The Impact of IMF Structural Adjustment Programs on Income Distribution

David Dow[*]

Department of Political Science

University of New Mexico

Advisor: Wendy Hansen

4/27/2011

Abstract

This study examines the effect of IMF structural adjustment programs on income inequality in 58 countries from 1986 to 2008. It uses a propensity score method to control for the nonrandom self-selection of countries into Fund programs, before estimating the effect of IMF programs on income distribution using a linear regression model. Interestingly, the analysis leads to the unexpected result that participation in IMF structural adjustment programs contributed to a decrease in Gini coefficients and an improvement in overall income distribution. Furthermore, no significant different effect is found between the IMF's Enhanced Structural Adjustment Facility and its Poverty Reduction and Growth Facility.

Introduction

This study seeks to examine the impact of IMF structural adjustment programs on income inequality using data on Gini coefficients from Frederick Solt's (2009) Standardized World Income Inequality Database (SWIID). Solt's SWIID seeks to maximize the coverage and comparability of observations on income inequality in the United Nations University's World Income Inequality Database by using a custom missing-data algorithm. Solt's dataset provides the larger data source of comparable cross-national Gini coefficient observations needed to make statistical inferences about the impact of IMF programs on income distribution (Solt, pp. 231-32). This study employs a two stage statistical process to estimate the effects of IMF programs on income inequality. The first stage aims to control for nonrandom self-selection by estimating a country's predicted probability of participating in an IMF program in any given year. The second stage seeks to compare the impact on income inequality of both the probability of participating in a program and actual participation in IMF programs. Lastly, it examines the separate effects on income distribution of both the IMF's Enhanced Structural Adjustment Facility (ESAF) and its Poverty Reduction and Growth Facility (PRGF).

The International Monetary Fund has provided financial assistance to low-income member countries through concessional loan agreements since the 1970s. While these loans were previously dispersed through the IMF's Trust Fund, its structural adjustment programs went into effect in 1986 with the implementation of the Structural Adjustment Facility (SAF). In the next year the program's name was changed to the Enhanced Structural Adjustment Facility (ESAF) and by 1996, the ESAF had become the primary facility for the IMF to lend to poor countries (IMF Factsheets, 2004). The programs were primarily designed to help low-income countries respond to balance of payment difficulties that they encountered. ESAF operated in this capacity until 1999 when it was replaced by the PRGF. The PRGF was established by the IMF with the explicit intent of making "the objectives of poverty reduction and growth more central to lending operations in its poorest member countries" (IMF Factsheets, 2009). While decreasing poverty rates in a nation does not have an unambiguous affect on its income distribution, a program that is successful in lowering poverty rates is likely to have a positive effect on decreasing income inequality. Therefore, it is plausible that the PRGF's increased policy focus on poverty reduction has led to a better impact on income inequality than the ESAF had previously. However, most of the theory and evidence on the subject (discussed in the next section) suggests that IMF structural programs have had negative distributional consequences overall. This study hypothesizes that while IMF programs will have negative distributional impacts on recipient countries overall, their effects will increasingly improve as countries enter into PRGF programs that focus more directly on decreasing poverty.

Literature Review

I. The Selection Problem

While early work attempted to measure IMF program effects through case studies (Johnson and Salop, 1980), quantitative methods have increasingly been used to estimate these effects more recently. A key to quantitatively assessing the impact of IMF adjustment programs on outcomes in recipient countries is controlling for the nonrandom selection process of countries into programs. This selection problem arises because the entrance of countries into IMF programs is generally based on their economic problems and the need for restructuring of the economy. Therefore, countries that choose to enter into programs may be systematically different from those eligible countries that choose not to enter into programs. However, this process of self-selection is only part of the larger story. The IMF also sets its own criteria for allowing countries into programs. It also engages in negotiations with countries to set the conditions that are part of the lending arrangement. Therefore, it may also have a systematic effect on selection into structural adjustment programs. While this study attempts to control for the country's self-selection by including the economic and political conditions that may influence its decision to enter, there is a possibility that there remains unobserved effects related to the IMF's decision to approve loans. This possibility is examined in more depth later in this paper.

The process of controlling for selection bias of participation in IMF lending arrangements has progressively advanced towards more sophisticated quantitative methods. An early example of a quantitative analysis of IMF program effects on labor

share of income is the work of Manuel Pastor (1987). Various authors have subsequently expanded methodologically on Pastor's work.

Three distinct groups of statistical approaches that attempt to account for IMF participation effects have developed. Atoyan and Conway (2006) provide a summary of the three statistical methods. The first to be employed in the area was the model used by Conway (1994) and Garuda (2000). Conway examined the effects of IMF program participation on macroeconomic variables such as public investment and growth, by first calculating propensity scores for each country's predicted probability of entering an IMF program in a given year. Garuda followed this method closely in his study concerning IMF program effects on income distribution. Both Conway and Garuda then use these propensity scores as controls for the initial conditions in a country before the IMF program is put into effect. This method is employed here in this study as well. The second method of estimating participation effects is used by Przeworski and Vreeland (2000) and Vreeland (2001, 2003ab). This method involves the separate estimation of independent variables for both the participating and non-participating samples. Two separate regressions are estimated and the difference between the two represents the IMF participation effects on other variables. The third method is one involving the matching of observations by their propensity scores and finding the average outcome difference between all matched observations. This average difference represents the effect of participation. This approach is used by Hardoy (2003) and Hutchison (2004).

II. Impact of IMF Programs on Poverty

The question of the impact of IMF structural adjustment programs on the poorest members of recipient nations has been approached from several directions. Some studies

have focused directly on the impact of IMF programs on poverty (Easterly, 2001; Hajro and Joyce, 2009), while others have been interested in the effects on income distribution generally (Pastor, 1987; Garuda, 2000; Vreeland, 2001, 2003a).

First, on the poverty front, Easterly's (2001) study examined the effects of both IMF and World Bank adjustment lending from 1980 to 1998 and considered both concessional and nonconcessional programs. Easterly used a number of dummy variables, including geographic location and national relationships to influential donors, as well as controlling for loan frequency and initial income in an attempt to control for selection bias. Then, using a database on poverty created by Ravallion and Chen (1997), Easterly found that adjustment lending led to a decrease in the impact of economic growth on poverty levels. Therefore, under adjustment programs a country's poor benefits less from periods of sustained growth but also suffers less from periods of economic contraction.

