Vacation laws and annual work hours

Joseph G. Altonji and Jennifer Oldham

Introduction and summary

Many European countries have laws mandating minimum paid vacations and holidays. The U.S. does not. The number of mandated days has risen over time and exceeds the levels taken by the average worker in the U.S. Over the past three decades, annual hours worked in Europe have fallen relative to hours in the U.S. Is there a connection among these phenomena?

To address this question, one must first consider how work hours are determined, as well as the role of vacation policy at the level of the firm and at the level of the country. We summarize evidence for the U.S. that firms care about work hours and use firm-wide vacation policies as a way to regulate them and discuss theories of why, despite worker heterogeneity, they choose uniform vacation policies rather than negotiating leave with individuals. We discuss possible economic rationales for vacation laws and present empirical evidence on whether they affect annual work hours. We also review the sparse literature on the evolution of vacation policy at the firm level and the country level during the twentieth century to obtain insight into the extent to which the laws may be viewed as exogenous with respect to labor supply preferences and other factors that determine work hours.

The heart of the article is a regression analysis of the relationship between the number of weeks of legally mandated paid vacation time and average annual hours.[1] Such an analysis is needed to help sort out the causal effect of the law and because workers and firms respond to the laws by adjusting hours per week and secondary job holding. Most of the analysis uses data for several European countries and the U.S. for various years between 1979 and 1999. A simple regression of annual hours on mandated vacation weeks shows that an additional week of vacation mandated by law is associated with 26.8 fewer hours worked annually. When we control simultaneously for the year and for the country, we find that an additional week of legislated paid vacation results in 51.9 fewer hours worked per year. Given that usual hours per week for full-time workers in the European countries in our sample (excluding Norway) averaged 40.2 in 1998, this estimate implies that mandating an extra week of paid vacation translates more than one for one into a reduction in weeks worked, although one cannot statistically reject a coefficient of 40. As we explain below, this result should be regarded with caution because it is driven by a relatively small number of within-country law changes, although it is robust to extending the sample to include hours and vacation laws from the early 1950s. The estimate falls to about 35 hours per year when we introduce separate time trends for the U.S. and the United Kingdom or estimate the model using only countries that have vacation laws.

Overall, our analysis suggests that at least part of the relationship between the laws and hours is causal and that workers and firms don't fully circumvent the law through changes in hours per week or through multiple job holding. Our results also imply that differences in the laws account for a substantial portion of the difference between the U.S. and Europe in annual hours per worker. They cannot answer the deeper question of whether the laws are a harmful constraint on individual choice or a solution to a market failure in the determination of work hours.

Joseph G. Altonji is a professor of economics at Yale University and a research associate at the National Bureau of Economic Research. Jennifer Oldham is an analyst at Citadel Investment Group. *This research was supported by the Institute for Policy Research, Northwestern University, the Economic Growth Center, Yale University, the Federal Reserve Bank of Chicago, and the National Science Foundation under grants SES-0112533 and SES-0301142. The authors thank Sherry Wang for excellent research assistance and Lisa Barrow for helpful comments.*

In the next section, we discuss the existing theories that are relevant to the question of the effect of vacation laws on annual hours worked. Then, we review the literature on the evolution of vacation policy. We discuss the data and econometric specification for the study. Then, we present our analysis of the effects of vacation laws.

