

# THE SHRINKING MIDDLE-INCOME CLASS: A MULTIVARIATE ANALYSIS

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## INTRODUCTION

The middle-income class is “shrinking” or even “disappearing” according to many analysts including Thurow [1984], who argues that “a bipolar income distribution composed of rich and poor is replacing the wide expanse of the middle class.” The principal cause identified by Thurow and others is “de-industrialization”. They argue that high technology and service jobs which tend to pay either very low or very high wages are replacing well-paying jobs in basic manufacturing, long the mainstay of the blue-collar middle class. Other hypothesized causes of a growing low-income class are the increasing proportions of family heads who are female, black, young, non-union or who work part time. To explain the expansion of the upper-income class, observers often point to the growing number of two-income families.

The causes of the shrinking middle class remain in doubt because these hypotheses have been tested separately with bivariate analyses. As a result, the potential for omitted variable bias is significant, and the results are difficult to interpret. This paper provides the multivariate analysis that has long been needed to clarify the issue. After a discussion of the hypotheses, we examine income distributions from the Panel Study of Income Dynamics which reveal a gradual shrinking of the middle class and a corresponding swelling of the lower and upper classes over time. We then test the hypotheses simultaneously by estimating the effect each has on the growing lower and upper income classes from 1971 to 1982. The results indicate that the decreases in annual hours of work and union membership are the most important of the hypothesized factors explaining the growth of the lower class. The more celebrated causes — the influx of baby-boomers, the growing number of families headed by women and blacks, and the decline of smokestack industries — prove to be less important. The rising number of two-income families and college graduates explain much of the change in the upper-income class.

## HYPOTHESES

Many conflicting opinions have been offered to explain the shrinking of the middle-income class. Kuttner [1983] attributes the shrinking middle class to the decline of unionism. Thurow [1984] agrees, arguing that unions “convert jobs that probably weren’t middle-income jobs based on the skills required into middle-income jobs.”

Others suggest that it is not only the decline of unions per se but reduced employment in basic industry that has led to a rise in the lower-income class at the expense of

the middle class [Thurow, 1984; Bluestone and Harrison, 1988]. Lawrence [1984], Beach [1989] and Levy [1987, 94-99] deny that the movement from manufacturing to services is an important factor. They argue that the entry of the baby-boom cohort into labor markets provides a better explanation, noting a larger decline in the proportion of younger people that fall in the middle-income group. Others claim that the effect of the changing age distribution actually serves to increase the employment in the middle-income group [Thurow, 1984; Bradbury, 1986; Bluestone and Harrison, 1988; Beach, 1989].

The "feminization of poverty" has also been advanced as a theory of the rising lower class (and shrinking middle class). If the number of families headed by females is growing and if those women are paid lower salaries, then that is an obvious source of movement toward the bottom-income group [Thurow, 1984].

Other explanations of the shrinking middle class include increased reliance on part-time work [Beach, 1989] and polarization of incomes earned by black men [Levy, 1987, 139].

A major reason for the lack of agreement about the causes of the shrinking middle class is that these studies (except for Bluestone and Harrison) employ bivariate analyses. As such, they have been unable to test the various hypotheses simultaneously, and the resulting omitted variable bias creates uncertainty about the validity of their conclusions. For instance, Bradbury examines demographic influences only, and Lawrence analyzes demographic effects apart from the effects of shifts in the industrial sector. Bluestone and Harrison employ multivariate analysis but do not include union membership, race and other determinants of low-wage status.

## DATA

In an attempt to determine why the middle class is shrinking, our study compares distributions of family incomes in 1971 and 1982 obtained from the cross-year file of Panel Study of Income Dynamics. All incomes are in current dollars and include receipts from labor and property. Although from a panel study, the income distributions represent different cross sections of families because new families (who break away from the original families) enter the study between 1971 and 1982. We chose the family-individual file because its rich family data enable testing of the hypotheses discussed above, especially the importance of unions and two-income families. The base year 1971 was selected because respondents were first asked about industry of employment in that year.

