MINIMUM WAGE EFFECTS ON YOUTH EMPLOYMENT VINDICATED

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by

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Working Paper n° 24

April 1986

* I gratefully aknowledge the help of Michel Picot, Violaine Monod and Christine Leblanc. John Martin provided stimulating arguments in a constructive discussion of the paper.

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ment

Abstract

Despite simple and strong theoretical foundations, as well as ample and robust empirical validations, the disemployment effects of minimum wage regulation on teenagers is not widely aknowledged in labor policy debates. Recent evidence about the french labor market has been distorted or ignored.

In this paper new evidence is marshalled and previous conclusions are vindicated. Smic is responsible for destroying teenagers employment opportunities.

I - INTRODUCTION

There are few fields in economic analysis where theoretical implications have been confirmed as substantially and generally as that relative to the youth and the unskilled disemployment caused by the increase of the compulsory minimum wage (Smic) compared to other wages (1).

Such a verification was carried out in France by the author (Rosa, 1981) (2) some years ago, with fairly standard results.

More recently, the O.E.C.D. published a study by John Martin (3) comparing the minimum wage's effects in the United States and in France. Martin draws the following conclusions :

"i) Increases in the level and coverage of the minimum wage have given rise to disemployment effects, especially among teenagers. These negative employment effects are typically small (the Minimum Wage Study Commission estimates that a 10 per cent increase in the minimum wage would give rise to a loss of 80,000 - 200,000 teenage jobs out of a workforce of some 8 millions).

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iv) Most studies show a small but positive minimum wage effect on youth unemployment : the Minimum Wage Study Commission concluded that on average a 10 per cent rise in the minimum wage led to an increase of less than 1 percentage point in the teenage unemployment rate.

When a standard two-equation model, which has been widely used in the North American literature, was fitted to data on French youth employment and labour force participation rates over the past two decades, the results suggested that increases in the Smic had virtually no discernable impact on the French youth labour market. It is also noteworthy that, throughout most of the 1970s, the Smic was virtually constant relative to the average hourly wage. In particular, the econometric results sharply highlighted the well-known difficulty of deriving robust coefficient estimates from time series data on a sample of highly-trended variables.

Apparently significant negative minimum wage effects on French youth employment over the period 1962-81 became statistically insignificant and coefficients sometimes even changed sign once trend variables were added to the basic equations. Generally a similar pattern emerged when the employment equations were estimated over the period 1968-81 though the results for the shorter sample period did indicate some disemployment effects for male teenagers. These negative employment effects were small - the estimated elasticities for male teenagers ranged from -0.2 to -0.4 - but these coefficients were not very significant.

The same sensitivity in the minimum wage effects was apparent in the labour supply equations once trend terms were added. For the period 1968-81 an attempt was made to model the school-work decision, taking into account the likelihood that decisions on whether to remain longer in school are also influenced by changes in the Smic. The results suggested some small positive minimum wage effects on the labour supply of young females while the effects were negative for teenage males.

An attempt was also made to assess the impact of the minimum wage on French youth unemployment using two different approaches. In neither case did the results suggest that the Smic had any discernable impact on youth unemployment with perhaps the sole exception of male teenagers over the period 1968-81.

Finally, one of the main explanations for the finding that the legal minimum wage has at most had only a small impact on the youth labour market in North America and France, presumably arises from the low level of the minimum relative to the average wage in these economies".

This conclusion revealing the author's skepticism about the Smic's possible disemployment effects, now serves as a reference to the students of the French labor market. Thus, quoting Malinvaud (4) :

"The minimum wage had been progressively less binding during most of the sixties but was strongly raised in 1968 and thereafter. As an indicator one may consider the ratio between the earnings of an adult worker paid at the minimum wage and the average earning of manual workers. It was equal to 0.53 in 1959, 0.46 in 1967, 0.57 in 1973, 0.60 in 1979 and 0.63 in 1983. As J. Martin (1983) has shown, the impact of this evolution should not be overestimated (see also OECD (1984, chapter V). It plaid, however, some negative role, in particular against youth employment".

In the present paper, we wish to show that the cautious tone of the Martin study is not warranted. It does not seem that the results for France appear less reliable or more ambiguous than the stronger ones obtained for other countries. Moreover, our former paper (apparently unknown to both Martin and Malinvaud) which has been completed with data up to 1984, corroborates all previous results : the Smic actually has a powerful destructive effect on youth employment.

In our conclusion, we will present a few suggestions relative to the general evolution of the labor market of the young in a period of demographic boom, in order to explain the substantial disemployment effect of a raise, however slight, of the Smic.

Lastly we will consider the reasons for the reluctance of many analysts to admit this disemployment effect, which seems so well established.

II – AN IRRELEVANT CONTROVERSY

Since Stigler's article in 1946 (5), the Smic's effects have been widely documented. The consequences on employment of the young and the unskilled have never really been questionned on a theoretical basis (the problem boils down to a negatively sloped labor demand function) or on the basis of empirical evidence (most empirical research concludes to the existence of a statistically significant disemployment effect).

For example, let us report the conclusion of Brown, Gilroy and Kohen (6) :

"The most frequently studied group in the empirical literature is teenagers. Time-series studies typically find that a 10 percent increase in the minimum wage reduces teenage employment by 1 to 3 percent. This range includes estimates based on a wide range of specifications and on different sample periods, but all used the same basic data source, the CPS. We believe that the lower half of that

range is to be preferred ; to the extent that differences in results can be attributed to differences in the specification chosen, the better choices seem to produce estimates at the lower end of the range. There may well be problems common to all the studies which lead to under-stating this impact, but that possibility remains to be shown. Cross-section studies of the effect on teenage employment produce a wider range of estimated impacts, which are roughly centered on the range found in the time-series research. Estimates of the minimum wage effect of a 10 percent increase on teenage unemployment rates range from zero to over three percent, but estimates from 0 to .75 percentage points are most plausible.

