989 and 2007 with 68% dated 2000 or later.

In order to standardize our measure of the returns to schooling, we apply the same earnings specification to each data set. Our use of a common specification removes one source of spurious variation in estimated returns across countries. For each country \( j \) and year \( t \), we estimate equations of the form

\[
\ln(w_{ijt}) = \alpha_{jt} + r_{jt}S_{ijt} + b_{jt}^1A_{ijt} + b_{jt}^2A_{ijt}^2 + \sum_{k=1}^{K} \beta_{kjt}X_{kijt} + \varepsilon_{ijt}
\]

where \( X_{kijt} \) includes \( K \) measures of individual attributes including marital status, gender and urban or rural residence. The estimated return per year of schooling is \( r_{jt} \), the coefficient on years of schooling \( S_{ijt} \). The estimated return per year of experience is \( b_{jt} = b_{jt}^1 + 2b_{jt}^2A_{jt} \), computed at the average age in the country.

Returns to human capital have clear advantages as measures of the returns to individual investments in developing countries. Investments in human capital are the most ubiquitous investment in the world. In developing countries where households may be liquidity constrained, households will devote investments to human capital before they invest in physical capital. Only when the anticipated return to an additional investment in human capital falls to the market return on physical capital will a household diversify its investment to include physical capital. Even if the household determines that schooling is not warranted, it will invest in
occupational skills. The estimated return to an additional year of life will reflect investments in training on the job. As with schooling, investment in job skills will be undertaken before the household devotes resources to physical capital. Figures 2A and 2B show that while there is considerable variation in estimated returns across countries for both types of human capital investments, almost all are positive with returns to schooling and experience averaging 8.1% and 4.6%, respectively.

Note also that we are agnostic about why human capital generates returns. As shown by Schultz (1988, 1999), human capital improves individual well-being along many dimensions including better decisions regarding health and fertility as well as labor market performance. To the extent that these other decisions also improve labor market performance, earnings capture, at least in part, several dimensions of improved decision making that result from human capital investments.

The 122 earnings functions are estimated separately using ordinary least squares. The estimated return to schooling in country $j$ in year $t$, $r_{jt}$, will reflect the institutional arrangements that affect the returns to skill in each country. If there are $L$ of these institutions, we can model the variation in estimated returns to schooling and experience by

$$
(2) \quad r_{jt} = \gamma_{jto} + \sum_{l=1}^{L} \gamma_{jlt} M_{lt} + \nu_{jt}^r
$$

$$
\quad b_{jt} = \delta_{jto} + \sum_{l=1}^{L} \delta_{jlt} M_{lt} + \nu_{jt}^b
$$

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15 We can only include individuals in the regression if they work for a wage. That means that our estimated returns are potentially subject to selection on labor supply. To investigate the importance of selection, we also estimated the returns using a Heckman selection correction which used aggregate household income and the presence of children as instruments in the probit selection equation. As shown in Appendix Table 2, OLS and selection corrected returns are highly correlated, consistent with the findings in Schultz (1999). We use the OLS estimates because only 90 data sets incorporated sufficient information to identify the selection equation, meaning a sacrifice of 26% of the sample if we limited the results to the selection corrected set.
If the \( l \text{th} \) institution, \( M_{ljt} \), affects returns to schooling or experience, then \( \gamma_{ljt} \neq 0 \) and \( \delta_{ljt} \neq 0 \).

We estimate (1) and (2) in two steps. The second stage corrects for clustering by country. Results for the cross-country rates of return regressions are presented in Table 2 for the entire working population and then separately for men and women and separately for urban and rural residents. Depending on the demographic sample, the regressions explain 31-44% of the cross-country variation in returns to schooling and 21-33% of the cross-country variation in returns to experience, suggesting that a substantial fraction of the differences in returns to human capital reflect country-specific institutions.

**A. Economic Freedom**

The prediction from the Schultz hypothesis that returns to human capital are positively influenced by the presence of and ability to respond to shocks is broadly supported by the data. Higher levels of the Economic Freedom Index are strongly positively correlated with returns to schooling. At sample means, the elasticity is 0.45. A 10% increase in the index raises returns to schooling by about 0.36 percentage points. The impact is virtually identical for men and women. Educated groups in urban areas are particularly benefited by freer economic institutions. Returns to schooling in rural areas are largely unaffected by the extent to which economic institutions regulate economic activity.

Returns to experience are also significantly affected by the extent of economic freedom with an elasticity of 0.74, evaluated at sample means. The effect is largely limited to males, presumably because males face a steeper age earnings profile with more potential for gains accruing to the most skilled. Economic freedom increases returns in both urban and rural markets, but the effect is largest in rural areas.
We can also investigate what subcomponents of economic freedom matter. In table 2, we report the coefficients on the coefficient of each Heritage Foundation sub-category taken from regressions that replicate the specification in column 1 of table 1 but that replace the Economic Freedom Index successively with each of its components. For reference, we also include the elasticity with the respect to the Economic Freedom Index from Table 1. Importantly, the largest elasticity is with respect to the index itself for both returns to schooling and returns to experience. That suggests that the various economic freedoms are not substitutes for one another but they reinforce each other. Buttressing that conclusion is that we cannot reject the null hypothesis that the subcomponents can be added up into a single index with a common coefficient. While there may be some interest in the subcomponents, we conclude that economic freedom is multidimensional with respect to returns to human capital.

Turning to the returns to education, all of the individual effects are positive save that of monetary policy. The most significant effect is for property rights. The largest individual elasticity is from Fiscal Freedom: Tax policies which limit the marginal tax rate on income; but the estimated effect is not precise. The other significant individual effects were Business Freedom: ease of entry; Investment Freedom: the quality of investment climate for domestic and foreign investors; and Freedom from Corruption. If there is a pattern, it seems factors that reflect freedom to invest and to protect assets at the individual level are the most important for raising returns to schooling, while macroeconomic policies have little impact.