The middle class is defined as those families with incomes between 50 and 150 percent of the current-year median incomes. The current-dollar income range for the middle class is \$5,100 to \$15,300 in 1971 and \$10,349 to \$30,046 in 1982. So defined, the middle class shrinks from 54.5 to 44.4 percent of families between 1971 and 1982, while the lower class increases from 22.8 to 26.9 percent of families and the upper class increases from 22.7 to 28.7 percent.<sup>1</sup>

## MULTIVARIATE ANALYSIS

### *Lower-Income Class*

As discussed above, six hypotheses have been put forward as explanations of the increase in the lower-income class at the expense of the middle class: (1) lower employment in manufacturing jobs; (2) declining union membership; (3) the coming of age of the baby boomers; (4) growth in the number of families headed by females; (5) polarization of black earnings; and (6) increased dependence on part time work. To test these hypotheses, we pool observations for 1971 and 1982 and estimate a probit model to discover how each of the above factors affects the likelihood of a family belonging to the lower class. We then examine the change in these factors over time to determine their effects on the size of the middle class.

The dependent variable for the regression is LOWERCLASS, a dummy variable which takes the value of one if the family is in the lower class and zero if in the middle class or upper class.<sup>2</sup> DURMFG, UNIONMEMBER, AGEHEAD<37, FEMALE, BLACK, and HOURSHEAD are variables designed to test the above hypotheses. DURMFG equals one when the family head is employed in durable goods manufacturing. If the shift away from durable manufacturing is a significant cause of the growing lower class (and shrinking middle class), DURMFG should have a negative coefficient. UNIONMEMBER equals one if the family head belongs to a union. If Thurow's hypothesis is correct, union membership should decrease the probability of being in the lower class. Lawrence suggests that families headed by baby boomers are more likely to be in the lower class. Thus, AGEHEAD<37 should have a positive coefficient associated with it. (The oldest members of the baby-boom cohort were 36 in 1982.) The "feminization of poverty" hypothesis advanced by Thurow and others leads us to expect that the probability of a family being in the lower class is greater when the family head is FEMALE. Levy's hypothesis about the growing income inequality of black families suggests a positive and increasing correlation between BLACK and lower-class status. The variable HOURSHEAD is the annual hours worked by the head of the household. Beach's hypothesis indicates that HOURSHEAD should be negatively correlated with lower-income class.<sup>3</sup>

We have included several other explanatory variables to control for influences on income class other than those hypothesized above. HOURSWIFE measures the annual working hours of the wife. As noted in the introduction, one possible reason for the rise of the upper-income class is the two-income hypothesis. By the same reasoning, the hours of work of the wife should be negatively correlated with the likelihood of being in the lower-income class. DISABLED equals one when health problems interfere with the type and amount of work done by the family head. AGEHEAD>60 equals one when the family head's age exceeds 60. This variable is included to pick up the effects of aging on income which are not captured by other variables. NONHSGRAD, which equals one when the family head has not graduated from high school, enters the regressions because of income variations predicted by human capital theory. We predict that being disabled, over age 60 or without a highschool degree will be positively related to the probability of being in the lower class.

