The Effects of Structural Adjustment Programs on Poverty and Income Distribution

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Abstract

The focus of this work is to measure the effects of Structural Adjustment Programs (SAPs) of the International Monetary Fund (IMF) on poverty and income distribution. We employ different methods to control for endogenous selection into IMF programs. To estimate the impact of those programs on poverty and income distribution, we make use of several specifications of a treatment effects model. We control for economic factors and include regional sub-models to test for robustness. Using data from 1982-2004 for 94 countries, we find evidence that participation in IMF programs is connected with higher poverty gaps and headcount ratios and a more unequal income distribution. Finally we employ a difference-in-difference technique to estimate the impact of SAPs on GINI indices. The application of this technique confirms the adverse effect of SAPs on income equality which do not vanish in the long run.

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1 Introduction

At the end of World War II the international economic system was devastated. Certain rules and procedures were needed to recover economic stability and therefore the need of new institutions emerged. One of the institutions established in the course of the Bretton Woods Agreements in 1944 was the International Monetary Fund (IMF). It was assigned with regulating the international monetary system and financial system and promoting its stability. It should encourage economic cooperation and help to promote the health of the world economy. Additionally to its purpose to "promote economic stability, help prevent crises, and help resolve them when they do occur" it is also responsible for "promoting growth and alleviating poverty" (International Monetary Fund, 2008). Michel Camdessus, the Managing Director of the Fund from 1987 to 2000, also highlighted the importance of poverty alleviation in his speech in Geneva in July 1999 with his statement: "It is now high time to bring our full attention to bear on the challenge of poverty."

Despite of the dedication of the IMF to reduce poverty, harsh criticism emerged that IMF programs lead to an increase in poverty rates in recipient countries (e.g. Hertz, 2004; Cavanagh, Welch Retallack, 2000; Lundberg and Squire, 2003; Abugre, 2000). Therefore, we try to find out in this paper if SAPs have a positive influence on poverty rates in participating countries or if IMF critics are right.

There exist former studies about the effects of IMF programs on indicators like poverty or income distribution (e.g. Garuda, 2000, Easterly, 2001, Vreeland, 2002) but there was no study which took both poverty and distributional effects into account. This study intends to fill this gap.

2 Structural adjustment

In this study I address the principal IMF programs, namely Stand-By Arrangements, the Extended Fund Facility, the Structural Adjustment Facility, the Enhanced Structural Adjustment Facility and the more recent arrangements under the Poverty Reduction and Growth Facility which replaced the Enhanced Structural Adjustment Facility in 1999.

Stand-By Arrangements (SBA) are generally shorter term agreements which last typically one to two years and imply higher conditionality. They are designed to help countries with more severe disequilibria to address short-term balance of payment problems. The greatest amount of IMF resources was provided under SBAs. The *Extended Fund Facility (EFF)* was established to help countries with severe disequilibria to address longer-term balance of payment problems which require fundamental economic reforms. The typical EFF program usually lasts three years. The *Structural Adjustment Facility (SAF)* and the *Enhanced Structural Adjustment Facility (ESAF)* are generally longer term programs with lower conditionality. Programs under the SAF normally imply less stringent conditionality than ESAF programs and mostly antecede ESAF

programs. ESAF programs sometimes have a longer duration than three years. The *Poverty Reduction and Growth Facility (PRGF)* was created in September 1999. It replaced the Enhanced Structural Adjustment Facility. The PRGF is a low-interest lending facility for low-income countries. It is based on country-owned Poverty Reduction Strategy Papers which are prepared by the government of the country concerned. The largest number of IMF loans has been made through the PRGF in recent years (IMF External Relations Department, 2008 and Garuda, 2000).

In this work we investigate the effects of SAPs on countries participating in any of these programs with the objective to maximize data points.

2.1 Theoretical impacts of IMF programs on poverty

Structural Adjustment Programs typically include a lot of different policies which interact with each other. It is most likely that the countries in which SAPs are implemented differ in terms of their economies and pre-program conditions from non-program countries but also from each other. Therefore, it is not easy to isolate the impacts of SAPs on poverty, which are in general complex and not clear-cut.