More recently, Hajro and Joyce (2009) tested the impact of IMF lending on poverty in 82 countries from 1985 to 2000. They test the impact of all types of lending programs (both concessionary and nonconcessionary) during this period on the measures of infant mortality rate and the Human Development Index (HDI). The authors use a fixed-effects estimator that attempts to control for unobservable time and country-specific characteristics that differentiate program from non-program countries (Hajro & Joyce, pp. 301). The authors ultimately find that the IMF programs have no significant direct impact on the poor. Instead they find that "growth and good institutions" have significant impacts on lowering infant mortality and increasing a nation's HDI score. They also find that the IMF's concessionary programs "increase the impact of growth on lowering infant

mortality, while the nonconcessionary programs lower the impact of growth on the HDI"
(Hajro & Joyce, pp. 291).

III. Impact of IMF Programs on Income Distribution

Pastor's (1987) work marked the first attempt to study the impact of IMF program
participation on income distribution using large-n data in Latin America from 1965 to
1981. He examined macroeconomic indicators both in the year before the program was
implemented and the year following its completion. He found that, on average, in
countries that participated in IMF programs, labor's share of income decreased from their
pre-program levels. Furthermore, Pastor also included a control group of Latin American
countries that did not participate in an IMF program during the time. While the study
represented a methodological change from previous studies, it suffered from its inability
to estimate the magnitude of the change in income distribution (Garuda, 2000, pp. 1033).
Also, according to Vreeland, a problem arose from Pastor's lack of a method to account
for other variables that caused changes in income distribution during the time the
program was in place (Vreeland, 2001, pp. 123). In other words, the factors that
impacted income distribution before the program was put in place would have to remain
constant throughout the program's existence for Pastor's method to be unbiased.

Garuda attempted to take this problem into account while examining the impact of
IMF lending programs on income distribution in the 2 to 5 year period following the
implementation of a program. Garuda used a logistic regression model to estimate the
propensity (predicted probability) of a country to enter an IMF program in a given year in
an attempt to control for nonrandom selection bias into IMF programs. He regressed a
number of economic variables against a binary variable of IMF program initiation to

estimate the probability of a country initiating a program in that given year. Once propensity scores were generated, Garuda then compared the changes in mean Gini coefficients and income shares of the lowest quintile of both participating and nonparticipating countries within bands of propensity scores and over time. Through this method he was able to estimate the impact of IMF programs on the distribution of income in similarly economically positioned countries. Garuda was forced to use this comparison of changes in mean due to a lack of the data needed for a regression analysis (Garuda, pp. 1037). Garuda finds that income distribution becomes less equal for participating countries relative to nonparticipating countries in the highest propensity group while it becomes significantly more equal at the lower levels of propensity scores. The middle propensity group also shows IMF programs to have an equalizing affect on income distribution but with smaller differences between program and nonprogram countries (Garuda, pp. 1042).

Vreeland (2001, 2003a) examined how IMF programs affect the labor share of income from the manufacturing sector for 110 countries from 1961 to 1993. This larger dataset allowed Vreeland to use more sophisticated statistical analysis, though its focus on manufacturing makes it a narrower picture of a nation's income distribution. Vreeland modeled the process of selection into programs as a dynamic one in which countries can enter a program and then choose whether or not to remain in it. He then calculates "hazard rates" for both selection decisions and includes them as instruments in the regression model of labor share of income in order to control for unobserved variables that might affect a countries entrance into programs and bias the results of the final regression (Vreeland, 2001, pp. 126). The hazard rates are estimates of the selection

error term (Vreeland, 2001, pp. 136). Vreeland ran separate regressions on labor share of income for both those countries participating and not participating in IMF programs. He also found that the hazard rates were not significant (suggesting that the selection process was not significantly biased by unobserved variables). His next step was to multiply the average observed values of the independent variables (capital stock/worker, level of GDP per capita, price level of consumption, and regime type) by the coefficients (separately for both countries participating and not participating) from the regressions. The difference between the program and nonprogram averages of these predicted labor shares of income is the estimated effect of IMF program participation (Vreeland, 2001, p.130). Vreeland found that participation in an IMF program resulted in a predicted decrease in labor share of income from manufacturing of 3.3% to 3.5% (pp. 131).

This study seeks to build on the existing literature of the impact of IMF programs on income distribution in a few specific ways. First, it expands on Garuda's work by using Solt's SWIID. The SWIID provides 846 observations on Gini coefficients for the sample of country-years used in this study. This larger dataset allows for the use of regression analysis across ranges of country's predicted probabilities of entering IMF programs. Furthermore, this dataset also allows for the examination of a broader measure of income distribution than Vreeland's (2001, 2003a) study allowed. These two changes are valuable in helping to better understand the relationship between IMF structural adjustment and income distribution in a more general sense. Lastly, this study also compares the performance of distinct IMF programs (ESAF and PRGF) that are supposed to be qualitatively different in the way they are implemented and what they target.

To the author's knowledge, evaluation of the PRGF, specifically, has been done on an exclusively case study basis. This is not surprising considering the relatively recent introduction of the program in 1999. However, qualitative reviews have indeed taken place in the previous decade. Robb (2003) examined the early impact of the PRGF on the policymaking and poverty outcomes of African nations. Robb claims the PRGF has led to more explicit linkages between policies and poverty outcomes, as well as incorporating analysis concerning the tradeoffs between macroeconomic stability and pro-poor policies. Goldsbrough (2004) has also conducted research into the short term impact of the PRGF on poverty outcomes. While finding that some factors, such as access to medical drugs and school enrollment, had improved since the implementation of a program, the outcome measures of poverty, such as maternal and infant mortality, have remained stagnant. Further work will be needed to assess whether the PRGF has led to significantly better outcomes for the poorest members of recipient nations.

Theory

I. Determinants of IMF Program Participation

While the theoretical focus concerning IMF programs is often on the effects of the program, focus on the determinants of participation has become prevalent as the need to statistically control for potential selection effects has arose. The initial answer concerning the determinants of participation comes from the demand side of the equation. Nations enter into IMF programs when they need the funding derived from the lending agreement. Following this assumption, one would expect macroeconomic variables such as economic growth, short-term debt, and investment to be the most important explanatory variables in explaining IMF program participation. A country in dire

economic conditions as defined by an increasing amount of debt, little investment, and with little or no economic growth would seemingly be more likely to request access to IMF loans to attempt to change their economic conditions. Conversely, a country in good economic standing might be less likely to enter conditional IMF agreements because it has less need for extra funding while simultaneously does not value extra funding above the costs of the interest rates it must pay and the policy concessions it must make to access the IMF funds. However, the determinants of participation appear to be more complex than they appear on the surface, as other political and economic factors are often taken into account by those choosing to seek a loan or not.

