Journal of Rural Development 12(December 1989) : 155~167

VOLUNTARY AND INVOLUNTARY PART-TIME TEENAGE LABOR AND THE MINIMUM WAGE : USING THE U.S. DATA *

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I. Introduction

This study was initially motivated by evidence that the minimum wage increases the proportion of teenagers who work part-time.[1] If this were so, a focus on total employment effects might mask important results on minimum wages. I find here for the period 1967 : 1 to 1987 : 4 that, although the evidence for a shift from full-time to part-time employment is weak, important consequences of minimum wages are indeed to be found in the disaggregate data.

Information is available on the number of those who held part-time jobs voluntary and involuntary since 1967.[2] It is argued in this study that this is an important distinction that reveals information about the skill levels of the labor market participants. Those employed

* This paper is based on author's doctoral dissertation and should not be constructed as reflecting the view of the K.R.E.I.

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[1] Gramlich(1976) found for teenagers that a high minimum wage reduced full-time employment substantially and raised part-time employment somewhat, with the net result being a relatively slight disemployment over the period 1963 to 1975. Brown, Gilroy and Kohen(1983) found some evidence that over the period 1963 to 1979 the minimum wage had a greater impact on full-time equivalent employment(the number of full-time workers plus one-half the number of part-time workers) than on the total employment of teenagers. This implies that the fraction of teenagers employed part-time rises as the minimum wage increases.

[2] Part-time workers are persons who are scheduled to work 1 - 34 hours during the survey week. Persons who work 1 - 34 hours by choice are defined as voluntary part-time workers. Persons who work less than 35 hours because of

part - time involuntarily are likely to be low skill and therefore to be more likely than other groups to be making close to the minimum wage. This group would be expected to adversely bear the brunt of increases in the minimum wage. Those employed part - time voluntarily are likely to be enrolled in school, to be viewed positively by employers, and to be members of a group with relatively high labor market skills. As the minimum wage rises members of this group might be substituted for full–time and involuntarily part - time employees. The empirical results bear out these hypotheses.

Ⅱ . Theoretical Background

The theoretical framework of this paper is an extension of a simple heterogeneous - worker model.[3] In the basic model there are two groups of workers ; those with low skill levels and those with high skill levels. The low skill group earns less than the new minimum wage. The high skill group earns more than the new minimum wage. The groups are assumed to be substitutes for one another. A rise in the minimum wage reduces the employment of the low wage group and increases the employment of the high wage group. Any set of workers containing a disproportionately high share of low skill–low wage earners—will suffer a disproportionately high loss of employment following an increase in the minimum wage.

The emphasis of this study on full–time , voluntary and involuntary part–time employment suggests an empirical characterization of the skill groups. Those who are involuntarily employed part - time reveal themselves to be more likely to have low skill levels and to be more likely making a wage below the new minimum wage. Their status of being unable to find full–time work implies that they have a low productivity. A rise in the minimum wage will cause some of the people

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slack work, material shortage, repairs to plant and equipment, or because they are unable to find full–time work are called economic part–time workers and are regarded as being involuntarily employed on a part–time basis. Full - time workers are defined as all persons who work 35 hours or more during the survey week and who work less than 35 hours for temporary reasons, such as legal holidays, bad weather, or brief illness. These definitions are from *Employment and Earnings,* June 1963.

[3] It is argued that any worker group for which a larger percentage earn the minimum wage suffers a great adverse employment effect and that low skill workers earn a wage below the new minimum wage and high skill workers earn a wage above the new ninimum wage. When the new minimum wage takes effect the low skill group loses jobs. Brown *et al*(1982) show the following $h \cdot n_1 \langle n_{1+2} \langle h \cdot (1 - Wm / W_2) \cdot n_1$ where h is the proportion of low wage workers, n_1 is the employment elasticity of the low wage workers, n_{1+2} is the

who were in this group to become unemployed or to leave the labor force.

