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RESEARCH ARTICLE

Poverty Eradication in Fragile Places: Prospects for Harvesting the Highest Hanging Fruit by 2030

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This paper explores the range of likely and potential progress on poverty eradication in fragile states to 2030. Using the International Futures model and recently released 2011 International Comparison Program data, this paper calculates current (2015) poverty for a US$1.90 poverty line, and subsequently runs three scenarios. The estimates suggest that there are 485 million poor in fragile states in 2015, a 33.5 per cent poverty rate. This paper's Base Case scenario results in a forecasted 22.8 per cent poverty rate in fragile states by 2030. The most optimistic scenario yields a 13.1 per cent poverty rate for this group of countries (257 million). An optimistic scenario reflecting political constraints in fragile states yields a 19.1 per cent poverty rate (376 million). Even under the most optimistic circumstances, fragile states will almost certainly be home to hundreds of millions of poor in 2030, suggesting that the world must do things dramatically differently if we are to reach the high hanging fruit and truly 'leave no one behind' in the next fifteen years of development.

Introduction

Poverty reduction in the last 15 years has been overwhelmingly successful. This success was highlighted by the first target of Millennium Development Goal 1 (MDG1) – reducing global $1.25-a-day poverty by half between 1990 and 2015 – being met five years early in 2010 (Chen and Ravallion, 2012). Attention has since shifted to the next round of global development goals calling for the eradication of extreme poverty globally by 2030.[1] For most of the developing world, poverty eradication, or something close to it,[2] is possible. However, with a few notable exceptions,[3] there has been relatively little conversation about the prospects for poverty reduction and eradication in fragile and conflict-affected countries (FCS). This oversight has four bases: i) the earlier MDG goal was a global goal, ii) most of the poor have historically been located in non-fragile states,[4] iii) fragile states have historically made the least progress on poverty reduction, and iv) development interventions have typically (though

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not always)[5] been more effective in non-fragile environments. In light of these realities, most policy focus over recent decades has been on poverty reduction in the rest of the developing world, where the proverbial fruit has been relatively abundant and low-hanging. However, with a new development goal of universal poverty eradication, the goal has become the harvesting *of all fruit* from the tree, both low-hanging and high-hanging. This paper assesses the feasibility of reaching the highest-hanging fruit – poverty eradication in fragile states.

This paper utilizes the International Futures (IFs) forecasting system, and a scenario modeling approach, to contribute practical forecasts of likely trends in poverty for fragile and conflict-affected states. This approach also examines the degree of leverage aggressive policies might have in accelerating poverty reduction in these environments. The results of this examination aim to provide a timely contribution to inform prioritization and strategic planning to meet the new global goals.

This paper's analysis is divided into four core sections. Following this introduction, the first section outlines the methodology used throughout the paper, while comparing the selected forecasting method to other approaches in recent literature. The second section presents our Base Case forecast. This Base Case represents the path we seem to be on, and briefly compares this paper's forecast with relevant forecasts from other sources. The third section presents an idealized, Best Case poverty forecast for fragile states based on optimistic levels of economic growth and reduced inequality in these countries. The final section of analysis explores the effects of improvements in security, institutions, and poverty reduction policies, focusing on the unique constraints to stability in fragile states. The

East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	South Asia	Sub-Saharan Africa		
Kiribati*	Bosnia and Herzegovina	Haiti	Egypt, Arab Rep.	Afghanistan	Burundi	Guinea	Nigeria
Korea, Dem. Rep.	Kosovo		Iraq	Bangladesh	Cameroon	Guinea-Bissau	Rwanda
Marshall Islands*			Libya	Nepal	Central African Rep.	Kenya	Sierra Leone
Micronesia, Fed. Sts.			Syrian Arab Republic	Pakistan	Chad	Liberia	Somalia
Myanmar			West Bank and Gaza	Sri Lanka	Comoros	Madagascar	South Sudan
Solomon Islands			Yemen, Rep.		Congo, Dem. Rep.	Malawi	Sudan
Timor-Leste					Congo, Rep.	Mali	Togo
Tuvalu*					Cote d'Ivoire	Mauritania	Uganda
					Eritrea	Niger	Zimbabwe

Table 1: OECD Fragile States List, 2015.
*These countries are not included in the International Futures model and have, therefore, been excluded from this analysis.
Source: OECD (2015).

paper concludes with a summary of its findings, utilizing the results from the alternative case scenarios to assess the feasibility of eradicating poverty in fragile states.

Methodology

The fragile states list used throughout this study comes from the Organization on Cooperation and Economic Development (OECD). This list is updated on a yearly basis, with **Table 1** showing the 2015 country set utilized throughout this study.[6]

The assessment of future poverty in fragile states, and our understanding of current poverty levels, has recently been complicated by the change of currency base year from 2005 to 2011 dollars (hereafter demarcated by $2005 or $2011), by the International Comparison Program.[7] In addition, many countries have rebased their calculations of GDP and purchasing power parity – leading to significant changes in some large economies such as India and Nigeria. The poverty analysis community, led by the World Bank, has incorporated these changes to identify the new threshold of $1.90 per day in $2011, replacing the previous $1.25 per day extreme poverty thresholds.[8]

Due to the multiple changes to and intermittent pattern of the surveys on which estimates are based, there can be significant differences in estimates of current poverty levels. The World Bank estimates that the total number living in poverty globally in 2012 was 897 million, and that in 2015 it may have declined to 702 million or 9.6 per cent.[9] This paper's calculations for 2015 are considerably higher, standing at 967 million. In part, this discrepancy reflects missing surveys and numbers in World Bank data for Afghanistan, Eritrea, North Korea, Lebanon, Libya, Myanmar, Somalia, South Sudan, and Zimbabwe, for which we have made estimates based on global GDP per capita (at PPP) patterns. This discrepancy also reflects a divergence on estimates of progress in a fair number of countries relative to the World Bank's estimates following most recent surveys. Overall, this means that the global poverty rate estimates for 2015 utilized in this paper are approximately 3.5 percentage points higher than those of the Bank, likely leading our forecasts to also be proportionately higher – a difference that does not significantly affect the paper's overall conclusions.

In line with previous research, initial estimates of poverty rates in countries were extracted from household surveys – namely the World Bank's PovcalNet. Estimates of poverty rates are based on two variables, mean income/consumption levels, and income distribution. Household surveys can be used to provide mean income levels. Alternatively, national account statistics can provide the household income or consumption mean. Researchers vary in their use of income or consumption mean, most often relying on survey values (e.g. Ravallion 2012 and 2013; Chandy, Ledlie and Penciakova 2013: 16); although the estimates of Edward and Sumner (2013: 9) use both means separately. Initial values from national account statistics most often differ from, and are typically higher than those derived from household surveys. Where data was missing, this analysis used base year adjustments to reconcile national accounts to survey-consistent levels.[10]

Income and consumption are functions of a wide range of drivers. These drivers include: patterns of human development, especially education levels; character and quality of governance, not just within government but in the relationships between government and society that can heavily shape and reflect the stability or fragility of states; physical foundations such as infrastructure and technology levels; and interaction with other countries via trade, aid, financial, knowledge, and migration flows.[11] Simple linear forecasting is unable to capture these complex relationships in development systems. This paper contends that proper forecasting of poverty rates must be founded on past patterns, combined with assumptions regarding the proximate and deeper drivers that affect income growth and the evolution

of distribution. Simulations were selected for use in this paper as they are well-suited to such forecasting, due to their ability to accommodate these inherent complexities.