In contrast, individual subcomponents most closely tied to returns to experience are more macroeconomic. Monetary Freedom; and Freedom from Government: the importance of government expenditure and enterprise; both had significant effects. Investment Freedom was the only subcomponent that significantly increased returns to both schooling and experience. In
the end, our prior comment remains – it is the aggregation of economic freedoms and not just one element that matters for returns to human capital.

**B. Globalization**

Integration with global markets does not have much effect on returns to schooling or experience. While the coefficient is always positive, it is never precisely estimated and the elasticities are quite small. Additionally, the Trade Freedom component of the Freedom Index registered no effect. If exposure to foreign trade and capital markets matters for labor demand by skill, it must be too small relative to the overall size of the labor market to have much of an effect. As trade tends to be a small share of developing country labor markets, it may not be as critical to individual human capital decisions as might be implied by some of the macroeconomic growth studies.

**C. Personal Rights**

Returns to schooling and experience are also not strongly tied to protection of individual political rights. The coefficient is positive in all instances with implied elasticities of 0.28 (schooling) and 0.14 (experience), but the effects are never precisely estimated for any of the populations. In exploring the subcomponents, again we cannot reject the null that the individual subcomponent effects are equal to that of the summation. However, one subcomponent, Freedom of Speech, retains significance on its own for both returns to schooling and experience. That measure reflects the degree of government censorship of the media—suggesting that educated and experienced workers benefit when they have free access to news. Although not obviously tied to more efficient matching, it is interesting that freer information flows raise returns to human capital.

**D. Democracy and Equal Rights**
More democratic political systems have no systematic impact on the returns to human capital, however measured. However, progress on equal rights, as indicated by the proportion of women among elected officials, has a positive correlation with estimated returns to schooling. The elasticity varies from 0.1 to 0.15 depending on the demographic group, suggesting that a 10% increase in women’s presence in the legislature is correlated with an increased return to schooling of about 0.1 percentage point. The effect is of like magnitudes for men and women, and is observed most strongly in the urban and rural regressions. Our interpretation is that improving political access to women is an indicator of more broadly equalizing access for all demographic groups. If true, the benefits of equalizing economic and political mobility raise the returns to schooling for all groups and not just the individual groups targeted for the improved access. Any conclusion about the effect of equal access on returns to human capital more generally must be considered fragile, however, as we fail to find any systematic relationship between political access to women and returns to experience.

E. Foreign Aid

Recent books have taken polar opposite positions on the importance of foreign aid on developing country growth. While the debate has primarily focused on aggregate measures of country growth, they would only affect growth if they altered individual expectations and resource allocation decisions. Table 2 suggests that infusions of foreign aid per capita lower returns to human capital. Estimated effects on returns to schooling are uniformly negative although not precisely estimated for all demographic groups. The effect is particularly large and negative for rural residents. Returns to experience are also negatively influenced by the magnitude of foreign aid for all demographic groups. In a Schultz world, if assistance aims to
insulate a country from economic shocks, it would also lower the need for managerial talents and would lower returns to skill.

**F. The extent of the market, growth, and life expectancy**

As suggested by human capital investment theory, life expectancy has a consistently large negative effect on returns to schooling and returns to experience that applies to all populations. The elasticity implies that a 10% increase in life expectancy lowers the marginal return per year of schooling by 15% or 1.2 percentage points and lowers the return to experience by 18% or 0.82 percentage points. These results are consistent with the presumption that there are diminishing marginal returns to human capital investments. Rising life expectancy causes all demographic groups to increase the time they spend investing in human capital inside and outside school. We get similar effects when we replace life expectancy with average years of schooling, but life expectancy has the stronger effect.

The other regressors suggest that returns to human capital are only weekly linked to the level of development as indexed by GDP per capita. Marginal returns to human capital fall as the country experiences growth in GDP per capita, suggesting that a rising tide raises the boats of the unskilled most.

The broad conclusion from Tables 2-4 is that returns to human capital investments are strongly tied to the level of economic freedom in the country, where economic freedom includes greater protection from expropriation of the gains from investments and less government restriction on individual decision making. Political freedoms do not have a systematic effect on returns to human capital investments except for the intriguing possibility that returns are higher in societies that share power broadly as indexed by women’s access to political positions. These outcomes corroborate the findings from transition economies that transition from planned to
market systems raises returns to human capital. They also suggest that differences in economic freedom explain part of the persistent cross-country variation in incomes identified by Schultz (1998).

V. **Do Economic and Political Freedoms Affect the Wage Distribution?**

We have established strong evidence that freer economic institutions lead to higher average returns to schooling and experience. That does not mean that all parties benefit. There are strong reasons to suspect that the most skilled benefit most from freer economic institutions. The models of Rosen, Murphy et al, and Schultz would all suggest that it is the most uniquely skilled whose returns are suppressed under more restrictive economic policies, and so they would benefit most from their relaxation. To the extent that maximizing returns to human capital requires geographic or occupational mobility, it is the most educated who are the most mobile (Schultz, 1988).

Many of the restrictive economic policies are aimed at redistributing income from the wealthy to the poor. Moderating or eliminating progressive tax rates, usury laws, minimum wages, and government services would all raise measured economic freedom, but their elimination might disadvantage the poorest segments of society, even as they benefit the wealthier groups.

