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CHAPTER THREE

Minimum Wages and Poverty in Developing Countries: Some Empirical Evidence

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INCREASED EMPHASIS on job creation in developing countries has focused attention on institutional rigidities, such as minimum wage laws. In particular, many Latin American governments seeking to become more competitive in the international arena are targeting labor market rigidities as impediments to reform and job creation. Interestingly, some governments are moving in the opposite direction, as their major OECD trading partners in the North seek to impose "fair labor standards" as a condition of further market access.' Korea, for example, passed a new minimum wage law in 1988. These labor market reforms raise the question of whether minimum wage laws help or hurt the poor in developing countries. This chapter analyzes the impact of change in statutory minimum wages on poverty.

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Our main empirical finding is that minimum wages and poverty are inversely related: that is, an increase in real minimum wages is accompanied by a fall in poverty. Similar results are obtained using a variety of poverty measures (headcount ratio and poverty gap), poverty lines (low and high), and population groups (urban and rural). The inverse relationship is also found when observations are classified by positive and negative growth, and when Latin American observations are distinguished from those for Asia.

Although the recurrent result is that minimum wages and poverty are inversely related, one cannot conclude that a rise in the minimum wage is the most cost effective way to reduce poverty. We do not estimate the efficiency losses that may result from higher minimum wages. Also, this empirical exercise is subject to all the caveats associated with cross-section analysis. Even if minimum wages can reduce poverty, they may not be the most efficient way to achieve this objective.' The paper is organized as follows. We briefly review the relationship between minimum wages and wages in the informal sector in labor market models with covered and uncovered sectors. We then present our main econometric results. Finally, the last section adds some concluding remarks on the policy relevance of these results.

Minimum Wages and Poverty: Theory

Debate over the distributional implications of minimum wages laws has been rekindled by the "new economics" of the minimum wage. Card and Krueger for example, argue that raising minimum wages sometimes

1. An example of this sort of pressure in Latin America was the proposal that Mexico raise its minimum wage at the rate of productivity growth, put forward by some pro-labor members of the U.S. Congress as one of the conditions for the passage of the North American Free Trade Agreement.

2. See, for example, the discussion in Saint-Paul (1994). In the case of Latin America and the Caribbean, Rama (1995) finds that the cost of minimum wages in terms of economic performance is not significant.

increases employment.[3] Whereas many believe minimum wages reduce poverty in developed countries—albeit at a cost—this not the conventional wisdom for developing countries. Rather, the dominant view is the one outlined by the recent *World Development Report* on labor markets, "Minimum wages may help protect the most poverty-stricken workers in industrial countries, but they clearly do not in developing nations."[4] Several arguments in support of this view are commonly cited. First, coverage of minimum wage laws in developing countries is limited to a small formal sector and because the informal sector is large these laws are difficult to enforce. Second, poverty lines are lower in developing countries and workers who benefit from minimum wage increases are usually not the poorest of the poor. Third, a large fraction of the poor work in the uncovered or self-employed sector. Also, high inflation rates make it hard to set real minimum wages.

Most of the arguments focus on variations of the Harris-Todaro model.' Under certain assumptions, the presence of a large uncovered sector means that an increase in formal sector wages pushes more unemployed into the informal sector, driving down informal sector wages. However, as Edward Gramlich—and, more recently, Daniel Hamermesh and David Card and Alan Krueger—emphasizes, this argument depends on a particular constellation of elasticities.[6] If formal sector labor demand is inelastic, a boost in formal sector wages may also drive up wages in the informal sector.' However, as Jeffrey Williamson and others have emphasized, many of the empirical predictions of the Harris-Todaro model do not seem to be borne out by empirical studies of developing country labor markets.[8] Hence it does not provide a solid basis for analysis of the impact of minimum wages in developing countries.

3. Card and Krueger (1995).

4. World Bank (1995, p. 75). The International Labor Organization has a different view: "minimum wages are a potentially important labour market policy instrument for reducing poverty" (Rodgers, 1995, p. 48). For more on this issue, see Lipton (1995, p. 130).

5. For early examples of formal models of the impact of minimum wages, see Mincer (1976) and Welch (1974).

6. Gramlich (1976); Hamermesh (1993); Card and Krueger (1995).

7. "Demand link" models present another alternative. In this case, the change in the distribution of income generated by raising the minimum wage may cause incomes in the uncovered sector to rise. This result largely depends on change in demand patterns of covered sector workers induced by the minimum wage increase. (Fiszbein, 1992.) The idea that the covered and uncovered sectors are linked not only through the labor market but also through the goods market was initially developed by Tokman (1978), among others; see also Cole and Sanders (1985).

8. Williamson (1989).

In fact, there are some a priori reasons why minimum wage legislation should have a greater impact on the poor in developing countries. Unskilled wages are a more important component of the poor's income in less developed countries than in developed countries, where a large portion of the poor are unemployed, on welfare, or retired. Because in developing countries the minimum wage and poverty lines are closer to one another, a minimum wage increase may lift workers out of poverty. In the United States, on the other hand, minimum wage earnings are generally not enough to lift the poor out of poverty.[9]

Moreover, the general equilibrium analysis models of Alan Carruth and Andrew Oswald and by Edward Leamer show that in small open economies a rise in formal sector wages always raises both covered and uncovered wages, while reducing the capital rental rate.[10] The intuition behind this result is straightforward: a rise in union or minimum wages in the formal sector cannot be passed along in higher prices. Therefore, profits fall, leading to a migration of capital, rather than labor, out of the formal sector. Capital moves to the informal sector, driving up wages and employment in that sector.[11] In addition, scattered evidence suggests that in some cases—Brazil, Costa Rica, and Mexico, for example—formal and informal wages move together, contrary to predictions from conventional analysis, which would lead one to expect that they were inversely related."

9. The ratio of minimum wages to poverty lines (expressed as a percentage) for some of the developing countries used in this study is shown in table 3-4.

10. Carruth and Oswald (1981); Leamer (1995). Although Carruth and Oswald's model is intended to analyze the impact of unions, their analysis also applies to minimum wage legislation.

11. Note in the Harris-Todaro model and in the demand link general equilibrium models, the effects of minimum wage changes do *not* depend on the existence of a nonstandard relationship between minimum wages and employment in the covered sector. In contrast to some of the models posited by the "new economics" of the minimum wage (see, for example, Card and Krueger, 1995, p. 236), in these models higher real wages in the formal sector unequivocally lead to lower levels of formal employment. Conversely, a nonstandard result does not require that the poor work in minimum wage jobs. One does need to assume, however, that the government can affect the real value of the minimum wage through statutory changes in the nominal minimum wage, and that the minimum wage is enforced at least in part of the economy. In closed economies, the reverse is likely to be true: covered sector wages may move inversely with wages in the uncovered sector, although the outcome depends on key parameters in the model.

12. On Mexico, see Maloney (1996), and on Brazil and Costa Rica, World Bank, (1990, p. 110). See also the studies listed in note 13.

In sum, the conventional wisdom holds that minimum wage laws are likely to harm uncovered and rural workers in developing countries. Most of these arguments appeal to a particular case of the Harris-Todaro model, in which higher formal sector wages force workers back into the informal sector, pushing down informal incomes. But theoretical results from small open economy models suggest otherwise. Also, to the extent that minimum wage laws affect unskilled wages, they are more likely to reduce poverty in developing countries than in industrialized countries.

The preceding discussion reveals that the impact of change in statutory minimum wages on poverty in developing countries is really an empirical issue. Most of the available econometric work focuses on the relationship between minimum wages and the wages of the unskilled workers. The existing studies often find the relationship to be positive.[13] However, they usually focus on urban workers, whereas the stronghold of poverty in developing countries is in rural areas. In addition, estimating labor market parameters is very data-intensive and is therefore difficult to carry out for a large number of countries simultaneously. An alternative approach is to estimate the determinants of poverty, including the minimum wage as one of the explanatory variables. We chose such a course. Specifically, we analyze the relationship between minimum wages and poverty by regressing change in poverty rates on change in the minimum wage and other variables that could affect poverty levels, for a cross-section of developing countries.