The International Futures (IFs) forecasting tool is used throughout this paper to estimate performance of global poverty systems at the country level. IFs includes not just the proximate drivers of poverty, but multiple interacting national and global modules that contain many or most of the known deeper drivers of poverty (see **Figure 1** below). There are 12 highly interconnected models in the International Futures System, comprised of more than 2000 variables with endogenous and exogenous relationships. As an illustrative example, institutions are shown in **Figure 1** as a part of domestic governance, influenced by policymakers which then have knock-on effects on education, health, the economy, changes in demography and other modules. The effectiveness of domestic governance is affected by the level of conflict and insecurity in the country, which also has flow through and knock-on effects in other modules. When combined, these effects contribute to changes in the economy and demographics within countries, affecting the level of poverty – as an outcome of the system (but also as a variable that affects others, including mortality patterns in the health model). The IFs system has been used in extended poverty analysis (see Hughes et al. 2008 for elaboration of structure and equations underlying that capability; also Burt et al 2014 and Turner et al. 2015 for applications), in analysis of governance and fragility (Hughes et al. 2014; Joshi et al. 2015) and in many other analyses (Hughes 2016 surveys other applications).

In other literature on poverty, analysts typically use forecasts of extended variables generated by others (e.g. Chandy, Ledlie and Penciakova, 2013 use those of the Economist Intelligence Unit) or they build upon extrapolations of recent growth rates. For instance, Edward and Sumner (2013: 11–12) look to the recent IMF World Economic Outlook estimates of GDP growth and develop scenarios that extend and/or shift those.[12] This paper's use of the IFs system includes endogenous models for each of those deeper variables, allowing for set levels of institutional effectiveness when considering policy options and their implications for greater richness in scenario analysis.[13]

The next three sections of the paper present three scenarios. Our first scenario presents a

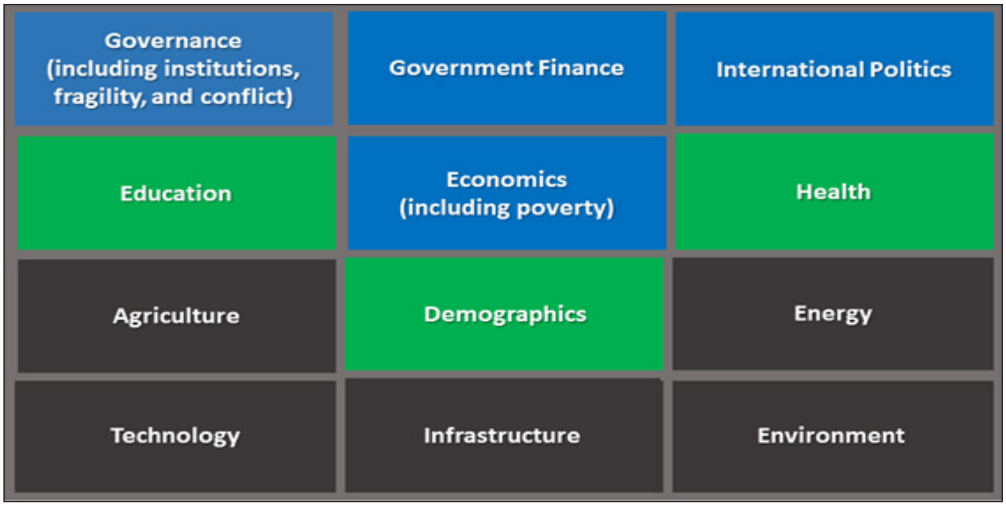

Figure 1: Models Within the IFs Forecasting System.
Source: (Hughes and Hillebrand 2008).

Base Case that considers the trajectory that fragile states appear to be on between now and 2030, with respect to poverty reduction. That scenario is not a simple extrapolation, but rather the dynamic unfolding of the interaction of the proximate and deeper driving variables in IFs. The Base Case facilitates comparison of our forecasting with that of others. Our second case assumes exceptional economic growth and income distribution variables to create a Best Case (Growth and Shared Prosperity) scenario with respect to the proximate drivers. That step allows us to estimate a maximum possible reduction in poverty for fragile states through 2030, based on current information. The third case explores the policy space – interventions that can be carried out by policymakers in fragile states and the international community, including very optimistic improvements in governance and security. Together the three cases provide readers with a picture of how successful aggressive efforts can be at eradicating poverty in fragile states.

Base Case: The Trajectory of Poverty Reduction In Fragile States

The majority of people living under $1.90 a day currently reside in non-fragile states, but the number of poor in fragile states will likely outnumber the number of poor residing in non-fragile states within the next four or five years. India continues to house an overwhelming proportion of the world's poor, while populous, middle income, non-fragile countries like China house most of the world's remaining poor population. **Figure 2** highlights the current distribution of the world's poor, and where the poor are likely to live in 2030. These estimates suggest that in 2015, there are 1,449 million people in fragile states, 485 million of whom are poor; whereas there are nearly 6 billion people in non-fragile states, 482 million of whom are poor. According to this paper's Base Case, by 2030, one would expect approximately two-thirds of the world's poor to reside in currently fragile countries. The Base Case presented here is the foundation against which this paper's alternate scenario results are compared.

The depth of the challenge of poverty eradication in fragile states is complicated by the slow rate of progress expected in the future. **Figure 3** shows estimates of the poverty rates in fragile states (each bubble is a state, with the poverty rate represented by the color of the bubble), as well as the total poor[14] population within each country (represented by the size of the

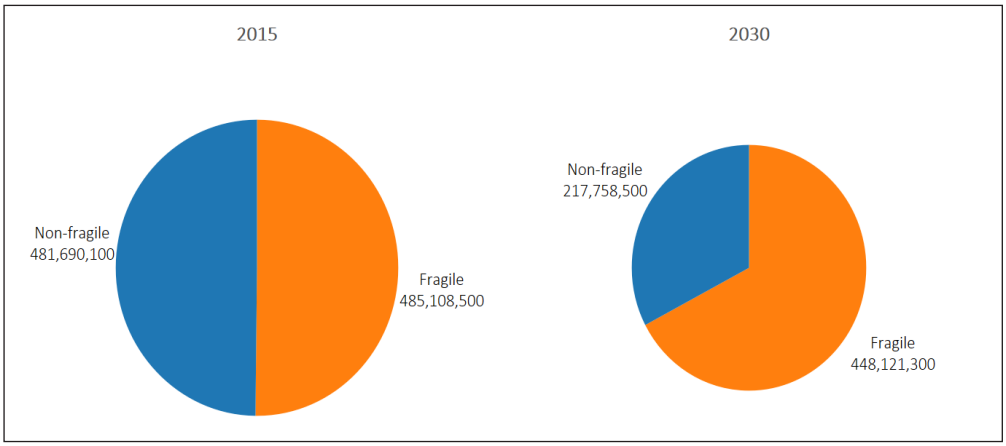

Figure 2: Developing World Poverty in 2015 and 2030.
A comparison of extreme poverty in fragile states versus non-fragile states in 2015 and 2030.
Source: Authors' own calculations; IFs v7.21 Beta.

corresponding bubble). The panel on the left shows the current state of poverty in fragile states, and the set of bubbles on the right shows the forecast of poverty in 2030 (using our Base Case scenario). As the bubbles show, progress in fragile countries is likely to be relatively slow; many countries remain above a 50 per cent poverty rate and, due to slow expected progress and relatively high population growth, most bubbles stay about the same size. An example country is Uganda, where the percentage of people living under $1.90 drops between 2015 and 2030 from 44 per cent to 38 per cent, but the number of poor increases over the same period – from 17.5 million to 23.6 million. Exceptions are populous, lower middle-income countries like Bangladesh and Ethiopia which may already be on a trajectory out of fragility and poverty. Of course, the problem of poverty in fragile states is not confined to just income and economic wellbeing; fragile states also lag behind other countries in terms of social development (World Bank, 2011).[15]

Diversity of Poverty in Fragile States

Although various elements of fragility are shared by many countries on the OECD list, each has a unique and disparate socio-political and economic situation and historical legacy. Poverty reduction and eradication will vary by composition of the economy, type and depth of poverty, and contextual factors.[16] Some countries on this list have been economically among the top performing developing countries in the past 15 years. For example, Chad has seen double-digit GDP growth rates in the past decade, largely due to its natural resources, despite instability. Liberia, at least before the recent outbreak of Ebola, also experienced double-digit growth rates; but unlike Chad, this growth has been post-conflict and is

