Different but Equal: Total Work, Gender and Social Norms in EU and US Time Use

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General introduction

Facts about work time, unemployment and labor-force participation in the US and Europe have been established for many years. Researchers have charted their changes, and transatlantic di erences in their levels and vicissitudes have been studied at great length. Facts about how Americans and Europeans spend their time away from the labor market and how these have changed over time have barely been considered. Even within the context of market work, we know almost nothing about how the timing of this activity—across a day or a week—di ers across the Atlantic. Our general purpose here is to establish a variety of new facts about both of these dimensions of human behavior—the amount of di erent types of non-work activities undertaken in Europe and the US, and the timing of market work—and to o er some theoretical explanations for them.

The issues that we study are important for a variety of reasons. If nothing else, however, simply adducing these facts has the tremendous virtue of enhancing both scholarly and public awareness about some characteristics of human behavior that are central to people's conceptions about how societies function and that can inform average citizens' views of what is occurring in their own and others' economies and societies. As such, the facts and their explanations perform, we believe, a general educational function that should not be underestimated. On narrower, economic grounds they allow us to study current di erences and recent changes in well-being (economic welfare) across countries along a variety of dimensions. We believe that this is a major step beyond merely looking at the amount of non-work activity and basing discussions of well-being on that one dimension, which is narrow both in terms of what people do and when they do it.

In Chapter we focus on data describing the time that people spend in each of the many activities that make up their day. We focus on data from the late s and early s, and for the early s, for Germany, Italy, the Netherlands and the US. We examine patterns and changes in non-work activities that we classify into several major groups; but we also examine them in less detail for each of twelve other countries, most of them in Europe. We pay substantial attention to di erences by gender, but our major focus is on the patterns of di erences between the EU and US in the kinds of

non-market activities undertaken and their distribution. We then proceed to ask such questions as: How do patterns of work activities di er over the week, and over the day, in the EU and US? Would market work in the EU look the same as in the US if Europeans had the same patterns of daily and weekly market activity as Americans?

In Chapter we o er a variety of explanations for some of the facts that we have discovered in Chapter . Of particular interest is our attempt to explain our findings about male-female di erences in the amount of total work—market work plus household production—that we discussed at length in the previous chapter. We examine the minimal requirements of a theory that might explain our findings, and in doing so we develop a theory of the mechanisms by which social norms can a ect sex roles in market and non-market productive activities. The chapter then proceeds to consider the welfare implications of coordinating non-market activities within a local or national economy and develops a model that helps to explain some of the findings in Chapter on the timing of market work.

While Chapter dealt with the work-leisure distinction and the timing of work, Chapter is concerned with the mix of work activities between the market and the home. We first derive some predictions about the relative importance of income and after-tax wages on market versus household work. We test these ideas on some of the data that we developed in Chapter , focusing on the role of di erences in labor taxation across the various EU countries and the US. We then consider how the choice between market and home work is altered when working the market engenders set-up costs—when market work is costly in terms of money and/or time over and beyond remunerated time. We examine the role and e ects of these costs on the same current data for Germany, Italy, the Netherlands and the US that we analyzed in Chapter . This discussion allows us to infer how working in the market alters what people do outside the market; as such, it provide insights into the welfare e ects of di erent patterns of market work.

Without going into the specific findings or explanations that this essay generates, a reasonable generalization of its results and analysis is that the US really is di erent from Europe in ways that had not previously been pointed out. Nonetheless, there are striking similarities within societies that, we believe, stem from an underlying sameness in people's basic values along a number of dimensions. We hope that our analyses will pave the way for substantial additional research that compares Europeans and Americans along dimensions beyond the narrow one of the amount of market work that is undertaken on the two continents.

CHAPTER

Time use and timing of work inside and outside the market

I. Introduction

An immense literature has examined US-European di erences in labor-force participation rates, weekly work hours, annual work hours, vacation time, etc., making the simple distinction between market work and all other time—all non-work (e.g., recently, Prescott, ; Alesina, Glaeser, and Sacerdote, . The narrower question, "What are the di erences between the US and Europe in what people do with their time when they are not on the job?" has only rarely and partially been addressed (Freeman and Schettkat,).