The effect of the minimum wage on young adult (20-24 years) employment is negative and smaller than that for teenagers".

On similar lines, Ragan (7) concludes his research on the United States case with the following statement : "A strong case can be made that, although the goals of a minimum wage, such as a higher standard of living for low-income families, are laudable, the actual outcome is less felicitous. Teenagers (as well as other low-productivity workers) are denied jobs and the experience that comes with being employed".

Rottenberg's study on Puerto Rico (8) and Corbo's on Chili (9) corroborate this point for other countries.

It must be observed here that contrary to the disemployment effect, which is not a theoretical subject of controversy, the minimum wage's effect on unemployment is not known on a priori ground. It may be positive or negative. This is due to the fact that unemployment is the result of various relations with the other two possible labor force status : compensated activity and inactivity (10) (not in the labor force). A raise of the minimum wage can simultaneously attract people to the labor market while the resulting shrinkage of jobs actually supplied can induce a certain number of young people to stop job hunting and return to school.

In this paper, we only study the effect of the Smic on employment, and not on unemployment.

The ripple effect of the Smic on other wages is often pointed out. Reajusting automatically the level of the Smic in proportion to price increases probably helps to index the entire wage scale. In this case, the minimum wage can cause an overall overestimation of the price of labor, which could lead to a general reduction of employment. However, making a single regulation measure responsible for determining the cast of labor in the entire economy probably exaggerates the influence of such a measure. It is more likely that the Smic's level is only part of a multiple negociation between employers and unions, which aims at fixing contracts and non wage equilibrium conditions in the labor market.

In a more recent period, research has been re-oriented towards the study of other effects of minimum wage regulations : on the opportunity of getting on-the-job training, on career profiles and on the prolongation of schooling in "university parking lots". The topics of these studies are more of a real matter of issue than the effect we wish to measure and furthermore they imply use of detailed data over long time periods. We do not examine them in the present research.

But coming back to the OECD study, we can observe, as Martin does, that the negative influence of the Smic is perfectly clear as long as no independant variable such as a simple time trend (TT) is introduced. This is what table 1 shows.

On the contrary, when the author introduces a trend similar to the one in the equations of ligns 4 to 10, the Smic's disemployment effect completely disappears. This is hardly surprising since the employment rate of young people has constantly decreased through the years, as is shown by diagram 1.

In these circumstances, the trend variable turns out being the only statistically significant explanatory variable of the disemployment of young people. Indeed, the use of a trend to explain another trend should always result in a good correlation and should also eliminate the influence of other, less monotonous, variables. But such a practice is warranted only if there is some underlying rationale for introducing a trend variable in a regression equation. Yet Martin hardly explains which economic phenomenon is reflected by such a trend variable. The introduction of this "explanatory" variable is purely ad hoc.

This means that the author explains the downward trend of young people's employment by a trend he does not in the end account for.

Therefore Martin's following comment cannot be agreed upon :

"The results show a clear tendency for the youth employment/population ratios, both male and female, to decline over time irrespective of cyclical conditions or changes in the minimum wage. The negative trend term may be partly capturing the impact of technical change on the demand for youth labour or it could reflect a long-term shift in the composition of demand away from industries intensive in youth labour. The Durbin-Watson statistics are now much more acceptable.

Moreover, the econometric value of such an estimate is subject to much criticism. Indeed from 1968 on, the Smic variable itself follows an upward bind. It is therefore much correlated to Martin's trend variable. But when two independent variables of the same regression are linked one to the other, the collinearity phenomenon reduces the reliability of the estimated parameter values.

According to Johnston's handbook (11) the major consequences of collinearity are the following :

> "1. The estimates precision lessens to the point that it becomes very difficult, if not impossible, to separate the respective influence of the various independent variables.
>
> 2. Research workers are sometimes lead <u>without reason</u> (underlined by us) to leave out of their analysis some independent variables because their coefficients are not significantly different from zero.
>
> 3. The estimated parameters then become very sensitive to the choice of the sample and adding a few observations sometimes produces ample variations of the parameter values".

In any case, if we must exclude a variable from Martin's list, it should not be the Smic for which theory predicts an unambiguous effect on employment of the young. Rather it should be the trend variable which no economic argument founds.

To implicitly privilege, as the author does, the trend variable in explaining the youth disemployment effect is therefore neither founded in econometric or in economic theory.

This weakness of the analysis allows us to reverse Martin's conclusions in order to infer from his own results that the Smic actually does destroy jobs for the 15 to 24 years old.

Moreover our updated 1980 research, with extended time series up to 1984, verifies this statement.

III - SMIC'S DISEMPLOYMENT EFFECTS VINDICATED

Our previous research was based on annual data for the 1963-1979 period. Its results are presented in table 2.

The results confirm standard conclusions of the relevant literature. An increase of the Smic relative to the average wage reduces in a statistically significant way the participation and employment rates of the young. Its results on youth employment compared to that of adults is evident for young males but less obvious for young females. But it is clear that relative employment is influenced by other factors that should figure in the equations, especially those which independently influence adults employment, thus keeping constant the $\frac{E}{R}J$ ratio (of which it is the denominator) while the Smic's increase could have actually reduced the numerator, that is the absolute number of employed young people.

It should be noted that economic conditions (represented by the adults' rate of unemployment, UA) and demographic structure (represented by the proportion of young people in total population, PJ) are simultaneously taken in account. We therefore have good reasons to think that the negative effect of the Smic on employment of young people is real and that is does not reflect the influence of some other business cycle or structural variable.

We now go back to the same tests for the 1963-1984 period. Because of the unsatisfactory value of the Durbin-Watson coefficients of the first tests, we call on the Cochrane-Orcutt method to process the residues. On the whole, the Durbin-Watson coefficients become more satisfactory whichever method is considered : ordinary least squares or Cochrane-Orcutt. This is shown in table 3.

