

Economic Institutions and Global Poverty

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Abstract

The Millennium Development Goal of halving the extreme poverty rate between 1990 and 2015 has nearly been achieved. This paper explores whether economic institutions contributed to the achievement of this goal. Prior research indicates that institutions consistent with economic freedom are conducive to economic growth in developing countries. But how are the poorest segments of society affected? Does growth resulting from institutional change benefit the poor? Using the most recent extreme poverty rate data of the World Bank, the analysis indicates that the relationship between lower rates of extreme poverty and the level of economic freedom is weak. However, the impact of changes in economic freedom on reductions of the extreme poverty rate is more robust. Increases in economic freedom correspond to larger reductions of the extreme poverty rate. Moreover, countries with a higher level of economic freedom prior to reforms experienced larger reductions in poverty.

Keywords: Poverty, Economic Freedom, Institutions, Development
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1. Introduction

The reduction and elimination of poverty in the developing world has been an important, perhaps the most important, goal of development economics. This goal is the first of the United Nations Millennium Development Goals. The aim is to reduce by half the percentage of people living in extreme poverty throughout the world between 1990 and 2015. This has nearly been achieved despite the recent global economic downturn. While there are undoubtedly many factors that contributed to such an unprecedented reduction in global poverty, the impact of economic institutions is the primary focus of this paper. Research on economic growth indicates that economic institutions are a significant determinant of growth and higher income levels. Whether these institutions exert a similar impact on extreme poverty in the developing world has been largely untested.

Economic growth rather than poverty has been a primary focus of development research. To a large degree, this is a result of the availability of national income data and absence of quality measures of poverty for a large set of countries. Economic growth is important and is associated with the improvement of life expectancy rates, infant mortality rates, and many other quality of life measures. There is continued debate about how the well being of the poorest segments of society are affected by institutional change supportive of economic freedom and the growth process. Some argue that the jobs in developing countries resulting from increased economic freedom reflect exploitation of the poor (Arnold and Hartman 2005). Others argue that these jobs are better than the alternatives given the existing level of development (Powell and Skarbek 2006; Krugman 1997). This debate highlights an issue that has attracted less attention in the economic development literature: How does institutional change that expands economic freedom influence the poor? This paper seeks to expand the literature beyond growth to poverty. In addition, the analysis uses recently updated poverty rates from the World Bank. These data are the most complete poverty dataset

to date and cover nearly the entire developing world during 1980-2005, allowing for a comprehensive panel data analysis.

The results indicate that economic institutions contributed to the achievement of the first Millennium Development Goal of halving the extreme poverty rate. Countries with institutions more consistent with economic freedom had lower poverty rates. More importantly, countries that implemented reforms during 1980-2005 that increased economic freedom experienced larger reductions in the extreme poverty rate.

2. Global Poverty

The extreme and moderate poverty rates from the World Bank, World Development Indicators are the most widely used measures of poverty in the developing world. Created by Chen and Ravallion (2008), they are the percentage of a country's population living on \$1.25 and \$2 per day or less, respectively, in 2005 international dollars. These rates are reported for 115 developing countries over the period 1978-2007.¹ They are based upon household consumption and income surveys conducted irregularly in various countries. This irregularity complicates statistical analysis. Therefore, the World Bank poverty measures were regularized to five-year intervals resulting in a poverty database covering 128 developing countries during 1980-2005.² See table A.1 of the appendix for a complete listing of the poverty data.

Figure 1 presents the World Bank extreme and moderate poverty rates for the 128 developing countries during 1980-2005. As the figure illustrates there was a secular decline in poverty during the period. The extreme poverty rate fell from 58.4 percent in 1980 to 25.1 percent in 2005, a decline of more than 30 percentage points.³ The

¹In 1978, 1979, and 1980 there are poverty rates for only one country each year. These countries are: India (1978), Panama (1979), and Madagascar (1980). It is not until the early 1980s that significantly more countries have reported poverty rates.

²See Connors (2011) chapter 2.

³The number of developing countries for which data were available ranged from 92 in 1980 to 128 in 2005. The poverty rate data were available for 89 countries continuously (for years ending in five or zero) during 1980-2005. These 89 countries comprised 91 percent of the developing world population in

moderate poverty rate exhibited a similar decline. In 1980 it stood at 75.7 percent, indicating that three-fourths of the developing world lived at or below the \$2 a day poverty line. By 2005, however, the moderate poverty rate was 45.6 percent, a decline of 30 percentage points. These aggregate poverty rates were derived by weighting the poverty rate for each country by its population during the year. While these figures are aggregate numbers and hide variation across regions, it is clear that poverty in the developing world declined during 1980-2005.

The aggregate data conceal differences across regions. The extreme poverty rate reductions were most rapid in Asia. While the initial poverty rate in Latin America was lower than other regions, the reductions, while substantial, were less than those of Asia. Sub-Saharan Africa registered the lowest poverty rate reductions. The regional pattern of reductions in the moderate poverty rate was similar.⁴

An absolute measure of poverty rather than income inequality is the focus of this analysis. There are several reasons for this. First, the conclusions of research on income inequality and development are either inconclusive or mixed (Anand and Segal 2008). Second, an absolute and standardized measure of poverty allows for a cross-country comparison. This is generally not the case when using a relative measure of poverty. Third, focusing on absolute poverty allows for a simple falsifiable research question. Are those living in extreme poverty better off in an institutional environment conducive to greater economic freedom? While income inequality is not the focus of this paper, regressions with income inequality are included in the appendix.

Maxim Pinkovskiy and Xavier Sala-i-Martin (2009) (hereafter PS) created an alternative measure of the extreme and moderate poverty rates. Their methodology differs from that used by the World Bank. While the World Bank uses only survey data, PS

2005 and an even higher percentage in the earlier years. The extreme poverty rate of these 89 countries fell from 59 percent in 1980 to 46 percent in 1990 and 26.8 percent in 2005. Thus, the extreme poverty rates (and changes in those rates) for the set of countries with data throughout the period were quite similar to those presented in figure 1 for all developing countries with data during the specified year.

⁴See table A.2 of the appendix for a regional breakdown of the extreme and moderate poverty rates.

use both survey and national income data when constructing their poverty rates.⁵ The dataset covers 191 countries annually during 1970-2006 and accounts for 98 percent of the world's population in 2006. The extreme poverty rate in this dataset represents the percentage of a country's population living on \$1 per day or less in 2000 international dollars. This is slightly below the \$1.25 per day in 2005 international dollars threshold used in the World Bank extreme poverty rate. The PS moderate poverty rate represents the percentage of a country's population living on \$2 per day or less in 2000 international dollars.

The PS poverty rates are lower than the World Bank poverty rates due to the use of both survey and national income data. While the level of poverty may differ, they both have similar time trends. The correlation between the PS and World Bank poverty rates is 0.76 and 0.84 for the extreme and moderate poverty rates, respectively. This illustrates that the two poverty measures are capturing similar aspects of global poverty.

The World Bank poverty rates are the most commonly used measures of poverty in the literature and by international organizations. Therefore, they are the primary measures of poverty here. They are based solely upon household surveys in developing countries and as such contain data that comes directly from the poor. In addition, Deaton argues that, "...if we need to measure poverty in a way that will convince those who are skeptical of the idea that average growth reaches the poor, there is little choice but to use the surveys (Deaton 2005, 18)." The extreme poverty rate of the World Bank is the primary focus of the analysis in this paper. Both the moderate poverty rate and the poverty rates of PS will be used later in order to test the robustness of the statistical results. Factors that affect poverty should be statistically significant with each measure.

⁵There is a widening discrepancy between income computed from surveys and national income data. Income levels and growth rates computed from survey data are consistently lower than those from national income data. This suggests that the World Bank poverty rates may overstate the level of poverty. See Deaton (2005).

3. Economic Freedom, Growth, and Poverty

Institutions more compatible with economic freedom have been shown to play an important role in the growth process. These institutions may also impact those living in extreme poverty. Therefore, this section highlights recent findings from the growth literature, as they are relevant to this analysis.

3.1 Economic Freedom and Growth

Recent scholarship on economic growth highlights institutions as an important, if not the most important factor for long run growth. Institutions, more compatible with economic freedom, are associated with higher income levels and growth rates. These institutions are characterized by the respect for private property rights, even handed enforcement of contracts, promotion of monetary stability, low trade barriers, and limits on government regulation and taxation. These institutions reduce both transactions cost and uncertainty, thereby enhancing the gains from trade, entrepreneurship, and investment.

A simple way to illustrate the impact of economic freedom on growth in the context of the neoclassical growth model is to view the total factor productivity (TFP) term as the absence of economic barriers. An economically free country is one that reduces or eliminates barriers to innovation, technology adoption, and entrepreneurship. This results in a higher TFP as resources are used more efficiently and productively. Parante and Prescott (2000) used the TFP term in this manner to represent the lack of economic barriers. Dawson (1998) used a similar approach and argued that the TFP term captured the direct impact of the institutional environment on growth.