The answer to this question is crucial for a variety of reasons. In terms of understanding di erences in well-being within the EU, and between the EU and the US, we cannot simply look at the amount of time spent in work in the market and time outside the market. While the nature of work differs across members of the labor force, at least all work can be viewed as something that individuals must be induced, through the receipt of a wage, to undertake. No such logical homogeneity exists with the broad category of non-work time. A half-hour spent changing an infant's dirty diaper is probably less enjoyable than a half-hour of sexual activity. Indeed, the two are totally di erent conceptually: The former is something that one can pay someone else to do; the latter cannot be "contracted out"—the pleasure from it generally cannot be obtained vicariously. With this consideration in mind, it seems reasonable to examine di erences in non-market time use across countries. Equally important, it is worth examining how these di erences might have changed in the past years.

The scholarly examination of people's choices between work and non-work has probably been the most heavily pursued aspect of labor economics (Sta ord,). The reason for this attention is partly the importance of the topic, but partly too the ready availability of data from many countries that allow us to examine demographic and economic di erences in and the determinants of the probability that people work, their weekly and annual hours of work, and the behavior of their work time over the life cycle. Despite the obvious importance of looking more closely at how people spend their non-work time, relatively little attention has been paid

to describing its patterns and examining its determinants. A few studies have considered how the price of time a ects the distribution of nonwork time (Kooreman and Kapteyn, ; Biddle and Hamermesh,); others (Gronau and Hamermesh, ; Hamermesh,) have examined how economic factors a ect the diversity of activities in which people engage outside the workplace and the extent to which they seek temporal variety. Generally, however, this line of inquiry has been limited by the relative paucity of available data sets. Until recently no country provided data on a continuing basis on how its citizens spend their time, and many have never provided such information. This absence of data has begun to change, and that change is what enables us to examine issues of the allocation of nonmarket time.

In this initial chapter we discuss a way of classifying the myriad di erent activities that people undertake outside the market. Some classification is necessary if we are to make what is an immense amount of information manageable. We then describe how the relevant data sets are collected and the benefits—and pitfalls—associated with drawing inferences from these data. Next we present simple comparisons of time allocation for Germany, Italy, the Netherlands and the US separately at a point in time and over time. We then examine in less detail the same issues across similar data sets for many countries at a single point in time. We inquire into whether the observed changes in time allocations within each of the four main countries studied are attributable to changes in their citizens' characteristics. The final substantive discussion deals with the timing of these various activities—does timing di er across countries, and how has it changed.

II. The economic motivation

The basic theory underlying our discussion is that of home production—the idea that people choose how much to work in the market and how to combine the remaining time with the goods that they purchase with their earnings (and unearned income) in order to maximize their satisfaction (Becker, ; Gronau,). The fundamental contribution of this idea is that on average those people with higher prices of time (higher wage rates) will substitute purchased goods for time in producing "commodities" that contribute to their well-being. Thus a high-wage American couple will spend their time flying to the Côte d'Azur for a one-week holiday, while a lower-wage American couple will take a two-week caravan trip to the Great Smoky Mountains National Park. Both households have the same amount of time; but because the former has, at least potentially, a much higher income, unless it saves the entire di erence between its income and the lower-wage couple's income, it will enjoy vacation time that

is more "goods-intensive." The well-o household must economize on its relatively scarce time; the poorer household must economize on the relative scarcity of goods it can purchase.

The number of di erent possible activities—combinations of goods and time—that one might consider is nearly infinite. All of these household activities can be viewed as part of household production—the generation of satisfaction-enhancing commodities through the combination of time and purchased goods. Yet we need to devise some way of aggregating them into useful economic categories in order to be able to talk about them and measure them. There is no single correct way of classifying these commodities and the time inputs into them: Aggregation methods are necessarily arbitrary. The one we use here has the virtue of providing fairly clear-cut economic distinctions while still reducing the number of aggregates to manageable proportions.

The first type of activity is that for which people are paid: **Market work**. We assume that people would not be working the marginal hour in the market if they were not paid, so that at the margin work is not enjoyable (or at least is less enjoyable than any non-work activity at the margin). Market work is the only category of activity currently included on the production side of national income accounts. In the economics literature it has, as our Introduction suggested, generally been treated as the flip-side of the aggregate of all activities outside the market.

Some of the activities in which we engage at home, using our own time and some purchased goods, are those for which we might have purchased substitutes from the market instead of performing them ourselves. We can hire someone to cook our meals (and buy the food) and clean up the dishes afterwards; we can hire nannies to care for our children instead of spending the time ourselves; and we can hire a painter rather than paint the living room ourselves. Such **secondary activities**, those that satisfy the third-party rule (Reid,) that substituting market goods and services for one's own time is possible, may be enjoyable, even at the margin; but they still have the common characteristic that we could pay somebody to perform them for us and we are not paid for performing them.