Individuals who are employed full-time are likely to be members of a higher skill group and to be likely making a wage above the new minimum. A rise in the minimum wage will reduce the numbers of this group, but not by as much. It is hypothesized that the percentage job loss of individuals in the full-time category will be less than the percentage job loss of those in the involuntary part-time group. It is also hypothesized that the full-time unemployment rate(those who are unemployed and looking for full-time work divided by the full-time labor force)will rise and in consequence the full-time labor force(the sum of those unemployed seeking full-time jobs, those holding full-time jobs, and those employed involuntary part-time)will fall as the minimum wage rises.

The group who are employed part-time voluntarily are viewed as possessing superior labor market skills to those who are employed part-time involuntarily. It appears that a large fraction of teenagers who are voluntarily employed part-time must be enrolled in school.[4] They are not looking for full-time work. They are likely to be viewed as attractive part-time workers by employers. A rise in the minimum wage will be unlikely to change the status of a person who was voluntarily employed part-time to that of being unemployed. Voluntary part-time workers may well be substitutes for full-time and involuntary part-time workers whose equilibrium wage would be below the minimum wage. The number of part-time jobs available to the group may rise as employers release lower skill individuals who were previously involuntarily employed part-time. The number of persons voluntarily employed part-time could rise. The part-time unemployment rate would fall and the part-time labor force would rise. Some descriptive statistics are presented in Table 1. From 1967 to 1987 the average levels of full-time, voluntary part-time, and involuntary part-time employment relative to population have averaged 19, 21 and 4 percent, respectively. Not indicated in Table 1 are the trends that from 1967 to 1987 full-time employment / population fell by 20 percent, voluntary part-time employment / population rose by 30 percent, and involuntary part-time employment / population more than doubled.[5] The next section will present an analysis of the behavior of these workers.

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aggregate employment elasticity and Wm and W_2 are minimum wage and wage for high-wage workers, respectively.

[4] From Table 1 it can be seen that 16 and 17 year olds hold the majority of part - time jobs held voluntarily by teenagers. 92.3 percent of this group were enrolled in school in October, 1986. 54.6 percent of 18 and 19 year olds were enrolled in school in October. 1986.

TABLE 1 Labor Market Characteristics for Teenagers, 16 and 17 Year Olds, 18 and 19 Year Olds : Sample Means 1967 : 1—1987 : 4

Labor Market Variable	Teenagers	16 and 17 year olds	18 and 19 year olds
Employment/Population			
Total	0.440	0.349	0.535
Full-time	0.189	0.072	0.312
Part-time	0.251	0.277	0.223
Voluntary Part-time	0.209	0.246	0.170
Involuntary Part-time	0.042	0.031	0.053
Labor Force/Population			
Total	0.532	0.433	0.635
Full-time	0.282	0.132	0.438
Part-time	0.250	0.301	0.196
Unemployed/Population			
Total	0.092	0.084	0.100
Full-time	0.051	0.029	0.074
Part-time	0.040	0.055	0.026
Unemployment Rate			
Total	0.171	0.194	0.157
Full-time	0.186	0.248	0.171
Part-time	0.162	0.180	0.134

Note : All data for civilians.

Ⅲ. Empirical Results

The study will use quarterly time series data for the period 1967 : 1 to 1987 : 4. The starting date is determined by the availability of data on the employment status of teenagers by voluntary and involuntary part - time categories. The empirical model to be used is based on the contribution of Brown, Gilroy and Kohen(1983). Single equations will be estimated in which the dependent variable is a measure of labor force status. The independent variables will include the minimum wage variable, a quadratic time trend, a business cycle variable, and a set of supply side variables.

The source of data was published monthly series from the Current Population Survey. Quarterly averages of the monthly observations were used. The variables constructed were :

EP : the ratios of civilian employment by total, full-time, part-time, voluntary part-time and involuntary part-time to civilian population for teenagers(16 to 19 years of age).

[5] Nardone(1986 b) shows that part - time employment has grown relative to full - time employment since 1968 for the whole economy. He presents an analysis of the characteristics of part-time workers.

LFP : the civilian labor force participation rate for teenagers by total, full-time, and part-time categories.

URY : the civilian unemployment rate for teenagers by total, full-time, and part-time categories.

