

## The Time Divide in Cross-National Perspective

# The Time Divide in Cross-National Perspective: The Work Week, Education and Institutions That Matter

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Prior empirical studies have found that American workers report longer hours than do workers in other highly industrialized countries, and that the highly educated report the longest hours relative to other educational levels. This paper analyzes disparities in working hours by education levels in 17 high- and middle-income countries to assess whether this finding holds cross-nationally, for both men and women. In contrast to many prior studies of working time, we use a measure of weekly rather than annual hours worked, which we argue provides a better window on the discretionary time available to individuals and households. We find that the within-country gradient in average hours by education is not uniform: higher income countries are more likely to show the U.S. pattern, and middle-income countries show the reverse pattern, with the less educated reporting longer hours. We conclude by assessing some possible macrolevel explanations for this variation, including per capita gross domestic product, tax rates, unionization, country-level regulations, earnings inequality, and the regulation of weekly work hours.

## Introduction

The optimal length of the work week is an ongoing subject of academic and political debate. Economists typically interpret low or reduced hours as a sign of a stagnant economy operating below its productive capacity. Others regard excessive time spent in waged work as socially destructive, the symptom of a culture of overwork and overproduction (Schor 1991). Recently, however, Jacobs and Gerson (2004) have argued that portraying the hours of American workers as especially long or short is an oversimplification, because the U.S. labor market is characterized by a polarization between those who work very long hours but would prefer to work less, and those who work less but have shorter hours than they desire. They further argue that paid working time is stratified

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by education and occupation, with highly educated professionals reporting the longest average hours.

This article focuses specifically on differences in working hours by educational attainment. Because men and women show very different patterns of hours, we first disaggregate by gender, and then address two main questions:

1. Does the gap in hours between high- and low-educated workers, as identified in prior research on high-income countries, extend to a larger sample that includes middle-income countries?
2. Can differences in the education gradient in hours be explained by the country-level indicators that have previously been shown to correlate with differences in the aggregate level of hours across the entire labor force?

While we replicate previous findings about the educational gradient in hours in the United States, we show that this pattern is not evident in all countries. We then show that some of these cross-country differences can be explained by macrolevel factors: national income, tax rates, wage inequality, unionization and working time regulation.

In the next section, we review prior findings about the hours distribution in the United States and elsewhere, the within-country differences in hours by educational attainment, and some proposed explanations for these results. We then describe our empirical analysis, a cross-sectional analysis using microdata from the Luxembourg Income Study (LIS), along with several auxiliary sources of national-level data. We present both simple descriptive comparisons of weekly hours across countries and country-specific regressions that control for cross-national variation in the demographic composition of the working-age population. Finally, we estimate regressions using country-level variables to investigate the relative effect of macrolevel factors on the cross-country variations we observe.

## Background

Recently, there has been a growing focus on working time as a distinct aspect not only of labor market outcomes but of inequality more generally, with its own implications for social behavior and public policy. Moreover, sociologists have argued that the intrinsic value of nonworking time should be better integrated into measures of social well-being, arguing that common standard-of-living indicators, such as per capita gross domestic product (GDP), capture the value of money while neglecting the value of time (Schor 1991; Verbakel and DiPrete 2008). Previous research on working time has addressed the historical trends in working hours across countries and among categories of workers, the possible negative social effects of very long work hours, and the social, cultural and political factors that shape differences in working time both within and across countries. Insofar as there are reasons to be concerned about the consequences of long (or short) hours, researchers should pay attention to inequality in hours in addition to their average level.

## ***Variation and Trends in Working Time***

Since the 1970s, the average work week has remained relatively steady or increased in the United States and several other rich countries, although annual work hours have continued to decline in many countries due to expansions of annual leave (Lee, McCann and Messenger 2007; Maddison 1995). Americans work more hours per year than workers in most other rich countries, in large part because Americans receive much less paid annual leave (Altonji and Oldham 2003). At the level of weekly hours, however, working time in the United States appears less exceptional (Lee, McCann and Messenger 2007).

However, it has been shown that working time is highly stratified by both gender and education. Gender differences in working time are longstanding: in all countries in recent times, women have been less likely to be in the labor force and, when employed, they work fewer hours (Lee, McCann and Messenger 2007). However, the size of these gaps varies widely by country: in general, female employment rates and average female working hours are inversely correlated (Osberg 2002), although the relationship is fairly weak.

In addition to differences by gender, there is evidence that working hours are increasingly stratified by education and occupation. In recent years, the largest increases in working hours in the United States have been found among the most highly educated and highly paid workers (Jacobs and Gerson 2001; Kuhn and Lozano 2006). Since 1940, average weekly hours in the United States have fallen among the less educated and risen among the more educated, particularly at the upper tail of the hours distribution (Coleman and Pencavel 1993a,b). Jacobs and Gerson (2004) argued that, at the household level, the longest hours are found among highly educated professionals; they also reported that this pattern was evident in other industrialized countries. Indeed, in certain countries—Canada, the Netherlands, France and Sweden—the disparities were even wider than in the United States. Some have interpreted this finding as a reason to be less concerned about long hours, because they are disproportionately concentrated among the more privileged.

However, Jacobs and Gerson argued that the United States was characterized by a mismatch at both ends of the hours spectrum: many workers with long hours report that they would like to work less, while many workers with shorter hours would like to work more. This raises one of the central questions in studies of working time: to what extent are observed hours a function of individual preferences (of workers and employers) or of societal and institutional factors? While many discussions (particularly among economists) focus on preferences, there is increasing recognition that the context in which preferences are formed and expressed cannot be ignored as an explanatory factor.

## ***Worker Preferences and the Effect of Long Hours***

If long hours were both freely chosen and socially beneficial, then they would be of less inherent interest. In the common neoclassical model of labor supply, workers are assumed to work a number of hours that is consistent with their

relative preference for consuming goods or leisure time. Moreover, low-average work hours are typically read as a symptom of either a cyclical downturn, or of an inefficient or rigid labor market (e.g., Rogerson 2008). Critics such as Marx (1990) and Chapman (1909), however, argued that even in a free market, both employers and workers could choose a level of hours that was greater than was optimal in terms of total output, because short-term gains would lead to overexploitation of workers and decreased productivity in the long run.

But even if they are economically efficient, long hours may have other negative effects. Golden and Altman (2008) distinguish among three separate concepts: long hours, overemployment, and overwork. Long hours means simply hours that are longer than average. Overemployment refers to workers' supplying more hours than they would like to, because employers do not offer work at the desired level. Overwork, finally, refers to an intensity or duration of labor that harms a worker's physical or mental health due to fatigue or stress. Prior studies have found that a substantial number of workers are overemployed (Lang and Kahn 2001; Golden 2006), and long hours have been associated with symptoms of overwork including poor health (Hanecke et al. 1998; Caruso et al. 2004), increased on-the-job injuries (Caruso et al. 2004), stresses related to work-life balance (Jacobs and Gerson 2001; Gornick and Heron 2006) and reduced civic participation (Schor 1991; Putnam 2000).

Moreover, individual preferences alone are not sufficient to explain variations in hours. Differences in the institutional and macroeconomic structure of the labor market may have the effect of both shaping worker preferences and altering the ability of workers to express preferences for longer or shorter work weeks (Golden and Altman 2008; Reynolds 2003). For example, unionized workers are more likely to be satisfied with their hours, while highly educated workers and workers in rich countries are more likely to desire reduced hours (presumably because both education and national income confer economic security and make shorter hours more economically feasible; Stier and Lewin-Epstein 2003; Berg, Appelbaum, Bailey and Kalleberg 2004). State policy may also play a direct role. For example, policies to assist working mothers may change the degree to which women perceive a tension between the desire to work for pay and their unpaid care responsibilities—although studies that have investigated the possibility that work-family conflict produces larger hours mismatches among workers with children have not found strong evidence in most countries Reynolds (2003).

### ***Explaining Variation in the Educational Gradient in Work Hours***

Several explanations have been advanced to explain variation in hours worked, both within and across countries. In our empirical analysis, we analyze five of these explanations, focusing on the ways that they may affect workers differently depending on educational attainment, and thus helping to explain the cross-national differences in the education gradient in hours. The five explanations included in our models are as follows: national per capita income, short-term tax incentives, long-term career incentives, union coverage and national regulations on working time. These do not exhaust the mechanisms that have been

proposed in the literature, which include the social context (whether a worker's peers have long or short hours) (Alesina et al. 2005), cultural differences in the relative preference for income or leisure (Blanchard 2004), and the individual psychology of "workaholics" (Burke and Cooper 2008). However, these are beyond the scope of the economic and institutional factors we aim to examine.