The extent to which secondary activities are contracted out is important in evaluating levels and changes in households' well-being, since we measure economic well-being by GDP, what is produced in the market. To the extent that in any country over time households are reducing the amount of secondary activities that they undertake, measured GDP will be growing more rapidly than the country's actual economic welfare. For that reason alone it is crucial to measure levels of and changes in secondary activities and to distinguish them from other household activities, and some e orts

have been made to propose methods of doing that (Abraham and Mackie,).

Other activities are things that we cannot pay other people to do for us but that we must do at least some of. We must sleep, have sex or eat for ourselves in order to derive any benefits from these activities—nobody else can do these for us and still let us derive any benefit from them. Someone else can shop for the bed, condom or food for us; but the actual production of the activity is ours alone. Such **tertiary activities** form the third general aggregate. It should be *prima facie* clear from this distinction between them and secondary activities why it is important to disaggregate non-market time: A drop in non-market time because people are contracting out more activities has much di erent implications for their well-being than does a similar decline in tertiary activity. The two types of activities are imperfect substitutes, nor are they likely to be equally substitutable for market work (the standard condition allowing aggregation).

The fourth and final aggregate is **leisure**. We include in this category all activities that we cannot pay somebody else to do for us and that we do not really have to do at all if we do not wish to. Television-watching, attending religious services, reading a newspaper, chatting with friends, etc., should be included in leisure. Leisure, of course, is inherently satisfying; but so is some (probably infra-marginal) secondary time, such as the first minute spent mowing the lawn or the first time one reads a new book to one's three-year-old; so too clearly are the first few hours of sleep in day (see Abraham and Mackie,). What distinguishes leisure from the other types of home activities is that one can function perfectly well (albeit not happily) with no leisure whatsoever: None is necessary for survival.

We believe that this fourfold distinction is theoretically useful and can be implemented empirically. Nonetheless, as with any accounting system, many of the classifications can be debated. Some might argue that religious activity should be viewed as a tertiary activity, since its ubiquity throughout human history might suggest that it is as necessary as sex. Obversely, given that most sex today is not for procreation, it might as well be classified as leisure rather than as tertiary. While bathing is nearly universal, one could argue that it is not a human need and should be viewed as leisure. All secondary activities contain at least some consumption component and might be viewed at least partly as leisure; all tertiary activities have some leisure component; and many leisure components, for example, exercise, might be

The example that is often brought up by those concerned about national income accounting is that of volunteer work (see Abraham and Mackie,). We count it as leisure, but one might argue that volunteer work could be performed by market substitutes and should be included as a secondary activity; alternatively, one might point out that it is mostly consumption and should be included as leisure.

viewed as investments (e.g., in health) that could be classified as tertiary. The main point is that one must choose a set of aggregates that can be consistently implemented across time and space.

In what follows we examine how activities have been divided among these four aggregates in Germany, the Netherlands and the United States, and how that division has changed in the past two decades. We also examine in less detail data on time use from three other countries, Spain, Australia and Japan, at one point in time; and we present brief summaries of data from nine other countries. Because one or two activities constitute the major component(s) of these aggregates—e.g., sleep in tertiary activity, television watching in leisure—we also focus attention on several sub-aggregates for the four main countries that we study.

III. Data on time use—generally and in this study

A. General description. In this Section we describe time-use data generally and the main data sets we use specifically. We do this because these data underlie both the evidence we provide in this and the subsequent chapters and because such data are much less familiar to economists and the general public than are the conventional labor-force data that obtain information on time spent at work in some recent week or year.

An increasing number of national governments have conducted time-diary surveys. While such surveys have been conducted for over years (Sorokin and Berger,), it is only recently that they have been fielded on regular bases in many industrialized countries. The general idea in a time-diary study is to give each respondent a diary for one recent (typically the previous) day and ask him/her to start at the day's beginning with the activity then underway and then indicate the time each new activity was undertaken and what that activity was. The respondent either works from a set of codes indicating specific activities, or the survey team codes the descriptions into a pre-determined set of categories. No matter how extensive a set of codes is, each survey will have a di erent way of coding and aggregating what might seem like the same activity to an observer. Time diaries have the virtue of forcing respondents to provide a time allocation that adds to hours in a day. Also, unlike retrospective data about last week's or even last year's time spent working, while the time-diary information is necessarily based on recall, the recall period is only one day.

