The effect of IMF programs on labor

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Abstract

Recent work shows that IMF programs hurt economic growth in the short run and finds no evidence that they help in the long run (Przeworski and Vreeland 2000). Why would governments choose to enter into programs that lower growth? It turns out that the damaging effects of IMF programs may not be evenly distributed. Two studies on the effects of IMF programs on income distribution find that they are negative (Pastor 1987a,b, Garuda 2000). So while the economy as a whole may suffer under the IMF, some groups may not be hurt at all. Using a dynamic version of the Heckman selection model, I study the effect of IMF programs on the labor share of income from manufacturing. The income of capital from manufacturing is found to increase when the government participates in an IMF program even though overall economic growth declines. This conclusion is supported by 2,095 observations of 110 countries from 1961 to 1993.

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1. Introduction

For over twenty years, study after study found that IMF programs have no adverse effects on economic growth (Reichmann and Stillson 1978, Connors 1979, Pastor 1987a,b, Gylfason 1987, Killick 1995). Yet IMF austerity programs, which involve fiscal austerity and tight monetary policy (Taylor 1993), were widely believed to have contractionary effects, at least in the short run. Recent studies – which account for nonrandom selection into IMF programs – have found evidence of these contractionary effects. Conway (1994) finds that the immediate impact of IMF programs on economic growth is negative. Przeworski and Vreeland (2000) find that IMF programs lower annual economic growth by 1.5 percent each year that a country participates, and find no evidence that programs help in the long run.

Why would governments choose to follow programs that hurt growth? It turns out that the damaging effects of IMF programs may not be evenly distributed. Two studies on the effects of IMF programs on income distribution show that they hurt the poor disproportionately (Pastor 1987a,b, Garuda 2000). So while the economy as a whole may suffer under the IMF, some groups may gain.

Suppose that national income, *Y*, is distributed between two functional groups, capital and labor, and that when a country participates in an IMF program, the share of income going to capital increases.

If national income grows at an annual rate, g , then next year's income of capital if the country does not participate in an IMF program is:

$$K_{t+1} = kY_t(1+g),$$

where *K* is the income of capital, and *k* is the proportion of national income capital receives.

If the country participates in an IMF program, then capital's income is:

$$K_{t+1}^{IMF} = (k+\Delta)Y_t(1+g-d),$$

where $\Delta>0$ is the effect of the IMF program on capital share of national income, and $d>0$ is the negative effect of the IMF program on economic growth.

If capital discounts the future at a high enough rate so that all it cares about is the next period, it will be better off under an IMF program when

$$K^{IMF} > K$$

$$\Rightarrow (k+\Delta)Y_t(1+g-d) > kY_t(1+g)$$

$$\Rightarrow \Delta > \left(\frac{d}{1+g-d}\right)k. \qquad (1)$$

To give this relationship more meaning, consider some numbers. According to my data[1], the average share of manufacturing earnings going to capital is about 62 percent ($k = 0.62$). The average rate of growth of output is 4.23 percent ($g = 0.042$). According to Przeworski and Vreeland (2000), the negative effect of IMF programs on economic growth is approximately 1.53 percent ($d = 0.0153$). According to the equation above, capital is better off, at least in the short run, if the increase in capital share of income (Δ) is 1.0 percent or greater.

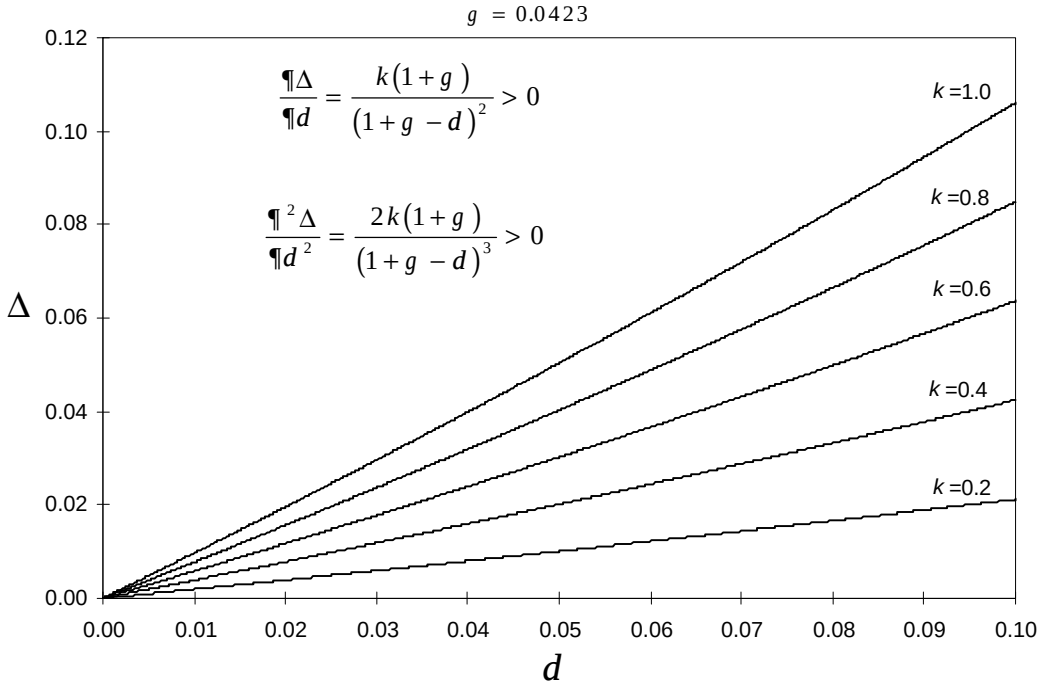
With other numbers, the shift in income to capital might have to be larger to make capital better off. Consider the average capital share of income from manufacturing observed the year before a country enters an IMF program, $k = 0.66$ and the average rate of output growth the year before entering an IMF program, $g = 0.0309$. Furthermore, suppose that the adverse effect of IMF programs on economic growth is set at 3.88 percent ($d = 0.0388$), the largest estimate reported by Przeworski and Vreeland. Given these figures, the increase in capital share of income must be 3 percent or greater.

Figure 1 shows "iso-income curves" for different values of initial capital share of income (*k*), holding initial rate of growth constant, $g = 0.0423$.[2] The iso-income curves show how much income must be transferred to capital (Δ) in order to keep the income of capital at the same level as it would be without an IMF program, for a given adverse effect of an IMF on economic growth (d). The figure shows that if capital has a smaller initial share of income (*k*), it will require a smaller shift in income distribution to keep its income the same despite lower economic growth. For all values of initial capital share, however, the first and second derivatives of the change in income distribution (Δ) with respect to the adverse change in economic growth (d) are positive at the point of indifference. This means that the more IMF programs hurt growth, the more income must be transferred to capital – at an increasing rate – in order to keep the income of capital the same as it would be without the IMF program.

[1] Described below.

[2] Setting initial rate of growth at different levels has only small effects. At the point of indifference, $\partial\Delta/\partial g = -kd/(1+g-d)^2$. This is shown below in Figure 3.

Figure 1: Iso-income curves
for different values of initial capital share, *k*



If the actual change in income distribution (Δ) lies above the iso-income curve for a given value of *k*, then income of capital will actually increase when the country participates in an IMF program even though the program hurts economic growth.

Hence the question of this paper: What is the effect of IMF programs on the labor share of income?

This is an empirical question. Evaluating the effects of IMF programs, however, is not straightforward. Because governments do not enter into IMF programs as random experiments, one cannot match "treatment" and "control" groups (Przeworski and Limongi 1996). The conditions of countries that participate in IMF programs differ systematically from the conditions of countries that do not (Goldstein and Montiel 1986, Conway 1994, Przeworski and Vreeland 2000). Thus, in order to evaluate IMF programs, one must distinguish between differences in country conditions and the inherent effects of IMF programs.