All of these reasons justify an evaluation of how economic or political freedoms affect returns to schooling at all points along the wage distribution. We address these issues by using quantile regressions to generate the cross-country distribution of estimated returns to schooling and experience at various points on the wage distribution. The quantile regressions applied the specification in (1) to the 0.1, 0.2, 0.25, 0.5, 0.75, 0.8, and 0.9 quantiles. Returns to schooling fall from 8.3% to 7.7% as we move up the quantiles. Results reported in table 7.1.1 of Angrist and
Pischke (2009) found that for samples of U.S. men, returns rose as they moved up the quantiles in 1990 and 2000, periods with rising earnings inequality in the United States. Their results for 1980 found declining returns to schooling for all but the highest quantiles.

Armed with our estimated quantile returns for each country, we repeated the estimation strategy in (2) to explain the variation in estimated returns to schooling at each of the quantiles. We also examine evidence for changes in the effect of institutions as we go from the lower to the upper quantiles. The results are shown in Table 5. To conserve space and aid comparisons, we only report the results for the 0.1, 0.5 and 0.9 quantiles. We also include a regression of the change in the 10-90 quantile returns, using the same specification, as a test of whether the change in returns across quantiles is statistically significant. The pattern of results for the intermediate quantiles is similar.

Surprisingly, there is only modest evidence that the benefits of economic institutions are shared unequally across the income distribution. The Economic Freedom Index becomes more important for returns to schooling as we move up the earnings quantiles, but its importance to returns to experience falls. The change in coefficients from the 0.1 to the 0.9 quantile is not statistically significant. Importantly, the effect of Economic Freedom is always positive, and so no quantile group does worse in a freer economic climate. In addition, gains to the upper-tail of the unobserved ability distribution from higher returns to schooling are counteracted by gains to the lower-tail from higher returns to experience.

There is modest evidence that stronger human rights benefit the upper-tail most from higher returns to experience. However, the gains are U-shaped and so the smallest benefits are at the median. In going from the least to the most endowed in unobserved abilities, there is no significant difference in returns from Empowerment.
Those in the upper-tail of the ability distribution have higher returns to schooling in countries with greater Equal Rights as proxied by women in the legislature. However, those at the bottom-tail gain also—just not as much, and the change in the benefit is not statistically significant.

Democracy and global trade have no impact on returns to human capital at any point on the ability distribution. Foreign aid lowers returns to schooling and experience at all quantiles. The effect on returns to schooling becomes larger as we move up the quantiles, but the effect on returns to experience gets smaller. The aggregate effect on returns to human capital is not significant.

Longer life lowers returns to human capital for all quantiles, but the effect is greatest at the upper tail of the unobserved ability distribution. Apparently, longer life encourages additional schooling for all quantile groups, but relatively more so for those at the upper-tail of unobserved ability. The implication is that improvements in life expectancy raise the education gap between the most and least able. Nevertheless, the difference in returns in going from the bottom to the top of the distribution is not statistically significant. The level of economic development, as measured by real GDP per capita, has similar effects on returns to schooling across all quantiles, as does the growth rate of real GDP per capita.

Overall, there is only modest evidence that freer economic institutions cause greater inequality in returns to human capital. More importantly, where evidence exists, it is because those at the upper tail are gaining more and not because those at the bottom tail are losing. We find no evidence that Economic Freedom disadvantages the poorest in society.
References


Collier, Paul. 2007. The Bottom Billion: Why the Poorest Countries are Failing and What Can be Done About it Oxford: Oxford University Press.


Easterly, William. 2006. The White Man’s Burden: Why the West’s Efforts to Aid the Rest Have Done so Much Ill and so Little Good New York: The Penguin Press.


Table 1: Correlations between Policy Variables, Measures of Economic Development and Returns to Schooling

<table>
<thead>
<tr>
<th>Institutional Measure</th>
<th>Life Expectancy at Birth, Total (Years)</th>
<th>Log of real GDP per capita</th>
<th>Growth Rate of Real GDP per Capita (%)</th>
<th>Returns per Year of Schooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Freedom Index</td>
<td>0.41</td>
<td>0.51</td>
<td>-0.14</td>
<td>0.32</td>
</tr>
<tr>
<td>Globalization Index</td>
<td>0.62</td>
<td>0.79</td>
<td>-0.07</td>
<td>0.21</td>
</tr>
<tr>
<td>Empowerment Rights Index</td>
<td>0.42</td>
<td>0.45</td>
<td>-0.15</td>
<td>0.25</td>
</tr>
<tr>
<td>Democracy (Freedom House/Imputed Polity)</td>
<td>0.53</td>
<td>0.57</td>
<td>-0.02</td>
<td>0.23</td>
</tr>
<tr>
<td>Women in the Legislature</td>
<td>-0.12</td>
<td>0.01</td>
<td>0.24</td>
<td>0.23</td>
</tr>
<tr>
<td>Log of real aid per capita</td>
<td>-0.17</td>
<td>-0.23</td>
<td>0.13</td>
<td>-0.20</td>
</tr>
</tbody>
</table>
Table 2: Cross-country regressions explaining variation in estimated returns to schooling and returns to experience, by gender and region