Determination of work hours and a theory of vacation policy

Employer regulation of work hours

One cannot talk sensibly about paid leave policies without first discussing the forces that determine work hours. Empirical research on work hours is dominated by the massive labor supply literature, most of which assumes that people choose hours at a parametric wage.[2] Cogan (1981), Hanoch (1980), and subsequent studies have modified the basic labor supply model framework to accommodate fixed costs, so that worker preferences and budget parameters influence the form in which work hours are packaged.[3] However, casual empiricism suggests that firms have strong preferences about employee hours. There is a good basis in theory for believing this to be the case. In particular, the models of Ehrenberg (1971), Lewis (1969), Rosen (1969), and Deardorf and Stafford (1976) emphasize the role of technological considerations, including startup costs, fatigue, and hiring and training costs that are fixed per employee. They also consider nonlinearities in compensation that are induced by fringe benefits, payroll taxes, and overtime pay, as well as the costs of coordinating workers who work different hours. Consequently, both average output per hour and the average full cost per hour of employing someone depend on hours worked per week and weeks worked per year. Since firms will prefer schedules that maximize the difference between output and cost, theory suggests that in many cases workers are not free to choose how much to work at a fixed wage or even at a wage that depends on hours. Altonji and Paxson (1986) and recent studies by Martinez-Granado (1999) and Senesky (2000) provide strong evidence that this is the case by showing that the variance of changes in hours per week, weeks per year, and hours per year is much stronger across jobs than within the job. This evidence suggests that work time is, to an important extent, a job-specific phenomenon.

A test based on a comparison of hours changes associated with quits and layoffs in Altonji and Paxson (1986), as well as a substantial literature using self-reported measures of unemployment, underemployment, and overemployment (for example, Ham, 1982 and 1986; Kahn and Lang, 1988 and 1992; and Altonji and Paxson, 1988) suggests that workers face demand constraints that they cannot fully avoid by changing jobs. Studies of the labor market for older workers have stressed restrictions on changing to part-time status with one's current employer, as well as a large wage penalty associated with giving up a full-time job for part-time work in another firm. (Gustman and Steinmeier, 1983 and 1984; Berkovic and Stern, 1991; Hurd, 1996; and Elder, 2000). In summary, restrictions on choice of hours in a given job appear to be a central feature of the labor market.

Firms regulate hours per day by setting work schedules. They regulate days of work by establishing fixed holidays, paid and unpaid vacation and personal days (hereafter, vacation days), and provisions for excused absences due to illness or family considerations, perhaps with pay. Strictly from a budget point of view, there is no meaningful economic distinction between "paid" and unpaid vacation. One can always adjust the wage rate to achieve a given level of annual compensation for a given amount of time worked over the year. However, adjusting time off without leaving an employment relationship involves adjusting vacation days.

Are work hours efficient?

Given training costs, nonlinearities in the relationship between work time and productivity, and components of compensation and payroll taxes that are to some degree fixed per employee, one would expect firms to offer fixed hours/wage packages or perhaps hours/wage menus that involve steep tradeoffs. Coordination costs are a further inducement for the firm to limit variation in work schedules and days off. Once the facts that job search is costly and that workers and jobs are tied bundles of characteristics are brought into the picture, many additional features of the labor market can be reconciled with the view that the distribution of hours and wages is efficient given search costs. These include survey evidence that some workers, particularly women with children and older workers, would reduce work hours with their current employer if they could reduce earnings and benefits proportionately, while others would like to increase hours in their current jobs. A worker may choose to continue in a job that has a good hourly wage, good working conditions, and is near home even if the hours are too long, because it is too difficult to find a job with more time off that is also competitive in other dimensions.

In contrast, Rebitzer and Taylor (1995) and Landers et al. (1996) provide specific examples of a broad class of models in which 1) work preferences are heterogeneous and unobserved by the firm and either directly influence (through current and future effort levels or turnover decisions) or are correlated with productivity; and

2) pay cannot be tied directly to the productivity of individual workers. The difficulty in matching pay to productivity may arise because productivity is unobservable or because it is hard to devise and enforce multi-period contracts, particularly when turnover is a key issue.

