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MINIMUM WAGES AND YOUTH EMPLOYMENT IN FRANCE AND THE UNITED STATES

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ABSTRACT

We use longitudinal individual wage and employment data for young people in France and the United States to investigate the effect of intertemporal changes in an individual's status vis-à-vis the real minimum wage on employment transition rates. We find that movements in both French and American real minimum wages are associated with relatively important employment effects in general, and very strong effects on workers employed at the minimum wage. In the French case, albeit imprecisely estimated, a 1% increase in the real minimum wage decreases the employment probability of a young man currently employed at the minimum wage by 2.5%. In the United States, a decrease in the real minimum of 1% increases the probability that a young man employed at the minimum wage came from nonemployment by 2.2%. These effects get worse with age in the United States, and are mitigated by eligibility for special employment promotion contracts in France.

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1. Introduction

In this paper we examine the link between changes in the minimum wage and employment outcomes for the youth (under 31) labor market, in France and the United States. We make use of longitudinal data on employment status and earnings to see how individuals are affected by real increases (in the case of France) or real decreases (in the case of the United States) in the minimum wage conditional on the individual's location in the earnings distribution. We take particular care to distinguish sub-populations that might be affected differently by the minimum wage, focusing, in particular, on low-wage workers and (in the case of France, where the data are available) on the use of employment-promotion contracts that allow the payment of sub-minimum wages.

Although little attention has been paid to the situation in Europe[1], some European countries provide interesting alternatives to the much-studied U.S. case. France, in particular, seems a perfect contrast to the United States. Whereas in the United States the nominal federal minimum wage remained constant for most states during most of the 1980s (thus implying a declining real federal minimum wage), nominal minimum wages in France rose steadily over the 1980s, as did real minimum wages. In this paper we exploit the different growth patterns in real minimum wages in a symmetric manner to more clearly understand their effect on employment.

Most existing studies of the French minimum wage system use aggregate time-series data and find no effect of the minimum wage system on youth employment[2]. This is surprising because, since its inception, a significant percentage of the French labor force has been employed at wages close to the minimum wage. One reason for the orientation in the empirical analyses done in France is, certainly, the tendency of American applied researchers to rely upon aggregate time series analyses[3] prior to the widespread dissemination of public use micro-economic data

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[1] See Dolado et. al. (1996) for a summary of minimum wage studies for France, the Netherlands, Spain and the United Kingdom.

[2] See, for example, Bazen and Martin (1991).

[3] See Brown, Gilroy and Kohen (1982) for a review.

such as the Current Population Survey (CPS). Another reason is that research access to French micro-data was extremely limited until the 1990s. In the present study we use micro-data from France and the United States that were collected in household surveys which are quite comparable. In particular, we use longitudinal information on the workers. Consequently, we are able to analyze both French and American minimum wage systems using individual-level panel data.

Because of the dramatic differences in the evolution of both nominal and real French minimum wages, as compared to the national U.S. minimum[4], we have designed statistical comparisons that address the same behavior using the different variations in the national minimum wage systems to identify the relevant effects. We use two different statistical approaches based on the same idea: analysis of employment transition probabilities conditional on the position of an individual in the wage distribution. In each approach, we decompose the wage distribution into 4 components (under, around, marginally over and over the minimum wage). We then, in our first approach, use a multinomial logit model to analyze the factors that affect the probability of making a transition between a particular position in the wage distribution and employment or nonemployment (in the case of France) or between employment or nonemployment and the position in the wage distribution (in the case of the United States). We find that young workers paid around the minimum wage in France were more likely to transition to a nonemployment state (unemployment or inactivity) than those paid over the minimum wage, and that, for French men, such differences were greater in years where major increases in the minimum wage occurred. In the U.S., we find that among workers currently employed around the minimum wage, a larger share were in a nonemployment state the previous period than among workers above the minimum wage. In both cases, the effects are strongest for the youngest workers. We find some minor "spillover" effects in both cases, and provide evidence to suggest that these effects capture some of the heterogeneity between low-wage and high-wage labor markets.

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[4] We do not consider state-specific minimum wages or youth subminimum wages in the United States, which became increasingly important at the end of the 1980s. See Neumark and Wascher (1992) for an explicit treatment of this variation in the U.S. data. Similarly, we do not explicitly control for minimum wages specified by collective agreement in France that exceed the national minimum. See Margolis (1993) for a detailed treatment of the effects of the collective bargaining agreement salary grids on employment.

In the second approach, we exploit the size of the movements in the real minimum wage more directly[5]. For France, we use the automatic and legislated increases in the nominal minimum wage that occur (at least) each July to identify groups of workers whose current wage rate will fall below the new minimum wage rate after the increase. We also identify workers whose present employment is part of a special youth program that permits wage payments below the statutory minimum. We use the limited duration of employment spells in such programs to identify a second group of minimum wage employment effects. Our statistical analysis identifies the change in future employment probabilities given an individual's minimum wage status in the present period. We show that individuals whose reference-year wage was between the two real minimum wages, as defined above, have substantially lower subsequent employment probabilities than those who were not. The conditional elasticity of subsequent nonemployment as a function of the real minimum wage for young male workers in France in this situation, evaluated at sample means, is -2.5. This effect is present even when unobserved labor market heterogeneity and supply behavior are partially controlled for by the inclusion of a separate category for workers marginally over the minimum. However, the impact of the minimum wage decreases with experience. We also show that youths who participated in employment programs had lower subsequent employment probabilities. For the United States we use the constancy of the nominal minimum wage between 1981 and 1987 to identify groups of employed workers whose real wage in the present period would have been below the real minimum wage in the previous period. We show that young men whose wages were between the two real minimum wages, as described above, had lower employment probabilities in the previous period than individuals who were not (the conditional elasticity, evaluated at sample means, is 2.2). These effects get worse with age in the United States, and are mitigated by eligibility for special employment promotion contracts in France.

The structure of this paper is as follows. Section 2 provides some institutional background on the systems of minimum wages in both France and the United States, and provides some preliminary indications of the potential impact in each case based on empirical wage distributions. Section 3 describes the data that we use to analyze the impact of minimum wages,

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[5] Our analysis bears some resemblance to that of Linneman (1982).

and section 4 lays out the statistical models used to evaluate the employment effects of minimum wage changes. Section 5 details the results of our multinomial logit analysis, and section 6 discusses the conditional logit analyses. Section 7 concludes.

2. Institutional Background

2.1 France

The first minimum wage law in France was enacted in 1950, creating a guaranteed hourly wage rate that was partially indexed to the rate of increase in consumer prices. Beginning in 1970, the original minimum wage law was replaced by the current system (called the SMIC, "salaire minimum interprofessionnel de croissance") linking the changes in the minimum wage to both consumer price inflation and growth in the hourly blue-collar wage rate. In addition to formula-based increases in the SMIC, the government legislated increases many times over the next two decades. The statutory minimum wage in France regulates the hourly regular cash compensation received by an employee, including the employee's part of any payroll taxes[6].

Figure 1 shows the time series for the French minimum wage and the associated employee-paid and employer-paid payroll taxes. Because of the extensive use of payroll taxes to finance mandatory employee benefits, by the 1980s the French minimum wage imposed a substantially greater cost upon the employer than its statutory value. Employees share in the legal allocation of the payroll taxes, as the figure shows; however, low wage workers benefit substantially more than the average worker from the social security systems financed through these taxes in proportion to their revenue (unemployment insurance, health care, retirement income and employment programs, in particular). Appendix Table A provides a complete

[6] In theory, there are no provisions in any of the minimum wage laws that would allow regional variation in the SMIC. In some sectors in the French economy, however, the effective minimum wage was determined by (often extended) collective bargaining agreements. These agreements typically covered entire regions and industries, especially when extended to non-bargaining employers. Although relatively important in the 1970s, these provisions became increasingly irrelevant during the 1980s (our period of analysis) as the collective agreement nominal salary grids remained fixed in the face of an increasing nominal SMIC. See Margolis (1993) for a discussion of extended collective agreements and their relation to the SMIC.

statistical history of the real and nominal SMIC, including employer and employee payroll tax components.

Figure 1: Monthly French Minimum Wage

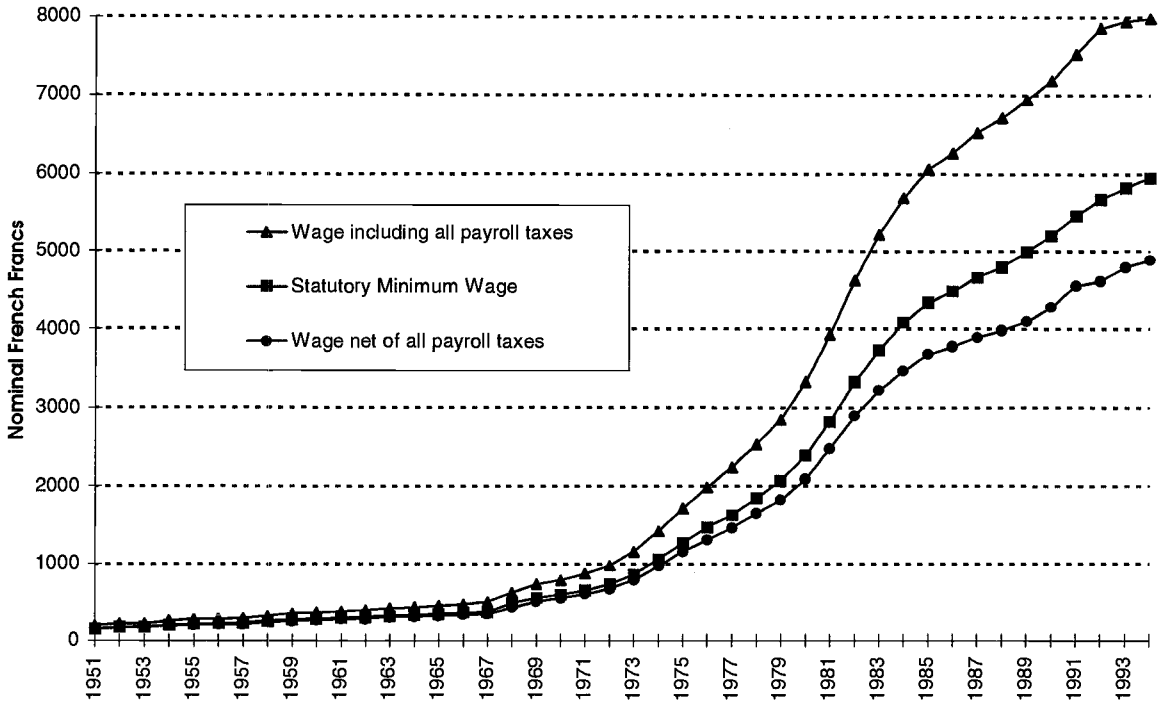
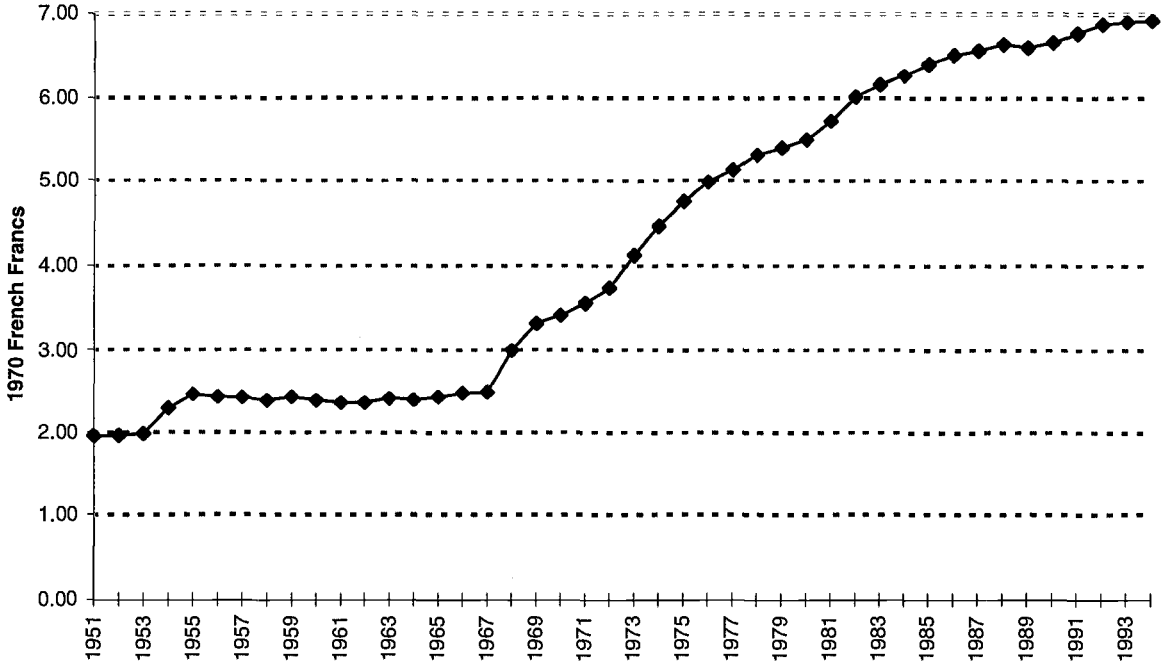


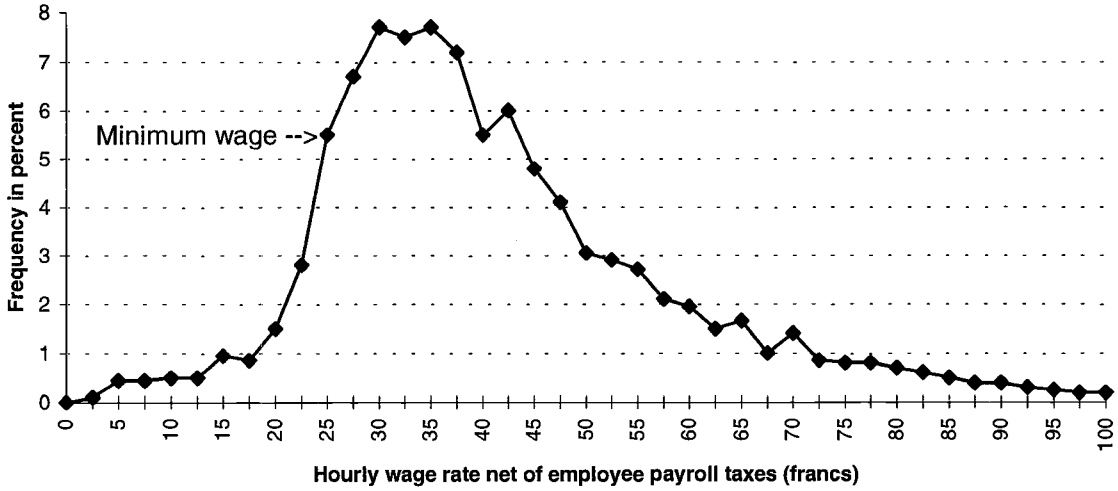
Figure 2 shows the real hourly French minimum wage from 1950 to 1994. Although the original minimum wage program (called the SMIG, "salaire minimum interprofessionnel garanti") was only partially indexed, in particular the inflation rate had to exceed five percent per year (two percent from 1957 to 1970) to trigger the indexation, the real minimum wage did not decline measurably over the entire post-war period and increased substantially during most decades.