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$Ed_{jt}$</td>
<td>$Exp_{jt}$</td>
<td>$Ed_{jt}$</td>
<td>$Exp_{jt}$</td>
<td>$Ed_{jt}$</td>
</tr>
<tr>
<td>Economic Freedom Index</td>
<td>0.068**</td>
<td>0.062*</td>
<td>0.063**</td>
<td>0.064*</td>
<td>0.066**</td>
</tr>
<tr>
<td></td>
<td>(2.39)</td>
<td>(1.83)</td>
<td>(2.05)</td>
<td>(1.91)</td>
<td>(2.23)</td>
</tr>
<tr>
<td>Globalization Index</td>
<td>0.021</td>
<td>-0.026</td>
<td>0.023</td>
<td>0.004</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>(0.53)</td>
<td>(-0.71)</td>
<td>(0.57)</td>
<td>(-0.09)</td>
<td>(0.97)</td>
</tr>
<tr>
<td>Empowerment rights index</td>
<td>0.215</td>
<td>0.105</td>
<td>0.130</td>
<td>0.235</td>
<td>0.193</td>
</tr>
<tr>
<td></td>
<td>(1.27)</td>
<td>(0.73)</td>
<td>(0.84)</td>
<td>(1.20)</td>
<td>(1.16)</td>
</tr>
<tr>
<td>Democracy (Freedom House/Imputed Polity)</td>
<td>0.107</td>
<td>-0.114</td>
<td>0.191</td>
<td>0.021</td>
<td>0.178</td>
</tr>
<tr>
<td></td>
<td>(0.58)</td>
<td>(-0.68)</td>
<td>(1.04)</td>
<td>(-0.69)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Women in Legislature</td>
<td>0.086**</td>
<td>-0.024</td>
<td>0.070*</td>
<td>0.079*</td>
<td>0.105**</td>
</tr>
<tr>
<td></td>
<td>(2.13)</td>
<td>(-1.02)</td>
<td>(1.77)</td>
<td>(-0.22)</td>
<td>(1.89)</td>
</tr>
<tr>
<td>Log of Real Aid per Capita</td>
<td>-0.347*</td>
<td>-0.540**</td>
<td>-0.311</td>
<td>-0.391*</td>
<td>-0.223</td>
</tr>
<tr>
<td></td>
<td>(-1.73)</td>
<td>(-3.42)</td>
<td>(-1.56)</td>
<td>(-1.84)</td>
<td>(-1.13)</td>
</tr>
<tr>
<td>Log of Life Expectancy at Birth, Total (Years)</td>
<td>-12.00**</td>
<td>-8.20**</td>
<td>-11.89**</td>
<td>-13.19**</td>
<td>-13.08**</td>
</tr>
<tr>
<td></td>
<td>(-4.71)</td>
<td>(-4.02)</td>
<td>(-4.71)</td>
<td>(-5.03)</td>
<td>(-5.05)</td>
</tr>
<tr>
<td>Log of real GDP per capita</td>
<td>0.853</td>
<td>0.396</td>
<td>0.785</td>
<td>0.966*</td>
<td>0.825</td>
</tr>
<tr>
<td></td>
<td>(1.64)</td>
<td>(0.71)</td>
<td>(1.58)</td>
<td>(1.67)</td>
<td>(1.60)</td>
</tr>
<tr>
<td>Growth Rate of Real GDP per Capita (%)</td>
<td>-0.135**</td>
<td>-0.076</td>
<td>-0.115**</td>
<td>-0.148**</td>
<td>-0.149**</td>
</tr>
<tr>
<td></td>
<td>(-2.57)</td>
<td>(-1.40)</td>
<td>(-2.16)</td>
<td>(-2.15)</td>
<td>(-2.67)</td>
</tr>
<tr>
<td>Constant</td>
<td>44.15</td>
<td>33.73</td>
<td>43.73</td>
<td>51.57</td>
<td>47.98</td>
</tr>
<tr>
<td></td>
<td>(4.30)</td>
<td>(4.60)</td>
<td>(4.33)</td>
<td>(4.86)</td>
<td>(4.43)</td>
</tr>
<tr>
<td>R2</td>
<td>0.41</td>
<td>0.33</td>
<td>0.40</td>
<td>0.35</td>
<td>0.44</td>
</tr>
<tr>
<td>Number of observations</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>113</td>
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</table>

t-statistics are in parentheses and elasticities are in brackets. ** p<0.05, * p<0.1
Table 3: Coefficients and estimated elasticities of the impact of the Economic Freedom Index and its subcomponents on the returns to schooling

<table>
<thead>
<tr>
<th>Heritage Foundation Subindex</th>
<th>Marginal Returns to Education</th>
<th>Marginal Returns to Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Freedom Index</td>
<td>0.068**</td>
<td>0.062*</td>
</tr>
<tr>
<td></td>
<td>(2.39)</td>
<td>(1.83)</td>
</tr>
<tr>
<td></td>
<td>[0.45]</td>
<td>[0.74]</td>
</tr>
<tr>
<td>Business Freedom</td>
<td>0.036**</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(2.23)</td>
<td>(0.08)</td>
</tr>
<tr>
<td></td>
<td>[0.17]</td>
<td>[0.01]</td>
</tr>
<tr>
<td>Freedom from Corruption</td>
<td>0.024*</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(1.69)</td>
<td>(0.36)</td>
</tr>
<tr>
<td></td>
<td>[0.08]</td>
<td>[0.04]</td>
</tr>
<tr>
<td>Financial Freedom</td>
<td>0.007</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>(0.41)</td>
<td>(1.39)</td>
</tr>
<tr>
<td></td>
<td>[0.03]</td>
<td>[0.25]</td>
</tr>
<tr>
<td>Fiscal Freedom</td>
<td>0.037</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(1.50)</td>
<td>(0.69)</td>
</tr>
<tr>
<td></td>
<td>[0.36]</td>
<td>[0.26]</td>
</tr>
<tr>
<td>Freedom from Government</td>
<td>0.018</td>
<td>0.033**</td>
</tr>
<tr>
<td></td>
<td>(1.37)</td>
<td>(2.15)</td>
</tr>
<tr>
<td></td>
<td>[0.17]</td>
<td>[0.54]</td>
</tr>
<tr>
<td>Investment Freedom</td>
<td>0.030*</td>
<td>0.047**</td>
</tr>
<tr>
<td></td>
<td>(1.75)</td>
<td>(3.15)</td>
</tr>
<tr>
<td></td>
<td>[0.19]</td>
<td>[0.53]</td>
</tr>
<tr>
<td>Monetary Freedom</td>
<td>-0.007</td>
<td>0.029*</td>
</tr>
<tr>
<td></td>
<td>(0.47)</td>
<td>(1.89)</td>
</tr>
<tr>
<td></td>
<td>[-0.07]</td>
<td>[0.42]</td>
</tr>
<tr>
<td>Property Rights</td>
<td>0.050**</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(3.31)</td>
<td>(2.50)</td>
</tr>
<tr>
<td></td>
<td>[0.27]</td>
<td>[0.05]</td>
</tr>
<tr>
<td>Trade Freedom</td>
<td>0.016</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.72)</td>
<td>(0.130)</td>
</tr>
<tr>
<td></td>
<td>[0.14]</td>
<td>[0.04]</td>
</tr>
<tr>
<td>F(8, 104)*</td>
<td>1.25</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Each estimate is from a separate regression of returns to schooling or returns to experience on the full model specification used in Table 2. The complete results are available from the authors on request. T-statistics are in parentheses and elasticities are in brackets.