Minimum Wages and Poverty: Empirical Evidence

The preceding discussion shows that higher minimum wages can thus reduce poverty, as long as (1) higher minimum wages result in higher uncovered sector wages; (2) the rise in uncovered sector wages is large enough to push some of the population out of poverty; and (3) the number of the beneficiaries (that is, those who are no longer poor) exceeds the number of those who become poor because the increase in minimum wages leaves them unemployed or earning less in the uncovered or "subsistence" sector.[14]

13. See, for example, Marquez (1981), Reyes-Heroles (1983), Wells and Drobny (1982), and Cicchelli-Velloso (1990). See also Freeman (1993, p. 128), Shaheed (1995), International Labor Organization (1988), and Bell (1995).

14. The underlying assumption is that the conventional poverty line is below the statutory minimum wage and is higher or equal to Hamermesh's (1993) "subsistence wage."

Available studies for Latin America show that a rise in the minimum wage may reduce poverty (and vice versa), at least in the short run. Samuel Morley, for example, who looks at the relationship between minimum wages and poverty in a cross-section of Latin American countries, finds a negative correlation between minimum wages and poverty.[15] The coefficient loses significance, however, when the relationship is analyzed for periods of recession only. Also using a cross-section of countries, Alain de Janvry and Elisabeth Sadoulet find that the coefficient is negative (that is, higher minimum wages imply lower poverty levels) in most cases. In contrast to Morley, in the case of urban poverty they find that the coefficient is significant only during a recession. These studies, however, use observations for Latin America alone. Our empirical analysis includes a number of developing countries outside this region.

Poverty and Minimum Wages: A Cross-National Analysis

Research in this area has historically been limited by inconsistent and infrequent poverty statistics for developing countries. Although the lack of poverty data remains a serious problem, the availability of consistent poverty statistics has greatly improved recently, as several research groups at the World Bank and the International Labour Organisation (ILO) have compiled comparable poverty rates for a number of developing countries. We use the poverty data compiled by these studies to assemble a sample that includes twenty-two countries and over forty time intervals.[16]

Using this sample, we regress the *change* in the standard headcount and other poverty measures on key determinants of poverty, including real wages and per capita income growth. This approach avoids the problems inherent in comparing the level of poverty across countries; for example, the lack of comparability across poverty lines and the need to include a number of state variables. Among our independent variables are several structural variables, such as the stock of human capital and the share of the labor force in agriculture, that can be measured in a similar way across countries. In contrast to previous studies, we include sixteen nonoverlapping sample intervals from nine countries outside

15. Morley (1992).

16. See table 3A-1.

Latin America: five in Asia and four in Africa, as well as sample intervals from thirteen Latin American countries.[17]

By restricting each sample to nonoverlapping intervals, we exclude a number of observations. However, by using alternative criteria to select nonoverlapping groups, some of these observations can still be utilized. In every case, our choice of countries and time intervals is dictated by the availability of consecutive survey-based poverty measures using identical poverty lines." The lack of real minimum wage series also imposes limitations on the sample size: about ten observations of change in poverty had to be dropped because there were no data on minimum wages.

We first examine the impact of real wages and real per capita income growth, separately, on poverty. The regression equations 1.1, 1.2, and 1.3, reported in the first three columns of table 3-1 and in figures 3-1, 3-2, and 3-3, reveal the expected positive correlation between per capita income growth, real (minimum and average) wages, and poverty. The results for per capita income and minimum wages are repeated in the regression in table 3-2 discussed later. Comparing regressions 1.2 and 1.3, the explained variance and statistical significance are clearly higher for change in real minimum wages than for either of the other two real wage variables tested: average real wages collected in the ILO's *Year Book of Labour Statistics* and the real manufacturing earnings series reported in the World Bank's CD-ROM *World Tables 1994*. Note, however, that since the three wage series were often not available for a given country, the regressions reported in table 3-1 are based on slightly different samples.[19]

Equation 1.4 adds minimum wages and average wages to the per capita income growth equation 1.1. Both the real minimum wage and growth coefficients remain highly significant, but the average wage coefficient drops dramatically in significance. When we control for change in per

17. The main sources of our poverty data (presented in table 3A-5) are two compilations recently assembled by the World Bank and the ILO. The main source of minimum wage data is International Labour Organisation (1988). Average wages come primarily from International Labour Organisation (various years) and CEPAL (1994). Because the two sets of average wage data differ slightly for some high inflation countries, both series were tested, yielding very similar results. All the series used in the regressions are available from the authors upon request.

18. See figures 3A-1 and 3A-2.

19. Ideally, one should use wages for unskilled workers. However, not enough observations are available for use in a regression.

capita income or in minimum wages, the average and manufacturing wage coefficients become insignificant.[20] Although heteroskedasticity is potentially a problem in regression 1.3, as the White test indicates, we find it generally true that the impact of average wages on poverty cannot be separated from that of per capita income and minimum wages. In over one-third (eighty-nine) of our observations in the full sample (including overlapping periods) poverty rises over a given interval, and in 134 cases it falls. Similarly, real minimum wages rise in about two-thirds of our observations and fall in seventy cases. This implies that our estimates do not simply represent trends in these two key variables.

These results suggest minimum wages affect poverty more than average wages and that they are less correlated with change in national income.[21] This is consistent with the fact that minimum wage laws mainly affect unskilled wages and therefore may be a more important determinant of the income of poor workers. The lack of correlation with national income can also be explained by the fact that real minimum wages are a target of government policy.[22] When we control for per capita income growth, real minimum wages remain highly significant but the magnitude of the effect on poverty drops substantially. Also, the variance explained by equation 1.4 is substantially higher than that explained by the previous regressions.

Although real minimum wages seem to affect poverty independent of average wages and per capita income growth, this correlation may result from other government policies or employment opportunities that are moving in consonance with minimum wages. Minimum wage changes may thus indicate a broad commitment by government to reduce poverty, using a variety of policy measures. We find little evidence to support this hypothesis. As discussed below, the impact of low wages on poverty persists even after controlling for available government spending variables. Also, when time series on social spending are available, they are not positively correlated with real minimum wages. In fact, the correla-

20. Regressing poverty changes on real manufacturing earnings and education expenditures yields a real wage coefficient of -0.85 with a t statistic of -1.65, but the adjusted R^2 is only about 0.1, even with the education variable.

21. See table 3A-2 for a three-way classification of countries and periods according to the direction of change in poverty, minimum wages, and per capita income.

22. Variations on equation 1.4 (not reported here) confirm these suppositions. Both average wage measures become insignificant when per capita income growth or minimum wage changes are added to the regression.

Table 3-1. *Poverty and Real Wages: Headcount Poverty Measures*[a]

Poverty line and independent variable	*(1.1)*	*(1.2)*	*(1.3)*	*(1.4)*	*(1.5)*	*(1.6)*[b]	*(1.7)*	*(1.8)*[b]	*(1.9)*[b]	*(1.10)*[b]
Poverty line[c]	High	High	High	High	High	Low	High	Low	High	High
Per capita income	**−1.90**	. . .	. . .	**−1.08**	−0.63	**−1.93**	. . .	. . .	. . .	**−0.72**
	(−5.77)	. . .	. . .	(−2.53)	(−1.85)	(−3.50)	. . .	. . .	. . .	(−2.13)
Real minimum wage	. . .	. . .	**−0.97**	**−0.78**	**−0.64**	**−1.09**	**−0.71**	**−1.29**	**−0.81**	**−0.61**
	. . .	. . .	(−6.03)	(−4.08)	(−4.24)	(−4.00)	(−4.68)	(−4.00)	(−3.68)	(−3.64)
Real average wage	. . .	**−0.69**	. . .	0.15	. . .	. . .	. . .	. . .	. . .	. . .
	. . .	(−2.07)	. . .	(0.66)	. . .	. . .	. . .	. . .	. . .	. . .
Real public spending	. . .	. . .	. . .	. . .	. . .	. . .	−0.20	−0.54	−0.24	. . .
	. . .	. . .	. . .	. . .	. . .	. . .	(−1.06)	(−1.54)	(−1.06)	. . .
Terms of trade	. . .	. . .	. . .	. . .	**−0.36**	. . .	**−0.44**	. . .	**−0.42**	**−0.40**
	. . .	. . .	. . .	. . .	(−2.56)	. . .	(−3.00)	. . .	(−3.11)	(−2.44)
Human capital stock[d]	. . .	. . .	. . .	. . .	−0.36	. . .	−0.46	. . .	−0.55	−0.42
	. . .	. . .	. . .	. . .	(−1.23)	. . .	(−1.49)	. . .	(−1.72)	(−1.65)
Unemployment[e]	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	**1.36**	. . .
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(2.41)	. . .
Inflation	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.01
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(0.40)
Education expenditure[f]	. . .	. . .	. . .	. . .	**−0.77**	**−1.28**	**−0.77**	**−1.25**	. . .	. . .
	. . .	. . .	. . .	. . .	(−2.21)	(−2.56)	(−2.09)	(−2.17)	. . .	. . .
Addendum										
Intercept	0.01	−0.02	**−0.02**	−0.01	0.02	**0.06**	0.02	0.04	0.01	0.00
	(0.58)	(−1.5)	(−3.07)	(−1.05)	(1.25)	(3.10)	(1.08)	(1.71)	(0.55)	(0.15)
White *F* test[g]	0.68	0.53	2.25	0.92	0.48	0.85	1.25	0.29	0.91	0.48
Probability value	0.62	0.60	0.13	0.50	0.88	0.55	0.32	0.93	0.56	0.89
Adjusted R^2	0.47	0.12	0.55	0.67	0.74	0.71	0.72	0.61	0.71	0.69
Number of observations	39	26	30	24	30	23	30	23	20	30