Policies and variables which might influence poverty and income distribution include currency devaluation, reductions in the budget deficit and changes in growth rates, inflation rates and interest rates. Some argue that economic growth of a country has a direct influence on poverty as gains achieved via growth would trickle down and benefit the poor leading to a reduction in poverty. Today however most agree that neither macroeconomic stability nor economic growth is enough for alleviating poverty (Gunter, Cohen, Lofgren, 2005). Although higher growth rates are on average accompanied by greater progress in poverty alleviation - as certain financial means are needed to combat poverty which can only be achieved via growth - this does not prove that trickle down strategies are the best methods for fighting poverty. It is important to take distributional effects into account as well. Therefore, the right politico-economic programs are needed (Stiglitz, 2002). The following section should give a general overview of theoretical expectations of these reforms on poverty.

A mayor goal of Structural Adjustment Programs is a **reduction of inflation**. It is broadly agreed that high levels of inflation have negative consequences on growth and poverty. Some studies however find that countries which achieve and maintain macroeconomic stability might not necessarily gain significant pay-offs in growth and poverty reduction (Gunter, Cohen, Lofgren, 2005). Lower inflation is likely to improve the real incomes of the poor if the adjustment of incomes to a rise in expenditures due to inflation is slow. The impact of lower inflation rates on income distribution depends on the rigidities of income to prices of each group of individuals. That means that if poorer individuals face longer adjustment lags than wealthier people, lower inflation will reduce inequality in income distribution (Garuda, 2000). Easterly and Fisher report that inflation increases poverty as the more wealthy have a better access to inflation-protected assets or other financial instruments that hedge in some

way against inflation (Easterly Fischer, 2000).

Adjustment lending is generally associated with **currency devaluation**. In developing countries there are negative associations with currency devaluation however. This is because of fears of setting off a devaluation-inflation spiral, low exports and import elasticities, increased domestic costs of servicing foreign debt, increased costs of financing subsidies for imported inputs, fear of a loss of confidence on the part of foreign investors and many other political reasons. Until now there is no clear cut conclusion about the relationship between devaluation and poverty (Gunter, Cohen, Lofgren, 2005). In theory however, the effect of currency devaluation is a decrease in the price ratio of non-tradable to tradable goods. This might be good for alleviating poverty and improve income distribution within a country if the poor are rural farmers producing goods for export as their incomes are increased but it might worsen income distribution if the poor are urban consumers who are facing higher food prices or rural farmers producing for domestic consumption (Garuda, 2000). Devaluation might worsen income distribution as well if elite groups engage in capital flight prior to the devaluation (Pastor, 1987).

Fiscal Policy is an essential component of IMF programs, which aim to decrease the budget deficit. This can be achieved through higher levels of taxation and/or reductions of public expenditure. Of course the re-distributional effects of such a policy depend on the composition of the budget cuts of the government, but are also influenced by producer mobility and the adaptability of consumer patterns. Real expenditure reduction is generally achieved through contraction in social expenditure, public sector contraction and privatization (Handa King, 1997). A study conducted by Johnson and Salop (1980) states that a downward adjustment of government expenditure to GDP is very likely to be borne out by public sector employees engaged in capital-intensive projects which come to be postponed (Johnson Salop, 1980 cited by Vreeland, 2002). Expenditure cuts in public sector employment - which lead to an at least temporary increase in unemployment - and lower wages and salaries of people working in the public sector, will tend to increase poverty and worsen income distribution, particularly when those reductions hit low-level government employees. How these policies affect prices of consumption goods is ambiguous. Changes in prices might affect real incomes of the poor in either direction, independent of their nominal incomes and therefore reduce or increase poverty (Garuda, 2000). Access to domestic credit affects poverty and income distribution as well. Increased interest rates or bank reserve requirements as well as imposed credit ceilings will reduce access to domestic credit and will make it easier for large companies to get credits in contrast to small and medium-sized firms. Generally the urban sector is favored over the rural sector (Johnson Salop, 1980 cited by Vreeland, 2002). Budgetary cuts or higher levels of taxation, as well as reductions in real wages and credit restraints, are very likely to reduce domestic demand. This leads to a decrease of overall spending. Heller (1988) states that such a contraction of spending "is almost certain to lower the well-being of both labor and the poorest members of an economy". If demand restraint in countries which participate in Fund programs is higher than it would have been