A further complication in the evaluation of the effect of IMF programs on distribution concerns the available data. This study is the first to evaluate the longest single series of data available on distribution: the labor share of income from manufacturing.[3]

[3] These data are available from *World Development Indicators on CD-ROM* (1995), which defines the series as "Total nominal earnings of employees divided by value added in current prices, to show labor's share in income generated in the manufacturing sector."

The disadvantage of this series is that it includes data only on the manufacturing sector. The advantage of using this series is that it includes 2,095 observations of 110 countries from 1961 to 1993. Ninety-one of these countries participated in 352 separate IMF arrangements which covered a total of 599 country-years. These data were collected according to the same methodology and are thus comparable across time and country. The importance of using this series of data is that previous studies using data with fewer observations were unable to use parametric methods to control for other factors that may influence both IMF participation and income distribution (Garuda 2000). Does the negative finding of previous studies disappear when one controls for other variables and nonrandom selection?

There are only two previous studies on the effects of IMF programs on distribution (Pastor 1987a,b, Garuda 2000). In the following section I review the results, methodologies, and data of these studies. In Section 3, I review the selection problem and explain the method I use to distinguish between the effects of IMF programs and the differences in country conditions. Section 4 presents the results – the effect of IMF programs on income distribution, and Section 5 answers the question of whether capital is better off under IMF programs. A brief conclusion follows.

2. Background

The potential effects of IMF economic reform programs on distribution are not straightforward. For example, the effect of reducing government budget deficit, a common condition of IMF programs, depends on the composition of budget cuts, producer mobility, and the adaptability of consumer patterns (Garuda 2000: 1033). As Garuda explains, "virtually any overall result can be achieved, provided that overall expenditures are reduced" (2000: 1034). Do governments structure reforms in ways that favor one group over another?

Pastor (1987a,b) conducted the first study on the effects of IMF programs on income distribution. Pastor considered labor's "wage share of net domestic product" (1987a: 88) in 18 Latin American countries from 1965 to 1981.[4] He compared labor share before and after IMF programs, and included a control group of non-program countries. He found that "the single most consistent effect the IMF seems to have is the redistribution of income away from workers" (1987a: 89).

[4] Pastor's data come from Series 1.3 of the U.N. National Accounts "Cost Components of the Gross Domestic Product (GDP)," which was computed from employee compensation, consumption of fixed capital, new indirect business taxes, and net operating surplus. He calculated labor share of income by dividing employee compensation by new production (GDP minus capital consumption) (1987a: 202).

The "before-after" approach that Pastor employs is intuitive and captures the way people commonly think about evaluating programs. The problem, however, is that one must assume that all of the conditions which can affect the labor share of income are exactly the same before and after a program is introduced. Any change in labor share is attributed to the introduction of the IMF program. Pastor's study needs to be updated with a broader data set using a method which corrects for the possible effects of selection, to determine whether the finding holds (for a review of different methodologies used to estimate IMF program effects, see Goldstein and Montiel 1986).

The Garuda (2000) study represents a methodological advance as he explicitly addresses the selection problem. Garuda studies the effects of 58 IMF programs on GINI coefficients and the income of the poorest quintile in 39 countries from 1975 to 1991. He finds that income distribution deteriorates when countries facing severe balance of payments problems enter into IMF programs. For countries facing less severe external accounts imbalances, however, he finds improvements in income distribution when countries enter IMF programs.

Garuda's data come from Deininger and Squire's (1996) recently published data set measuring income inequality. Unfortunately, this data set provides only a limited number of observations that are of high quality and are comparable across countries and time, as they come from numerous sources. Garuda uses 370 observations.

The scarcity of data limit the methods Garuda can employ to analyze the effects of the IMF. While he attempts to correct for selection bias by constructing "propensity scores" (see Conway 1994 for a description of the method), he cannot incorporate the "propensity scores" in a regression analysis because of "data limitations" (Garuda 2000: 1037). He controls for selection by breaking observations "into groups by propensity score and then [comparing] means within those groups." Garuda notes, however, that while "data limitations prevented the use of…regression-based modeling,…it should definitely be employed with a larger data set."[5]

This study takes the next step suggested by Garuda, applying regression analysis to a larger data set. Note that the data I use suffer from the limitation that they come from only one sector of the economy – manufacturing. This is a severe limitation as this sector of the economy is small in many developing countries. Employing other data sets, however, leads to a different – but potentially more severe – limitation: the inability to correct for selection bias using parametric analysis. The recently expanded version of Deininger and Squire's data (see the *World Income Inequality Database*) includes 1,703

[5] It may seem that the 370 observations that Garuda worked with should be sufficient to run regression analysis. Note, however, that the data exhibit country specific effects, thus at least two observations per country are required or observations must be discarded. And there must be two observations in each state of program participation. Very few observations remain once observations are discarded.

separate country-year observations. These observations, however, are not comparable as they are measured in different ways. For example. data from different countries have different reference units (household, individual) and different income definitions (UNDP 2000: 8).[6] The updated labor share data that Pastor used from the United Nations includes only 511 separate country-year observations. When one controls for country-specific effects and splits the sample between countries participating in IMF programs and countries not participating, there are simply not enough observations to use parametric methods to correct for selection bias.

The data I use include 2,095 country-year observations. This is by far the largest data set available on a single series of data. Rather than use propensity scores to control for selection effects, the method I use to control for selection follows Przeworski and Vreeland (2000) who follow Heckman (1979, 1988). The next section describes this method. If my results are consistent with the findings of Pastor and Garuda, we will have confidence that even controlling for the fact that countries participate in IMF programs under bad economic conditions, the inherent effects of programs are negative on income distribution. If my findings are not consistent, then we must question whether the previous findings are simply driven by nonrandom selection.

3. The selection problem

To estimate the effects of IMF programs, one must draw inferences about an unobserved counterfactual. The task is to compare outcomes if countries had participated and not participated in the programs under the same conditions. The standard difficulty in estimating the counterfactual necessary to evaluate the effects of any policy or program is nonrandom selection (Heckman 1988). What one observes in the real world are not experiments, which would match "treatment" and "control" groups, thus permitting direct inferences about the effects of IMF programs. Since the situations of countries that participate in IMF programs differ from those that do not, observed differences in income distribution may depend on these differing situations as well as the inherent effects of the IMF program. Note that because selection is nonrandom, one may not always be able to match the observed cases for these conditions. Furthermore, not all of these conditions are observable (Przeworski and Vreeland 2000). "Political will," for example, may influence both a government's decision to participate in an IMF program and influence income distribution. A methodology failing to account for such unobservable variables may result in biased estimates of the effects of IMF programs. Indeed, if such selection occurs, controlling for observed variables can actually increase the bias (Achen 1986, Przeworski and Limongi 1996).

How can one capture the effects of the relevant unobserved variables? Note that in all statistical models there is a stochastic component, usually referred to as the "error term." In fact, the error term represents unobserved explanatory variables, which are usually assumed to

[6] For a critique of this see Atkinson and Bourgignon (2000).

be random disturbances. Yet, if the errors from the estimation of selection are correlated with the errors from the estimation of growth, then the effects of unobserved variables are not random. The correlation indicates that unobserved variables that drive participation also determine performance. The method for correcting for selection effects caused by unobserved variables involves measuring the correlation between the errors from selection and the errors from performance. This correlation serves as an approximation of the effects of the relevant unobservable variables. These effects can then be removed, and what is left is the unbiased effect of the IMF-treatment.