A second factor in understanding the determinants of IMF program participation comes from the supply side of the lending arrangements. The IMF's decisions to lend to particular countries are also not likely to be random and therefore may systematically impact the economic effects of IMF programs. The IMF does not give out loans unconditionally. It requires loan recipients to follow macroeconomic structural adjustments (created by both IMF and domestic country officials) in order to receive continued funding. By setting these conditions, the IMF has a certain degree of control over who participates in programs. A potential bias exists if the IMF chooses to lend to countries that are more likely to have successful adjustment programs while rejecting the demands for loans of countries that are unlikely to overcome their more severe problems. This potential bias may be reduced since the eligible pool of countries are generally poor and lack the creditworthiness to secure lending on market terms, though the possibility remains for the IMF to discriminate within the pool to a certain extent. Also, while this bias may be partially accounted for in measuring the economic conditions amongst both

eligible participating and non-participating countries, the IMF's program conditionality and decision-making may have other influences as well. For instance, the nature of the structural adjustments (privatization, liberalization, etc…) may deter some countries with strong ideological commitments to more closed and controlled economies (such as Cuba, North Korea, or China) from even pursuing IMF lending agreements. However, records of failed negotiations between eligible low-income countries seeking a loan and the IMF are generally not available. This perhaps stems from the notion that a rejection from the IMF is a signal about the lack of stability and creditworthiness of a nation that might further decrease foreign and domestic investor confidence. Without this information though it is difficult to understand the potential bias that the IMF's selection process might have on the program's outcomes.

Within the literature, the independent variables others have tested as determinants of IMF program initiation are mainly the economic variables of the recipient countries. A main starting criteria for the IMF in determining that a nation is in "need" of an IMF agreement is the nation's foreign exchange position (Vreeland, 2003b, pp. 323). Foreign exchange is needed in order for a nation to import the foreign goods that it requires. A decreasing or low foreign exchange level may signify a need for an IMF agreement. In this study, a similar variable measuring the ratio of total reserves to imports of goods and services is used. A country with a low ratio may be more likely to need IMF assistance in order to afford its imports. Therefore, a negative relationship is expected. Since one of the main missions of the IMF in regards to low-income countries is to help them with their poor balance of payment records, it seems unlikely (though not impossible) that they

would systematically choose to lend to countries in better positions while rejecting those with more pressing needs.

A second variable, connected to reserves, is that of short-term international debt. This variable includes all private, public, and publicly guaranteed debt. A nation with a low level of foreign exchange is not able to import higher levels of goods and services without increasing its debt. Theoretically, the debt variable seems to reinforce the foreign exchange variable for countries in a position of need. Higher amounts of debt are likely to lead to a greater need for IMF programs, particularly if the debt leads to financial crises and default. The IMF makes it clear themselves that one of the goals of the Fund is to promote programs and policies in participating nations that help them to improve their country's current account balance and adjust the macroeconomic conditions to lessen long-term debt. One would then expect countries with negative account balances and high levels of debt to be more likely to seek IMF agreements for the explicit purpose of helping solve this problem. However, some countries do not follow this pattern. These other countries can find themselves in a position of debt without experiencing foreign exchange problems. Uruguay, for example, found itself in a position of increasing deficits largely due to increasing government expenditures during the late 1980s. This increasing deficit level occurred even though Uruguay held double the foreign reserves of the average Latin American country (Vreeland, 2003b).

A third theoretical variable used in this study is the ratio of debt service to a country's gross national income (GNI). The *World Development Indicators* (WDI) measure the debt service ratio as "the sum of principal repayments and interest actually paid in foreign currency, goods, or services on long-term debt, interest paid on short-term

debt, and repayments (repurchases and charges) to the IMF" (World Bank, 2010). Given this definition and measure, debt service should theoretically have a positive relationship with the initiation of IMF programs. Countries paying back IMF loans are likely to have a higher debt service ratio and also might be more likely to enter IMF programs in the future. A pattern of dependency on future loans may develop. If this is true then a positive relationship should exist.

The economic growth of a country is another variable used for predicting IMF program participation. Conceivably, a country that is experiencing high levels of growth is less likely to request an IMF agreement than a nation that is experiencing negative or flat levels of growth. A country with negative growth is more likely to be experiencing other significant economic problems as well, making it more likely to fall into the category of a nation in need of a loan. A country in need may view the lending agreement as a possible remedy for its overall economic malaise. Similarly a stagnant economy would allow policymakers more justification for changing course and moving towards an IMF agreement. A lagged growth variable is also included to account for the possible lag in the response of policymakers to economic conditions. However, this negative relationship between growth and IMF participation could be offset by the selection process of the IMF. The IMF may be more likely to lend to countries that have experienced growth in preceding years because it is more confident in that nation's ability to repay the loan while implementing meaningful adjustments. Countries with higher levels of growth may also be more open to the adjustments in the first place and only in need of smaller adjustments, rather than the radical ones that may be need elsewhere in low growth areas.

A nation's level of investment as a share of GDP per capita may also be important in predicting its propensity to participate in IMF programs. A country with a high level of investment should be less likely to enter into an agreement because it has a lower level of need for a loan. Conversely, a country with a low level of investment will have a higher need for funding. The net inflow of foreign direct investment (FDI) is also included as a variable predicting IMF program participation. Theoretically, a low level of FDI may also again signify a need for an IMF loan in order to spur growth in a nation. However, FDI may also be low when a nation has high levels of domestic investment and does not need any further IMF loan. A third possibility does exist as well. A country may seek an IMF loan regardless of its economic "need" if it hopes that the IMF's approval of a lending agreement will lead to increased investor confidence in the nation's economy in general. Overall, the relationship between investment and participation in IMF programs is a rather complex and nuanced one.

The presence of a legislative election in the year preceding the initiation of an IMF program has theoretical significance for two reasons. First, this election variable may reflect the influence of new legislative leadership on the initiation of an IMF agreement after the election. Alternatively, it may be merely reflecting the more open discussion of issues during the election and subsequent readiness to agree to IMF structural changes the next year. Secondly, the fact that the election took place in the previous year means that politicians are now further removed from the next election. If IMF programs are unpopular among the voting population then it is important for the nation's politicians to be further removed from the next election if they are going to attempt to implement such a program. Vreeland (2003b) has argued that a country such

as Uruguay initiated an IMF agreement in order to help push through economic policy that was politically unpopular at the time. Other authors have made the general assertion elsewhere as well that IMF agreements allow politicians to act as they wish while being somewhat protected politically by the perceived imposition of the IMF (Putnam, 1988; Gourevitch, 1986). This incentive for politicians to agree to IMF programs may also help explain cases in which countries with relatively better economic conditions (therefore a relatively lower level of need) choose to pursue an arrangement anyway. For these reasons there may be increased initiation of IMF programs in the year following a legislative election.