Figure 2: Real Hourly Minimum Wage (France)



The French minimum wage lies near most of the mass of the wage rate distribution for the employed work force. To show the location of the SMIC in this distribution, we plotted the empirical distribution of hourly wage rates for 1990, the earliest year for which the Labor Force Survey reports continuous wage data. Figure 3 shows these data. We have indicated the SMIC directly on the figure. Notice that the first mode of the wage distribution is within five francs of the minimum wage and the second mode is within 10 francs of the minimum. In the overall distribution, 13.6% of the wage earners lie at or below the minimum wage and an additional 14.4% lie within an additional 5F per hour of the SMIC.

Figure 3: Empirical Distribution of Hourly Wages in France 1990



Dolado et. al. (1996) discuss the incidence of the SMIC with respect to household income. They find that, although people employed at the SMIC do tend to be in the poorest households, the distribution of "smicards" (people paid the SMIC) is not monotonically decreasing in household income. For example, they find that the share of individuals paid the SMIC in each decile of household income increases from 10.1% in the lowest decile to 13.1% in the 3rd lowest decile, then decreases to 6.6% for the 5th decile, increasing to 7.4% for the 6th decile and then declining monotonically to 0.6% in the highest decile of household income.

2.2 United States

The first national minimum wage in the United States was a part of the original Fair Labor Standards Act (FLSA) of 1938. The American national minimum wage has never been indexed and increases only when legislative changes are enacted. The national minimum applies only to workers covered by the FLSA, whose coverage has been extended over the years to include most jobs. The statutory minimum wage regulates the hourly regular cash compensation received by an employee including the employee's part of any payroll taxes.

Figures 4 and 5 show the distribution of the American hourly wage rate and the location of the minimum wage in that distribution for 1981 and 1987, the beginning and ending year of our

analyses[7]. For 1981, 17.7% of the employed work force had wage rates at or below the minimum wage and an additional 14.6% had wage rates within an additional $1.00 per hour of the minimum. For 1987, only 9.5% of employed persons have hourly wage rates at or below the minimum while and additional 9.9% lie within an additional $1.00 per hour of the minimum.

Figure 4: Empirical Distribution of Hourly Wages in the U.S. 1981

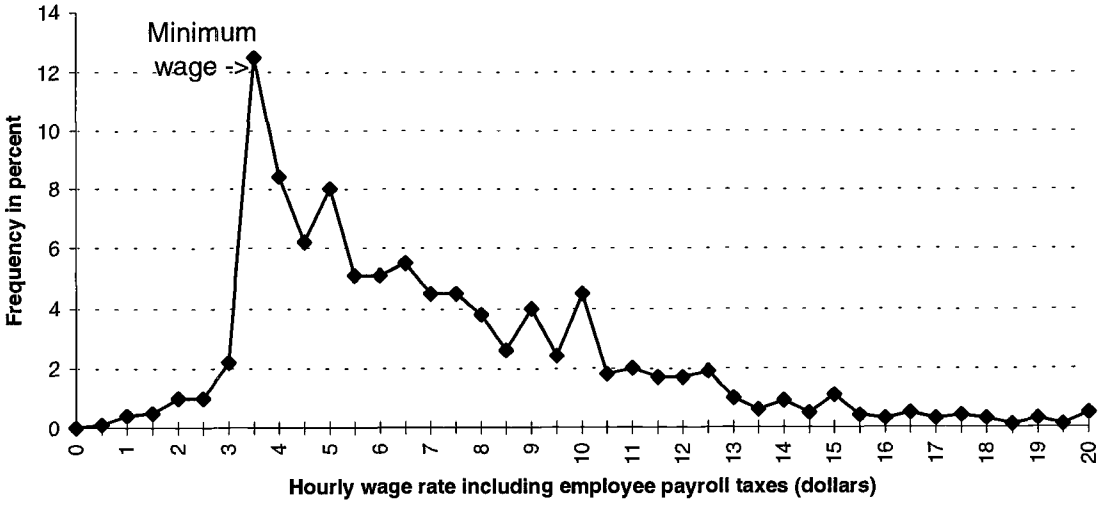
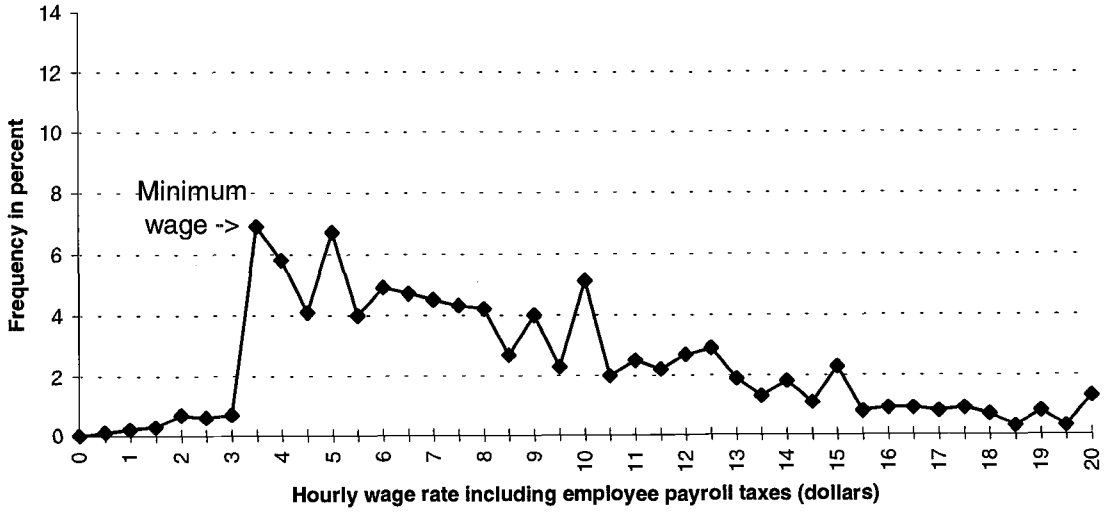


Figure 5: Empirical Distribution of Hourly Wages in the U.S. 1987



[7] It should be noted that the federal minimum wage was increased to $3.35 / hour in 1980.

3. Data Description

3.a. France

The French data were extracted from the "Enquête Emploi" (Labor Force Survey) for the years 1981 to 1989. The sixty thousand households included in the Labor Force Survey sample are interviewed in March of three consecutive years with one-third of the households replaced each year. Every member of the household is surveyed and followed provided that he or she does not move during the three years. We used the INSEE research files for each of the indicated years. These files include the identifiers that allowed us to follow individuals from year to year. Using these identifiers we created year-to-year matched files for the years 1981-82 to 1988-89.

The survey measures usual monthly earnings, net of employee payroll taxes but including employee income taxes, and usual weekly hours. Usual monthly earnings is measured in 20 intervals of widths varying from 500F to 5,000F. It is important to note that the narrowest intervals were used for the lowest salaries. We take the categorical nature of our wage data explicitly into account in our analyses, in that we compare the declared wage category against the wage category in which an individual working the same number of hours per month at the SMIC would be found.

Certain young workers were employed in publicly-funded programs that either combined classroom education with work ("apprentis", "stage de qualification" or "stage d'insertion, contrat emploi - formation") or provide subsidized low-wage employment ("TUC, travaux d'utilité collective" or "SIVP, stage d'initiation à la vie professionnelle" both from 1985 to 1989). All of these programs provide a legal exemption from the SMIC and from certain payroll taxes. Most of these programs are limited to workers 25 years old and under.

The employment status in year t is equal to one for all individuals who are employed in March of the survey year, and equal to 0 otherwise. The French Labor Force Survey definition of employment is the same as the one used by the International Labor Office: a person is employed if he or she worked for pay for at least one hour during the reference week. The definition is thus consistent with the American BLS definition used below.

Our control variables consisted of education, labor force experience, seniority, region of France, date of labor force entry and year. Education was constructed as eight categories: none, completed elementary school, completed junior high school, completed basic vocational/technical school, completed advanced vocational/technical school, completed high school (baccalauréat), completed technical college or undergraduate university, and completed graduate school or post-college professional school. Labor force experience was computed as the difference between current age and age at school exit. Seniority was measured as the response to a direct question on the survey (years with the present employer). Region is an indicator variable for the "Ile de France" (Paris metropolitan area) as the region of residence.

The SMIC data were taken from Bayet (1994), which reports official INSEE statistics. We selected the hourly SMIC for March of the indicated year, net of employee payroll taxes.

3.b. United States

We used the official BLS public-use outgoing rotation group files from the Current Population Survey for the months January to May and September to December and the years 1981 to 1987. We applied the Census Bureau matching algorithm to create year-to-year linked files for the years 1981-82 to 1986-87.

The outgoing rotation groups (households being interviewed for the fourth or eighth time in the CPS rotation schedule) are asked to report the usual weekly wage and usual weekly hours. Individuals who normally are paid by the hour were asked to report that wage rate directly. We created an hourly wage rate using the directly reported hourly wage rate, when available, and the ratio of usual weekly earnings to usual weekly hours, otherwise. Respondents are asked to report these wage measures gross of employee payroll taxes, so they are not directly comparable to the measures constructed from the French data, which are reported net of employee payroll taxes. We created real hourly wage rates by dividing by the 1982-84-based Consumer Price Index for all Urban Workers for the appropriate month.

We created a second set of hourly wage measures for the United States that included income from tips in the hourly wage. To do this we computed a second hourly wage rate as usual

weekly earnings divided by usual weekly hours for workers who reported that they were paid by the hour. When this second hourly wage rate exceeded the one directly reported, we used the computed measure. This measure of hourly wage rate is used below in the analysis labeled "including income from tips."

An individual is employed in year *t* if he or she worked at least one hour for pay during the second week of the survey month. We used the CPS employment status recode variable to determine employment. The BLS definition is thus consistent with the one used in the French Labor Force Survey.

Our control variables consist of education, potential labor force experience, race, marital status and region. Education was constructed as the number of years required to reach the highest grade completed. For the multinomial logit analysis, this was decomposed into 6 categories: less than junior high school (no diploma), junior high school, high school, less than 4 years of college, 4 years of college, and more than 4 years of college. Potential labor force experience is age minus years of education minus five Race is one for nonwhite individuals, Marital status is one for married persons. Region is a set of three indicator variables for the northeast, north-central and southern parts of the U.S.

The U.S. national nominal minimum wage was $3.35 throughout our analysis period[8].

3.c. Empirical Transition Probabilities

A preliminary analysis of the empirical transition probabilities of young workers into or out of employment based on their positions in the wage distribution relative to the minimum wage suggests that one might expect to see significant impacts of the minimum wage on employment probabilities in both France and the United States. In the case of France, we are concerned with that probability that an individual is employed at the date $t+1$ given the person's employment status and wage rate relative to the SMIC (if employed) at date t. In the case of the United

[8] Throughout the period, and particularly towards the end, some states independently increased their nominal wages above the national level. We do not explicitly account for state-by-state variation in the nominal minimum

States, the question is whether or not an individual was employed at date t given their employment status and wage rate relative to the minimum wage (if employed) at date $t+1$.

Let miw_t be the nominal hourly minimum net wage in year t, $rmiw_t$ be the real hourly minimum net wage in year t and h_t represent the number of monthly hours worked in the sample month in year t. For France, let $wcat_t$ be the category in which the individual's nominal net monthly earnings falls in year t, and for the United States let w_t be the individual's hourly net wage rate in year t and rw_t be the real net wage for year t.

For France, define $micat_t$ as the earnings category into which expected nominal monthly earnings at the SMIC ($h_t \times miw_t$) would fall, and order the categories from 1 (less than 500 francs per month) to 15 (over 45,000 francs per month). Then, we define the following 6 departure (occupied at date t) states:

- Out of the labor force at t
- Unemployed at t
- Employed at t and paid under the SMIC $\left(\mathrm{I}(wcat_t < micat_t) = 1\right)$
- Employed at t and paid the SMIC $\left(\mathrm{I}(wcat_t = micat_t) = 1\right)$
- Employed at t and paid marginally over the SMIC $\left(\mathrm{I}(wcat_t = micat_t + 1) = 1\right)$
- Employed at t and paid over the SMIC $\left(\mathrm{I}(wcat_t > micat_t + 1) = 1\right)$

where I(.) is the indicator function taking the value 1 when the condition is true and 0 otherwise. We also define two arrival (occupied at date $t+1$) states:

- Employed at $t+1$
- Not Employed at $t+1$.

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wage. See Neumark and Wascher (1992) for an analysis, using a different methodology, of the effects of inter-state variation of minimum wages in the United States.

For the United States, recall that the nominal minimum wage was constant over the entire sample period at \$3.35 per hour. Thus we construct the 6 arrival states as:

- Out of the labor force at $t+1$
- Unemployed at $t+1$
- Employed at $t+1$ and paid under the minimum wage $\left(\mathrm{I}(w_{t+1} < \$3.25) = 1\right)$
- Employed at $t+1$ and paid the minimum wage $\left(\mathrm{I}(\$3.25 \leq w_{t+1} < \$3.50) = 1\right)$
- Employed at $t+1$ and paid marginally over the minimum wage $\left(\mathrm{I}(\$3.50 \leq w_{t+1} < \$4.00) = 1\right)$
- Employed at $t+1$ and paid over the minimum wage $\left(\mathrm{I}(w_{t+1} \geq \$4.00) = 1\right)$

and we have the same two departure states,

- Employed at t
- Not Employed at t.

Using these definitions, figures 6 and 7 describe the breakdown of the population and the change in the real hourly minimum wage for French young men and women respectively, figures 8 and 9 show the corresponding breakdowns and changes for U.S. young men and women respectively. Table 1 describes the distribution of transitions over the sample periods for the French data, and table 2 describes the distribution of transitions for the American data.