The basic idea of the models is as follows. Conditional on a set of variables that are observable to the firm, worker preferences for hours are assumed to depend positively on a characteristic *d* that varies across workers. Firms have no direct information on the value of *d* for a particular worker. Conditional on hours worked *N*, the productivity of the worker is positively related to *d*. The variation in productivity may reflect quit behavior, effort levels, an association between *d* and innate ability, health status, or human capital investment that is not observed by the firm, or other factors. Finally, productivity cannot be perfectly contracted on, because it is not directly observable or because of other considerations discussed in the employment contracting and efficiency wage literatures.[4] Abstracting from characteristics of the worker that the firm does observe, such as education and previous experience, pay will only be conditional on *N*. Competition among firms and the distribution of worker types will determine an earnings–hours locus ($W(N)$, N) of points that are equally profitable to firms and clear the market for employment at each value of *N*. The value of *W* will reflect the direct relationship between *N* and productivity (through startup costs, fatigue, and so on) and the average of the productivity characteristics of workers who choose *N*. Workers with higher values of *d* will choose higher values of *N*. Since productivity depends positively on *d*, this will reinforce a relationship between *W* and *N*. Wages for a given value of *N* will adjust accordingly, with further shifts in supply and demand for jobs offering *N* hours.

As Rebitzer and Taylor argue, the fact that workers are essentially signaling productivity through their choice of *N* may lead to an equilibrium in which hours in the typical job are too long. Firms that offer more time off may attract a lower-quality work force. The gap in wages between jobs with long hours and short hours may be larger than in the full information case. The market for jobs with an intermediate value for *N* may shrink, as few workers are interested in a contract offering a moderate amount of time off at a wage that is consistent with the average productivity of the workers who would demand it.

Empirical testing of the effects of adverse selection on hours is in its infancy. A few implications of the model do appear to be consistent with some basic facts about vacation policy. In particular, Altonji and Usui (2001) show that vacation leave is largely set firm-wide with little latitude for negotiation. Job changers usually start at the bottom of the vacation/seniority ladder at their new firm, regardless of the vacation on their previous job. Since vacation time varies within the firm based on seniority and vacations are not fully synchronized, it is hard to explain the lack of worker level bargaining with an appeal to coordination costs. Further, the fact that vacation time increases with seniority is consistent with the possibility that concern about adverse selection influences employer decisions about work time requirements for two reasons. First, a seniority-related delay in obtaining high levels of vacation will discourage workers with low values of *d* from taking a job in the first place, reducing the adverse selection problem that the firm faces in offering more vacation. Second, delay gives the firm time to observe and weed out poor performers, further reducing the adverse selection problem.

Implications for vacation laws

What are the implications for vacation law policy? From the point of view of the standard competitive model of the labor market, vacation laws are hard to defend.[5] However, minimum vacation laws may be welfare-improving if adverse selection is important enough. Working in the opposite direction are the costs of restricting choice when preferences for leave are heterogeneous. (This heterogeneity led to the market failure in the first place.) We conjecture that the net social benefit of the laws depends on the importance of unobserved heterogeneity relative to observed heterogeneity and the strength of the association between leisure preferences and productivity, as well as heterogeneity in the employer preferences for hours.

Recent research in psychology and economics provides alternative rationales for minimum vacation laws. The basic idea is that because of problems of commitment, time inconsistency, and consumption externalities, society may arrive at an equilibrium in which people work more and consume more than is efficient. Laws that regulate how much people work may have benefits in such a situation. However, given heterogeneity in skill levels, leisure preferences, and consumption needs, this comes at a cost.

A final argument would revolve around health externalities. Suppose that time off from work improves physical or mental health and that the costs of illness are borne in part by society. In this case, a standard externalities argument might justify state intervention. Allen (1969) argues that the impetus for paid vacations in the late nineteenth and early twentieth century came from employers, who often emphasized beneficial effects of rest on productivity, in part because of

health benefits.[6] Not all of these benefits, if they actually exist, would be internal to the firm and worker.

We are skeptical that social regulation of vacation weeks does more good than harm. Nevertheless, it is interesting to examine the extent to which vacation laws actually affect work hours and account for cross-country differences in hours. A key issue in addressing these questions is the extent to which the laws simply reflect differences over time and across countries in other factors that have determined weeks of vacation and annual hours. To get some perspective on this, we briefly discuss the evolution of vacation leave in the U.S. and Europe.