Additional empirical evidence is supportive of the view that institutions more compatible with economic freedom exert a positive impact on growth and income levels (Wu and Davis 1999; Knack and Keefer 1995). Gwartney, Lawson, and Holcombe (1999) found that countries with increases in economic freedom had correspondingly higher

rates of economic growth. Using granger causality tests, Dawson (2003) indicated that the direction of causality was from economic freedom to growth. Earlier work by Dawson found that economic freedom is positively related to growth through its impact on investment (1998). Gwartney, Holcombe, and Lawson (2006) indicate that a higher level of economic freedom not only corresponds to higher levels of investment, but also to higher productivity of private investment.

3.2 Economic Freedom and Poverty

The growth literature indicates that economic freedom is related to higher average per capita income levels, but is it also related to higher incomes for the poor in the developing world? Shleifer (2009) argues that the answer is yes. Less economically free countries maintain barriers that stifle the entrepreneurial aspirations of the poor. Increased economic freedom implies a reduction of these barriers allowing the poor to flourish (Vargas Llosa 2008). Others are less certain about how economic freedom may impact the poor. Increased economic growth may only benefit those in the highest income strata (Galor and Zeira 1993) and in spite of improved institutions (i.e. more economic freedom) the poor may still be left behind (Ray 2010).

Several papers comprise the extent of the empirical economic freedom and poverty literature. Norton (2003) found that the protection of private property rights specifically, and economic freedom in general, exert a positive impact on the well being of the poor. The measures of poverty used by Norton are the Human Development Index and the Human Poverty Index of the World Bank. These two measures are composites of various aspects of poverty. Norton and Gwartney (2008) found that increases in economic freedom correspond to reductions in poverty. This analysis, however, used older measures of the World Bank poverty rates prior to the methodology changes and significant revisions of the PPP conversion ratios. This paper seeks to extend this literature in two ways. First, the latest World Bank poverty rates are used as the

measure of poverty. These rates are more comprehensive and are considered to be a more accurate measure of poverty in the developing world. Thus, the results presented here cover significantly more of the developing world than previous studies and use data considered to be more accurate. Second, the impact of both the level and change in economic freedom on poverty rates is considered. Much of the research on institutions and economic outcomes focuses on levels. While the static aspect of institutions is important, understanding the dynamic impact on extreme poverty is potentially more helpful.

4. Cross-Country Empirical Framework

The estimation equations used in this analysis are a variant of the equation derived from the linear approximation of the transition to a steady state output level in the neoclassical growth model. Typically the dependent variable is the natural logarithm of per capita income or the annual growth rate. Here the dependent variable is the extreme poverty rate. This analysis comprises two parts. The first focuses on the level of extreme poverty while reductions in the extreme poverty rate are the focus of the second.

$$poverty_{it} = \alpha + \beta EFW_{it} + \delta Z_{it} + d_t + u_{it} \quad (1)$$

Equation one lists the typical regression for the analysis involving levels. Here, $poverty_{it}$ is the extreme poverty rate for country i in period t . Of the independent variables, EFW_{it} is the level of the economic freedom index and Z_{it} is a matrix of variables relevant to extreme poverty. The variable d_t is included to control for common time-effects and the white noise error term is u_{it} . The variables of Z_{it} in the primary analysis include: democracy, foreign aid, a geographic factor, and regional dummy variables. Additional regressions incorporate variables for corruption and income inequality.

It is likely that regressions based on the above equation will be biased due to endogeneity of various forms. To compensate for this, various modifications of this specification are used. The results include pooled OLS regressions using the lagged value of

the independent variables, fixed effects regressions, and GMM estimation of Blundell and Bond (1998) where differences of the lagged values of the endogenous variables are used as instruments.

$$\Delta poverty_{it-10} = \alpha + \beta \Delta EFW_{it-10} + \theta EFW_{it-10} + \phi \Delta X_{it-10} + \delta Y_{it} + d_t + u_{it} \quad (2)$$

Equation two examines the impact of changes in economic freedom over ten-year periods on reductions in the extreme poverty rate. The variable EFW_{it-10} is included in these regressions to control for the initial level of economic freedom. It is possible that the impact of institutional change is conditioned on the initial conditions. It is also possible that the inclusion of this variable biases the results. The section to follow addresses this issue in more detail. The control variables of Z_{it} from equation one are split into a vector containing a dynamic variable, X_{it} , and a matrix containing static variables, Y_{it} . The matrix X_{it} includes the democracy variable while Y_{it} contains the others. The extreme poverty rate at the beginning of the period is added to Y_{it} in equation two to help control for initial conditions.

Changes in economic institutions may take time to exert their full impact on economic outcomes. Therefore, two variations of equation two are included. The first includes the change in economic freedom over the ten-year period and the change that occurred during the previous period. The second only includes changes that occurred during the previous period. It is expected that institutions will exert an impact over time because of expectations, credibility, and the transmission of information. For example, businesses in many poor countries often go through an onerous bureaucratic and regulatory process to obtain permission from the government to operate. This costly process shapes expectations, often discouraging the creation of businesses and forcing some underground. A new, simplified, regulatory and business approval process requires time before it can be incorporated into an individuals expectations. Also, a new process for businesses has to be credible in order to have any affect on behavior. Es-

establishing credibility does not happen immediately. Rather, over time the new system becomes credible if it is consistently implemented. Lastly, information about changes to the regulatory and business approval process takes time to reach those who will be affected. Taken together this suggests that the impact of a change in economic freedom will be felt both in the short-run and the long-run.

The extreme poverty rate from the World Bank, *World Development Indicators* discussed in section two is the dependent variable in this analysis. It is regularized to five-year intervals over the period 1980-2005. An index of economic freedom is the primary variable of interest and comes from the 2009 edition of the *Economic Freedom of the World Report*, published annually by the Fraser Institute and authored by James Gwartney and Robert Lawson. The Economic Freedom of the World (EFW) index measures the degree to which a country's institutions allow voluntary transactions coordinated by markets, respect for private property rights, and the even handed enforcement of contracts. Forty-two sub-components, scaled from 0-10, are used to derive the ratings in five areas. The areas are: the size of government, legal structure and the security of property rights, access to money of stable purchasing power, openness to trade, and regulation of credit, labor, and business. The ratings for these five areas are aggregated into a summary index with higher values indicating more economic freedom. The data are available for 141 countries. The version of the index used here is chain-linked and spans the period 1980-2005 at five-year intervals covering 102 countries or more in each of the years.

The Polity IV index, a widely used measure of democracy, is used in the analysis. The Polity Project, which publishes the Polity IV index, is part of the Center for Systemic Peace. The data is from the 2009 report by Benjamin R. Cole and Monty G. Marshall. It covers the period 1800 to the present and includes all polities that currently exist or have existed. The Polity IV index rates all countries on an autocracy-democracy scale from -10 to 10, with -10 representing autocracy and 10 representing democracy.

The impact of democracy on economic outcomes has been explored extensively in the literature. Barro (1991) found that democracy exerted a positive impact on growth, while later work found diminishing returns to democracy (Barro 1997). Gwartney, Lawson, and Holcombe (1999) found that political institutions did not have a significant impact on growth after controlling for economic freedom.

The measures of political rights and civil liberties, published by Freedom House, are also commonly used measures of democratic institutions. They are, however, highly correlated with the Polity IV index.⁶ This analysis was done with each of these democracy measures and the results were similar. The results presented in the next section contain those with the Polity IV index. Results with the two Freedom House measures are available upon request from the author.

The existence of extreme poverty is a motivating factor for the provision of foreign aid. The foreign aid variable used in the analysis is the net Official Development Assistance (ODA) from the OECD divided by a country's GNI. It includes aid based grants and loans that have a large grant component. All military aid is excluded.

Gallup, Sachs, and Mellinger (1999) and Diamond (1999) argue that geographic and locational factors exert a significant impact on a country's economic outcomes. To control for the influence of these factors the analysis includes a variable from Gallup, Sachs, and Mellinger (1999). The variable is the percentage of a country's land area located in the tropical zone between the Tropics of Cancer and Capricorn. This variable captures the impact of the disease environment, especially malaria, as well as other hardships associated with life in the tropics. Summary statistics for all the variables used in this analysis are listed in appendix A.

5. Results

⁶The correlation between the Polity IV index and the political rights and civil liberties measure during 1980-2005 is 0.90 and 0.86, respectively.