Thus, before one can tell a story about the effects of IMF programs on labor, one must first tell a story of *selection*. The literature on the determinants of selection into IMF programs is growing (for example see Bird 1996 and Knight and Santaella 1997). Unfortunately, there are only a few hundred observations of certain determinants of IMF programs such as balance of payments, foreign reserves, and government budget deficit that coincide with the observations available on labor share. Fortunately, Alvarez *et al.* (1996) have collected 4,126 observations for 135 independent countries from 1950 (or date of independence) to 1990 on several economic variables that have been reported as significant predictors of IMF programs.[7]

Table 1 compares the results of two specifications of the determinants of IMF program participation. The first specification (Full model) includes the variables that Bird (1996: 1754-1755) reports there to be a consensus about their importance in the literature on IMF program participation: per capita income (Level), economic growth (Growth), change in exchange rate (Exchg rate), balance of payments (BOP), and past participation in IMF programs (Years under).

In addition to these variables, the "full" specification also includes variables that Przeworski and Vreeland (2000) find to be significant predictors of IMF program participation: foreign reserves (Reserves), government budget deficit (Deficit), debt service (Debt service), private and public investment (Investment), the number of other countries participating in IMF programs (Number under), whether elections were held the previous year (Lagged election), and whether a country is a democracy or dictatorship (Regime).

The second specification (Stripped model) includes only the variables for which the are no missing values: Level, Growth, Exchg rate, Years under, Investment, Number under, Lagged election, and Regime.

I use the "stripped" specification to avoid losing the thousands of observations that are missing on the other variables. Of the 1,034 observations available for the "full" specification, only a few hundred are in common with the 2,095 observations on the labor

[7] The Alvarez *et al.* data set (ACLP World Political/Economic Database) draws most of these economic variables from the *Penn World Tables 5.6* (Heston and Summers 1995). For definitions of the variables used in selection, see Appendix 3.

share of income from manufacturing. While some of the results of the two specifications differ, the instruments used to correct for selection bias (described below) are highly correlated.

Note that because governments usually enter into IMF programs and remain under them for a number of years (typically 5 years, according to my data), I model the selection process as a dynamic one, where governments can choose to enter and then remain under programs.[8]

[8] For details on the dynamic probit model see Amemiya 1985, chapter 11, Przeworski *et al*. 2000, or Przeworski and Limongi 1997. The model is also described in Appendix 1 below.

Table 1: Determinants of participation in IMF programs

	Determinants of entering		*Determinants of remaining*			
Variable	**Full model (1034 obs)**	**Stripped model (3991 obs)**	**Full model (1034 obs)**	**Stripped model (3991 obs)**	**1,034 obs sample means**	**3,991 obs sample means**
Constant	**-0.6598***	**-1.3017****	**0.5597**	**0.7954****	1.0	1.0
(standard error)	(0.360)	(0.129)	(0.445)	(0.201)		
Level	**-0.00003**	**-0.0001****	**-0.00002**	**-0.0001****	2146.46	3544.95
(standard error)	(0.00005)	(0.00002)	(0.00007)	(0.00003)		
Growth	**-0.0103**	**-0.0188****	**-0.0004**	**-0.0075**	1.06	2.24
(standard error)	(0.010)	(0.006)	(0.010)	(0.007)		
Years under	**0.0074**	**0.0415****	**-0.0142**	**0.0038**	6.87	3.67
(standard error)	(0.012)	(0.007)	(0.013)	(0.009)		
Number under	**-0.0088**	**0.00002**	**0.0104**	**0.0075**	36.70	29.63
(standard error)	(0.007)	(0.003)	(0.008)	(0.005)		
Lagged election	**0.4101****	**0.2482****	**-0.0169**	**0.1784**	0.19	0.22
(standard error)	(0.165)	(0.085)	(0.195)	(0.120)		
Regime	**0.0738**	**-0.0087**	**0.2004**	**-0.0314**	0.73	0.60
(standard error)	(0.185)	(0.093)	(0.184)	(0.115)		
Exchg rate	**0.0002**	**0.0006**	**0.0010**	**0.0025**	9.47	6.74
(standard error)	(0.002)	(0.001)	(0.002)	(0.002)		
Investment	**-0.0245****	**0.00000**	**0.0038**	**0.0048**	13.30	16.94
(standard error)	(0.012)	(0.005)	(0.013)	(0.007)		
Deficit	**-0.0106**		**0.0140**		-6.22	
(standard error)	(0.011)		(0.013)			
Debt service	**0.0626****		**0.0329***		5.13	
(standard error)	(0.020)		(0.019)			
Reserves	**-0.0890****		**-0.0341**		3.00	
(standard error)	(0.039)		(0.037)			
BOP	**-0.0215**		**-0.0246**		-1.45	
(standard error)	(0.015)		(0.017)			

	Full model (1034 obs)	Stripped model (3991 obs)		
Correctly predicted participating	83%	80%	**Predicted Pr correlation:**	**0.97**
Correctly predicted not participating	88%	94%	**Hazard rates correlation:**	**0.96**

This "stripped" selection model performs well, correctly predicting 80 percent of "participating" observations and 94 percent of the "not participating" observations (where the "prediction" cut-off is at 50 percent probability of participating/not participating). According to the "stripped" specification, countries with low levels of per capita income (Level) are more likely to "enter" into IMF arrangements and more likely to "remain."[9] Countries with low per capita income growth (Growth) are also more likely to enter programs, although this variable is not a significant predictor of continued participation. History matters: Years under measures the number of years in a country's history it has spent under IMF programs. Countries that have spent longer periods of time participating in past agreements are more likely to return to IMF agreements. This variable does not determine how long the current spell of participation will last, however, as it does not have a significant effect on the decision to remain. What other countries are doing also matters. Number under measures the number of other countries around the world that are currently participating in IMF programs. While this variable does not appear to influence the decision to enter into programs, it determines why countries remain. The more countries currently participating in an IMF program, the more likely a particular country is to continue participating. Finally, Table 1 shows that elections matter. Lagged election is a dummy variable coded 1 if the previous year had legislative elections and 0 otherwise. Governments are more likely to enter into IMF programs after elections.

These results are not fully consistent with the results from the "full" specification. The result on elections is the only robustly significant finding. The differences between results may be due to omitted variable bias, as two significant variables from the "full" model (Reserves and Debt service) cannot be included in the "stripped" model due to missing observations. Yet, the difference in results may also be due to sampling bias. Note the difference in the means of Level and Growth between the two samples.

The differences between the results of the two models may not be important for the purpose of this paper. The reason it is important to have a good model of the selection process into IMF programs is to obtain the instruments required to correct for potential selection bias when estimating the effect of IMF programs on distribution. The instruments used are derived in part from the predicted probability of participation. Notice the lower right hand corner of Table 1, where it is labeled "Predicted Pr correlation." This reports the correlation between the predicted probability of participation from the two models ("full" and "stripped"). The high correlation of 0.97 indicates that the "stripped" predicted probability of participation for each country-year observation is very close to the "full" predicted probability.

[9] Throughout the paper, coefficients significant at the 95 percent confidence level are indicated by ** in tables. Significance at the 90 percent level is indicated by *.

The actual instrument used to correct for potential selection bias is the "hazard rate." The hazard rates produced by the two specifications are also highly correlated (0.96).

The "hazard rate" represents one way of measuring the errors associated with each selection decision. Note that the statistical model used to estimate selection involves two decisions: the decision to enter agreements and the decision to continue/terminate agreements. Both of these decisions represent an area where relevant unobserved variables may be omitted. Hence, to correct for selection bias, one needs two instruments, one corresponding to each of the selection decisions. For countries currently under agreements, the hazard rate is the marginal probability that the agreement ends, given that it has survived thus far. For countries not currently under agreements, the hazard rate is the marginal probability that a program begins, given that there is no agreement in place. The hazard rates have a convenient property: when included in the estimation of program effects, the parameters capturing their influence indicate the correlation between the selection and the performance error terms. If such hazard rates are not included as explanatory variables, then the estimation of the effects of IMF programs on growth will suffer from a misspecification – specifically omitted variable – bias.