YK : the Kaitz index using teenage employment as weights.[6]

UR : the civilian unemployment rate for men aged 25 to 54 as a proxy for business cycle

AFP : the ratio of teenagers in the armed forces to total civilian population

ENP : the ratio of teenagers enrolled in school to teenage civilian population, from the October supplement to the CPS.
The October values were assigned to the fourth quarter of the survey year and the three following quarters in the next calendar year.

SY : the fraction of those ages 16-19 who are 16 and 17.

POP : the ratio of teenage civilian population to total civilian population

POP2 : the ratio of civilian population ages 20-24 to total civilian population

T : a linear time trend.[7]

TSC : *T* squared.

Q2, Q3, Q4 : dummy variables for the second, third, and fourth quarters.

1. Effects on Teenage Employment

Table 2 presents estimates of the effect of the minimum wage on total and sub-totals of teenage employment relative to population over the period 1967 : 1 to 1987 : 4. Results for specifications covering slightly different sets of explanatory variables and a linear and logarithmic linear functional form are reported as a means of checking for robustness.

In most equations autocorrelation in the residuals was a serious problem. A second order autocorrelation correction was found to be

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[6] The Kaitz index as a minimum wage measure has a following form :

$$\Sigma E_i / E_t \{ (MW_i / AHE_i)\ C_i + (MW_i^* / AHE_i)\ C_i^* \}$$

where E = nonagricultural employment
MW = basic minimum wage rate
AHE = average hourly earnings of nonsupervisory workers
C = proportion of nonsupervisory vorkers covered by the minimum wage rate
MW^* = minimum wage rate for newly covered workers
C^* = proportion of nonsupervisory employees covered by the minimum wage applicable to newly covered workers
i = major industry divisions
t = total private nonagricultural economy.

This formulation allows the minimum wage variable to reflect the coverage change as well as the change in the nominal minimum wage level.

[7] Time trends are included to reflect the impacts of slowly changing social factors and other gradually moving variables omitted from the equation.

adequate to deal with the difficulty. The results reported are all from equations corrected for second order autocorrelation.[8]

The basic specification of Table 2 includes seasonal dummies, a quadratic time trend, a cyclical variable *UR*, four supply side variables *AFP, SY, POP,* and *POP2,* and the Kaitz minimum wage index *YK*. The other specifications involve dropping the relative population of 20 to 24 year olds and including the school enrollment variable for teenagers respectively. The results reported refer to the percentage change in an employment ratio resulting from a ten percent increase in the minimum wage. For the linear functional form equations estimates for the minimum wage effects were obtained using sample means.

Results for the effect of the minimum wage on total teenage employment over the 1967 : 1 — 1987 : 4 period are reported on the first two rows of Table 2. A rise of ten percent in the minimum wage reduces employment by less than one percent. The effect is only statistically different from zero at marginal level of significance in a few equations. This contrasts with estimated effects of 1 to 2 percent found in time series studies covering somewhat earlier time periods.[9] A decline in the estimated impact on employment for a period including the 1980's is to be expected since the Kaitz index has declined by about eighteen percent between 1979 and 1987 and the fraction of teenagers earning the minimum wage has presumably declined. For sub–groups earning the minimum wage the employment effects might still be significant.

The effects of the minimum wage on full–time employment are presented on lines 3 and 4 of Table 2. The effects are negative but not significant statistically from zero at usual levels of confidence. The effects of the minimum wage on the level of part–time employment are also not significantly different from zero.

When Part–time employment is broken down into voluntary and involuntary components statistically significant differences emerge. The last two lines of Table 2 indicate that the number of those holding part-time jobs involuntarily falls by between 3 and 5 percent following a ten percent rise in the minimum wage. These estimates are highly significant. This outcome is consistent with the hypothesis that those

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[8] The estimating equations will be $Y_t = f(X's) + \rho_{-1} e_{t-1} + \rho_{-2} e_{t-2} + u_t$ where Y is dependent variable and X's are independent varlables.The method used was Yule - Walker. A maximum likelihood procedure was also tried and was found to yield very similar estimates and conclusions.