Table 1 presents pooled OLS, fixed effects, and GMM regressions for the extreme poverty rate at five-year intervals during 1980-2005. The focus of this table is the impact of levels of economic freedom on the extreme poverty rate. The first column lists the pooled OLS results of regressing the extreme poverty rate on economic freedom and other control variables during the same five-year period. The sign of the coefficient of the economic freedom and democracy variables is consistent with economic theory. The marginal impact of a one unit higher level of economic freedom is a 6.33 percentage point lower extreme poverty rate. More democratic countries also have lower extreme poverty rates. The average level of foreign aid as a share of GNI during the five-year period is significant, but its sign indicates that there is a positive correlation between aid and higher poverty rates. This specification, however, does not allow one to determine if this correlation is due to countries receiving aid because they are poor or whether aid contributes to poverty. The tropical location variable is not significant. This is largely the result of the inclusion of three regional dummies: Sub-Saharan Africa, Asia, and Latin America. Countries located in the tropical zones have a challenging disease environment that theory predicts would be associated with higher rates of extreme poverty. Including the regional dummies for Sub-Saharan Africa and Asia, which are largely in the tropics and contain the majority of the world's poor, explains the insignificance of the tropical variable in this regression.

Including the regional dummies for Sub-Saharan Africa, Asia, and Latin America in these regressions and those that follow helps to control for important factors where little or no panel data exists. There is a drawback to including the regional dummies. These regions are also less economically free and less democratic. Thus, these dummy variables reduce the impact and significance of economic freedom and democracy. The inclusion of these dummies should result in more conservative estimates. In addition to regions, all the panel regressions contain controls for time effects. The standard errors listed are robust to heteroskedasticity and clustered by country.

The independent variables in the first regression are contemporaneous with the dependent variable. Therefore, it is probable that the corresponding coefficient estimates are biased because of endogeneity, simultaneity, or both. The second column of table one contains regressions where the economic freedom, democracy, and foreign aid variables are lagged by ten years. By lagging these independent variables the source of the bias is theoretically reduced. The value of the economic freedom coefficient in the second column remains negative and significant at the one percent level. However, when the democracy variable is lagged it is no longer significant. The variable representing foreign aid as a share of GNI is still significant, but only at the ten percent level.

Lagging potential endogenous variables reduces one form of bias, but does not reduce another. A second source of potential bias is from an unobserved effect. And two common ways to control for this are with a fixed effects or random effects regression—depending upon the nature of the unobserved effect. Columns three and four of table one contain fixed effects regressions with a lag of the independent variables of zero, and ten years respectively. A robust Hausman test indicates that the fixed effects model is more appropriate in this situation. The results of a random effects model are not included.

The economic freedom variable is not significant in the fixed effects regressions of table two. Neither is the democracy or foreign aid variable. The advantage of using a fixed effects model is that all time constant unobserved effects are removed. However, this can be a disadvantage when the independent variables of interest change slowly over time. The within transformation removes all of the variation between countries and results in the insignificance of variables that change slowly.

The last two columns of table one use the Blundell and Bond (1998) GMM estimator to account for both a potential unobserved effect and bias due to endogeneity. This estimator uses lagged differences of the endogenous variables as instruments. If the lagged differences are correlated with the endogenous variables and uncorrelated

with the current period error term the GMM estimator should provide consistent estimates. Economic freedom, democracy, and foreign aid are considered the endogenous variables in these regressions. Thus, lagged differences of these variables are used as instruments. In column five the coefficient on the economic freedom variable is negative and significant at the ten percent level. A unit increase in the level of economic freedom corresponds to a 3.65 percentage point lower extreme poverty rate over a five-year period. The democracy variable is also significant and negative indicating that more democratic countries have lower rates of extreme poverty. Foreign aid as a share of GNI on the other hand has a positive and significant relationship with higher rates of extreme poverty. The last column of the table includes the three regional dummies. When these dummies are added both the level of economic freedom and democracy are no longer significant. However, the foreign aid variable remains significant at the one percent level. The Hansen test statistic for overidentification of the instruments is shown below the GMM regressions along with the degrees of freedom. In each case the null hypothesis that the instruments are valid is not rejected indicating that the lagged differences of the endogenous variables appear to be adequate.

The results of this first table indicate that after controlling for several channels through which the coefficient estimates may be biased, the relationship between the level of economic freedom and the extreme poverty rate is weak. This result is largely consistent with the experience of two important countries: China and India. Both countries experienced reductions in the extreme poverty rate, yet the level of economic freedom is low compared to other countries. China's extreme poverty rate was 84 percent in 1980 and decreased to 15.9 percent by 2005. Of the 141 countries ranked in 2005, China's economic freedom rating is in the 33rd percentile. India is similar. Its extreme poverty rate declined from 65.9 percent to 41.6 percent during the same period. Yet its level of economic freedom in 2005 was in the 43rd percentile. This suggests that the level of economic freedom may not be the most important determinant of the

extreme poverty rate.

In addition to India and China, the extreme poverty rate of many other countries decreased during 1980-2005. While the level of economic freedom in many of these countries remains low it has increased. China's economic freedom rating in 1980 was 4.41 out of 10. By 2005 it was 6.07, a 38 percent increase. During the same period the rating for India increased by 20 percent to 6.5 out of 10. The experience of these two countries suggests a different relationship between economic freedom and poverty. The impact of the level of economic freedom on the extreme poverty rate may be less important than changes in economic freedom.

Table two contains pooled OLS regressions examining the impact of changes in economic freedom on reductions in the extreme poverty rate during 1980-2005. The variables are differenced over ten-year periods. The dependent variable is constructed such that reductions in poverty are positively signed. Therefore, positive regression coefficients are associated with reductions in the extreme poverty rate. The first column of the table lists regressions in which the change in the dependent variable is contemporaneous with changes in the relevant independent variables. The independent variables are: the change in economic freedom—the primary variable of interest, change in the democracy rating, the extreme poverty rate at the beginning of the period, the economic freedom rating at the beginning of the period, the average level of foreign aid as a share of GNI during the period, and the tropical location variable.

The first regression indicates that the impact of a unit change in economic freedom during the ten-year period corresponds to a reduction in the extreme poverty rate of 2.42 percentage points. This result is significant at the one the percent level. A change in the democracy rating does not appear to exert a significant impact in the regression. The next two variables, the initial levels of extreme poverty and the economic freedom rating, control for the initial conditions in each country. As the coefficients indicate, the conditions at the beginning of the period matter. Countries with a higher extreme

poverty rate experienced larger reductions in poverty during the period. Likewise, countries with more economic freedom at the beginning of the period exhibited larger reductions in the extreme poverty rate. Similar to table one, both foreign aid and tropical location appear to be associated with higher poverty. Both are negative and significant indicating they lead to less reductions in the extreme poverty rate.

The results of the second regression of table two are little changed when the three regional dummies are added. The results appear to be robust to the inclusion of regional factors.

These regressions involving changes eliminate the chance of biased estimates due to unobserved time invariant effects. But, a potential issue remains. De Haan, Lundström, and Sturm (2006) argue that including both the change in economic freedom and the level at the beginning of the period results in endogeneity bias. They show that the two terms mathematically reduce to the level of economic freedom at the end of the period, which may be endogenous with the dependent variable.

The concern of De Haan et al. (2006) with this type of regression is valid. However, controlling for the initial level of economic freedom is important because the potential impact of a change in economic freedom may differ accordingly. Column three of the table addresses this issue. It lists regression results where the initial level of economic freedom is replaced by a simple binary variable. This variable is 1 for the countries whose initial level of economic freedom is in the upper half of the countries included in the regression and 0 otherwise.⁷ The coefficient on this dummy indicates that the initial level of economic freedom remains significant. Countries that had initial economic freedom ratings in the upper half had larger reductions in the extreme poverty rate during the period. More importantly, after removing this potential source of endogeneity, the overall results of the regression remain unchanged. The impact of a change in economic freedom on the extreme poverty rate is still significant at the one percent level.⁸

⁷The results are not sensitive to the initial economic freedom threshold chosen.

⁸In additional regressions, not shown here, the variable representing the change in economic freedom

The first three regressions of table two focused on contemporaneous changes. The next two regressions add changes that occurred during the prior period. If institutional changes take time to exert their full impact on economic outcomes then changes in economic freedom may influence subsequent reductions in the extreme poverty rate. Column four includes both the contemporaneous and prior change in economic freedom. The initial level of economic freedom included in the regression is now the level at the beginning of the prior period. The coefficient of current period changes in economic freedom is largely unchanged. The change in the prior period also appears to exert an impact on subsequent reductions in extreme poverty. A unit change in economic freedom corresponds to a 2.47 percentage point reduction in the extreme poverty rate in the current decade. The same change in the prior decade has a 2.43 percentage point impact. Both coefficients are significant at the one percent level. The regression in column five replaces the initial economic freedom variable with a binary similar to column three. Both changes in economic freedom remain significant and indicate an impact on reductions in the extreme poverty rate.⁹

The last two regressions in table two are included to examine two potential issues that may influence the previous regressions. First, regressions four and five include changes in economic freedom during two periods. Even when the binary variable is included, the issue raised by De Haan et al. (2006) may be present. Second, the first three regressions leave unanswered the question of whether changes in economic freedom influence reductions in extreme poverty or whether the reverse is true.