otherwise, it is most likely for poverty levels to rise. If the participation in IMF programs however tend to increase the overall growth, poverty rates would get lower due to job creation. To evaluate the effects of job growth, it is important to know the composition of growth and the sectors of the economy in which poverty is predominant. Therefore, agricultural growth may lead to reductions in poverty if rural poverty is widespread (Garuda, 2000). Gunter, Cohen and Lofgren (2005) state that in general poor people suffer more from policy changes and shocks than the wealthy and therefore need to be protected from the effects of contractionary fiscal policies.

IMF programs imply **trade liberalization** most of the times. Trade liberalization is likely to have two contrary effects on poverty. First, sectors which were protected before the liberalization will contract and lead to lower incomes in these areas. Apart from that however, trade liberalization might benefit labor-intensive sectors and finally result in higher wages or lower unemployment (Handa King, 1997). Gunter, Cohen and Lofgren (2005) survey the recent empirical literature about the effects of trade liberalization on poverty. According to them, most of the studies show that trade liberalization has had - or could have had - a positive impact on poverty reduction but led to a higher inequality. They also mention that, depending on production, trade and consumption patterns, some poor people are positively and some negatively affected by trade liberalization. It depends on the type of agreement if trade liberalization benefits developing countries or not.

The effects of **labor market reform** are ambiguous as well. Restrictions tend improve the situation of the employed to the detriment of the unemployed (Handa King, 1997).

Financial liberalization is a common tool used by the IMF to force changes in the domestic capital markets of developing countries. It can be shown that there is a strong connection between financial liberalization, weaknesses in the domestic banking sector and currency crisis. It is commonly agreed that financial liberalization needs to be accompanied by sound economic policies and legal and regulatory underpinnings to improve economic performance, because they would have strongly negative effects on some poor groups otherwise (Bird Rajan, 2001).

Structural Adjustment Programs can be completed successfully in many different ways which imply different consequences on poverty and income distribution. **Political power** plays an important role in determining the way of achieving a program (Vreeland, 2002; Garuda, 2000 and Pastor, 1987). Therefore, it is most likely that IMF programs are implemented in such a way that hurts politically powerful groups least, frequently at the expense of the poor.

3   Empirical analysis

It is quite difficult to find an answer to the question if SAPs have positive or negative impacts on poverty levels, as we cannot observe the outcomes which would have occurred in the absence of SAPs in affected countries. Additionally

the participating countries do not make their choice randomly on whether to join a program or not. Countries which are more likely to join an IMF agreement generally face different macroeconomic conditions (Przeworski Vreeland, 2000). One has to take into account these differences in country conditions which could contribute to differences in poverty and/or income distribution between countries. That, and the fact that not all of the relevant factors contributing to these differences are observable (as political will for example), will produce biased estimates of the effect of SAPs on poverty and income distribution. To avoid selection bias we perform treatment effect regressions of poverty indicators on program participation. Then, we control for other factors as well to test if there is a change in the results. We use different specifications of the model and estimate region sub-models to test for robustness.

3.1   Descriptive poverty model

For taking a first look at our data we group the data according to the program participation status of the countries (*never* under IMF agreement, *before* the first program participation, *during* program participation, *between* two IMF programs and *after* the last IMF program as long as program participation is observed). Then, we calculate the means, medians, standard deviations and the number of observations for each of the categories. It turns out that poverty rates are higher for countries *during* and especially *between* participation in IMF programs. Those poverty rates are not only higher in comparison to poverty rates of countries which *never* participated in an IMF agreement but also higher than poverty rates observed *before* the first participation in a SAP. *After* the last participation observed in the time horizon of the dataset, poverty rates turn out to get lower again, even lower than they had been *before* the first participation. The same pattern emerges when it comes to income distribution. It should be mentioned that the standard deviation is quite large for all groups.