*Test that the sum of the 9 subindex effects equals the effect of the overall Economic Foundation Index
Table 4: Coefficients and estimated elasticities of the impact of the Empowerment Rights Index and its subcomponents on the returns to schooling

<table>
<thead>
<tr>
<th>Empowerment Rights Subindex</th>
<th>Marginal Returns to Education</th>
<th>Marginal Returns to Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empowerment rights index</td>
<td>0.215</td>
<td>0.105</td>
</tr>
<tr>
<td></td>
<td>(1.301)</td>
<td>(0.73)</td>
</tr>
<tr>
<td></td>
<td>[0.284]</td>
<td>[0.139]</td>
</tr>
<tr>
<td>Freedom of movement</td>
<td>0.108</td>
<td>-0.224</td>
</tr>
<tr>
<td></td>
<td>(0.133)</td>
<td>(0.35)</td>
</tr>
<tr>
<td></td>
<td>[0.017]</td>
<td>[-0.036]</td>
</tr>
<tr>
<td>Political participation</td>
<td>-0.261</td>
<td>1.06*</td>
</tr>
<tr>
<td></td>
<td>(-0.648)</td>
<td>(1.80)</td>
</tr>
<tr>
<td></td>
<td>[-0.074]</td>
<td>[0.301]</td>
</tr>
<tr>
<td>Freedom of religion</td>
<td>0.884</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(1.356)</td>
<td>(0.02)</td>
</tr>
<tr>
<td></td>
<td>[0.129]</td>
<td>[-.002]</td>
</tr>
<tr>
<td>Freedom of speech</td>
<td>1.130**</td>
<td>0.582**</td>
</tr>
<tr>
<td></td>
<td>(2.135)</td>
<td>(2.08)</td>
</tr>
<tr>
<td></td>
<td>[0.265]</td>
<td>[.137]</td>
</tr>
<tr>
<td>Workers rights</td>
<td>0.152</td>
<td>-0.121</td>
</tr>
<tr>
<td></td>
<td>(0.319)</td>
<td>(0.300)</td>
</tr>
<tr>
<td></td>
<td>[0.029]</td>
<td>[-0.023]</td>
</tr>
</tbody>
</table>

F(4, 108)\textsuperscript{*} = 1.51

Each estimate is from a separate regression of returns to schooling or returns to experience on the full model specification used in Table 2. The complete results are available from the authors on request.

\textsuperscript{*}t-statistics are in parentheses and elasticities are in brackets.

\textsuperscript{*}Test that the sum of the 5 subindex effects equals the effect of the overall Empowerment Index
Table 5: Cross-country regressions explaining variation in returns to schooling and returns to experience estimated at selected quantiles

<table>
<thead>
<tr>
<th>Quantile</th>
<th>0.10</th>
<th>0.50</th>
<th>0.90</th>
<th>90-10</th>
</tr>
</thead>
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<td>$Edr_{jt}$</td>
<td>$Exp:b_{jt}$</td>
<td>$Edr_{jt}$</td>
<td>$Exp:b_{jt}$</td>
</tr>
<tr>
<td>Economic Freedom Index</td>
<td>0.017</td>
<td>0.093**</td>
<td>0.057**</td>
<td>0.058*</td>
</tr>
<tr>
<td>(0.47)</td>
<td>(2.40)</td>
<td>(2.05)</td>
<td>(1.91)</td>
<td>(2.49)</td>
</tr>
<tr>
<td>Globalization Index</td>
<td>-0.022</td>
<td>-0.049</td>
<td>0.036</td>
<td>-0.024</td>
</tr>
<tr>
<td>(0.39)</td>
<td>(1.19)</td>
<td>(0.94)</td>
<td>(0.70)</td>
<td>(1.19)</td>
</tr>
<tr>
<td>Empowerment rights index</td>
<td>0.139</td>
<td>0.158</td>
<td>0.248</td>
<td>0.031</td>
</tr>
<tr>
<td>(0.61)</td>
<td>(0.69)</td>
<td>(1.42)</td>
<td>(0.26)</td>
<td>(1.18)</td>
</tr>
<tr>
<td>Democracy (Freedom House/Imputed Polity)</td>
<td>0.020</td>
<td>-0.007</td>
<td>0.098**</td>
<td>0.003</td>
</tr>
<tr>
<td>(0.45)</td>
<td>(-0.21)</td>
<td>(2.27)</td>
<td>(0.12)</td>
<td>(1.97)</td>
</tr>
<tr>
<td>Log of Real Aid per Capita</td>
<td>-0.271</td>
<td>-0.817**</td>
<td>-0.293</td>
<td>-0.365**</td>
</tr>
<tr>
<td>(0.98)</td>
<td>(4.09)</td>
<td>(1.44)</td>
<td>(2.56)</td>
<td>(1.85)</td>
</tr>
<tr>
<td>(3.55)</td>
<td>(2.27)</td>
<td>(5.26)</td>
<td>(3.67)</td>
<td>(4.97)</td>
</tr>
<tr>
<td>Log of real GDP per capita</td>
<td>0.898</td>
<td>0.313</td>
<td>0.879</td>
<td>0.670</td>
</tr>
<tr>
<td>(1.44)</td>
<td>(0.50)</td>
<td>(1.63)</td>
<td>(1.24)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>Growth Rate of Real GDP per Capita (%)</td>
<td>-0.119*</td>
<td>-0.057</td>
<td>-0.151**</td>
<td>-0.091*</td>
</tr>
<tr>
<td>(1.79)</td>
<td>(0.93)</td>
<td>(2.96)</td>
<td>(1.72)</td>
<td>(1.63)</td>
</tr>
<tr>
<td>Constant</td>
<td>38.8**</td>
<td>25.4**</td>
<td>49.7**</td>
<td>32.9**</td>
</tr>
<tr>
<td>(3.80)</td>
<td>(2.76)</td>
<td>(4.82)</td>
<td>(3.81)</td>
<td>(4.32)</td>
</tr>
<tr>
<td>R2</td>
<td>0.17</td>
<td>0.26</td>
<td>0.40</td>
<td>0.32</td>
</tr>
<tr>
<td>Number of observations</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
</tr>
<tr>
<td>F(9, 85)$^a$</td>
<td>2.32**</td>
<td>2.71**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent variable in the first six columns is the estimated return to schooling or return to experience from the associated quantile earnings function. Difference in the coefficients between the 90th and 10th quantiles are reported in the last two columns.