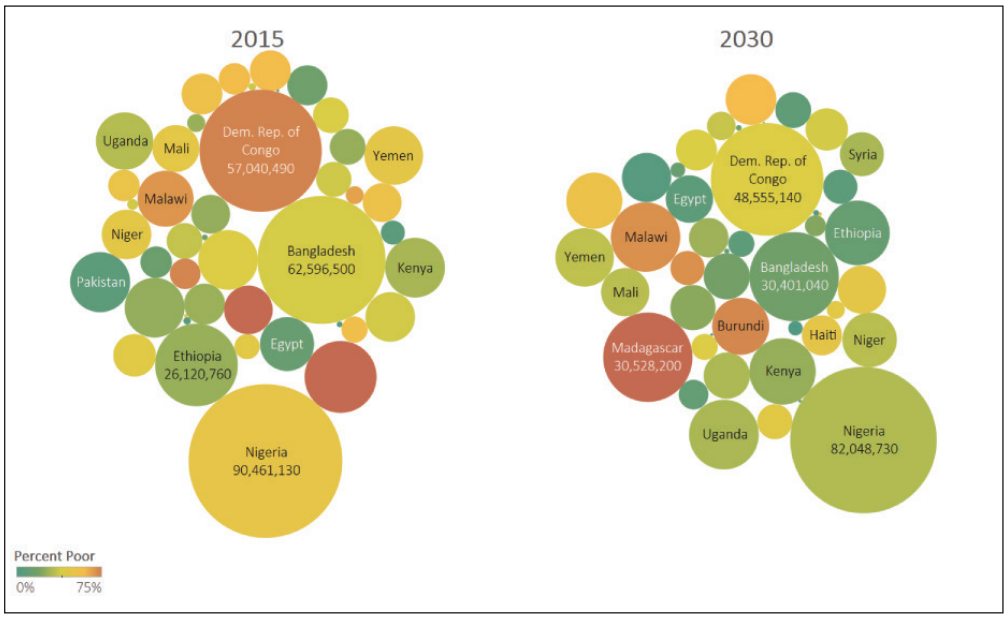

Figure 3: Fragile States Poverty and Distribution, 2010 and 2030.
A comparison of the number and percent of poor in fragile countries in 2015 and 2030. Color of the bubble shows percent poor at $1.90/day. Size of the bubble is proportional to the number of poor at $1.90/day.
Source: IFs v7.21 Beta.

connected to diversification of the country's economy. At the same time, other countries have a recent history of stagnant economic growth, such as the Federated States of Micronesia, Malawi, and Madagascar.[17] Inequality varies as well – high inequality in Zimbabwe and Central African Republic has been persistent, but countries like Timor-Leste and Burundi rank in the bottom 40 countries in Gini.[18] The scatterplot in **Figure 4** illustrates the diversity of socioeconomic conditions among the examined fragile states, as well as their average GDP growth rates from 2005 to 2014, according to the World Economic Outlook (WEO). Countries colored red, orange, or yellow experienced average growth rates of less than five per cent per year, while countries in green and blue had average growth rates above five per cent over the last decade.

Results for Comparative Forecast of Global Poverty

To begin, this paper compared its Base Case results to four recent and influential papers with global poverty projections: Chandy, Ledlie and Penciakova's work on poverty trends (published in various outlets 2013 and 2014), Edward & Sumner (2013a), Ravallion (2013), and the World Bank's poverty policy report of October 2014 (World Bank, 2014).[19] For fragile states, the IFs Base Case is 'in the neighborhood' of forecasts carried in the research of Chandy, et al. (2013 and 2014), and Edward and Sumner (2013a) (see **Figure 5**).

In our Base Case scenario, poverty reduction is slow, but steady, in fragile states. There are a variety of explanations for this, including aggregation-saturation effects. Take, for example, three fragile countries with high

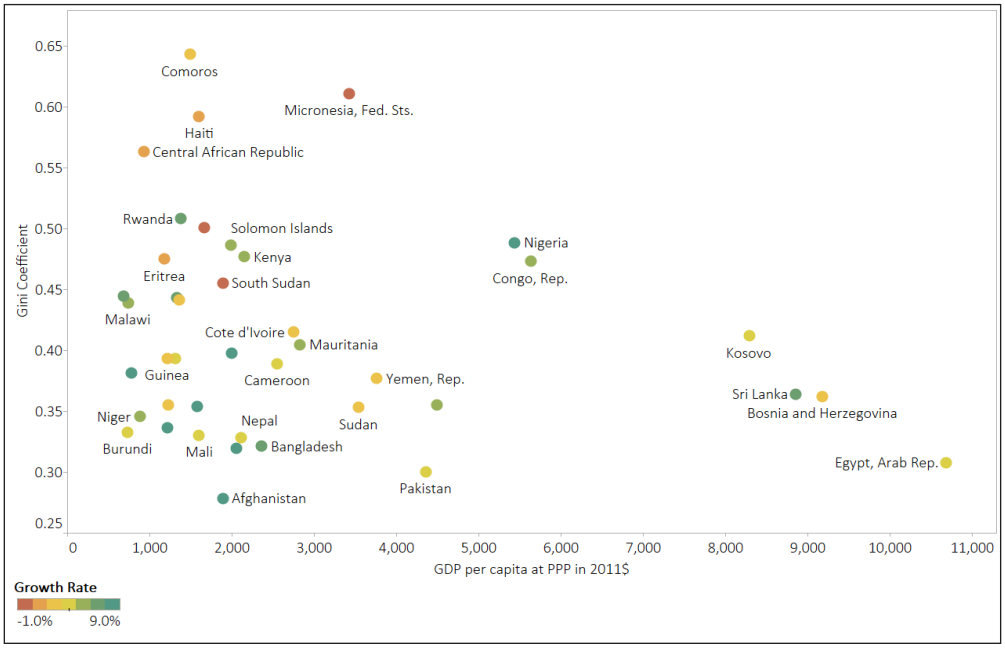

Figure 4: Diversity of Situations in Fragile States.
This graphic shows GDP per capita data at purchasing power parity in 2011 constant USD. Gini coefficients are 2010 estimates from the International Futures model (based on World Bank data). Libya and Iraq are excluded from this graphic because of high year-on-year fluctuations in their GDP. The latest World Bank data shows Libya's GDP per capita at PPP as $23,000 and Iraq's as $14,500.
Source: IFs v7.21 Beta, World Bank.

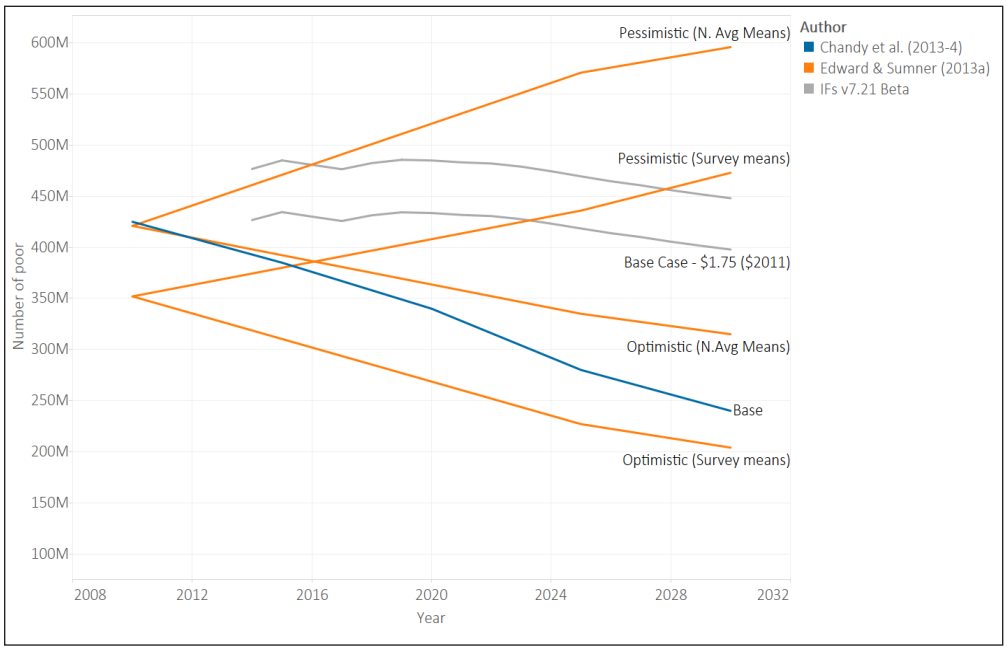

Figure 5: Fragile State Poverty Forecasts.
Poverty forecasts for fragile states from different authors in terms of number of people living in poverty (by author – results by earlier authors have not been adjusted for the new poverty line).
Source: Chandy et al. (2013 – 4), Edward & Sumner (2013a), and IFs v7.21 Beta.