Figure 6
Population Breakdown by Earnings and Evolution of Real SMIC: French Young Men

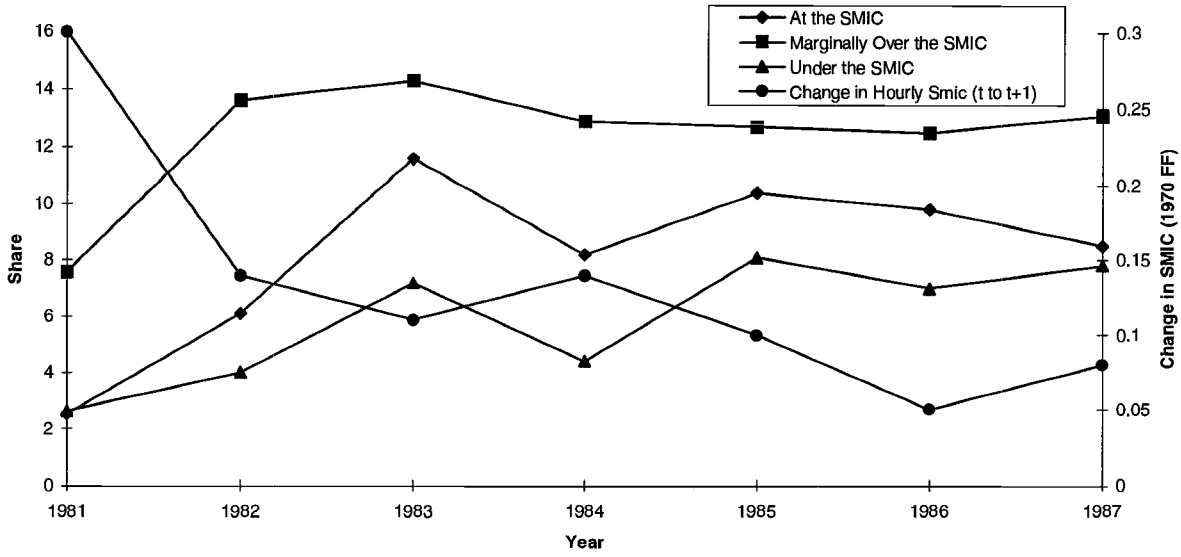

Figure 7
Population Breakdown by Earnings and Evolution of Real SMIC: French Young Women

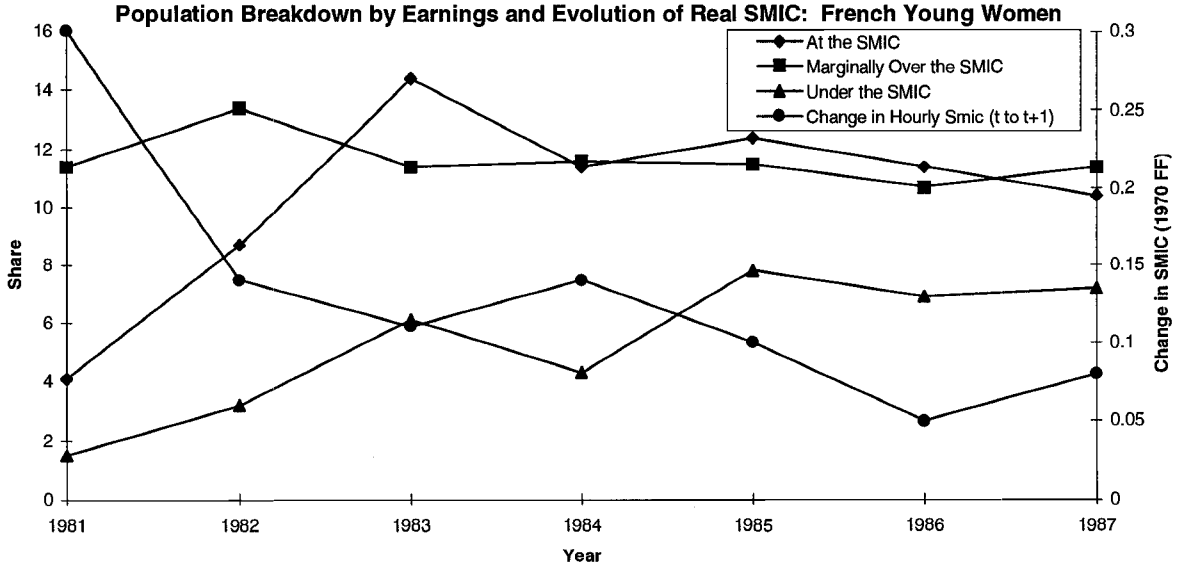

Figure 8
Population Breakdown by Earnings and Evolution of Real Minimum Wage: U.S. Young Men

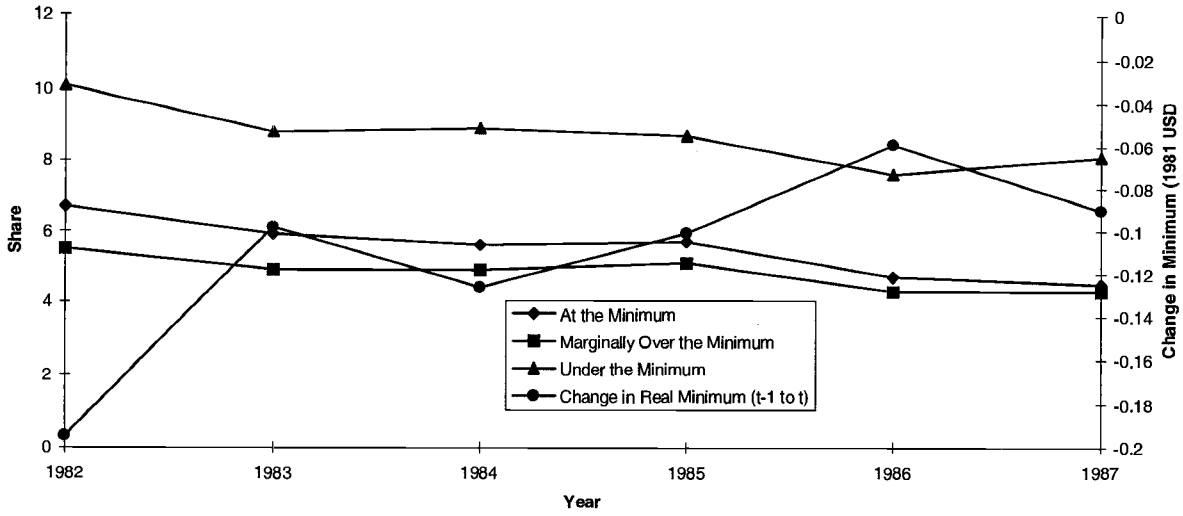

Figure 9
Population Breakdown by Earnings and Evolution of Real Minimum Wage: U.S. Young Women

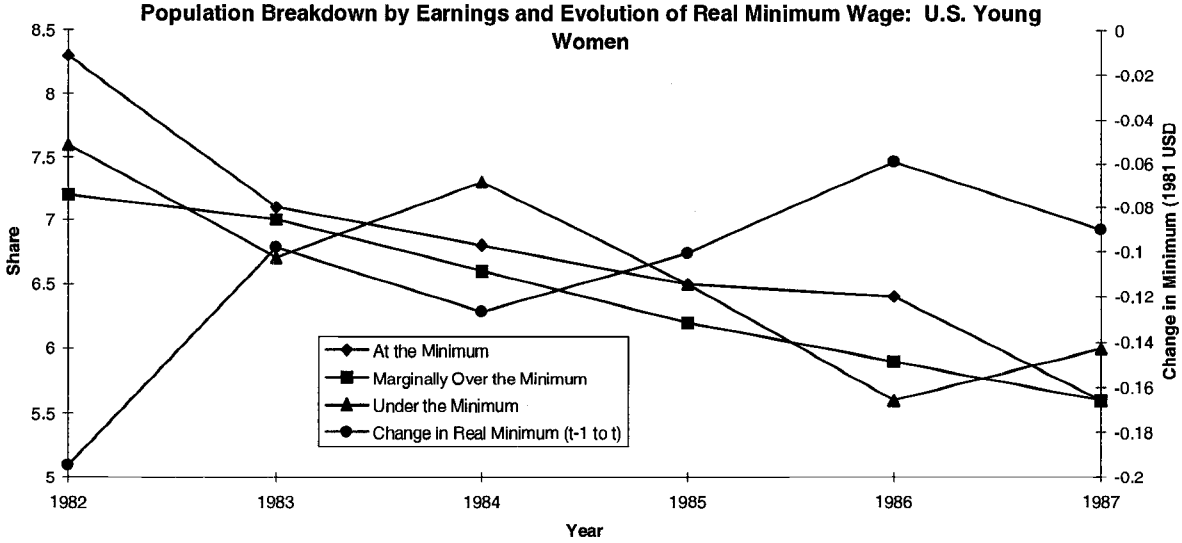

Table 1
Transition Probabilities for France (30 Years Old and Under)

From\To	Out of LF	Unemployed	**Nonemployment**	Under SMIC	At SMIC	Marginal SMIC	Over SMIC	**Employment**	TOTAL
Out of LF	10081	2150	**12231**	556	574	452	852	**2434**	14665
Overall %	11.67%	2.49%	**14.15%**	0.64%	0.66%	0.52%	0.99%	**2.82%**	16.97%
Row %	68.74%	14.66%	**83.40%**	3.79%	3.91%	3.08%	5.81%	**16.60%**	100%
Column %	67.54%	18.10%	**45.64%**	11.85%	7.40%	4.64%	2.28%	**4.08%**	111.8%
Unemployed	2328	5733	**8061**	856	723	595	1041	**3215**	11276
Overall %	2.69%	6.63%	**9.33%**	0.99%	0.84%	0.69%	1.20%	**3.72%**	13.05%
Row %	20.65%	50.84%	**71.49%**	7.59%	6.41%	5.28%	9.23%	**28.51%**	100%
Column %	15.60%	48.27%	**30.08%**	18.25%	9.32%	6.11%	2.78%	**5.39%**	100.33%
Under SMIC	6	14	**20**	1410	474	210	220	**2314**	2334
Overall %	0.01%	0.02%	**0.02%**	1.63%	0.55%	0.24%	0.25%	**2.68%**	2.70%
Row %	0.26%	0.60%	**0.86%**	60.41%	20.31%	9.00%	9.43%	**99.14%**	100%
Column %	0.04%	0.12%	**0.07%**	30.06%	6.11%	2.16%	0.59%	**3.88%**	39.1%
At SMIC	133	150	**283**	880	2144	661	300	**3985**	4268
Overall %	0.15%	0.17%	**0.33%**	1.02%	2.48%	0.76%	0.35%	**4.61%**	4.94%
Row %	3.12%	3.51%	**6.63%**	20.62%	50.23%	15.49%	7.03%	**93.37%**	100%
Column %	0.89%	1.26%	**1.06%**	18.76%	27.63%	6.79%	0.80%	**6.69%**	56.1%
Marginal SMIC	175	451	**626**	540	2465	3194	1166	**7365**	7991
Overall %	0.20%	0.52%	**0.72%**	0.62%	2.85%	3.70%	1.35%	**8.52%**	9.25%
Row %	2.19%	5.64%	**7.83%**	6.76%	30.85%	39.97%	14.59%	**92.17%**	100%
Column %	1.17%	3.80%	**2.34%**	11.51%	31.77%	32.79%	3.12%	**12.36%**	84.1%
Over SMIC	2202	3378	**5580**	449	1380	4630	33837	**40296**	45876
Overall %	2.55%	3.91%	**6.46%**	0.52%	1.60%	5.36%	39.16%	**46.63%**	53.09%
Row %	4.80%	7.36%	**12.16%**	0.98%	3.01%	10.09%	73.76%	**87.84%**	100%
Column %	14.75%	28.44%	**20.82%**	9.57%	17.78%	47.53%	90.43%	**67.60%**	208.5%
TOTAL	14925	11876	**26801**	4691	7760	9742	37416	**59609**	86410
	17.27%	13.74%	**31.02%**	5.43%	8.98%	11.27%	43.30%	**68.98%**	100%
	99.8%	82.62%	**182.4%**	100.1%	114.72%	82.91%	119.85%	**417.62%**	600%
	100%	100%	**100%**	100%	100%	100%	100%	**100%**	600%

Source: French Labor Force Survey, 1981-1989, matched year to year.

Table 2
Transition Probabilities for the United States (30 Years Old and Under)

From\To	Out of LF	Unemployed	Under Min.	At Min.	Marginal Min.	Over Min.	TOTAL
Out of LF	25245	3124	1586	2278	1617	4547	38397
Overall %	19.27%	2.38%	1.21%	1.74%	1.23%	3.47%	29.31%
Row %	65.75%	8.14%	4.13%	5.93%	4.21%	11.84%	100%
Column %	72.53%	31.21%	16.40%	30.79%	22.69%	7.33%	181.0%
Unemployed	2466	2819	574	897	773	3065	10594
Overall %	1.88%	2.15%	0.44%	0.68%	0.59%	2.34%	8.09%
Row %	23.28%	26.61%	5.42%	8.47%	7.30%	28.93%	100%
Column %	7.09%	28.16%	5.94%	12.12%	10.85%	4.94%	69.10%
Nonemployment	**27711**	**5943**	**2160**	**3175**	**2390**	**7612**	**48991**
Overall %	**21.15%**	**4.54%**	**1.65%**	**2.42%**	**1.82%**	**5.81%**	**37.40%**
Row %	**56.56%**	**12.13%**	**4.41%**	**6.48%**	**4.88%**	**15.54%**	**100%**
Column %	**79.62%**	**59.37%**	**22.34%**	**42.92%**	**33.53%**	**12.28%**	**250.06%**
Under Minimum	1511	471	5038	674	490	2018	10202
Overall %	1.15%	0.36%	3.85%	0.51%	0.37%	1.54%	7.79%
Row %	14.81%	4.62%	49.38%	6.61%	4.80%	19.78%	100%
Column %	4.34%	4.71%	52.11%	9.11%	6.88%	3.25%	80.40%
At Minimum	1445	668	424	2002	1502	2231	8272
Overall %	1.10%	0.51%	0.32%	1.53%	1.15%	1.70%	6.31%
Row %	17.47%	8.08%	5.13%	24.20%	18.16%	26.97%	100%
Column %	4.15%	6.67%	4.39%	27.06%	21.07%	3.60%	66.95%
Marginal Minimum	1091	485	323	673	1534	3467	7573
Overall %	0.83%	0.37%	0.25%	0.51%	1.17%	2.65%	5.78%
Row %	14.41%	6.40%	4.27%	8.89%	20.26%	45.78%	100%
Column %	3.13%	4.85%	3.34%	9.10%	21.52%	5.59%	47.53%
Over Minimum	3046	2443	1723	874	1211	46674	55971
Overall %	2.33%	1.86%	1.32%	0.67%	0.92%	35.63%	42.72%
Row %	5.44%	4.36%	3.08%	1.56%	2.16%	83.39%	100%
Column %	8.75%	24.41%	17.82%	11.81%	16.99%	75.28%	155.06%
Employment	**7093**	**4067**	**7508**	**4223**	**4737**	**54390**	**82018**
Overall %	**5.41%**	**3.10%**	**5.73%**	**3.22%**	**3.62%**	**41.52%**	**62.60%**
Row %	**8.65%**	**4.96%**	**9.15%**	**5.15%**	**5.78%**	**66.31%**	**100%**
Column %	**20.38%**	**40.63%**	**77.66%**	**57.08%**	**66.47%**	**87.72%**	**349.94%**
TOTAL	34804	10010	9668	7398	7127	62002	131009
	26.57%	7.64%	7.38%	5.65%	5.44%	47.33%	100%
	141.2%	58.21%	71.4%	55.66%	56.89%	216.70%	600%
	100%	100%	100%	100%	100%	100%	600%

Source: U.S. Current Population Survey, 1981-1987, January-May and September-December, matched year to year.

In the case of the United States, it is clear from looking at the raw transition probabilities that minimum wage workers are different from their higher-paid counterparts. A much larger

share of the population employed at the minimum wage at date $t+1$ comes from the non-working pool (42.92 percent) than does the share of the population employed far over the minimum wage (only 12.28 percent). The case in France is less clear, since the differences between the share of workers paid at the SMIC who are not employed the following period (6.63 percent) and those paid over the SMIC who are not employed the following period (12.16 percent) are much less dramatic, and even go in the opposite direction from the U.S. results. These effects may, however, be due to the presence of various sorts of employment promotion contracts, which might shield workers paid at or under the SMIC from layoffs. Such effects would not be visible in these cross-tabulations, and our conditional logit results go to great lengths to try to discriminate between the effects of the contracts and the effects of the minimum wage.

It should be noted that the transition behavior of workers paid marginally over the minimum is, in both countries, intermediate between the transitions made by those paid at the minimum and those paid over the minimum. This "spillover" effect could be capturing a degree of heterogeneity between low-wage and high-wage workers, and we will exploit this control group in what follows.

Clearly, this descriptive analysis is not sufficient to discredit the hypothesis that low wage workers are, in some way, qualitatively different from high wage workers; in fact, the spillover effect noted above suggests that such heterogeneity may exist. To separate out this effect, we need to control for worker characteristics[9] and analyze more carefully the transitions between employment and nonemployment.