[9] Brown, Gilroy, and Kohen(1982) in their survey report that time series studies typically find that a 10 percent increase in the minimum wage reduces teenage employment by one to three percentage points. If greater weight is assigned to those studies that include a significant portion of the experiences of the 1970's in the sample and control for exogenous factors governing the relative supply of teenagers the lower half of that range is preferred.

holding part - time jobs involuntarily are of lower skill level than other groups and contain a higher proportion of individuals earning less than the level of the minimum wage.

The results in Table 2 indicate that voluntary part-time employment rises by between 0.5 and 1 percent following a ten percent increase in the minimum wage. This result is consistent with teenagers enrolled in school who work part - time voluntarily being viewed positively by employers. As the minimum wage rises these workers are substituted for workers with weaker labor market skills. From Table 1 it can be seen that the voluntary part - time group for teenagers is four times as great as the involuntary part-time group. The net effect of the minimum wage on total part - time employment is then insignificant.

TABLE 2 Estimated Effects of a 10 Percent Increase in the Minimum Wage on the Teenage Employment Ratio(in percent) : 1967 : 1 – 1987 : 4

Dependent Variable	Specification		
	Basic – *POP2*	Basic	Basic + *ENP*
Total Employment			
Linear	-0.49	-0.88	-0.78
	(1.16)	(1.97)	(1.85)
Logarithmic	-0.69	-0.79	-0.56
	(1.48)	(1.54)	(1.21)
Full-time			
Linear	-0.36	-1.16	-0.83
	(0.44)	(1.35)	(1.22)
Logarithmic	-0.70	-0.86	-0.26
	(0.67)	(0.75)	(0.28)
Part-time			
Linear	-0.02	0.03	-0.01
	(0.05)	(0.09)	(0.03)
Logarithmic	-0.09	0.04	-0.02
	(0.24)	(0.09)	(0.04)
Voluntary Part-time			
Linear	0.69	0.87	0.87
	(1.80)	(2.06)	(2.01)
Logarithmic	0.56	1.01	1.00
	(1.29)	(2.20)	(2.12)
Involuntary Part-time			
Linear	-3.91	-4.59	-4.76
	(3.93)	(4.18)	(4.38)
Logarithmic	-3.31	-4.06	-4.17
	(3.50)	(3.89)	(3.95)

Note : t-statistics are shown in parenthesis.
Basic specification includes *Q2, Q3, Q4, T, TSQ, UR, SY, AFP, POP, POP2,* and *YK* as independent variables.
In logarithmic equations, the dependent variables, *UR, POP, POP2* and *YK* are entered logarithmically, other variables linearly.

An increase in the minimum wage would seem to shift part-time jobs from low skill teenagers desiring full-time work to higher skill teenagers enrolled in school desiring part-time work.

The data in Table 1 suggests that the effect of the minimum wage on the part-time employment of 16 and 17 year olds and 18 and 19 year olds might move in different directions. 28% of 16 and 17 year olds held part-time jobs and only about one in eight of them were held involuntarily. Whereas twenty two percent of 18 and 19 years held part-time jobs and about one in four of them were held involuntarily. These proportions suggest that a rise in the minimum wage might cause part-time employment of 16 and 17 year olds to rise and that of 18 and 19 year olds to fall. Given that the full-time employment of 16

TABLE 3 Estimated Effects of a 10 Percent Increase in the Minimum Wage on 16 and 17 Year Olds Employment Ratio(in percent) : 1967 : 1—1987 : 4

Dependent Variable	Specification		
	Basic—*POP2*	Basic	Basic+*ENP*
Total Employment			
Linear	0.71	0.42	0.55
	(1.42)	(0.75)	(1.02)
Logarithmic	0.37	0.59	0.87
	(0.67)	(0.99)	(1.62)
Full-time			
Linear	0.54	-1.04	-0.94
	(0.42)	(0.77)	(0.74)
Logarithmic	-0.37	-0.14	-0.55
	(1.00)	(0.08)	(0.43)
Part-time			
Linear	1.48	1.46	1.48
	(2.90)	(2.85)	(2.90)
Logarithmic	1.43	1.35	1.43
	(2.70)	(2.53)	(2.70)
Voluntary Part-time			
Linear	1.58	1.82	1.84
	(2.86)	(2.99)	(3.01)
Logarithmic	1.22	1.80	1.86
	(1.96)	(2.77)	(2.85)
Involuntary Part-time			
Linear	-2.76	-2.70	-2.66
	(2.28)	(1.94)	(1.91)
Logarithmic	-1.92	-1.76	-1.44
	(1.37)	(1.10)	(0.95)