To see if there is a significant difference between poverty rates of countries under IMF agreement and countries not participating in SAPs we perform mean comparison tests (two-sample t-tests) with unequal variances. It turns out that there is no systematic difference of *pgap_1, phcr_1* and *gini_1* between participation observations and non participation observations. The differences between the means of *pgap_2, phcr_2, gini* and *gini_rep* by program participation status turn out to be significant, indicating that countries which are currently under IMF agreement face systematically higher values for those variables.

Note that this is just a descriptive supervision of the data. To eliminate the bias in the data other econometric methods have to be used.

3.2   Treatment effects model

We are interested in estimating

$$\text{pov}_{it} = x'_{it}\beta + \delta D_{it} + \epsilon_{it}$$

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where pov_{it} is our poverty indicator in country i in year t, x'_{it} is a set of explanatory variables, D_{it} is the program participation dummy and ϵ_{it} is the error term. It is very likely that the results will be biased due to endogenous selection into programs and differing economic preconditions of program countries and the control group. To account for that problem we need to estimate the variables of interest in two stages.

In the first stage we want to estimate the probability of program participation to account for systematic differences in participation countries using a probit model:

$$D^*_{it} = w'_{it}\gamma + u_{it}; D_{it} = 1 \ if \ D^*_{it} > 0, \ 0 \ otherwise$$

where D^*_{it} is our predicted participation probability, w'_{it} is a set of explanatory variables and u_{it} is the error term.

In the second stage, the participation probability enters in our regression via the inverse Mill's ratio which accounts for selection bias.

$$E[pov_{it}|D_{it} = 1, x_{it}, D^*_{it}] = x'_{it}\beta + \delta + \rho\sigma_\epsilon \left[\frac{\phi(w'_{it}\gamma)}{1 - \Phi(w'_{it}\gamma)} \right]$$

$$E[pov_{it}|D_{it} = 0, x_{it}, D^*_{it}] = x'_{it}\beta + \rho\sigma_\epsilon \left[\frac{-\phi(w'_{it}\gamma)}{\Phi(w'_{it}\gamma)} \right].$$

The coefficient δ will now account for the self selection into programs. To calculate the difference in poverty rates/GINI coefficients between for participating countries and nonparticipants, we subtract the second equation from the first and get

$$E[pov_{it}|D_{it} = 1, x_{it}, D^*_{it}] - E[pov_{it}|D_{it} = 0, x_{it}, D^*_{it}] = \delta + \rho\sigma_\epsilon \left[\frac{\phi_{it}}{\Phi_{it}(1 - \Phi_{it})} \right].$$

Not controlling for bias in performing least squares regressions leads to an overestimation of the treatment effect.

3.2.1 Estimations

Our model which is used to predict the probability of program participation (propensity score) is specified like indicated in Table 1[1].

The model predicts 75.9% of program participations and 71.5% of non-program observations correctly.

Performing regressions of poverty gaps, poverty headcount ratios and GINI indices on IMF-program participation in the second stage, the coefficient of program participation turns out to be positive and highly significant (at the one percent level) for each of the indicators (one exception is *gini_1* which is significant on the ten percent level).

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[1]Exclusion restrictions are the number of countries currently under IMF agreement and the number of program years of a countries past. An explanation of the variables can be found in the Appendix.