a. The dependent variable is the log annual change in poverty assessed by the headcount measure; that is, the growth rate of the poor less that of the total population. All variables are expressed as annual log changes, except where noted. *t* statistics are shown in parentheses. Boldface indicates coefficients significant at the 5 percent level.

b. *t* statistics are calculated using White consistent errors.

c. The high and low poverty lines are typically $50–$60 per month and $30 per month in 1985 purchasing power parity dollars, respectively.

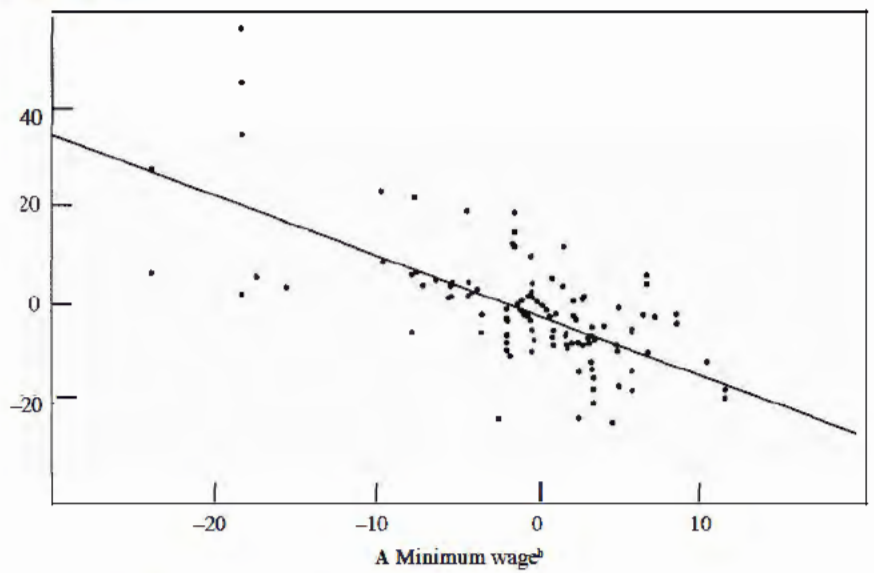
d. Human capital growth is proxied by the log change in average years of secondary education per adult.

e. The unemployment variable is the change in the unemployment rate divided by the number of years in the interval.

f. Average education expenditure is expressed as a percent of GDP. This is often important as a state variable.

g. This is the *F* statistic for White's heteroskedasticity test without cross-terms. A high *F* or a low probability value suggests that the null hypothesis of homoskedastic errors should be rejected.

Figure 3-1. *Change in Headcount Ratio and Minimum Wage*[a]



a. All observations for high and low poverty lines, including overlapping periods.
b. Annual log change.

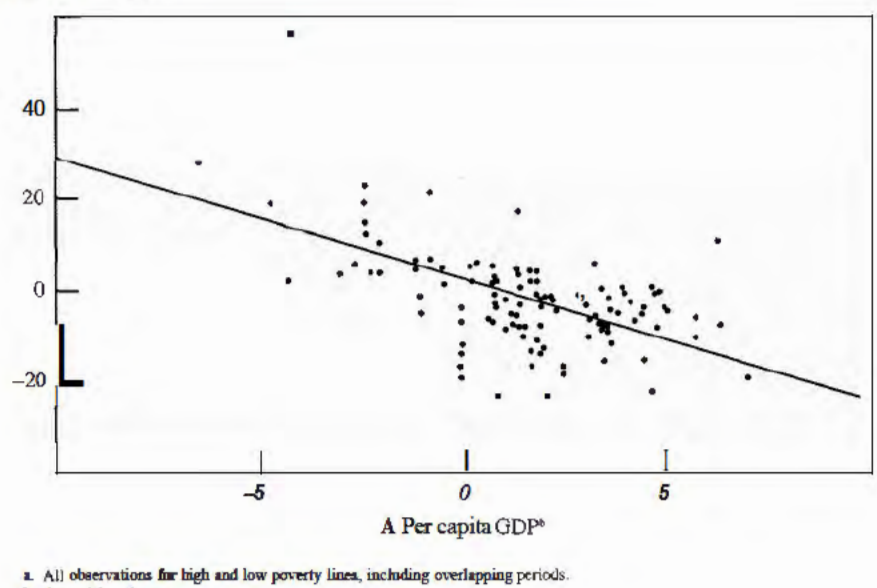
tion is often negative.[23] Changes in agricultural output and prices also affect poverty, especially in low-income countries.

To allow for these potential interactions, we test a number of measures of public spending and agricultural income.[24] Unfortunately, there are few consistently reported series on social spending targeted at the poor. When time series are not available, we use time-invariant averages as "state variables" to capture each country's ongoing commitment to particular programs. Regressions 1.5 to 1.8 are typical of those including a broader range of policy and state variables. Our social spending state variables include total current spending, spending on social programs, and spending on social security. The most relevant state variable seems to be the share of education expenditure in GDP (which we express as a percentage). A related but time-varying measure is annual change in years of secondary education per adult. This measure of human capital does better than either total years of education or years of primary

23. These results are available directly from the authors upon request.

24. Domestic agricultural terms of trade are not available for most countries, so we use external terms of trade with change in real agricultural value added.

Figure 3-2. *Change in Headcount Ratio and per Capita GDP*[a]



a. All observations for high and low poverty lines, including overlapping periods.
b. Annual log change

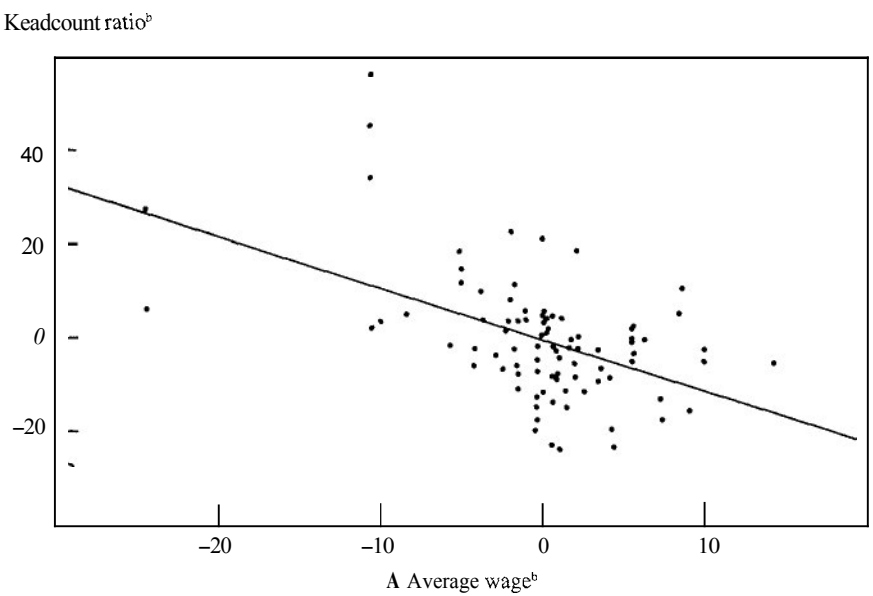
education per adult, although the level—rather than the change—of primary education per adult sometimes affects the rate of decline when poverty is severe. Change in total real government consumption is the only broadly available indicator of government spending on social programs. The other public spending measures we test are not statistically significant.[25]