Lastly, a variable is included measuring the total number of IMF structural adjustment programs in place amongst all countries in the sample during each year. Vreeland (2001) used a similar variable and noted that it may be a proxy for poor world conditions causing many countries to enter IMF programs. To test this possibility, Vreeland includes a variable for world economic growth as another potential proxy for world conditions. However, the variable is not significant (Vreeland, 2001, p. 138-139). While the possibility still exists that the number of countries is a proxy for world conditions at the time, the variable may also represent the IMF's willingness in a given year to accept countries to enter into programs. It may reflect the time-specific characteristics of the IMF in regards to its own budget constraints and lending policies. While it is difficult to control for the IMF's decision-making process in approving loans, this variable may account for part of the IMF's selection process.

II. Effects of Structural Adjustment Policies on Income Inequality

While previous empirical results have suggested that IMF programs have a negative effect on income distribution, the theoretical relationship is one of great complexity and ambiguity. As several researchers (Pastor, 1987; Vreeland, 2001) and IMF officials have noted, the effect of IMF programs on income distribution can hinge on the structure and type of reforms and recipient country's economy, as well as the effectiveness in implementing the reforms. However, quantitative studies to date have not been able to take these effects into account in assessing the outcomes of IMF programs.

The IMF's concessionary structural adjustment programs have been centered on particular conditions. Common policies implemented under structural adjustment programs have been reduction of public expenditure, currency devaluations, privatization, changes in interest rates, and capital market and trade liberalization.

First, the reduction of public expenditures has been a key part of IMF structural adjustment programs. Programs have sought to correct the budget deficit and account balance problems that have been problematic for poor countries. The IMF's proposal of contractionary policies in regard to government expenditures is a cornerstone of their strategy for reducing budget deficits and other payment problems. The effect of decreases in public spending on income distribution may be one of the more theoretically straightforward relationships observed. As pro-poor spending decreases the opportunities and overall income of the poorest sectors of society should also fall, holding all else constant. While tax rates may stay the same, the government's revenues are shifted from social spending to targeting the budget deficit. Therefore, even if the wealthier sectors of

society do not benefit from decreased tax rates, the poor no longer have access to income-supplementing programs.

Currency devaluations have been a key policy of IMF programs in many countries and several authors have noted their potential impact on income distribution (Pastor, 1987; Garuda, 2000; Vreeland, 2001). Devaluations often seek to decrease the price ratio of nontradable to tradable goods. Garuda argues that the impact of currency devaluation is dependent on the identity of the poor in that country:

> If the poor are rural farmers producing goods for export, devaluation will increase the value of agricultural goods in domestic currency… But, if the poor are urban consumers facing higher food prices, or rural farmers producing foodstuffs for domestic consumption, the distribution of income is likely to worsen (1033).

He elaborates on this point by stating that, in general, income distribution is improved by returns to labor and peasant-owned capital and worsened when returns increase for capital and capitalist-owned land and natural resources. Since both labor and capital intensive industries can exist in both the nontradable and tradable sectors, the overall impact of devaluations on income distribution is ambiguous from a theoretical standpoint.

The liberalization of trade has also been a prominent issue of globalization. IMF structural adjustment programs have incorporated trade liberalization in many nations. Its impact on income distribution is affected by the domestic sectors that are faced with increased competition from foreign importers. Increased foreign substitutes can lower the price of goods and services for consumers. However, without the protection of tariffs, fledgling domestic industries can collapse under the pressure of foreign competition. If this occurs then domestic workers may suffer disproportionately through job loss while those unaffected by the liberalization will benefit from lower prices for goods. The impact of trade liberalization on income distribution is dependent on the

character of the nation's economy, the composition of its poor, and the political choices made in the pace and nature with which liberalization policies are carried out. Winters et al. (2004) provide an overview of the empirical evidence of the impact of trade liberalization on poverty. While most studies suggest that trade liberalization helps reduce poverty in the long run, Winters et al. also acknowledge that these policies can be harmful to the poor in the short term (2004, pp. 106-107).

The policy of privatizing a country's previously nationalized companies is an example of a policy that theoretically has somewhat ambiguous distributional effects. Privatization is theorized to lead to greater efficiency in the company's production process and potentially lower its output prices by shedding inefficient labor or capital. The decrease in prices (if they do indeed take place) is coupled with a loss of jobs in the short-term. In developing countries, where a social safety net is often not in place, the loss of these jobs can have negative distributional effects by lowering the income of the now unemployed workers and increasing the returns to the new private owners of the company. On the other hand, a more efficient company may be able to lower prices so that consumer surplus is increased in the aggregate market. Another facet of the privatization process has unfortunately been corruption. Nationalized companies have often been sold at prices well below market value (or with no legitimate bidding process at all) as a way of rewarding political cronies. This practice also involves another important factor in assessing the impact of IMF structural adjustment programs on income distribution; that of politics.

As described for several of the structural adjustment policies above, the politics of a nation play a key role in determining the distributional outcomes of its IMF

participation. Many studies have noted that political power can play an integral role in deciding how the costs and benefits of IMF structural adjustment programs are distributed amongst the population (Johnson and Salop, 1980; Diaz-Alejandro, 1981; Sisson, 1986; Pastor, 1987; Garuda, 2000; Vreeland 2001, 2003). Since many of the effects of IMF programs have an ambiguous effect on income distribution and are also further influenced by political processes varying across nations, the empirical testing of their impact is critical to understanding them on a large scale.

III. Other determinants of Income Inequality

In order to understand the effect of IMF participation on income distribution, other factors that influence inequality must be taken into account in the causal model. First, a variable measuring the government's share of GDP is included in an effort to measure the effect of government spending on inequality. One might expect a high measure in this variable to be associated with a lower level of inequality. However, this will only occur if the government spending targets labor and the poor. If government spending is instead focused on providing corporate subsidies or running nationalized companies for the large benefit of a few elites, then the level of inequality may be generally higher.

The model also takes into account the distribution of age in the population. If a country is comprised largely of both young and old people then inequality is expected to be higher since these groups are usually less productive workers and often dependent on middle aged people for support. Carter (2006) includes these measures in his study on economic freedom and inequality and finds the population over 64 years old to have a significant positive relationship over large ranges (Carter, pp. 170).

Carter also includes a variable measuring the percentage of population residing in urban areas. This study uses its alternative of rural population in order to gauge a possible rural-urban divide that may be driving income inequality. As mentioned earlier, the impact of currency devaluation can depend on the structure of the domestic economy in terms of the ratio of rural farmers to urban consumers, as well as nature of rural farm production.