### **National Per Capita Income**

It is commonly assumed that there is a negative association between a country's level of income (captured by per capita income) and the average level of hours worked. Historically, economic growth in highly industrialized countries has often coincided with reduced hours (Huberman 2005). This pattern is consistent with the microeconomic theory of a "backward-bending" supply curve for labor: in this model, leisure is treated as a good like any other, and high-income workers are predicted to consume more of it (Hamermesh and Rees 1984). However, in recent years the evidence for this relationship at a macrolevel is inconclusive: Lee, McCann and Messenger (2007) show that among high-income countries (those with a per capita gross national income over 20,000 U.S. dollars), there is no clear relationship between aggregate income and average working hours.

This could be because higher national income is associated with lower hours among less-educated workers but not higher educated workers, and richer countries have a higher proportion of the latter. In richer countries, higher absolute wages may make it easier to achieve a basic minimum level of well-being with fewer hours of work. It could also be because the institutions of the welfare state in richer countries lessen dependence on the labor market. In either case, these considerations will be more salient to less-educated workers who tend to command lower wages. To assess these possibilities, we will examine the relationship between national income and the education hours gap.

### **Short-Term Incentives: Taxes on Labor Income**

Economists such as Prescott (2004) and Davis and Henrekson (2004) have argued that shorter work hours in European countries relative to the United States are explained by high tax rates that disincentivize labor supply. These findings have been criticized, however, both on methodological grounds and for failing to control for differences in unionization and regulation (Alesina et al. 2005).

If taxes do affect labor supply (as captured in weekly work hours), however, we expect the effect to vary by education. In the presence of progressive taxation, higher average tax rates would be expected to have a greater effect on the hours of more highly educated workers, who generally earn more. The magnitude of this effect may vary by country, because the education wage premium differs substantially across countries (Boarini and Strauss 2007). If lower taxes disproportionately increase the hours of high education workers, this could increase the education gap in hours. However, the effect of taxes on the highly educated may be lessened if they are responding to longer term incentives, as explained below. So, in principle, the effect of taxes on the education gap in hours could operate in either direction.

### Long-Term Incentives: Career Advancement

Another incentives-based argument is that people work long hours, not because of the immediate monetary return they receive, but because of the long-term career advantages that accrue to workers who put in more “face time.” People may work longer hours due to fear of losing their job (Bell and Freeman 1995) or to win promotion (Bell and Freeman 2001). Bell and Freeman (2001) found that in the United States and Germany, workers in occupations with higher levels of inequality had a higher propensity to work long hours.

Inequality may have a greater effect on the hours of either high- or low-educated workers, depending on the underlying mechanism. If highly educated workers are driven by the “carrot” of career advancement, and less likely to be hourly workers or to be covered by overtime regulations, then we would predict that income inequality will have a stronger effect for highly educated workers. However, if the “stick” explanation of threatened unemployment is of greater significance, this may be more important for lower education and lower wage workers for whom unemployment would create greater hardship, and thus their hours would be higher in the presence of more inequality. To separate these dynamics, we will separately examine the effect of inequality in the top and bottom halves of the income distribution. We expect top-half inequality to be associated with higher hours among the more educated, who are more likely to be in this half of the distribution, and we expect bottom-half inequality to be more strongly associated with high hours among the less educated. Thus, in a context where the more educated generally work more, top-half inequality will increase the hours gap and bottom-half inequality will decrease it.

### Unionization

Unions are thought to influence the work week in three principal ways. Most directly, individual unions can reduce the work week through the collective bargaining process, by including hours restrictions in contracts (Bosch and Lehdorff 2001). As political actors, unions and union federations can also influence the degree to which working hours are regulated by the state. Finally, high levels of unionization are associated with lower earnings inequality (Card 2001): by compressing the wage structure, they may disincentivize long work weeks by decreasing the long-term return to long hours (as argued by Bell and Freeman). For all of these reasons, the work week is expected to be shorter in countries where more workers are either members of unions or covered by collective bargaining agreements.

Unions also appear to have the effect of imposing more uniform work weeks through both collective bargaining and their influence on state regulation: research has shown that high levels of unionization are associated with both shorter work weeks and fewer part-time jobs (Alesina et al. 2005; Gornick and Meyers 2003). This would mean that high union coverage would reduce hours gaps. However, in studies of income, unionization has been shown to primarily affect the wages of unskilled workers (who are likely to have less education). Thus, it is possible that unionization will also disproportionately reduce

the hours of the less educated (Pontusson, Rueda and Way 2002), which could widen the hours gap between them and the more highly educated.

### Regulation of Working Time

Most industrialized countries set a normal, or standard, work week, aimed at limiting the number of hours worked weekly by most workers (McCann 2004, 2005). Normal weekly hours generally refer to the threshold above which overtime becomes payable; some countries establish normal hours primarily through legislation while others rely more on collective agreements. Prior research on working time regulations indicates that the regulation of the normal work week does reduce working time overall: a number of studies have estimated the magnitude of the effect of reducing regulated normal hours on actual hours worked and found that it leads to substantial declines in actual hours (see Gornick and Heron 2006 for a review.) However, the effect of the length of the normal work week on hours gaps is more difficult to predict a priori. Work-time regulations may not apply to many workers in some countries—as in the United States, where many salaried workers are exempt from overtime laws. These are disproportionately highly educated workers; if they work very long hours, then a lower hours threshold may translate into bigger hours gaps. If regulations have broad coverage, conversely, then they may result in smaller gaps.

### Data and Methods

The primary source of data for the analysis is the LIS database, which contains comparable microdatasets, mostly based on national household surveys, currently for over 40 high- and middle-income countries (see <http://www.lisdatacenter.org>). Microdata on income, household demography and employment outcomes, including weekly work hours, are harmonized by the LIS staff to make these variables comparable across countries. The LIS data are available in waves that are spaced approximately 5 years apart, with Wave V, centered on 2000, being the most recent one that has been completed.<sup>1</sup> In addition to LIS, we draw on external sources for country-level measures of per capita income, taxation, unionization and hours regulation, described in more detail in the section on country-level data below and in the Appendix (see the [online supplementary material](#)).

This analysis uses only data from Wave V of the LIS data. Although the use of earlier waves would allow an analysis of trends, the data on working hours are less consistent for earlier periods. Thus, this analysis focuses on drawing comparisons across countries rather than changes over time. We include 17 countries that contain data on “usual weekly working hours,” i.e., the key dependent measure in our analysis. The countries included in this study (with their two-letter abbreviations) are as follows: Austria (AT), Belgium (BE), Switzerland (CH), Germany (DE), Spain (ES), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Israel (IL), Italy (IT), Luxembourg (LU), Mexico (MX), the Netherlands (NL), Russia (RU), the United Kingdom (UK), and the United States (US).

The universe for the study is restricted to the civilian, nonagricultural population aged 25–54 years. Military and agricultural populations are excluded

because of the difficulty of accurately measuring their hours. The age range allows us to study the hours of prime-age workers, net of cross-national variation in the duration of education or the timing of retirement.

The LIS datasets, like most microdata based on household or worker surveys, provide data on weekly hours—not on annual hours, which are generally based on enterprise data. Ideally, we would have access to microdata on both annual and weekly hours; nevertheless, we believe that the weekly hours measure has advantages. Annual hours measures conflate two separate dimensions with regard to the availability of nonworking time. The first is what we might call “episodic” time, which is available in occasional blocks, such as vacation time or parental leave. The availability of these blocks of time off varies widely across countries, and contributes to observed differences in annual hours. The other relates to working (and nonworking) time on a weekly basis. In this study, we are mainly concerned with time that is available on a regular, week-to-week basis. This kind of time is of particular sociological interest because it facilitates ongoing unpaid activities, such as child care or civic participation.

### ***Individual-Level Analysis***

In the first stage of our analysis, we describe the employment rates and average work week in each of the 17 countries, disaggregated by gender and education. We then control for various other individual-level characteristics that may explain different patterns of hours in different countries.

The key variables of interest are as follows:

- Employment (coded as employed or nonemployed)
- Hours worked
- Gender
- Education (categorized as low, medium, or high)

We disaggregate our results by gender, as is standard in the working time literature. The education variable operationalizes [Jacobs and Gerson’s \(2004\)](#) claim that, in high-income countries, highly educated professionals report the longest hours. Education is only a partial measure, however, because the original claim also relates to occupational categories, which are not available for all countries in this study. However, when we compare the hours of professionals with nonprofessionals in the 15 countries with available data, we find a similar pattern to those reported for education (results available upon request).