Regressions six and seven replace all current changes of the independent variables with changes during the previous period. Thus, all changes examined take place prior to changes in the dependent variable. In addition, the variable for the initial level

remains significant even when the control for the initial level of economic freedom is excluded.

⁹Multicollinearity does not appear to be an issue in the regressions when both changes are included. Changes in one decade are not highly correlated with changes in the subsequent decade. The correlation coefficient is 0.2.

of economic freedom is the level at the start of the earlier period. This specification removes the endogeneity issue of De Haan et al. and focuses only on a unidirectional impact of the independent variables. The results of these final two regressions indicate that changes in economic freedom in the prior period remain significant even when the three regional variables are included.

The four overall results from this table are: 1) Current and prior changes in economic freedom exert a significant impact on reduction in the extreme poverty rate. 2) Poorer countries exhibit larger reductions in extreme poverty during the subsequent period as do economically freer countries. 3) Democratization does not appear to influence changes in poverty. 4) Initial regressions indicate foreign aid impedes reductions in poverty, but subsequent regressions indicate this result is not robust.

6. Alternate Specifications

The robustness of the previous results is analyzed using several different specifications. The economic freedom variable used in this analysis as a proxy for economic institutions is an aggregated index of five sub-indices. Prior research indicates that each sub-index may exert a different impact on economic outcomes (Carlsson and Lundström 2002; Heckelman and Stroup 2000). Tables A.8 and A.9 in the appendix contain regressions examining the impact of each sub-index of the economic freedom rating on both the level and change of the extreme poverty rate. When the extreme poverty rate is regressed on the level of each of the sub-indices the size of government index is the only variable with insignificant results. The remaining sub-indices, legal institutions, monetary policy, trade policy, and business regulations are all significant at the ten percent level or higher. In addition, the sign of each sub-index is negative indicating that they are associated with lower rates of extreme poverty. When reductions in the extreme poverty rate are regressed on changes in each sub-index the results are much less significant. These results are shown in table A.9. The legal institutions sub-index is the only component

of the economic freedom index with statistically significant results. Countries that experience improvements in their legal institutions have larger reductions in the extreme poverty rate.

These results illustrate the importance of legal institutions. However, the importance of the other categories should not be overlooked. These categories are not substitutes, rather they complement each other. The impact of trade freedom on those living in extreme poverty will be reduced if a country does not have private property rights or a legal system to enforce the rights. Similarly, non-onerous regulations facilitate trade and reduce potential opportunities for corruption. While disaggregating the index is instructive, the composite index provides a more complete picture of the impact of economic institutions.

There are two other factors that may exert an impact on the extreme poverty rate that are not included in the analysis of the previous section. They were excluded because much less data exist for these factors. The first is the Corruption Perceptions Index (CPI) published annually by Transparency International. The data span the period 1998-2005. Corruption is a problem for many countries throughout the world. It is an especially acute problem for the poorest in these countries because they do not have the financial means to better their lives in a corrupt system. The second factor is income inequality. The income inequality data are taken from the Inequality Project at the University of Texas. The Gini coefficients used here cover the period 1980-2002. Tables A.10 and A.11 of the appendix list regressions that include the average of both of these variables. Because the CPI data spans a short time period, its average during the period 1998-2005 is used for all of the time periods. The inequality data is averaged for each ten-year period. In regressions involving levels, both the corruption and inequality variables are significant. Countries with less corruption have lower extreme poverty rates while countries with higher inequality have higher poverty rates. In all but one of the specifications the level of economic freedom remains significant. In regressions that

include corruption, the significance of the economic freedom variable is reduced as is the magnitude of the coefficient. This should be expected as the two variables are highly correlated.¹⁰ The results in table A.11 contain the regressions involving changes. Both the average level of corruption and inequality is insignificant in these regressions. The variable representing the change in economic freedom is significant at the five percent level or higher in all but one specification.

The final set of tables included in the appendix contain regressions where the dependent variable is the moderate poverty rate (\$2 per day in 2005 international dollars). The regressions are identical to those in tables one and two except that the dependent variable is the moderate poverty rate. The pattern of the results in tables A.12 and A.13 is identical to tables one and two. Both the level of economic freedom and current and prior changes exerts a significant impact on the moderate poverty rate. Additional regressions—not included but available upon request—use the PS poverty dataset to further test the robustness of the results. Again the pattern of the results is identical indicating that the results appear to be robust under a variety of specifications.

7. Conclusion

The Millennium Development Goal of halving the extreme poverty rate by 2015 will be achieved. The result is that hundreds of millions of people in the developing world no longer live in extreme poverty. Most of these reductions took place in Asia and Latin America while very little occurred in Sub-Saharan Africa.

This analysis finds that institutional reform consistent with economic freedom was a contributing factor to this decline in poverty. Countries with more economic freedom had lower rates of extreme poverty. Moreover, countries that experienced increases in economic freedom had larger reductions in the extreme poverty rate. The initial

¹⁰The correlation coefficient between the average CPI and the level of economic freedom in 2000 and 2005 is 0.75 and 0.78, respectively.

institutional level also played a significant role in the analysis. Countries with higher levels of economic freedom initially, experienced larger declines in poverty during the subsequent period. These results stress the importance of economic institutions and are consistent with the existing institutional literature. They also expand the current literature by demonstrating that institutional change consistent with economic freedom supports reductions in poverty in the developing world.

Appendix A

Table A.1: Extreme (\$1.25 per day) and moderate (\$2 per day) poverty rate by country

Note: Figures in bold are the actual poverty rate data from the World Bank (Chen and Ravallion 2008). Non-bold values were estimated using per capita GDP and under-five mortality data. See Connors (2011), chapter 2 for details.

	Percentage of Population Living on \$1.25 per Day or Less						Percentage of Population Living on \$2 per Day or Less					
	1980	1985	1990	1995	2000	2005	1980	1985	1990	1995	2000	2005
Albania				2.0	2.0	2.0				6.5	8.7	7.8
Algeria	25.2	18.1	6.6	6.8	10.9	8.5	31.7	25.1	23.8	23.6	20.4	16.8
Angola	64.0	63.5	61.9	61.2	54.3	44.2	70.4	69.5	67.9	71.3	70.2	52.0
Argentina	5.6	2.0	2.0	2.0	6.0	4.5	10.9	2.0	3.2	7.0	14.3	11.3
Armenia				17.5	16.5	10.6				38.9	47.7	43.4
Azerbaijan				15.6	6.3	2.0				39.3	27.1	2.0
Bangladesh	77.5	72.2	66.8	59.4	57.8	49.6	99.0	99.0	92.5	87.4	85.4	81.3
Belarus			2.0	2.3	2.0	2.0			2.0	11.1	2.0	2.0
Benin	65.2	62.6	61.3	57.3	53.4	47.3	81.6	79.0	79.1	75.6	71.3	75.3
Bhutan	56.1	48.7	39.9	33.7	28.5	26.2	76.8	68.5	56.7	49.0	42.6	49.5
Bolivia	37.0	34.5	4.0	18.9	23.8	19.6	46.7	46.7	17.2	29.9	34.9	30.3
Bosnia and Herzegovina				14.6	2.0	2.0				25.0	2.0	2.0
Botswana	42.0	35.6	31.9	31.2	32.3	23.1	65.1	54.7	50.2	49.4	46.0	36.3
Brazil	17.1	17.5	15.5	10.5	11.1	7.8	31.1	31.5	27.8	21.9	22.6	18.3
Bulgaria			2.0	2.0	2.6	2.0			2.0	2.2	7.8	2.4
Burkina Faso	74.7	71.0	68.3	71.2	70.0	56.5	94.8	90.9	88.7	85.8	87.6	81.2
Burundi	72.3	70.4	84.2	85.7	86.4	81.3	97.1	94.7	95.2	95.3	95.4	93.4
Cambodia				48.6	45.8	40.2				77.8	74.6	68.2
Cameroon	52.8	45.6	46.9	51.5	32.8	49.1	65.3	56.3	60.2	74.4	57.7	62.6
Cape Verde	43.0	38.3	36.0	33.1	20.6	27.9	62.9	55.9	53.4	49.7	40.2	42.6
Central African Republic	62.9	61.2	61.6	82.8	64.9	62.4	81.5	80.5	82.0	90.7	85.6	81.9
Chad	71.3	65.9	64.6	65.3	66.3	61.9	90.3	82.8	82.5	83.6	84.9	83.3
Chile	12.3	10.5	4.4	2.3	2.0	2.0	22.9	23.4	13.6	9.1	6.0	3.9
China	84.0	61.7	60.2	45.0	32.0	15.9	97.8	88.3	84.6	71.8	56.3	36.3
Colombia	13.7	12.3	9.5	11.2	16.8	15.7	24.4	23.1	19.4	23.3	29.1	27.1
Comoros	56.7	51.9	49.1	46.7	44.3	46.1	74.0	69.2	67.5	66.3	64.6	65.0
Congo, Dem. Rep.	69.0	68.4	69.1	73.2	74.1	59.2	88.8	88.8	91.0	99.0	99.0	79.5
Congo, Rep.	37.9	33.6	36.1	38.3	39.5	54.1	49.3	42.4	46.1	49.1	50.2	74.4
Costa Rica	21.4	10.4	9.2	7.5	4.4	2.4	35.7	21.5	18.7	16.4	11.5	8.6
Cote d'Ivoire	16.9	9.5	13.8	21.1	23.7	15.5	34.9	23.9	35.1	47.9	47.9	38.9