4. Statistical Models for the Minimum Wage Effects on Employment

In order to control for the impact that variables, including the minimum wage and its movements, might have on labor market transitions, we applied two different statistical

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[9] There remains a possibility that unobserved worker heterogeneity might bias our results in sections 5 and 6. Because of selection considerations and sample sizes, we were not able to use standard (Hsiao (1986)) or nonstandard (Abowd, Kramarz and Margolis (1994)) techniques to control for these effects. Thus we are forced to suppose that the inclusion of the "marginally above" the minimum wage group is sufficient to capture any heterogeneity in transition rates that is correlated with wages.

techniques. In the first approach, we use a multinomial logit analysis to try to control for factors that might render low wage workers different from other workers, and could thereby affect their transition probabilities. We analyze the raw transitions and describe the factors that increase or reduce the probability of transitions involving nonemployment and how these factors differentially affect minimum wage and above-minimum wage workers. In the second approach, we exploit the size of the increases to categorize workers as "between" old and new values of the real minimum wage (i.e. with an hourly real wage rate lying between the old and the new real minimum wage), and we use a logit analysis of subsequent (or prior) employment probabilities to see if workers who might be directly affected by minimum wage increases have significantly different subsequent (or prior) employment probabilities.

4.a. The Multinomial Logit Analysis

Using the same definitions of states as in section 3.c., we regroup the unemployed and inactive states into a single state, nonemployment. Using the notation *N*=nonemployment, *E*=employment, *U*=under the minimum, *A*=at the minimum, *M*=marginally over the minimum and *O*=over the minimum, we can define the set of possible transitions for each country. Thus, for France there are 10 possible transitions: *O* to *E* or *O* to *N*, *M* to *E* or *M* to *N*, *A* to *E* or *A* to *N*, *U* to *E* or *U* to *N* and *N* to *E* or *N* to *N*. For the United States there are 10 symmetric transitions: *E* to *O* or *N* to *O*, *E* to *M* or *N* to *M*, *E* to *A* or *N* to *A*, *E* to *U* or *N* to *U* and *E* to *N* or *N* to *N*. We use a multinomial logit approach to control for observable factors while allowing for a common shock. For interpretation, however, we are particularly concerned with the conditional transition probabilities.

In the French case, we are interested in the probability of transition out of employment conditional on the position in the earnings distribution. For the U.S., we are interested in the initial state of a worker conditional on his or her ex-post position in the earnings distribution. In each of these cases, we have in mind the hypothesis of a competitive labor market, and thus a model in which a worker with a given marginal productivity (equal to the wage) closer to the minimum wage might be more at risk to transit out of employment in France or to have come from nonemployment in the U.S. than an observationally equivalent worker paid above the minimum wage. We suppose that those workers employed at wages marginally above the

minimum share unobservable characteristics that affect transition probabilities in the absence of a minimum wage, and that all differences in their transition behavior can be attributed to the more direct impact of the minimum wage on those paid at it relative to those paid marginally over it. We can use our parameter estimates from the multinomial logit to see how the differences in these conditional transition probabilities evolve over time, thus seeing if the difference is correlated with movements in the real minimum wage. This approach is particularly useful for seeing not only how minimum wage movements affect the probability of job loss conditional on employment (or on having come from nonemployment conditional on being employed), but also for determining whether minimum wage movements play a role in excluding workers completely from the labor market. We can also see which workers are the most likely to transition out of employment in France or come from nonemployment in the U.S. based on observable characteristics, such as age, conditional on the individual's position in the earnings distribution. Furthermore, since our estimates are based on the entire population, interpretation of these results can be more easily generalized than the results based on the employed subsample of our data, as in the conditional logit analysis described below.

4.b. The Conditional Logit Analysis

Once again, let $rmiw_t$ be the real hourly minimum net wage in year t and let rw_t be the real hourly net wage for year t. Let age_t represent an individual's age at the date t and $stage_t$ indicate that the person was employed under some employment promotion contract that allows for sub-minimum wages in year t. Finally, let e_t indicate the individual's employment status (employed=1) in year t.

We define a person as "between" in France if the mean of the cell in which the person is located at the date t is at or above the minimum wage at date t but below the minimum wage (in date t francs) at date $t+1$. Algebraically, after defining rw_t to be the mean of the cell in which the individual is located, this is equivalent to

$$\mathrm{I}(rmiw_t \leq rw_t \leq rmiw_{t+1}) = 1.$$

We also break up the sub-minimum population (those for whom $rw_t<rmiw_t$) into two groups in France: those on employment-promotion contracts ($stage_t$) and those not on employment-promotion contracts. Thus, for France, we estimate variants of the following equation for individuals:

$$\Pr\left[e_{t+1}=1\middle|e_t=1\right]=\mathrm{F}\begin{pmatrix} x_t\beta+\alpha_1\,\mathrm{I}\left(rw_t<rmiw_t\right)\times stage_t\times\left(rmiw_{t+1}-rmiw_t\right) \\ +\alpha_2\,\mathrm{I}\left(rw_t<rmiw_t\right)\times\left(1-stage_t\right)\times\left(rmiw_{t+1}-rmiw_t\right) \\ +\alpha_3\,\mathrm{I}\left(rmiw_t\le rw_t\le rmiw_{t+1}\right)\times\left(rmiw_{t+1}-rmiw_t\right)\times age_t \\ +\alpha_4\,\mathrm{I}\left(rmiw_{t+1}<rw_t\le\left(rmiw_{t+1}\times 1.1\right)\right)\times\left(rmiw_{t+1}-rmiw_t\right)\times age_t \end{pmatrix} \quad (1)$$

where $\mathrm{F}(\cdot)$ is the standard logistic function. The logit described in equation (1) allows us to test the hypothesis, implied by the theory of competitive labor markets, that if marginal productivity stays constant, increases in the real minimum wage render previously employed individuals, whose wages fall in between the old and new minima, currently unemployable. In particular, this specification also us to see if the effects of the minimum wage vary with age, and we experiment with different degrees of age aggregation to evaluate particular labor market phenomena such as the end of eligibility for employment promotion contracts or mandatory military service.

We define a person as "between" in the United States if the person's wage at the date *t+1* is at or above the minimum wage at date *t+1* but below the minimum wage (in date *t+1* dollars) at date *t*. Algebraically, this is equivalent to

$$\mathrm{I}\left(rmiw_{t+1}\le rw_{t+1}\le rmiw_t\right)=1\,.$$

We also define the variable $rmarg_t$ as the deflated value of \$4.00 at date *t*. Thus for the United States, we estimate variants of the following equation:

$$\Pr\left[e_t=1\middle|e_{t+1}=1\right]=F\begin{pmatrix} x_t\beta+\alpha_1\,\mathrm{I}\left(rw_{t+1}<rmiw_{t+1}\right)\times\left(rmiw_t-rmiw_{t+1}\right)\times age_t \\ +\alpha_2\,\mathrm{I}\left(rmiw_{t+1}\le rw_{t+1}\le rmiw_t\right)\times\left(rmiw_t-rmiw_{t+1}\right)\times age_t \\ +\alpha_3\,\mathrm{I}\left(rmiw_t<rw_{t+1}\le rmarg_t\right)\times\left(rmiw_t-rmiw_{t+1}\right)\times age_t \end{pmatrix} \quad (2)$$

The interpretation of equation (2) is symmetric to that of equation (1). Does a relatively large decrease in the real minimum wage allow previously unemployable individuals to be employed? Furthermore, in the United States, we explictly examine the impact that tips might have on our measure of the position of a person in the wage distribution.

Notice that the equations for the U.S. have empirical content because the nominal minimum wage rate does not change during our sample period whereas the real minimum wage rate declines because of general price inflation. In contrast, the equations for France have empirical content because the indexation formula is tied to general price inflation and to the growth in average hourly earnings among blue-collar workers, and as noted in section 2.1, real minimum wages increased steadily throughout the sample period[10].

5. Multinomial Logit Results

5.a. France

Appendix table B shows some of the results of estimating the multinomial logit for France. We have reported only the coefficients on certain key variables; the reference state is the transition U to E. The multinomial logit models for both France and the United States were estimated on the entire population, and not just on the youth subpopulation (as is the case for the conditional logit models), in order to highlight differences between younger and older workers. A large number of the coefficients are significantly different from zero, and the differences in the intercepts are consistent with the raw transition probabilities (O-E is more probable than O-N, N-N is more probable than N-E, etc...). Having completed one's baccalauréat (roughly the equivalent of high school in the U.S.) is an advantage for those employed over the minimum wage (0.62 vs. 0.29 for men, 1.34 vs. 1.06 for women), however men with baccalauréats who are employed at the minimum wage seem relatively worse off (-0.31 vs. -0.49). This might be coherent with a signaling explanation in which only the low-productivity baccalauréat holders are willing to accept jobs at the minimum wage.

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[10] Our conditional logit estimates are performed on the set of individuals who are employed at some point in the sample. Thus the coefficients should not necessarily be interpreted as representative of the entire potential labor force, but rather as appropriate for the sample of workers who satisfy the selection criterion.

In general, the coefficients corresponding to transitions from marginally over the SMIC are intermediate between transitions from at the SMIC and transitions from over the SMIC. This is consistent with the idea of using workers paid marginally over the SMIC as a comparison group for the purposes of analyzing the effects of the minimum wage on the population of workers being paid at the minimum. For French women in particular, the time-series transition behavior of women paid marginally over the minimum strongly resembles that of women paid at the minimum. We exploit these results in the conditional logit models that follow in section 6.

Since the interpretation of the raw regression coefficients is not immediately informative, figure 10 explores the variation in conditional transition probabilities out of employment with age for a French man in 1984 who entered the labor market between 1962 and 1972, living in the Paris region with a baccalauréat, and figure 11 shows the same conditional transition probabilities for a French woman with the same characteristics. All conditional transition probabilities are conditional on the date t position in the earnings distribution. The general downward trends in both figures are due simply to the fact that young people are more likely to transition out of employment independent of the position in the wage distribution. Still, it is worth noting that while 51-60 year olds paid over the minimum are about 1/3 as likely to transition out of employment than 16-18 year olds, workers paid at the minimum seem to benefit much less from the reduction in the probability of transitioning out of employment as they age. Furthermore, it seems that aging does not reduce the probability of transitioning out of the labor force at all for women being paid under the minimum. This suggests that the subminimum population of older women is characterized by a much weaker labor force attachment than comparable women paid elsewhere in the wage distribution.

Figure 10
Probability of Leaving Employment (Relative to 16-18 Year Olds): French Men

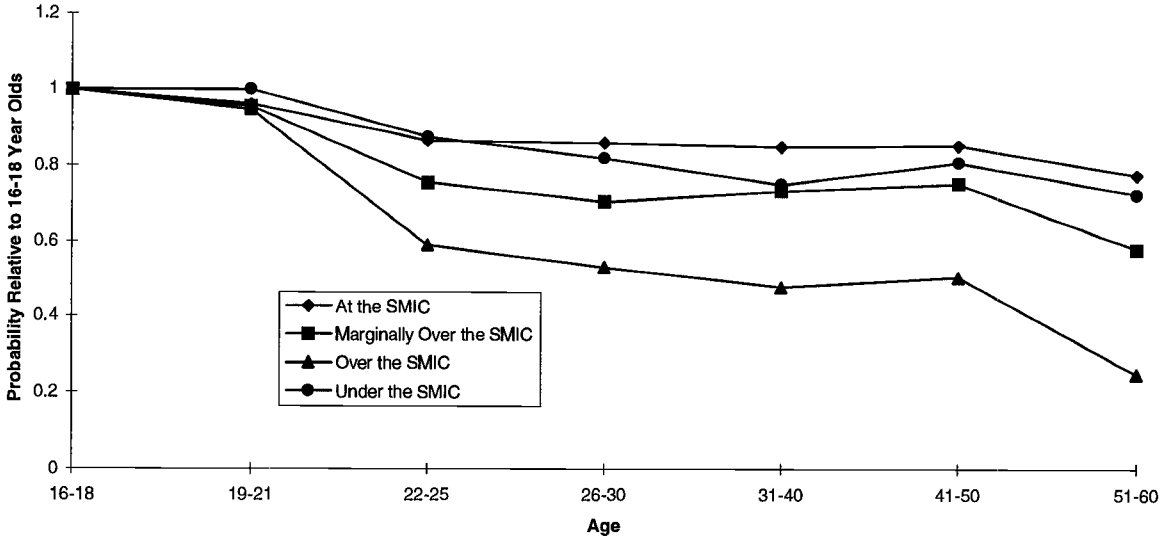
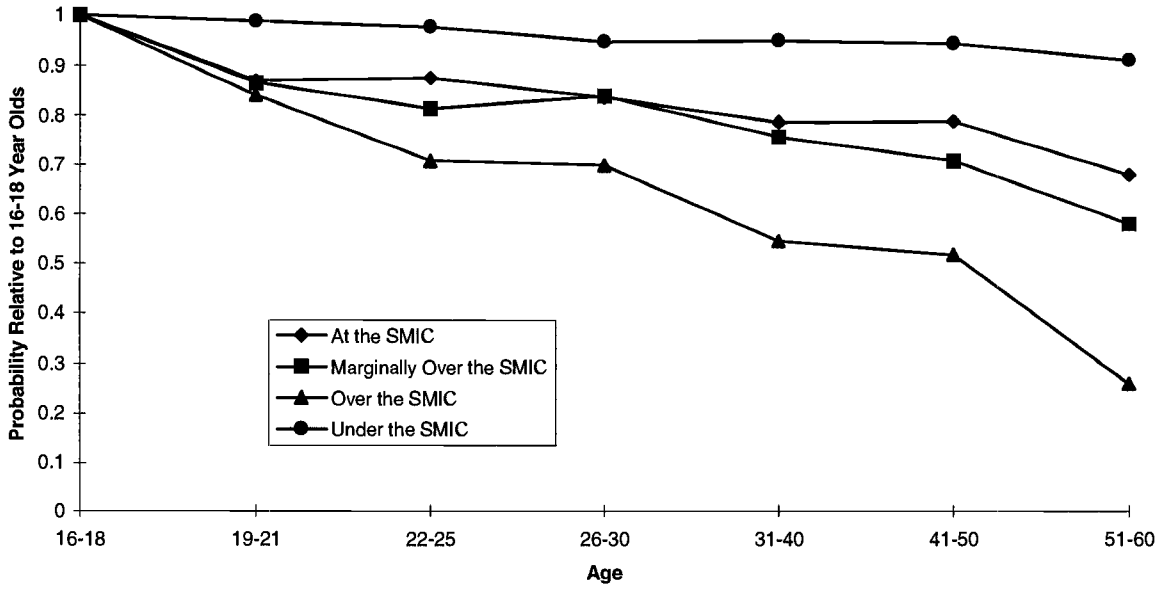


Figure 11
Probability of Leaving Employment (Relative to 16-18 Year Olds): French Women



5.b. The United States

Appendix Table C shows some of the results of estimating the multinomial logit for the United States. Once again, we have reported only the coefficients on certain key variables; the reference state is the transition E to U. A certain number of the coefficients are significantly

different from zero, and the differences in the intercepts are consistent with the raw transition probabilities (E-O is more probable than N-O, E-O is more probable than E-A, etc...). Having completed high school is associated with a relative higher share coming from employment for those employed over the minimum wage (0.75 vs. 0.49 for men, 0.65 vs. 0.37 for women), however men with high school diplomas who are employed at the minimum wage come disproportionately from nonemployment (0.13 vs. 0.08) whereas the effect is opposite for women (-0.02 vs. 0.05), although the differences in the estimated coefficients are small. The subminimum transitions do not seem dramatically different from the at minimum transitions (the coefficients in the E-A column are rarely significantly different from zero), although a significantly smaller share of young women paid under the minimum were employed in the previous period, relative to those paid at the minimum. This suggests that low-wage employers hire relatively more from the pool of nonemployed, and thus could be interpreted as running counter to the idea that the subminimum sectors in the United States (particularly jobs which receive income from tips) provide more stable employment than jobs that pay the minimum wage.