The LSmic coefficient is practically always significant and negative : the increase of the Smic reduces the relative employment of young people, their employment rate and their participation rate. The economic conditions (UA) also have very significant net effect on these variables. Finally, the demographic structure (PJ) shows that a higher proportion of young people in the total population increases their relative employment, which is logical, but decreases their rates of employment and participation, which is also easy to understand. Indeed a higher number of young people in the total population means that eventually adjustments will occur and that they will find a job, at least as they get "older" that is when they get closer to 24 years old. It could happen that simultaneously the ratio of employed 15 to 24 years old to total 15 to 24 years old decreased. This would reveal the difficulty they have finding a job. In other words, their probability of being hired decreases. In such circumstances many will be discouraged and will not enter the labor market befor the age of 24. This lovers their participation rate.

On the whole, this is an unambiguous verification of the Smic's disemployment effect observed in previous work.

But in order to demonstrate more clearly the reliability of these results, we introduce like Martin does in a second series of tests, a trend variable. This variable has no purpose in our model. But we wish to show that good theoretical and econometric results, twice verified on time series of different lengths, can be destroyed by collinearity.

Indeed, the trend variable, which has a parallel evolution to that of the Smic/average wage variable, takes practically all meaning away from the equations of table 4.

The results obtained are then reversed : for equation (2) or (4), for example, an increase in the Smic increases the employment of the young compared to that of adults. Similarly, equation (15) and (19) show that an increase in the Smic' increases the employment rate of the young.

In several equations, an increase in the adults' rate of unemployment would lead to a systematic increase in young people's employment and participation which could not easily be rationnaly accounted for. In other equations, such an increase loses all meaning.

It then seems obvious that it is the method that is faulty. The introduction of an unwarranted trend variable has a harmful effect on the results which seemed otherwise reliable in a correctly specified equation.

To bring to light this harmful influence, we summarize in table 5 the results obtained in the verification with and without the trend variable.

IV - CONCLUSION

It is necessary to be cautious in any research which claims scientific value and which concerns such a preoccupying issue as that of youth employment.

However, we must consider :

1) That there is no theoretical controversy on the subject, as the various studies quoted show.

2) That Martin's results (1983) as well as ours (1981, 1985) point in the same direction, that of price theory, as long as one does not introduce into the model a trend variable which is not justified on theoretical grounds.

3) That there hardly is any economic policy issue admitting empirical evidence as clear and unambiguous as this one.

Moreover, our results are quite coherent with those of international studies, especially in the U.S.

Indeed, table 3 shows that a 10 % increases in the Smic relative to the average wage reduces the employment rate of the young by about 2 to 4,6 %.

This parameter range is slightly larger and higher than that observed for other countries. But its central value is quite close to what is generally obtained.

It can be observed here that we do not draw conclusions concerning the effect of the Smic on young people's unemployment, which would be a much more complex question because other determinants are involved (12).

As previously mentionned on going research is above all oriented towards other effects of the Smic : on education, on training in the firm, on career profiles. There are here enough matters of debate to avoid introducing artificial ones on points where, on the contrary, authors fundamentally agree.

Finally, for the most skeptical : how can it be explained on a more intuitive basis that a rather small increase of the Smic reduces employment of the young ?

The following hypothesis could be proposed and should be submitted to rigorous testing : the numerous "baby boom" generation (in the United States as well as in France) must normally have caused the fall of the equilibrium wage of young people relative to that of adults, especially from the mid 60's on. The result is particularly obvious on graph 2.

In these circumstances, in order to easily absorb the more numerous age groups into firms, the distribution of salaries relative to age would have to spread. Instead the relative increase of the Smic reduces the wage dispersion. A sufficient condition would be that this wage span stay constant throughout the demographic evolution in order to induce in fact a fall of young people's employment rate. But a fall is even more likely if the Smic increases relatively to other wages such as has been the case since 1968.

This is a typical example of a dramatic economic policy error which could have been avoided, thus sparing young people serious difficulties.

This raises one more difficult question. If this is the case why do governments continue to enforce such regulations ? The answer could well lie in the following two points :

1) The disemployment effects of the Smic are partly counter-balanced by the unemployment benefits as shown by Leffler (13) in the case of the United States. Consequently the disemployment effect is better tolerated. This is especially true of France, considering its generous unemployment benefits.

2) There is a conjunction of interest between pressure groups in favor of the Smic as Rustici (14) reminds us : Unions, whose members are protected from the competition of young workers, allowing them to maintain salaries above the market clearing level ; employers associations who see the Smic as one way of cartelizing bilaterally the labor market (thus avoiding overbidding). This both satisfies workers and simplifies labor management.

To support this analysis, let us recall the recent reactions of the french employers' federation. It claims that is rallies the idea of a more flexible Smic which corresponds to ideas momentarily retained by the socialist government which considered introducing a smic for the young ("Smij") ; yet is totally refuses its suppression (15).

The economist however must not consider such arguments when he presents the conclusions of his research, especially when this conclusion is reliable and seriously verified.

NOTES

(1) Charles Brown, Curtis Gilroy and Andrew Kohen, "The Effects of the Minimum Wage on Employment and Unemployment", Journal of Economic Literature, June 1982.
Simon Rottenberg (ed.), The Economics of Legal Minimum Wages, American Entreprise Institute, 1981.

(2) Jean-Jacques Rosa, "Les effets du Smic sur l'emploi et la participation des jeunes", Vie et Sciences Economiques, avril 1980. Reproduit dans Le Rapport Rosa, Bonnel, 1983.
Jean-Jacques Rosa, "The Effects of Minimum Wage Regulation in France", in Simon Rottenberg (ed.), The Economics of Legal Minimum Wage. American Entreprise Institute, 1981.

(3) John P. Martin, "Effets du salaire minimum sur le marché du travail des jeunes en Amérique du Nord et en France", OCDE, Etudes Spéciales, juin 1983.

(4) Edmond Malinvaud, "The Rise of Unemployment in France", papier présenté à la Conférence on the Rise in Unemployment, may 27-31, 1985.