COEFFICIENT	prog
lgdp_pc	-0.000229***
	(0.0000264)
num	0.0112***
	(0.00291)
years	0.161***
	(0.00920)
lexch	0.00000343**
	(0.00000135)
linvest	-0.0187***
	(0.00627)
Constant	-1.444***
	(0.163)
Observations	2827
R^2	.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1: Determinants of participation in IMF programs

| COEFICIENT	Pgap_1	Pgap_2	Phcr_1	Phcr_2	Gini_1	Gini_rep	Gini
prog	12.50***	28.48***	29.30***	59.94***	4.596*	18.69***	19.45***
	(1.509)	(3.304)	(3.322)	(5.868)	(2.664)	(2.064)	(2.141)
Constant	-1.009	0.395	0.145	4.335	41.13***	30.76***	30.36***
	(0.689)	(1.830)	(1.714)	(3.737)	(1.599)	(1.164)	(1.205)
athrho	-1.191***	-1.636***	-1.392***	-2.509***	-0.531***	-1.740***	-1.751***
	(0.153)	(0.210)	(0.147)	(0.532)	(0.171)	(0.241)	(0.238)
lnsigma	2.375***	3.032***	3.139***	3.659***	2.335***	2.627***	2.654***
	(0.0868)	(0.0673)	(0.0674)	(0.0606)	(0.0519)	(0.0497)	(0.0500)
Observations	339	339	346	346	353	241	241
R-squared	.	.	.	.	.	.	.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression on poverty indicators

The results shown in Table 2 indicate that - controlling for selection bias - countries which are participating in one of the IMF programs mentioned above, face higher poverty rates, higher poverty headcount ratios, or higher income inequality respectively, than if they would not have participated.

To get information about which income groups are affected negatively by IMF program participation, we perform treatment regressions of income decentiles on program participation. According to the results, the first seven income decentiles (the 70% of the population in lower income levels) are likely to lose some of their income share. For decentile 8, the coefficient of program participation turns out not to be significant and the two upper decentiles (the richest 20% of the population) seem to benefit when participating in Structural Adjustment Programs. Graph 1 summarizes these outcomes graphically.

Graph 1: Changes in income shares of income decentiles
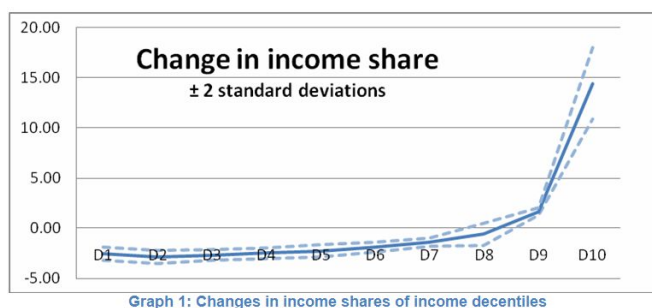
3.2.2 Region subsamples

To test if there are differences in the effects of SAPs on poverty and income distribution in different regions, we group our countries into seven regions and perform the same regressions like before. Due to data limitations it is not possible however to achieve results in all of the regressions.

	Pgap_1	Pgap_2	Phcr_1	Phcr_2	Gini_1	Gini_rep	Gini
East Asia and Pacific	±						
Europe and Central Asia	+	+	+	+	+	+	+
Latin America and Carribbean	-	-	-	-	-	+	+
Middle East and North Africa	±		±				
North America							
South America							
Sub-Saharan Africa	+	+	+	+	-		

Table 3: Region subsamples

Note that in Latin America and Carribbean the poverty indicators and the GINI index measured by the WDI is likely to improve, while GINI measured by

the WIID is likely to worsen during participation years. In Sub-Saharan Africa GINI measured by the WDI is likely to improve as well during program years.

3.2.3 Robustness

To check if the results are robust, we include different specifications of the program participation model. We use alternative definitions of the model including *ldebt_serv, lreserves, lbop_gdp, linfl, lfdi, lexp_growth, limp_growth, lext_debt, lgni_pc* and political variables like *sys_pres* and *finittrm*. The main results obtained in the 2nd stage are stable over alternative specifications.

We also included additional explanatory variables like GDP per capita growth, inflation, net current transfers, gross domestic savings, labor force participation rate, education and GINI in the second stage. The program coefficient stays significant in all of the regressions, although in some of them on a lower significance level[2].