$^a$Joint test of changes in the nine coefficients between the 90th and 10th quantiles

t-statistics are in parentheses. ** p<0.05, * p<0.1
Figure 1: Histograms of estimated returns to schooling and to potential work experience across developing countries

Source: Authors calculations based on the coefficients from earnings function regressions applied to 122 household survey data sets covering 86 countries
Figure 2A: Returns to Schooling by Level of Development and Economic Freedom

- Most Free: Avg = 9.7%
- Medium Free: Avg = 8.3%
- Least Free: Avg = 6.3%
Figure 2B: Returns to Experience by Level of Development and Economic Freedom

Returns per year of Potential Experience

Log GDP Per Capita

Most Free: Avg = 5.0%

Medium Free: Avg = 4.7%

Least Free: Avg = 4.2%
Appendix A. Picking indicators

Developing indices has become a growth industry. The review by the Quality of Government Institute (Teorell et al, 2009) listed 82 sources, most with multiple sub-indicators. The indexes are collected for different purposes and they measure different things. The indicators are quantitative, qualitative, objective, subjective, descriptive and abstract.

To narrow the set of indicators, we used the following criteria:

- The indicator had to be comprehensive in the number of countries included.
- The indicator had to use comparable data across countries to insure comparability.
- The indicator had to have been used consistently over a long time period to insure comparability across years.
- The indicator had to relate to measures of individual freedom, whether in the economic, political or social realm. The best measures related to whether there were constraints placed on individual choice that could force the individual to make suboptimal choices of where to live, where to work, whether to open a business, whom to associate with, what to produce or what to buy.
- We had to be able to understand the description of the indicator sufficiently to know what it measures and to replicate the measure if necessary. This became particularly important when there was a need to interpolate or extrapolate beyond the available data.

Our selection was greatly aided by the data compilation made available by the Quality of Government Institute. Our included measures were:

Economic Freedom: The Heritage Foundation Index of Economic Freedom is available from 1994-2006. We used the closest value to the year. The Index is the average of 9 subindexes, each of which varies between 0 (least free) to 100 (most free):

- Business Freedom: Rises with the ease of starting or closing a business;
- Trade Freedom: Rises as the levels of tariff and nontariff barriers are reduced;
- Fiscal Freedom: Increases as marginal tax rates on personal and corporate income and total taxes as a fraction of GDP fall;
- Freedom from Government: Rises as the importance of state-owned enterprises and government expenditure as a share of GDP are reduced;
- Monetary Freedom: Rises as inflation rates fall and as the imposition of price controls are reduced;
- Investment Freedom: Rises with quality of investment climate for both foreign and domestic investors;
- Financial Freedom: Rises as regulations on banking and other financial institutions are eased;
- Property Rights: Rises with legislation and enforcement that protect individual property;
- Freedom from Corruption: Rises with the country’s score on Transparency International’s Corruption Perception Index.
A Labor Freedom index was added recently, but we do not use it. There were 5 cases where there was no data. Where both measures were available, we regressed the Heritage Foundation measures on the 6 World Bank Governance Indicators: Voice and Accountability; Political Stability; Government Effectiveness; Regulatory Quality; Rule of Law; and Control of Corruption (Kaufmann, Kraay and Mastruzzi, 2008). We then used the projected values based on the 6 indicators to replace the missing Heritage values in the 5 cases.

Empowerment Rights: We used the Empowerment Index from Cingranelli and Richards: Human Rights Dataset, 2005. The data are available for all countries from 1981-2004. For data sets of vintage 2005 or later, we used the 2004 data. The Index is composed of 5 subindexes:

- Freedom of Movement: Indicates the extent to which domestic or foreign travel is unrestricted;
- Freedom of speech: Indicates the extent to which the media is uncensored;
- Worker’s Rights: Indicates the extent to which rights are protected;
- Political Participation: Indicates the extent to which political participation is free and open;
- Freedom of Religion: Indicates the extent to which the government allows free religious practices.