A brief history of vacation leave

Paid vacation time is a relatively recent development in Europe and the U.S. Allen (1969) provides a detailed history for the U.S. that we draw upon heavily here. Prior to 1940, much of the initiative for vacations came from management, who saw vacations as a way to increase productivity, reduce turnover, and attract and keep workers during tight labor markets, such as the 1920s, when vacation policies spread rapidly. Indeed, Allen characterizes 1910–40 as "the management phase" of the vacation movement in the U.S. As evidence that firms cared about the productivity benefits of restful vacations, she notes that vacation plans often prohibited employees from taking short-term employment or from deferring vacation time. Some firms built camps where employees could go during vacations.

Paid vacations were first provided to managerial personnel on a limited scale in the mid-nineteenth century. They gradually spread to office personnel and then to salaried foremen and supervisors. Vacations were more prevalent among more highly skilled employees with seniority in more stable positions. They were also more common for jobs in which the work could be shifted over time. Allen uses data from U.S. Department of Labor's Bureau of Labor Statistics (BLS) reports to estimate that the percentage of salaried workers who received paid vacations exceeded 10 percent in 1900, 33 percent by WWI, and 80 percent by 1935.

Vacations spread more slowly to hourly wage workers, for whom management believed the productivity benefits to be smaller and less likely to be captured by the firm because of higher turnover rates. At the end of WWI, about 5 percent of manufacturing firms had permanent vacation plans for hourly wage earners. The plans spread during the 1920s, along with more formal personnel policies, other fringe benefits, and the view that vacations brought productivity benefits for blue-collar workers as well as managerial and supervisory employees. They declined during the early years of the Great Depression in the face of economic pressure and diminished concerns about recruiting and turnover costs. (For data on the prevalence of nonwage benefits, including vacations during the 1920s and 1930s, see Moriguchi, 2002). Allen estimates vacation coverage of wage earners at about 5 percent in 1920 and about 10 percent in 1930. Coverage declined in the early 1930s but was more than 10 percent in 1935.

Allen argues that at least through the 1930s, paid vacation was a low priority for workers and for unions. With the rapid growth of unions after 1935, vacation plans spread. By 1940, vacation coverage for hourly employees had grown to 50 percent. However, the primary concerns of unions were recognition and higher wages, not increased paid vacation time. Allen points out that the most unionized industries in the 1930s and 1940s had the shortest paid vacations, and that these paid vacation plans were still initiated by managers, not unions.

During WWII, paid vacation spread, but often as a way to increase compensation in a tight labor market under wage controls administered by the National War Labor Board. It is interesting to note that management initially opposed recommendations from the Office of Production Management that firms making essential war materials provide vacation bonuses in place of time off. The employers were concerned that dropping vacations would lower productivity.[7] Allen discusses the fact that workers and unions began to demand paid vacation during this period, in part as a way to increase compensation within the strictures of the Labor Board.[8]

After the war years, paid vacation came to be seen by employees as a standard part of the employment package. However, Allen asserts that the value placed by employers on vacation time may be seen in post-war contract negotiations that forbade workers from taking pay in lieu of vacation or from skipping vacation in one year in order to have a longer vacation the following year.[9]

In Europe, unions and workers played a more central role in the spread of vacation time. In the 1930s paid vacation time became as important an issue to workers and trade unions as the eight-hour day and the 48-hour week had been in the first quarter of the twentieth century. Pressures by trade unions resulted in paid vacation legislation in many European countries. Blyton (1985), Allen (1968),[10] and Green and Potepan (1988) emphasize the importance of pressure from unions, the government, and, more generally, employees, in the initial growth in paid vacation time in Europe. In some countries, vacation laws mandating a minimum number of vacation days played a key role in the spread of vacation time. In others, collective

bargaining played the key role, with national legislation following.