For the multivariate analysis, we estimate 34 models predicting weekly hours: separate models for men and women, in each of the 17 countries. Separate regressions by country allow the education gradient in hours to be compared cross-nationally while allowing the effect of the other predictors to vary across countries. In the main text, we use graphs to show the key results from these models. The coefficients, standard errors, and sample sizes of the regressions are available in the [Appendix \(see the online supplementary material\)](#).

In addition to the education variable described above, the following predictors are included as controls:

- Age
- Presence of children in the household, distinguishing between infants (aged 0–2 years), toddlers (aged 3–5 years), older children (aged 6–12 years) and teenagers (aged 13–17 years)
- Other household income from spouse’s earnings (if applicable) and any cash income from property owned
- Homeownership
- Presence of older persons in the household (distinguishing those aged 65–74 years and those older than 75 years of age)

Note that all of these models include only persons who are employed. See the [online supplementary material](#) (the Appendix) for further explanation and motivation for this choice.

### **Country-Level Analysis**

In the second part our analysis, we use the individual-level regression models estimated in the previous step to assess country-level factors that may shape both average hours and the education gap in hours. We estimate *regression-adjusted* average weekly hours in each country, for men and women in each educational category. These regression-adjusted averages are simply point estimates from the models. For the value of the noneducation variables, we chose values that are close to the modal or average across the countries in our study. This was done separately for men and women.<sup>2</sup> This produces eight values for each country: regression-adjusted hours for all workers, the highly educated, the medium educated and the low educated, separately for men and women.

Using these values, we assess the bivariate association between the macrovariables and the regression-adjusted average level of weekly hours, within each educational category, to see whether these variables show different correlations for different groups of workers. The limitations of the data preclude a more complex model, and thus these regressions should be regarded as a suggestive extension of our descriptive account rather than decisive evidence of a causal relationship.

The variables below operationalize the concepts described in the Explaining Variation in the Educational Gradient in Work Hours section above. Where the data are taken from a source other than LIS, we ensured that the macrolevel data for each country were from the same year as the LIS microdata (1999, 2000, or 2001, depending on the country), or from within 3 years of the LIS year where an exact match was impossible. See the [online supplementary material](#) (the Appendix) for a detailed explanation of the data sources.

We used the following six variables:

- Real GDP per capita (reported by the Organisation for Economic Co-operation and Development)
- Average tax rate on wages ([Organisation for Economic Co-operation and Development 2008](#); [Israeli Ministry of Finance 1997](#))
- Inequality between the top and middle of the earnings distribution, measured by the ratio between the 90th and 50th percentile of full-time workers’ earnings (calculated by the authors from LIS data)

- Inequality between the middle and bottom of the earnings distribution, measured by the ratio between the 50th and 10th percentile of full-time workers' earnings (calculated by the authors from LIS data)
- Union coverage, i.e., the percentage of workers covered by wage bargaining agreements (Visser 2009)
- Normal hours, measured by either the normal work week as defined by law (normally the overtime threshold) or the average collectively agreed normal hours, whichever is lower (various sources; see the Appendix in the [online supplementary material](#))

We elaborate on the logic of some of our country-level variable construction decisions here. We use inequality in full-time wages within a country to operationalize the Bell and Freeman (1995) argument about the potential return to longer hours worked in service of career advancement. If higher inequality leads to longer hours—whether through the “carrot” of promotion, the “stick” of potential unemployment or both—then we would expect to find that wage inequality is positively associated with average weekly hours. However, a single measure of inequality may not be sufficient to capture these effects, particularly because we disaggregate workers into educational groups, which are concentrated in different parts of the wage distribution (supporting table available from the authors). For this reason, we will use two separate measures of wage inequality below: the 90/50 percentile ratio of wages and the 50/10 ratio.

Furthermore, we use country-level wage inequality. This is not an ideal approach; it would be preferable to also measure inequality at a lower level of aggregation—within occupations as in Bell and Freeman (2001), or even within workplaces. Our data, however, do not allow such a fine-grained analysis. Moreover, there may be advantages to using a country-level measure that captures broader dynamics. For one, people may change occupational categories over the course of their careers; for another, perceptions about long-term returns to high hours may be driven by country-level wage trends, rather than in specific jobs or workplaces.

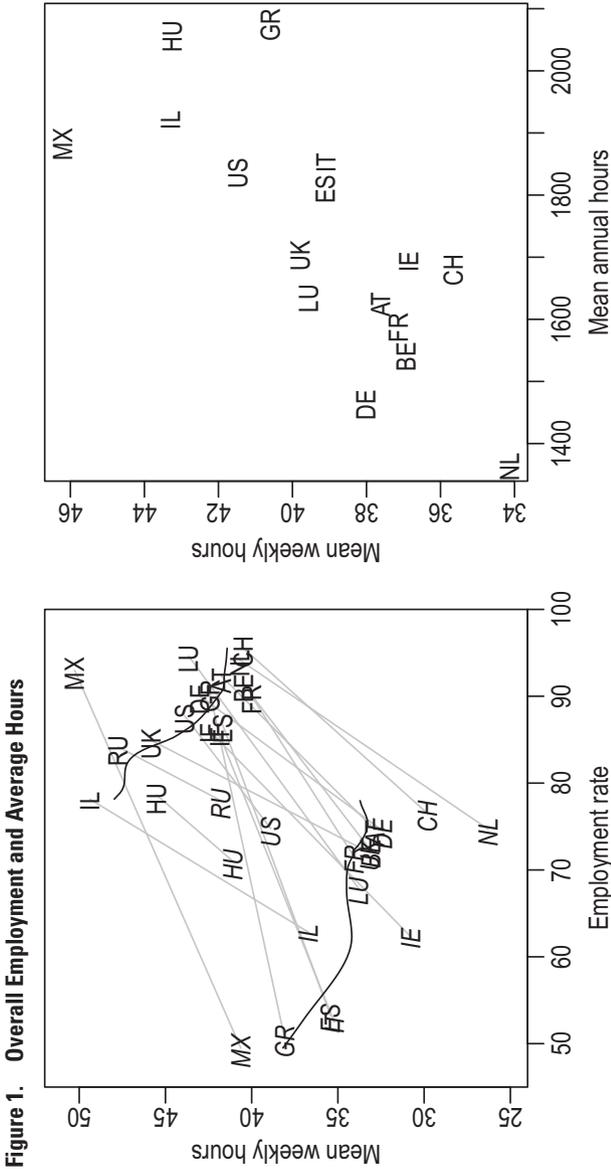
Regarding the regulation of weekly work hours, in addition to setting a normal work week, many countries set maximum weekly hours. In our empirical work, we used limits on normal rather than maximum weekly hours for two reasons. First, the former mechanism sets lower thresholds and hence applies to many more workers, so it is more likely to show detectable effects. Second, within the European Union (EU), the harmonization of limits on maximum hours (required by the 1993 EU Working Time Directive) limits variation across EU member states (which includes 12 of the 17 countries in this study). In addition, the Directive excuses some employers from maximum hour limits where their employees agree (Boulin et al. 2006). In the EU, in contrast, the regulation of normal hours is left to the individual countries.

## Results

### *Descriptive Overview*

The plots in Figure 1 show the overall levels of employment and average hours for all 17 countries in the study. The left plot reports both average weekly hours

and employment rates for men and women. In every country, women have lower employment rates and lower average hours among the employed, relative to men. Among both men and women, however, employment rates and weekly hours are negatively correlated: where employment rates are higher, average work hours among the employed are generally lower. This is shown on the graph by a locally weighted regression (lowess) curve. The correlation between employment rates and weekly hours is  $-0.48$  for men and  $-0.29$  for women. We can distinguish between countries in which the gender employment gap is



high but the gender hours gap is fairly low (e.g., Mexico and Greece), and those in which the gender employment gap is relatively low but the gender hours gap is high (e.g., Israel and the Netherlands). These gaps, of course, exist alongside variation in the overall level of both hours and employment: Switzerland (CH) is characterized by shorter work weeks and higher employment rates among both genders than is Israel, for example, although the relative positioning of men and women within each country is similar.