As in the French case, the time series behavior of the transitions of workers paid marginally over the minimum closely mimics that of workers paid at the minimum, further reinforcing the idea that the group of workers paid marginally over the minimum might be a reasonable control group for minimum wage workers. Also, as in the French case, the interpretation of the raw coefficients can be difficult. Figure 12 explores the variation in conditional (on arrival state) transition probabilities into employment with age for an American man in 1984 who entered the labor market between 1962 and 1972 with a high school diploma, and figure 13 shows the variation of the conditional transition probabilities for an American woman with the same characteristics.

Figure 12
Probability of Moving Into Employment (Relative to 16-18 Year Olds): U.S. Men

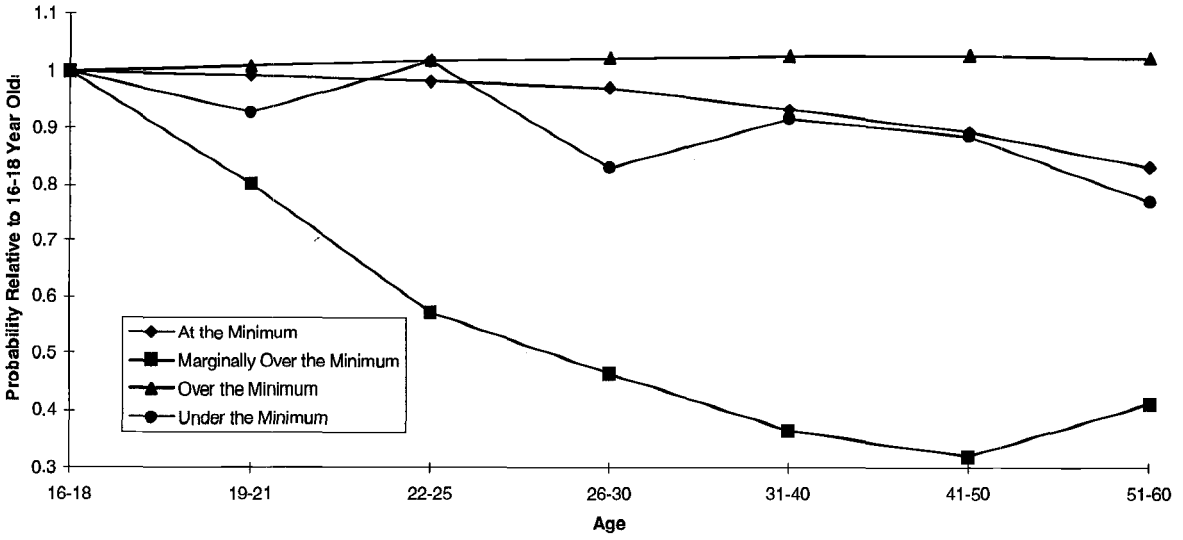
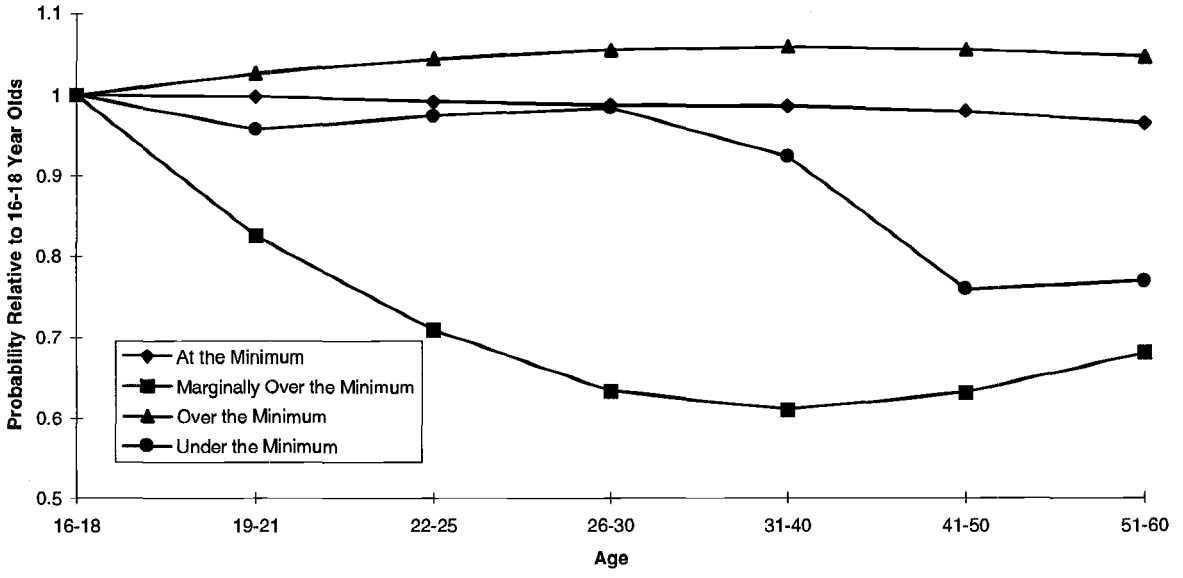


Figure 13
Probability of Moving Into Employment (Relative to 16-18 Year Olds): U.S. Women



Clearly, in the United States, the effect of age on the transition probabilities differs dramatically from the French case. The two figures are similar in form, although the relative reduction in the conditional probability of transitioning from nonemployed to marginally over the minimum is stronger for men and turns back up sooner for women. The most remarkable difference between the French and U.S. cases is that while in France the probability of making a

O-N transition decreases with age, there is either no effect or a slight increase in the relative probability of N-O transitions (the U.S. equivalent) for older workers relative to younger workers in our results for the U.S. This could be due to the high stability in general of jobs that pay substantially over the minimum wage; the intercepts for E-O transitions are significantly larger than all other estimated intercepts in the model. On the other hand, in the U.S. it seems that the probability of transitioning from nonemployment to marginally over the minimum wage is the transition the most affected by aging, while in France, the order of magnitude of the change is about half for 31-40 year olds relative to 16-18 year olds (a 63% drop versus a 27% drop for men, a 39% drop versus a 24% drop for women). If workers paid marginally over the minimum are indeed a reasonable control group for minimum wage workers, the relatively feeble decline in the probability of having come from nonemployment experienced by workers paid at the minimum suggests that, in the United States at least, the minimum wage is playing a role in determining the sorts of transitions that low wage workers make in the labor market.

6. Conditional Logit Results

6.a. France

Table 3 shows the results of estimating equation (1) for France on young people, using broad age categories[11]. We have reported the coefficients for the key real minimum wage variables, as well as variables for several types of employment contracts in France[12].

[11] Appendix Table D provides descriptive statistics for the French data used in these regressions.

[12] We explicitly consider Fixed Term Contracts (CDD), Youth employment schemes (Young Stagiaire), and Apprenticeships, with the reference being Long Term Contracts (CDI). See Abowd, Corbel, and Kramarz (1996) for more detail on the differences between CDD and CDI.

Table 3
Estimated Effect of Real French Minimum Wage Increases
On Subsequent Employment Probabilities - Broad Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young men, hourly wage				
Fixed-Term Contract	-0.5129	0.0819	0.0001	-0.0478
Young Stagiaire	-0.8777	0.1263	0.0001	-0.0818
Apprentice	-0.1490	0.1364	0.2747	-0.0139
Real $Wage_t$ < Real $SMIC_t$ & Not Young Stagiaire	2.9500	2.2341	0.1867	0.7765
Real $Wage_t$ < Real $SMIC_t$ & Young Stagiaire	9.0935	5.5130	0.0990	5.4727
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(16 $\leq Age_t \leq$ 19)	5.4614	8.5478	0.5229	2.0094
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(20 $\leq Age_t \leq$ 24)	-7.7651	8.2247	0.3451	-1.2017
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(25 $\leq Age_t \leq$ 30)	-33.2708	9.9755	0.0009	-4.8928
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(16 $\leq Age_t \leq$ 19)	2.9869	5.2162	0.5669	1.1201
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(20 $\leq Age_t \leq$ 24)	-3.4111	4.2892	0.4264	-0.4256
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(25 $\leq Age_t \leq$ 30)	-3.7791	5.8713	0.5198	-0.2914
B. Young women, hourly wage				
Fixed-Term Contract	-0.9351	0.0826	0.0001	-0.0879
Young Stagiaire	-1.4152	0.1150	0.0001	-0.1331
Apprentice	-1.0683	0.1954	0.0001	-0.1005
Real $Wage_t$ < Real $SMIC_t$ & Not Young Stagiaire	-0.8857	2.3804	0.7098	-0.1604
Real $Wage_t$ < Real $SMIC_t$ & Young Stagiaire	8.3441	5.0400	0.0978	4.4279
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(16 $\leq Age_t \leq$ 19)	-1.6553	9.8606	0.8667	-0.2759
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(20 $\leq Age_t \leq$ 24)	-8.7397	6.8185	0.1999	-1.2485
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*(25 $\leq Age_t \leq$ 30)	-11.6779	7.8799	0.1383	-1.5537
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(16 $\leq Age_t \leq$ 19)	-5.1875	7.6857	0.4997	-0.7447
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(20 $\leq Age_t \leq$ 24)	0.3164	4.4018	0.9427	0.0354
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*(25 $\leq Age_t \leq$ 30)	-1.6632	4.7962	0.7288	-0.1734

Source: French Labor Force Survey, 1981-89, matched year to year.

Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, education (8 groups), region (Ile de France) and age (3 groups), as well as the continuous variables labor force experience (through quartic), seniority, seniority squared and hourly wage in year t (through cubic). All displayed coefficients except Fixed-Term Contract, Young Stagiaire and Apprentice are equal to the indicated group multiplied by the real percentage increase in the SMIC between year t and t+1 (1981=100). The coefficients and elasticities show the partial effects on the probability of employment in year t+1, given t. A separate equation was estimated for each demographic panel. Sample sizes are Young Men: 30,804; Young Women: 26,434.

The coefficients show that French men aged 25-30 with real wage rates in period *t* that are above the real minimum in *t* but below the real minimum wage in period *t+1* have much lower subsequent employment probabilities than similar men paid substantially over the period *t+1* real minimum wage. The elasticity is very large: an increase of 1% of the minimum wage entails an decrease in the probability of keeping one's job of 4.6%, relative to men aged 25-30 who are paid marginally over the minimum. One interpretation of these results is that although low-wage workers do differ from high wage workers (as the fairly consistent negative coefficients suggest),

the minimum wage hits workers whose real wages are between the two minima much harder than other low wage workers.

Similar results hold for women and people 20-24 years old, but these coefficients are less significant. In general, the employment loss effects worsen with age among the young employed population, but the level of detail is not sufficient to speculate on why certain age groups are more affected than others. It is clear from the estimates of the coefficients on the different contract types that all of the types of contract studied here lead to more precarious labor force attachment than an indefinite term contract on average, but the employment promotion contracts (Young Stagiaire) seem to provide relative security for the subminimum population[13]. Looking at these populations in more detail, in particular at what happens to 25 year-olds (who will no longer be eligible for employment promotion contracts the following year), will give us more information on whether the dramatic differences seen between the 25-30 year old and 20-24 year-old men with wages between the two minima are due to the expiration of the protection provided by the employment promotion contracts. Table 4 gives these detailed results.

[13] See Bonnal, Fougère, and Sérandon (1994) for an analysis centered on the impact of the youth employment schemes.

Table 4
Estimated Effect of Real French Minimum Wage Increases
On Subsequent Employment Probabilities - Detailed Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young men, hourly wage				
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($16 \leq Age_t \leq 19$)	4.9184	8.5415	0.5647	1.8096
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 20$)	9.4237	17.3312	0.5866	1.8847
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 21$)	-14.4978	13.9315	0.2980	-2.9995
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 22$)	-16.5940	18.9398	0.3810	-2.0742
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 23$)	-21.2335	19.3804	0.2732	-3.6252
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 24$)	24.3191	32.6535	0.4564	1.1581
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 25$)	-63.8672	19.4477	0.0010	-15.0276
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 26$)	-48.3802	22.1020	0.0286	-7.7408
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 27$)	-10.1344	41.6355	0.8077	-0.8108
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($28 \leq Age_t \leq 30$)	-18.1628	15.4336	0.2393	-2.0957
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($16 \leq Age_t \leq 19$)	2.9091	5.2114	0.5767	1.0909
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 20$)	-1.2895	7.5889	0.8651	-0.3281
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 21$)	-5.3057	7.6142	0.4859	-0.8079
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 22$)	-14.2510	9.4418	0.1312	-1.3538
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 23$)	9.8803	11.9823	0.4096	0.8084
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 24$)	5.1411	12.0952	0.6708	0.3054
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 25$)	7.3424	13.7843	0.5943	0.8811
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 26$)	-2.0793	13.6645	0.8791	-0.1368
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($Age_t = 27$)	-6.7963	13.8000	0.6224	-0.2281
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq (1.1*$Real $SMIC_{t+1})$)*($28 \leq Age_t \leq 30$)	-8.2901	8.4234	0.3250	-0.6564

Source: French Labor Force Survey, 1981-89, matched year to year.

Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, education (8 groups), region (Ile de France), age (10 groups), fixed term contract, young stagiaire, apprentice, paid under the SMIC and young stagiaire and paid under the SMIC and not young stagiaire, as well as the continuous variables labor force experience (through quartic), seniority, seniority squared and hourly wage in year t (through cubic). All displayed coefficients are equal to the indicated group multiplied by the real percentage increase in the SMIC between year t and t+1 (1981=100). The coefficients and elasticities show the partial effects on the probability of employment in year t+1, given employment in year t. Sample size: 30,804.

Table 4 (Continued)
Estimated Effect of Real French Minimum Wage Increases
On Subsequent Employment Probabilities - Detailed Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young women, hourly wage				
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($16 \leq Age_t \leq 19$)	-1.7276	9.8645	0.8610	-0.2879
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 20$)	38.9118	23.1330	0.0926	3.0882
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 21$)	-2.5471	12.7138	0.8412	-0.3069
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 22$)	-14.8695	14.2127	0.2955	-2.2876
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 23$)	-35.7959	14.0221	0.0107	-7.8100
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 24$)	-26.8167	17.8484	0.1330	-4.3098
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 25$)	4.9443	23.7480	0.8351	0.5494
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 26$)	-17.3310	15.5787	0.2659	-2.3788
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($Age_t = 27$)	0.3354	18.9002	0.9858	0.0419
(Real $SMIC_t \leq$ Real $Wage_t \leq$ Real $SMIC_{t+1}$)*($28 \leq Age_t \leq 30$)	-18.7008	11.4752	0.1032	-2.6715
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($16 \leq Age_t \leq 19$)	-5.2027	7.6973	0.4991	-0.7469
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 20$)	26.3323	11.6838	0.0242	2.7296
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 21$)	7.0573	8.8323	0.4243	0.7876
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 22$)	-14.9729	8.3171	0.0718	-1.7468
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 23$)	-4.4278	9.8576	0.6533	-0.5009
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 24$)	-6.0435	9.7212	0.5341	-0.6784
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 25$)	-0.0432	10.5009	0.9967	-0.0054
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 26$)	1.5230	9.9692	0.8786	0.1488
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($Age_t = 27$)	7.7465	12.2241	0.5263	0.7173
(Real $SMIC_{t+1} \leq$ Real $Wage_t \leq$ (1.1*Real $SMIC_{t+1}$))*($28 \leq Age_t \leq 30$)	-7.2571	7.0661	0.3044	-0.7392

Source: French Labor Force Survey, 1981-89, matched year to year.

Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, education (8 groups), region (Ile de France), age (10 groups), fixed term contract, young stagiaire, apprentice, paid under the SMIC and young stagiaire and paid under the SMIC and not young stagiaire, as well as the continuous variables labor force experience (through quartic), seniority, seniority squared and hourly wage in year t (through cubic). All displayed coefficients are equal to the indicated group multiplied by the real percentage increase in the SMIC between year t and t+1 (1981=100). The coefficients and elasticities show the partial effects on the probability of employment in year t+1, given employment in year t. Sample size: 26,434.

Looking first at the men, the most remarkable feature is, in fact, the huge negative coefficient affecting 25 year old men whose wages are between the two minima. This elasticity of -15.9 (expressed as a difference from the "marginally above" category), and the subsequent negative coefficients for "between" men are consistent with the idea that the minimum wage has a strong negative impact on subsequent employment probabilities. However, the presence of employment promotion contracts, and the reduction in employer social insurance contributions that they imply, helps workers who are under 25 to retain their jobs in the face of a steadily increasing real SMIC. When workers are no longer eligible for such contracts, their probability of

losing their job increases dramatically. Relative to the control group of marginally above the SMIC workers, the coefficients for 25 and 26 year olds are significantly larger. In fact, there is no significant bump in the coefficients at 25 years old for the marginally above workers, suggesting that this phenomenon is only pertinent to minimum wage workers. This further reinforces the interpretation that "between" workers who are eligible for employment promotion contracts are shielded from the negative effects of movements in the SMIC, but "older" young workers are not.

On average, the coefficients for workers between the two SMICs are more negative than for workers marginally over the date *t* SMIC. The average difference (excluding the 25 year olds) is 7.8, suggesting that the "between" population might be different from the "marginal" population. Unfortunately, none of these differences (except for 25 year olds) is significant, and in fact none of the other coefficients for men are significantly different from 0. Although there are also a few significant coefficients in the results for women, interpretation of these results is much more difficult. Although 23 year old women with wages between the two minima are significantly more likely to be not employed the following year than women who are paid over the SMIC, the difference with 23 year old women paid marginally over the SMIC is not significant. And the large, positive coefficients on 20 year old women, again present in both the "between" and "marginal" populations, is hard to explain. These results may reflect the added opportunities available for women as men go off to perform their military service (and thus withdraw from the labor market), but such an interpretation can neither be accepted not rejected exclusively on the basis of the evidence presented here.

In addition to estimating the conditional logits with "marginally over" the SMIC defined as 1.10 times the SMIC, we also estimated these models with two alternative definitions (1.15 and 1.20 times the SMIC). Table 5 analyzes the robustness of the coefficients for the between and marginal categories to these changes in the definition of "marginally over". It seems clear that our results are quite robust to changes in the definition of "marginal".

Table 5
Robustness of Conditional Logit Results to Variations in the Definition of "Marginally Over the Minimum"

	Narrow		Medium		Wide	
	Between	Marginally Over	Between	Marginally Over	Between	Marginally Over
FRANCE						
Youth						
Men	4.0888	0.7317	5.3906	4.0222	6.5107	5.0473
	(6.6196)	(3.8171)	(6.6543)	(2.6087)	(6.7083)	(2.4817)
Women	-6.0281	-0.4525	-6.0108	-0.4013	-5.8400	-0.1178
	(8.2804)	(4.2333)	(8.3134)	(3.1828)	(8.3809)	(3.0601)
UNITED STATES						
Youth						
Men	1.9965	-1.6196	2.0827	-1.9342	1.5043	-2.6988
	(1.6373)	(1.8837)	(1.7436)	(1.7077)	(1.7871)	(1.6751)
Women	3.9599	-0.8667	4.6514	-0.5443	3.8852	-1.6244
	(1.5578)	(1.8022)	(1.6694)	(1.6615)	(1.7297)	(1.6484)

Sources: French Labor Force Survey, 1981-89, matched year to year and American Current Population Survey, 1981-87, January-May, September-December, matched year to year.

Notes: Coefficients come from logistic regressions conditional on employment at the date *t* for France and the date *t+1* for the United States. For France, the categories are defined as: Narrow = SMIC to 1.10*SMIC, Medium = SMIC to 1.15*SMIC and Wide = SMIC to 1.20*SMIC. For the United States, the categories are defined as: Narrow = $3.35 to $3.75, Medium = $3.35 to $4.00 and Wide = $3.35 to $4.25. For this table, Youth is defined as 25 years old and under. See the notes to tables 3, 4 and 6, 7 and 8 for details on other variables in the regressions.

6.b. United States

Table 6 shows the results of estimating equation (2) using both the hourly wage measure that excludes income from tips and the measure that includes income from tips, and interacting with total labor market experience instead of age[14]. In every case, individuals who are employed in year *t+1* were more likely to have been unemployed or not in the labor force in *t* if their real wage in *t+1* was between the real minimum wage in years *t* and *t+1*. The magnitudes of these effects are large, with elasticities for men with zero experience of -1.42 to -1.97 and for women with no experience of -3.01. Once again, we refer to comparisons with the marginal group, i.e. workers who are paid marginally above the old (date *t*) minimum wage, to get at the direct effect of movements in the real minimum wage on transitions into employment. By weighting the different experience groups, a decrease of the real minimum wage of 1% between *t-1* and *t* is related to an increased probability of having been non-employed at *t-1* of 2.2% (in difference from the marginal workers) for those men who are paid between the *t* and *t+1* minimum wages. These results are consistent with the neoclassical idea that decreases in the real minimum wage make

[14] Appendix Table E provides descriptive statistics for the U.S. data used in these regressions.

non-employed workers easier to employ, and these workers enter disproportionately between the two minimum wages. This decreases the share of those employed at date $t+1$ that were employed at date t for the "between" group more than for other groups.

Table 6
Estimated Effect of Real US Minimum Wage Decreases On Prior Employment Probabilities
Total Labor Market Experience

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young men, hourly wage - No Tips				
Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$	-0.4567	2.5368	0.8571	-0.1498
Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$	-3.0723	1.6532	0.0631	-1.3287
Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$	0.3153	1.6178	0.8455	0.0977
(Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$)*Experience	0.2406	0.4178	0.5648	0.4046
(Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$)*Experience	-1.4714	0.2841	0.0001	-2.5115
(Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$)*Experience	-0.8961	0.2497	0.0003	-1.3746
B. Young women, hourly wage - No Tips				
Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$	-0.0535	2.1856	0.9805	-0.0340
Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$	-8.3538	1.5107	0.0001	-4.8544
Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$	-2.6704	1.5055	0.0761	-1.8436
(Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$)*Experience	-0.6488	0.2570	0.0116	-1.3900
(Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$)*Experience	-0.9277	0.2007	0.0001	-1.8917
(Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$)*Experience	-0.8574	0.1894	0.0001	-1.5564
C. Young men, hourly wage - With Tips				
Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$	-2.6088	2.4905	0.2949	-1.7404
Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$	-4.3814	1.6346	0.0074	-2.4823
Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$	-0.7521	1.6034	0.6390	-0.5111
(Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$)*Experience	0.1059	0.4154	0.7988	0.1805
(Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$)*Experience	-1.5673	0.2849	0.0001	-2.6350
(Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$)*Experience	-0.9464	0.2491	0.0001	-1.4794
D. Young women, hourly wage - With Tips				
Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$	-3.0938	2.0570	0.1326	-1.8775
Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$	-9.1702	1.4879	0.0001	-5.2774
Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$	-3.3196	1.4939	0.0263	-2.2658
(Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$)*Experience	-0.7841	0.2570	0.0023	-1.7565
(Real $Min.Wage_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real $Min.Wage_t$)*Experience	-0.9762	0.2009	0.0001	-1.9923
(Real $Min.Wage_t \leq$ Real $Wage_{t+1} \leq$ Real $(\$4.00)_t$)*Experience	-0.8851	0.1894	0.0001	-1.6186

Source: American Current Population Survey, 1981-87, January-May, September-December, matched year to year.
Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, region (3), nonwhite and married; and years of schooling, labor force experience (through quartic), and log hourly real wage (1982 prices, through cubic). All displayed coefficients are equal to the indicated group times the real decrease (absolute value of the change in logarithms) in the minimum wage between year t and $t+1$. The coefficients and elasticities show the partial effects on the probability of employment in year t, given employment in year $t+1$. A separate equation was estimated for each panel. Sample sizes are Young men: 41,001; Young women: 38,992.

It is interesting to note the differences, or rather lack of differences, between the results that measure wages with and without tips. None of the qualitative results seem sensitive to the

manner in which we define wages, however some intuition can be gleaned from how the coefficients seem to shift when passing from measures without tips to measures with tips. All of the coefficients shown in Table 6 become more negative when tips are included in the wage measure. This is also consistent with the standard neoclassical model, which would imply that the with tips measure more accurately describes a worker's marginal productivity, and would conclude that the less significant coefficients in the no tips estimation are affected by measurement error. Nevertheless, due to the lack of any qualitative difference between the results with and without tips, and because our no tips measure uses reported rather than constructed data[15], the rest of our results for the United States will be based on the wage measure that excludes tips.

Table 7 reestimates equation (2) using the broad age categories, as in table 3. As was suggested by the negative coefficients on the experience interaction terms in Table 6, the effects of the minimum wage worsen as young workers get older. The differences between workers paid between the two minima and workers paid marginally over the t minimum are still significant for all age groups, and the elasticities are still large. For the oldest age group, a decrease of 1 percent in the real minimum wage at t is associated with a 5.96 percent higher chance that a given "between" worker came from nonemployment, whereas such a change is associated with only an 1.81 percent higher chance for "marginal" workers. Unlike the French case, although 25-30 year olds with date $t+1$ wages between the two minima have a higher chance of having come from nonemployment than 20-24 year olds, the difference is not nearly as dramatic. This is not surprising, as there existed no nationwide employment promotion schemes in the United States in the 1980s that would have induced effects similar to the French case.

[15] Welch (1997) provides evidence on various sorts of measurement error in the Current Population Survey, and hints that hours are likely to be a greater source of measurement error than wages.

Table 7
Estimated Effect of Real U.S. Minimum Wage Increases On Prior Employment Probabilities (Excluding Tips) - Broad Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young men, hourly wage				
$\text{Real Wage}_{t+1} < \text{Real Min.Wage}_{t+1}$	0.6119	1.9147	0.7493	0.2007
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(16 \le \text{Age}_t \le 19)$	-6.1455	1.3807	0.0001	-2.9233
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(20 \le \text{Age}_t \le 24)$	-11.8902	1.9536	0.0001	-4.2095
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(25 \le \text{Age}_t \le 30)$	-19.4188	3.1495	0.0001	-5.9588
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(16 \le \text{Age}_t \le 19)$	-0.9696	1.3901	0.4855	-0.3767
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(20 \le \text{Age}_t \le 24)$	-5.9107	1.7693	0.0008	-1.4697
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(25 \le \text{Age}_t \le 30)$	-9.8243	2.4330	0.0001	-1.8055
A. Young women, hourly wage				
$\text{Real Wage}_{t+1} < \text{Real Min.Wage}_{t+1}$	-3.2195	1.6924	0.0571	-1.1762
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(16 \le \text{Age}_t \le 19)$	-9.1433	1.3730	0.0001	-4.3346
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(20 \le \text{Age}_t \le 24)$	-14.0812	1.6675	0.0001	-4.8644
$(\text{Real Min}_{t+1} \le \text{Real Wage}_{t+1} \le \text{Real Min}_t)*(25 \le \text{Age}_t \le 30)$	-19.8125	1.8812	0.0001	-7.1220
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(16 \le \text{Age}_t \le 19)$	-3.0577	1.4261	0.0320	-1.1732
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(20 \le \text{Age}_t \le 24)$	-8.4481	1.4757	0.0001	-2.2399
$(\text{Real Min}_t \le \text{Real Wage}_{t+1} \le \text{Real } (\$4.00)_t)*(25 \le \text{Age}_t \le 30)$	-12.5349	1.5423	0.0001	-3.2334

Source: American Current Population Survey, 1981-87, January-May, September-December, matched year to year.
Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, region (3 categories), nonwhite, married and age (3 categories); and years of schooling, labor force experience (through quartic), and log hourly real wage (1982 prices, through cubic). All displayed coefficients are equal to the indicated group times the real decrease (absolute value of the change in logarithms) in the minimum wage between year t and $t+1$. The coefficients and elasticities show the partial effects on the probability of employment in year t, given employment in year $t+1$. A separate equation was estimated for each demographic panel. Sample sizes are Young men: 41,001; Young women: 38,992.

One might think that our approach of considering *previous* employment in the United States could be subject to the possibility, especially among young people, that many of the transitions from non-employment to employment are first jobs after the end of schooling[16]. Since we control for schooling as a set of regressors reflecting different levels of educational attainment, looking at the pattern of age coefficients for "between" workers and "marginal" workers should allow us to ignore such considerations to the extent that entry into the labor force does not occur disproportionately in a particular wage category. Table 8, which provides our conditional logit analysis at the same level of aggregation as Table 4, therefore allows us to concentrate more

[16] See Topel and Ward (1992), among others, for an analysis of early-career mobility in the United States.

precisely on how minimum wage movements affect the stability of early career employment at different points in the wage distribution.

Table 8
Estimated Effect of Real U.S. Minimum Wage Increases On Prior Employment Probabilities (Excluding Tips) - Detailed Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young men, hourly wage				
Real $Wage_{t+1}$ < Real $Min.Wage_{t+1}$	0.2962	1.9152	0.8771	0.0971
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(16 ≤ Age_t ≤ 19)	-6.5106	1.3857	0.0001	-3.0970
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 20)	-11.6092	3.1697	0.0002	-4.4924
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 21)	-9.0680	3.4352	0.0083	-3.2645
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 22)	-7.3453	4.7357	0.1209	-2.0986
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 23)	-22.0209	5.2597	0.0001	-8.4499
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 24)	-15.1148	5.2426	0.0039	-4.6784
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 25)	-16.6557	6.2664	0.0079	-4.7588
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 26)	-17.9004	6.9347	0.0098	-5.3701
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(Age_t = 27)	-15.9424	8.5432	0.0620	-5.1813
(Real Min_{t+1} ≤ Real $Wage_{t+1}$ ≤ Real Min_t)*(28 ≤ Age_t ≤ 30)	-22.0514	4.5378	0.0001	-6.9252
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*(16 ≤ Age_t ≤ 19)	-1.2309	1.3918	0.3765	-0.4783
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 20)	-4.7686	3.0687	0.1202	-1.2724
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 21)	-4.4151	3.3797	0.1914	-1.2184
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 22)	-5.2612	3.9467	0.1825	-1.2314
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 23)	-9.3349	4.0392	0.0208	-2.0277
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 24)	-8.6274	4.7811	0.0712	-1.9071
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 25)	-6.4574	4.8991	0.1875	-1.1170
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 26)	-8.4370	5.7535	0.1425	-1.5576
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*($Age_t$ = 27)	-12.1263	5.3991	0.0247	-2.4804
(Real Min_t ≤ Real $Wage_{t+1}$ ≤ Real ($4.00)$_t$)*(28 ≤ Age_t ≤ 30)	-10.7899	3.5679	0.0025	-1.9561

Source: American Current Population Survey, 1981-87, January-May, September-December, matched year to year.

Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, region (3 categories), nonwhite, married and age (10 categories); and years of schooling, labor force experience (through quartic), and log hourly real wage (1982 prices, through cubic). All displayed coefficients are equal to the indicated group times the real decrease (absolute value of the change in logarithms) in the minimum wage between year *t* and *t+1*. The coefficients and elasticities show the partial effects on the probability of employment in year *t*, given employment in year *t+1*. A separate equation was estimated for each demographic panel. Sample size is Young men: 41,001.