In the latter half of the 1930s, both American and European workers were typically granted an average of one to two weeks of paid vacation, the difference being that in the U.S., paid vacation was provided by employers or negotiated through collective bargaining, while in many European countries it was guaranteed by law. In 1954, the International Labor Organization (ILO) convention adopted a recommendation setting more liberal standards for vacations with pay in member countries than those first outlined in the 1936 convention. Many western European countries adhered to this standard by passing new legislation concerning minimum paid vacations.[11]

Although Americans and Europeans initially took comparable amounts of paid vacation, trends in vacation time in the U.S. and Europe diverged in the decades after World War II. In each decade of the 1960s, 1970s, and 1980s, vacation time mandated by law in European countries rose by an average of one additional week per decade, while in the U.S. and the United Kingdom vacation time continued to be determined solely on the basis of employer policy or private labor union agreements. By the late 1980s, workers in Finland, France, Luxembourg, Spain, and Sweden enjoyed five weeks minimum mandated paid vacation each year.[12] This divergent trend in vacation legislation is mirrored in the trends of the amount of vacation taken in Europe and the U.S. Throughout the postwar years, vacation time in Europe grew, while growth in vacation time taken by Americans slowed after the 1970s.[13] This is reflected in the fact that Organization for Economic Cooperation and Development (OECD) estimates of annual hours for the U.S. actually show a slight growth between 1979 and the late 1990s.[14]

The above discussion suggests that differences between Europe and the U.S. in trends in annual work hours are associated with differences in paid leave from work, but the history of vacation time leaves open the question of whether vacation legislation has a causal effect on annual hours worked. It is clear that in some countries vacation legislation simply reflected developments in collective bargaining agreements. Even in these cases, vacation legislation may have led to increased vacation time for nonunion workers. No previous study provides a quantitative analysis of the effect of vacation legislation on annual hours worked, the issue to which we now turn.

Data and econometric specification

The sample of countries consists of the U.S., the UK, Finland, France, Germany (West Germany prior to 1991), Italy, the Netherlands, Norway, and Sweden. The hours data are average annual hours actually worked per person in employment and are obtained from the OECD. The data on vacation legislation in western European countries are pieced together from Green and Potepan (1988), Blyton (1985), Greis (1984), Hewitt Associates (2001), and the ILO (1996).

We study the effects of mandatory vacation legislation on vacation time by estimating variants of the regression model

$$1)\quad \textit{Annual Hours Worked}_{ct} = \alpha + \beta\,(\textit{Min\_Vacation}_{ct}) + \gamma\,(\textit{Year Dummies}_{t}) + \lambda(\textit{Country Dummies}_{c}) + u_{ct}.$$

In the model, the variable *Min_Vacation* is the number of weeks of paid vacation mandated by law. The coefficient β is the effect on annual hours worked of an additional week of mandated vacation. The elements of the coefficient vector γ on the year dummies capture the average difference between annual hours in year *t* and the reference year (1979) that is due to other factors that are common to all countries. The elements of the vector of country-specific intercepts λ capture the average difference in annual hours between the particular country indexed by *c* and the reference country, which is the U.S. These differences are due to country-specific factors that are fixed during the sample period. They include culture and country-specific tastes, demographic characteristics, and financial incentives for work. The variable u_{ct} is the error term. We report results with and without the country and year dummies.

Because the data concerning vacation legislation come from many sources, there may be some inconsistencies in the measures across countries and over time. For most of our analysis, the data on vacation laws are for 1979, 1982, 1984, 1995, and 1999. For the years 1979, 1982, and 1984, the variable is a measure of legally mandated minimum weeks of paid vacation.[15] In the absence of information about law changes between the years for which we have data, we assume that the laws are in effect in two or three years after the year for which we have data, as summarized in table 1. For example, we set the law measure in 1980 and 1981 to the value in 1979. Due to lack of more complete data on the laws, we set the law measure in 1996–99 to the value observed in either 1995 or 1999 depending on the country.[16] Table 1 summarizes the assignments that we have made.

Results

Basic results

Column 1 of table 2 reports the estimates of equation 1 with year dummies and country dummies

TABLE 1

Assignment of vacation laws to years

Year of law	Years law is assumed applicable
1979	1979–81
1982	1982–83
1984	1984–86
1995 or 1999	1996–99

excluded. The estimate of β is –26.8 (with a standard error of 7.38). Taken at face value, the result says that an increase in mandatory vacation time by one week leads to a reduction in annual hours of 26.8.