This study also includes a measure of the nature of the recipient country's regime. Both Barro (2000) and Carter include similar measures in their studies on income inequality. Barro uses indices to measure the rule of law and electoral rights and finds a marginally significant negative relationship for the rule of law but an insignificant result for electoral rights (Barro, pp. 23). Carter, using the Gastil indices, finds a significant negative relationship for political rights and a significant positive relationship between civil liberties and income inequality (Carter, pp. 170). This study uses a somewhat broader measure in the Polity2 variable from the Polity IV (2010) dataset. This measure is a combined polity score, ranging from -10 (strongly autocratic) to 10 (strongly democratic), based on the combination of a nation's separate autocracy and democracy scores. This particular variable is also modified to better estimate a polity's rating during times of transition or interregnum (Marshall et al., 2010, pp. 17). This facet of the data allows researchers to better use it for time-series analysis. Given the divergent empirical results on the relationship between political and civil openness and income inequality, theoretical expectations are difficult to propose. However, it seems a reasonable expectation that countries with wider political and civil opportunities will have greater equality in economic outcomes. Conversely though, one can envision an autocratically

scored government that grants few opportunities to its citizens and creates an equality of poverty amongst large sections of the populace.

The specification for income distribution also includes dummy variables for both African and Latin American countries. Barro's study includes similar variables and finds them to be significantly positive and large in magnitude. Given the inclusion of variables such as per capita GDP and education in Barro's model, he argues that these results must be driven by some other variable not included in the model. He states that his preliminary results suggest that colonial heritage and religious affiliation account for a substantial portion of this continental effect (Barro, pp. 22).

Another important variable to consider is the degree of openness in a nation's economy. This study utilizes a measure of trade as a share of national GDP in order to estimate a country's economic openness. As mentioned earlier, trade liberalization can have several effects working in opposite directions on income distribution. This variable is also linked to IMF programs due to the latter's focus on liberalization of trade. Important for this study is the potential endogeneity of the trade measure to IMF programs. If IMF programs do have a significant influence on the trade policy of recipient countries, then the impact of trade openness on income distribution may be ultimately driven by participation in structural adjustment programs. In essence, the trade variable may be capturing one of the mechanisms through which IMF programs cause changes in income distribution.

This study also includes a variable measuring access to healthcare, in the form of the percentage of infants that have been immunized for diphtheria, pertussis, and tetanus. Theoretically, low levels of access to healthcare are expected to lead to higher levels of

income inequality. Not only is it probable that one will find income inequality in areas of healthcare inequality, but also that a lack of access to healthcare may lead to lower worker productivity. If this in indeed true then one would expect to see a relationship in which Gini coefficients decrease as healthcare access increases.

Lastly, a measure of educational attainment was included in the initial model as well. However, the variable was found to be insignificant and also reduced the number of overall observations. The significance of the relationship between IMF programs and income distribution was not affected though. Therefore, the measure of educational attainment was dropped from the study in order to maintain a greater number of observations.

Methods

The selection process for this study involved two steps. First, only particular countries are eligible to enter the programs in question in the first place. This eligibility has historically been determined by the IMF following the same criteria the World Bank uses for its own IDA lending. The main eligibility requirement has been a GNI per capita ceiling. In 2008, this ceiling was $1965. The IMF and World Bank have adjusted this ceiling throughout the years to account for inflation. As a first criteria for selection in this study, countries were included if their GNI per capita in that year was below the historical cutoff when adjusted for inflation. The study includes countries that were initially eligible for the program in 1986 and later dropped out because their GNI per capita increased past the cutoff. Furthermore, countries were also allowed to enter the dataset after 1986 according to the level of GNI per capita and existence as a state.

The second selection problem stems from the nonrandom self-selection of countries into adjustment programs from this pool of initially eligible countries. In order to control for this selection process, I use a propensity score model to estimate the predicted probability of a country entering an IMF program in any given year. This method follows the path of Conway (1994) and Garuda (2000) in this area. The predicted probabilities are generated by estimating a logistic regression model where the dependent variable is a binary variable expressing whether or not a country was under a structural adjustment program in that year. The independent variables are economic and political factors related to a country's decision to enter a program. This model produces the predicted probability between 0 and 1. It also clusters specific countries together and generates robust standard errors based on the variation in the country's specific data. The model looks as follows:

$$Y_1 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8$$

Where:

Y_1 is a binary variable coded 1 if an IMF structural adjustment program was in effect during that year and coded 0 if no program existed. X_1 is the ratio of total reserves to imports of goods and services. X_2 is the investment share of GDP. X_3 is a binary variable indicating the presence of a lagged election in the previous year. X_4 is debt service as a percentage of GNI. X_5 is the growth rate of GDP. X_6 is growth of GDP lagged one year. X_7 is the net inflows of foreign direct investment as a percentage of GDP. X_8 is the ratio of short-term debt to total reserves. X_9 is the number of countries in the whole sample currently participating in IMF programs in that year. The results of this model are shown in Table 1 in the next section.

This propensity score is then used as an independent variable in the second regression on income inequality. The first causal model is constructed in order to gauge what effect a nation's propensity to enter into an IMF program has on its income distribution. The first model looks as follows:

$$Z_1 = a + b_0 Y_1 + b_1 V_1 + b_2 V_2 + b_3 V_3 + b_4 V_4 + b_5 V_5 + b_6 V_6 + b_7 V_7 + b_8 V_8 + b_9 V_9 + b_{10} V_{10} + b_{11} V_{11}$$

Where:

Z_1 is the Gini coefficient after taxes and transfers. Y_1 is the country's predicted probability score of being under an IMF program in that specific year. V_1 is the government share of GDP per capita. V_2 is the percentage of the population over 65 years of age and V_3 is the percentage of the population 14 years old and younger. V_5 and V_6 are dummy variables for whether the country is located in Africa or Latin America. V_7 is the country's revised Polity rating as scored in the Polity IV dataset. V_8 is the percentage of the population living in rural areas. V_9 is the amount of trade as a percentage of GDP. V_{10} is the percentage of infants immunized for diphtheria, pertussis, and tetanus. V_{11} is the country's GDP per capita in that year. The results of this first causal model are presented in Table 2 in the next section.

A second causal model is constructed to measure the impact of actual participation in IMF structural adjustment programs. Instead of including the propensity score as an independent variable, this model includes a treatment variable signifying whether or not a country is participating in an IMF program in that year. The model is constructed as such:

$$Z_1 = a + b_0T_1 + b_1V_1 + b_2V_2 + b_3V_3 + b_4V_4 + b_5V_5 + b_6V_6 + b_7V_7 + b_8V_8 + b_9V_9 + b_{10}V_{10} + b_{11}V_{11}$$

This model replaces the variable Y_1 with T_1, which is the treatment variable mentioned above. Table 3 shows the results of this model.