Globalization Index: Dreher (2006) developed the KOF Index of Globalization, which is available for most countries between 1970 and 2006. The index is a weighted average of Economic Globalization (based on trade and capital flows and restrictions on those flows); Political Globalization (based on participation in international organizations and embassies hosted); and Social Globalization (access to telephones, Internet, tourism, and books within the country). We generated a predicted index for the 11 cases where the overall index was missing, using a regression of the KOF Index of Globalization on the Political Globalization subindex and the Heritage Foundation’s Trade Freedom Index.

Life Expectancy at Birth. Available from the World Development Indicators, for all countries and for various years between 1960 and 2006. When an exact match of dates was not available, we used interpolations of preceding and subsequent year’s data.

Democracy: Freedom House reports an Imputed Polity indicator between 1972 and 2007 for all countries. The measure ranges from 0-10 with 0 being least democratic and 10 being most democratic.

Percent women in legislature: The Inter-parliamentary union reports the percentage of women in the lower house of parliament for all countries between 1997 and 2008. Melander (2005) reports a similar series from 1965-2002 except that it is the percent of women in the upper house of parliament. To fill in the missing IPUW data, we regressed the IPUW series on Melander series for years when both observations were available. We then used the predicted IPUW values to replace missing values where needed.

Other data
Real GDP per Capita and the Growth rate of Real GDP per Capita were obtained from the United Nations Statistics Divisions’ National Accounts.

Real Foreign Aid per Capita was generated by using the World Development Indicators Foreign Aid Series divided by country population obtained from the United Nations Statistics Divisions’ National Accounts. The resulting series was then converted into constant U.S. dollars using the U.S. Department of Commerce GDP deflator.

Appendix Table 1: Sample Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. DEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returns to Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8.09</td>
<td>3.51</td>
</tr>
<tr>
<td>Male</td>
<td>7.28</td>
<td>3.32</td>
</tr>
<tr>
<td>Female</td>
<td>9.74</td>
<td>3.79</td>
</tr>
<tr>
<td>Urban</td>
<td>8.29</td>
<td>3.68</td>
</tr>
<tr>
<td>Rural</td>
<td>7.50</td>
<td>4.04</td>
</tr>
<tr>
<td>Returns to Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.64</td>
<td>2.73</td>
</tr>
<tr>
<td>Male</td>
<td>4.60</td>
<td>2.95</td>
</tr>
<tr>
<td>Female</td>
<td>4.52</td>
<td>4.16</td>
</tr>
<tr>
<td>Urban</td>
<td>5.09</td>
<td>3.17</td>
</tr>
<tr>
<td>Rural</td>
<td>3.99</td>
<td>3.13</td>
</tr>
<tr>
<td>Economic Freedom Index</td>
<td>55.25</td>
<td>10.81</td>
</tr>
<tr>
<td>Globalization Index</td>
<td>51.79</td>
<td>12.72</td>
</tr>
<tr>
<td>Empowerment rights index</td>
<td>6.14</td>
<td>2.76</td>
</tr>
<tr>
<td>Democracy (Freedom House/Imputed Polity)</td>
<td>6.26</td>
<td>2.74</td>
</tr>
<tr>
<td>Women in the Legislature</td>
<td>11.79</td>
<td>8.02</td>
</tr>
<tr>
<td>log(Life Expectancy at Birth)</td>
<td>4.15</td>
<td>0.17</td>
</tr>
<tr>
<td>log(GDP per Capita)</td>
<td>6.86</td>
<td>1.03</td>
</tr>
<tr>
<td>Growth Rate: GDP per Capita (%)</td>
<td>3.18</td>
<td>5.00</td>
</tr>
<tr>
<td>log(Aid per Capita)</td>
<td>-1.43</td>
<td>1.37</td>
</tr>
</tbody>
</table>

Appendix Table 2: Correlation between Selection Corrected and Least Squares Returns to Schooling

<table>
<thead>
<tr>
<th>Least squares estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection Corrected estimates</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td>Rural</td>
</tr>
</tbody>
</table>

Based on 90 observations of 122 possible
Appendix B. An illustrative model of matching and returns to human capital

We turn to a variation of the Pissarides (2000) model of two-sided labor market search to show how more flexible market institutions, reflected in a more efficient mechanism matching firms to workers, raises returns to human capital. Other models can yield a similar prediction. For example, Murphy et al (1991) show that strong property rights, ease of firm entry, and larger markets will cause the most able to become entrepreneurs, simultaneously increasing overall growth and returns to skill. Rosen (1983) demonstrates that returns to specialized applications of skill to an activity increase as transaction costs fall and the size of the market increases. The common feature in these models is that more efficient gains from trade among agents create increasing returns to skill.

Let $q(\theta)$ be a matching function that defines the rate at which a vacant job is matched to an available unemployed worker. $\theta$ is a measure of labor market tightness: the ratio of job vacancies to unemployed workers. As $\theta$ gets larger, the number of vacancies rises relative to the number of unemployed available to fill the jobs. The probability that a given vacancy is filled falls as $\theta$ increases, and so $q'(\theta) < 0$. Job seekers of equal ability are randomly assigned to vacancies for which they qualify. The expected duration of a job remaining vacant is $1/q(\theta)$, and so jobs stay unfilled longer when the matching process is inefficient. In our framework, better market institutions would raise $q(\theta)$ at the same level of $\theta$, and so good institutions yield matches faster at any given level of labor market tightness. In essence, the unemployed are sorted into available vacancies more efficiently, workers waste less time searching and more time working, and the overall level of production in the economy rises.