In column 2, we add year dummies to control for time-related changes affecting hours in all countries. The coefficient on vacation weeks is –25.4 (7.70). Not surprisingly, the coefficients on the year dummies show a decline in annual hours worked since 1979.

In column 3, we control for both year dummies and country dummies and use variation over time in $Min\_Vacation_{ct}$ within countries to identify the effects of the laws. The estimate of β is –51.9 (11.7). The results imply that an extra week of mandated vacation results in a reduction in annual hours by more than one full-time week and is within one standard error of a reduction of one full-time week. This suggests that the laws have bite, and that workers do not respond to them by working more hours per week or by holding additional jobs.[17]

As we noted earlier, dummy variables for each country control for country-specific attributes, including variations in work preferences and culture. Fixed country differences account for a large part of the variance in hours in the sample, as evidenced by the increase in adjusted R^2 from .04 to .91 when we add the country dummies. The coefficients on the country dummy variables tell how much workers in each country would work, compared with workers in the U.S., holding vacation legislation constant. The positive coefficient for Spain suggests that *in the absence of the vacation laws*, Spanish workers would actually work more hours annually than U.S. workers. The negative coefficients for Germany, Italy, the Netherlands, Norway, Sweden, and the UK suggest that workers in those countries would work fewer hours annually than U.S. workers even in the absence of vacation laws.

Note that the UK is one of the countries whose workers would work less than those in the U.S. if there were no vacation laws. The UK is the only country in the sample other than the U.S. that currently does not have vacation legislation. The analysis in Blyton (1985) of the role of trade unions in the spread of paid vacation time in the UK suggests that unions may explain the negative country dummy in the UK. ILO (1995) emphasizes the powerful role of unions in the British economy during much of the postwar period.

To highlight the role of vacation laws in country differences in hours, in column 4 of table 2 we drop the vacation law variable from equation 1. The country coefficients rise substantially in absolute value, reflecting the role of vacation laws in explaining the overall difference in annual hours between the U.S. and Europe.

Sensitivity checks

The vacation law variable might be picking up the effect of differences between the U.S. and European countries in trends in other factors that affect hours, such as the age structure of the population and wages.[18] A simple way to control for such factors is to add a separate quadratic time trend for the U.S. to the model with vacation weeks, year dummies, and country dummies. The trend variables are set to 0 in 1979. The estimate of β, the coefficient on vacation weeks, falls to –39.9 (11.2), and coefficients on the linear and quadratic trend terms are 20.3 (10.2) and –.571 (0.48). The trend coefficients indicate that everything else equal, including vacation laws, annual hours were rising in the U.S. relative to other countries by 20.3 hours in 1979, but were actually declining by –2.54 hours per year in 1999. We obtain –35.1 (11.7) as the estimate for β if we allow for separate quadratic trends for the U.S. and the UK or eliminate the U.S. from the sample. When we eliminate both the U.S. and the UK from the sample and thus estimate β using only within-country variation in the laws for the countries that have laws, the estimate declines only slightly to –34.1 (12.9). The decline in the absolute value of the estimates of β when we control for separate time trends for the U.S. and the UK means that cross-country differences in trends in other factors that influence hours and happen to be correlated with vacation law policy explain part of the link between vacation laws and hours, but not most of it.

One of the limitations of the analysis is that the number of changes in vacation laws after 1979 is relatively small. Consequently, we augmented the sample using data on annual hours for 1950 reported in Van Den Bergh and Wittelsberger (1981) and data on mandatory vacation weeks in 1954 from Green and Potepan (1988). We exclude Spain in this year for lack of data. The mean of the vacation law variable increased from 1.93 to 3.36 between 1954 and 1979. It only rose from 3.36 to 3.9 between 1979 and the late 1990s.