(5) Georges J. Stigler, "The Economics of Minimum Wage Legislation", American Economic Review, june 1946.

(6) See for instance Brown, Gilroy et Kohen, footnote (1) above.
Also, Minimum Wage Study Commission, Washington D.C., Government Printing Office, 1981.

(7) J.F. Ragan Jr., "Minimum Wages and the Youth Labor Market", The Review of Economics and Statistics, may 1977.

(8) Simon Rottenberg, "Minimum Wages in Puerto Rico", in S. Rottenberg (ed.) op.cit.

(9) Vittorio Corbo, "The Impact of Minimum Wages on Industrial Employment in Chile", in Simon Rottenberg (ed.), op.cit.

(10) See our presentation of the unemployment problem, in Le Rapport Rosa.

(11) J. Johnston, Econometric Methods, Mc Graw Hill, 2nd edition, 1972.

(12) See above note (10).

(13) Keith B. Leffler, "Minimum Wages, Welfare, and Wealth Transfers to the Poor", Journal of Law and Economics, october 1978.

(14) Thomas Rustici, "A Public Choice View of the Minimum Wage", Cato Journal, Spring-summer 1985.

(15) See for instance "Smic : le Cnpf plaide la réforme", Les Echos, september 16, 1985, which states :
"Pas question de supprimer le Smic mais il faut "revoir le mécanisme de fixation du salaire minimum" suggère Yvon Chotard, vice-président du CNPF...".
Also, the 1st october 1985 :
"Jean-Louis Giral, président de la FNTP, aux "Echos" : Le Smic doit être négocié entre les partenaires sociaux au niveau national".
Ce dernier poursuit :
"Le Smic a un caractère inflationniste certain et il tend à augmenter le chômage. Dans nos professions, il a progressé beaucoup plus vite que les prix, entraînant des répercussions sur l'ensemble de la grille des salaires, avec pour conséquence un tassement de la hiérarchie, ce qui n'est pas bon.
Par ailleurs, il a fait disparaître toute une série d'emplois, de petits métiers qui deviennent trop coûteux.
Ceci étant, que l'on maintienne un garde-fou pour éviter qu'il y ait des abus et des salaires exagérément bas, nous en sommes d'accord. Mais il faudrait rechercher d'abord un système qui mette fin à l'indexation du Smic sur les seuls prix".

See moreover Paul Fabra in le Monde du august 27, 1985 : "Pourquoi il faut conserver le Smic".

Table 1

Regression results[a] for the employment/population ratio, 1962-81

Equation No.	Dependent variable[b]	CONST	URM25	SMICGDP	TT	TTSQ	PACT	$\bar{R}^2$	S.E.E.	D.W.
1.	M(15-24)	5.259 (26.47)	−0.073 (3.02)	−0.258 (5.90)				0.968	0.022	1.02
2.	F(15-24)	4.649 (14.93)	−0.117 (3.09)	−0.184 (2.69)				0.927	0.035	1.03
3.	Y(15-24)	5.000 (23.04)	−0.092 (3.49)	−0.229 (4.80)				0.963	0.024	1.00
4.	M(15-24)	4.219 (21.50)	−0.033 (2.24)	0.003 (0.05)	−0.018 (6.37)			0.990	0.012	2.12
5.	F(15-24)	3.467 (7.59)	−0.071 (2.09)	0.116 (1.01)	−0.021 (3.11)			0.952	0.028	0.82
6.	Y(15-24)	3.924 (16.29)	−0.051 (2.81)	0.041 (0.70)	−0.019 (5.37)			0.986	0.015	1.14
7.	M(15-24)	4.218 (20.82)	−0.032 (1.79)	0.003 (0.05)	−0.018 (5.48)	−0.00001 (0.09)		0.990	0.013	2.12
8.	F(15-24)	3.443 (14.95)	0.003 (0.16)	0.114 (2.05)	−0.009 (2.43)	−0.0009 (6.92)		0.988	0.014	1.65
9.	Y(15-24)	3.913 (22.62)	−0.018 (1.20)	0.041 (0.99)	−0.014 (4.90)	−0.0004 (4.00)		0.993	0.011	1.69
10.	Y(15-24)	4.059 (10.94)	−0.018 (1.13)	0.037 (0.78)	−0.014 (4.76)	−0.0003 (2.18)	−0.004 (0.30)	0.992	0.011	1.71