Job seekers are sorted into groups based on their exogenously given abilities, $H$. Each firm can only hire one worker and so jobs and firms are synonymous. Job vacancies and job seekers are indexed by a required minimum level of $H$. That level of human capital also defines the value of output produced by the firm. The firm faces a cost in filling a vacant job equal to $cH$, $c<1$, and so it is more expensive to fill jobs requiring greater skill.

Job Creation

A firm decides to create a job vacancy if it can do so profitably, and so in competitive markets, the expected profit from an additional vacancy must be zero. Let $J$ be the present value from a filled job and $V$ be the present value of an unfilled vacancy evaluated at the interest rate $r$. The zero expected profit condition requires that:

$$ rV = -cH + q(\theta)(J - V) $$

so that the stream of earnings expected from a vacancy is equal to the probability of filling the vacancy times the added return from a filled job net of the search costs. Competitive forces will drive $V$ to zero, and so in equilibrium,

$$ J = \frac{cH}{q(\theta)}. $$

A filled job generates a stream of earnings such that:

$$ rJ = H - w - \lambda J $$

So that the value of the job reflects the value of output net of the wage, $w$, minus the expected loss of future revenue if the job disappears. The parameter $\lambda$ is the random probability that the firm experiences an adverse shock large enough to drive the firm out of business. These shocks could be due to a loss of productivity or to taste shifts that lower the value of output. Inserting (2) into (3) and rearranging yields what Pissarides calls the job creation condition:

$$ w = H - \frac{(r+\lambda)cH}{q(\theta)} $$
which is similar to a standard derived demand for labor, save that the firm sets the wage equal to the value of the marginal product net of the expected hiring costs. Lower frictions in hiring as measured by a high value of $q(\theta)$ will increase the firm’s pay offers. Economic or political institutions that make matching less efficient will lower firm demands for labor.

**Wage Determination**

Just as firms decide whether or not to offer a job vacancy, workers will decide whether to enter the labor market. Individuals have a value of time outside the labor market, $\tilde{v} = \tilde{v}(\theta)$, which we assume is proportional to the market wage. The parameter may reflect the nonmarket uses of time or it may be a policy parameter such as an unemployment insurance benefit which ties earnings outside the labor market to what can be earned while employed. If $W$ and $U$ are respectively, the present values of being employed and being unemployed, then the stream of returns from a job will be:

$$ rW = w - \lambda(W - U), $$

where the returns include the probability of job loss in the event of an adverse shock. The stream of returns to unemployment will be:

$$ rU = \rho w + \theta q(\theta)(W - U), $$

where $\theta q(\theta)$ turns out to be the rate of job entry from unemployment to employment.

The firm and the worker set the wage so as to maximize their weighted net return from the match. The worker’s gain is $(W - U)$ and the firm’s gain is $(J - V)$. The joint net gain from the match is $(W - U + J - V)$. The worker’s share of the gain is defined as $\psi$. Therefore the net gain to the worker is:

$$ W - U = \psi(W - U + J - V) $$

Substituting in (2), (5) and the requirement that $V=0$ in equilibrium yields an equilibrium wage $w = (1 - \psi)rU + \psi H$. Inserting (2) and the requirement that $V=0$ into (7) allows us to derive a term for $(W - U)$ which when inserted into (6) generates $rU = \rho w + \theta \frac{\psi}{1-\psi} c H$.

Substituting this into the wage equation and rearranging yields the wage equation:

$$ w = \frac{\psi H (1 + \theta c)}{1 - (1-\psi) \rho} $$

**Equilibrium**

Equations (4) and (8) provide two equations in two unknowns, $w$ and $\theta$. The job creation equation (4) is downward sloping in market tightness, $\theta$, and the wage equation (8) is upward sloping in $\theta$. The two equations generate unique equilibrium values of $w$ and $\theta$, as illustrated in Figure 1A. Inserting (8) into (4) yields an implicit function in $\theta$:

$$ 1 - \frac{\psi (1+c\theta)}{1-(1-\psi) \rho} - \frac{(r+\lambda) c}{q(\theta)} = 0 $$

Equation (9) implies that the equilibrium value for $\theta$ is fixed by $\theta^*(r, \lambda, c, \psi, \rho)$ which is independent of skill. Therefore, the degree of job market tightness does not depend on the distribution of skills in the economy. Instead, equilibrium job market tightness $\theta^*$ decreases at higher interest rates, exposure to adverse shocks, higher search costs, higher value of nonmarket time, and higher labor share of match rents.

Countries with better matching mechanisms, say from institutions that improve information flows in the economy, will have higher values of $q(\theta^*)$ at any level of labor market

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16 In the Pissarides (2000) formulation, a third equation fixes the unemployment rate, but it turns out that when nonmarket time is proportional to the market wage, unemployment does not enter either the equilibrium job creation or the wage equations.
tightness, $\theta^*$. This shifts the job creation curve outward, but it does not affect the wage equation.\footnote{It turns out that in markets with more efficient match mechanisms, filled jobs generate lower rents even as they increase the speed at which vacancies are filled, and so the worker’s present value of time spent searching does not vary with $q(\theta^*)$. As a result, worker incentives to accept wages are unaffected by $q(\theta^*)$.} As shown in Figure 1A, the outward shift in job creation caused by a more efficient match mechanism raises both equilibrium wage and market tightness. Because the outward shift in the job creation curve is larger for workers with greater skill, the most skilled benefit most from better matching mechanisms in the labor market. If education or on-the-job training are positively correlated with the exogenous skill $H$, then we will observe higher returns to education or experience in economies with institutions that generate better matching mechanisms.

\begin{equation*}
W = H - \frac{(r + \beta) \cdot H}{q(\theta)}
\end{equation*}

\begin{equation*}
W^* = \frac{\phi H(1 + \theta \psi)}{1 - (1 - \psi)^2}
\end{equation*}