Appendix 1 demonstrates formally how the hazard rates are incorporated into the estimation of the effect of IMF programs on labor share. The general procedure is the following. A regression model of labor share is estimated separately for countries observed participating in programs and for those observed not participating. The hazard rates are included in this estimation as instruments to control for the effects of unobserved variables driving selection. This generates two sets of parameters, one characterizing countries under agreement, the other characterizing countries not under. These "under" and "not under" parameters are not biased by selection. The vector of independent variables characterizing each country at each time can then be multiplied alternatively by the "under" parameters and the "not under" parameters. The parameters on the hazard rates, which control for the effects of unobserved variables are left out. This removes the effects of selection and produces two counterfactual observations for each country during each year which are matched for all conditions – observed and unobserved. These selection-unbiased values of labor share "under" and "not under" are averaged separately over all countries and years, so that the difference between them is the net effect of IMF programs.

Armed with a statistical story of selection, one can now turn to evaluating the effects of IMF programs and control for differences in country conditions, both observed and unobserved.

4. The effect of IMF programs on labor share

First consider what is observed. The World Bank reports 2,095 observations of the labor share of income generated in the manufacturing sector in 110 independent countries over the period from 1961 to 1993. The mean labor share of these observations is 37.59 percent, the median is 36.7 percent.

Ninety-one of these countries participated in 352 separately signed IMF arrangements which lasted a total of 599 country-years. Table 2 shows the labor share of income from manufacturing according to IMF experience:

Table 2: Labor share of manufacturing income according to IMF experience

Observations of countries:	Mean	Median	N
Never under a spell	45.069	46.679	414
Before spells	36.177	36.000	381
Before and between spells	34.754	33.350	758
During spells	**31.570**	**29.500**	**599**
Between spells	33.317	30.100	377
Between and after spells	38.930	39.400	799
After spells	43.945	45.300	422

The first row of Table 2 (**Never under a spell**) shows the mean and median labor share (percentages) for the 19 countries in the sample that never participate in an IMF agreement for as long as they are observed (414 country-year observations). The second row (**Before spells**) gives the mean and median labor share for those countries that have not yet participated in an IMF program but eventually do participate. The third row (**Before and between spells**) pools the "**Before**" observations and the "**Between**" observations, which are observations of countries that are not currently participating in an IMF program, but have in the past and do in the future. The "**During spell**" row presents the 599 observations of countries actually participating in an IMF arrangement. The "**Between spells**" row reports just the "**Between**" observations (countries that are not currently participating but have participated and will participate again). The "**Between and after spells**" row pools the observations of "**Between spells**" with the observations of

"**After spells**," which are observations of countries that have participated in IMF programs in the past, but do not return before the end year of the sample (1993).

Table 2 shows that the observation made by Pastor in 1987 holds over a longer period of time and over the entire world: labor share is lower for countries that participate in IMF programs. Labor is best off in countries that have never participated in an IMF program, and worst off in countries currently participating in an IMF program. Labor does slightly better when the country leaves the IMF program, but labor share does not appear to rebound immediately.

Figure 2 represents these observations graphically over time:

Figure 2: Labor share of manufacturing according to IMF experience

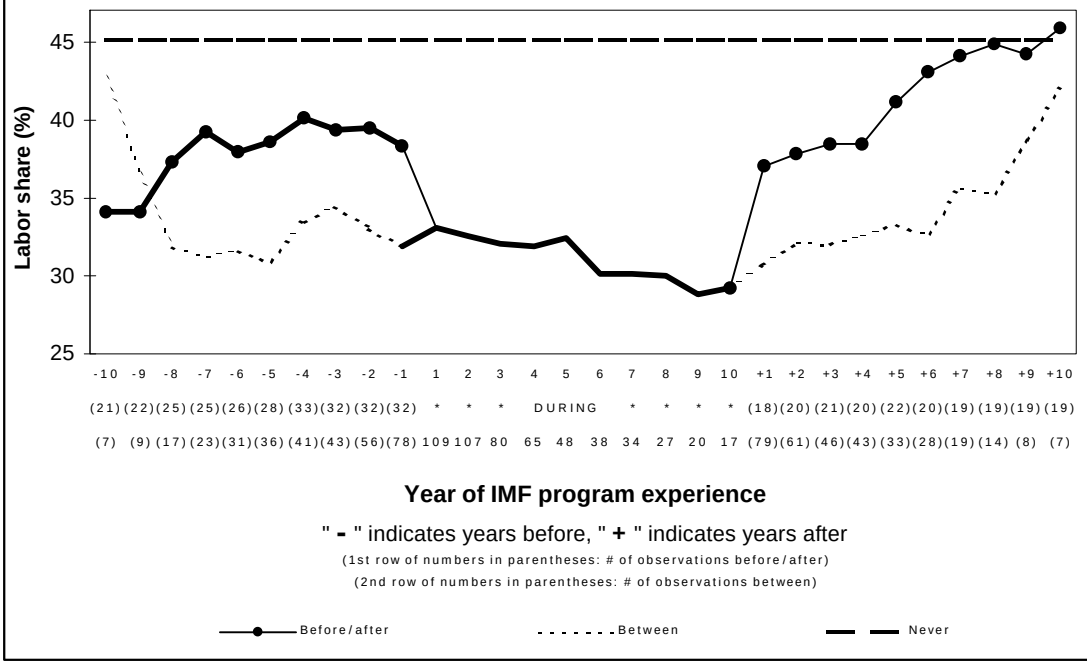


Figure 2 shows the experience of countries over time. The valley traced by the thick line in the middle of the figure represents the labor share of manufacturing income when countries participate in IMF programs. The dotted lines show the experience before and after programs. The thin dashed line represents the experience of countries between programs. Note that many of the between observations are double counted because countries may exit IMF programs for only a short time before returning. For example, of the 78 observations of countries between programs one year before returning (-1), and the 79 observations of countries between programs one year after (+1), 29 of these observations are in common. The horizontal line near the top of the figure represents countries that never participate in IMF programs.

Labor share is low in countries before they enter IMF programs, but there does not appear to be any trend leading up to participation. When countries enter IMF programs, labor share plummets and as participation continues it seems to trend downward. When countries emerge from IMF programs, labor share trends upward – it appears to take about 10 years to "catch up" to countries that never participate. Note, however, that most countries that participate in IMF programs return before 10 years. This is why the number of "between" observations after programs declines rapidly as countries move from +1 to +7 years out – countries enter new IMF programs. The average stint "out" of IMF programs before returning is about 5 years.

So the observed world supports Pastor's and Garuda's findings. But do they hold when one controls for nonrandom selection on observed and unobserved conditions? Table 3 presents the regression results according to the method described in the previous section. The regression is run on the sample split between observations of countries with IMF programs and those without. The hazard rates are included to correct for potential selection bias. The model includes random effects to control for country specific characteristics. [10]

My specification of the determinants of labor share follows the "benchmark regression" suggested by Rodrik (1999: 714) in his recent work, "Democracies Pay Higher Wages":

(a) average labor productivity in manufacturing, as measured by capital stock per member of the labor force (Capital stock/worker 1000s)[11]
(b) per capita GDP, "as a handy proxy for other structural determinants correlated with levels of income" (Level)

[10] All variables are lagged so the first observation for each country is discarded. This reduces the sample size from 2,095 to 2,016. Only 1,846 of these observations are included in the regression analysis because the random effects model to control for country specific effects requires there be at least 2 observations for each country. Countries with only one observation in either the "participating" or "not participating" states are discarded. I choose the random effects model so that a single constant terms is estimated for each state, "participation" or "not participation." This is a more convenient approach than the fixed effects model which estimates a country-specific constant term. If a country is observed only in one state of participation, no counterfactual constant term is estimated. Thus, one cannot estimate what labor share would have been if the country had been in the other state of participation. One way around this is to simply use the average of the fixed effects for each state. When I do this, the results presented below hold and in fact are much more dramatic. These results are available from the author upon request.