Table 8 (continued)
Estimated Effect of Real U.S. Minimum Wage Increases On Prior Employment Probabilities (Excluding Tips) - Detailed Age Categories

Name of effect	Coefficient	Standard Error	P-Value	Elasticity
A. Young women, hourly wage				
Real $Wage_{t+1}$ < Real Min.$Wage_{t+1}$	-3.7559	1.6913	0.0264	-1.3722
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(16 $\leq Age_t \leq$ 19)	-9.8220	1.3730	0.0001	-4.6564
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 20)	-12.2205	2.8456	0.0001	-4.6320
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 21)	-12.8276	3.1141	0.0001	-4.6853
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 22)	-13.4058	3.6339	0.0002	-4.4009
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 23)	-14.1311	4.2524	0.0009	-4.1771
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 24)	-14.0301	4.2585	0.0010	-4.1895
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 25)	-23.5188	4.2544	0.0001	-9.5817
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 26)	-18.8257	4.0242	0.0001	-6.4372
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(Age_t = 27)	-20.1282	4.6770	0.0001	-6.8814
(Real $Min_{t+1} \leq$ Real $Wage_{t+1} \leq$ Real Min_t)*(28 $\leq Age_t \leq$ 30)	-19.6787	2.4999	0.0001	-6.9948
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*(16 $\leq Age_t \leq$ 19)	-3.4490	1.4233	0.0154	-1.3234
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 20)	-2.3108	2.8808	0.4225	-0.5968
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 21)	-4.9630	2.9318	0.0905	-1.3019
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 22)	-9.1566	3.0945	0.0031	-2.5897
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 23)	-13.4398	3.2502	0.0001	-3.4858
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 24)	-14.1707	3.4026	0.0001	-3.7468
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 25)	-16.7514	3.1826	0.0001	-4.7031
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 26)	-7.2195	3.7185	0.0522	-1.5576
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*($Age_t$ = 27)	-6.5597	3.5805	0.0669	-1.4072
(Real $Min_t \leq$ Real $Wage_{t+1} \leq$ Real ($4.00)$_t$)*(28 $\leq Age_t \leq$ 30)	-15.0802	2.0915	0.0001	-4.2146

Source: American Current Population Survey, 1981-87, January-May, September-December, matched year to year.
Notes: Equations estimated by maximum likelihood logit. All equations include indicators for year, region (3 categories), nonwhite, married and age (10 categories); and years of schooling, labor force experience (through quartic), and log hourly real wage (1982 prices, through cubic). All displayed coefficients are equal to the indicated group times the real decrease (absolute value of the change in logarithms) in the minimum wage between year t and $t+1$. The coefficients and elasticities show the partial effects on the probability of employment in year t, given employment in year $t+1$. A separate equation was estimated for each demographic panel. Sample size is Young women: 38,992.

As was the case in our earlier results, the probability that a worker came from nonemployment is higher among the set of workers with date $t+1$ real wages between the two minima than among the set of workers with date $t+1$ real wages marginally above the date t real minimum. The same holds true for a comparison of "between" workers with workers earning substantially more than the date t real minimum, and these differences are often significant. Although there is a lot of variation across the different ages, there appears to be a secular trend towards a higher and higher share of workers coming from nonemployment as age increases, and

this trend is steeper among "between" workers than among "marginal" workers, particularly for young men. This is not the case in France, and it may suggest that information is revealed faster in the U.S., and that, as workers age, the sorts of low-wage jobs they can find becomes become increasingly precarious.

Since there do not exist systematic, targeted programs that should affect transitions among young people throughout the United States in the same manner (with the exception of education), interpretation of these coefficients is not as straightforward as in the French case. However, if (as mentioned above) the coefficients corresponding to a given age are particularly strong, and if this age corresponds to the age at which many students typically finish a certain diploma, one might conclude that the coefficients are capturing disproportionate entry into the labor force at particular places in the wage distribution. Unfortunately, the most remarkable coefficients (23 years old for men and 25 years old for women) are not concurrent with ages at which a significant portion of the future workforce is in their last year of schooling. There does not seem to be any clear interpretation for the particular age pattern of the coefficients in the United States.

Finally, to promote comparability between our analysis, which is done conditional on the employment state in either year t (France) or year $t+1$ (US), and other analyses, which consider the effects of the minimum wage unconditional on the previous or future employment state, we compute the implied unconditional elasticities implied by our estimates. To calculate an unconditional elasticity we apply Bayes law to obtain the relation between the forms of the analysis equations we used for France and the United States. Hence, we have

$$\Pr[e_{t+1}=1|e_t=1,rmiw_t,rmiw_{t+1}]=\Pr[e_t=1|e_{t+1}=1,rmiw_t,rmiw_{t+1}]\frac{\Pr[e_{t+1}=1|rmiw_t,rmiw_{t+1}]}{\Pr[e_t=1|rmiw_t]} \quad (3)$$

To calculate the elasticity we use the following derivative formula:

$$\frac{\partial \ln \Pr[e_{t+1}=1]}{\partial \ln rmiw_{t+1}}=\frac{\partial \ln \Pr[e_{t+1}=1|e_t=1,rmiw_t,rmiw_{t+1}]}{\partial \ln rmiw_{t+1}}-\frac{\partial \ln \Pr[e_t=1|e_{t+1}=1,rmiw_t,rmiw_{t+1}]}{\partial \ln rmiw_{t+1}} \quad (4)$$

Notice that the derivative in equation (4) simplifies because the denominator in the ratio of unconditional probabilities in equation (3) does not depend upon the future minimum wage. On

the right hand side of equation (4) there are two terms. For France, we can estimate only the first of these two terms because the real minimum wage is always increasing. The conditions necessary for estimating the second term occur in the United States, where the real minimum wage is always decreasing. To estimate the unconditional elasticity in equation (4) we must make an assumption regarding the term that cannot be estimated in the particular country. We assume that this term is zero, which means that increases in the real minimum wage do not change the rate at which nonemployed workers become employed and, conversely, decreases in the real minimum wage do not change the rate at which employed workers at t remain employed at $t+1$. Our results are summarized in Table 9. To take advantage of the structure of our estimates in Tables 3 and 7, we computed the required conditional elasticities in equation (4) according to the following formula for France, which assumes that the appropriate control group is the individuals who are marginally over the minimum wage.

$$\frac{\partial \ln \Pr[e_{t+1}=1 \| e_t=1]}{\partial \ln rmiw_{t+1}} = \Pr[\text{at minimum}] \sum_{\ell} \left[\frac{\partial \ln \Pr[e_{t+1}=1 \| e_t=1, \ell, \text{at minimum}]}{\partial \ln rmiw_{t+1}} - \frac{\partial \ln \Pr[e_{t+1}=1 \| e_t=1, \ell, \text{ marginally above}]}{\partial \ln rmiw_{t+1}} \right] \Pr[\ell]$$

where the summation is taken over the three age groups. We use the comparable formula for the US.

Table 9
Elasticity Estimates for Young Men and Women
Rate of Change of Employment Probability
for a 1% Increase in the Real Minimum Wage

	France	US
Conditional (aggregated over age groups)		
Young men	-2.489	-2.234
Young women	-1.044	-1.873
Unconditional (aggregated over age groups)		
Young men	-0.203	-0.123
Young women	-0.108	-0.127

Sources: France: Table 3, Figures 6, 7 and Labor Force Survey. US: Table 7, Figures 8, 9 and Current Population Survey.

Notes: The conditional elasticity is the weighted average of the elasticities for each age group in Tables 3 and 7 reported as the difference between the elasticity for the "at minimum" group as compared to the "marginally above" group. The unconditional elasticity is an estimate of the rate of change of the employment probability in period t+1 given a one percent increase in the real minimum wage between periods t and t+1.

7. Conclusion

This paper has shown that, for young people in both France and the United States, movements in the real minimum wage are associated with significant employment effects, typically in the direction predicted by competitive labor market theory. In France, as the real SMIC increased over the period from 1981 to 1989, a certain share of young French workers had real wages that fell between the increasing consecutive real minimum wages. For workers in this situation, subsequent employment probabilities fell significantly. However, participation in employment promotion programs seemed to shield these workers from some of the effects of the increasing real SMIC, and when this eligibility ended, the probability of subsequent nonemployment shot up dramatically. In the United States, a comparable effect of a real minimum wage moving in the opposite direction occurred, as many workers had market wage rates that were passed by the declining real minimum wage over the period from 1981 to 1987. American workers whose current real wage rate would have been below the real minimum wage in earlier periods were much less likely to have been employed in those earlier periods.

By comparing effects of minimum wage movements on workers employed at the minimum with those employed marginally above it, we identify the direct effects of the minimum wage, as distinct from heterogeneity across the wage distribution in labor force attachment and response to macroeconomic shocks. We suppose that these workers have identical labor supply behavior, but they also have much higher subsequent reemployment probabilities in France as well as much higher prior employment probabilities in the U.S. Within the youth population, these strong effects increase with age in the United States, and the pattern in France is dominated by eligibility for employment promotion contracts. Across the population as whole, however, our multinomial logit results suggest that, in both countries, it is the youth who are most affected by movements in the real minimum wage.

Even if the conditional elasticities in question are large, the at-risk groups (workers between two minimum wages) are relatively small -- 8% of young men and 10% of young women in France, 6% of young men and 7% of young women in the U.S. Thus, overall unconditional elasticities tend to be much lower than the elasticities conditional on being between the two minima. If the relevant policy question concerns the impact of the minimum wage on those individuals most likely to be affected by it (i.e. those currently paid at the minimum wage), our results suggest that there are much larger negative employment effects on this group, especially as compared to the group in the wage distribution marginally above the minimum, than other research has found.

References

Abowd, John M., Patrick Corbel, and Francis Kramarz (1996), "The Entry and Exit of Workers in French Establishments, " NBER working paper.

Abowd, John M., Francis Kramarz and David N. Margolis (1994), "High Wage Workers and High Wage Firms, " NBER working paper.

Bayet, Alain (1994) "Les salaires de 1991 à 1993 dans le secteur privé et semi-public," *INSEE Résultats* Emploi - Revenus no. 64.

Bazen, S. and J.P. Martin (1991) "L'impact du salaire minimum sur les salaires et l'emploi en 1994," *Note du Bureau Emploi - Salaires* 95BD4.

Bonnal, Liliane, Denis Fougère and Anne Sérandon (1994) "L'impact des dispositifs d'emploi sur le devenir des jeunes chômeurs: une évaluation économétrique sur données longitudinales," *Economie et Prévision.*

Brown, Charles, C. Gilroy and A. Kohen (1982) "The effect of the minimum wage on employment and unemployment," *Journal of Economic Literature* (June): 487-528.

Card, David and Thomas Lemieux (1996) "Wage Dispersion, Returns to Skill and Black-White Wage Differentials," *Journal of Econometrics.*

Dolado, Juan, Francis Kramarz, Steven Machin, Alan Manning, David Margolis and Coen Teulings (1996) "The Economic Impact of Minimum Wages in Europe," *Economic Policy* (October): 319-372.

Hsiao, Cheng (1986) *The Analysis of Panel Data*, (Cambridge: Cambridge University Press).

INSEE (forthcoming) "Séries longues sur les salaires," Division Revenus.

Juhn, C., K.M. Murphy and R. Topel (1991) "Why has the natural rate of unemployment increased over time," *Brookings Papers on Economic Activity* 2.

Linneman, Peter (1982) "The economic impacts of minimum wage laws: a new look at an old question," *Journal of the Political Economy* (June): 443-69.

Margolis, David (1993) *Compensation Practices and Government Policies in Western European Labor Markets*, Cornell University Ph.D. dissertation (May).

Neumark, David and William Wascher (1992) "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws," *Industrial and Labor Relations Review* (October): 55-81.

Topel, Robert H. and Michael P. Ward (1992) "Job Mobility and the Careers of Young Men," *Quarterly Journal of Economics* (May): 439-479.

Welch, Finis (1997) "Wages and Participation," *Journal of Labor Economics* (January): S77-S103.

Appendix Table A

Statistical History of the "Salaire Minimum Interprofessionnel de Croissance" (SMIC)

Year	Statutory hours per month	Gross Hourly SMIC (Francs)	Gross Real Hourly SMIC (Francs 1970)	Gross Monthly SMIC (Francs)	Net Monthly SMIC (Francs)	Monthly total compensation cost (Francs)	Employee payroll tax rate (% at SMIC)	Employer payroll tax rate (% at SMIC)	Consumer Price Index (1970=100)
1951	173.3	0.89	1.95	154.41	145.15	195.78	6.00	26.79	45.60
1952	173.3	1.00	1.96	173.33	162.93	220.74	6.00	27.35	50.98
1953	173.3	1.00	1.98	173.33	182.33	222.47	6.00	28.35	50.39
1954	173.3	1.15	2.29	199.98	187.98	256.67	6.00	28.35	50.21
1955	173.3	1.25	2.46	216.45	203.46	277.81	6.00	28.35	50.80
1956	173.3	1.26	2.43	218.40	205.30	280.32	6.00	28.35	51.80
1957	173.3	1.29	2.42	223.78	210.35	287.22	6.00	28.35	53.21
1958	173.3	1.46	2.39	253.87	238.64	319.50	6.00	28.85	61.19
1959	173.3	1.58	2.43	270.62	253.84	349.51	6.20	29.15	64.98
1960	173.3	1.61	2.39	279.19	261.88	360.57	6.20	29.15	67.40
1961	173.3	1.64	2.36	284.69	267.04	370.52	6.20	30.15	69.59
1962	173.3	1.72	2.36	298.77	278.45	393.33	7.05	31.65	72.91
1963	173.3	1.84	2.41	319.62	297.09	418.88	7.05	31.05	76.38
1964	173.3	1.89	2.39	328.27	305.13	430.20	7.05	31.05	78.98
1965	173.3	1.97	2.43	342.28	318.15	448.56	7.05	31.05	80.98
1966	173.3	2.06	2.48	358.27	331.15	468.00	7.05	31.36	83.22
1967	173.3	2.13	2.49	368.32	339.66	498.45	8.15	35.33	85.41
1968	173.3	2.68	3.00	484.81	426.84	617.17	8.17	32.78	89.28
1969	173.3	3.16	3.32	548.16	503.32	728.07	8.18	32.82	95.12
1970	173.3	3.42	3.42	591.92	543.50	786.13	8.18	32.81	100.00
1971	173.3	3.76	3.56	651.72	598.15	867.31	8.22	33.08	105.52
1972	173.3	4.19	3.74	725.96	668.00	971.62	8.26	33.84	111.99
1973	173.3	4.95	4.12	858.27	786.52	1151.28	8.36	34.14	120.20
1974	173.3	6.10	4.46	1053.74	967.78	1421.63	8.42	34.53	136.71
1975	173.3	7.26	4.75	1260.25	1150.86	1711.87	8.68	35.82	152.80
1976	173.3	8.34	4.98	1466.01	1306.18	1981.47	9.67	37.03	167.49
1977	173.3	9.40	5.13	1629.59	1464.19	2239.06	10.15	37.40	183.22
1978	173.3	10.61	5.31	1839.61	1650.68	2536.45	10.27	37.88	199.82
1979	173.3	11.94	5.40	2068.69	1817.14	2843.62	12.14	38.91	221.30
1980	173.3	13.80	5.49	2391.67	2085.54	3324.42	12.80	39.00	251.30
1981	173.3	16.30	5.72	2824.41	2478.98	3925.93	12.23	39.00	285.00
1982	169.0	19.17	6.02	3323.46	2892.07	4623.60	12.98	39.12	318.70
1983	169.0	21.50	6.16	3725.87	3216.92	5221.43	13.66	40.14	349.29
1984	169.0	23.53	6.27	4077.88	3465.79	5693.33	15.01	39.62	375.19
1985	169.0	25.44	6.41	4335.00	3676.51	6056.88	15.19	39.72	397.04
1986	169.0	26.53	6.51	4482.87	3777.27	6270.64	15.74	39.88	407.62
1987	169.0	27.60	6.56	4663.84	3894.77	6528.91	16.49	39.99	420.43
1988	169.0	28.65	6.64	4791.71	3977.60	6715.10	16.99	40.14	431.74
1989	169.0	29.54	6.60	4991.42	4093.46	6943.58	17.99	39.11	447.33
1990	169.0	30.80	6.66	5205.20	4269.83	7182.13	17.97	37.89	462.38
1991	169.0	32.30	6.77	5458.70	4547.95	7527.66	17.39	37.90	477.20
1992	169.0	33.58	6.87	5674.46	4606.38	7860.94	17.98	38.53	488.60
1993	169.0	34.45	6.91	5821.21	4794.70	7945.37	18.38	36.49	498.86
1994	169.0	35.20	6.92	5947.96	4881.38	7981.57	18.64	34.19	508.84

Source: Series longues sur les salaires (INSEE, to appear in 1995).