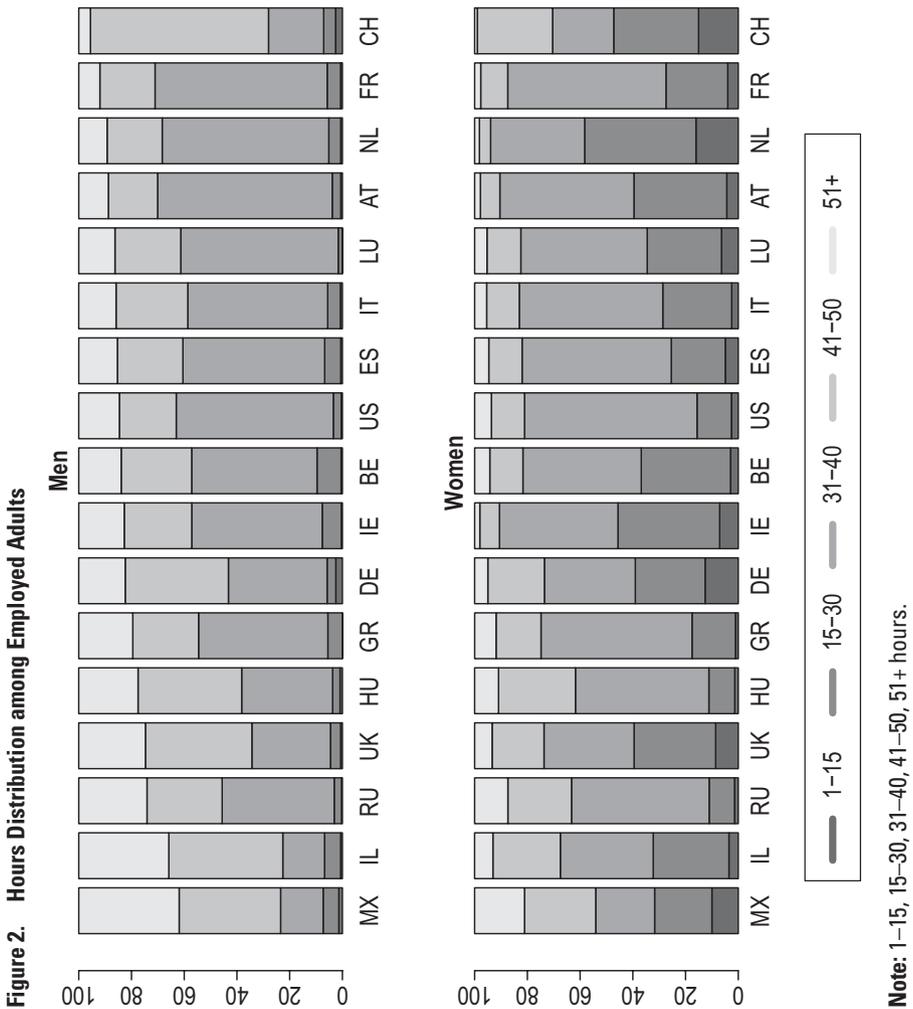
As noted above, our study focuses on weekly hours, while some cross-national studies assess annual hours. The right-hand plot in Figure 1 shows the relationship between average weekly hours (calculated from LIS data) and average annual hours from other sources). While the two measures are highly correlated, the differences are large enough to suggest that the two distributions are determined by a somewhat different set of factors. Moreover, these annual hours figures are for all employees, because figures disaggregated by gender are not available for this time period and this set of countries. An analysis of data available for 2006–2007 suggests that a gender disaggregation would not look dramatically different, although annual and weekly hours are less closely correlated among women than among men (available from the authors upon request).

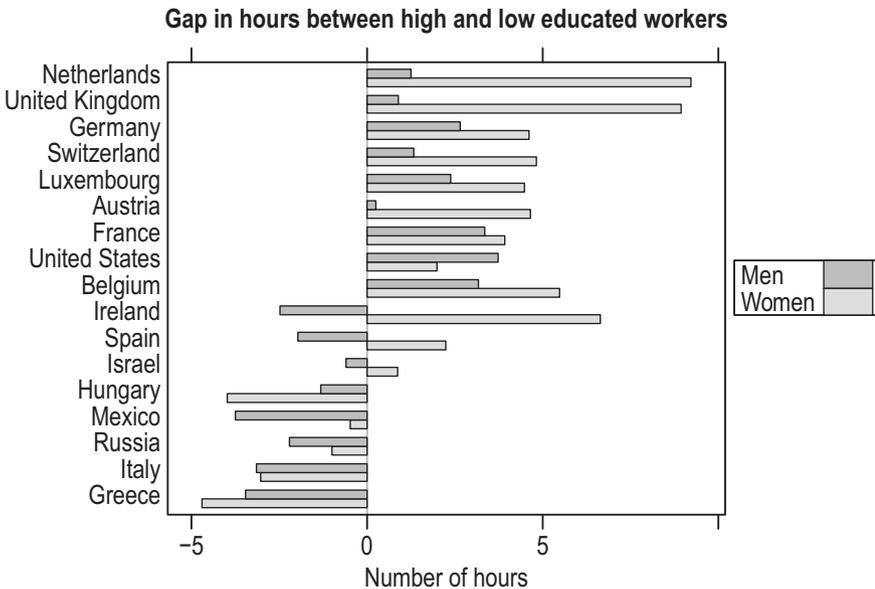
From these graphs, we see that average weekly hours in the United States are not the highest. One surprising is that men's hours are uniformly high. While in the United States men's hours are, on average, higher than in most of the European countries, the differential is not large—and hours are higher in the United Kingdom. This suggests that it would be an exaggeration to regard Europeans as uniformly working shorter hours than Americans, as is often reported. European *men*, at least, report spending nearly as much time working each week as do their American counterparts. Because this analysis is restricted to weekly hours among prime-age men, however, note that we are not capturing cross-national heterogeneity in annual hours (which are affected by the length of vacation time), nor the differences in labor market behavior of younger workers and those near retirement. Note also that there is a cluster of countries where men report substantially longer work weeks, closer to 45 than to 40 hours. Aside from the United Kingdom, however, these countries are all substantially lower income than the United States; we return to this point later.

At the same time, there is much more dispersion of employment and average hours among women. Figure 1 shows that, in keeping with earlier findings, the United States has an unusual combination of high female employment and long working hours; only the post-Communist economies of Russia and Hungary show a similar combination.

Figure 2 reports the distribution of working hours in discrete intervals, to show the prevalence of long hours (i.e., more than 40) and very long hours (51+ hours). Here we see again that the United States is not particularly unusual: when the countries are ordered by the proportion of men working very long hours, the United States falls in the middle. Even in many western European countries, the percentage of men and women reporting work weeks above 40 hours is higher than in the United States. The United States is somewhat unusual, however, in that relatively few employed women work 30 or fewer hours per week.

We now turn to our primary concern, hours disparities by educational level. Figure 3 reports the difference in average hours between high- and low-educated workers, or the “education hours gap,” for each country, by gender. There is a large differential everywhere, one which is generally larger among women than among men. But in contrast to the homogeneity in average hours, here the education hours gap takes two markedly different forms. One group of countries mirrors the United States: the highly educated work longer hours. That pattern is also seen in the United Kingdom and in seven continental European countries: Austria, Belgium, France, Germany, the Netherlands, Luxembourg and Switzerland. The reverse pattern is found in Mexico, in two former Eastern bloc countries (Hungary and Russia) and in two southern European countries (Greece and Italy). In three



**Figure 3. Differential in Average Working Hours between High- and Low-educated Workers**

**Note:** When the bar points to the right, highly educated workers have longer hours. When it points to the left, low-educated workers have longer hours. (The countries are ordered according to the size of the education hours gap for both genders combined.)

other countries—Ireland, Spain and Israel—the pattern is mixed, with women resembling the former group of countries and men the latter. This diversity complicates the earlier finding of Jacobs and Gerson; it is clear that while the U.S. pattern holds true for some countries, it does not hold true for others.

One possible factor underlying these patterns is different levels of employment at the different levels of education. Recall that, as Figure 1 shows, higher overall employment rates are associated with lower average hours, for both men and women. The explanation is not entirely clear; it may be that where the work week is more restricted (by regulation or union contracts, for example), some people are willing or able to enter the labor force, who would otherwise be nonemployed. Or it might be that where work hours are shorter, there are more jobs to go around, and thus a higher employment rate, consistent with one of the often-invoked reasons for reducing working hours. The same factors—including education—that make persons more likely to be employed may also make them more likely to prefer or be offered lower hours. It may also be that in countries with less generous policies in support of reconciling work and family, the population of women becomes bifurcated between those who take up careers and delay or forgo childrearing, and those who stay out of the labor force entirely to raise children. We would expect the former group to be made up disproportionately of those with more human capital.

