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, nearly every study on the effect of IMF programs on economic growth showed programs had zero effect (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 the growth is helped 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 not be hurt at all.

Suppose, for example, that national income, Y, is distributed between two 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, r, then next year's income of capital if the country does not participate in an IMF program is:

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

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:

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

where $\Delta > 0$ is the effect of the IMF program on capital share of national income, and $d < 0$ is the 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 indifferent between entering an IMF program and not entering when

$$K = K^{IMF}$$
$$\Rightarrow kY_t(1+r) = (k+\Delta)Y_t(1+r+d)$$
$$\Rightarrow \Delta = \frac{-kd}{1+r+d}.$$

And capital will be better off if the increase in capital share of national income (Δ) is greater than $\frac{-kd}{1+r+d}$, even if the IMF program hurts growth.

To give this relationship a little more meaning, consider some real numbers. According to the World Bank, the share of manufacturing earnings going to capital the year before a country enters into an IMF program is about 62 percent ($k = 0.62$). The average rate of growth of output in my data[1] is 4.23 ($r = 0.042$). According to Przeworski and Vreeland (2000), the effect of IMF programs on economic growth is approximately –1.5 percent ($d = 0.015$). According to the equation above, capital is better off, at least in the short-run, if the increase in capital share of income is 1.2 percent or greater.

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

This is an empirical question. One needs to know the effect of IMF programs on the distribution of income. Evaluating the effects of IMF programs in not straightforward, however. 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. 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 data available. This study is the first to evaluate the longest series available on distribution: the labor share of income from manufacturing.[2] The advantage of using this series is that it includes 2,095 observations of 110 countries from 1961 to 1993. 91 of these countries participated in 352 separate IMF arrangements which covered a total of 599 country-years. The other advantage of using these data is that they were collected according to the same methodology and are thus comparable across time and country. The disadvantage of this series is that it includes data only on the manufacturing sector.

[1] Described below.

[2] These data are available from *World Development Indicators, 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."

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. A brief conclusion follows.

2. Background

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.[3] 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).

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. Hence, 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.

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

[3] 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).

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."

This study takes the next step suggested by Garuda, applying regression analysis to a larger data set. Rather than use propensity scores to control for selection effects, however, the method I use to control for selection follows Przeworski and Vreeland (2000) who follow Heckman (1976, 1979, 1988). The next section describes this method.

3. The selection problem

Estimating the effects of IMF programs is not straightforward. 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 the "treatment" and the "control" groups, thus permitting direct inferences about the experimental effects. 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. And 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 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. Those 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.[4] Thus, I use a "stripped" model of selection that includes only variables for which the full sample is available. 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 (for details on the dynamic probit model see Amemiya 1985, chapter 11, Przeworski *et al*. 2000, or Przeworski and Limongi 1997). Table 1 presents the selection results:[5]

[4] 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).

[5] Because dynamic probit requires that one use lagged variables, 135 observations are lost (one for each country). A total of 3,991 observations are used in this estimation.

Table 1: Determinants of participation in IMF programs

	Determinants of entering		*Determinants of remaining*		
Variable	**Coefficient**	**S.E.**	**Coefficient**	**S.E.**	**Mean**
CONSTANT	-1.3198**	0.094	0.8134**	0.162	1.00
LEVEL	-0.0001**	0.00001	-0.0001**	0.00002	3544.95
GROWTH	-0.0189**	0.006	-0.0071	0.007	2.24
YEARS UNDER	0.0414**	0.007	0.003	0.009	3.67
NUMBER UNDER	0.0006	0.003	0.0080*	0.005	29.63
LAGGED ELECTION	0.2452**	0.085	0.177	0.120	0.22

Frequencies of actual & predicted outcomes

	Predicted		
Actual	0	1	TOTAL
0	2748	169	2917
1	220	854	1074
TOTAL	2968	1023	3991

Number of observations	3991
Log likelihood function	-1177.43
Restricted log likelihood	-2324.23
Chi-squared	2293.59
Degrees of freedom	11
Significance level	0.0000

All variables are lagged one year.

This "stripped" selection model performs well, correctly predicting over 90 percent of observations (where the "prediction" cut-off is at 50 percent probability of participation/not participation). Table 1 shows that countries with low levels of per capita income (LEVEL) are more likely to enter into IMF arrangements and more likely to continue participation in IMF programs.[6] 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 countries 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

[6] Coefficients significant at the 95 percent confidence level are indicated by **. Significance at the 90 percent level is indicated by *.

the decision to remain. What other countries do 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.

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. 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.