Note : *t*-statistics are shown in parenthesis.
Basic specification includes *Q2, Q3, Q4, T, TSQ, UR, SY, AFP, POP, POP2,* and *YK* as independent variables.
In logarithmic equations, the dependent variables, *UR, POP, POP2* and *YK* are entered logarithmically, other variables linearly.

and 17 year olds averages only about 7 percent over 1967–1987 and that of 18 and 19 year olds averages 31 percent there could be different behavior in the level of total employment for the two age groups.

Results for effect of the minimum wage on the employment of 16 and 17 year olds and 18 and 19 year olds are presented in Tables 3 and 4 respectively. Procedure followed are the same those for the 16–19 age group. Results continue to be controlled for the proportion of the 16–19 age group population that is aged 16 and 17. The school enrollment variable is the one appropriate for the age group being considered. The estimated impact of a ten percent rise in the minimum wage on the total employment of 16 and 17 year olds is positive, but is not statistically significant. Results on full–time employment of 16 and

TABLE 4 Estimated Effects of a 10 Percent Increase in the Minimum Wage on 18 and 19 Year Olds Employment Ratio(in percent) : 1967 : 1—1987 : 4

Dependent Variable	Specification		
	Basic—*POP2*	Basic	Basic+*ENP*
Total Employment			
Linear	-1.21	-1.66	-1.59
	(2.93)	(3.92)	(3.84)
Logarithmic	-1.32	-1.53	-1.44
	(2.96)	(3.10)	(3.00)
Full-time			
Linear	-1.01	-1.72	-1.30
	(1.23)	(1.96)	(1.86)
Logarithmic	-0.94	-1.04	-0.59
	(0.92)	(0.93)	(0.60)
Part-time			
Linear	-1.34	-1.41	-1.85
	(2.34)	(2.20)	(3.88)
Logarithmic	-1.00	-1.18	-1.65
	(1.55)	(1.61)	(2.95)
Voluntary Part-time			
Linear	-0.44	-0.29	-0.62
	(0.75)	(0.45)	(1.26)
Logarithmic	-0.29	-0.01	-0.38
	(0.46)	(0.01)	(0.63)
Involuntary Part-time			
Linear	-4.28	-5.18	-5.60
	(3.37)	(3.78)	(4.30)
Logarithmic	-3.21	-4.01	-4.45
	(2.52)	(2.89)	(3.29)

Note : t-statistics are shown in parenthesis.
Basic specification includes *Q2, Q3, Q4, T, TSQ, UR, SY, AFP, POP, POP2,* and *YK* as independent variables.
In logarithmic equations, the dependent variables, *UR, POP, POP2* and *YK* are entered logarithmically, other variables linearly.

17 year olds is not statistically significant. part–time employment of 16 and 17 year olds rises by between 0.76 and 1.46 percent following a 10 percent rise in the minimum wage. These results are statistically significant. Voluntary part–time employment of 16 and 17 year olds rises by between 1 and 2 percent. Involuntary part–time employment of 16 and 17 year olds falls by between 1.5 and 3.0 percent. This effect on the involuntary part–time employment of 16 and 17 year olds swamped by the positive effect of the minimum wage on the much bigger group of voluntary part - timers.