As a check on the robustness of the results found in using the first method, this study also includes a second method involving the propensity scores. This second method takes propensity scores and groups them into three blocks according to the level of score. Low, middle, and high propensity score groups are created and separate regression models are run using each propensity group as the sample. This allows for the estimation of the impact on income distribution of IMF programs in a sample of only nations with similar predicted probabilities of entering programs. The results of this analysis are presented in Table 4.

The initial methodological process is also used in the final portion of the study in estimating the impact of the SAF/ESAF programs in comparison to the PRGF programs. To estimate the impact of these different programs on income distribution, the dataset is split between those observations before 1999 (when the PRGF replaced the ESAF) and those afterward. The estimation then proceeds as normal and results are presented in Tables 5 and 6.

Results

I. Selection Model

The first results presented here are for the selection model of IMF participation. Initially, there are 651 cases of countries not entering programs in a given year and 676 cases of countries entering IMF programs in a given year. Then, using the available

economic and political variables, the model generates 1133 predicted probabilities of countries entering an IMF program. The distribution of IMF participation among those countries with predicted probabilities changes to 488 country-years of non-participation and 645 country-years of participation. The model is successful in correctly predicting 68% of cases. This result is slightly, though not significantly, better at prediction than the model employed by Garuda. It also results in a proportional reduction in error of 25.2%.

Although the determinants of IMF participation are mainly important in this study as a control mechanism, the results shown in Table 1 are interesting in several respects. The growth rate lagged one year, the number of country's participating in IMF programs at the time, and short-term debt as a percentage of reserves turn out to be significant in predicting IMF participation. Unexpectedly, however, short-term debt has a negative relationship with IMF participation and growth has a positive relationship. Short-term debt may have exhibited a negative relationship for a few theoretical reasons. First, as the level of debt increases for a country, it may be less willing to participate in IMF programs and incur more debt. Countries may be learning that IMF programs have largely been ineffective in spurring growth and therefore are poor options for escaping a cycle of debt. Furthermore, poor countries may have better options today than in the past to borrow from other nations in their regional area. It is also possible that the positive relationship between growth and IMF participation is a result of low-growth countries deciding not to increase their debt and enter IMF programs because of the IMF's poor past performance in spurring growth. Higher growth countries may be more confident in continued growth and repayment but still need the IMF loan to address other structural problems.

Table 1. Determinants of IMF Participation (1986-2008)			
Dependent Variable	Dependent Variable Description	Number of obs = 1133 Wald chi2(9) = 50.53 Prob > chi2 = 0.0000 Pseudo R^2 = 0.1019	
IMFPROGRAM	Binary variable coded 1 if a country participated in IMF program in that year. Coded 0 if not participating.		
Independent Variable	Independent Variable Description	Coefficient	Robust Std. Error
GRO	Percentage change in real GDP	.016	.017
LGRO	Percentage change in real GDP lagged one year	.036*	.015
KI	Investment share of GDP per capita	.007	.016
NUMBER	Number of countries in sample under IMF programs in that year	.067***	.012
STDEBT	Short-term debt as a percentage of total reserves	-.0003*	.0002
RESERVES	Ratio of total reserves to imports of goods and services	-1.02	.815
LAGELECTION	Presence of a legislative election in the previous year	-.083	.150
DEBTSERV	Total debt service as a percentage of GNI	.004	.013
FDIINFLOW	Foreign direct investment, net inflows as a percentage of GDP	-.033	.024
Constant		-1.54***	.52
Notes			
*** Significance at the 1% level			
** Significance at the 5% level			
* Significance at the 10% level			
P.R.E. = 25.2%			
Standard error adjusted for 58 clusters by country			

This relationship might also be explained by the unobserved behavior of the IMF and its

own selection process. This provides very tentative evidence that the IMF may be more

likely to approve loans to countries with higher growth rates. Lastly, there is a strong

positive relationship between the number of countries under a program in a given year

and IMF participation. This may merely be driven by the fact that as the number of

countries in the sample increases the probability of an individual country participating

increases. However, the variable for the number of countries under a program in a given year may also be a proxy for something more substantial. First, as mentioned earlier it may be a proxy for world economic conditions, which may drive more or less countries to participate in IMF programs. It may also represent the supply side of the selection question. The IMF may be more willing (or more able due to its own financial position) to lend to a greater number of countries during certain time periods.

II. Causal Models

The results for the initial causal model, which tests the relationship between a nation's propensity score and income distribution, is presented in Table 2. The main finding is that a nation's propensity of entering an IMF program appears to have no significant effect on the distribution of income. Instead, a country's geographic location in Africa and Latin America has a significantly positive relationship with its Gini coefficient. Being a Latin American country resulted in an increase of 7.15 to 15.51 units on the Gini coefficient scale. The African variable resulted in a subsequent increase of 3.17 to 8.45 units. Both of these results are highly significant and large in magnitude. These geographic variables are also capturing this relationship while controlling for the level of GDP per capita, the political structure, and access to health care (and education in another specification not reported here). Similar to Barro's speculation, the relationship may be driven by a colonial heritage. The preferential treatment of particular ethnic groups by colonial governments or the corrupt enrichment of specific individuals may have contributed to more unequal societies after independence.

Table 2. Income Distribution by IMF Propensity (1986-2008)			
Dependent Variable	Dependent Variable Description	Number of obs = 714 F(11, 55) = 6.53 Prob > F = 0.0000 R-squared = .2580 Root MSE = 8.44	
GININET	Solt's (2009) estimate of Gini index of inequality in equivalized (square root scale) household disposable income, using Luxembourg Income Study data as the standard.		
Independent Variable	Ind. Variable Description	Coefficient	Robust Std. Error
PROPENSITY	Predicted probability of participating in an IMF program	-2.03	4.75
GI	Government share of GDP per capita	-.0371	.119
POP65	Percentage of population over age 65	.705	.865
POP14	Percentage of population under age 14	.443	.413
AFRICA	Dummy variable for geographic location in Africa	5.81**	2.64
LATAM	Dummy variable for geographic location in Latin America	11.33***	4.18
POLITY	Polity score for that year according to Polity IV data	-.080	.161
RURAL	Percentage of population living in rural areas	.031	.076
TRADE	Sum of exports and imports of goods and services measured as a share of GDP.	.064*	.032
IMMUNEDPT	Percentage of children ages 12-23 months who received vaccinations before 12 months or at any time before the survey.	.032	.049
GDPCAP	GDP per capita	.0007	.001
Constant		8.35	17.25
Notes			
*** Significance at the 1% level			
** Significance at the 5% level			
* Significance at the 10% level			
Std. Err. adjusted for 56 clusters by country			

It is also possible that the Polity variable is not correlated with the level of corruption

found in a nation and is not accounting for the large amounts of corruption that have

occurred in parts of Africa and Latin America. If wealth accumulation in a society is largely influenced by corruption and an individual's social connections, then income inequality would likely increase. Lastly, a nation's trade also has a significantly positive relationship with income distribution. For every 1 percent increase in the trade ratio, the Gini coefficient increased by 0.64. This suggests that a more open trade economy may adversely expose particular domestic groups to changes in international markets that can contribute to an increase in income inequality.