[11] To control for labor productivity, Rodrik (1999) uses manufacturing value added per worker instead of capital stock per worker. I use capital stock per worker because of the greater availability of data (4,126 observations versus 1,838 observations). These variables are highly correlated: ($r = 0.8$).

(c) average price level of consumption, "to indicate cost-of-living differences not captured by exchange rate conversions" (Price level of consumption)
(d) country specific effects (random effects model).

I also follow Rodrik by including a variable measuring "regime."

These data come from the *ACLP Data Set* (Alvarez *et al*. 1996) which takes the economic data from the *Penn World Tables 5.6* (Heston and Summers 1995).

Table 3: Labor share of income from manufacturing regression by participation status

	Not **participating in IMF programs**			***Participating*** **in IMF programs**		
Explanatory variables	**Coefficient**	**Standard error**	**Mean**	**Coefficient**	**Standard error**	**Mean**
Constant	34.41**	1.45	1.00	34.46**	1.51	1.00
Capital stock/worker (1000s)	0.21**	0.07	13.18	-0.07**	0.03	5.58
Level (1000s)	-0.36	0.26	5.28	0.29**	0.13	2.46
Price level of consumption	0.07**	0.01	71.40	0.002**	0.001	54.59
Regime (Dictatorship=1)	-3.63**	0.98	0.45	-1.57**	0.08	0.64
Hazard rate	0.60	0.67	-0.23	0.10**	0.05	0.53
Dependent variable	Mean	Standard deviation		Mean	Standard deviation	
Labor share	39.88	13.63		31.57	11.73	
Number of observations	1305			541		
Lagrange multiplier test	3258.22			1243.42		
Hausman test (fixed versus random)	49.42			7.64		

All variables are lagged one year

Most of the coefficients reported in Table 3 are consistent with Rodrik's (1999) findings. First of all, his finding that dictatorships pay lower wages than democracies holds when one controls for participation in IMF programs. Note, however, that this finding is stronger when countries are not participating in IMF programs. On average, labor share of income is 3.6 percent lower in dictatorships than in democracies when countries do not participate in IMF programs, but only 1.6 percent lower when countries participate in IMF programs. This may be because labor share is already so much lower when countries participate in IMF programs.

For observations of countries not participating in IMF programs, the effect of Capital stock/worker (1000s) is positive and significant, as is the effect of Price level of

consumption. For observations of countries participating in IMF programs, the effect of GDP per capital (Level) is positive and significant, as is the effect of Price level of consumption. There are two strange findings reported in Table 3 that are not consistent with Rodrik's (1999) findings: the insignificant negative effect of Level for observations of countries not participating, and the significant – though small – negative effect of Capital stock/worker for observations of countries participating.

The fact that Level does not have a positive effect on labor share of income for observations of countries not participating in IMF programs may have to do with the fact that countries with high levels of GDP per capita are less likely to participate in IMF programs, as shown in section 3. The relationship between labor share and GDP per capita may simply be flat at higher levels on per capital income. To test this, I replace Level with LOG Level (the natural logarithm of GDP per capita) in the specification presented in Table 4:

Table 4: Labor share of income from manufacturing regression by participation status (with the natural log of GDP per capita)

	***Not* participating in IMF programs**			***Participating* in IMF programs**		
Explanatory variables	**Coefficient**	**Standard error**	**Mean**	**Coefficient**	**Standard error**	**Mean**
Constant	32.60**	1.56	1.00	34.63**	1.54	1.00
Capital stock/worker (1000s)	0.07	0.05	13.18	-0.08	0.06	5.58
LOG Level (1000s)	1.56	1.01	1.25	0.94	0.66	0.64
Price level of consumption	0.06**	0.01	71.40	0.003	0.003	54.59
Regime (Dictatorship=1)	-2.96**	1.02	0.45	-1.56**	0.21	0.64
Hazard rate	0.44	0.66	-0.23	0.10	0.12	0.54
Dependent variable	Mean	Standard deviation		Mean	Standard deviation	
Labor share	39.88	13.63		31.57	11.73	
Number of observations	1305			541		
Lagrange multiplier test	3302.65			1192.36		
Hausman test (fixed versus random)	38.28			8.77		

All variables are lagged one year

The effect of LOG Level is not significant, but the coefficient is positive, as expected. The strange negative effect of Capital stock/worker for countries observed participating in IMF programs, persists in this specification, although it is not significant. This result may simply be driven by multicollinearity between Level and Capital stock/worker

as they are highly correlated ($r = 0.9$). In the specification presented in Table 5, I leave out Level:

Table 5: Labor share of income from manufacturing regression by participation status (without GDP per capita)

	***Not* participating in IMF programs**			***Participating* in IMF programs**		
Explanatory variables	**Coefficient**	**Standard error**	**Mean**	**Coefficient**	**Standard error**	**Mean**
Constant	33.75**	1.38	1.00	34.74**	1.56	1.00
Capital stock/worker (1000s)	0.13**	0.04	13.18	0.004	0.05	5.58
Price level of consumption	0.06**	0.01	71.4	0.003	0.004	54.59
Regime (Dictatorship=1)	-3.40**	0.98	0.45	-1.58**	0.32	0.64
Hazard rate	0.51	0.66	-0.23	0.13	0.18	0.54
Dependent variable	Mean	Standard deviation		Mean	Standard deviation	
Labor share	39.88	13.63		31.57	11.73	
Number of observations	1305			541		
Lagrange multiplier test	3293.86			1207.19		
Hausman test (fixed versus random)	39.86			9.31		

All variables are lagged one year

The effect of Capital stock/worker for countries observed participating in IMF programs is positive, though not significant in this specification. All other coefficients have the expected sign.

In order to test for the significance of the apparent time trends evidenced in Figure 2, I tested "count" variables: For countries participating, I included a count of how many consecutive years a country has participated in IMF programs. For countries not participating, I included a count of the number of years since participation in an IMF program ended (coded zero if a country has not yet participated). To distinguish countries that have not yet participated, I also included a dummy variable if a country has not yet participated and zero otherwise. I also tested for trends leading up to IMF programs. When these splines are included in the regressions, the trends over time observed in Figure 2 turn out not to hold when the other variables are taken into account. They are not statistically significant when included in the above specifications.[12]

[12] These results are not presented here, but are available from the author upon request.

In all of the above specifications, the coefficients for the Hazard rates are small, and almost all of them are not significant. This indicates that the results reported by Pastor (1987) may not have been biased by nonrandom selection. Indeed, the only significant hazard rate effect, reported in Table 3 for countries observed participating, indicates that the direction of bias is upward for countries observed participating. Thus, it is not surprising that my findings (below) are consistent with the negative findings of previous studies on the effect of IMF programs on labor share. I use the coefficients above to estimate the inherent effects of IMF programs. One can take the observed values of Capital stock/worker, Level, Price level of consumption, and Regime, multiply them by the coefficients for "*Participating*" reported in Table 3, and then calculate the hypothetical labor share. The same can be done to simulate labor share if countries did not participate.

Table 6 presents the average for the entire world of these hypothetical scenarios. Because the parameters are unbiased by nonrandom selection, differences in country conditions are essentially "matched." Thus, the differences between these averages are an estimate of the inherent effects of IMF programs.

Table 6: Hypothetical labor share of income from manufacturing according to IMF experience (selection-corrected estimates)

	According to specification from Table 3	According to specification from Table 4	According to specification from Table 5
Predicted labor share if countries do not participate:	37.64%	37.74%	37.66%
Predicted labor share if countries participate:	34.33%	34.20%	34.17%
Predicted overall effect:	**-3.32%**	**-3.54%**	**-3.49%**
Number of observations:	1846		
Actually observed mean:	37.44%		
Observed mean not participating in IMF programs:	39.88%		
Observed mean participating in IMF programs:	31.57%		
Observed difference:	-8.31%		

Table 6 reports that once one controls for other factors – nonrandom selection, the average labor productivity in manufacturing, per capita GDP, the average price level of consumption, country specific effects, and regime – the inherent effect of IMF programs is negative. The effect of IMF programs on labor share of income for manufacturing is much smaller than the observed difference of 8.3 percent; the effect ranges from -3.3 to -3.5, depending on the specification of labor share used. This, however, is a significant negative effect and confirms the results of Pastor (1987) and Garuda (2000). Governments under IMF economic reform programs structure these reforms such that labor is hit harder than capital.