It is not entirely straightforward to use Van Den Bergh and Wittelsberger's data on hours with the

TABLE 2

Effects of vacation laws on annual work hours

	Dependent variable: Annual hours worked OLS estimates (standard errors in parentheses)			
Explanatory variables	**1**	**2**	**3**	**4**
Min_Vacation	–26.8 (7.38)	–25.4 (7.70)	–51.9 (11.7)	
Country dummies				
Finland			134.0 (65.7)	–141.6 (22.7)
France			38.2 (62.6)	–223.3 (22.7)
Germany			–72.5 (49.5)	–272.2 (22.2)
Italy			–95.1 (39.0)	–241.9 (24.1)
Netherlands			–270.8 (44.0)	–443.7 (22.2)
Norway			–241.6 (52.7)	–456.8 (22.2)
Spain			237.2 (62.7)	–25.5 (22.2)
Sweden			–106.6 (62.0)	–65.9 (22.2)
United Kingdom			–174.1 (20.2)	–174.1 (22.2)
Year dummies	No	Yes	Yes	Yes
Adjusted R^2	0.096	0.040	0.910	.892
N	115	115	115	115

Notes: See text for a description of the sample and time period. Prior to 1991, German data were for West Germany. The U.S. is the reference country. OLS is ordinary least squares.

Organization for Economic Cooperation and Development (OECD) data. These authors report annual hours for 1979 as well as 1950. To minimize the effect of inconsistencies in their hours series and the OECD series, we use the ratio of the 1979 values that they report to the values from OECD to link the 1950 values to the OECD series. Note that in using hours for 1950 with the vacation laws in 1954, we are assuming that the vacation laws were similar in the two years. In any event, the estimate of β is –55.6 (11.3) using the extended sample when we include country and year dummies, which is close to, but a bit larger than, our previous estimate.[19] This provides support for the analysis based on the post-1979 sample.

One should not make too much of the specific estimates of the effects of the vacation laws or the country dummies. Given that a substantial amount of vacation time is offered in both the U.S. and the UK without vacation laws, it is unlikely that the entire amount of legislated vacation is binding in its effect on vacation time taken or on annual hours. However, the evidence does suggest that vacation laws in Europe are part of the explanation for the fact that annual hours worked are lower there.

Conclusion

Jobs are hours–wage packages in which employers circumscribe work hours. There are good reasons to expect firms to offer fixed hours/wage packages or perhaps hours/wage menus that involve steep tradeoffs and to limit variation in work schedules and days off. There is abundant evidence that they do so. There is also some theoretical support for the view that the menu of hours choices available to workers is inefficient relative to what would prevail if firms could easily observe productivity or could easily enforce multi-period contracts, although there is no real evidence on the importance of the problem.

Policies governing paid and unpaid leave are important levers through which firms set hours. In the U.S., leave policy is largely determined by firm-wide policy, despite heterogeneity in worker preferences. However, many countries have adopted laws mandating minimum vacation leave. Our regression analysis of the relationship between vacation laws and annual work hours for a cross-section time series of countries suggests that such laws do lead to a reduction in annual hours. We wish to stress, however, that our study is a preliminary look at the question of whether vacation laws influence hours rather than the final word. It would be very useful to expand the analysis to include more countries and a longer period and to pay more careful attention to the exact timing of the laws and their effects on hours. This will require a substantial effort to obtain hours measures and measures of the law that are consistent across time and place. Our use of country dummies and time dummies goes part of the way to addressing the concern that causality runs from work hours to the laws rather than from the laws to the hours, but further work looking at the political economy of the laws is needed. Whether minimum vacation laws needlessly restrict choice or solve a failure of the market to provide an efficient level of vacation is an open question.

NOTES

[1]Legislation governing the work week also may influence differences in annual hours across countries. See Lehndorff (2000) for a recent study of the evolution of a shorter work week in European Union member countries. See Hunt (1999) and Crépon and Kramarz (2001) for studies of the effects of laws mandating reductions in the work week in Germany and France, respectively.