In some time-diary studies only one day's diary is collected from one household member; in others, several days' diaries and/or several household members will appear in the sample. The extent of demographic and economic information available also varies across surveys, with economic characteristics in most of the surveys being fairly sparsely reported. With

one old and very minor exception, none of the time-diary studies provides longitudinal information (except for the very short-term information generated because diaries are kept for two or more days within the same week).

B. The specific data. While many European countries have now generated time-diary surveys, in most cases these have been recent one-o e orts to measure the allocation of time. Only a few countries have undertaken repeated surveys, albeit at irregular intervals, that have used identical or nearly identical categorizations of activities and that thus allow us to compare how non-market time use has changed over time. For that reason, although we recognize they can in no sense be viewed as representative of how Europeans use time, we concentrate most of our attention here on Germany, Italy and the Netherlands. We do not argue that these countries are typical of the EU in any way. Rather, all three have produced large nationally representative time-diary surveys recently and around years earlier, and in all three the surveys and coding mechanisms were nearly identical (in Germany and the Netherlands) or fairly similar (Italy) over time.

The German data are from the / and / *Zeitbudgeterhebungen* conducted by the German Statistiches Bundesamt ( ). Adult members of each household were asked to complete time diaries on two consecutive days. In / nearly , individuals completed diaries, with nearly all respondents completing diaries on two days (so that with minor discrepancies the days are equally distributed across the week). In / we have diaries from , people, about half with diaries on two consecutive days, half on three consecutive days, with the survey days disproportionately recorded on weekends. The categorization of activities allowed for over di erent activities, with coding being almost identical in the two surveys; and respondents could report their time use in five-minute intervals. Because the survey was undertaken immediately following re-unification, we restrict almost all the discussion of the German data to the former West Germany. We do, however, present a brief discussion of these major dimensions of time use in the former East Germany.

The Italian household diaries *Uso del Tempo* were conducted over - month periods in / and / by ISTAT (see ISTAT, for a description of the recent survey). Roughly , individuals, each in a separate household, completed a time diary for one day in / , as did roughly , people in / . Diaries were collected in roughly equal numbers in each case from among the five weekdays as a group, Saturdays and Sundays. The possible categorizations of activities in / totaled around , while in / categories were possible. There is no direct mapping from the earlier to the later data, although the market work and secondary time categorizations are very closely comparable.

The Dutch *Tijdbestedingsonderzoek* (NIWI,) is a quinquennial cross-section time-budget study that has been conducted since . In our analyses we use the surveys conducted in October and October . The survey covered adults, the survey adults, with one from each household, whose diary records were kept for seven consecutive days (Sunday through Saturday). In each case half the sample produced diaries in one week, half in the next; but because one of the two weeks in included the Saturday/Sunday when Europe went o Summer Time, we can only use one week's data from that survey. Each individual listed the activity engaged in at each quarter-hour of the previous day. The range of possible activities encompasses over usable activities, with the coding being almost identical in the two surveys that we use here.

Until the United States lagged much of the developed world in the availability of time-diary information. There had been occasional small-scale surveys, but no large-scale nationally-representative survey had been conducted. We thus use the Time Use Survey (Robinson and Godbey,), a university-conducted survey of individuals, including both spouses in a married-couple household, each of whom kept a diary for one day that covered activities on the previous day. A total of activities was possible, covering, as in the Dutch data, activities in each quarter-hour of the previous day. The hebdomadal distribution of days is nearly uniform.

American backwardness in the production of time-diary data ended with the introduction of the American Time Use Survey in . The ATUS for o ers one-day diaries from nearly , individuals (see Hamermesh, Frazis, and Stewart,). Because exact starting and stopping times for each activity are listed in these computer-based telephone surveys, the duration of activities is variable to the minute. The survey offers basic categories. The ATUS collected half the diaries on the two weekend days, while the other half was spread across the five weekdays.

The tables in the appendix to this chapter summarize, for each of the eight surveys, the main categories (in the German data, , for example, in the ATUS) that make up each of four aggregates on which we concentrate. The descriptions are translated from the originals.

Throughout this chapter we restrict comparisons for Germany, Italy, the Netherlands and the US (and also for Spain, Australia and Japan) so that all

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Even this large number of activities results from combining time spent reading each particular newspaper and magazine into one overall category, newspaper/magazine reading.