TABLE 1  
Results of Probit Estimation

Variables	Probit Coefficients	
	Lower-Income Class	Upper-Income Class
DURMFG (1=employed in durable manufacturing.)	-0.358 <sup>b</sup> (2.469)	-0.043 (0.425)
UNIONMEMBER (1=yes)	-0.628 <sup>a</sup> (5.529)	-0.047 (0.517)
FEMALE (1=yes)	0.455 <sup>a</sup> (4.538)	-1.104 <sup>a</sup> (6.047)
BLACK (1=yes)	0.613 <sup>a</sup> (4.001)	-0.713 <sup>a</sup> (3.596)
AGEHEAD<37 (1=yes)	0.487 <sup>a</sup> (4.911)	-.726 <sup>a</sup> (8.788)
HOURSWIFE (Annual work hours of wife, 000s)	-0.815 <sup>a</sup> (9.716)	0.479 <sup>a</sup> (10.314)
HOURSHEAD (Annual work hours of head, 000s)	-0.780 <sup>a</sup> (12.93)	0.433 <sup>a</sup> (7.720)
DISABLED (1=health interferes with work)	0.232 <sup>b</sup> (2.063)	-0.155 (1.305)
AGEHEAD>60 (1=yes)	0.479 <sup>a</sup> (3.550)	-0.274 (1.778)
NONHSGRAD (1=did not graduate from high school)	0.850 <sup>a</sup> (8.923)	.....
COLLGRAD (1=college graduate)	.....	1.163 <sup>a</sup> (12.452)
DUM82 (1=82 data; 0=71 data)	-0.028 (0.148)	0.109 (0.577)
DURMFG*DUM82	-0.084 (0.463)	0.185 (1.482)
UNIONMEMBER*DUM82	-0.081 (0.522)	0.268 <sup>b</sup> (2.306)
FEMALE*DUM82	0.024 (0.199)	0.142 (0.675)
BLACK*DUM82	-0.134 (0.714)	0.192 (0.803)
AGE<37*DUM82	-0.081 (0.651)	0.199 <sup>b</sup> (1.972)
HOURSWIFE*DUM82	0.265 <sup>a</sup> (2.747)	-0.066 (1.181)
HOURSHEAD*DUM82	0.031 (0.435)	0.061 (0.897)
DISABLED*DUM82	0.008 (0.057)	-0.133 (0.861)

TABLE 1 (Cont.)  
Results of the Probit Estimation

Variables	Probit Coefficients	
	Lower-Income Class	Upper-Income Class
AGEHEAD>60*DUM82	-0.331 <sup>b</sup> (1.972)	-0.194 (1.022)
NONHSGRAD*DUM82	-0.183 (1.536)	.....
COLLGRAD*DUM82	.....	-0.234 <sup>b</sup> (2.067)
CONSTANT	0.307 (1.948)	-1.780 <sup>a</sup> (11.22)
R2 (between observed and predicted)	0.511	0.318
Likelihood Ratio Test (21 d.f.)	2,623 <sup>a</sup>	1,781 <sup>a</sup>
Sample Size:	5,198	5,198

Note: Absolute t statistics in parentheses. Superscripts b and a indicate significance at .05 and .01 levels respectively.

DUM82 equals one for families sampled in 1982 and zero for those sampled in 1971. DUM82 and DUM82 times each of the above variables have been included to allow for the possibility that the structural equation changes between 1971 and 1982.

Results of the probit estimation of the lower-income class regression are shown in Table 1. All the primary coefficients are statistically significant at the 5 percent level and have the expected signs. These coefficients characterize the 1971 structural equation. The cross product terms with DUM82 reflect changes in the coefficients between 1971 and 1982. With the exception of the hours worked by wives and the over age 60 variable, the changes in the coefficients are insignificant. Based on these results, one might conclude that all of the above hypotheses are correct. That is, not working in manufacturing, not being a union member, being under age 37, black, female, and working fewer hours all increase the likelihood of being in the lower class. However, such a conclusion confuses statistical significance and magnitude. Moreover, the theories concerning the growth of the lower class are all joint hypotheses: (1) The characteristic in question is a significant determinant of the likelihood of being in the lower class; and (2) Demographic changes have increased the prevalence of that characteristic in the population.

To evaluate the specific hypotheses described above, the mean probability of being in the lower-income class in 1971 is estimated using the 1971 means of the independent variables. The probability is then recalculated substituting the 1982 mean of the

variable in question. The resulting predicted change in the share of families in the lower class is due to the change in that variable alone.<sup>4</sup> For example, the percentage of our sample employed in durable manufacturing fell from 15.7 percent in 1971 to 13.9 percent in 1982. We find that if the only change between 1971 and 1982 had been the lower employment in durable manufacturing, the rise in the lower class would have been only about 0.1 percentage points instead of the actual 4.1 percentage-point increase. (The change in the coefficient itself is not of concern in this example since DURMFG\*DUM82 is statistically insignificant.) Thus, de-industrialization is not an important cause of an expanded lower class.