Change in agricultural value added, or its GDP share, has no consistent impact on the rate of change in poverty levels, so regressions including this variable are not reported. Change in external terms of trade, however, does affect households near the high poverty line.[26] When the terms of trade variable is included in regressions 1.6 and 1.8 (where the sample is based on low poverty lines), it turns out not to be significant (and hence it is left out of the reported regressions). Since severe poverty mostly occurs in rural areas, this suggests that in commodity exporting nations, changes in terms of trade affect the urban poor and the upper

25. Recall that comparable annual measures of social spending are very difficult to obtain for developing countries.

26. Data on domestic terms of trade are not available for the required countries and periods.

Figure 3-3. *Change in Headcount Ratio and Average Wage"*



a **All** observations for high and low poverty lines, including overlapping periods
b Annual log change

strata of the rural poor. This is consistent with the findings of Martin Ravallion and M. Huppi which suggest that, in Indonesia, the upper strata of the poor benefit the most from higher rice prices.[27]

Controlling for other factors such as human capital investment and per capita income growth reduces the poverty-minimum wage elasticity from almost 1.0 to the range of 0.6 to 0.8. Still real minimum wages remain an important (and statistically significant) determinant of poverty. Observe that the poverty-minimum wage elasticity is always higher for the low poverty line sample. This seems counterintuitive, but seems to be an artifact of how we measure the change in poverty."

Since minimum wages affect unemployment, controlling for change in unemployment is a strictly counterfactual exercise. For the subsample of

27. Ravallion and Huppi (1989).

28. See appendix 3A. If we use the annual difference in the headcount rather than the log change, much of the difference between the high and low poverty line disappears. Note also that the coefficients are consistently higher in the low poverty line regressions, suggesting that the metric of the dependent variable is a factor. The coefficient on per capita income, for instance, increases from 0.63 for the high poverty line sample in equation 1.5 to 1.93 for the low poverty line regression 1.6.

countries for which unemployment rates are available, this variable is associated with higher poverty. Controlling for unemployment increases the minimum wage coefficient to –0.81 in equation 1.9 (from the lower levels in regressions 1.5 and 1.7), implying that these variables are inversely related (that is, when the unemployment variable is not kept constant "artificially," raising the minimum wage has a smaller impact on poverty). This inverse relationship between unemployment and minimum wages can be confirmed by regressing unemployment on minimum wages as shown in table 3-3.

Eliana Cardoso argues inflation is an important determinant of poverty.[29] However, the coefficient for inflation is not statistically significant in regression 1.10. When the minimum wage variable is dropped from this equation, inflation does have a significant negative impact on poverty. Together, these results suggest that inflation affects poverty by reducing minimum or unskilled wages.[30] If nominal minimum wages change infrequently or by small amounts compared to inflation, real minimum wage movements may be dominated by change in the price level. If this were the case, the two variables would be inversely correlated, potentially creating a problem of multicolinearity and making it hard to separate the effect of the two variables. Neither of these problems is apparent in our samples. Adding inflation in equation 1.10 has little effect on the coefficients on minimum wages or other variables. Also, replacing minimum wages by inflation in regression 1.5 (not shown here) reduces the R^2 from 0.71 to 0.47. This suggests that real minimum wages are capturing more than the effect of inflation on poverty.

The Impact of Minimum Wages by Growth Phase, Region, and Sector

Previous studies have found asymmetric poverty dynamics in recessions and recoveries. Morley, for example, finds evidence that raising minimum wages mitigates poverty only when the economy is growing.[31] We find more symmetrical effects. Because our sample includes eight intervals in which per capita income declined, we are also able to test the regional aspects of poverty and real wage changes. There are not

29. Cardoso (1992).

30. Note, however, that for some samples (not shown here) inflation does have a small independent effect and the coefficient is statistically significant, even after controlling for change in minimum wages.

31. Morley (1992).

enough data to perform separate regressions, but assuming all other coefficients are identical the minimum wage variable can be split into positive and negative growth cases. Table 3-2, equation 2.1, shows raising minimum wages is more effective for reducing poverty during periods of economic growth, but the difference is not statistically significant. The Wald test reported in the lower panel of table 3-2 cannot reject the null hypothesis that the two coefficients are equal.

Dummy variables can also be added to identify differences among regions and sectors. In table 3-2 the real minimum wage change variable is split into observations for Latin America and for Asia plus Africa. Both the extent of poverty and wage policy differ between these two regions. Regression 2.2 compares the effect of minimum wages in the seventeen Latin American observations with those for the Asian and African countries. Again, the Wald test shows the coefficients are statistically indistinguishable.

Although minimum wages can benefit uncovered workers in small open economies, minimum wage policy is clearly associated with urban workers.[32] By constructing a predominately low poverty line sample, including seventeen rural poverty estimates, we compare the impact of minimum wages in rural and urban areas. In every case a national estimate of the minimum wage is used—only a few countries enforce minimum wages by sector or occupation such as agricultural laborer. The results are reported in regression 2.3. The minimum wage coefficient is considerably higher for urban and national poverty. Even though the coefficient on rural minimum wages is not significant at the 10 percent level, the Wald test rejects the null of equal coefficients with about 10 percent confidence.

Lack of data on nominal Wages and coverage ratios prevents us from taking these factors into account. Our results, however, indicate a strong correlation between minimum wages and poverty, even without conditioning the relationship on coverage ratios or relative wages. For the cases where minimum wages are not binding and coverage is limited, one would expect to find a much weaker correlation between minimum wages and poverty. Nevertheless, available information shows that minimum

32. The only statistically significant sectoral dummy is that for urban poverty rates. Living in an urban area consistently dampens the rate of change in poverty in any direction. This urban dummy is not consistently significant and has little effect on the other coefficients, so to preserve degrees of freedom, it is not included in the regressions reported here.

wages are usually set at levels higher than a country's poverty lines (see table 3-4), which suggests that to the extent minimum wages reflect unskilled wages (or these move in tandem), a rise in the former can reduce poverty.[33]

Alternative Poverty Indicators

The limitations of the headcount measure of poverty are well known. Our final set of regressions, reported in table ***3-3,*** corroborates the results presented earlier using several other measures of poverty such as the poverty gap and the income gap.[34] Regressions 3.1 and 3.2 use the poverty gap instead of the headcount ratio. Although these samples are small, the results are consistent with the headcount estimates reported in equation 1.5. Again, we find that terms of trade are insignificant for low poverty line groups and that the observed coefficients are larger for the low poverty line sample. The only surprising result is the absence of a per capita growth effect. However, regressing the poverty gap on per capita income alone does yield a significant negative relationship: poverty gaps diminish when per capita income goes up.

Regression 3.3 uses the same time periods and sample dependent but uses the log change in per capita calorie intake as the dependent variable. Evidently, the initial estimates suffer from a heteroskedasticity problem. In equation 3.3a we use per capita growth as a weighting variable, and the weighted least-squares estimates confirm the results of the initial estimate while almost eliminating the heteroskedasticity problem. Again, using the same sample of countries and the same time intervals, our final equation evaluates the effect of minimum wages on unemployment. We find that real minimum wage increases raise unemployment. According to these estimates, a 10 percent rise in minimum wages could increase unemployment by between 0.5 and 1 percent. These estimates must be interpreted with care, since regressing our annual pool of unemployment rates on minimum wage changes yields insignificant results. Also, among those that we evaluate, unemployment is probably the least consistently defined measure of welfare across countries.

33. Table **3-4** presents information for 1985. Minimum wages reached record lows in Latin America during the 1980s (see **Cox** Edwards, 1996), hence the ratios were probably even higher in earlier periods.