poverty rates that also have very high population growth rates – Democratic Republic of Congo, Madagascar, and Malawi. In a population-weighted aggregation of trends for the entire fragile state group, the slower rates of progress and higher population growth of these three populous countries are powerful enough to offset the gains of other countries within the group that eliminate poverty and, therefore, stop contributing to poverty reduction. This aggregation-saturation effect suggests a worrying possibility when considered at the global level: rather than the global rate of poverty reduction continuing to accelerate as it has over the last 20 years, we could reach a turning point where the rate of poverty reduction decreases because it is concentrated in populous countries with slow rates of progress.

The two most important proximate drivers of poverty reduction are growth and inequality (distribution of the growth). Under the Base Case, per capita economic growth among developing countries is fairly stable over the next 40 years. The model also sees that inter-state and global inequality decreases over time. However, on average, inequality in most developing countries examined in the IFs Base Case increases – an average increase of 1.5 points between 2010 and 2030 on the 100-point Gini index, and a further 1.5 points by 2050.

Further examination highlighted broader economic trends, and other characteristics of fragile states captured by the IFs system, as explanations for potentially slowing or stalling poverty rate reduction. Many of the countries that are outliers on fragility and poverty are outliers on other dimensions as well. For instance, the three states mentioned above, along with many other fragile states, have often run large trade

deficits as a portion of GDP. The economic model in IFs does not allow such deficits to continue indefinitely; so, within the model, an increase in interest rates and/or reduction in government transfers will squeeze household consumption and limit poverty reduction. Further, the Base Case of IFs also anticipates that foreign aid from high-income countries will not keep pace with economic growth in low-income countries, where aid receipts as a percentage of GDP have risen quite steadily to approximately 18 per cent over a long period of time, but that have recently begun to decline.

Alternative Scenarios for Poverty in Fragile States: The Best Case of Growth and Shared Prosperity

World Bank President Jim Kim has stressed the importance of including 'shared prosperity' in the post-2015 agenda,[20] with the phrase 'leave no one behind' becoming an important part of the United Nations post-2015 agenda discussion.[21] Moving beyond the Base Case, the next step in this analysis was to create what is labeled not just an optimistic scenario, but the Best Case scenario. To do so, the two proximate drivers of poverty, the economic growth tied directly to income and consumption, and the Gini coefficient summarizing distribution of income and consumption, were directly manipulated. The aim of this analysis is to uncover what fragile state poverty could be in 2030, in a world of exceptional economic growth and shared prosperity. First this paper analyses the impacts of optimistic growth and optimistically improved distribution separately, before combining them to create the Best Case – Growth and Shared Prosperity – scenario.

Approach

The optimistic economic growth scenario explores the effects of above-average GDP growth for the examined fragile states. The IFs model utilizes WEO estimates from 2010 to 2016 to set initial rates of GDP growth.[22] These rates are followed by optimistic growth rates for the period 2016 to 2030. The optimistic rates set for this analysis are two percentage points above the higher of either 1) WEO's forecasted GDP growth rates from 2015 to 2019 or 2) forecasted growth from the IFs Base Case. These estimates are almost certainly overly optimistic – leaving this analysis to highlight what is possible at the upper bounds of progress for the examined set of fragile states, rather than what is likely. It should be noted that the optimistic growth rates set within this analysis are roughly in line with the optimistic projections used by Edward and Sumner (2013a) and Ravallion (2013).

Globally, within-country inequality seems to be increasing more often than not.[23] Almost all projections rely on simplifying assumptions, typically assuming that there is no change (e.g. Ravallion, 2012; Chandy, Ledlie and Penciakova, 2013: 17). The use of constant Gini in Ravallion's *optimistic* scenario demonstrates, however, the general acceptance of the baseline expectation that inequality will continue to increase in the developing countries. The slowly rising Gini forecast produced by the IFs Base Case is also in line with this expectation.

Two more optimistic scenarios were also created in this analysis. The first scenario holds inequality, represented by the Gini coefficient, at constant 2010 levels for the entire forecast period. The second scenario builds in a trend of decreasing inequality among the fragile states, which follows the optimistic scenarios of Chandy et al. (2013) and Edward and Sumner (2013a). To calibrate reasonable rates of improvements in Gini for this scenario, past instances of decrease in that index were examined. This analysis found, as expected, that higher values of Gini have decreased faster than lower values of Gini. The results of this analysis were then used to reduce Gini based on current Gini for each country – on average by ½ standard deviation in the scenario – thus, ensuring that all countries

improve on inequality in the lower inequality scenario.

Results for Higher Growth and Shared Prosperity Scenarios

The poverty reduction results for these cases are highly optimistic, devoid as they are from the constraints of policy and the limits of realistic global growth. Given the differences between fragile states described above, it is no surprise that the prospects for poverty reduction vary by country as well. Countries that are already forecasted in our Base Case to have potentially rapid increases in economic growth in the next 15 years have less incremental poverty reduction. Countries with relatively low rates of poverty see less effect on poverty reduction from this scenario – for example, Palestine, Bosnia and Herzegovina and Kosovo. The countries that benefit most from the improved economic growth assumptions are countries that currently have stagnating GDP forecasts in the Base Case (Syria, Liberia, Afghanistan, Nigeria, Myanmar, Rep. of Congo), suggesting that a growth turnaround in these countries in the next few years could have dramatic effects on their poverty reduction. The optimistic growth forecast reduces poverty in Liberia by a staggering 33 percentage points over 15 years. For the entire fragile states group, optimistic growth reduces the poverty rate in 2030 from 22.8 per cent (Base Case) to 18.8 per cent.

A similar pattern emerged in the constant and lower inequality scenarios **Figure 6**. Although inequality rises in the Base Case for most countries, it does fall for some. For those in which it falls more rapidly in the Base Case than in either inequality scenario, the scenarios can potentially generate a slight increase in poverty. An increase occurs for twelve of the 47 countries for the constant inequality scenario, and for two countries in the lower inequality scenario. Overall, the constant inequality scenario reduces the poverty rate of 2030 in fragile states from 22.8 per cent to 20.1 per cent, and the lower inequality scenario reduces the poverty rate to 16.6 per cent. The largest poverty reduction over the Base Case from the decreasing inequality scenario (in percent poor terms) occurs in Haiti. The poverty rate falls from 54 per cent in 2015 to 37.5 per cent by 2030, versus 49.6 per cent in the Base Case – resulting in the number of poor falling from 5.7 million to 4.8 million by 2030.

Finally, this analysis combined both optimistic scenarios – high growth and decreasing inequality – to yield a lower bound estimate of prospective poverty in fragile states. As expected, poverty reduction is greater when growth and reduced inequality (shared prosperity) occur together. This combined scenario (dubbed the Best Case or GSP scenario for 'growth and shared prosperity') represents an unprecedented shift to promote the twin goals of exceptional economic growth and shared prosperity in fragile states over the next 15 years. The resulting 2030 poverty rate of 13.1 per cent would be incredible progress, but unfortunately it demonstrates that poverty eradication in fragile states, while perhaps not impossible, would be exceptionally difficult.[24] This should be interpreted as the lower bound of poverty possible in FCS, given current approaches and dynamics around growth and distribution, and can inform reasonable target setting for this group of countries.