Table A.1 – continued

	Percentage of Population Living on \$1.25 per Day or Less						Percentage of Population Living on \$2 per Day or Less					
	1980	1985	1990	1995	2000	2005	1980	1985	1990	1995	2000	2005
Croatia			2.0	2.0	2.0	2.0			2.0	2.0	2.0	2.0
Czech Republic			2.0	2.0	2.0	2.0			2.0	2.0	2.0	2.0
Djibouti			11.7	4.8	18.8	8.8			24.4	15.1	41.2	26.1
Dominican Republic	24.4	16.4	8.4	5.9	4.4	5.0	37.9	30.4	20.8	15.7	12.4	15.1
Ecuador	20.2	12.2	14.0	15.9	14.9	9.8	28.6	22.3	24.0	28.2	27.7	20.4
Egypt, Arab Rep.	25.5	14.8	4.5	2.5	2.0	2.0	46.2	35.3	27.6	26.3	19.3	18.4
El Salvador	26.1	22.2	15.9	12.7	12.8	11.0	36.1	34.7	24.7	25.2	22.2	20.5
Eritrea				54.2	51.1	48.7				76.6	75.1	74.0
Estonia			2.0	2.0	2.0	2.0			2.0	2.0	2.6	2.0
Ethiopia	66.2	71.9	70.7	60.5	55.6	39.0	89.9	95.2	93.4	84.6	86.4	77.5
Gabon						4.8						19.6
Gambia, The	65.7	59.3	55.8	56.0	66.7	34.3	82.4	77.2	74.3	75.3	82.0	56.7
Georgia				4.5	11.9	13.4				13.1	28.7	30.4
Ghana	56.4	56.9	50.3	45.7	39.1	30.0	75.9	78.4	78.1	72.0	63.3	53.6
Guatemala	39.1	52.5	39.3	25.6	13.1	11.7	51.6	70.4	55.8	40.6	26.8	24.3
Guinea	77.8	74.5	92.6	36.8	61.6	70.1	94.1	91.7	98.4	63.8	79.6	87.2
Guinea-Bissau			41.3	52.1	48.8	45.7			58.5	75.7	77.9	72.1
Guyana	12.8	13.3	12.9	5.8	7.7	3.9	21.9	24.5	25.1	15.0	16.8	12.6
Haiti	48.2	44.2	41.5	43.2	54.9	34.7	61.7	60.1	58.9	63.9	72.1	57.8
Honduras	27.9	24.4	43.5	21.9	14.4	22.2	42.3	40.1	61.6	37.3	26.8	34.8
Hungary		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
India	65.9	55.5	53.6	49.4	46.5	41.6	89.0	84.8	83.8	81.7	79.4	75.6
Indonesia	39.1	34.7	29.2	22.2	19.5	16.0	59.0	53.6	46.5	37.6	35.8	31.2
Iran, Islamic Rep.	14.6	4.2	3.9	2.0	2.0	2.0	20.3	13.8	13.1	8.2	8.3	8.0
Jamaica	6.9	6.4	2.0	2.9	2.0	2.0	14.8	15.0	8.3	11.5	7.5	5.8
Jordan	6.4	2.0	2.8	2.0	2.0	2.0	12.3	2.0	14.9	11.5	11.0	7.2
Kazakhstan			2.0	4.6	3.6	3.1			2.0	18.1	15.0	17.2
Kenya	28.2	26.4	38.4	24.1	29.2	19.7	49.7	48.9	59.3	48.2	51.2	39.9
Korea, Rep.	8.3		2.0	2.0	2.0	2.0	20.0		5.5	2.0	2.0	2.0
Kuwait	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Kyrgyz Republic			2.0	18.6	27.1	21.8			2.0	30.1	56.4	51.9
Lao PDR		53.3	55.7	49.3	44.0	28.6		74.1	84.8	79.9	76.8	47.4
Latvia			2.0	2.0	2.0	2.0			2.0	2.9	3.0	2.0
Lebanon			11.2	6.6	5.8	4.2			22.2	14.1	13.0	10.3
Lesotho	55.9	44.4	49.0	47.6	47.1	43.4	78.2	62.2	70.3	61.1	66.0	62.2

Table A.1 – continued

	Percentage of Population Living on \$1.25 per Day or Less						Percentage of Population Living on \$2 per Day or Less					
	1980	1985	1990	1995	2000	2005	1980	1985	1990	1995	2000	2005
Liberia	64.9	64.3	72.0	81.5	66.3	83.7	76.3	78.4	95.5	99.0	92.0	94.8
Lithuania			2.0	2.7	2.0	2.0			2.0	8.6	2.0	2.0
Macedonia, FYR				7.5	2.9	2.0				17.1	10.2	3.2
Madagascar	85.9	80.1	79.3	72.5	79.3	67.8	94.3	93.2	92.7	88.4	90.9	89.6
Malawi	94.8	93.0	89.4	87.3	83.1	73.9	99.0	99.0	99.0	99.0	93.5	90.4
Malaysia	12.7	2.8	2.0	2.1	2.0	2.0	24.2	12.1	11.1	11.0	9.6	7.8
Mali	81.5	79.2	75.0	86.1	61.2	51.4	97.1	97.7	93.6	93.9	82.0	77.1
Mauritania	35.7	41.3	32.4	33.1	21.2	30.2	58.0	64.6	56.2	58.4	44.1	53.8
Mauritius	25.3	22.0	18.1	15.8	13.4	11.2	37.0	32.6	26.2	22.3	18.2	14.8
Mexico	11.1	12.8	6.1	5.2	4.8	2.4	15.1	28.5	16.0	16.1	13.7	5.9
Moldova			16.1	15.1	30.6	8.1			44.6	36.8	56.8	28.9
Mongolia		32.4	29.3	18.8	24.8	22.4		48.8	45.3	43.5	53.6	49.0
Morocco	18.5	8.4	2.5	5.2	6.5	2.5	34.0	28.6	15.9	21.9	24.4	14.0
Mozambique	77.9	78.3	73.2	81.3	78.8	74.7	99.0	99.0	98.7	92.9	91.8	90.0
Myanmar	53.4	50.1	53.3	49.1	44.9	40.3	84.1	80.0	84.7	79.0	72.4	64.7
Namibia	33.0	33.2	33.3	49.1	34.2	29.1	41.2	42.8	43.9	62.2	43.2	37.4
Nepal	83.0	78.1	74.0	68.4	59.9	55.1	99.0	93.4	91.1	88.1	81.4	77.6
Nicaragua	30.1	26.5	26.5	32.5	20.6	15.8	44.4	42.5	45.3	49.2	38.0	31.8
Niger	82.8	85.0	72.8	78.2	74.5	65.9	97.9	99.0	91.1	91.5	96.1	85.6
Nigeria	63.2	53.9	65.2	58.9	61.5	64.4	75.2	76.9	78.8	78.1	75.8	83.9
Oman	15.1	3.8	2.0	2.0	2.0	2.0	19.6	5.6	3.4	2.0	2.0	2.0
Pakistan	54.9	66.5	64.7	36.0	32.5	22.6	89.1	89.1	88.2	73.5	70.2	60.3
Panama	7.0	8.8	16.9	11.5	11.5	9.3	17.8	17.3	26.8	19.7	20.0	17.9
Papua New Guinea	33.7	32.5	31.6	35.8	27.3	26.4	50.8	50.4	50.5	57.4	45.5	45.2
Paraguay	17.1	16.1	5.9	12.7	17.1	9.3	29.5	29.3	19.4	21.8	27.3	18.4
Peru	14.8	2.0	2.0	7.2	12.6	8.2	20.3	5.2	5.2	18.4	24.4	19.4
Philippines	31.7	34.9	30.6	24.9	22.5	22.3	54.5	61.9	56.1	48.2	44.8	44.4
Poland		2.0	2.0	3.1	2.0	2.0		2.0	2.0	9.9	2.0	2.0
Romania			2.0	5.0	3.7	2.0			2.0	23.2	17.2	3.4
Russian Federation			2.0	3.2	2.1	2.0			3.9	7.9	7.1	2.0
Rwanda	67.8	63.3	67.0	68.4	76.6	63.9	87.2	88.4	87.9	91.1	90.3	84.2
Saudi Arabia	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Senegal	62.7	56.0	65.8	54.1	44.2	33.5	77.1	71.7	81.5	79.4	71.3	60.3
Sierra Leone	62.5	59.6	62.8	61.2	62.5	53.4	76.9	75.2	75.0	80.4	84.2	76.1
Singapore	2.0		2.0		2.0	2.0	2.0		2.0		2.0	2.0