34. Their characteristics and properties can be found in Foster, Greer, and Thorbecke (1986).

Table 3-2. *Poverty and Real Minimum Wages, by Region and Growth Phase*[a]

Poverty line and independent variable	*Growth (2.1)*			*Region (2.2)*			*Rural or urban (2.3)*		
	Common	*Negative*	*Positive*	*Common*	*Asia plus Africa*	*Latin America*	*Common*	*Urban-national*	*Rural*
Poverty line[b]	High	. . .	. . .	High	. . .	. . .	Low	. . .	. . .
Per capita income	−0.69	. . .	. . .	−0.63	. . .	. . .	**−1.86**	. . .	. . .
	(−1.96)	. . .	. . .	(−1.84)	. . .	. . .	(−2.20)	. . .	. . .
Real minimum wage	. . .	**−0.57**	**−0.70**	. . .	**−0.67**	**−0.63**	. . .	**−1.91**	−0.63
	. . .	(−3.47)	(−4.40)	. . .	(−2.15)	(−4.52)	. . .	(−3.13)	(−1.54)
Real public spending	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Terms of trade	**−0.36**	. . .	. . .	**−0.36**	. . .	. . .	. . .	. . .	. . .
	(−2.64)	. . .	. . .	(−2.71)	. . .	. . .	. . .	. . .	. . .
Human capital stock[c]	. . .	. . .	. . .	−0.37	. . .	. . .	−0.07[d]	. . .	. . .
	. . .	. . .	. . .	(−1.34)	. . .	. . .	(−1.47)	. . .	. . .
Education expenditure[e]	**−0.86**	. . .	. . .	**−0.77**	. . .	. . .	. . .	. . .	. . .
	(−2.31)	. . .	. . .	(−2.11)	. . .	. . .	. . .	. . .	. . .
Addendum									
Intercept	0.01	. . .	. . .	0.01	. . .	. . .	0.04	. . .	. . .
	(0.65)	. . .	. . .	(0.65)	. . .	. . .	(0.95)	. . .	. . .
White *F* test[f]	0.34	. . .	. . .	0.48	. . .	. . .	1.62	. . .	. . .
Probability value	0.96	. . .	. . .	0.90	. . .	. . .	0.19	. . .	. . .
Wald test[g]	. . .	0.73	. . .	. . .	. . .	0.01	. . .	2.81	. . .
Probability value	. . .	0.96	. . .	. . .	. . .	0.91	. . .	0.11	. . .
Adjusted R^2	0.73	. . .	. . .	0.73	. . .	. . .	0.55	. . .	. . .
Number of observations	30	. . .	. . .	30	. . .	. . .	28	. . .	. . .

a. The dependent variable is the log annual change in poverty assessed by the headcount measure; that is, the growth rate of the poor less that of the total population. All variables are expressed as annual log changes, except where noted. *t* statistics, shown in parentheses, are calculated using a White heteroskedasticity-consistent covariance matrix. Boldface indicates coefficients significant at the 5 percent level.

b. The high and low poverty lines are typically $50–$60 per month and $30 per month in 1985 purchasing power parity dollars, respectively.

c. Human capital growth is proxied by the log change in average years of secondary education per adult.

d. For this low poverty line human capital is proxied by the log of the average years of secondary education per adult.

e. Average education expenditure is expressed as a percent of GDP. This is often important as a state variable.

f. This is the *F* statistic for White's heteroskedasticity test without cross-terms. A high *F* or a low probability value suggests that the null hypothesis of homoskedastic errors should be rejected.

g. The null hypothesis for these Wald tests is that the two minimum wage coefficients are equal.

Table 3-3. *Poverty and Real Minimum Wages: Alternative Welfare Measures*[a]

Poverty line and independent variable	*Dependent variable*						
	Poverty gap[b]		*Per capita calorie intake*[c]			*Unemployment*[c,d]	
	(3.1)[e]	*(3.2)*[e]	*(3.3)*	*(3.3a)*	*(3.4)*	*(3.5)*[e]	*(3.6)*[e]
Poverty line	High	Low	. . .	. . .	. . .	. . .	. . .
Per capita income	0.45	0.74	0.17	0.10	. . .	−0.10	. . .
	(0.43)	(0.39)	(1.68)	(1.59)	. . .	(−1.35)	. . .
Real minimum wage	**−0.79**	**−1.59**	0.06	**0.08**	**0.10**	**0.08**	**0.05**
	(−2.73)	(−2.49)	(1.60)	(3.11)	(3.23)	(2.82)	(2.45)
Real public spending	. . .	. . .	. . .	. . .	0.04	. . .	−0.06
	. . .	. . .	. . .	. . .	(.61)	. . .	(−1.89)
Terms of trade	−0.46	. . .	. . .	. . .	0.08	. . .	−0.03
	(−2.09)	. . .	. . .	. . .	(1.94)	. . .	(−1.08)
Human capital stock[f]	−1.01	−1.35	. . .	. . .	. . .	−0.09	−0.11
	(−2.07)	(−1.77)	. . .	. . .	. . .	(−1.10)	(−1.38)
Addendum							
Intercept	0.03	0.04	0.00	0.00	0.00	0.01	0.01
	(1.19)	(0.80)	(0.2)	(0.98)	(0.37)	(1.36)	(1.47)
White *F* test[g]	1.58	1.02	3.37	1.90	1.54	0.45	0.91
Probability value	0.28	0.47	0.02	0.14	0.21	0.83	0.54
Adjusted R^a	0.42	0.56	0.32	0.30	0.37	0.24	0.29
Number of observations	16	16	30	30	30	21	21

a. All variables are annual log changes, except where noted. *t* statistics are shown in parentheses. Boldface indicates coefficients significant at the 5 percent level.
b. The poverty gap is the headcount ratio times the average income shortfall of the poor.
c. Includes all nonoverlapping observations.
d. The unemployment variable is the change in the unemployment rate divided by the number of years in the interval.
e. *t* statistics are calculated using a White heteroskedasticity-consistent covariance matrix.
f. Human capital growth is proxied by the log change in average years of secondary education per adult.
g. This is the *F* statistic for White's heteroskedasticity test without cross-terms. A high *F* or a low probability value suggests that the null hypothesis of homoskedastic errors should be rejected.

Table 3-4. *Ratios of Nominal Minimum Wages to Poverty Lines, Selected Countries, 1985*

Units as indicated

Country	*Minimum wage*[a]	*High poverty line ratio*[b]	*Low poverty line ratio*[c]
Argentina	79.29	1.32	2.64
Brazil	51.95	0.87	1.73
Colombia	95.34	1.59	3.18
Costa Rica	110.15	1.84	3.67
Mexico	120.99	2.02	4.03
Peru	36.65	0.61	1.22
Philippines	93.19	1.55	3.11
Paraguay	189.06	3.15	6.30
Uruguay	64.25	1.07	2.14

Source: Nominal minimum wages obtained directly from International Labour Organization's data base on "Labor Statistics on Legal Minimum Wages" (LABMINW) and the poverty lines reported in Tabatabai and Fouad (1993).
a. U.S. dollars per month.
b. Ratio of minimum wage to high poverty line ($60 per person per month), expressed as a percentage.
c. Ratio of minimum wage to low poverty line ($30 per person per month), expressed as a percentage.

Concluding Remarks

Our results indicate that minimum wage increases or declines may be associated with declines or increases, respectively, in poverty rates in developing countries. This result is consistent across high and low poverty lines, alternative measures of poverty, and the classification of observations by whether the economy is growing or contracting, by whether the population is urban or rural, and by region (Latin America or Asia plus Africa).[35]

These results, however, are not a flat endorsement of minimum wage increases as a cost effective policy to reduce poverty. Higher minimum wages do seem to raise unemployment. Minimum wage increases may also reduce efficiency and competitiveness. If minimum wage legislation has a negative effect on growth, it could hurt the poor over the long term. Even if raising the minimum wages can be shown to reduce poverty in the short run, in the long run it could reduce employment opportunities.

These caveats in mind, these results suggest reducing minimum wages in developing countries does hurt the poor, at least in the short run.

35. Using a different approach to analyze this question for the United States, Card and Krueger (1995, p. 305) find some evidence that "the effects of the minimum-wage variable on either the overall poverty rate or the poverty rate of workers are negative and marginally significant, suggesting that poverty rates fell faster in states in which the minimum wage had a bigger impact." When the authors control for change in economic conditions across states, the coefficient, although still negative, becomes statistically insignificant.

Appendix 3A: Data Sources and Estimation Issues

This appendix describes the data sources and discusses several estimation issues raised by the income and minimum wage elasticities of poverty estimates presented in this chapter.