Based on these results the question for policymakers becomes: if not three per cent,[25] what is a reasonable poverty goal for fragile states? While the international development community agrees that growth and shared prosperity are essential in poverty eradication, policymakers cannot directly change economic growth or inequality, and must instead adopt policies that promote growth or reduce inequality. Taking this into consideration, this paper's analysis now turns to modeling the possible impacts from actions policymakers have at their disposal in fragile states.

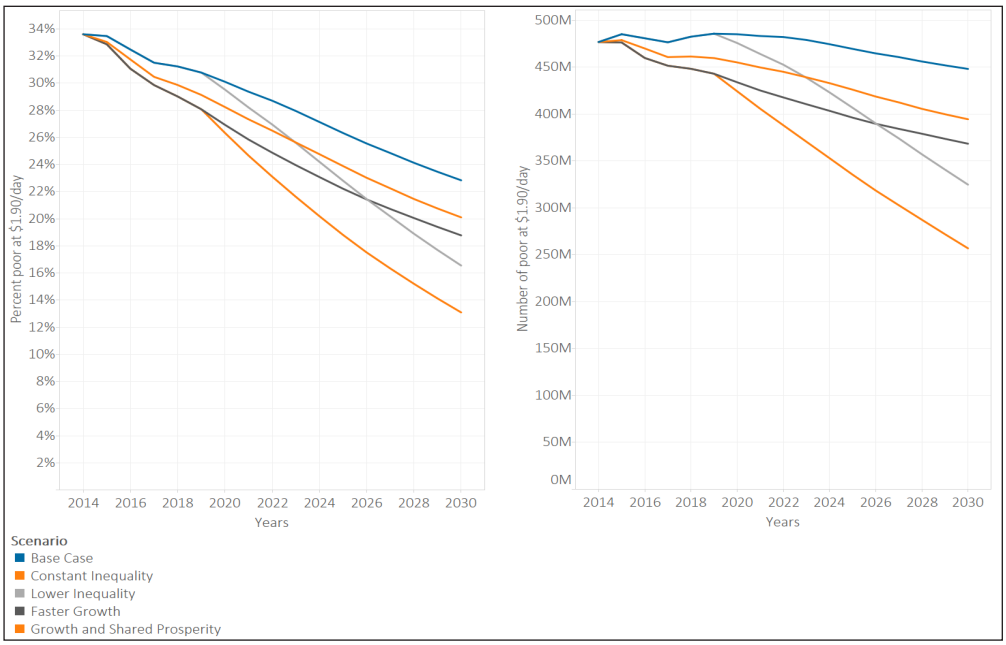

Figure 6: Poverty Rate and Headcount, Growth and inequality Scenarios.
Figure 6 shows five forecasts under different economic growth and inequality assumptions in terms of percent poor (left) and number of poor (right).
Source: IFs v7.21 Beta.

Targeting Institutions, Conflict, and Policies to Reduce Poverty in Fragile States

Growth and shared prosperity are integral parts of poverty eradication-on this point, the literature, historical trends, and the above scenario analyses agree. But how do policymakers promote growth and shared prosperity in fragile states? What is keeping fragile states from improving growth and attaining more equitable distributions of income and consumption? To answer these questions, two core elements of fragility – weak institutions and the presence of conflict – are analyzed to allow the development of aggressive but reasonable scenarios based on improvements in both areas.

Both weak institutions and the presence of conflict inhibit economic growth and, in some cases, exacerbate inequality. For example, weak institutions contribute to poor health and education, decreased government transparency, increased government corruption, poor infrastructure, and inefficient economic management, fiscal policy, and business regulation (North 1990; Tanzi and Davoodi; 2002; Rodrik 2007; Fukuyama 2011; Acemoglu and Robinson 2012). The presence of conflict also has extensive detrimental effects on the development of a society. According to the World Bank (2011), "... a major episode of violence ... can wipe out an entire generation of economic progress."[26] The cases in this section represent the possible gains that can be made if these two issue areas are directly addressed as a part of the post-2015 agenda. The improvements used in the optimistic scenarios are based on historically-observed rapid improvements in institutional strength and reductions of conflict in fragile states, following the methodology developed by Pritchett and de Weijer (2010).

Approach

To identify realistic prospects for improving institutions and reducing conflict, this analysis first quantifies the current level of institutional capacity and conflict in each fragile state. Included in this analysis are several governance indices that are forecasted within the IFs model, including the level of democratization, gender empowerment, government administrative capacity, and government corruption. The IFs governance capacity index combines the ability of governments to mobilize revenues as a portion of GDP with the level of corruption reduction. While the IFs inclusion index combines democratization with gender empowerment. A simple average of the IFs capacity and inclusion indices to represent institutions is used – with the resulting value labeled the 'institution index.' This analysis utilizes the IFs security index, which combines an estimate of the probability of intrastate conflict with a sub-index representing overall government performance and associated risk of instability. Both the IFs institution and security indices are based on historical data.

The resulting two optimistic scenarios for institutions and security (referred to as 'improved institutions' and 'improved security') are framed around 2010-based standard deviation improvements in the IFs institutions index and the IFs security index. To determine whether these scenario interventions are reasonable, the magnitudes of improvement were checked against the thresholds for good governance developed in Pritchett and de Weijer (2010, hereafter PdW). While PdW do not use any indicators directly comparable with the IFs security index, their threshold values for governance lie slightly above the world average. An increase of one standard deviation in the average value of fragile states on the IFs institution index would put that grouping slightly above the world average, supporting this paper's choices with respect to the scale of the improvements.

This analysis next checked the rate of improvement in its scenarios against an optimistic scenario methodology. PdW investigate the gains that have been made by developing countries in improving institutions from 1985 to 2009, in terms of bureaucratic quality, corruption, and the role of the military in politics. PdW then compare the length of time it would take fragile countries to reach a qualitatively designated 'good enough' level of governance if they were to improve at 1) their current rate, 2) the average rate of all developing countries, 3) the rate of the fastest 20 countries, and 4) the rate of the top performer. The 'fastest 20' rate of improvement is used as the optimistic scenario, and PdW conclude that, at this rate, the average fragile state can achieve a threshold ('good enough') level of bureaucratic quality in approximately 24 years. Given that this paper's time horizon is a little less than two-thirds the horizon used in Pritchett et al., a comparable rate of improvement in the IFs indices would produce roughly 60 per cent of a full standard deviation improvement by 2030. Therefore, the assumption in this scenario of a full standard deviation improvement by 2030 is quite an aggressive scenario for reduction in fragility.

This paper's scenarios assume that improvements in government revenues, gender empowerment, democracy (as measured by the Center of Systemic Peace's Polity IV autocracy-democracy index scores)[27] and reductions in government corruption begin in 2015, and ramp up steadily through 2030. The interventions used in this analysis are not equally weighted; most gains in the aggregate institution index were purposefully made through the decrease of government corruption and increase of democracy levels, based on the assumption that corruption and lack of political freedom are greater short-term impediments to state capacity-building in fragile states than revenue collection or gender empowerment.[28] Similarly, the interventions made with respect to the two underlying variables of the IFs security index

Box 1: Areas of Interventions in the Improved Institutions and Security Extended (IISE) Scenario

Most of the scenario interventions used in the IISE scenario come from previous scenario work in Hughes et al. (2014) and Hughes (2013). These interventions represent likely policy changes that would occur as a result of improved institutions and security.

Human Capital

Investment in human capital is a very large component of this scenario, and most investment is funneled into the education system and health care. For education, the intake rate, survival rate, and gender parity are improved. Improved health comes in the form of decreased deaths from communicable diseases (AIDS, malaria, respiratory infections, etc.), and decreased incidences of undernourishment in children. Attention to family planning also reduces fertility.

Environment

Quality of life is also improved in this scenario through the decrease of solid fuel use indoors, which is a proxy for increased ability of the government to provide natural gas and electricity for households. Urban air pollution is also reduced to represent increased regulatory capacity of the government and the positive environmental effects that would result from better regulation.