The results reported in Table 4 are for 18 and 19 year olds. A 10 percent rise in the minimum wage lowers the employment of this group by between 1 and 2 percent. These estimates are all statistically significant at the 1 percent level of confidence. Full - time and part–time employment of 18 and 19 year olds falls for a rise in the minimum wage. Not all of the estimates are statistically significant. Involuntary part - time employment of 18 and 19 year olds falls by between 3 and 6 percent. This seems to be the group on which the minimum wage has the greatest adverse impact. Voluntary part – time employment of 18 and 19 year olds is not statistically affected by the minimum wage.[10]

2. Effects on Labor Force Participation

The estimated percentage change in labor force participation rates due to a ten percent rise in the minimum wage are reported in Table 5. Results reported are for the most comprehensive specification of independent variables.[11] All equations were corrected for second order correlation using the Yule–Walker procedure. The participation rate of teenagers(16 – 19 year olds) is not significantly affected over the 1967 : 1 – 1987 : 4 period. Brown, Gilroy and Kohen(1983) found labor force withdrawal of about one percent over the period 1954 - 1979. They did find that over a later part of the period labor force withdrawal was smaller. There is evidence that the full–time labor force tends to decline by 1 percent and that part–time labor force tends to rise by 0.6 percent in response to a 10 percent rise in the minimum wage. These results are consistent with the employment results noted earlier. The full–time labor force includes those employed part–time on an in-

[10] 18 and 19 year olds employed part–time voluntarily may contain few individuals earning close to the minimum wage. The supply of individuals making significantly above the minimum wage would not be elastic to a rise in the minimum wage.

[11] The specification underlies the results reported in the last column in Tables 2, 3 and 4, and includes *Q2, Q3, Q4, T, TSQ, UR, SY, AFP, POP, POP2, ENP,* and *YK* as indepen dent variables. ***ENP*** varies between the various age group.

TABLE 5 Estimated Effects of a 10 Percent Increase in the Minimum Wage on Labor Force Participation Rates(in percent) : 1967 : 1 – 1987 : 4

Dependent Variable	Age Groups		
	16–19	16–17	18–19
Labor Force Participation Rate			
Total			
Linear	-0.27	0.47	-0.98
	(0.84)	(0.97)	(3.61)
Logarithmic	-0.24	0.58	-0.95
	(0.80)	(1.37)	(3.35)
Full-time			
Linear	-0.89	-0.60	-1.26
	(1.93)	(0.68)	(2.87)
Logarithmic	-0.92	-0.46	-1.14
	(2.28)	(0.54)	(2.54)
Part-time			
Linear	0.66	1.32	-0.31
	(1.92)	(2.66)	(0.77)
Logarithmic	0.66	1.32	-0.31
	(1.92)	(2.66)	(0.77)

Note : *t*-statistics are shown in parenthesis.
Results reported are for the most comprehensive specification of the independent variables.

voluntary basis. The decline in the number of this group and in the category of full–time employees results in a rise in full–time unemployment and withdrawal from the full–time labor force. The part–time labor force includes those employed part–time voluntarily. As the size of this group rises the part–time labor force expands.

The results in Table 5 show that the labor force participation rate of 18 and 19 year olds falls by about 1 percent following a 10 percent rise in the minimum wage. Most of this effect is due to a fall in the full–time labor force of something more than 1 percent. These results are statistically significant at one percent level of confidence. The part-time labor force of 18 and 19 year olds is not significantly affected by the minimum wage. Effects on the 16 and 17 year olds labor force of the minimum wage are different. Less than one third of 16 and 17 year old labor force participants operate in the full–time labor market. Results for the response of the part–time labor force will dominate the overall results. The part–time labor force participation rate of 16 and 17 year olds rises by about one percent following a 10 percent rise in the minimum wage. 16 and 17 year olds appear to be an elastic source of voluntary part–time labor for increases in the minimum wage. The small full–time labor force of 16 and 17 year olds is not significantly impacted by the minimum wage. The overall labor force of 16 and 17 year olds tends to rise by about half of one percent according to the point estimates reported, although these are not statistically significant.