It is therefore important to examine whether the education gap in hours is associated with a corresponding gap in employment. While the more educated

are almost always employed at higher rates than the less educated, the size of this differential varies substantially by country. Thus, to the extent that less-educated workers are employed at lower rates than more educated workers within a given country, we would also expect that those who are employed would report relatively longer hours. That is, there should be a negative correlation between the education gap in employment (the difference in employment rates between high- and low-educated workers) and the education gap in hours.

Figure 4 plots both employment and hours by country, disaggregated by education and gender. With respect to the United States, these figures seem to confirm the story told by Jacobs and Gerson and others: the more highly educated report more hours than the less educated. Note also that the difference is substantively quite large, although generally not quite as large as the gender gap. The gap in average hours between a high and low educated man is 3.7 hours, or nearly 9 percent, compared with the 5.5-hour gap between a highly educated man and a highly educated woman.

The varied country patterns seen in Figure 3 are driven more by differences in the hours worked by the less educated: in many of the richer countries, the less educated work considerably fewer hours. The standard deviation of average hours for the highly educated across countries is 2.9 for men and 2.9 for women, compared with 3.7 and 5.8 for the low educated. Moreover, cross-nationally, it does not appear that the differences in hours levels among countries are correlated with differences in employment rates.

### ***Multivariate Models: Regression Models of Employment and Hours***

The multivariate models analyze the within-country associations between education, hours and gender, net of a set of demographic controls. To examine the net effect of education on hours, we compare the coefficient for the “high education” dummy variable across models. (Because low education is the reference group, this amounts to comparing the education hours gap across countries, net of all the other controls.) Figure 5 reports this coefficient among the employed only.<sup>3</sup> Here we see that the pattern described in the prior section appears to hold. It is not as consistent as in the bivariate descriptive context—some confidence intervals cross the zero line—but the general clustering of countries persists.

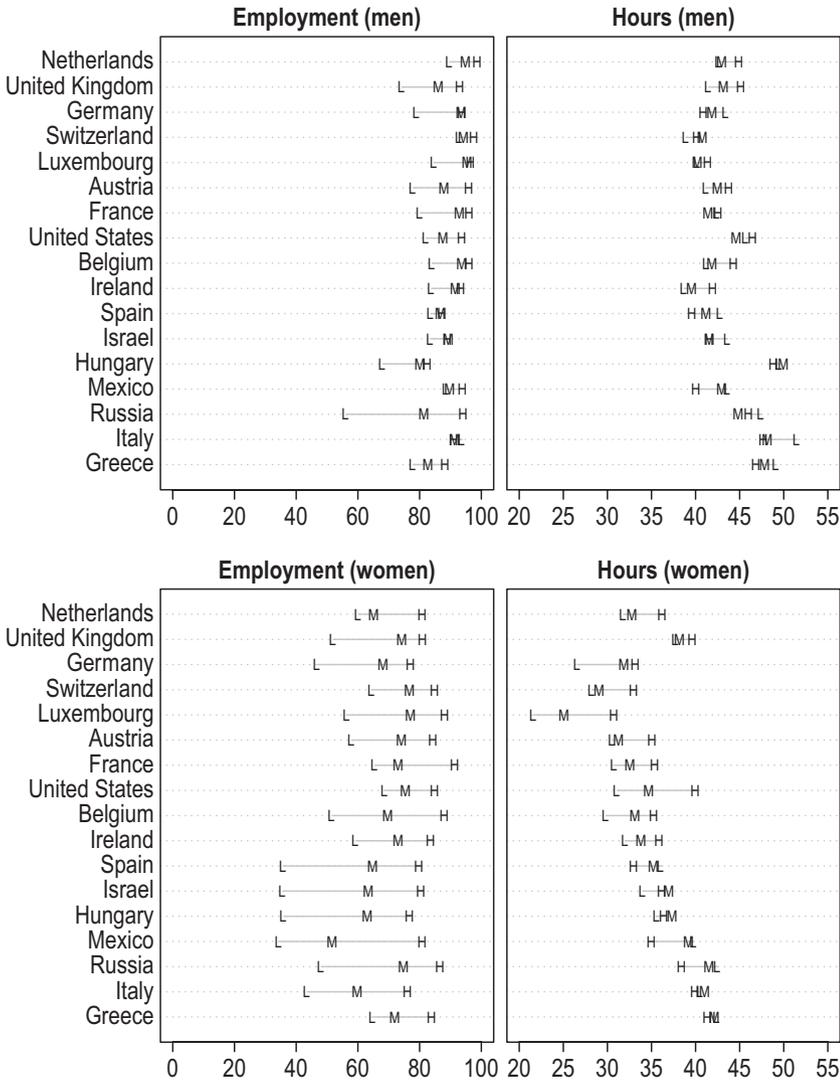
For both genders, however, the results of the multivariate analysis indicate that the observed variation among countries with respect to the education gradient in hours cannot be attributed entirely to the demographic composition of the workforce in these countries. This suggests that country-level differences explain at least some of the pattern.

### ***Country-Level Analysis***

#### ***Bivariate Comparisons***

The dependent variable for this analysis is regression-adjusted mean weekly hours, at the country level, based on the regressions in the previous section. We use eight different measures, reflecting the demographic distinctions we have identified so far: mean weekly hours for all men, for all women and for men and women of high, medium and low education.

**Figure 4. Hours by Education and Gender**



**Note:** As in the previous graph, the countries are ordered according to the overall size of the gap between high- and low-education workers, from highest to lowest.

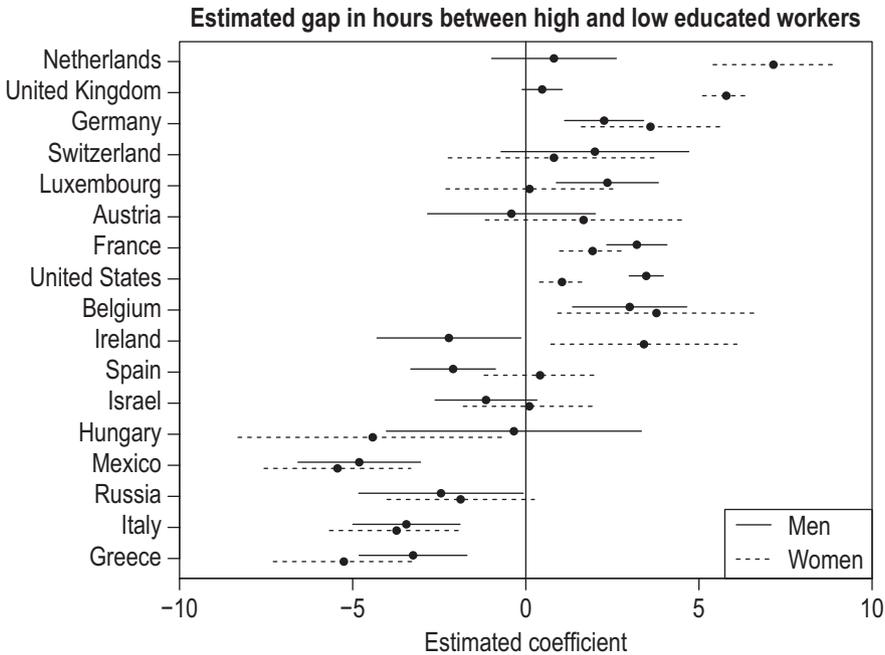
Figures 6, 7, 8, 9 and 10 show the associations between the country-level predictors that we have identified for this study and regression-adjusted mean weekly hours, with separate plots for men and women. In four cases the country-level variable on the x-axis is the same for men and women (GDP per capita, taxes, unionization and normal hours), while in one it differs (earnings inequality, which is calculated separately for male and female full-time workers). Because of data limitations, a small number of data points are missing:

inequality for Switzerland and union coverage for Mexico. Countries are plotted according to the mean weekly hours for all workers of each gender. Regression lines are drawn showing the relationship for all workers, and the relationship for each of the three education subgroups. So, in the left graph of Figure 6, the solid line represents the relationship between GDP per capita and regression-adjusted average hours for all men, while the other lines represent the relationship between GDP per capita and the average hours of each education group.