Applying this methodology to each of the dependent variables produces the following results.<sup>5</sup> The largest increases in the lower class are attributed to union membership and hours worked by the head of the household. Union membership fell from 24.9 percent in 1971 to 15.3 percent in 1982. Substituting this change into the equation generates a predicted increase of 1.2 percentage points in the share of families in the lower class. This result provides strong support for the hypothesis that the decline in unions is a major cause of the shrinking middle class. The hours worked by the family head fell by an average of 13.5 percent. This change alone would have caused a 4.6 percentage-point rise in the lower-income class. To the extent that the decline in hours worked reflects an increase in part-time employment, this result supports Beach's [1989] argument concerning the decline of the middle class.

The number of family heads under age 37 increased from 40.7 percent to 48.5 percent. This change generates a 0.8 percentage point increase in the lower class share. Thus the baby boom does explain a small portion of the fall of the middle class.

The major factors restricting the rise in the lower class appear to be increases in the highschool graduation rate and the number of hours worked by wives. The number of family heads without a high school degree fell substantially from 31.2 percent to 21.7 percent. All else being equal, this would have caused the lower class to shrink by 1.5 percentage points. The average number of hours worked by wives in the sample increased from 530 to 636 per year. Substituting this change into the regression equation generates a decrease of the lower class by 1.6 percentage points. However, the coefficient on HOURSWIFE\*DUM82 is positive and significant at the 1 percent level. The impact of an extra hour of a wife's work in 1982 is the coefficient on HOURSWIFE plus the coefficient on HOURSWIFE\*DUM82. Since the sum of these coefficients is smaller in absolute value than the coefficient on HOURSWIFE, this suggests that an extra hour of a wife's work in 1982 had less of an impact on the probability of being in the bottom class. Thus, while the average number of hours worked by the wife increased, each hour had less effect on the likelihood of being in the lower class in 1982 than in 1971. Changing the mean of HOURSWIFE to its 1982 value and including the effect of the coefficient on HOURSWIFE\*DUM82, we find the net effect of these two opposing forces to be a rise of 1.7 percentage points.

This analysis casts doubt upon the hypotheses concerning females and blacks. The coefficient on FEMALE suggests that families headed by females are more likely to belong to the lower-income class. However, the small increase in the number of these families from 19.1 percent of the sample to 21.1 percent generates only a 0.2 percentage-point rise in the lower class. Being black has a similar effect on the probability of lower class membership, but the number of black families rose only 0.3 percent between 1971 and 1982. As a result the predicted impact of this change on the size of the lower class is minimal. Levy's hypothesis is that black incomes have polarized over recent years. If he

is correct, then being black should have a greater effect on the probability of being poor in 1982 than it did in 1971. This would be reflected in a change in the black coefficient as opposed to a change in the number of black families. However, the coefficient on BLACK\*DUM82 which represents the change in the coefficient between 1971 and 1982 is not statistically significant at any reasonable confidence level. While blacks remain more likely to be in the bottom class, the polarization is apparently affecting black and white families similarly.

Finally, note that the increasing number of people over age 60 would have increased the lower share by 0.5 percentage points. However, the coefficient on AGE>60\*DUM82 is negative and significant at the 1 percent level suggesting that being over the age of 60 had less effect on the probability of being in the lower class in 1982 than it did in 1971. This finding may reflect improved government support programs for the elderly and retirement at older ages.

### *Upper-Income Class*

To explore the causes of the increasing upper-income class, the same independent variables are used with the exception that the dummy reflecting high school graduation is replaced with a variable which equals one if the family head is a college graduate. The dependent variable is UPPERCLASS, which equals one if the family is in the upper-income class.

The results of the probit estimation of the probability of being in the upper-income class are presented in Table 1. Six of the coefficients are significant at the 5 percent level and another is significant at the 10 percent level. As one might expect, those factors which were shown to increase the likelihood of being in the lower class decrease the probability of being in the upper class and vice-versa. Thus, being female, black, young or old decreases the odds of belonging to the upper class. Working more hours and having a college degree increases the probability of being in the upper class. Evaluating the equation using 1971 mean values and again using 1982 mean values produces an estimated rise in the share of families in the upper class of 5.8 percentage points compared to the actual increase of 6 percentage points.