5. Is capital better off?

If IMF programs hurt economic growth and lower the labor share of income from manufacturing, the income of labor is obviously lowered when governments enter into IMF programs. The same is not true for capital.

Recall from the introduction that even if growth is hurt by 1.5 percent, capital is better off under IMF programs if the shift in the distribution of income is at least 1.0 percent. Clearly this is the case.

Rewriting condition (1) from the introduction, capital will be better off provided the following condition holds:

$$g > \frac{kd}{\Delta} + d - 1$$

(recall that g is rate of growth, d is the negative effect of the IMF on growth, k is capital share and Δ is the effect of the IMF on capital share).

If $d = 0.015$, as Przeworski and Vreeland (2000) predict, and $\Delta = 0.03$ (a conservative estimate according to Table 6), then capital will most certainly be better off under IMF programs. This is because the condition $g > 0.5k - 0.985$ will almost always hold: if $\Delta = 0.03$, the highest reasonable value of k is 0.97 $\Rightarrow g > -0.5$.[13]

Indeed, Figure 3 shows that for any reasonable rate of growth (g), capital will be better off. Indifference curves are plotted for different values of k and the negative effect of the IMF on growth (d) is allowed to vary from 0.001 to 0.05. As long as growth is

[13] According to the 4,126 observations of GDP annual growth in the *ACLP* data set, annual output growth has been less than -0.25 only four times: Uganda 1984 (-0.45), Angola 1975 (-0.32), Iraq 1981 (-0.31), and Nicaragua 1979 (-0.28). In all of these cases, either no IMF agreement was present, or the government discontinued participation the following year. Mean growth per annum for the sample is 0.04, and for the 1,080 observations of countries participating in IMF programs it is 0.03.

above the indifference curve for the appropriate distribution of income (k), the income of capital will be higher if the country participates in the IMF program than without the program:

Figure 3: If IMF programs redistribute 3% of income, growth condition for capital to be better off is usually satisfied

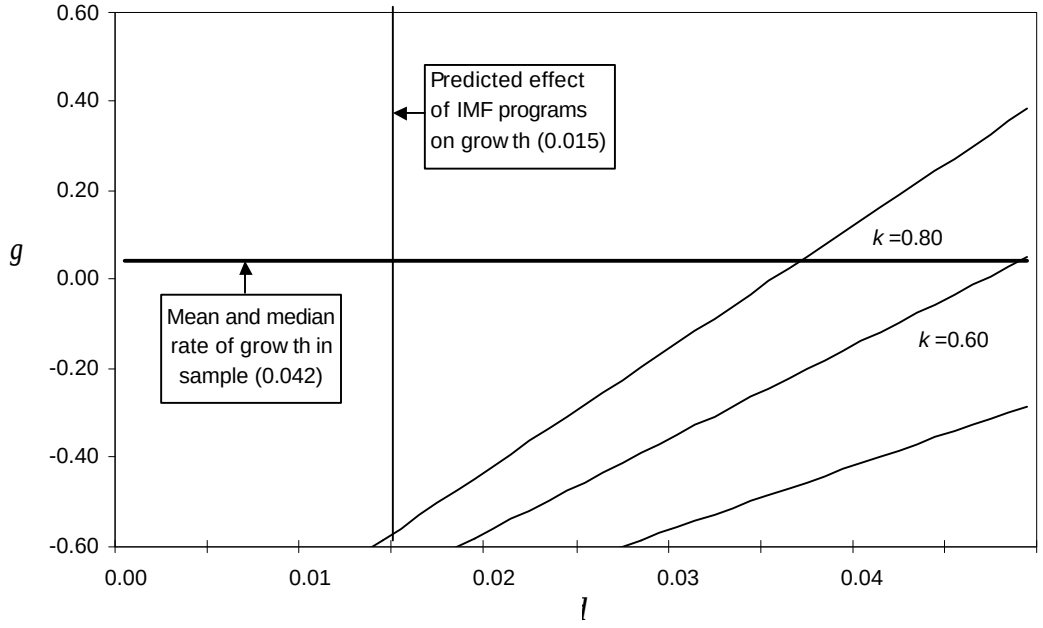


Figure 3 shows that if IMF programs hurt growth by about 1.5 percent per year, capital will be better off, at least in the short run. Indeed, even if growth is hurt by up to 5 percent, the growth rate need not be positive for capital to be better off, unless capital receives more than 60 percent of income.

Note that the prediction that IMF programs lower the labor share of income by 3 percent holds constant the effects of other variables. The above estimations predict effects *as if* country-year observations were matched for all conditions, observed and unobserved. Because governments that actually enter into IMF programs usually suffer from particularly adverse economic conditions, one may observe capital to actually lose income. The statistical analyses of this section indicates, however, that capital *would* do worse if the government did not enter into the IMF program, and labor *would* be better.

Sometimes, however, capital is better off even if one does not control for selection effects. Consider Congo which had a labor share of earnings from manufacturing of 48.8 percent in 1985. The government entered into an IMF agreement in 1986 and labor share dropped to 40.3 percent. Although the country as a whole experienced negative growth of

-2.99 percent that year, the income of capital grew. Earnings from manufacturing[14] were 5,227 million in 1985, of which 2,676 million went to capital. Earnings from manufacturing dropped to 5,059 million in 1986, of which capital received 3,020 million. The income of capital increased 9.5 percent despite the overall economic contraction.

Another interesting story is that of Uruguay in 1990. In 1989, labor share of manufacturing was 25.8 percent. In 1990, the government entered into an IMF program. The economy experienced a contraction of -1.03 percent and earnings from manufacturing dropped from 3,722 million to 3,667 million. Labor share of income from manufacturing, however, also dropped to 23.1 percent. Thus, the income going to capital increased from 2,762 million to 2,820 million. Despite negative growth for the economy as a whole, the income of capital increased by 2 percent.

And finally, consider Ecuador. This country participated in its first IMF agreement in 1973. In 1974, the labor share of income from manufacturing was 24.8 percent. Labor share grew until 1982 when it reached 52.8 percent. In 1983, the government entered into another IMF program. Labor share plummeted to 34.8 percent. Ecuador experienced a drastic contraction that year with economic growth of -5.76 percent. But capital experienced an increase in income in 1983. Earnings from manufacturing in 1982 were 3,413 million, of which 1,611 million went to capital. The following year, earnings from manufacturing dropped to 3,366 million, but 2,195 million of this went to capital. The income of capital grew by 36 percent!

[14] Data on earnings from manufacturing was taken from *World Development Indicators on CD-ROM* (2000), where it is defined as follows: "Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 2. Data are expressed [*sic*.] constant 1995 U.S. dollars."

6. Conclusion

As the first study to use regression analysis that controls for the effects of nonrandom selection on the largest set of data on distribution yet considered, this study confirms the main findings of Pastor (1987a,b) and Garuda (2000). IMF programs have negative distributional consequences. Thus, this finding holds across data sets and methodologies.

If IMF programs hurt economic growth and redistribute income away from labor, labor is worse off – in terms of income – when countries participate in IMF programs. For capital, however, there is a trade-off: growth decreases but share of income increases. Shifts in distribution towards capital mitigate the negative effects on economic growth for this group. This paper shows that the change in capital share of income from manufacturing is large enough to increase the income of capital, despite lower growth rates.