3. Effects on Unemployment Rate

Results on the effect of a 10 percent increase in the minimum wage on unemployment rates are reported in Table 6. The estimates given refer to the change in an unemployment rate in percentage points. There does not appear to be a significant impact of the overall unemployment rate of teenagers over the 1967 : 1–1987 : 4 period.[12] There is evidence that the full-time unemployment rate tends to rise and that the part-time unemployment rate tends to fall.[13] The breakdown by age group indicates that the decline in the part-time unemployment rate is driven by a decline of about 0.60 in the part-time unemployment rate of 16 and 17 year olds. The rise in the full-time unemployment rate seems to be mainly driven by a rise of 0.40 in the full-time unemployment rate of 18 and 19 year olds. Estimates of the impact of the minimum wage on the full-time unemployment rate of 16 and 17 year olds and on the part-time unemployment rate of 18 and 19 year olds are not statistically different from zero.

TABLE 6 Estimated Effects of a 10 Percent Increase in the Minimum Wage on Unemployment Rates(in percentge point) : 1967 : 1—1987 : 4

Dependent Variable	Age Groups		
	16—19	16—17	18—19
Unemployment Rate			
Total			
Linear	0.08	-0.25	0.41
	(0.54)	(1.53)	(2.14)
Logarithmic	0.01	-0.68	0.36
	(0.06)	(1.85)	(2.03)
Full-time			
Linear	0.45	0.36	0.42
	(2.66)	(1.15)	(2.22)
Logarithmic	0.33	0.84	0.37
	(1.88)	(0.60)	(1.92)
Part-time			
Linear	-0.21	-0.58	0.33
	(1.25)	(3.02)	(1.39)
Logarithmic	-0.31	-0.68	0.26
	(1.95)	(3.67)	(1.19)

Note : *t*-statistics are shown in parenthesis.
Results reported are for the most comprehensive specification of the independent variables.

[12] Estimates of the effect of a 10 percent increase in the minimum wage on the teenage unemployment rate range from zero to 3 percent. Brown(1988) points out that studies which control for the teenage population share and include the 1970's produce estimates of 0.75 percentage points or less.

[13] A comparison of the coefficients on the minimum wage variable in the full-time and part-time equations for each of the functional forms indicates that they are statistically different from one another at high levels of confidence.

Ⅳ. Summary and Policy Implication

A ten percent increase in the minimum wage is found to reduce teenage involuntary part - time employment identified as low skill by about 4 percent. Those teenagers who desire but are unable to find full - time work for an extended period bear the most severe consequences of an increase in the minimum wage. It was found that the employment of this group falls by between 5 and 6 percent following a 10 percent increase in the minimum wage.

Teenage voluntary part-time employment—identified as relatively high skill—was found to rise by about 1 percent following a ten percent increase in the minimum wage. Effects on the teenager labor force participation rate and unemployment rate were not significant. The full - time unemployment rate was found to increase and the full-time labor force participation rate was found to fall as the minimum wage rose. The part-time equivalents were found to move in opposite and offsetting directions.

16 and 17 year olds dominate the teenage part-time labor market and 18 and 19 year olds dominate the teenage full-time labor market. 16 and 17 year olds were found to gain part-time employment as the minimum wage rose. Their unemployment rate fell. 18 and 19 year olds were found to lose full-time jobs and part-time jobs held involuntarily as the minimum wage rose. Their unemployment rate rose and their labor force participation rate fell.

The main consequence of a rise in the minimum wage over the period 1967 — 1987 seems to be a shift from involuntary part-time employment to voluntary part-time employment. Since most of the job losers are 18 and 19 years old and most of the job gainers are 16 and 17 years old the shift is not due primarily to a rise in the minimum wage causing changes in self-identification between involuntary and voluntary part-time.

A sub-minimum wage has been proposed for teenage workers so as to mitigate the reduced employment of teenagers due to a rise in the minimum wage for adults. The results in this paper indicate that this would not by the main consequence of a sub-minimum wage for teenagers. The evidence is weak that a sub-minimum wage would significantly increase the number of teenagers found in either full-time or part-time jobs. The main effect of a sub-minimum wage would be to shift part-time employment from voluntary to involuntary part-time employment. A greater number of the most disadvantaged who would otherwise not find work would have part-time jobs although they would still desire full-time work. As part-time workers, albeit involuntary ones, they are developing work experience that might enable them to obtain better and full-time work later.

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