In particular, table 3A-1 shows the countries and periods, classified into episodes of growth and recession, used in the regressions. Figures 3A-1 and 3A-2 show the frequency of countries and periods for the "standard" regression, equation 1.7 from table 3-1. Table 3A-2 presents a three-way classification of the full sample for minimum wages, per capita income, and poverty. Finally, table 3A-3 lists all of the poverty measures that serve as dependent variables, along with their published source and any available documentation on the poverty line and the type of survey data used to obtain the poverty estimate (that is, whether the poverty line is defined in terms of income or consumption expenditure, whether the rate refers to households or persons, the region covered by the survey, and so forth). Apart from the wage and unemployment data, most of the data for the dependent variables are from the World Bank's CD-ROM *World Tables 1994*. The primary sources for the minimum wage data are International Labour Organisation (1988) and several unpublished tables of real minimum wages compiled by researchers at the ILO and Comision Economica para la América Latina y el Caribe (CEPAL). Average wages are from ILO (various years), CEPAL (1994); manufacturing wages are from the World Bank's *World Tables 1994*.

The range and average change of the observations included in our standard regression, equation 1.7, are as follows. For the real minimum wage (with the real average wage in parentheses), the change is from −9.6 (−4.3) to 4.7 (10) percent per year; the average for positive observations is 2.5 (3.3) percent per year and the average for negative observations is −3.3 (−1.9) percent per year. For poverty, according to the headcount measure, the range is from −7.7 to 8.4 percent per year, and the averages are 3.5 and −4.5 percent per year for positive and negative observations, respectively. **A** complete listing of the data in spreadsheet format is available from the authors upon request.

The Magnitude of Poverty Elasticities

The main dependent variable in this study is the headcount measure of poverty. If economic growth raises income uniformly across all persons

or households, the rate at which the headcount ratio falls depends both on shape of 'the Lorenz curve and on the initial level of poverty. This point is illustrated by Cline (1992) in his comment on Morley (1992). The fact that the elasticity varies with the level of the poverty line has potentially important implications for the results reported in table 3-1, where it seems that the minimum wage poverty elasticity is higher for the lower poverty line headcount measure. Is this result due to the fact that increases in the minimum wage mainly benefit lower income groups, or is it simply due to the effect noted above? To gain some insight into this question, we briefly explore the sensitivity of the poverty elasticity to the level of poverty.

Several researchers, including Cline (1972) and Lydall (1968), have found that the Pareto function

$$N = A(ym) - b,$$

where N is the number of persons or households, ym is the lowest observed level of per capita income, and $b > 1$, provides a useful approximation to observed cumulative income distributions. A and B are the parameters that characterize the distribution. Thus for any given poverty line income yp, the number of persons with income above the poverty line is $A(yp) - b$ and the headcount poverty rate, H, is simply given by

$$H = 1 - (yp/ym) - b.$$

Cline then shows the elasticity, E, with respect to a uniform rise in per capita income, y, is given by

$$E = -b / [(yp/ym)b - 1].$$

The Gini coefficient for the Pareto distribution function, $G = 1/[2b - 1]$, can be used to determine a plausible value for b. Given a Gini coefficient of 0.45, b is roughly 1.5. The poverty-income elasticity now depends on the relationship between the poverty line, yp, and the minimum (subsistence) income, ym. Cline argues that a plausible value for the ratio yp/ym is 1.5, yielding a poverty income elasticity of about −1.8, which is very similar to that reported in regression 1.1 of table 3-1.

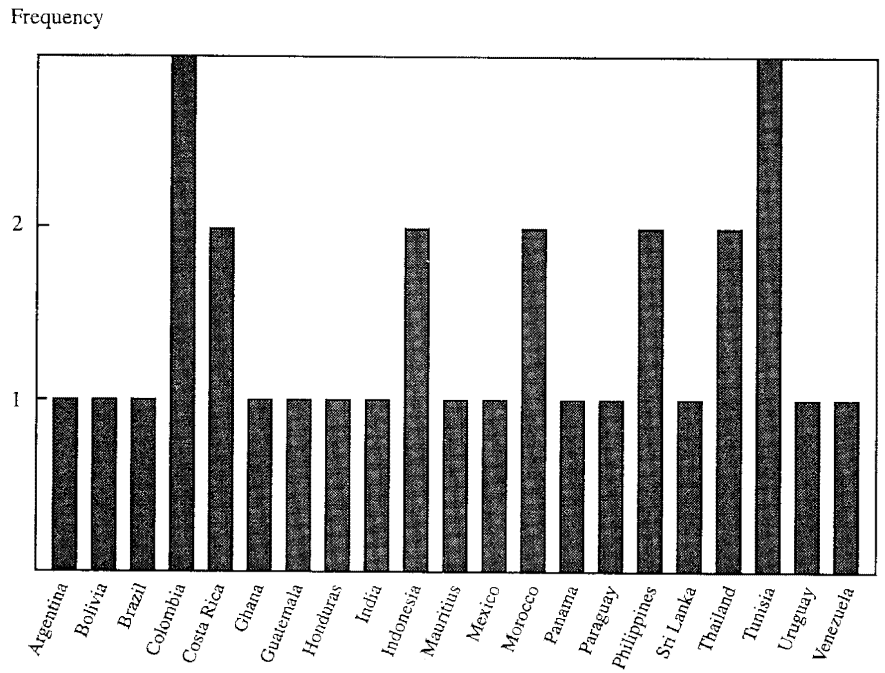
We now return to the question at hand: how sensitive is the poverty elasticity to change in the poverty line, especially to a lower poverty line? Figure 3A-3 plots the several possible methods of computing the poverty-income elasticity against various poverty lines (more precisely, various ratios of poverty line to minimum income, yp/ym). **As** is clear from the

Table 3A-1. *Countries and Periods Included in Regresssions*[a]

Region and country	Headcount ratio as dependent variable		Poverty gap as dependent variable	
	Recession	*Growth phase*	*Recession*	*Growth phase*
Africa				
Ghana		1987–90[b,c]		
Mauritius		1980–87[b,c]		
Morocco		1970–84[b,c], 1975–80[d,e] 1980–85[d,e], 1984–90[c,f]		1970–84[b,c]
Tunisia		1975–80[c,f], 1975–80[d,e] 1980–85[c,f], 1980–85[d,e] 1985–90[c,f]		
Asia and the Pacific				
India		1977–83[b,c], 1978–83[d,e] 1984–90[c,d], 1984–87[d,e]		1977–83[b,c]
Indonesia		1987–90[b,c], 1990–93[b,c] 1971–85[c,f], 1971–85[d,e]		
Philippines		1985–88[c,f] 1963–82[c,d], 1973–78[d,e]		
Sri Lanka		1985–90[c,f]		1963–82[d,c]
Thailand		1975–81[b,c], 1976–81[d,e] 1981–88[b,c]		1981–86[b,c]
Latin America and the Caribbean				
Argentina	1980–89[f,g]		1980–89[b,g]	
Bolivia		1986–89[f,g]		1986–89[f,g]
Brazil		1980–89[c,f], 1980–89[b,e]		1980–89[c,f]
Colombia		1971–78[b,c], 1978–88[b,c] 1980–89[d,g], 1988–91[c,f]		1971–78[b,c], 1980–89[f,g]
Costa Rica	1977–83[b,c], 1977–83[d,c] 1981–89[c,f]	1971–77[b,c], 1971–77[d,e]		
Guatemala		1983–86[b,c], 1983–86[d,e]	1977–83[b,c], 1981–89[c,d]	1983–86[b,c]
Honduras		1986–89[e,f]		1986–89[b,c]
Mexico	1984–89[c,f]	1986–89[f,g]		1986–89[f,g]
Panama	1979–89[c,d], 1979–89[b,e]		1979–89[c,f]	
Paraguay		1983–90[f,g]		1980–89[f,g]
Peru	1979–86[d,g]		1986–90[f,g]	
Uruguay	1981–89[f,g]		1981–89[f,g]	
Venezuela	1981–89[d,e], 1982–89[c,f]			