Balance of payments crises and exchange instability are facts of life, so the IMF has an important role to play as a lender of last resort. The question is whether coping with these crises must necessarily reduce labor share. Note that reducing the income of labor may be by design. After all, the IMF presumes that balance of payments crises are due to excess demand. The former Managing Director of the Fund, however, claimed that the primary objective of IMF programs is "high quality growth," not merely "growth for the privileged few, leaving the poor with nothing but empty promises" (Camdessus 1990).

When the benefits of positive economic growth are distributed across all income groups, growth is "high quality." Yet previous research shows that IMF programs lower economic growth, and this paper demonstrates that the adverse effects are concentrated on labor and the poor. Indeed, despite negative economic growth, the income of "the privileged few" increases. Thus, according to the characterization of Camdessus, the form of growth promoted by the IMF must be considered of the "lowest quality."

Appendix 1: The selection model of IMF program performance

The dynamic probit model:

Assume participation at time *t* depends on participation at time *t*-1 (i.e., assume the data obey a first-order Markov process). Let d_{it} denote participation status in country *i* at time *t*: d_{it}=1 if country *i* is under agreement at time *t*, and d_{it}=0 if country *i* is not under agreement at time *t*.

Let $p_{NU,it}$ denote the "transition probability" that country *i* enters into an IMF arrangement at time *t* (that is goes from *not* under at time *t*-1 to *under* at time *t*). The probability that the country does not enter an arrangement at time *t* is $p_{NN,it}=1-p_{NU,it}$. Similarly, $p_{UU,it}$ denotes the probability that country *i* stays under at time *t*. The probability that participation ends at time *t* (i.e., that country *i* goes from $U_{i,t-1}$ to N_{it}) is $p_{UN,it}=1-p_{UU,it}$.

The probability of participation at time *t*, $p(d_{it}=1)$ is the probability of going under, $p_{NU,it}$, if country *i* was not under at time *t*-1 $(1-d_{i,t-1})$ plus the probability of continued participation, $p_{UU,it}$, if country *i* was already under agreement at time *t*-1 $(d_{i,t-1})$:

$$\begin{aligned} p(d_{it}=1 \mid d_{i,t-1}) &= p_{NU,it}(1-d_{i,t-1}) + p_{UU,it}d_{i,t-1} \\ &= p_{NU,it} + (p_{UU,it} - p_{NU,it})d_{i,t-1}. \end{aligned}$$

Let $p_{NU,it} = F(\gamma' X_{i,t-1})$, where $F(\cdot)$ represents the cumulative distribution function of the standard normal distribution. Let $p_{UU,it} = F\left[(\gamma+\alpha)' X_{i,t-1}\right]$. Then one can rewrite the probability of an IMF agreement as:

$$p(d_{it}=1 \mid d_{i,t-1}) = F(\gamma' X_{i,t-1} + \alpha' X_{i,t-1} d_{i,t-1}).$$

From this, one can write the likelihood function and estimate the probability of selection into IMF programs. Note that this estimation is equivalent to estimating a straightforward probit where the latent variable, d_{it}^*, is defined as:

$$d_{it}^* = \gamma' X_{i,t-1} + \alpha' X_{i,t-1} d_{i,t-1} + \nu_{it}.$$

I will refer to this last equation in the next section when discussing how to use hazard rates to control for selection bias.

Correcting for Selection Bias from Unobserved Variables

Following Heckman (1988), the problem of measuring the effect of Fund programs on labor share is as follows. Let ℓ_{it} be labor share of country *i* at time *t*. Define:

$$\ell_{it} = \begin{cases} \ell^*_{it} & \text{if } d_{it} = 0 \\ \ell^*_{it} + d_{it}\Delta_{it} & \text{if } d_{it} = 1 \end{cases}$$

where ℓ^*_{it} is a country's "latent" labor share, the share of income that labor receives if a country does not participate in an IMF program; d_{it} is a dummy variable set to 1 if a country participates, and 0 otherwise; and Δ_{it} denotes the impact of the program on labor share. This is the parameter of interest. We want to estimate the impact of the IMF program on countries who participated in the program:

$$E\left(\ell_{it} - \ell^*_{it} \mid d_{it} = 1\right) = E\left(\Delta_{it} \mid d_{it} = 1\right).$$

If assignment into programs were random, mean value of labor share for non-program countries would equal the latent labor share of program countries: $E\left(\ell^*_{it} \mid d_{it} = 0\right) = E\left(\ell^*_{it} \mid d_{it} = 1\right) = E\left(\ell^*_{it}\right)$. By virtue of random assignment, ℓ^*_{it} would be statistically independent of treatment status, d_{it}.

However, there is no reason, *a priori*, to assume that assignment into programs is random. And if participation is not randomly assigned, the dummy variable indicating participation, d_{it}, will be correlated to the error term e_{it} from the following equation:

$$\ell_{it} = b'Z_{it} + d_{it}\Delta_{it} + e_{it}$$

where Z_{it} is a vector of observable variables affecting ℓ_{it}, b is a vector of fixed parameters, and Δ_{it} is the impact of the IMF program on country *i*'s labor share at time *t*. If there is selection bias, $E\left(e_{it}\ d_{it}\right) \neq 0$. Thus, in expectation, e_{it} will not equal zero and hence:

$$E\left(\ell_{it} \mid Z_{it}, d_{it}\right) \neq b'Z_{it} + d_{it}\Delta_{it}.$$

If the correlation between d_{it} and e_{it} comes from the observed determinants of d_{it}, ($X_{i,t-1}$ from the selection estimation of the previous section) correction is straightforward – one simply needs to control for the observed determinants of selection. However, the correlation can also be caused by correlated error terms, $E\left(e_{it}\ v_{it}\right) \neq 0$ (where v_{it} also comes from the selection estimation of the previous section).

Heckman suggests correcting for this by incorporating the expected value of the selection error term into the performance equation. The inclusion of such variables corrects for the bias. Note that there are two situations to consider: $d^*_{it} > 0$ and $d^*_{it} \leq 0$:

$$(1)\ E\left(v_{it} \mid d_{it}^{*} > 0\right) = E\left(v_{it} \mid v_{it} > -\left(g + a\right)' X_{i,t-1}\right)$$

$$= \frac{f\left[-\left(g + a\right)' X_{i,t-1}\right]}{1 - F\left[-\left(g + a\right)' X_{i,t-1}\right]} = \frac{f\left[\left(g + a\right)' X_{i,t-1}\right]}{F\left[\left(g + a\right)' X_{i,t-1}\right]} = l_{it}^{1}$$

$$(2)\ E\left(v_{it} \mid d_{it}^{*} \le 0\right) = E\left(v_{it} \mid v_{it} \le -\left(g + a\right)' X_{i,t-1}\right)$$

$$= \frac{-f\left[-\left(g + a\right)' X_{i,t-1}\right]}{F\left[-\left(g + a\right)' X_{i,t-1}\right]} = \frac{-f\left[\left(g + a\right)' X_{i,t-1}\right]}{1 - F\left[\left(g + a\right)' X_{i,t-1}\right]} = -l_{it}^{0}$$

The Heckman method to correct for this bias involves calculating the hazard rates, l , and including them in the estimation of labor share:

$$E\left(\ell_{it} \mid Z_{it}, X_{i,t-1}, d_{it}^{*} > 0\right) = b_1' Z_{it} + q^{1} l_{it}^{1}$$

$$E\left(\ell_{it} \mid Z_{it}, X_{i,t-1}, d_{it}^{*} \le 0\right) = b_0' Z_{it} + q^{0} l_{it}^{0}$$

These properly specified equations will give unbiased estimates of b from which one can calculate labor share under IMF programs and labor share not under. Thus one can estimate the average Δ, the impact of IMF programs on labor share of income from manufacturing.