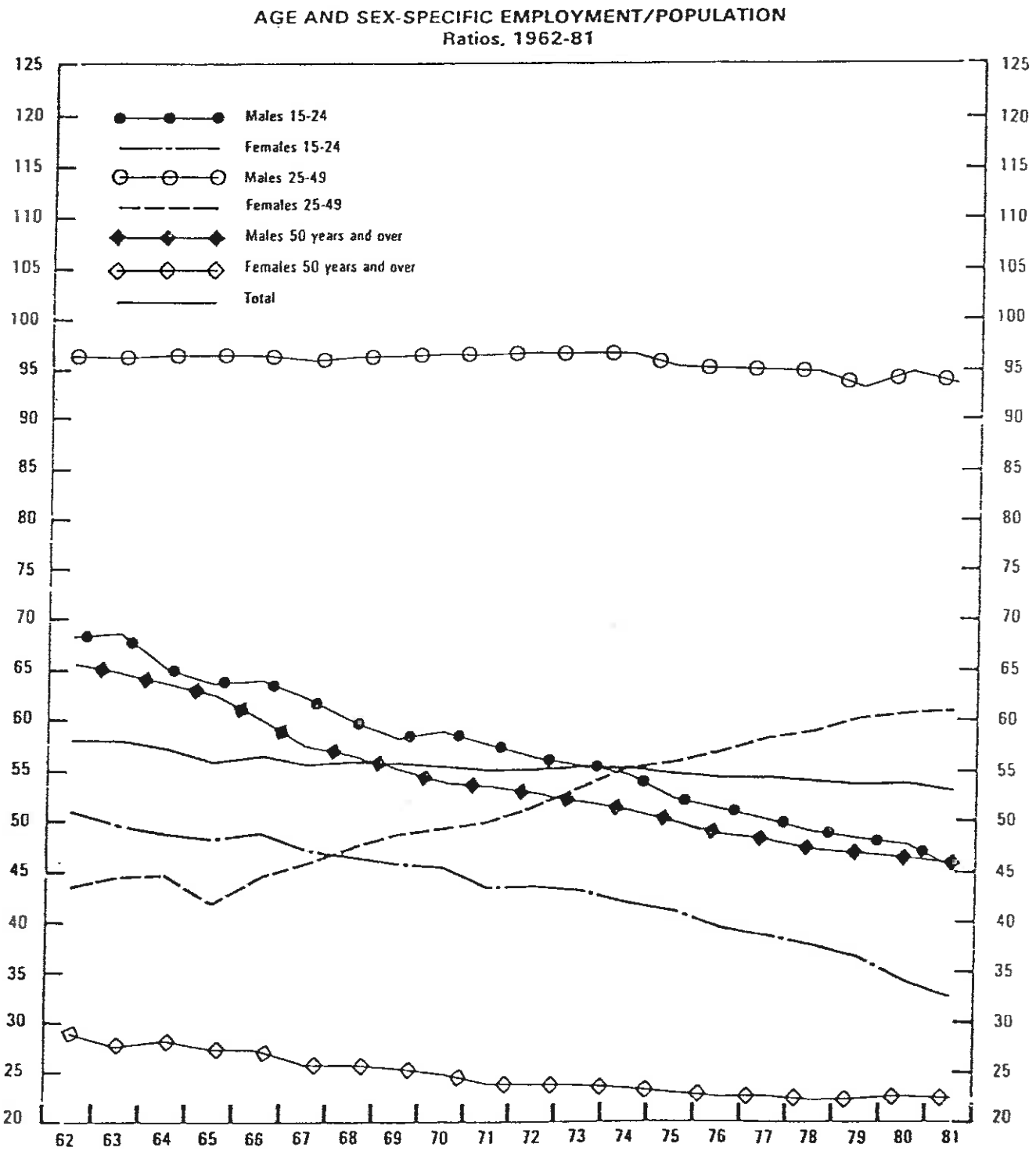
a) t-statistics are presented in parentheses.
b) The symbols M, F and Y refer to the male, female and total youth cohorts, respectively.

Source : John Martin, Effects of the Minimum Wage on the youth labor market in North America and in France, Ocde Special Studies, 1983.

The Student coefficients figuring in parentheses below the regression coefficients are all superior to two. They indicate that the negative coefficient of the GDP.SMIC variable (that is the Smic deflated by the GDP price index) is significantly different from 0. Moreover there is a high percent of explained variance for the employment/population ratio of the 15 to 24 years old. The variations of the unemployment variable (URM25) and the Smic variable toghether account for 92 to 97 % of the variance of the employment rate of the 15 to 24 years old.

Thus, according to these tests, the Smic's evolution does lead to a significant and perceptible decrease in employment of young people.

Diagram 1



Source : John Martin, op.cit.

Table 2

THE IMPACT OF SMIC ON RELATIVE EMPLOYMENT, EMPLOYMENT RATE, AND PARTICIPATION OF THE YOUNG
(annual data, 1963–1979)

Equation Number	*Dependent Variable*	*Constant*	*LSMIC*	*LMIL*	*LPJ*	*LUA*	R^2	*DW*
1	*LERJ*	−4.12	−0.46	—	—	−0.12	0.76	0.41
		(−3.82)	(−1.65)			(−2.68)		
2	*LERJM*	−5.85	−0.68	—	—	−0.15	0.87	0.76
		(−6.12)	(−2.77)			(−3.65)		
3	*LERJF*	−3.48	−0.17	—	—	−0.95 E–01	0.41	1.00
		(−2.45)	(−0.48)			(−1.51)		
4	*LTEJ*	−2.57	−0.41	0.11	−0.22	−0.85 E–01	0.96	1.15
		(−3.63)	(−3.84)	(2.33)	(−1.19)	(−4.04)		
5	*LTEJM*	−3.14	−0.61	0.91 E–01	−0.57	−0.10	0.95	1.00
		(−2.95)	(−3.73)	(1.22)	(−2.02)	(−3.35)		
6	*LTEJF*	−3.44	−0.17	0.14	0.22	−0.59 E–01	0.93	0.96
		(−5.24)	(−1.74)	(3.21)	(1.31)	(−3.03)		
7	*LTPJ*	−1.42	−0.41	0.58 E–01	−0.50	−0.40 E–01	0.95	1.00
		(−2.04)	(−3.85)	(1.18)	(−2.73)	(−1.97)		
8	*LTPJM*	−2.36	−0.61	0.50 E–01	−0.96	−0.72 E–01	0.95	1.07
		(−2.25)	(−3.80)	(0.68)	(−2.76)	(−2.93)		
9	*LTPJF*	−1.89	−0.16	0.70 E–01	−0.15	−0.39 E–01	0.82	0.91
		(−2.87)	(−1.61)	(1.51)	(−0.19)	(−0.19)		

NOTE: Number of observations, 17; *t*-statistics in parentheses; significance levels are $t_{01} = 2.76$, $t_{05} = 2.05$, and $t_{10} = 1.70$. For definitions of variables, see appendix.