For another kind of robustness check we restrict the observations of the control group. We include only countries which never participated in an IMF program for the time observed and countries before their first program participation. Doing so, we make sure that there is no (long-run) influence of IMF programs in the control group which is not taken into account. We estimate the probability of program participation with the formula

$$\text{prog}_{it} = \beta_1 gdppc_{it-1} + \beta_2 num_t + \beta_3 years_{it} + \beta_4 invest_{it-1} + \beta_5 debt\_serv_{it-1} + \beta_6 reserves_{it-1} + \beta_7 ext\_debt_{it-1} + \epsilon_{it}$$

With this setting, program participation can be predicted at a more reliable level. 91.4% of program participations and 83.8% of non-program observations can be predicted correctly.

Note that in Table 4 the coefficients of program participation are still positive and highly significant for all of the poverty indicators. They are lower however than they were with the specification from before. This indicates that there is a negative effect of program participation on poverty, but that it is not as big as suggested by the model before. The coefficient of program participation in a regression of GINI becomes insignificant. Regressions of GINIs from the WIID could not be performed due to data limitations. Controlling for addtional explanatory variables does not alter the results.

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[2]In a limited number of cases controlling for secondary education leads to insignificant program participation coefficients.

COEF	Pgap_1	Pgap_2	Phcr_1	Phcr_2	Gini_1
prog_new	6.522***	14.02***	17.17***	23.21***	-1.773
	(1.612)	(3.530)	(4.657)	(7.168)	(1.660)
Constant	0.347	5.065*	2.121	19.63***	44.72***
	(1.159)	(2.743)	(3.551)	(5.843)	(1.416)
athrho	-1.125***	-1.347***	-1.423***	-1.077***	-0.592***
	(0.233)	(0.332)	(0.392)	(0.322)	(0.223)
lnsigma	2.070***	2.736***	2.882***	3.320***	2.241***
	(0.0863)	(0.0537)	(0.0655)	(0.0381)	(0.0335)
Observations	238	238	240	240	246
R-squared	.	.	.	.	.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Regression on poverty indicators - new control group

3.3 Difference-in-difference approach

There exist criticism about the use of a treatment effects model which state that the exclusion restrictions have to be very powerful to guarantee that the model takes out bias reliably. To avoid this difficulties and to make sure that there is no problem in the specification of the model, we make also use of an alternative approach to compare treatment and control group observations to see the effects of Structural Adjustment Programs on poverty and income distribution. A difference-in-difference model is recommended to account for time-invariant, endogenous and unobserved effects which are likely to be present in our case due to endogenous program participation because of self selection into IMF agreements. We are using a variant of the difference-in-difference model used by Egger et al. (2005).

We specify a treatment year and compute a three-year average of GINI in the period after the treatment year. We do the same for a six-year period before the treatment calculating two three-year averages in this period. Then we compute differences between the calculated averages. The same is done for countries which have never been under an IMF agreement until the last year of the post-treatment period, which serve as a control group. We do this for different treatment-years and collapse the dataset. With the resulting data we can perform two-group mean-comparison tests with unequal variances, testing whether there is a difference between the treatment and the control group before and after the treatment and if there is a difference within the treatment group before and after the treatment.

Looking at the results in Table 5, we can see that the difference in changes in GINIs before program participation between program and control group is insignificant as we would expect. Comparing program and control group after treatment, we find a significant higher increase in GINI indices in the program group. Furthermore, comparing the difference in GINIs before and after treat-

	Pr(Diff<0)	**Pr(Diff≠0)**	**Pr(Diff>0)**
Program vs. controls: before treatment	0.2472	0.4945	0.7528
Program vs. controls: after treatment	0.0169	0.0338	0.9831
Program: before vs. after treatment	0.0240	0.0480	0.9760

Table 5: T-tests on differences in means

ment in program groups we find that after program particicpation the change in GINIs is higher. The results indicate faster rising inequality after program participation.