Higher GDP per capita is associated with lower average hours, in keeping with prior findings and theory; the relationship is somewhat stronger among women. Of more relevance to this analysis, however, is the difference between high- and low-educated workers. On the left side of these graphs, the line for the low educated is above the line for the high educated, indicating that the less educated work longer hours. On the right side of the graph, the relationship is reversed. Note that the relationship is negative for all educational categories, but more so for less-educated workers. This indicates that the gap in hours between high- and low-educated workers is higher in richer countries because the less educated work less, not because the more educated work more.

In Figure 7, we see that average income tax rates on wages are positively associated with hours, with the effect being somewhat smaller for women than for men. This complicates arguments, such as those of Prescott, that taxes reduce hours by

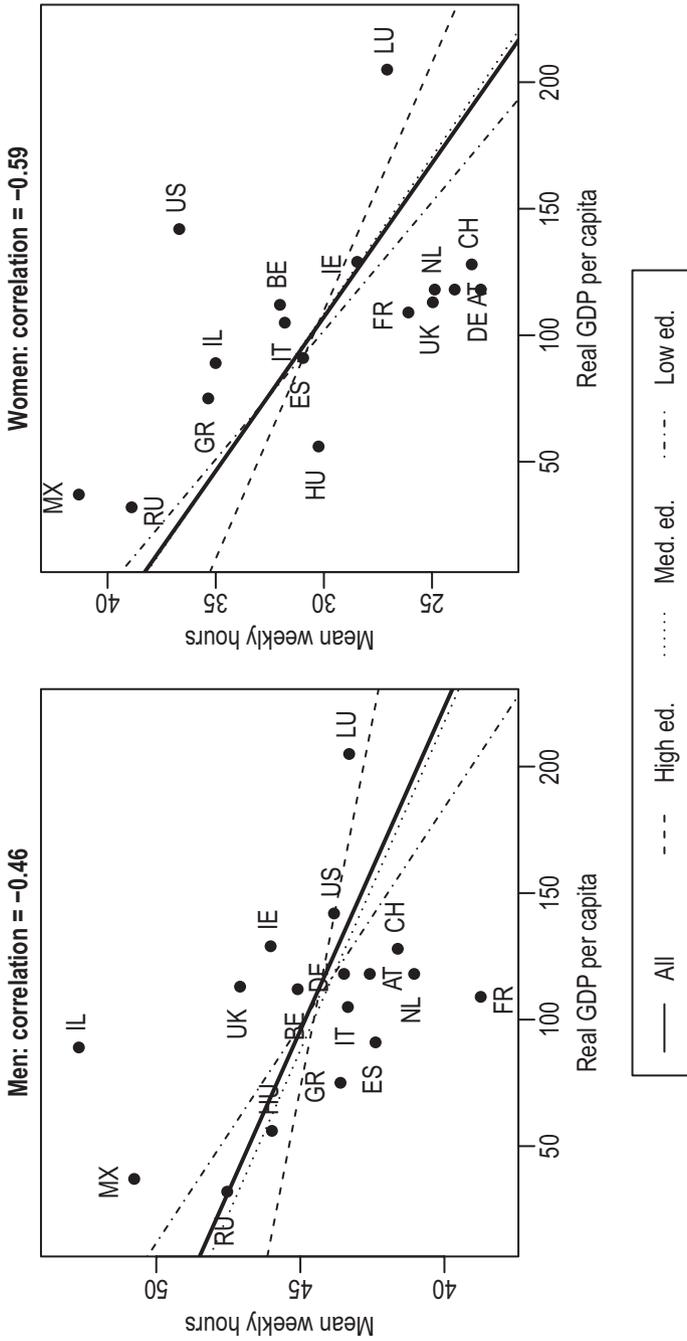
**Figure 5. Coefficient of High Education (vs. Low Education) on Predicted Weekly Hours, among the Employed, with 95-percent Confidence Intervals**



**Note:** As in the previous figures, the countries are ordered according to the overall size of the education hours gap.

disincentivizing work.<sup>4</sup> These results could indicate that labor supply in these cases is dominated by the income effect, in which higher taxes induce greater labor supply

Figure 6. Real GDP per Capita and Mean Weekly Hours, by Gender and Education Category



Notes: GDP is normalized, with 100 set to the OECD average. The plotted regression lines represent the association between the variable on the x-axis and regression-adjusted hours for all workers (solid line), the highly educated (dashed line), the medium educated (dotted line) and the low educated (dot-dash line). Points represent the regression-adjusted mean hours for all workers.

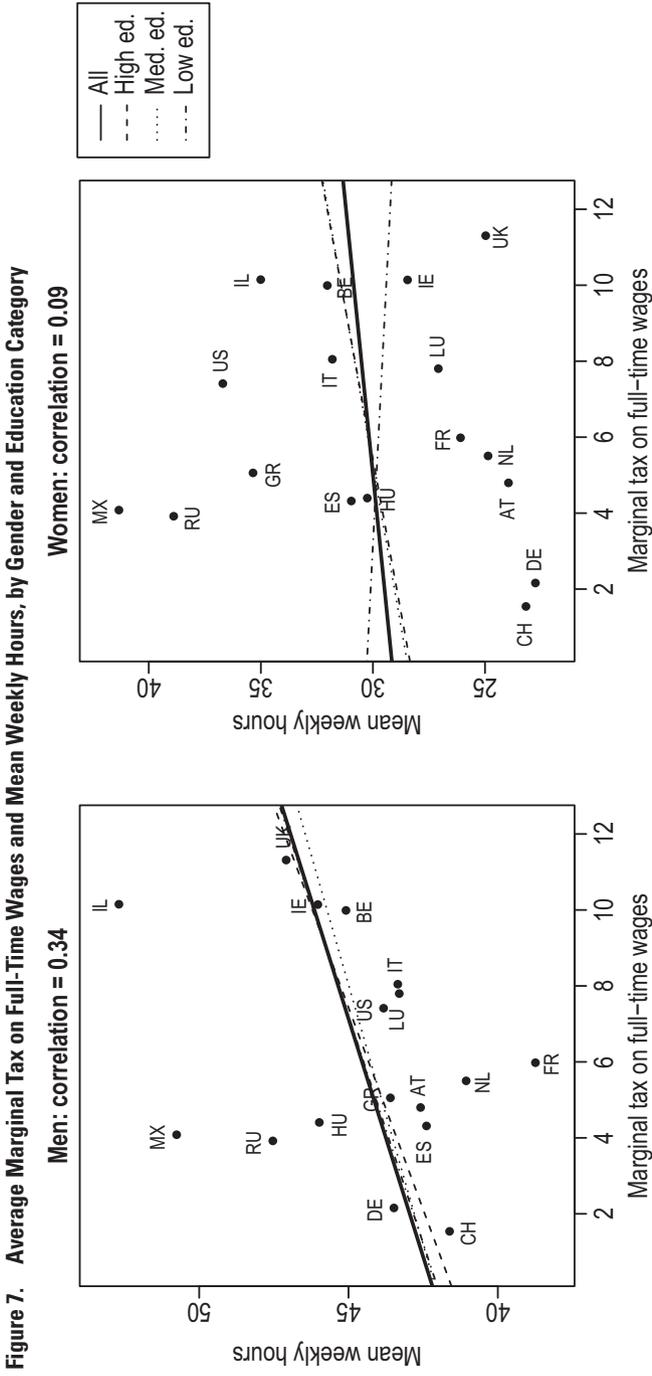
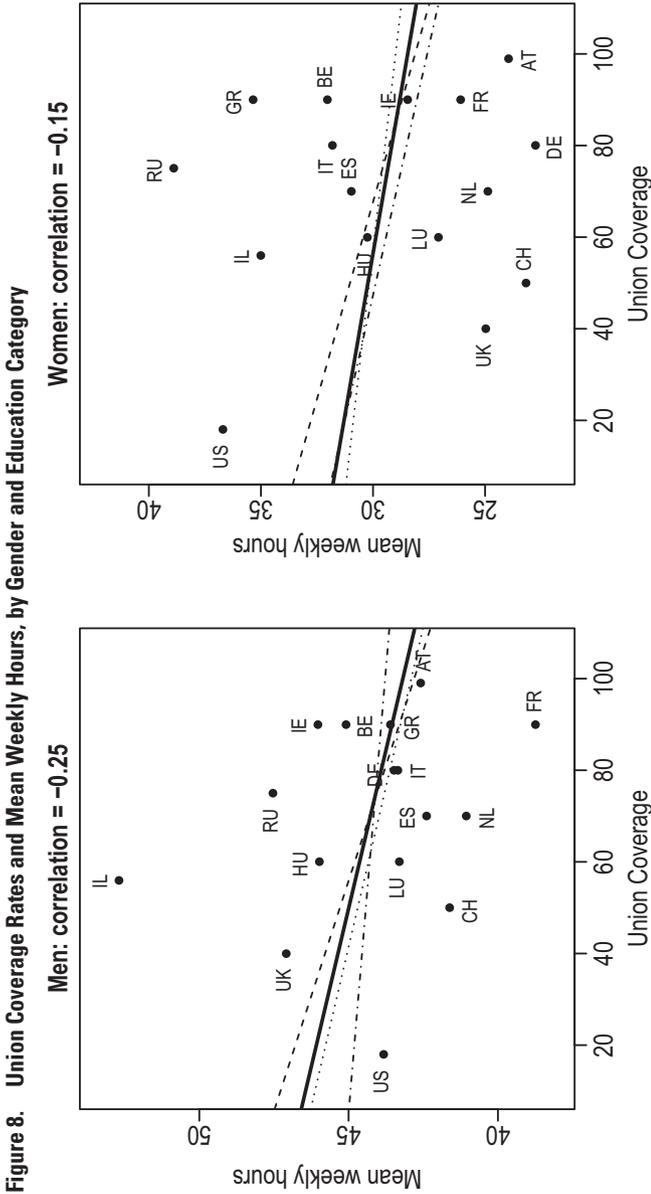