Definition of variables

SMIC : Nominal hourly SMIC divided by the general index of hourly wages (W)

SP : Real hourly SMIC, that is, SMIC divided by the price index

UA : Rate of unemployment of adults (twenty-five- to sixty-year-olds)

PIB : Gross domestic product at 1970 prices

W : General index of nominal hourly wages

P : Consumer price index

MIL : Ratio of draftees to total number of young people (fifteen- to twenty-four-year-olds)

JP : Ratio of fifteen- to twenty-four-year-olds to total population

EJ : Number of fifteen- to twenty-four-year-olds employed

EJM : Number of fifteen- to twenty-four-year-old males employed

EJF : Number of fifteen- to twenty-four-year-old females employed

ERJ : Relative employment of the young, that is, EJ divided by total number of twenty-five- to sixty-year-olds employed

ERJM : Relative employment of young males, that is, EJM divided by total number of twenty-five- to sixty-year-old males employed

ERJF : Relative employment of young females, that is, EJF divided by total number of twenty-five- to sixty-year-old females employed

TEJ : Employment rate of the young, that is, EJ divided by total population of fifteen- to twenty-four-year-olds

TEJM : Employment rate of young males

TEJF : Employment rate of young females

TPJ : Participation rate of the young, that is, unemployment and employed fifteen- to twenty-four-year-olds divided by total population of fifteen- to twenty-four-year-olds

TPJM : Participation rate of young males

TPJF : Participation rate of young females

L means the logarithm of the concerned variable

D means the rate of growth of the concerned variable.

Table 3

The Impact of Smic on relative employment, employment rate, and participation of the young

(annual data, 1963 - 1984)

		Dependent variable	Intercept	LSMIC	LMIL	LPJ	LUA	R^2	DW	Autocorrelation coefficients (U_t, U_{t-1})	(U_t,
1	OLSQ	LERJ	3.320*** (187.78)	- 0.534** (- 2.26)	-	-	- 0.239*** (- 6.02)	0.946	1.153		
2	CORC(1)	LERJ	3.314*** (100.75)	- 0.629** (- 2.69)	-	-	- 0.212*** (- 5.11)	0.957	1.978	0.500 (0.201)	
3	OLSQ	LERJ	4.116*** (22.19)	- 0.664*** (- 3.80)	-	0.557*** (4.30)	- 0.217*** (- 7.40)	0.973	2.065		
4	CORC(1,2)	LERJ	4.262*** (30,45)	- 0.686*** (- 4.80)	-	0.663*** (6.709)	- 0.210*** (- 8.51)	0.979	1.865	- 0.143 (0.207)	- 0. (0.
5	OLSQ	LERJ	4.576*** (11.21)	- 6.678*** (- 3.93)	0.0707 (1.26)	0.723*** (3.94)	- 0.195*** (- 5.73)	0.950	2.147		
5	CORC(1,2)	LERJ	4.116*** (11.25)	- 0.701*** (- 4.57)	- 0.027 (- 0.42)	0.621*** (4.48)	- 0.215*** (- 7.86)	0.979	1.89	- 0.124 (0.207)	- 0. (0.
7	OLSQ	LERJH	3.151*** (265.5)	- 0.681*** (- 4.30)	-	-	- 0.187*** (- 6.99)	0.970	1.82		
8	CORC(1,2)	LERJH	3.152*** (338.6)	- 0.594*** (- 3.47)	-	-	- 0.201*** (- 7.89)	0.974	1.86	0.153 (0.213)	- 0. (0.
9	OLSQ	LERJH	3.467*** (21.74)	- 0.732*** (- 4.88)	-	0.221* (1.98)	- 0.178*** (- 7.03)	0.975	2.23		

		Intercept	LSMIC	LMIL	LPJ	LUA	R^2	DW		
CORC(1,2)	LERJH	3.518*** (37.31)	- 0.775*** (- 7.59)	-	0.256*** (3.86)	- 0.169*** (- 9.67)	0.983	2.21	- 0.224 (0.18)	- 0.5 (0.1
OLSQ	LERJH	3.663*** (10.10)	- 0.739*** (- 4.82)	0.0299 (0.60)	0.291* (1.78)	- 0.168*** (- 5.56)	0.976	2.27		
CORC(1,2)	LERJH	3.316*** (13.25)	- 0.788*** (- 7.35)	- 0.0359 (- 0.855)	0.194* (2.01)	- 0.177*** (- 9.21)	0.984	2.19	- 0.191 (0.183)	- 0.5 (0.1
OLSQ	LERJF	3.589*** (126.7)	- 0.426 (- 1.128)	-	-	- 0.324*** (- 5.08)	0.905	1.07		
OLSQ	LERJF	4.923*** (17.34)	- 0.643** (- 2.40)	-	0.932*** (4.70)	- 0.287*** (- 6.39)	0.958	1.98		
CORC(1,2)	LERJF	5.268*** (21.01)	- 0.710*** (- 3.02)	-	1.183*** (6.66)	- 0.267*** (- 6.51)	0.967	1.88	- 0.101 (0.215)	- 0.2 (0.2
OLSQ	LTEJ	3.687*** (7.82)	- 0.365* (- 1.83)	0.076 (1.17)	- 0.384* (- 1.81)	- 0.187*** (- 4.75)	0.952	1.21		
CORC(1,2)	LTEJ	3.801*** (6.64)	- 0.268 (- 1.17)	0.091 (0.72)	- 0.330 (- 1.55)	- 0.188 (- 5.12)***	0.962	1.85	0.589 (0.24)	- 0.3 (0.2
OLSQ	LTEJ	3.190*** (14.97)	- 0.350* (- 1.75)	-	- 0.563*** (- 3.79)	- 0.211*** (- 6.25)	0.942	1.32		
CORC(1,2)	LTEJ	3.249*** (12.79)	- 0.373* (- 1.87)	-	- 0.385* (- 2.02)	- 0.194*** (- 5.56)	0.961	1.93	0.467 (0.23)	- 0.2 (0.2