Infrastructure

An increase in government capacity improves access to safe water and improved sanitation. These improvements further enhance health outcomes. The scenario also includes improvements in access to electricity and telecommunications through increased access to mobile services and broadband.

Policy Shifts

The IISE scenario includes a set of policy orientation shifts that are likely if a country had improved institutions; therefore, it is assumed that the governance foundation is strong enough to both enforce and benefit from these policy shifts. The shifts include greater economic freedom, the promotion of exports, greater trade openness, improved agricultural yields, and increased government spending in research and development.

International Support

Finally, the scenario also includes interventions that represent a concerted effort from the international community to inject productive capital into fragile states through greater inflows of foreign direct investment and aid. Access to an increased amount of credit from the IMF and the World Bank is also included.

Intervention Magnitudes

In each case the magnitude of intervention was scaled so as to be 'aggressive, but reasonable', as developed in the Patterns of Potential Human Progress volume series and elaborated in the sources specified. The two most common approaches to scaling involved historical analysis of good performers and the use of standard error analysis of functions against income levels.

(intrastate violence and government risk) were not equally weighted in the pursuit of a standard deviation improvement in security. Instead, this analysis fully eliminated intrastate conflict and then further reduced the risk of poor government performance to achieve the desired overall improvement in the security index for the fragile state grouping. These are obviously heroic assumptions, representing a very optimistic scenario.

Results for Improved Institutions and Security Extended (IISE) Case

Although institutions and security are improved in the scenarios, IFs does not automatically link these improvements to a full set of policy consequences. For example, increased institutional strength conceptually leads to changes in government policy concerning issues as disparate as family planning and demographics, human development, economic orientation, and environmental sustainability; but, greater institutional strength does not 'turn on' better policies in the IFs model, as *perhaps* they would, and we hope that they would, in reality. Therefore, the breadth of improvements within an actual society resulting from a reduction of fragility would very likely be significantly greater than the improvements represented by the improved institutions and security alone. The Improved Institutions and Security Extended (IISE) scenario therefore also includes the policy-related changes that would most likely result. The policy-related interventions are based on work done in the *Patterns of Potential Human Progress* (PPHP) series by the Pardee Center for International Futures. Each volume covers a specific issue area (poverty, education, health, infrastructure, and governance), and each volume contains scenario analyses that frame the

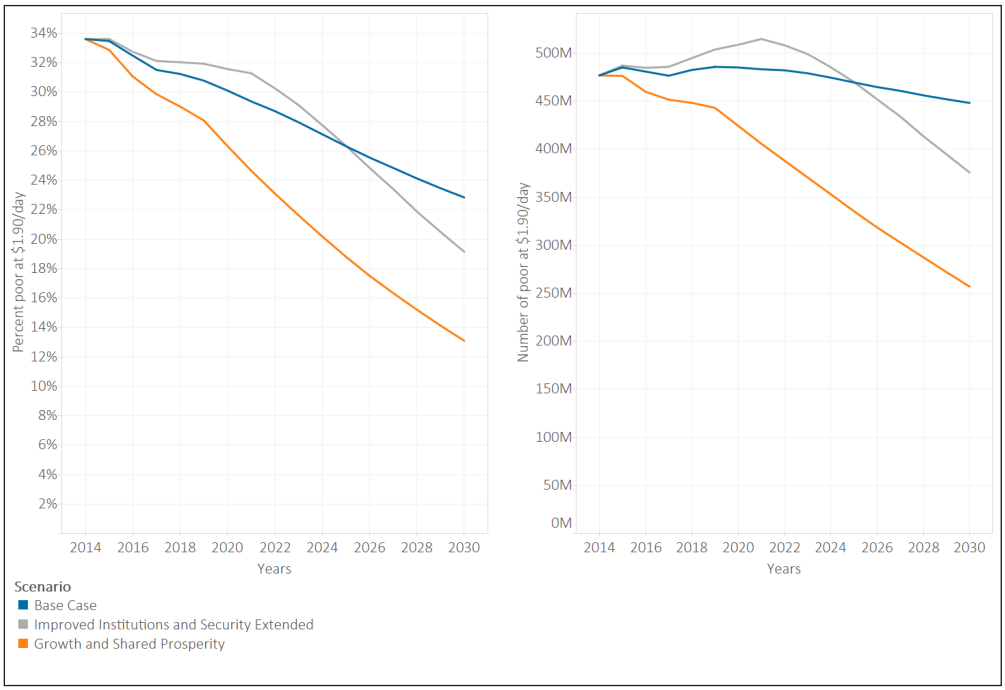

Figure 7: Poverty Rate and Headcount, Alternative Scenarios.
Figure 7 shows three optimistic forecasts in terms of percent poor (left) and number of poor (right).
Source: IFs v7.21 Beta.

Highest poverty headcount reductions, IISE vs. Base Case, 2030

Nigeria	Bangladesh	Dem. Rep. of Congo	Niger	Pakistan
–16,610,430	– 7,320,340	– 5,088,860	– 4,975,260	– 4,698,328

Greatest change in poverty rates, IISE vs. Base Case, 2030

Guinea	Niger	Liberia	Madagascar	Somalia
– 23.2 % points	– 14.5 % points	– 13.9 % points	– 12.9 % points	– 10.0 % points

Table 2: Countries with the Largest Reductions in Poverty in 2030 as a Result of the IISE Interventions.

potential gains and potential challenges for the issue in question. In Hughes (2013), optimistic scenarios from the five volumes are combined into an improved policy and policy orientation scenario, which represents 'aggressive, but reasonable' improvements across all five issue areas of the PPHP series. **Box 1** gives a short description of the six different clusters of interventions added into this IISE scenario.

The result of the IISE scenario is promising, and the resulting poverty rate is much closer to the limit poverty rate obtained from the growth and shared prosperity scenario. By 2030, the poverty rate falls from 33.5 per cent to 19.1 per cent, compared to 22.8 per cent in the Base Case and 13 per cent in the growth and shared prosperity scenario (see **Figure 7**).

Note that poverty reduction in the IISE is more gradual from 2015 to 2020, relative to the Base Case. The slowdown in the rate of poverty reduction in the early years of the forecast is due to short-term tradeoffs

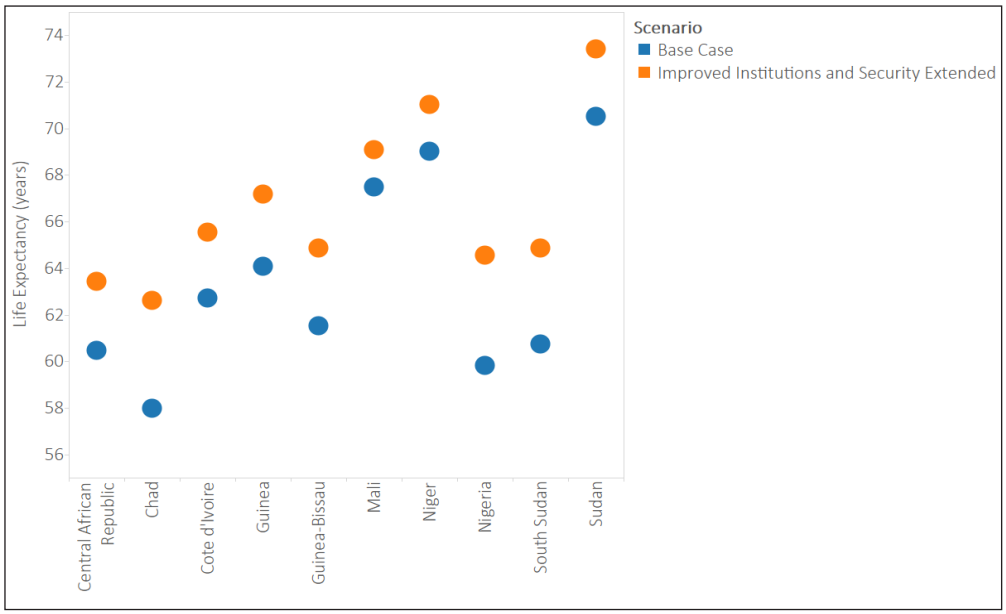

Figure 8: Changes in Life Expectancy as a Result of IISE Scenario, 2030.
Figure 8 shows the average forecasted lifespan by country in select fragile countries.
Source: IFs v7.21 Beta.

within the IISE scenario that yield longer term benefits. As increased government spending on human capital and increased savings/investment are major features of the IISE scenario, this expenditure can displace some household consumption in the short term (however, with appropriate shaping of policies, for instance the use of conditional cash transfers, and/or with additional external assistance, that displacement could be minimized or even reversed). Poverty headcounts are calculated directly from household consumption, so a decrease in household consumption has an immediate additive effect on poverty figures. In contrast to their immediate costs, some investments, including those in education and health, take a considerable amount of time before pay-offs appear. The long term benefit of these investments begins to materialize after 2020, and the rate of poverty reduction outperforms the Base Case.