Figure 7. Average Marginal Tax on Full-Time Wages and Mean Weekly Hours, by Gender and Education Category

to maintain a given level of consumption, rather than a substitution effect where lower net wages lead to an increase in leisure or nonwaged work in the home.

With respect to our central research question, there is very little difference between the different educational attainment categories among men. Thus, although tax rates may help explain differences in overall hours worked across countries, they do not seem to explain the hours gradient by education *within* countries. Among women, however, hours among the more educated are more



sensitive to tax rates, suggesting that tax rates may play some role in explaining the relative labor supply of more and less-educated women.

In Figure 8, we see that higher union coverage is associated with lower hours, for both genders and across all education categories. Somewhat surprisingly, however, the effect is strongest among highly educated workers. In the countries in this analysis, we see that for both genders, and especially among men, union coverage is negatively correlated with GDP per capita, and so lower rates of union coverage may be one reason why highly educated workers report relatively longer hours in the richer countries.

Figure 9 reports the relationship between normal weekly hours (as defined by law or the average of collective bargaining agreements) and average weekly hours. Across all demographics, there is a strong positive association: where the normal hours threshold is higher, people work more. However, the relationships are different for high- and low-educated workers. As expected, a higher normal-hours threshold is much more strongly associated with higher usual weekly hours, for less-educated workers. Note the gray line on these plots, which indicates the point at which normal hours thresholds and average reported weekly hours are equal. Among men, reported usual weekly hours are higher than the normal hours threshold in all countries but Switzerland (this is still the case even if raw means are plotted instead of the regression-adjusted values).

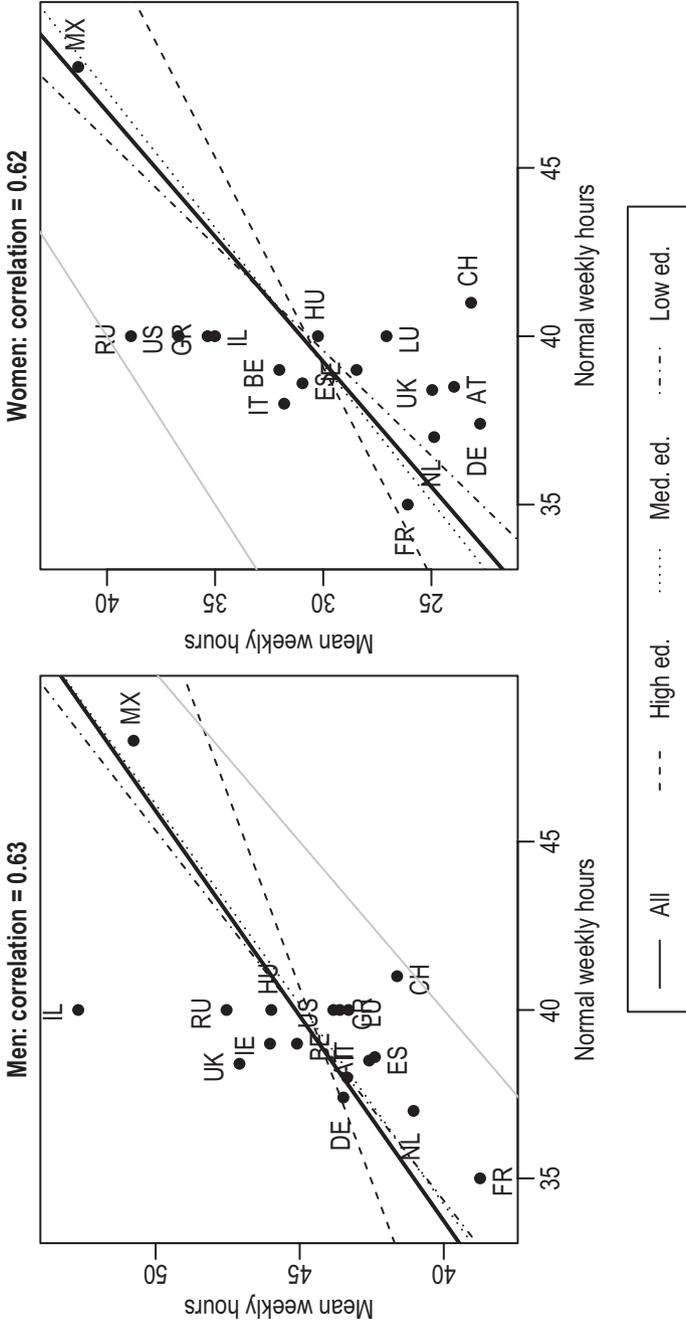
Earnings inequality generally shows a positive association with hours, with the exception of bottom-half inequality and women's hours. The association is stronger for highly educated workers—more strongly positive for top-half inequality and bottom-half male inequality, and more strongly negative for bottom-half female inequality. These results provide some support for the effect of inequality on hours, in either the “carrot” or the “stick” formulation described above, both of which predict a positive association. It is surprising, however, that top-half inequality has the strongest relationship with the hours of less-educated workers, who are the least likely to have earnings in this part of the distribution. This raises the possibility that the *perceived* future rewards to long hours may be more important than the perception of current promotion prospects of these workers.

## Discussion

In our cross-national analyses of weekly work hours, we have found that:

- Men report surprisingly long weekly hours in all of the countries in our study, and (contrary to expectation) men's average weekly hours in the United States are not much higher than in other countries, while women in the United States report a combination of both long hours and a high employment rate not often seen in other comparably rich countries.
- Confirming prior research, in the United States highly educated workers report longer hours than the less educated.
- The education gradient in hours is not uniform across countries. In general, the U.S. pattern holds only in the richer countries in our study, with less affluent countries showing the reverse pattern, with the less educated reporting longer hours.

Figure 9. Normal Weekly Hours (Statutory or Average of Collective Bargaining Agreements) and Mean Weekly Hours