The instruments used to measure unobserved variables are called "hazard rates." The "hazard rate," defined as the marginal probability of misclassifying an observation, represents one way of measuring the errors associated with each selection decision. 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.

4. The effect of IMF programs on labor share

First consider what is observed. The World Bank reports 2,195 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.

91 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 (in percent) 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**" observations are the 599 observations of countries actually participating in

an IMF arrangement. The "**Between spells**" row reports the labor share for 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 1 represents these observations graphically over time:

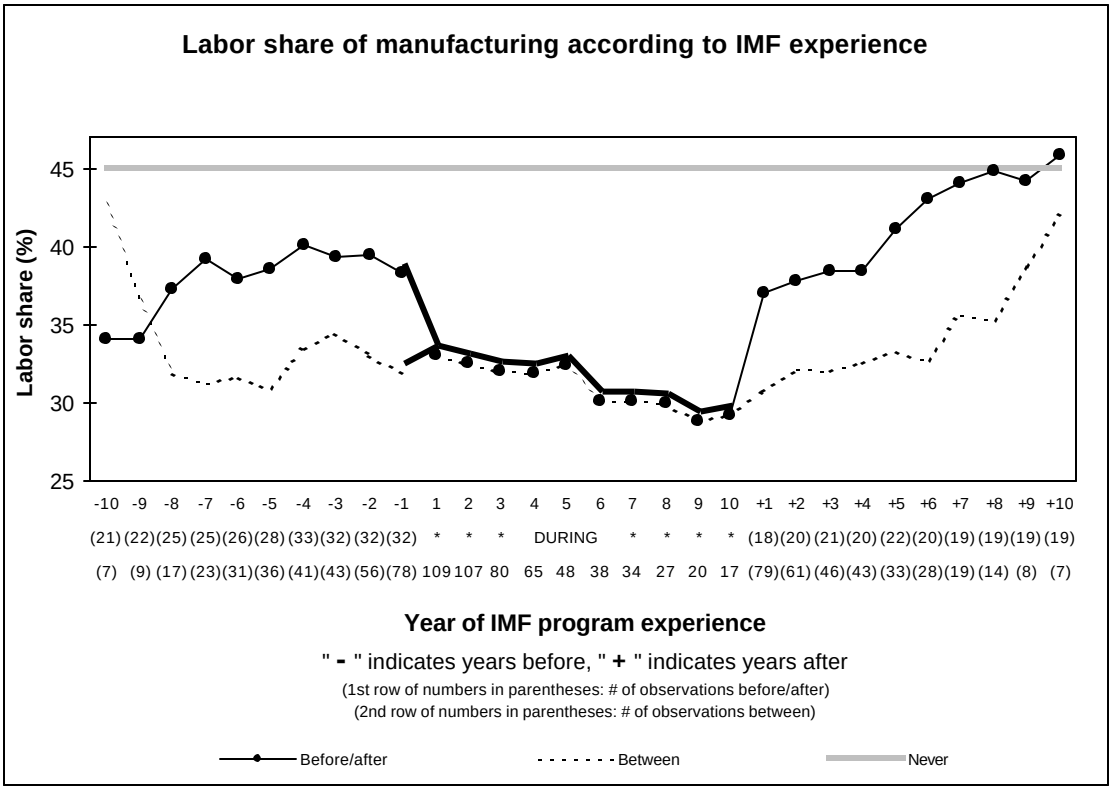

Figure 1 shows the experience of countries over time. The thick line in the middle of the figure represents the labor share of manufacturing income when countries participate in IMF programs. The thin dotted lines show the experience before and after programs. The dashed line represents the experience of countries between programs. Note that many of these observations are double counted because many countries exit programs for only a year or two 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 entering IMF programs, but there does not appear to be any trend. When countries enter IMF programs, labor share plummets and seems to trend downward. When countries emerge from IMF programs, labor share trends upward. After experiencing an IMF program, it appears to take about 10 years for labor to achieve the same share of income as 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 after previous participation is about 5 years.

So the observed world supports Pastor'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. I also control for real gross domestic investment (private and public) as a percentage of GDP, the US prime interest rate, growth of per capita GDP, per capita GDP, the percent change in the consumer price index (inflation), and regime – a dummy variable coded 1 for dictatorships and 0 for democracies. These data come from the *ACLP Data Set* (Alvarez *et al*. 1996) which includes economic data from the *Penn World Tables 5.6* (Heston and Summers 1995) (the US prime interest rate comes from *International Financial Statistics CD-ROM, 1994*).[7]

In order to test for the significance of the apparent time trends evidenced in Figure 1, I include two count variables: For countries participating, I include "Years under current program," which counts how many consecutive years a country has participated in an IMF program. For countries not participating, I include "Years since last IMF program," which counts 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 include a dummy variable "Not yet participated," coded 1 if a country has not yet participated and zero otherwise.