Table 3 shows the results of the second causal model measuring the impact of actually participating in an IMF program on income distribution. The results are significantly different. While the African, Latin American, and trade ratio variables remain significant, they are joined by the treatment variable measuring IMF participation. IMF participation is found to be highly significant and has a *negative* relationship with income distribution. In other words, participation in an IMF program is associated with a decrease in Gini coefficient of 2.453 to 4.567 units. These results are also significant due to the result found above in the first causal model. The fact that no significant relationship was found between propensity score and Gini coefficient suggests that the relationship between actual IMF participation and income distribution is not significantly biased by a country's self-selection into programs or starting economic conditions. However, the IMF's own selection of countries into programs may still play a role in the result. If the IMF was particularly adept at choosing to lend to countries that were in a better position to use the funds in a successful and equitable way, then this selection effect might be biasing the relationship between IMF participation and Gini coefficients upward.

The negative relationship found here between IMF participation and Gini coefficient is especially surprising given the previous work suggesting that IMF programs have adverse effects on income distribution. However, previous studies differed in several ways from this one. First, they all examined earlier time periods for the most part. Vreeland's study uses the most recent data but extends only to 1993. Furthermore, Vreeland's study examined a more narrow measure of income distribution. It seems plausible that a worsening of income distribution in the manufacturing sector, which is small in many developing countries, could have coincided with movement toward less income inequality in the broader society.

Table 3. Income Distribution by IMF Participation (1986-2008)		
Dependent Variable	Number of obs = 773 F(11, 56) = 8.15 Prob > F = 0.0000 R-squared = .2855 Root MSE = 8.107	
GININET		
Independent Variable	Coefficient	Robust Std. Error
IMFPROGRAM	-3.51***	1.057
GI	-.032	.104
POP65	.677	.793
POP14	.406	.399
AFRICA	6.85***	2.45
LATAM	12.55***	4.21
POLITY	-.027	.137
RURAL	.061	.07
TRADE	.065**	.029
IMMUNEDPT	.03	.039
GDPCAP	.001	.001
Constant	7.78	16.97
Notes		
*** Significance at the 1% level		
** Significance at the 5% level		
* Significance at the 10% level		
Std. Err. adjusted for 57 clusters by country		

A shortcoming of this study is the inability to examine the impact of IMF programs on particular sectors of society in order to better understand how income was redistributed as a result of IMF participation.

As a test on the robustness of the results from Table 3, I also employ another method using propensity score ranges. In order to evaluate the impact of IMF participation on income inequality for similar ranges of propensity scores, I apply regression analysis to three distinct groups. Separate regressions are run on those countries with low predicted probabilities of entering an IMF program (propensity scores below .5), average probabilities (.5 to .7) and those with high probabilities (above .7). The results of these regressions are presented in Table 4. Unlike the results of Garuda's study, the effect of IMF participation is strongest for those in countries in the middle group that have propensity scores near the mean. While the low and high propensity groups still show a negative relationship between IMF participation and Gini coefficients, the results are no longer significant at even the 10% level. These results may be partially due to a lack of observations in the low propensity group. However, this seems less likely since all three models are themselves significant at the 1% level. Instead, it may be the case that countries entering IMF programs with severe economic problems, as in the high propensity group, may see less significant effects on income distribution due to their prioritizing of adjustments. For instance, if a country's politicians are able to choose how they implement IMF adjustments, they may be more likely to overlook pro-poor spending and income distribution if they are in dire need of decreasing their deficit and increasing economic growth. On the other end of the spectrum, countries in the low propensity group may not "need" IMF assistance in the same manner that high propensity countries

do, and therefore are perhaps able to implement smaller adjustments that have less

significant effects on income distribution.

Table 4. Regression by Propensity Groups (SAF & ESAF) (1986-2008)			
Dependent Variable			
GININET	Propensity Groups		
Independent Variable	Low (Below .5) (120 obs.) 79 no program 41 IMF programs	Middle (0.5 - 0.7) (369 obs.) 121 no program 248 IMF programs	High (Above 0.7) (284 obs.) 101 no program 183 IMF programs
IMFPROGRAM	-4.01 (3.50)	-5.35** (2.49)	-1.62 (1.25)
GI	-.126 (.190)	-.003 (.129)	.063 (.107)
POP65	.981 (3.15)	1.14 (1.06)	.293 (.615)
POP14	.798 (1.04)	.524 (.465)	.108 (.338)
AFRICA	3.34 (3.89)	6.16** (3.01)	6.34** (2.45)
LATAM	9.91 (5.98)	14.4*** (5.23)	12.46*** (3.13)
POLITY	-.372 (.271)	-.170 (.276)	.254** (.112)
RURAL	-.026 (.151)	.082 (.104)	.089* (.051)
TRADE	.068* (.039)	.060* (.035)	.063** (.026)
IMMUNEDPT	.135*** (.048)	.012 (.059)	-.016 (.033)
GDPCAP	.002 (.002)	.001 (.001)	.0001 (.001)
Constant	-8.50 (44.88)	2.5 (20.95)	21.70 (15.78)
Notes			
*** Significance at the 1% level			
** Significance at the 5% level			
* Significance at the 10% level			
Std. Err. adjusted for clusters by country			

They also are generally on sounder footing economically to begin with so they may have better distribution of income before starting the program. Countries with less glaring issues of poverty or inequality may be less inclined to address them during structural adjustment.

III. Comparison of programs

The final analysis of this study is a comparison of the effects of the SAF/ESAF programs and PRGF programs. This analysis seeks to answer whether the IMF's switch to the PRGF and its increased emphasis on poverty reduction had any effect on income distribution. The results are presented in Tables 5 and 6.

The difference between the SAF/ESAF and PRGF programs on income distribution is not significantly different, although the finding for the PRGF programs has a slightly larger coefficient and is more robust. While one might expect to see a significantly different result between the two programs, the idea that the SAF/ESAF programs were already contributing to decreasing Gini coefficients may temper this outlook. The change to the PRGF was made with the notion that IMF programs were not structured in a way to provide significant aid to the poorest members of recipient nations. In fact, many believed that previous IMF programs were detrimental to the poor. The results of the regression for the ESAF programs suggest that this was not necessarily the case and that income distribution may have actually improved under them. Further, the differences in the programs are mostly in the planning of the structural adjustment programs. The more open nature of planning in theory does not necessarily lead to the inclusion of politically marginalized groups in the process.