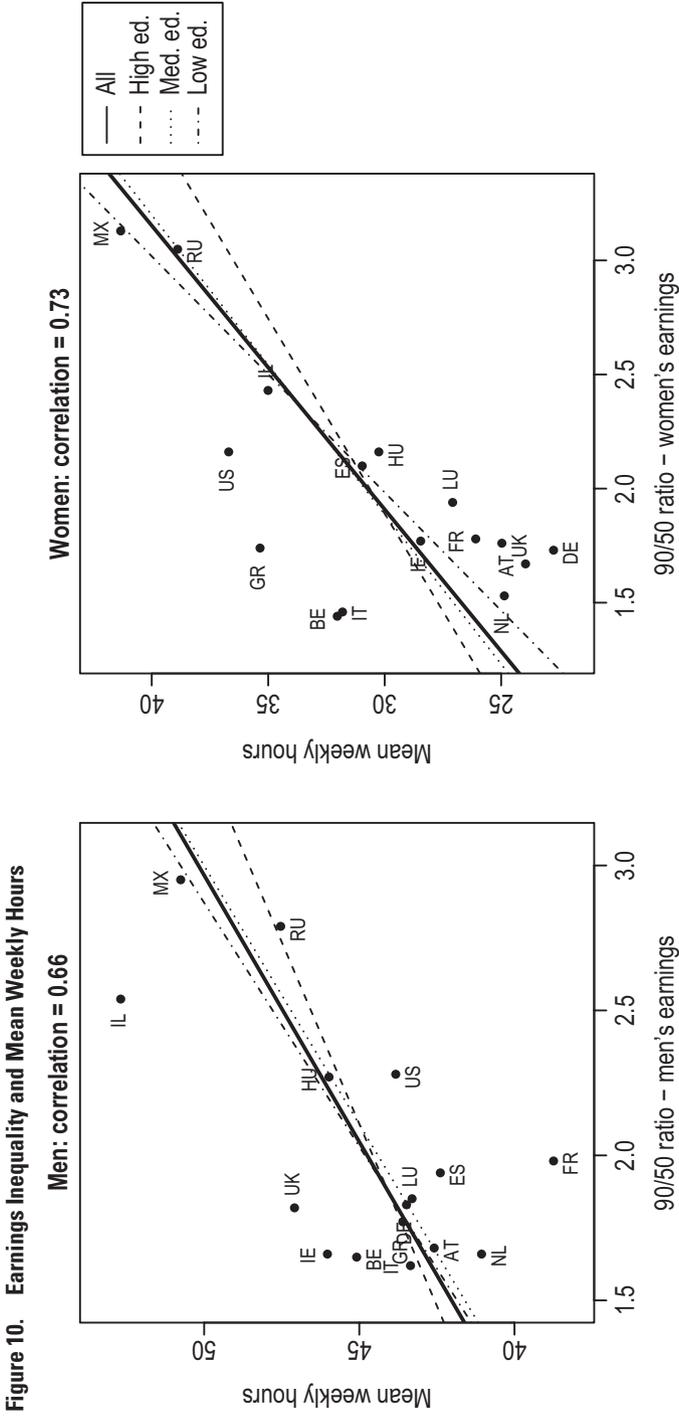


Figure 10. Earnings Inequality and Mean Weekly Hours

- Confirming prior research, higher average hours are associated with several country-level factor: high GDP per capita, low union coverage, high normal weekly hours thresholds and high inequality (especially in the top half of the distribution). Higher tax rates are associated with higher hours, however, contrary to the prediction made in other research.
- Country-level factors associated with the pattern of hours gaps found in af-

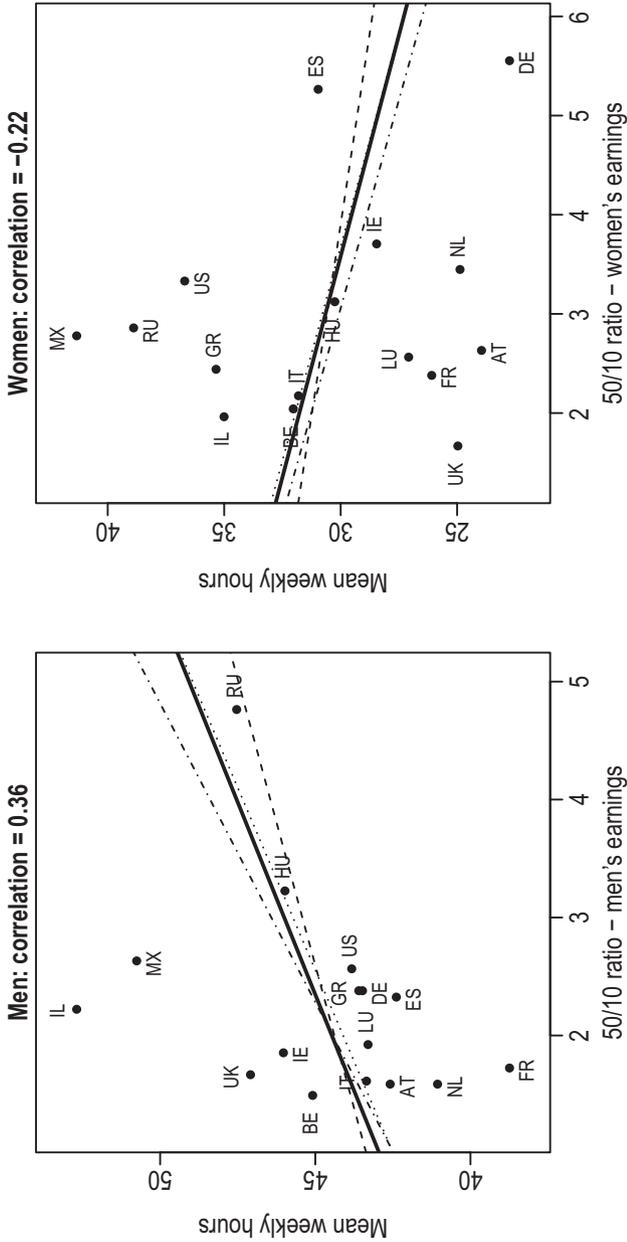


Figure 10. continued

fluent countries include high GDP per capita, low levels of union coverage, low normal weekly hour thresholds and low levels of earnings inequality. While tax rates are associated with longer hours, the association only differs between levels of educational attainment among women.

These findings suggest a number of avenues for future research. More research is needed to explain these new findings on the education gradient in hours across countries. Our preliminary work shows that there is a general relationship between a country's GDP per capita and the education gradient in hours. However, the details of this relationship are not consistent with the theory of the backward-bending supply curve for labor that is often used to explain the general association between country income and hours. It is the least educated workers, who have the lowest earnings on average, who show the strongest negative association between national income and working hours. In explaining this pattern, we find evidence for the importance of country-level institutional factors such as unions and hours regulations. We also find some evidence of the importance of individual preferences, as reflected in the responsiveness of highly educated workers' hours to inequality and to tax rates.

This study includes a small number of countries and fairly crude macrolevel measures. Future studies with more countries could address the relationship between individual- and country-level factors with greater precision, through the use of techniques such as multilevel modeling. The inclusion of more middle- and low-income countries is also important for future research, because this study has shown that the distribution of hours differs greatly by national income level. More precisely constructed macrolevel variables, such as inequality and tax rate measures at the occupation level and a more disaggregated measure of direct labor market regulation, could better illuminate the relationships we have found. Finally, the focus on weekly hours could be expanded to a treatment of annual hours, where the United States is a notable outlier both in its high reported level of hours and in its minimal regulation of hours through mandated paid annual leave.

Another limitation of this study is its strictly cross-sectional design. A stylized fact produced by our inquiry is that, in the highest income countries, the most highly educated work the longest hours, while in lower income countries, the less educated do. A key question is whether, as countries move up (or down) the global income ladder, their distributions of working hours change to conform to this pattern. And if so, through what mechanisms?

The analyses presented here underscore the importance of understanding the ways in which the distribution of working time is stratified and unequal, both within national labor markets and across countries. At the same time, we have emphasized the degree to which long work weeks, often above the established threshold, are common in all segments of the labor market. Of course, these facts are open to a wide variety of normative and policy interpretations, of which we introduce only a few. The prevalence of very long hours raises the possibility of widespread overwork or overemployment associated with it, topics that call for future research. The long weekly work hours among men, in particular,

pose a potential obstacle to equalizing the distribution of household labor and unpaid care work between men and women. And in light of the economic and political arguments in favor of reducing hours, those concerned with designing and implementing policy should attend to the relation between long hours and inequality, as well as the seemingly weak responsiveness of labor supply to tax rates on earnings. But regardless of whether societies want to increase, redistribute or decrease hours, it is vitally important that we understand who works how many hours, and what motivates them to do so.

## Notes

1. For details on all LIS datasets (including the names and exact years of the original surveys, response rates, sampling frames and sample sizes), see <http://www.lisdata-center.org>.
2. Choosing different values does not substantively change our results, nor does using the unadjusted raw means.
3. In an analysis not shown here, we also estimated models of employment, using the same predictors. When comparing the models for each country, the low educated have a lower probability of employment, but there is no consistent pattern beyond that. This is further evidence against the explanation of hours gaps in terms of differential probabilities of employment.
4. The discrepancy between our findings and Prescott's may relate to the way in which taxes are measured: we prefer our variable because it uses a direct estimate the marginal tax on wages, whereas Prescott uses strong modeling assumptions to derive marginal tax rates from national accounts.

## Supplementary Material

Supplementary material is available at *Social Forces* online, <http://sf.oxfordjournals.org/>.

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