[7] There are missing values for CPI, so the sample size is reduced, from 2,195 to 1,940. The mean labor share for this sample is 37.73 with median 36.90. There are 97 countries included in the sample which covers 1963 to 1990. 81 of these countries participated in 320 IMF arrangements for a total of 543 country-years of program participation. The total observations in this sample is 1,940, but only 1,778 are included in the regression analysis because the Durbin-Watson test statistic indicates auto correlated error terms even after fixed effects for countries are included. In order to correct for autocorrelation, the error term is estimated as $e_{i,t} = re_{i,t-1} + h_{i,t}$, and the first observation for each country is discarded.

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**
Investment (% of GDP)	0.047	0.049	20.6	0.192**	0.078	14.630
US prime interest rate	0.216**	0.061	9.437	-0.013	0.080	9.778
Per capita income growth	-0.138**	0.033	2.94	-0.043	0.050	0.847
Per capita income	-0.001**	0.000	5754	0.001	0.001	2546
Inflation (% change in CPI)	-0.001**	0.001	24.3	-0.001	0.001	49.1
Regime (Dictatorship=1)	-1.031	0.996	0.4264	-1.629**	0.763	0.620
Years since last IMF program	0.160**	0.055	4.781			
Not yet participated	1.736*	1.029	0.5314			
Years under current program				-0.172**	0.088	5.095
Hazard rate	1.152	0.750	-0.1949	-0.944	0.591	0.452
Dependent variable	Mean	Standard deviation		Mean	Standard deviation	
Labor share	40.299	13.764		31.041	11.596	
Estd. Autocorrelation of e(i,t)		0.00000			0.00000	
Rho		0.00000			0.00000	
Observations		1304			474	
Parameters		100			73	
Adjusted R-squared		0.78397			0.83184	
Lagrange Multiplier Test		3738.39			787.7	

Table 3 reports that investment has a significant positive effect on labor share for countries that participate in IMF programs, although it has no significant effect on countries that do not participate. The US prime interest rate, on the other hand, has a significant positive effect on labor share for countries that do not participate, but no effect on countries that do participate. Per capita income and per capita income growth are not significant for countries participating. They have strange effects for countries not participating – they are negative. Inflation also has a negative effect on labor share for countries not participating, and no

significant effect for countries not participating. Regime affects countries participating – dictatorships have a lower labor share than democracies.[8]

The trend variables are significant. For countries not participating, the positive significant coefficient of 0.16 on "Years since last IMF program" indicates that labor share grows by 0.16 percent each year since participation in an IMF program ended. For countries that have not yet participated, labor share is significantly higher. The positive significant coefficient on "Not yet participated" indicates that countries that have not yet turned to the IMF have higher labor share by 1.74 percent. Finally, "Years under current program" matters for countries that are participating. There is a significant negative trend. Each year that a country participates in an IMF program, labor share drops an average of 0.17 percent.

The inclusion of the hazard rates corrects for potential nonrandom selection. Thus, one can use them to simulate the inherent effects of IMF programs. For example, one can take the observed values of Investment, US prime rate, Per capita income growth, Per capital income, Inflation, and Regime, multiply them by the parameters for "participating" reported in Table 3, and then calculate the hypothetical labor share for 1 year of participation, 2 years, 3 years, etc. The same can be done to simulate labor share if countries never participated. Or one can simulate the post-IMF experience after 1 year, 2 years, etc.

Table 4 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.

[8] Country specific constant terms are estimated but not reported. They are available from the author upon request.

Table 4: Hypothetical labor share of income from manufacturing according to IMF experience (selection-corrected estimates)

Predicted labor share if countries never participated:			40.71%
Predicted labor share if countries participated (stint set at mean of 4.5 years):			34.15%
Predicted overall effect:			**-6.56%**
Predicted labor share if countries participated…		Predicted labor share after ending IMF program…	
year 1:	34.75%	year 1:	39.20%
year 2:	34.58%	year 2:	39.36%
year 3:	34.41%	year 3:	39.52%
year 4:	34.23%	year 4:	39.68%
year 5:	34.06%	year 5:	39.84%
year 6:	33.89%	year 6:	40.00%
year 7:	33.72%	year 7:	40.16%
year 8:	33.54%	year 8:	40.32%
year 9:	33.37%	year 9:	40.48%
year 10:	33.20%	year 10:	40.65%
Predicted effect of *returning* to an IMF program after typical "between" stint of not participating (5 years):			**-5.09%**
Predicted effect of *leaving* IMF programs after typical stint participating (5 years):			5.14%

Table 4 reports that the overall effect of IMF programs on labor share is -6.56 percent, comparing the predicted labor share if countries never participated to the predicted labor share of countries participating in IMF programs. For countries that have participated in the past, the typical effect is less severe, -5.09 percent, but the reason for the smaller effect is that labor has not yet fully recovered its losses from the previous IMF program. This estimate is based on the observation that on average governments return to IMF programs after 5 years if they have participated in the past.