Appendix 2:

2,095 observations of labor share of income from manufacturing for 110 countries[15]

Argentina: 1963,1970-1991
Armenia: 1991
Australia: 1963-1992
Austria: 1963-1993
Bahamas: 1978-1983,1986-1987,1991
Bangladesh: 1971-1990
Barbados: 1970-1989,1991-1992
Belgium: 1963-1992
Belize: 1989-1992
Benin: 1974-1981
Bolivia: 1970-1991
Botswana: 1968,1972,1974-1988
Brazil: 1963-1991
Burkina Faso: 1974-1983
Burundi: 1971 –1980,1983,1986- 1991
Cameroon: 1970-1972,1974-1984,1989-1990
Canada: 1963-1993
Central African Republic: 1973-1978,1980-1983,1985-1990,1992
Chad: 1975
Chile: 1963-1993
China: 1980-1986
Colombia: 1963-1993
Congo: 1968-1976,1981-1988
Costa Rica: 1963,1965,1968-1991
Cote d'Ivoire: 1966-1982
Croatia: 1991-1992
Denmark: 1963-1992
Dominican Republic: 1963-1983
Ecuador: 1963-1993
Egypt: 1964-1992
El Salvador: 1963-1985,1991
Fiji: 1970-1992
Finland: 1963-1993
France: 1977-1989
Gabon: 1966,1972-1978,1980-1982
Gambia: 1975-1982
Ghana: 1963-1987
Greece: 1963-1993
Greek Cyprus: 1991-1992
Guatemala: 1968,1971-1990
Honduras: 1963-1966,1968-1969,1971-1975,1983-1992
Hungary: 1971-1991
Iceland: 1968-1991
India: 1963-1992
Indonesia: 1970-1992
Iran: 1963-1977,1979-1991
Iraq: 1963-1977,1981-1987,1991-1992
Ireland: 1963-1993
Israel: 1963-1988,1990-1991
Italy: 1967-1993
Jamaica: 1963-1992
Japan: 1963-1971,1974-1993
Jordan: 1963-1992
Kenya: 1963-1992
Lesotho: 1980-1985
Luxembourg: 1963-1993
Madagascar: 1967-1986
Malawi: 1964-1975,1979-1986
Malaysia: 1968-1993
Mali: 1969-1981
Malta: 1964-1989
Mauritius: 1968-1991
Mexico: 1984-1991
Morocco: 1967-1969,1976-1980,1985-1992
Myanmar: 1963
Nepal: 1977,1986,1991
Netherlands: 1963-1991
New Zealand: 1963-1992
Nicaragua: 1965-1985
Niger: 1978,1980-1988

[15] The sub-samples used in the main body of the text are available from the author upon request. For a list of countries participation in IMF programs, see Przeworski and Vreeland 2000.

Nigeria: 1963-1985
Norway: 1963-1993
Pakistan: 1963-1989
Panama: 1963-1993
Papua New Guinea: 1975-1989
Peru: 1963-1969,1972-1973,1979-1988
Philippines: 1963-1966,1968-1992
Poland: 1972-1990
Portugal: 1963-1990
Qatar: 1991-1992
Romania: 1991-1991
Rwanda: 1969-1979,1984-1986
Senegal: 1974-1985,1987-1989
Seychelles: 1976-1986
Sierra Leone: 1981
Singapore: 1965-1993
Slovenia: 1991-1992
Somalia: 1967-1979,1986
South Africa:
1963,1964,1966,1968,1970,1972-1993
South Korea: 1965-1993
Spain: 1963-1991
Sri Lanka: 1966,1980-1983,1987-1990
Sudan: 1972-1975
Swaziland: 1968,1970-1973,1976-1989
Sweden: 1963-1993
Syrian Arab Republic: 1961,1965-1991
Tanzania: 1965-1974,1978-1988
Thailand: 1967-1970,1974-
1977,1979,1982,1984,1986,1988-1991
Togo: 1974-1979,1982-1984
Trinidad and Tobago: 1966-1968,1974-
1978,1981-1987
Tunisia: 1963-1981
Turkey: 1963-1992
Uganda: 1963-1969,1971
United Kingdom: 1963,1968-1992
United States: 1963-1993
Uruguay: 1968,1976-1993
Venezuela: 1963,1965,1967-1993
Zaire: 1968-1969,1972
Zambia: 1964-1991
Zimbabwe: 1965-1993

Appendix 3: Definitions and sources of variables

Selection variables

Dependent variable

Participation in IMF programs: Dummy variable coded 1 for the country-years when there was a conditioned IMF agreement (Stand-by Arrangement, Extended Fund Facility Arrangement, Structural Adjustment Facility Arrangement, or Enhanced Structural Adjustment Facility Arrangement) in force, 0 otherwise. Source: *ACLP Data Set* which takes it from *IMF Annual Reports* and *IMF Survey*.

Explanatory variables

Level: "Level" of economic development measured as real GDP per capita in 1985 international prices, chain index. Source: *ACLP Data Set* which takes it from *Penn World Tables 5.6*, where it appears as "RGDPL."

Growth: Economic growth measured as the annual rate of growth of Level. Source: *ACLP Data Set*.

Years under: Cumulative number of years a country has been under IMF agreements. Source: *ACLP Data Set*.

Number under: Total number of *other* countries in the world currently under IMF agreement (does not include the given country itself). Source: *ACLP Data Set*.

Lagged election: Dummy variable coded 1 if legislative elections were held the previous country-year. Source: *ACLP Data Set* which takes it directly from Banks (1993: 20), where it appears as "LEGISLATIVE ELECTION," and is defined as follows: "The number of elections held for the lower house of a national legislature in a given year."

Regime: Dummy variable coded 1 for dictatorships and 0 for democracies. Source: *ACLP Data Set*. For more on this variable, see Alvarez *et al*. (1996).

Exchg rate: Exchange rate (national currency relative to the US dollar). Source: *ACLP Data Set* which takes it from *Penn World Tables 5.6*, where it appears as "ExR."

Investment: Real gross domestic investment (private and public) as a percentage of GDP. Source: *ACLP Data Set* which takes it from *Penn World Tables 5.6*, where it appears as "i."

Deficit: Central government overall surplus as a percentage of GDP. Source: *ACLP* which takes it from *World Development Indicators on CD-ROM 1994*.

Debt service: Total debt service as a percentage of GNP. Source: *World Development Indicators on CD-ROM 1998*.

Reserves: International reserves to imports of goods and services. Source: *World Development Indicators on CD-ROM 1998*.

BOP: Overall balance of payments as a proportion of GDP. Source: *International Financial Statistics on CD-ROM 1994*.

Performance variables

Dependent variable

Labor share: Total nominal earning of employees divided by value added in current prices, to show labor's share in income generated in the manufacturing sector. Source: *World Development Indicators on CD-ROM* (1995), where it appears as UM VAD WAGE ZS.

Explanatory variables

Price level of consumption: The price index of a country's consumption basket in 1985 international prices. Source: *ACLP Data Set* which takes it from *Penn World Tables 5.6*, where it appears as "PC."

Capital stock/worker (1000s): Capital stock in 1000's 1985 international prices divided by the size of the labor force. The sources of both the capital stock and the labor force variables is the *ACLP Data Set* which modifies these variables from *Penn World Tables 5.6*. For a full description of these variables, see Przeworski *et al*. 2000 pages 295 and 296.

Investment: Same as above.

US prime interest rate: Source: *ACLP Data Set* which takes it from *International Financial Statistics on CD-ROM* (1994).

Regime (Dictatorship=1): Same as above.

Years since last IMF program: Number of country-years since the last IMF program in that country ended, coded 0 for countries currently participating or countries that have not yet participated.

Not yet participated: Dummy variable coded 1 if a country has not yet participated in an IMF program and 0 otherwise.

Years under current program: Number of country-years participating in a spell of consecutive IMF agreements, beginning when a country signs an IMF agreement when

there was no agreement in place the preceding year and ending when no consecutive agreement is signed and the last agreement signed runs out. Coded 0 if a country is not currently participating in IMF agreements.

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