Table A.1 – continued

	Percentage of Population Living on \$1.25 per Day or Less						Percentage of Population Living on \$2 per Day or Less					
	1980	1985	1990	1995	2000	2005	1980	1985	1990	1995	2000	2005
Slovak Republic			2.0	2.0	2.0	2.0			2.0	2.0	2.3	2.0
Slovenia		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
South Africa	25.8	23.9	22.4	21.4	26.2	21.7	41.5	40.6	39.7	39.9	42.9	38.3
Sri Lanka	25.2	20.0	15.0	16.3	14.0	12.5	46.3	51.6	49.5	46.7	39.7	27.3
St. Lucia	13.4	11.5	5.8	20.9	3.5	2.9	26.6	24.7	14.8	40.6	11.4	9.9
Sudan	53.2	53.5	51.7	49.7	47.0	44.3	72.3	73.9	71.4	68.5	64.4	60.3
Suriname	12.6	13.6	13.4	13.1	15.5	7.8	20.9	23.5	23.9	24.1	27.2	16.9
Swaziland	78.4	73.5	66.9	78.6	62.9	66.3	96.6	91.5	82.2	89.3	81.0	80.7
Syrian Arab Republic	21.7	19.2	16.9	13.1	12.2	10.9	35.3	33.8	32.8	27.2	26.6	24.7
Taiwan	6.6	3.0	2.0	2.0	2.0	2.0	18.3	12.0	4.0	2.0	2.0	2.0
Tajikistan				39.5	44.5	21.5				61.7	78.5	50.8
Tanzania	83.5	82.3	72.6	81.9	88.5	74.4	95.8	95.5	91.3	95.7	96.6	86.8
Thailand	21.9	19.4	11.3	2.0	2.0	2.0	44.0	41.4	33.2	17.4	17.5	11.5
Timor-Leste					52.9	41.9					77.5	67.7
Togo	59.4	58.7	57.6	57.2	53.9	38.7	77.1	78.6	78.2	79.1	76.1	69.3
Trinidad and Tobago	2.0	2.9	3.1	3.9	2.0	2.0	4.2	7.1	11.1	9.1	5.1	2.0
Tunisia	25.2	8.7	5.9	6.5	2.6	7.1	37.5	25.1	19.0	20.4	12.8	16.7
Turkey	16.9	2.0	2.1	2.1	2.0	2.7	25.7	7.7	13.8	9.8	9.6	9.0
Turkmenistan			14.4	63.5	24.8	15.4			50.2	85.7	49.6	26.8
Uganda	64.7	65.9	69.3	64.4	58.9	51.5	87.5	89.9	87.3	85.9	81.2	75.6
Ukraine			2.0	2.0	2.0	2.0			8.4	8.4	8.4	2.0
United Arab Emirates	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Uruguay	9.1	8.7	2.0	2.0	2.0	2.0	16.9	18.8	2.0	3.0	2.3	4.5
Uzbekistan			2.0	28.9	37.2	46.3			2.0	49.9	64.6	76.7
Venezuela, RB	6.2	6.5	2.9	8.7	14.0	10.0	16.4	17.9	9.2	19.5	23.9	19.8
Vietnam	58.1	54.7	53.5	63.7	44.9	22.8	90.9	85.9	83.8	85.7	73.5	50.5
Yemen, Rep.			4.5	15.5	12.9	17.5			15.4	36.7	36.3	46.6
Zambia	52.6	53.3	62.8	63.7	55.4	64.3	68.0	70.0	76.2	80.8	74.8	81.5

Table A.2: World Bank mean extreme and moderate poverty rates for sub-Saharan Africa, Latin America, Asia, India, and China, 1980-2005

Extreme Poverty Rate (\$1.25 per day)

Country/Region	No. of Countries	1980	1985	1990	1995	2000	2005
Sub-Saharan Africa	39	60.8	58.1	60.3	57.7	57.1	51.3
Latin America	24	15.6	14.7	11.2	9.7	10.9	8.1
Asia	15	69.1	55.7	53.5	43.7	36.4	26.9
China		84.0	61.7	60.2	45.0	32.0	15.9
India		65.9	55.5	53.6	49.4	46.5	41.6
Asia, omitting China and India	13	47.1	46.0	42.6	34.8	30.9	24.7

Moderate Poverty Rate (\$2 per day)

Country/Region	No. of Countries	1980	1985	1990	1995	2000	2005
Sub-Saharan Africa	39	77.3	77.3	78.1	77.4	76.1	72.3
Latin America	24	25.5	26.8	21.3	20.6	21.4	17.0
Asia	15	88.3	82.2	79.2	71.3	63.4	52.5
China		97.8	88.3	84.6	71.8	56.3	36.3
India		89.0	84.8	83.8	81.7	79.4	75.6
Asia, omitting China and India	13	71.1	69.2	65.0	57.8	54.6	48.0

Table A.3: World Bank extreme and moderate poverty rates summary statistics

Extreme poverty rate (\$1.25 per day, 2005 international dollars)						
	1980	1985	1990	1995	2000	2005
mean	39.8	36.1	29.5	28.9	27.1	23.4
std. dev.	26.4	26.7	27.8	26.8	25.2	23.3
max	94.8	93.0	92.6	87.3	88.5	83.7
min	2.0	2.0	2.0	2.0	2.0	2.0
No. of countries	92	95	116	125	127	128
Moderate poverty rate (\$2 per day, 2005 international dollars)						
	1980	1985	1990	1995	2000	2005
mean	54.0	51.0	42.7	43.3	41.6	37.1
std. dev.	30.6	31.7	33.7	31.9	31.5	30.4
max	99.0	99.0	99.0	99.0	99.0	94.8
min	2.0	2.0	2.0	2.0	2.0	2.0
No. of countries	92	95	116	125	127	128

Note: These summary statistics are not weighted by each country's population. Hence, the means differ from those in figure 1.

Table A.4: Economic Freedom of the World (EFW) summary statistics

	1980	1985	1990	1995	2000	2005
All countries						
mean	5.5	5.5	5.8	6.0	6.5	6.6
std. dev.	1.2	1.3	1.3	1.2	1.0	1.0
max	9.2	8.8	8.8	9.1	8.8	8.9
min	2.8	2.1	3.0	3.2	3.9	3.2
No. of countries	102	109	113	123	123	130
High income countries						
mean	6.9	7.0	7.5	7.6	7.7	7.7
std. dev.	0.9	0.9	0.7	0.7	0.6	0.5
max	9.2	8.8	8.8	9.1	8.8	8.9
min	5.4	5.4	6.0	6.2	6.6	6.9
No. of countries	24	24	24	24	24	24
Low and middle income countries						
mean	5.1	5.1	5.3	5.7	6.1	6.3
std. dev.	1.0	1.1	1.1	1.1	0.9	0.9
max	7.9	8.1	8.7	8.8	8.5	8.7
min	2.9	2.1	3.0	3.2	3.9	3.2
No. of countries	78	85	89	99	99	106

Table A.5: Polity IV summary statistics

	1980	1985	1990	1995	2000	2005
All countries						
mean	-2.5	-2.1	0.3	2.3	2.9	3.6
std. dev.	7.2	7.3	7.2	6.8	6.6	6.5
max	10.0	10.0	10.0	10.0	10.0	10.0
min	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
No. of countries	157	157	159	159	159	159
High income countries						
mean	9.7	9.8	10.0	10.0	10.0	10.0
std. dev.	0.7	0.6	0.2	0.2	0.2	0.2
max	10.0	10.0	10.0	10.0	10.0	10.0
min	8.0	8.0	9.0	9.0	9.0	9.0
No. of countries	20	20	21	21	21	21
Low and middle income countries						
mean	-4.3	-3.8	-1.1	1.1	1.9	2.7
std. dev.	5.8	6.1	6.6	6.6	6.4	6.4
max	10.0	10.0	10.0	10.0	10.0	10.0
min	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
No. of countries	137	137	138	138	138	138

Table A.6: Sachs tropical location summary statistics

	All countries	High income countries	Low and middle income countries
Tropical location (% land area in tropics)			
mean	0.5	0.1	0.6
std. dev.	0.5	0.2	0.5
max	1.0	1.0	1.0
min	0.0	0.0	0.0
No. of countries	210	24	186