Regarding Garuda's finding that IMF programs have positive distributional consequences for countries with less propensity to enter IMF programs, I find no evidence. I break the sample up into bands of per capita income and find that the negative effects are smaller at higher levels of development, but they are never positive:

Per capita income:	<2000	2000 – 4000	4000 – 6000	>6000
Effect on labor share:	-11.29	-10.91	-8.50	-2.25

So now one can answer the question of whether or not capital is hurt by IMF programs. Recall from the introduction that capital is typically better off under IMF programs even if growth is hurt by 1.5 percent provided that the labor share of income drops at least 1.2 percent. Clearly this is the case.[9] But how much better off is capital?

Make the simplifying assumption that gross domestic product (GDP) is divided between capital and labor according to the numbers presented in Table 4. Table 5 shows how the average GDP of countries that will participate in IMF programs ("before" and "between" observations) would grow and be divided between labor and capital. The table makes the conclusion clear: capital is better off under IMF programs.

[9] Indeed, rewriting the condition from the introduction, capital will be better off provided $r > \frac{-kd}{\Delta} - d - 1$ (recall that r is rate of growth, d is the 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 $\Delta = 0.05$ (a conservative estimate, according to Table 4), then capital will most certainly be better off under IMF programs. This is because the condition $r > 0.3k - 0.985$ will almost always hold: if $\Delta = 0.05$, the highest reasonable value of k is 0.95 $\Rightarrow r > -0.673$. If one uses the largest estimate that Przeworski and Vreeland report, d =0.04, then the condition that must hold is $r > 0.8k - 0.96$. This will also hold even if k=0.95 provided $r > -0.20$. According to the 4,126 observations of GDP annual growth in the ACLP data set, there are only 9 observations of GDP growth less than -0.20. The lowest growth rate observed is -0.45.

Table 5: Is capital better off under IMF programs which cause lower growth but a higher share of income for capital?

2 simulations starting with GDP 63,817 billion 1985 PPP $
(average income for the "before" and "between"observations)

One simulation with average rate of GDP growth of countries participating in IMF programs: 3.22%
One simulation with predicted rate of GDP growth if countries do not participate: 4.75% (+1.53)

	No participation: higher growth of GDP, lower capital share			**IMF participation lower growth of GDP, higher capital share**		
	Labor share	Capital share	GDP (billions) grows at 4.75%	Labor share	Capital share	GDP (billions) grows at 3.22%
year 1	40.7%	59.3%	$66,848	34.8%	65.2%	$65,872
year 2	40.7%	59.3%	$70,024	34.6%	65.4%	$67,993
year 3	40.7%	59.3%	$73,350	34.4%	65.6%	$70,182
year 4	40.7%	59.3%	$76,834	34.2%	65.8%	$72,442
year 5	40.7%	59.3%	$80,483	34.1%	65.9%	$74,775

	Income of capital (billions)		Income of capital (billions)		***Gain for capital with IMF program (billions)***
year 1	$39,634	year 1	$42,981	year 1	*$3,347*
year 2	$41,517	year 2	$44,482	year 2	*$2,965*
year 3	$43,489	year 3	$46,036	year 3	*$2,547*
year 4	$45,555	year 4	$47,643	year 4	*$2,088*
year 5	$47,719	year 5	$49,306	year 5	*$1,587*

Note that these hypothetical examples isolate the effects of the IMF. They predict these 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, capital may 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 off without the IMF.

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[10] 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 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 1983, which participated in its first IMF agreement since 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. Then the government entered into an IMF program and 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!

[10] Data on earnings from manufacturing was taken from *World Development Indicators 2000 CD-ROM*, 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."

5. 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 definitely worse off 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.

The former Managing Director of the Fund 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 is "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. If not, 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 $d_{it}^{*} \le 0$:

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

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

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

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

The Heckman method to correct for this bias involves calculating the hazard rates, ?, 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[11]

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

[11] The sub-samples used in the main body of the text are available from the author upon request.

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

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