			Intercept	LSMIC	LMIL	LPJ	LUA	R^2	DW		
0	OLSQ	LTEJH	3.172^{xxx} (6.17)	- 0.468^{xx} (- 2.15)	0.0635 (0.89)	- 0.793^{xxx} (- 3.43)	- 0.192^{xxx} (- 4.49)	0.953	1.47		
1	CORC(1,2)	LTEJH	3.098^{xxx} (5.87)	- 0.386 (- 1.70)	0.0518 (0.526)	- 0.812^{xxx} (- 4.25)	- 0.203^{xxx} (- 5.92)	0.966	1.71	0.417 (0.219)	- 0 (0
2	OLSQ	LTEJH	2.758^{xxx} (12.07)	- 0.455^{xx} (- 2.11)	-	- 0.942^{xxx} (- 5.90)	- 0.219^{xxx} (- 5.87)	0.951	1.53		
3	CORC(1,2)	LTEJH	2.833^{xxx} (14.48)	- 0.464^{xx} (- 2.46)	-	- 0.885^{xxx} (- 6.39)	- 0.204^{xxx} (- 6.29)	0.966	1.69	0.342 (0.21)	- 0. (0.
4	OLSQ	LTEJF	4.361^{xxx} (8.51)	- 0.223 (- 1.03)	0.094 (1.33)	0.139 (0.60)	- 0.177^{xxx} (- 4.15)	0.930	1.13		
5	CORC(1,2)	LTEJF	2.414^{xxx} (4.93)	0.357^{xx} (2.28)	- 0.105 (- 1.37)	0.344^{x} (1.87)	0.028 (0.82)	0.978	2.01	1.022 (0.25)	- 0 (0
6	OLSQ	LTEJF	3.750^{xxx} (16.04)	- 0.204 (- 0.93)	-	- 0.081 (- 0.49)	- 0.207^{xxx} (- 5.59)	0.922	1.26		
7	CORC(1,2)	LTEJF	3.172^{xxx} (9.38)	0.349^{xx} (2.46)	-	0.266 (1.55)	0.029 (0.89)	0.975	2.11	1.29 (0.22)	- 0 (0

		Intercept	LSMIC	LMIL	LPJ	LUA	R^2	DW		
OLSQ	LTPJ	3.373***	- 0.389**	0.0767	- 0.621***	- 0.0707**	0.939	1.60		
		(9.77)	(- 2.66)	(1.61)	(- 4.00)	(- 2.45)				
CORC(1,2)	LTPJ	4.259***	- 0.000107	0.286***	- 0.462***	- 0.075***	0.954	2.21	0.817	- 0.5
		(10.99)	(- 0.00063)	(3.37)	(- 3.13)	(- 3.03)			(0.18)	(0.1
OLSQ	LTPJH	3.008***	- 0.496**	0.0709	- 0.937***	- 0.104***	0.939	1.82		
		(6.60)	(- 2.58)	(1.83)	(- 4.57)	(- 2.74)				
CORC(1,2)	LTPJH	2.878***	- 0.539***	0.0611	- 1.007***	- 0.100***	0.956	2.05	0.105	- 0.5
		(7.30)	(- 3.15)	(0.88)	(- 6.88)	(- 3.52)			(0.20)	(0.2
OLSQ	LTPJF	3.862***	- 0.245**	0.0851**	- 0.209*	- 0.0292	0.907	1.14		
		(15.16)	(- 2.28)	(2.43)	(- 1.83)	(- 1.37)				
CORC(1)	LTPJF	4.046***	- 0.163	0.1165	- 0.147	- 0.0306	0.926	1.81	0.544	
		(14.52)	(- 1.55)	(1.70)	(- 1.04)	(- 1.46)			(0.21)	
OLSQ	LTPJF	3.309***	- 0.228*	-	- 0.409***	- 0.0563***	0.877	1.34		
		(25.87)	(- 1.89)		(4.59)	(- 2.77)				
CORC(1,2)	LTPJF	3.716***	0.118	-	0.0834	0.0194	0.944	1.97	1.028	- 0.0
		(21.48)	(1.25)		(0.69)	(0.87)			(0.24)	(0.2

Notes table 3

OLSQ : Ordinary least squares

CORC : Cochrane-Orcutt

CORC (i) : autocorrelation (U_t , U_{t-1})

CORC (i,j) : autocorrelation (U_t , U_{t-1}) and (U_t , U_{t-j})

Between brackets, Student coefficients

*** significatively different from zero at 1 %
** significatively different from zero at 5 %
* significatively different from zero at 10 %

Table 4

The impact of Smic with a temporal trend added

(annual data, 1963-1984)

		Dependent variable	Intercept	LSMIC	LPJ	LUA	T (Temporal trend)	R^2	DW	Autocorrelation coefficients (U_t, U_{t-1})	(U_t, U_t
1	OLSQ	LERJ	3.315^{xxx} (70.97)	- 0.546^{xx} (- 1.98)	-	- 0.244^{xxx} (- 3.63)	0.000073 (0.09)	0.946	1.178		
2	CORC(1)	LERJ	3.767^{xxx} (44.78)	- 0.00046 (- 0.032)	-	0.0369 (0.99)	- 0.0511^{xxx} (- 7.02)	0.989	2.23	0.776 (0.037)	
2'	CORC(1,2)	LERJ	3.781^{xxx} (44.8)	+ 0.00045 (0.029)	-	0.0361 (0.935)	- 0.0519^{xxx} (- 6.952)	0.989	2.20	0.645 (0.25)	(0.099 (0.19)
3	OLSQ	LERJ	4.737^{xxx} (26.73)	- 0.348^{xx} (- 2.61)	0.901^{xxx} (8.08)	- 0.0437 (- 1.08)	- 0.0239^{xxx} (- 4.91)	0.988	2.14		
4	CORC(1,2)	LERJ	4.252^{xxx} (18.59)	0.088 (0.62)	0.434^{xx} (2.57)	0.0350 (1.01)	- 0.0453^{xxx} (- 7.19)	0.991	1.99	0.790 (0.24)	- 0.107 (0.18
5	OLSQ	LERJH	3.811^{xxx} (18.70)	- 0.558^{xxx} (- 3.63)	0.411^{xxx} (3.21)	- 0.0813^{x} (- 1.74)	- 0.0133^{xx} (- 2.37)	0.981	2.35		
6	CORC(1,2)	LERJH	3.691^{xxx} (26.77)	- 0.667^{xxx} (- 5.26)	0.347^{xxx} (4.18)	- 0.113^{xxx} (- 2.92)	- 0.00809 (- 1.57)	0.985	2.27	- 0.283 (0.21)	- 0.502 (0.21)