Table A.7: Foreign Aid (ODA) as a share of GNI summary statistics

	1975	1980	1985	1990	1995	2000	2005
mean	5.3	7.1	7.2	9.2	9.6	6.9	7.5
std. dev.	6.6	9.2	9.1	11.2	13.5	9.1	10.6
max	36.0	42.1	50.0	59.4	96.9	47.5	52.5
min	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1
No. of countries	97	105	115	126	156	159	158

Table A.8: Extreme poverty rate and the sub-components of economic freedom (pooled OLS), 1980-2005

Independent variable	Dependent variable: Extreme poverty rate (\$1.25 per day)				
	(1)	(2)	(3)	(4)	(5)
Size of government (area 1)	-1.17 (1.08)				
Legal institutions (area 2)		-2.16 * (1.18)			
Sound money (area 3)			-1.5 ** (0.70)		
Trade freedom (area 4)				-5.32 *** (1.25)	
Regulation of credit, labor, and business (area 5)					-7.42 *** (1.42)
Democracy	-0.94 *** (0.29)	-0.76 *** (0.28)	-1.02 *** (0.29)	-0.83 *** (0.29)	-0.75 *** (0.28)
Foreign aid/GNI, 10-year average	1.25 *** (0.40)	1.06 *** (0.37)	1.06 *** (0.41)	1.5 *** (0.41)	0.9 *** (0.34)
Tropical location (% area in tropics)	18.02 *** (6.61)	17.85 *** (5.04)	18.49 *** (6.17)	15.54 *** (5.83)	19.46 *** (5.53)
Intercept	17.45 ** (7.07)	13 (8.41)	19.36 *** (5.75)	37.78 *** (9.18)	53.16 *** (9.43)
R ² (adjusted)	0.36	0.39	0.36	0.45	0.48
No. of observations	354	308	365	301	314

Notes:

All regressions include time dummies.

***, ** and * indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table A.9: Reductions of extreme poverty rate and changes in sub-components of economic freedom (pooled OLS, 10 year periods), 1980-2005

Independent variable	Dependent variable: Reduction in extreme poverty rate (\$1.25 per day), 10 year change				
	(1)	(2)	(3)	(4)	(5)
Size of government, 10 year change (10 year lag)	-0.37 (0.45)				
Legal institutions, 10 year change (10 year lag)		0.79 * (0.41)			
Sound money, 10 year change (10 year lag)			0.23 (0.20)		
Trade freedom, 10 year change (10 year lag)				0.03 (0.43)	
Regulation of credit, labor, and business, 10 year change (10 year lag)					2.23 (1.45)
Democracy (10 year lag)	-0.03 (0.08)	-0.05 (0.08)	-0.02 (0.08)	-0.01 (0.08)	0.09 (0.10)
Extreme poverty rate, start of period	0.21 *** (0.05)	0.21 *** (0.06)	0.21 *** (0.05)	0.20 *** (0.06)	0.24 *** (0.05)
Economic freedom, start of prior period	0.83 (0.79)	1.57 * (0.82)	1.05 (0.80)	0.91 (0.81)	1.64 ** (0.80)
Foreign aid/GNI, 10-year average	-0.40 * (0.22)	-0.15 (0.22)	-0.38 * (0.22)	-0.36 * (0.22)	-0.48 ** (0.20)
Tropical location (% area in tropics)	-3.20 ** (1.49)	-3.07 ** (1.46)	-3.34 ** (1.48)	-3.30 ** (1.56)	-2.08 (1.75)
Intercept	-1.84 (4.86)	-5.81 (5.32)	-2.54 (4.93)	-1.81 (4.95)	-9.71 * (5.45)
R ² (adjusted)	0.19	0.22	0.19	0.19	0.23
No. of observations	202	175	203	184	174

Notes:

All regressions include time dummies.

*, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table A.10: Extreme poverty rate, corruption, inequality, and economic freedom (pooled OLS), 1980-2005

Dependent variable: Extreme poverty rate (\$1.25 per day)				
Independent variable	(1)	(2)	(3)	(4)
Economic freedom, 10 year lag	-6.13 *** (1.24)	-2.99 ** (1.36)	-6.30 *** (1.44)	-2.77 (1.72)
Democracy, 10 year lag	-0.29 (0.19)	-0.18 (0.19)	-0.30 (0.25)	-0.19 (0.25)
Foreign aid/GNI, 10-year average (10 year lag)	0.59 (0.37)	1.00 *** (0.30)	0.78 * (0.45)	0.69 (0.43)
Corruption index, average 1998-2005		-4.16 *** (1.20)		-3.52 *** (1.27)
Inequality, 10 year average			0.80 *** (0.32)	0.71 ** (0.31)
Tropical location (% area in tropics)	4.40 (4.72)	0.93 (4.55)	0.32 (4.97)	-2.76 (5.72)
Intercept	37.86 *** (6.86)	38.30 *** (6.41)	1.37 (14.31)	3.43 (14.50)
Region Dummies	Yes	Yes	Yes	Yes
R ² (adjusted)	0.68	0.72	0.66	0.67
No. of observations	282	269	164	159

Notes:

All regressions include time dummies.

*, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table A.11: Reductions in extreme poverty rate and corruption, inequality, and changes in economic freedom (pooled OLS), 1980-2005

Dependent variable: Reduction in extreme poverty rate (\$1.25 per day), 10 year change				
Independent variable	(1)	(2)	(3)	(4)
Economic freedom, 10 year change	2.19 *** (0.68)	1.82 *** (0.73)	2.00 ** (0.98)	1.42 (0.99)
Democracy, 10 year change	-0.01 (0.11)	0.04 (0.11)	0.13 (0.14)	0.19 (0.14)
Extreme poverty rate, start of period	0.26 *** (0.04)	0.28 *** (0.04)	0.28 *** (0.05)	0.28 *** (0.05)
Economic freedom, start of period	1.72 *** (0.58)	1.18 (0.74)	1.93 *** (0.77)	1.11 (0.99)
Foreign aid/GNI, 10-year average	-0.25 ** (0.12)	-0.34 ** (0.14)	-0.52 *** (0.20)	-0.50 ** (0.21)
Corruption index, average 1998-2005		0.67 (0.45)		0.48 (0.54)
Inequality, 10 year average			-0.10 (0.11)	-0.08 (0.12)
Tropical location (% area in tropics)	-1.46 (1.27)	-0.79 (1.39)	1.31 (1.53)	2.17 (1.75)
Intercept	-8.21 ** (3.75)	-8.28 ** (3.83)	-4.00 (6.38)	-2.77 (6.38)
Region Dummies	Yes	Yes	Yes	Yes
R ² (adjusted)	0.26	0.27	0.21	0.21
No. of observations	295	282	177	172

Notes:

All regressions include time dummies.

*, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table A.12: Moderate poverty rate and the level of economic freedom (pooled OLS, fixed effects, and GMM), 1980-2005

Independent variable	Dependent variable: Moderate poverty rate (\$2 per day)					
	Pooled OLS		Fixed effects		GMM	
	(1)	Ten year lag (2)	(3)	Ten year lag (4)	(5)	(6)
Economic freedom	-8.91 *** (1.60)	-8.71 *** (1.71)	-0.90 (0.82)	-0.73 (0.98)	-4.16 * (2.44)	-3.80 ** (1.96)
Democracy	-0.39 ** (0.19)	-0.36 (0.22)	-0.07 (0.12)	0.09 (0.11)	-1.14 *** (0.42)	-0.36 (0.27)
Foreign aid/GNI, 5-year average	0.76 ** (0.32)	0.72 ** (0.30)	0.18 * (0.11)	0.07 (0.11)	1.36 *** (0.43)	0.70 *** (0.22)
Tropical location (% area in tropics)	5.17 (5.48)	6.73 (5.97)			20.98 *** (5.66)	6.32 (6.26)
Intercept	64.83 *** (9.11)	60.62 *** (9.26)	50.44 *** (4.14)	49.43 *** (5.00)	43.09 *** (16.74)	32.50 *** (13.19)
Region Dummies	Yes	Yes			No	Yes
R ² (adjusted)	0.72	0.71				
No. of observations	470	324	470	324	470	470
Sargan/Hansen test					71.76 (p=0.39)	67.43 (p=0.53)
Degrees of freedom					69	69

Notes:

All regressions include time dummies.