Table 5. Income Distribution (SAF & ESAF) (1986-2008)		
Dependent Variable GININET	Number of obs = 432 F(10, 47) = 5.85 Prob > F = 0.0000 R-squared = .3070 Root MSE = 8.5341	
Independent Variable	Coefficient	Robust Std. Error
IMFPROGRAM	-2.40*	1.28
GI	-.054	.133
POP65	1.02	.146
POP14	.615	.557
AFRICA	7.75***	2.85
LATAM	9.77**	4.53
POLITY	.005	.208
RURAL	.043	.083
TRADE	.064*	.032
IMMUNEDPT	.066	.039
GDPCAP	.002	.002
Constant	-4.73	26.10
Notes		
*** Significance at the 1% level		
** Significance at the 5% level		
* Significance at the 10% level		
Std. Err. adjusted for 48 clusters by country		

Lastly, it is still possible that the PRGF had a distinctly different impact on the income share of the poorest members of a nation, even as broad measures of income inequality were essentially the same, though this goes beyond the scope of this study.

Furthermore, the particular effects of the different programs may be difficult to estimate because of the manner of the transition from the ESAF to the PRGF. Countries that were currently participating in ESAF programs in 1999 were shifted to the PRGF by the publication of the IMF's annual report in the year 2000. Therefore, country programs that began as ESAF programs ended as PRGF programs. This may bias the observations around the time of transition.

Table 6. Income Distribution (PRGF) (1986-2008)		
Dependent Variable GININET	Number of obs = 340 F(11, 55) = 6.67 Prob > F = 0.0000 R-squared = .3073 Root MSE = 7.332	
Independent Variable	Coefficient	Robust Std. Error
IMFPROGRAM	-3.9***	1.37
GI	.026	.123
POP65	.226	.731
POP14	.075	.439
AFRICA	5.53*	3.08
LATAM	15.38***	4.45
POLITY	.051	.193
RURAL	.081	.066
TRADE	.063**	.027
IMMUNEDPT	-.051	.058
GDPCAP	.0003	.001
Constant	28.06	19.05
Notes		
*** Significance at the 1% level		
** Significance at the 5% level		
* Significance at the 10% level		
Std. Err. adjusted for 56 clusters by country		

Conclusion

The finding in this study, suggesting that IMF participation has contributed to a decrease in income inequality, is both a surprising and potentially controversial one. While far from giving us a complete picture of the impact of IMF structural adjustment on income distribution, this research further complicates the story and leads to a need to further question and investigate the mechanisms through which IMF participation affects the poor, labor, and the owners of capital. Furthermore, while the result is encouraging for those concerned with poverty and inequality, it is a rare positive result in the larger literature on IMF programs. Though this positive finding does suggest that IMF programs

may not have been as damaging to participating countries as popular opinion may lead one to believe, most research finds that IMF programs have either a negative or neutral impact on economic growth and poverty. These other findings show that IMF programs have a great deal of room for improvement if they are to be considered effective in supporting poor countries in pursuing economic stability and growth.

Further work in this area might attempt to link IMF programs to actual economic adjustments rather than assume that such adjustments take place when a program merely exists. While IMF structural adjustment programs are concessional in the sense that the adjustments must be made in order for the loan to be disbursed to the country, it is not clear that oversight of these programs leads to strong adherence to the conditions imposed by the IMF. If a linkage between IMF structural adjustment programs and economic reform does not exist as widely as is assumed, then the results correlated with participation in an IMF program may actually be caused by some other phenomena related or unrelated to the program. For example, a country that enters into an IMF agreement but implements only small reforms could see income distribution change in several ways. Income inequality could theoretically increase as those with access to the IMF loan use it to reward political cronies rather than to institute economic adjustments and correct debt problems. Income inequality could also conceivably decrease if the recipient government uses the money for pro-poor and labor spending while ignoring many conditions of the program. The key issue here is how responsive recipient governments are to conditionality and whether or not the IMF strictly enforces the conditions.

Another potential area for research mentioned earlier involves quantitatively assessing the impact of IMF programs on the mechanisms that may lead to changes in income inequality or poverty. For instance, empirical research on the effects of IMF participation on unemployment, prices, wages, public expenditures, and education may provide insight into the specific areas that the PRGF programs have either succeeded or failed in helping the poor. Furthermore, the empirical link between these variables and broader income inequality can also be strengthened. This evidence could help to target specific policies of IMF programs that systematically lead to worse poverty or inequality outcomes and to keep in place those that have helped to decrease poverty and inequality. Though data for some of these variables is unavailable for many countries participating in IMF programs, the more recent increase in data collection in poorer countries should help researchers to better test IMF program performance.

Finally, work that includes an analysis of the structure and pace of the reforms carried out under IMF programs can help to clarify how these factors impact the distributional outcomes of structural adjustments. This area of research may be the most relevant for policy interventions if it can illuminate the character of those reforms that are most helpful to recipient countries, as well as those that are most harmful.

Appendix A

List of countries in sample

Albania	Rep. of Congo	Lesotho	Rwanda
Angola	Comoros	Liberia	Senegal
Armenia	Djibouti	Madagascar	Sierra Leone
Azerbaijan	Ethiopia	Malawi	Sri Lanka
Bangladesh	Gambia	Mali	Sudan
Benin	Ghana	Mauritania	Tajikistan
Bolivia	Georgia	Mozambique	Tanzania
Burundi	Guinea	Mongolia	Togo
Burkina Faso	Guinea-Bissau	Moldova	Uganda
Cambodia	Guyana	Nepal	Uzbekistan
Cameroon	Honduras	Nicaragua	Vietnam
Central African Republic	India	Niger	Zambia
Chad	Kenya	Nigeria	Zimbabwe
Cote d'Ivoire	Kyrgyz Republic	Pakistan	
Dem. Rep. of Congo	Lao PDR	Philippines	

Appendix B

List of variables and source

Variable	Source
IMFPROGRAM	IMF annual reports, 1985-2009
GININET	SWIID Version 3.0
GRO, LGRO	World Development Indicators (2010)
KI	Penn World Tables 7.0
NUMBER	IMF annual reports, 1985-2009
STDEBT	WDI
RESERVES	WDI
LAGELECTION	Database of Political Institutions, 2009
DEBTSERV	WDI
FDIINFLOW	WDI
GI	PWT 7.0
POP14	WDI
POP65	WDI
POLITY	Polity IV: Political Regime Characteristics and Transitions, 1800-2009
RURAL	WDI
TRADE	WDI
IMMUNEDPT	WDI
GDPCAP	WDI

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