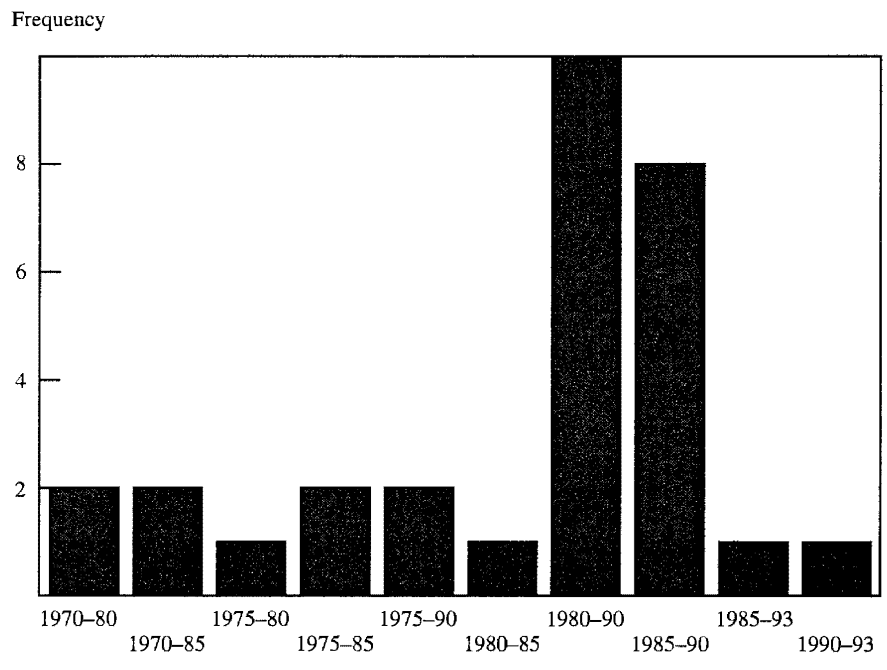
Source: See tables 3-4 and 3A-3.
a. Minimum wage data are available for each observation included.
b. Dependent variable only available for high poverty line.
c. National.
d. Dependent variable only available for low poverty line.
e. Rural.
f. Dependent variable available for both high and low poverty lines.
g. Urban.

Figure 3A-1. *Frequency of Countries in Standard Regression, (1.7)*



formula for E, this elasticity rises as the poverty line falls. For comparison, we plot the poverty elasticity used here against the same range of change in poverty (that is, log change in H over the log change in income at each poverty line shown on the y-axis of this figure). Both elasticities are sensitive to change in the poverty line, although the elasticity used here is less sensitive. One somewhat arbitrary method that avoids this problem is to use an elasticity based on the change in $\log(1 + H)$ as opposed to $\log(H)$. This is the measure used by Morley (1992). When the high and low poverty line estimates reported in table 3-1 are performed using the change in $\log(1 + H)$ as the dependent variable, similar estimated coefficients are obtained for all variables, except that the difference between the high and low poverty line coefficients is reduced. The elasticity of the lower poverty lines with respect to the minimum wage is still higher, but the difference is insignificant according to the standard F tests. This discussion leads one to conclude that the lower poverty line elasticity appears to be higher than the elasticity for the upper poverty line, but this may be simply an artifact of the method used to gauge change in poverty. All of the elasticities pictured in figure

Figure 3A-2. *Frequency of Periods in Standard Regression (1.7)*



3A-3 rise as the poverty line falls relative to the minimum income of the population.

Poverty Data: Sample and Sources

The majority of the poverty measures used as dependent variables in this study come from recent recompilations of survey data undertaken by World Bank researchers and the ILO. The three primary sources are studies by Chen, Datt, and Ravallion (1991), Psacharopoulos (1993), and Tabatabai and Fouad (1993). We also obtain a number of poverty estimates from the World Bank's 1990 *World Development Report* and *World Tables 1994* (on CD-ROM) and from some (unpublished) individual country sources. In total, we provide information on twenty-two countries, nine of which lie outside Latin America. In each case, we use only two observations, based on similar surveys. Of 223 total observations, eighty-nine are based on household data in both years; the remaining are based on individual data. Fifty-five observations use poverty lines based on expenditure, while the rest use poverty lines defined by income. Our

Table 3A-2. *Three-by-Three Plot of Changes in Poverty, Minimum Wages, and per Capita GDP*[a]

Total = 180

Item	*Poverty falls*		*Poverty increases*	
	Country/period (poverty measure)		*Country/period (poverty measure)*	
	(total = 5)		(total = 37)	
Minimum wage and GDP fall	URY 1981–89 (h)(is)(U)	URY 1981–89 (h)(pg)(U)	ARG 1980–89 (h)(is)(U)	PER 1986–90 (h)(U)
	URY 1981–89 (h)(U)	URY 1981–89 (L)(U)	ARG 1980–89 (h)(pg)(U)	PER 1986–90 (L)(is)(U)
	URY 1981–89 (L)(pg)(U)		ARG 1980–89 (h)(U)	PER 1986–90 (L)(pg)(U)
			ARG 1980–89 (L)(U)	PER 1986–90 (L)(U)
			BRA 1980–83 (L)(N)	URY 1981–89 (L)(is)(U)
			MEX 1984–89 (h)(N)	VEN 1981–89 (h)(is)(N)
			MEX 1984–89 (L)(N)	VEN 1981–89 (h)(pg)(N)
			PAN 1979–89 (h)(is)(N)	VEN 1981–89 (h)(R)
			PAN 1979–89 (h)(N)	VEN 1981–89 (L)(is)(N)
			PAN 1979–89 (h)(pg)(N)	VEN 1981–89 (L)(N)
			PAN 1979–89 (h)(R)	VEN 1981–89 (L)(N)
			PAN 1979–89 (L)(is)(N)	VEN 1981–89 (L)(pg)(N)
			PAN 1979–89 (L)(N)	VEN 1982–89 (h)(N)
			PAN 1979–89 (L)(pg)(N)	VEN 1982–89 (L)(N)
			PER 1979–86 (L)(U)	VEN 1987–89 (h)(N)
			PER 1980–90 (L)(U)	VEN 1987–89 (h)(N)
			PER 1980–91(L)(U)	VEN 1987–89 (L)(N)
			PER 1986–90 (h)(is)(U)	VEN 1987–89 (L)(R)
			PER 1986–90 (h)(pg)(U)	
	(total = 18)		(total = 24)	
Minimum wage falls but GDP increases	BRA 1983–86 (h)(N)	HND 1986–89 (L)(U)	BRA 1979–89 (h)(U)	GHA 1987–90 (h)(N)
	BRA 1983–87 (h)(N)	LKA 1985–90 (h)(N)	BRA 1980–87 (h)(N)	GTM 1986–89 (h)(pg)(N)
	COL 1988–91 (h)(N)	LKA 1985–90 (L)(N)	BRA 1980–89 (h)(is)(N)	GTM 1986–89 (h)(R)
	COL 1988–91 (L)(N)	PHL 1971–85 (L)(N)	BRA 1980–89 (h)(N)	GTM 1986–89 (h)(U)
	CRI 1971–77 (h)(N)	PHL 1971–88 (L)(N)	BRA 1980–89 (h)(pg)(N)	GTM 1986–89 (L)(R)
	CRI 1971–77 (L)(R)	TUN 1985–90 (h)(N)	BRA 1980–89 (h)(R)	HND 1986–89 (h)(U)
	GTM 1986–89 (h)(N)	TUN 1985–90 ((h)(N)	BRA 1980–89 (L)(N)	HND 1986–89 (h)(U)
	GTM 1986–89 (L)(N)	TUN 1985–90 (L)(N)	BRA 1980–89 (L)(N)	HND 1986–89 (L)(pg)(U)
	HND 1986–89 (h)(U)	TUN 1985–90 (L)(N)	BRA 1980–89 (L)(pg)(N)	HND 1986–89 (L)(U)
			BRA 1981–87 (h)(N)	PHL 1971–85 (h)(N)
			BRA 1985–89 (h)(N)	PHL 1971–85 (L)(R)
			BRA 1985–89 (L)(N)	PHL 1971–88 (h)(N)
	(total = 64)		(total = 16)	
Minimum wage and GDP increase	BRA 1970–80 (L)(N)	LKA 1963–82 (L)(N)	BOL 1986–89 (h)(is)(U)	COL 1978–88 (h)(pg)(N)
	COL 1971–78 (h)(is)(N)	LKA 1963–82 (L)(pg)(N)	BOL 1986–89 (h)(pg)(U)	CRI 1971–86 (h)(is)(N)
	COL 1971–78 (h)(N)	LKA 1973–78 (L)(R)	BOL 1986–89 (h)(U)	CRI 1983–86 (h)(is)(N)
	COL 1971–78 (h)(pg)(N)	MAR 1970–84 (h)(is)(N)	BOL 1986–89 (L)(is)(U)	MAR 1975–80 (L)(R)
	COL 1971–88 (h)(is)(N)	MAR 1970–84 (h)(N)	BOL 1986–89 (L)(pg)(U)	PRY 1983–90 (L)(is)(U)
	COL 1971–88 (h)(N)	MAR 1970–84 (h)(N)	BOL 1986–89 (L)(U)	THA 1981–86 (h)(is)(N)
	COL 1978–88 (h)(R)	MAR 1980–85 (L)(R)	COL 1978–88 (h)(is)(N)	THA 1981–86 (h)(N)
	COL 1980–89 (h)(is)(U)	MAR 1984–90 (h)(N)	COL 1978–88 (h)(N)	THA 1981–86 (h)(pg)(N)
	COL 1980–89 (h)(pg)(U)	MAR 1984–90 (L)(N)		
	COL 1980–89 (h)(U)	MAR 1984–90 (L)(N)		
	COL 1980–89 (L)(is)(U)	MAR 1985–91 (h)(N)		
	COL 1980–89 (L)(pg)(U)	MAR 1985–91 (L)(N)		
	COL 1980–89 (L)(U)	MUS 1980–87 (h)(N)		
	CRI 1971–86 (h)(N)	MUS 1984–90 (h)(N)		
	CRI 1971–86 (h)(pg)(N)	PHL 1985–88 (h)(N)		
	CRI 1983–86 (h)(N)	PHL 1985–88 (L)(N)		
	CRI 1983–86 (h)(pg)(N)	PRY 1980–89 (h)(pg)(U)		