3.3.1 Robustness

To control for reliability of the results we conduct several robustness test. First of all we use variing duration of the time windows. We do not only look at three year periods but also calculate four, five, six and seven year periods. The results stay robust. For a comparison of program and control group after the treatment it is also possible to calculate 8 up to 15 year periods, which should account for long-run developments in GINI indices. Doing so we can reject the null hypothesis that there is no difference between the changes in GINIs in program vs. control countries after the treatment at even higher singficance levels. As the time horizon grows very large(12 years and more) the significance decreases again, probably due to a smaller sample size and smaller power of the test. With a time window of only two years we cannot reject the null hypothesis of no difference in the changes of GINIs.

Performing another robustness check, we include not only countries without prior participation in IMF programs like in the table above but also countries which participated in a program before the pre-period. The main results did not change.

Furthermore, we also do a variant of the model, calculating not changes in the average GINIs but growth rates. Also this specification does not alter our findings.

4 Summary of the results

Summarizing, one can say that Structural Adjustment Programs of the IMF seem to have negative impacts on poverty and income distribution. This results are not only found in different specifications of a treamtment effects model but for GINI indices also in a difference-in-difference approach.

Program participation seems to affect poverty headcount ratios more than poverty gaps. Poverty headcount ratios rise much more in countries participating in IMF programs than do poverty gap indicators. Surprisingly, the coefficients of program participation differ a lot from each other, according to the GINI indicator used as independent variable. Using $gini\_1$[3] leads to a system-

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[3]From the "World Development Indicators" database

atically lower program participation coefficient than using *gini* and *gini_rep*[4]. The difference remains controlling for additional variables. This result reflects the problematic in obtaining reliable data for measuring inequality of income distribution. GINI coefficients might not be comparable to each other, as it is to be assumed that there are differences in the calculations of the coefficients.

One of the arguments of the IMF is that, although there might be a negative impact on poverty levels in the short run, the situation tends to improve in the long run. It does not disclose however, how long IMF programs need to show positive outcomes. It is also not easy to tell if good results concerning poverty reduction in the long run are based on IMF programs, as there has been a large time horizon between the program implemented and the result achieved. Due to data limitations and a big amount of factors that determine poverty reduction, it is quite hard to estimate the impact of IMF programs on poverty indicators in the long run. A first step could be made in this study by estimating long run effects of SAPs on GINI indicators, by using a difference-in-difference approach. Doing the same with poverty indicators might be a good starting point for further research given more detailed poverty data available.

Acknowledgements

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[4]From the "World Income Inequality Database"

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A   Variables used in this study

A.1   Program participation model

prog: Dummy variable coded 1 for current participation in an IMF program (SBA, EFF, SAF, ESAF, PRGF) and 0 otherwise (source: Evrensel (2002) and own calculations[5])

prog_new: Dummy variable coded 1 for current participation in an IMF program (SBA, EFF, SAF, ESAF, PRGF) and coded 0 for countries never participating in an IMF program and countries before their first participation in an IMF program (same sources as for prog)

lgdp_pc: Lagged GDP per capita (source: World Development Indicators 2007 - World Bank (CD))

num: Number of other countries participating in an IMF program (source: created by summing up prog over all countries in a given year minus prog of the country itself)

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[5]We adopted the data from Evrensel (2002) who coded the dummy equal to 1 for participation of at least one day of a year in a program for programs from 1971 to 1981; for programs from 1982 to 2006 we took the data from the IMF homepage (IMF Members' Financial Data by Country; http://www.imf.org/external/np/fin/tad/exfin1.aspx) and coded the dummy equal to 1 for participation in an IMF program of at least 4 months of a year, as any program implemented needs some time to show effects. The break in the data does not affect the variable prog used here, as we consider only years from 1982 on. It just affects the variable years indirectly as this variable used in the 1st model sums up the program-dummies in the entire history of the country.