[2]See Killingsworth (1983), Pencavel (1986) and Blundell and MaCurdy (1999) for comprehensive surveys. Rosen (1976), Biddle and Zarkin (1989), and Moffitt (1984) are early examples of labor supply studies in which workers choose hours and wages according to a market locus. Here, we draw heavily on the discussion in Altonji and Usui (2001).

[3]See Heim and Meyer (2002) for a recent discussion of the importance of fixed time and money costs in the determination of work hours, as well as the difficulties that these and other sources of nonconvexity pose for labor supply analysis.

[4]See Malcomson (1999), Gibbons and Waldman (1999), and Weiss (1990) for surveys of this literature.

[5]Using a "rat race" model in which heterogeneity in preferences is key, Landers et al. (1996) show that a mandatory reduction in the hours of associates in law firms can improve welfare.

[6]See Allen (1969), chapter 3.

[7]See Allen, p. 90.

[8]See also Greis (1984), pp. 30–31.

[9]Henle (1962) provides information on the role played by collective bargaining agreements in increasing paid vacation time in the U.S. between 1940 and 1960. Green and Potepan (1988) study the effect of union membership on vacation time in the U.S. and Europe. They provide evidence based on the 1979 cross section from the Panel Study of Income Dynamics that union members receive more paid vacation than nonunion members, controlling for other characteristics. Altonji and Usui (2001) find that male union members receive .23 more weeks of paid vacation and take .39 more weeks of vacation than nonunion members, controlling for education, experience, job seniority, race, region, and city size.

[10]See Allen (1968), pp. 53–59.

[11]See U.S. Department of Labor, Bureau of Labor Statistics, 1955, pp. 88–89.

[12]See Green and Potepan (1988), pp. 180–184.

[13]For discussions in the popular press dramatizing the difference in amount of vacation time taken by Europeans and the amount taken by Americans, see Moseley (2000) and Robinson (2000).

[14]There is considerable controversy over the trend in work hours in the U.S. Greis (1984) provides a detailed analysis of the U.S. trend in annual hours and its components—weeks per year and hours per week after 1947, as well as a literature review. She provides reasonably strong evidence for a decrease in hours. Abraham and Spletzer (1998) point out that there is a substantial discrepancy between the trend in hours implied by job-based surveys of employers and the household-based *Current Population Survey*. The employer-based data appear to show a decline in hours. See Schor (1991), Kniesner (1993), and Stafford (1992) for differing views on trends in work time and on whether Americans work more than the optimal amount, given preferences and productivity.

[15]In some cases, we converted the data on mandated minimum days of paid vacation to weeks by dividing by five.

[16]Furthermore, we use vacation law data from Germany for the year 2000 in our analysis for the vacation law in effect in Germany during the years 1996–99.

[17]When we use the log of hours as the dependent variable, we obtain a coefficient of –.023 (.0081).

[18]Bell and Freeman (2000) provide a careful study of the disparity in hours worked by Americans compared with Germans. They find that the greater hours worked by Americans are due to labor supply responses to differences in wage inequality between the two countries. The theory is that extra work pays off more in the U.S. in the form of promotions and salary hikes, generating more hours worked. Such differences could lead to differences in both the level and trend in hours, because wage inequality has increased in the U.S. relative to most European countries. See Katz and Autor (1999) for references to the inequality literature. Using the Luxembourg Income Study, an international archive of datasets from industrialized countries, Jacobs and Gerson (2000) present evidence that the rise in annual hours worked in the U.S. between 1970 and 1997 can be attributed to demographic shifts in the labor force. Specifically, they find that the increase in joint hours worked by dual-earner, husband-wife families accounts for most of the increase in the average for the U.S. They find that the working time of male-breadwinner families and families headed by single women with no husband present has not changed significantly.

[19]The estimate of β is –55.3 (11.7) when we extend the sample using Maddison's (1982) hours data for France, West Germany, Italy, Sweden, the UK, and the U.S. for the years 1950 and 1979.

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