The most significant demographic factors behind the increasing upper-income class appear to be changes in the number of hours worked by wives and the increase in the number of college graduates. The increasing number of hours worked by wives alone would account for 1.1 of the 6 percentage point rise in the upper class. This lends support to the two-income hypothesis. The number of college graduates increased from 17.4 percent of the population to 21.3 percent, and this would have led to a 1 percentage point rise in the upper class. However, note that the coefficient on COLLGRAD\*DUM82 is negative and significant, suggesting a college education had less effect on the likelihood of belonging to the upper class in 1982. The rising number of graduates just offsets the decreased importance of a college degree on the probability of upper class membership, resulting in a minimal -0.1 percentage points net effect.

The coefficient on UNIONMEMBER is insignificant, suggesting that it had little effect on the probability of being in the upper class in 1971. The 1982 coefficient, however, is significantly larger, suggesting an increase in the likelihood of being in the upper-income class for union members. Perhaps union membership is declining most dramatically in lower-wage occupations. The net effect of the increase in the union

coefficient and the 9.6 percentage-point drop in union membership between 1971 and 1982 is a 1.03 percentage-point increase in the upper class.

Four demographic changes counteracted the rise in upper-income class membership predicted thus far. The falling number of hours worked by the average family head would have decreased the size of the upper class by 2.4 percentage points. The increase in the number of families headed by females would have caused a 0.5 percentage-point decline. The rise in the proportion of workers over age 60 would have caused upper-class membership to fall by 0.3 percentage points. Finally, the rising number of workers under age 37 would have caused a drop of 1.2 percentage points. However, this was more than offset by a decrease in the impact of youth on the probability of upper-class membership.

## CONCLUSIONS

There has been vigorous debate over the causes of the shrinking middle-income class. Previous studies have been unable to resolve the issue because the bivariate analyses employed do not control for other factors which may affect a family's income class and, as a result are seriously affected by omitted-variable bias.

Our multivariate analysis shows that three of the more widely accepted hypotheses about the growing lower-income class — de-industrialization, the rising number of families headed by women, and increasing polarization of incomes of black families — explain very little of the growth in the lower class. The aging of the baby boomers explains a slightly larger proportion of the rise in the lower class. More important is the decline of union membership, distinct from the decline in durable manufacturing jobs. The reduced number of average hours worked by the family head is also an important cause of the shrinking middle class. The rising proportion of our sample with a high school education helped stem the increase of the lower-income class.

The major hypothesis advanced to explain movement from the middle to upper-income classes is the impact of two-income families. Our results suggest that this effect appears to be statistically significant, but modest. The rising number of college graduates has encouraged the growth of the upper-income class, but this is largely offset by a reduction in the marginal impact of a college degree on the probability of being in the upper-income group.

## NOTES

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1. Our results are not highly sensitive to this definition of the middle class (which is the same as that employed by Kusters and Ross [1988]). For instance, when defined more broadly at the upper end to include incomes from 50 to 200 percent of the median, the middle-income class shrinks from 67.6 percent of all families in 1971 to 57 percent in 1982. Under this definition, the coefficients for the top-class regression are generally smaller (as one would expect), but all of the significant coefficients retain their signs. Of course, the coefficients for the bottom class regression remain the same.
2. An alternative specification in which the dummy variable is zero if the family is in the middle class (with the upper class deleted) yields similar results.
3. In nuclear families, the Panel Study of Income Dynamics designates the husband as head. In families where there is a single adult, he or she is the head.

4. See Pindyck and Rubinfeld [1981, 298-301] for a simple example of this type of forecasting with a dichotomous dependent variable (and a logit function).
5. To test our results for robustness with respect to functional form, we recalculated using OLS regression coefficients and the techniques used by Farber [1985] and Blinder [1973]. Although the magnitude of the predicted changes was different reflecting the downward bias inherent in the linear probability model, the ranking of the importance of the variables was identical.

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