The countries with the greatest improvements in incidence of poverty (see **Table 2**) as a result of the IISE scenario are Nigeria, Dem. Rep. of Congo, Uganda, Madagascar, and Ethiopia. These countries come out on top for two possible reasons: firstly, they have a large number of poor in the Base Case, and therefore have great potential for reduction from 2015 to 2030; and secondly, the security-improving interventions have a dramatic effect in countries that have ongoing conflicts, like Nigeria and Dem. Rep. of Congo.

Guinea had the largest reduction in poverty rate compared to the Base Case 2030 forecasts, followed by Niger, Liberia, Madagascar, and Somalia. The poverty rate in Guinea dropped from 48.5 per cent to 25

Figure 9: Poverty Rate and Headcount, Alternative Scenarios in 2030.
Figure 9 shows the change in percent and number of poor between 2010 and 2030. The 'X' marks the Base Case poverty value in 2010. Blue marks represent the Base Case, orange marks show the Growth and Shared Prosperity scenario, and gray marks show the Improved Institutions and Security scenario.
Source: IFs v7.21 Beta.

per cent in the IISE scenario. Likewise, under the IISE scenario, the poverty rate for 2030 drops from 33.2 per cent to 18.7 per cent in Niger, from 22 per cent to six per cent in Liberia, from 86.6 per cent to 73.7 per cent in Madagascar, and from 60 per cent to 50 per cent in Somalia. While none of these poverty rates come near the three per cent goal of the international community, the number of people lifted out of poverty remains extremely significant. The Base Case forecast anticipates an overall decline in the poverty headcount in fragile states of 37 million from 2015 to 2030 (as the rate declines by 10.6 percentage points). However, as a result of the IISE scenario, the poverty headcount would be reduced by 109 million, or 14.5 percentage points.

The IISE scenario also helps identify the effects of poverty reduction in the overall well-being of people in fragile states. The forward linkages included in this scenario have a positive effect on health and social welfare, not just incomes. Some other notable improvements from this scenario include a lower total fertility rate, increased average years of education, and fewer deaths from communicable diseases. Life expectancy changes dramatically for a few fragile states that are disproportionately affected by communicable disease burdens (see **Figure 8**). In short, while this scenario still does not eliminate poverty by 2030, it lays a much stronger foundation for doing so in the years beyond 2030.

Concluding Remarks

Summary of Poverty Reduction Possibilities in Fragile States

Based on current trends and past performance (the Base Case), the poverty rate for fragile states is expected to fall from 33.5 per cent in 2015 to 22.8 per cent in 2030. The absolute number of people living under $1.90 a day is expected to decline from 485 million in 2015, to 448 million in 2030. When combined with overall progress in poverty reduction in non-fragile developing countries, the percentage of the developing world's poor living in fragile states is projected to increase from 50 per cent in 2015 to 67 per cent in 2030.

In the most optimistic, but unfortunately not very realistic Best Case, this paper's analysis explored the results of fragile countries experiencing very high rates of growth with shared prosperity (GSP scenario). This scenario was developed to consider what might be something close to a true limit on poverty reduction potential. The result for fragile states in this highly optimistic scenario, framed by macro-economic assumptions rather than policy level assumptions, is a poverty rate of 13 per cent and a poverty headcount of 257 million in 2030.

Under an ambitious but more realistic case with improved institutions, peace, and poverty reduction policies in fragile states (under the IISE scenario), the poverty rate is reduced to 19.1 per cent in 2030, and the poverty headcount falls to 376 million by 2030. This paper believes this scenario to be at least potentially achievable.

Figure 9 shows the variation for a number of countries within the fragile state set, both in rates and numerical levels of poverty and in their prospects for responsiveness to our alternative scenarios. Focusing only on the ten countries with the greatest number of poor, one can see that the potential for accelerated reduction in our analysis ranges from cases (such as Nigeria and Pakistan) in which the acceleration could cut numbers by 2030 by more than half relative to the Base Case, to other cases (such as Bangladesh and Ethiopia) where progress is already likely to be sufficiently rapid. Although other cases, specifically Madagascar and Malawi, have problems of such intensity that any scenarios have only a marginal impact.

All countries, fragile or not, can benefit from improved institutions. These results demonstrate that even within the subset of fragile countries, the impact of improved institutions has varying effects. Many countries (including Burundi, Chad, DRC, Myanmar, Sierra Leone, West Bank and Gaza and Zimbabwe) could attain more than half

of their maximum expected poverty reduction through effective institutional reforms. For other countries, less than half of their poverty reduction could be achieved through institutional reform because the effects of already anticipated growth are strong – Liberia is a prime example. Still other countries (Comoros, Haiti, Madagascar, Somalia, and Yemen) have such high initial poverty gaps – with populations living well below the extreme poverty threshold – and/or other desperate conditions, that they are not expected to make significant progress under any of the scenarios considered here.

Remarks on the 3% Poverty Target

This paper's most optimistic forecast (using $1.90 as the poverty line) still yields a poverty rate of 13 per cent in 2030 for fragile states. This is significantly short of the global goal of three per cent set by the World Bank in 2013. This does not necessarily mean that a poverty rate at or below three per cent for some or all fragile states is not achievable. In fact, in our GSP scenario, Afghanistan and Myanmar reach that level. Yet as the difference between the projected poverty rate for the fragile states as a whole and the 3 per cent target suggests, most of the countries in the fragile country grouping, or at least enclaves of the poor within them, are at great risk of being 'left behind' with respect to the eradication target.

This paper's broader analysis of the prospects for fragile states also yields important insights on the realism of the global aspiration to eradicate poverty. So long as poverty reduction in fragile states lags behind other countries, it is unlikely that the world will reach the three per cent universal goal by 2030.

Areas of Additional Research

This analysis has focused on the potential for improvement with respect to poverty reduction in fragile states. It has not given attention to the downside risks. Those are many, of course, including the possibility that other states could fall into fragility for a variety of reasons. Nor does this analysis include any attention to future changes in climate, and the numerous effects that could have. The effects of climate change add an additional obstacle to poverty reduction in fragile states, as reflected in the post-2015 agenda. This results from fragile states being particularly vulnerable to disasters (Keefer et al., 2011), and many of the countries that most likely to be affected by climate change currently being classed as fragile (Shepherd et al., 2013). Resultantly, this paper would be enhanced by an analysis of the degree to which countries, especially fragile states, may be affected in coming years by climate change, and the resultant effects on poverty reduction.[29]

IFs is a powerful tool for comparing country trends over time, allowing the user to explore possible futures based on user-defined assumptions. Due to the discontinuities associated with fragility, conflict, insecurity and instability, and extreme poverty, and the 'smoothed' indexes that have been assumed here representing institutions and security, the results presented in this paper should be taken as forecasts for broad brush trends in fragile situations. However, IFs is also well-suited for scenario thinking and contingency planning – the sort of discontinuities described above (conflict, regime change, unsustainable levels of poverty and social unrest) could be easily modeled with discrete state changes and scenario considerations within IFs for certain countries in the near or distant future. For example, a deeper examination of some cases utilized throughout this paper could use IFs to examine specific scenarios and outcomes.[30]

Final Words

The global goal is currently framed as eradication of extreme poverty everywhere, suggesting that we will 'pick all the fruit' of poverty reduction – low-hanging and high-hanging. The analysis forwarded in this paper shows how both growth *and* shared prosperity contribute to poverty reduction. While further underlining the role of

institutional reform with security achievement and appropriate policies in delivering the effects of growth and shared prosperity.