years: Cumulative number a years that a country has been under IMF agreement (source: created by summing up prog over a countries past[6])

sys_pres: Dummy variable coded 1 if the systems consist of unelected executives or with presidents who are elected directly or by an electoral college or systems without prime minister (source: Database of Political Institutions; http://go.worldbank.org/2EAGGLRZ40)

finittrm: Dummy variable coded 1 if there is a constitutional limit on the number of years the chief executive can serve before new elections must be called (source: Database of Political Institutions; http://go.worldbank.org/2EAGGLRZ40)

lexch: Lagged official exchange rate (LCU per US$, period average) (source: World Development Indicators 2007 - World Bank (CD))

linvest: Lagged investment share of RGDPL (% in 2000 Constant Prices) (source: Penn World Tables; http://pwt.econ.upenn.edu/php_site/pwt_index.php; http://pwt.econ.upenn.edu/php_site/pwt62/pwt62_form.php; PWT 6.2 (188 countries, 1950-2004, 2000 as base year)

ldebt_serv: Lagged total debt service (% of GNI) (source: World Development Indicators 2007 - World Bank (CD))

lreserves: Lagged total reserves (includes gold, current US$) (source: World Development Indicators 2007 - World Bank (CD))

lbop_gdp: Lagged current account balance (% of GDP) (source: World Development Indicators 2007 - World Bank (CD))

linfl: Lagged inflation, GDP deflator (annual %) (source: World Development Indicators 2007 - World Bank (CD))

lfdi: Lagged foreign direct investment, net inflows (% of GDP) (source: World Development Indicators 2007 - World Bank (CD))

lexp_growth: Lagged exports of goods and services (annual % growth) (source: World Development Indicators 2007 - World Bank (CD))

limp_growth: Lagged imports of goods and services (annual % growth) (source: World Development Indicators 2007 - World Bank (CD))

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[6]There is a break in the data as mentioned in the explanation of prog.

lext_debt: Lagged external debt, total (DOD, current US$) (source: World Development Indicators 2007 - World Bank (CD))

lgni_pc: Lagged GNI per capita, PPP (current international $) (source: World Development Indicators 2007 - World Bank (CD))

A.2   Poverty Model

pgap$_1$: Poverty gap at $1 a day (PPP) (%) (source: World Development Indicators 2007 - World Bank (CD))

pgap_2: Poverty gap at $2 a day (PPP) (%) (source: World Development Indicators 2007 - World Bank (CD))

phcr_1: Poverty headcount ratio at $1 a day (PPP) (% of population) (source: World Development Indicators 2007 - World Bank (CD))

phcr_2: Poverty headcount ratio at $2 a day (PPP) (% of population) (source: World Development Indicators 2007 - World Bank (CD))

phcr_national: Poverty headcount ratio at national poverty line (% of population) (source: World Development Indicators 2007 - World Bank (CD))

phcr_urban: Poverty headcount ratio at urban poverty line (% of urban population) (source: World Development Indicators 2007 - World Bank (CD))

phcr_rural: Poverty headcount ratio at rural poverty line (% of rural population) (source: World Development Indicators 2007 - World Bank (CD))

gini_1: GINI index (source: World Development Indicators 2007 - World Bank (CD))

gini: GINI index (source: World Income Inequality Database, WIID2C, http://www.wider.unu.edu/research/Database/en_GB/wiid/)

gini_rep: Reported GINI index (source: World Income Inequality Database, WIID2C, http://www.wider.unu.edu/research/Database/en_GB/wiid/)

d1 - d10: Income decentiles (income definition: income, disposable) (source: World Income Inequality Database, WIID2C, http://www.wider.unu.edu /research/Database/en_GB/wiid/)

gdp_pcg: GDP per capita growth (annual %) (source: World Development Indicators 2007 - World Bank (CD))

infl: Inflation, GDP deflator (annual %) (source: World Development Indicators 2007 - World Bank (CD))

nct: Net current transfers (BoP, current US$) (source: World Development Indicators 2007 - World Bank (CD))

gdsavings: Gross domestic savings (% of GDP) (source: World Development Indicators 2007 - World Bank (CD))

lf_part: Labor force participation rate, total (% of total population ages 15-64) (source: World Development Indicators 2007 - World Bank (CD))

prim: School enrollment, primary (% gross) (source: World Development Indicators 2007 - World Bank (CD))

sec: School enrollment, secondary (% gross) (source: World Development Indicators 2007 - World Bank (CD))