***, **, and * indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table A.13: Reductions in the moderate poverty rate and changes in economic freedom (10 year periods), 1980-2005

Independent variable	Dependent variable: Reduction in moderate poverty rate (\$2 per day), 10 year change						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Economic freedom, 10 year change	3.32 *** (0.84)	3.17 *** (0.77)	2.07 *** (0.69)	2.69 *** (0.98)	1.87 ** (0.94)		
Economic freedom, 10 year change (10 year lag)				3.26 *** (0.81)	1.99 *** (0.76)	2.27 *** (0.72)	2.02 *** (0.80)
Democracy, 10 year change	0.10 (0.09)	0.10 (0.09)	0.12 (0.09)	0.17 (0.12)	0.16 (0.12)		
Democracy, 10 year change (10 year lag)						-0.07 (0.09)	-0.10 (0.10)
Extreme poverty rate, start of period	0.16 *** (0.03)	0.23 *** (0.04)	0.19 *** (0.04)	0.25 *** (0.05)	0.20 *** (0.05)	0.14 *** (0.04)	0.20 *** (0.06)
Economic freedom, start of period	3.01 *** (0.66)	3.15 *** (0.65)		3.93 *** (1.04)		2.66 *** (0.88)	2.57 *** (0.95)
Higher economic freedom binary			3.50 *** (0.94)		4.98 *** (1.41)		
Foreign aid/GNI, 10-year average	-0.38 *** (0.12)	-0.31 *** (0.10)	-0.35 *** (0.10)	-0.30 * (0.18)	-0.27 (0.18)		
Foreign aid/GNI, 10-year average (10 year lag)						-0.15 (0.18)	-0.06 (0.17)
Tropical location (% area in tropics)	-2.94 ** (1.42)	-1.64 (1.58)	-0.70 (1.56)	-1.94 (1.64)	-1.14 (1.67)	-4.99 *** (1.67)	-2.68 (1.88)
Intercept	-15.50 *** (4.13)	-17.69 *** (3.98)	-2.46 (1.85)	-20.98 *** (6.56)	-2.58 (2.67)	-10.18 * (5.28)	-11.59 ** (5.71)
Region Dummies	No	Yes	Yes	Yes	Yes	No	Yes
R ² (adjusted)	0.22	0.28	0.25	0.26	0.24	0.14	0.20
No. of observations	295	295	295	203	203	197	197

Notes:

All regressions include time dummies.

***, ** and * indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

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Tables and Figures

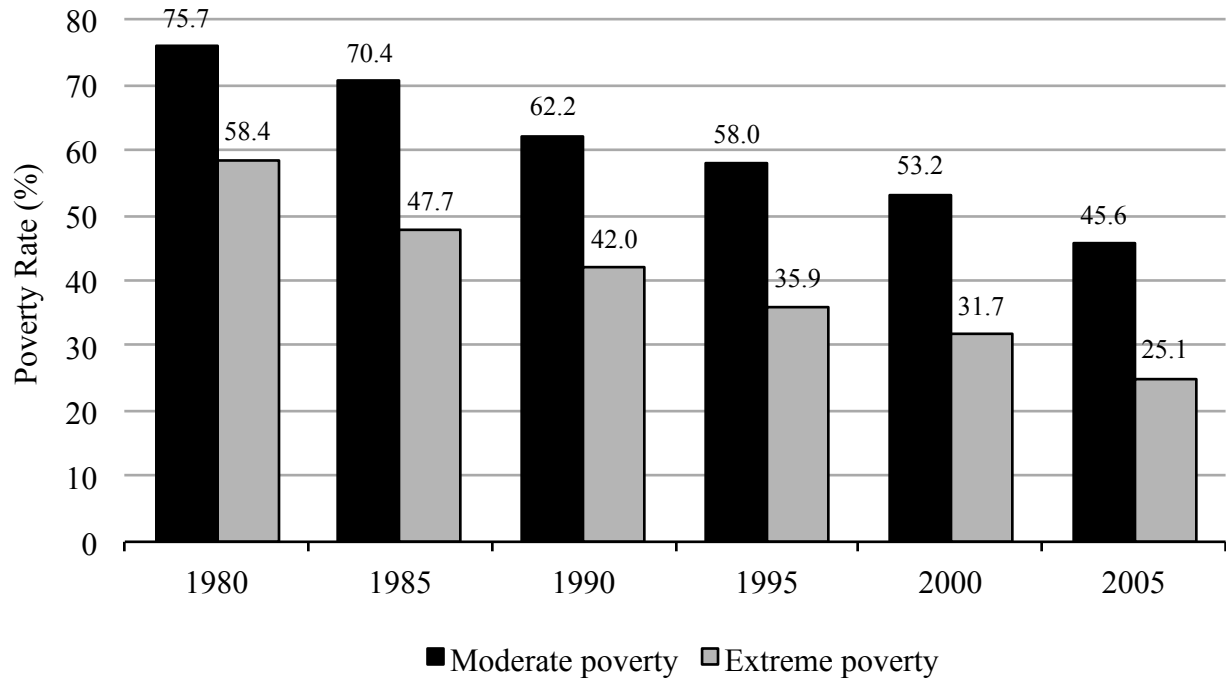


Figure 1: World Bank extreme (\$1.25) and moderate (\$2) poverty rate of the developing world, 1980-2005

Table 1: Extreme poverty rate and the level of economic freedom (pooled OLS, fixed effects, and GMM), 1980-2005

Independent variable	Dependent variable: Extreme poverty rate (\$1.25 per day)					
	Pooled OLS		Fixed effects		GMM	
	Ten year lag (1)	Ten year lag (2)	Ten year lag (3)	Ten year lag (4)	(5)	(6)
Economic freedom	-6.33 *** (1.20)	-5.86 *** (1.36)	-0.59 (0.69)	-0.15 (0.87)	-3.65 * (1.99)	-3.19 (2.10)
Democracy	-0.26 * (0.15)	-0.28 (0.18)	-0.01 (0.12)	0.05 (0.10)	-0.69 * (0.38)	-0.03 (0.19)
Foreign aid/GNI, 5-year average	0.66 ** (0.31)	0.55 * (0.29)	0.14 (0.09)	-0.07 (0.12)	1.24 *** (0.44)	0.65 *** (0.25)
Tropical location (% area in tropics)	2.36 (4.33)	3.84 (4.48)			13.60 *** (3.82)	1.12 (4.01)
Intercept	45.73 *** (6.84)	37.85 *** (6.99)	37.00 *** (3.44)	32.80 *** (4.56)	31.13 ** (13.43)	21.78 (13.58)
Region dummies	Yes	Yes			No	Yes
R ² (adjusted)	0.70	0.68				
No. of observations	470	324	470	324	470	470
Sargan/Hansen test					71.07 (p=0.41)	75.52 (p=0.28)
Degrees of freedom					69	69

Notes:

All regressions include time dummies.

*, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.

Table 2: Reductions in the extreme poverty rate and changes in economic freedom (pooled OLS, 10 year periods), 1980-2005

Independent variable	Dependent variable: Reduction in extreme poverty rate (\$1.25 per day), 10 year change						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Economic freedom, 10 year change	2.42 *** (0.72)	2.19 *** (0.68)	1.63 *** (0.59)	2.47 *** (0.87)	1.95 ** (0.80)		
Economic freedom, 10 year change (10 year lag)				2.43 *** (0.70)	1.65 *** (0.62)	1.62 *** (0.58)	1.08 * (0.62)
Democracy, 10 year change	-0.01 (0.11)	-0.01 (0.11)	0.00 (0.11)	-0.02 (0.13)	-0.03 (0.13)		
Democracy, 10 year change (10 year lag)						-0.02 (0.09)	-0.08 (0.09)
Extreme poverty rate, start of period	0.20 *** (0.03)	0.26 *** (0.04)	0.24 *** (0.04)	0.31 *** (0.05)	0.28 *** (0.05)	0.19 *** (0.04)	0.24 *** (0.05)
Economic freedom, start of period	1.92 *** (0.62)	1.72 *** (0.58)		2.75 *** (0.87)		1.84 ** (0.76)	1.44 * (0.74)
Higher economic freedom binary			2.16 *** (0.85)		3.89 *** (1.20)		
Foreign aid/GNI, 10-year average	-0.33 ** (0.14)	-0.25 ** (0.12)	-0.28 ** (0.12)	-0.31 (0.19)	-0.30 (0.19)		
Foreign aid/GNI, 10-year average (10 year lag)						-0.06 (0.18)	0.05 (0.15)
Tropical location (% area in tropics)	-3.02 ** (1.36)	-1.46 (1.27)	-1.00 (1.25)	-2.33 * (1.38)	-1.85 (1.40)	-4.69 *** (1.51)	-2.96 ** (1.44)
Intercept	-7.88 ** (3.94)	-8.21 ** (3.75)	-0.17 (1.79)	-14.04 *** (5.51)	-1.76 (2.35)	-5.70 (4.71)	-5.76 (4.74)
Region Dummies	No	Yes	Yes	Yes	Yes	No	Yes
R ² (adjusted)	0.20	0.26	0.25	0.27	0.27	0.18	0.24
No. of observations	295	295	295	203	203	197	197

Notes:

All regressions include time dummies.

***, ** and * indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Heteroskedastic robust standard errors clustered by country are listed in parenthesis.