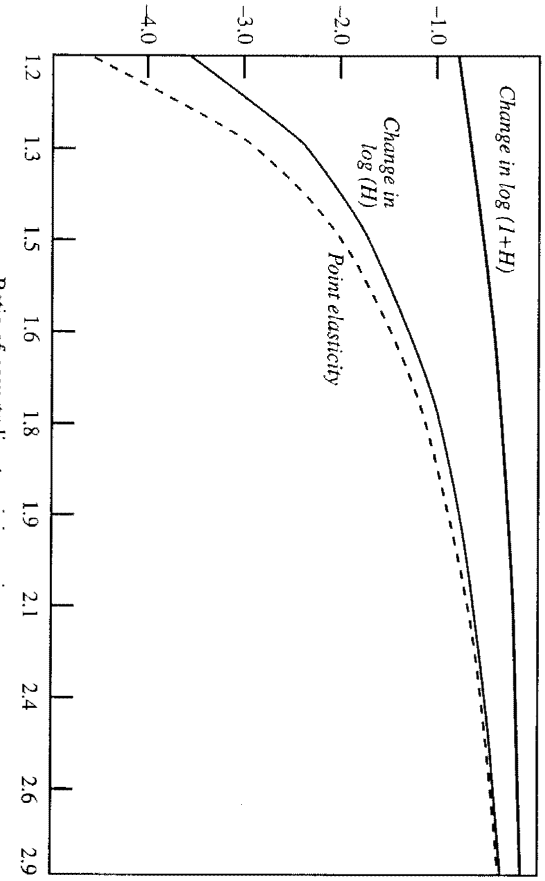
Table 3A-2. (*continued*)

Total = 180

Item	Poverty falls		Poverty increases	
	Country/period (poverty measure)		Country/period (poverty measure)	
	CRI 1983–86 (L)(R)	PRY 1980–89 (L)(pg)(U)		
	IDN 1984–87 (L)(N)	PRY 1983–90 (h)(is)(U)		
	IDN 1984–87 (L)(R)	PRY 1983–90 (h)(U)		
	IDN 1984–90 (h)(N)	PRY 1983–90 (L)(U)		
	IDN 1984–90 (L)(N)	THA 1975–81 (h)(N)		
	IDN 1987–90 (h)(N)	THA 1976–81 (L)(R)		
	IDN 1990–93 (h)(N)	THA 1981–88 (h)(N)		
	IND 1972–83 (h)(is)(N)	TUN 1975–80 (h)(N)		
	IND 1972–83 (h)(N)	TUN 1975–80 (L)(N)		
	IND 1972–83 (h)(pg)(N)	TUN 1975–80 (L)(R)		
	IND 1977–83 (h)(is)(N)	TUN 1975–80 (L)(U)		
	IND 1977–83 (h)(N)	TUN 1980–85 (h)(N)		
	IND 1977–83 (h)(pg)(N)	TUN 1980–85 (L)(N)		
	IND 1978–83 (L)(R)	TUN 1980–85 (L)(R)		
	LKA 1963–82 (L)(is)(N)	TUN 1980–85 (L)(U)		
	(total = 9)		(total = 7)	
Minimum wage increases but GDP falls	CRI 1977–83 (h)(is)(N)	CRI 1981–89 (h)(U)	CRI 1977–83 (h)(N)	VEN 1982–87 (h)(N)
	CRI 1981–89 (h)(is)(N)	CRI 1981–89 (L)(is)(N)	CRI 1977–83 (h)(pg)(N)	VEN 1982–87 (h)(pg)(N)
	CRI 1981–89 (h)(N)	CRI 1981–89 (L)(N)	CRI 1977–83 (L)(R)	VEN 1982–87 (L)(R)
	CRI 1981–89 (h)(pg)(N)	CRI 1981–89 (L)(pg)(N)	VEN 1982–87 (h)(is)(N)	
	CRI 1981–89 (h)(R)			

a. Key to entries follows table 3A-3.

Figure 3A-3. *Poverty Elasticities*[a]



Source: Authors' simulation.

a. Poverty elasticities are sensitive to the poverty line.

total sample includes forty poverty gaps and thirty-nine income gap or shortfall ratios; the remaining 144 measures are headcount ratios. Eighty-three of the observations are based on lower poverty lines (less than $40 per month in 1985 purchasing power parity dollars per person) and the remaining 140 were based on higher poverty lines (above $40). Fifty-three measures came from urban areas, twenty-one from rural areas, and the rest were based on national surveys.

The average interval between observations in a set is almost eight years; the median is seven years. The fact that the majority of the observations are from the 1980s is, in fact, an advantage. In over one-third (eighty-nine) of total observations (including overlapping periods), poverty increases over the interval in question (in 134 cases it decreases). Similarly, real minimum wages rose in about two-thirds of total observations and fell in seventy cases. The implication is that our estimates do not simply represent trends in these two key variables. During normal times, one expects poverty rates to fall and minimum wage rates to rise, but this was not the case during the 1980s. During a period of stable economic growth, real wages are likely to rise while poverty falls, creating

Key to tables 3A-2 and 3A-3:

ARG	Argentina	PR	Puerto Rico
BGD	Bangladesh	PRY	Paraguay
BOL	Bolivia	RWA	Rwanda
BRA	Brazil	SGP	Singapore
CHN	China	TAI	Taiwan
COL	Colombia	THA	Thailand
CRI	Costa Rica	TUN	Tunisia
GHA	Ghana	TZA	Tanzania
GTM	Guatemala	URY	Uruguay
HND	Honduras	VEN	Venezuela
IDN	Indonesia	YUG	Yugoslavia, Federal Republic of
IND	India	E	Welfare measure is expenditure
KOR	Korea, Republic of	H	High poverty line
LKA	Sri Lanka	I	Welfare measure is income
MAR	Morocco	L	Low poverty line
MEX	Mexico	N	National
MUS	Mauritius	P	Individuals
MYS	Malaysia	R	Rural
PAK	Pakistan	U	Urban
PAN	Panama	h	Headcount ratio
PER	Peru	is	Income gap ratio
PHL	Philippines	pg	Poverty gap ratio
POL	Poland		

a potentially spurious correlation over time. But this was certainly not the case during the 1980s—the period from which the majority of our observations are drawn. On the contrary, the 1980s were characterized by high variability in both poverty and real wages. In 89 of our time intervals poverty rose while in 134 cases it fell. Similarly, real minimum wages rose in about two thirds of our observations but fell in 70 cases. This sample of highly variable wage and poverty rates is also useful because minimum wage laws are often considered a "safety-net" policy to protect the poor in periods of economic instability.

The regressions reported in this paper use a number of different samples of poverty changes. The length and country composition of the observations are generally determined by the availability of survey-based poverty measures. We have dropped a few observations because they exhibit unlikely change in poverty, or minimum wages, or both. Some observations have been dropped because large changes in poverty or minimum wages tend to distort the results. The outliers are Venezuela 1987–89 and Peru during the 1980s. Including the outliers increases the effect of minimum wages on poverty but some of the other variables lose significance. Also, because many observations overlap, there are alternative ways to organize the data. The specific sample used for each

regression and the complete data set are available from the authors upon request.

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