			Intercept	LSMIC	LPJ	LUA	T	R^2	DW		
14	OLSQ	LERJF	5.988^{XXX} (27.23)	- 0.102 (- 0.61)	1.523^{XXX} (11.01)	0.0109 (0.218)	- 0.0411^{XXX} (6.79)	0.988	1.77	0.368 (0.284)	0.4 (0.2
15	CORC(1,2)	LERJF	5.339^{XXX} (24.4)	0.108 (0.92)	0.723^{XXX} (3.77)	0.110^{XXX} (3.67)	- 0.0759^{XXX} (- 10.03)	0.995	2.16		
18	OLSQ	LTEJ	3.84^{XXX} (17.1)	- 0.018 (- 0.107)	- 0.201 (- 1.42)	- 0.0278 (- 0.54)	- 0.0253^{XXX} (- 4.08)	0.973	1.19		
19	CORC(1,2)	LTEJ	3.914^{XXX} (17.41)	0.357^{X} (1.81)	- 0.171 (- 1.15)	- 0.040 (- 0.941)	- 0.0306^{XXX} (- 4.605)	0.981	1.97	0.795 (0.221)	- 0.4 (0.2
22	OLSQ	LTEJH	3.31^{XXX} (11.88)	- 0.171 (- 0.81)	- 0.633^{XXX} (- 3.61)	- 0.0561 (- 0.879)	- 0.0215^{XX} (- 2.81)	0.966	1.67		
23	CORC(1,2)	LTEJH	3.19^{XXX} (13.05)	- 0.0593 (- 0.233)	- 0.709^{XXX} (- 4.68)	- 0.0907 (- 1.49)	- 0.0197^{XX} (- 2.16)	0.973	1.83	0.351 (0.227)	- 0.5 (0.2
26	OLSQ	LTEJF	4.527^{XXX} (20.04)	0.1906 (1.12)	0.349^{XX} (2.45)	0.0106 (0.206)	- 0.0300^{XXX} (- 4.82)	0.966	0.71		
27	CORC(1,2)	LTEJF	4.356^{XXX} (19.20)	0.384^{XX} (2.74)	0.156 (0.93)	0.0439 (1.29)	- 0.0410^{XXX} (- 6.58)	0.984	2.04	0.831 (0.24)	- 0.1 (0.2

			Intercept	LSMIC	LPJ	LUA	T	R^2	DW		
18	OLSQ	LTPJ	3.298^{xxx} (17.47)	- 0.157 (- 1.10)	- 0.566^{xxx} (- 4.77)	0.0238 (0.55)	- 0.0164^{xxx} (- 3.16)	0.955	1.92		
19	CORC(1,2)	LTPJ	3.270^{xxx} (23.11)	- 0.188 (- 1.38)	- 0.600^{xxx} (- 7.03)	0.0538 (1.38)	- 0.0192^{xxx} (- 3.59)	0.956	2.09	- 0.101 (0.21)	- 0.4 (0.2
10	OLSQ	LTPJH	2.968^{xxx} (11.15)	- 0.267 (- 1.33)	- 0.871^{xxx} (- 5.20)	0.00867 (- 0.14)	- 0.0163 (- 2.22)	0.949	2.03		
1	CORC(1,2)	LTPJH	2.875^{xxx} (16.01)	- 0.347^{xx} (- 2.04)	- 0.939^{xxx} (- 8.70)	0.0055 (0.11)	- 0.0166 (- 2.47)	0.965	2.18	- 0.106 (0.200)	- 0.5 (0.1
4	OLSQ	LTPJF	3.743^{xxx} (31.22)	- 0.00769 (- 0.08)	- 0.169^{xx} (- 2.24)	0.0654^{xx} (2.38)	- 0.0167^{xxx} (- 5.08)	0.949	1.44		
5	CORC	LTPJF	3.70^{xxx} (29.74)	0.129 (1.10)	- 0.219^{xx} (- 2.61)	0.075^{xx} (2.60)	- 0.0209^{xxx} (- 4.79)	0.958	2.03	0.275 (0.22)	- 0.11 (0.21

		Intercept	LSMIC	LPJ	LUA	T	R^2	DW
OLSQ	LTUJ	- 1.662** (- 2.07)	- 1.159* (- 1.92)	- 1.709*** (- 3.39)	0.643*** (3.50)	0.0689*** (3.12)	0.979	1.97
(correction CORC inutile)								
OLSQ	LTUJH	- 1.099 (- 1.34)	- 1.151* (- 1.87)	- 1.261** (- 2.45)	0.729*** (3.90)	0.0519*** (2.31)	0.975	2.05
(CORC inutile)								
OLSQ	LTUJF	- 2.216** (- 2.34)	- 1.226* (- 1.71)	- 2.176*** (- 3.65)	0.562** (2.59)	0.0815*** (3.83)	0.979	2.05

LTUJ = log (Taux de chômage)

Table 5

A comparison of results,
with and without trend variable

Equation number		Without trend		With trend		
		OLSQ	CORC	OLSQ	CORC	
1-6	LERJ	***	***	***	insignificant	
9-10	LERJH	***	***	***	***	(second order autocorrelation)
14-15	LERJF	**	***	-	-	
18-19	LTEJ	*	*	-	* (sign > 0)	
22-23	LTEJH	**	**	-	-	
26-27	LTEJF	-	**	-	** (sign > 0)	(strong autocorrelation of 1st and 2nd order)
28-29	LTPJ	**	-	-	-	(no autocorrelation)
30-31	LTPJH	**	***	-	**	(2nd order autocorrelation)
34-35	LTPJF	*	-	-	-	(no autocorrelation)

For young men, there is an on the average satisfactory resistance of the estimated parameters without the trend.
On the contrary, for young women, the coefficients lose all meaning or even change signs.