To close on an optimistic note, readers should be reminded that our analysis is based on a model built on past performance. The next round of poverty reduction post-2015 could outperform our scenarios with innovative approaches, new technologies, more efficient aid, more inclusive growth, and an increased focus on the countries identified above as being most likely to lag. To be effective, such bold new steps will need to be undertaken early if the compounded effects of development are to bloom before 2030. If the global community stays the current course, or waits too long to handle the tough cases in fragile states, we will not only miss our goal, but we will once again find these countries lagging in development in the next round of global goal setting.

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Competing Interests

Gary Milante is a member of the Editorial Board for Stability, on a voluntary basis. No other authors have any competing interests.

Notes

[1] Kim (2013), UN (2013), The White House (2013), and USAID (2014).

[2] The World Bank (2013) defines poverty eradication as being met when global poverty rates are less than 3%.

[3] Examples include: Global Agenda Council on Benchmarking Progress (2012), Karver, Kenny and Sumner (2012), Sumner (2010), Sumner (2012a), Sumner (2012b).

[4] Poverty rates on the other hand have been lower typically in non-fragile states; see Edward and Sumner (2012).

[5] IEG Annual Report (2013); for summary findings in fragile states see Hellman (2013).

[6] Countries are included on the Organization on Cooperation and Economic Development's 2015 fragile states list if they meet any one of the following criteria: 1) the country is included on the World Bank's Fragile and Conflict-affected Situations list, or 2) the country has a score of 90 or above on the Fund for Peace's Fragile States Index. For inclusion on the World Bank's list the country must currently have, or have had within the last 3 years, 1) a UN peace-keeping operation within its borders, 2) currently have a UN political mission within its border or have had one within the last 3 years, and/or 3) the country has a Country Policy and Institutional Assessment (CPIA) score below 3.2 (averaged with CPIA scores from regional development banks, where available). Three countries on the OECD list (Kiribati, Marshall Islands, and Tuvalu) were not included in this analysis because the countries are excluded from the International Futures model.

[7] Dykstra, Kenny, and Sanedfur (2014) show that rebased poverty lines cannot be used across time to measure poverty-applying the $1.25 poverty level to the rebased $2011 values halves the global poverty overnight. The inflation adjusted poverty line (for the US Dollar from 2005 to 2011) would yield a new poverty line of $1.45, however inflation across countries is highly variant. Chandy and Kharas (2014) estimate global poverty in light of the revised PPP estimates from the ICP using $1.78 in $2011. They also recognized some particular challenges posed by recent surveys in countries such as Nigeria and India, the latter during a drought period. In popular press, Peter Lanjouw (2014), heading the World Bank's poverty and inequality research unit, said the new value could be

as much as $1.75 per day. While Jollife and Prydz (2015) identified $1.82 as the new $1.25 equivalent.

[8] The $1.25 per day poverty rate was originally established in Ravallion (2003). We have also considered two other possible poverty lines – $1.50 and $2.00 (using a $2011 base)-as a sensitivity test for determining the total headcount and poverty rates under these other poverty lines (available from the authors upon request).

[9] World Bank estimates for 2012 at http://iresearch.worldbank.org/PovcalNet/index.htm?1; 2015 values reported in "World Bank: 'extreme poverty' to fall below 10% of world population for first time," *The Guardian* October 4, 2015, at http://www.theguardian.com/society/2015/oct/05/world-bank-extreme-poverty-to-fall-below-10-of-world-population-for-first-time.

[10] Any forecast will require initial assumptions about the relationship between national accounts and survey data (Dhongde and Minoiu, 2013). Some care is needed to resolve discrepancies between the means provided by the two methods (a simple ratio can suffice), and to whether or not those discrepancies will remain constant or change. A common approach is to carry forward the historical ratios *of growth* in the two sets of means. For instance, Ravallion (2012: 7, footnote 16) notes that 90% of growth in private consumption per capita passes from national accounts to survey means (though India is an outlier). See also Edward and Sumner (2013: 7) for a discussion of this methodology. Chandy, Ledlie, and Penciakova (2013: 16–17) calculate a general discount coefficient of 0.81 for consumption (0.54 for India). There is an obvious difficulty, however, in assuming that the discrepancy between underlying consumption by households and the value built-into national accounts will continue to grow in the long run, and it is a generally pessimistic assumption with respect to future poverty reduction. The current and future distribution can be represented by deciles of population or summarized in standard analytical forms such as the log-normal density function tied to the Gini coefficient, which is the approach adopted in throughout this analysis.

[11] On the relationship between labor, poverty and income, see Azevedo et. al (2013), on geography, access and poverty, see Kanbur and Sumner (2011), on debt and poverty, see Kemal (2001) and Leo (2009) and, on development more generally see Todaro and Smith (2009).

[12] The IMF has continued to lower its forecasts for global growth, including its 1 percent annual reduction for low-income countries in April 2016, another reason our poverty values and forecasts are less optimistic than some others.

[13] IFs Base Case forecasts of population, another key variable in poverty analysis, tend to be quite close to the UNDP's medium variant. The forecast of the Gini coefficient is based on the forecasted differences in income generation between two subsections of the population – skilled and unskilled households. The crude nature of the Gini forecasting method is a recognized shortcoming of the model, and one that can be addressed by specifying Gini forecasts exogenously.

[14] Before the resetting of the poverty line at $1.90 per day, those living on less than $1.25 per day were referred to as "extreme poor". The use of the term poor in the literature is typically based on level of analysis (using international comparison lines or national poverty lines). For the purposes of this paper, "poor" refers to those living on less than $1.90 per day.

[15] Progress is possible, however. It is estimated that 43 out of the 50 fragile states had met at least one goal, and 45 countries are expected to meet at least one goal by 2015, see the World Bank Group (2014), "Progress towards MDGs," in: Global Monitoring Report 2014/2015 as of 20 October 2014, available at

http://worldbank.org/prospects/gmr14; see also, OECD (2015).

[16] Milante (2015).

[17] IMF (2013).

[18] World Development Indicators (2012).

[19] Our forecasts for global poverty fall squarely between optimistic and pessimistic scenarios for Chandy et al (2013/4), Edward & Sumner (2013a) and Ravallion (2013), and behaves most similarly to estimates from the World Bank (2014). See Burt et al. (2014) for extended comparison.

[20] Kim (2013).

[21] United Nations (2013).

[22] These values have not been updated to reflect the October 2014 release of WEO GDP forecasts.

[23] Milanovic (2012) and Todaro and Smith (2009).

[24] This value is, of course, still above the 2030 values of the World Bank's low scenario and that of Chandy for their somewhat different sets of fragile states with associated lower starting points in 2010. Among the reasons are the dynamics around household consumption share of the IFs economic and financial forecasts, as discussed earlier.

[25] See note 2.

[26] For an extensive discussion on the effects of conflict on development, see pp. 5–6 of the 2011 WDR, including this summary quote on page 6.

[27] Available at: http://www.systemicpeace.org/inscrdata.html.

[28] The relative weights of the different interventions are based on preliminary scenario analysis; with this in mind, the configuration of the IIS scenario could be disaggregated and its individual effects studied further in subsequent work.

[29] Chronic poverty, as opposed to more episodic incidence, is another issue that has increasing salience in poverty reduction research and its incorporation into this analysis would be beneficial. However, the concept of chronic poverty is not easily modeled-it is not yet conceptually well-defined, and it is often based on household-level data rather than country-level data.

[30] See Cantore (2011) and see the African Futures Project for some insightful country level scenarios, available at: https://www.issafrica.org/futures/.

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