Note: Data for 1950-1969 are for the earlier minimum wage system (SMIG).

Appendix Table B
Multinomial Logit Results for France
(Standard Errors in Parentheses)

	Transition																		
	Men									Women									
Effect	U - N	A - N	A - E	M - N	M - E	O - N	O - E	N - N	N - E	U - N	A - N	A - E	M - N	M - E	O - N	O - E	N - N	N - E
Intercept	1.39	-2.98	-3.81	-5.95	-5.77	-3.96	-3.36	-0.42	-4.52	2.44	-1.55	-0.93	-1.71	-1.02	1.03	2.77	2.08	-3.10
	(0.91)	(0.87)	(0.53)	(0.75)	(0.45)	(0.47)	(0.40)	(0.41)	(1.02)	(0.73)	(0.59)	(0.37)	(0.66)	(0.35)	(0.48)	(0.32)	(0.31)	(0.96)
1982	-0.11	-0.13	-0.18	0.13	0.01	0.38	0.40	0.26	0.32	0.02	0.04	-0.02	0.19	0.13	0.35	0.35	0.23	0.30
	(0.12)	(0.12)	(0.08)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)	(0.13)	(0.10)	(0.08)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.12)
1983	-0.28	-0.11	-0.23	0.41	0.18	0.79	0.79	0.53	0.64	-0.05	0.13	0.00	0.53	0.40	0.78	0.69	0.45	0.64
	(0.12)	(0.12)	(0.08)	(0.09)	(0.06)	(0.06)	(0.06)	(0.06)	(0.13)	(0.10)	(0.07)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.13)
1984	-0.07	-0.14	-0.21	0.23	0.13	0.62	0.57	0.30	0.45	0.03	0.08	0.00	0.40	0.28	0.65	0.51	0.34	0.52
	(0.12)	(0.12)	(0.08)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)	(0.13)	(0.10)	(0.07)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.13)
1985	-0.16	0.06	-0.07	0.64	0.37	1.00	0.94	0.59	0.57	-0.07	0.30	0.11	0.62	0.44	0.87	0.72	0.51	0.46
	(0.12)	(0.12)	(0.08)	(0.09)	(0.06)	(0.06)	(0.06)	(0.06)	(0.13)	(0.10)	(0.08)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.12)
1986	-0.30	0.00	-0.08	0.50	0.33	0.82	0.81	0.44	0.64	-0.23	0.13	0.08	0.42	0.36	0.61	0.57	0.40	0.30
	(0.12)	(0.12)	(0.08)	(0.09)	(0.06)	(0.07)	(0.06)	(0.06)	(0.13)	(0.10)	(0.07)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.12)
1987	-0.39	0.00	0.05	0.45	0.34	0.80	0.79	0.43	0.33	-0.26	0.23	0.12	0.36	0.37	0.63	0.57	0.41	0.38
	(0.12)	(0.12)	(0.08)	(0.09)	(0.06)	(0.07)	(0.06)	(0.06)	(0.13)	(0.10)	(0.08)	(0.05)	(0.08)	(0.05)	(0.06)	(0.04)	(0.04)	(0.12)
1988	-0.34	0.24	0.14	0.66	0.47	0.99	0.92	0.56	0.49	-0.24	0.37	0.26	0.64	0.54	0.77	0.74	0.56	0.46
	(0.12)	(0.13)	(0.08)	(0.11)	(0.07)	(0.07)	(0.06)	(0.06)	(0.14)	(0.10)	(0.09)	(0.05)	(0.09)	(0.05)	(0.06)	(0.05)	(0.04)	(0.14)
Baccalaureat	-0.26	-0.31	-0.49	-0.35	-0.50	0.29	0.62	-0.02	0.42	0.08	0.01	0.04	0.30	0.38	1.06	1.34	0.38	1.04
	(0.16)	(0.13)	(0.08)	(0.13)	(0.07)	(0.07)	(0.06)	(0.06)	(0.13)	(0.11)	(0.09)	(0.06)	(0.10)	(0.05)	(0.06)	(0.05)	(0.05)	(0.12)
Age=22-25	0.60	-0.68	-0.81	-0.90	-1.01	-1.50	-1.78	-1.29	-1.02	0.77	0.04	-0.22	0.00	-0.19	-0.53	-0.69	-0.39	0.12
	(0.11)	(0.13)	(0.07)	(0.12)	(0.06)	(0.08)	(0.06)	(0.06)	(0.16)	(0.10)	(0.09)	(0.06)	(0.11)	(0.05)	(0.08)	(0.05)	(0.05)	(0.17)

Source: French Labor Force Survey, 1981-1989, matched year to year.

Notes: Equations estimated by multinomial Logit. Transitions identified by U=under the minimum, A=at the minimum, M=marginally over the minimum, O=over the minimum, N=nonemployment, E=employment. In addition to the coefficients shown, the regression included indicator variables for region (Ile de France), 8 education categories, 8 age categories and 3 entry cohorts. The reference transition was U-E. The reference categories for the indicator variables were year=1981, education=no degree, age=41-50 years old and year of entry into labor market=before 1961. Separate equations were estimated for men and women. Sample sizes were men: 145,646; women: 166,716.

Appendix Table C
Multinomial Logit Results for the United States
(Standard Errors in Parentheses)

	Transition																	
	Men									Women								
Effect	N-U	N-A	E-A	N-M	E-M	N-O	E-O	N-N	E-N	N-U	N-A	E-A	N-M	E-M	N-O	E-O	N-N	E-N
Intercept	-1.61	0.11	0.30	0.80	1.20	4.28	6.60	-0.80	-0.39	-0.89	2.74	0.81	3.45	1.94	5.56	6.91	0.34	1.40
	(1.06)	(0.86)	(0.58)	(0.91)	(0.54)	(0.51)	(0.44)	(0.44)	(0.46)	(0.67)	(0.57)	(0.40)	(0.61)	(0.38)	(0.42)	(0.32)	(0.32)	(0.34)
1982	0.04	0.17	0.02	0.13	0.10	0.26	0.07	0.16	0.06	0.06	0.09	0.04	0.09	-0.02	0.14	0.09	0.06	0.02
	(0.07)	(0.05)	(0.04)	(0.06)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
1983	-0.07	0.22	0.00	0.18	0.05	0.34	0.09	0.15	-0.05	0.00	0.13	0.00	0.07	-0.06	0.17	0.11	0.05	-0.01
	(0.08)	(0.05)	(0.04)	(0.06)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
1984	0.01	0.22	0.05	0.20	0.08	0.30	0.16	0.20	0.03	0.01	0.16	-0.06	0.12	-0.01	0.24	0.19	0.10	0.05
	(0.09)	(0.06)	(0.06)	(0.07)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
1985	0.01	0.16	0.02	0.22	0.17	0.34	0.27	0.27	0.06	-0.08	0.11	-0.12	0.21	-0.04	0.26	0.22	0.06	0.02
	(0.12)	(0.08)	(0.07)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.08)	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)
1986	-0.06	0.09	-0.08	0.20	0.06	0.35	0.20	0.21	0.05	-0.05	0.09	-0.07	0.16	-0.06	0.36	0.29	0.10	0.08
	(0.08)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
High School	-0.12	0.13	0.08	0.16	0.12	0.49	0.75	0.12	0.38	-0.14	0.05	-0.02	0.19	0.20	0.37	0.65	-0.05	0.22
	(0.09)	(0.07)	(0.05)	(0.07)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.06)	(0.05)	(0.04)	(0.06)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
Age=22-25	0.09	0.13	0.10	0.25	0.14	0.20	-0.11	-0.86	-0.71	0.13	0.63	0.21	0.76	0.25	0.52	0.21	-0.64	-0.21
	(0.27)	(0.21)	(0.14)	(0.22)	(0.13)	(0.12)	(0.11)	(0.11)	(0.11)	(0.16)	(0.13)	(0.10)	(0.14)	(0.09)	(0.10)	(0.08)	(0.08)	(0.08)

Source: American Current Population Survey, 1981-1987, January-May, September-December matched year to year.

Notes: Equations estimated by multinomial Logit. Transitions identified by U=under the minimum, A=at the minimum, M=marginally over the minimum, O=over the minimum, N=nonemployment, E=employment. In addition to the coefficients shown, the regression included indicator variables for 6 education categories, 8 age categories and 3 entry cohorts. The reference transition was E-U. The reference categories for the indicator variables were year=1981, education=no diploma, age=61 years old and older and year of entry into labor market=before 1961. Separate equations were estimated for men and women. Sample sizes were men: 162,073; women: 199,682.

Appendix Table D
Descriptive Statistics Conditional on Employment - France

	Entire Population				Youth (Under 31 Years Old)			
	Men		Women		Men		Women	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Age	37.5769	(10.7732)	36.9156	(10.9116)	25.0472	(3.6006)	24.9998	(3.4430)
Seniority	10.9995	(9.0239)	9.5347	(8.1790)	4.2628	(5.7013)	4.4259	(6.1117)
Experience	20.5879	(14.7257)	19.6161	(13.1948)	7.5144	(12.0523)	6.8722	(10.8535)
Fixed-Term Contract	0.0144	(0.1191)	0.0178	(0.1322)	0.0342	(0.1697)	0.0357	(0.1756)
Apprenticeship	0.0064	(0.0795)	0.0021	(0.0462)	0.0216	(0.0671)	0.0065	(0.0389)
Young Stagiaire	0.0037	(0.0611)	0.0057	(0.0750)	0.0124	(0.0818)	0.0173	(0.0986)
Paris Region	0.2031	(0.4023)	0.2350	(0.4240)	0.1907	(0.3924)	0.2217	(0.4151)
Year = 1988	0.0692	(0.2538)	0.0724	(0.2592)	0.0641	(0.2449)	0.0629	(0.2428)
Year = 1987	0.1386	(0.3455)	0.1444	(0.3515)	0.1343	(0.3410)	0.1349	(0.3415)
Year = 1986	0.1374	(0.3443)	0.1420	(0.3490)	0.1342	(0.3409)	0.1352	(0.3419)
Year = 1985	0.1413	(0.3484)	0.1430	(0.3501)	0.1385	(0.3453)	0.1401	(0.3471)
Year = 1984	0.1437	(0.3508)	0.1399	(0.3469)	0.1427	(0.3498)	0.1402	(0.3471)
Year = 1983	0.1455	(0.3526)	0.1411	(0.3481)	0.1481	(0.3552)	0.1490	(0.3561)
Year = 1982	0.1479	(0.3550)	0.1443	(0.3514)	0.1554	(0.3623)	0.1567	(0.3635)
No Education	0.2407	(0.4275)	0.1821	(0.3859)	0.2361	(1.4579)	0.1635	(1.5493)
Elementary School	0.1845	(0.3879)	0.2114	(0.4083)	0.0978	(0.2941)	0.0963	(0.2908)
Jr. High School	0.0610	(0.2394)	0.0920	(0.2890)	0.0794	(0.2701)	0.1055	(0.3072)
Basic Vo-Tech School	0.2997	(0.4581)	0.2344	(0.4236)	0.3989	(0.4896)	0.3129	(0.4632)
Advanced Vo-Tech School	0.0509	(0.2199)	0.0689	(0.2533)	0.0477	(0.2103)	0.0887	(0.2831)
Baccalauréat (High School)	0.0434	(0.2038)	0.0709	(0.2566)	0.0460	(0.2050)	0.0921	(0.2878)
Technical College or University	0.0495	(0.2169)	0.0841	(0.2776)	0.0554	(0.2157)	0.1008	(0.2891)
Grad School or Post-College Professional School	0.0639	(0.2445)	0.0541	(0.2263)	0.0387	(0.1727)	0.0401	(0.1815)
Employed the Next Period?	0.9285	(0.2577)	0.9209	(0.2699)	0.9068	(0.2666)	0.9060	(0.2871)
Observations Under the SMIC & Stagiaire	329		422		329		424	
Observations Under the SMIC & Not Stagiaire	5548		9826		3256		3617	
Observations Between Two Real SMICs	849		1292		494		645	
Observations Marginally Over the SMIC	4146		5441		2155		2206	
Total Observations	104081		80993		30804		26434	

Source: French Labor Force Survey, 1981-89, matched year to year.

Appendix Table E
Descriptive Statistics Conditional on Employment - United States

	Entire Population				Youth (Under 31 Years Old)			
	Men		Women		Men		Women	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Years of Education	12.8629	(2.8842)	12.8531	(2.4770)	12.7341	(2.2514)	12.9628	(2.0845)
Experience	20.5188	(12.9620)	20.1023	(12.9669)	7.3809	(4.0105)	6.9846	(3.9707)
Nonwhite	0.1156	(0.3198)	0.1399	(0.3469)	0.1177	(0.3223)	0.1312	(0.3376)
Married	0.7055	(0.4558)	0.5973	(0.4905)	0.4366	(0.4960)	0.4342	(0.4957)
Year = 1981	0.2005	(0.4004)	0.1937	(0.3952)	0.2048	(0.4035)	0.2019	(0.4014)
Year = 1982	0.2004	(0.4003)	0.2000	(0.4000)	0.2007	(0.4005)	0.2061	(0.4045)
Year = 1983	0.2049	(0.4036)	0.2023	(0.4017)	0.2076	(0.4056)	0.2043	(0.4032)
Year = 1984	0.1133	(0.3169)	0.1151	(0.3191)	0.1137	(0.3174)	0.1138	(0.3176)
Year = 1985	0.0706	(0.2561)	0.0721	(0.2587)	0.0694	(0.2542)	0.0695	(0.2542)
Northeastern U.S.	0.2326	(0.4225)	0.2316	(0.4219)	0.2249	(0.4175)	0.2304	(0.4211)
North Central U.S.	0.2618	(0.4396)	0.2613	(0.4393)	0.2679	(0.4429)	0.2684	(0.4431)
Southern U.S.	0.3215	(0.4670)	0.3249	(0.4683)	0.3251	(0.4684)	0.3176	(0.4655)
Employed the Previous Period?	0.9170	(0.2760)	0.8705	(0.3358)	0.8397	(0.3668)	0.7977	(0.4017)
Observations Under the Minimum Wage	2571		5367		1475		2481	
Observations Between Two Real Minimum Wages	4085		7645		3177		4434	
Observations Marginally Over the Minimum Wage	6799		13218		4664		6097	
Total Observations	121356		110287		41001		38993	

Source: American Current Population Survey, 1981-87, January-May, September-December, matched year to year.