Although it is not relevant for our purposes, the ATUS is an on-going survey that will be generating roughly time diaries each month into the foreseeable future. As such, it is the first and only continuing time-diary study in the world.

the data sets are based on individuals ages through . This eliminates only a few teenagers or much older citizens. The restriction is imposed to ensure comparability across the data sets, as they di er in the minimum ages surveyed and, in a few cases, in the maximum age covered. More important, since we wish to obtain statistics describing a representative day of the week, and some of the surveys over-weighted weekends, we weight all calculations to adjust for this statistical problem and thus present data for a representative day.

C. Pitfalls. There are a number of problems with time-diary data generally and with the particular data sets that we use. Unlike well-known national longitudinal or cross-section household surveys, response rates in time-diary surveys are quite low. Many more potential respondents in the sampling frame must be contacted in order to obtain a reasonable size sample of diaries. In the ATUS, for example, the non-response rate was over percent, and it was above percent in the Dutch data. Whether the respondents are a random sample of the population along observable dimensions is not always clear, but there is some encouraging evidence on this for the ATUS (Abraham, Maitland, and Bianchi,). The more di cult question is whether non-response is non-random along unobservable dimensions that may be correlated with the distribution of activities and/or with the observable demographic/economic variables used to describe patterns of time use. We cannot infer the extent of biases from this source with the available data; but their possible existence should make one more wary about results using time-diary data than about inferences based on the more commonly used household data sets.

Most people engage in more than one activity at the same time during at least part of their waking hours. Unfortunately, the Dutch data allow the respondent to list only one activity at a time, as does the American TUS. The ATUS does allow people to list childcare as a second activity, but it is the only second activity that is recorded. The German and Italian data sets do provide fully for the possibility of second activities. The general absence of information on secondary activities means that, to the extent that the amount of multi-tasking increases over time, as we would expect if full incomes are rising and variety of activities is a superior good (as shown in Gronau and Hamermesh,), comparisons over time will automatically be biased. All we can hope is that these biases are minor over the fairly short periods (to years) that we examine compared to any other secular trends that we observe.

As we have noted, the di erent countries' time-diary data are based on di erent categorizations of activities. Even with the broad aggregations on which we base our analyses, we cannot be certain that an activity that we

classify in the United States as, for example, leisure would be classified as leisure in Germany. Indeed, even if the same categorizations were used in all four countries, cognitive di erences due to language and culture could well generate di erent categorizations of what an outside observer would view as the same activity. One must be very careful about making cross-country comparisons of the amounts of time spent in di erent specific activities, and even of time spent in these broad aggregates.

The problem is much less acute if we merely compare changes in time use over time within a country based on diaries using the same categorizations. Thus comparisons of changes in time allocation over a decade in the Netherlands and Germany thus seem fairly safe. Even here, however, comparisons across time can pose some problems. The more recent Dutch and German categorizations allow for the category of time spent on computers at home for work or non-work purposes. Does time spent on such activities take the place of what would have previously been leisure, such as playing games? Or does it substitute for secondary activity, such as managing household finances using pen and pencil? We cannot be sure how the coding of activities changes when new possibilities are provided; and there are always wholly novel activities that did not even exist earlier. The problem is more severe in the comparisons within Italy over time, as the number of possible categories is much greater there, and time spent in travel cannot be specifically linked to other activities in / , while it can in / . The problem is still more severe in the US data, as there are many more categories in the ATUS than in the TUS and the surveys were conducted by di erent organizations.

We believe that, because we concentrate on broad aggregates, problems with making comparisons over time within the Netherlands and Germany are minimal. Even less problematic are comparisons at a point in time, such as across demographic groups, within any of the countries that we examine. Any cross-country comparisons of time use that we or anyone else makes should, however, always be taken with several grains of salt, and those that we do make here should be viewed as very tentative at best.

IV. Time Use in Germany, Italy the Netherlands and the United States, 1985-2003

A. Differences in time allocation. The first thing to examine is simple aggregate information on how people in each of the four countries spent their time and, more important, how their use of time changed within each

In constructing the aggregates for / we prorate travel time among the three aggregates that are not necessarily mainly conducted at home—market work, secondary activities and leisure.

Table 1.1. Time Allocations (minutes), Averages and Their Standard Errors, All Individual Ages 20-74*

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	6,928	7,239	25,490	37,882	1,531	1,586	3,567	17,668
Days surveyed	2	2 or 3	1	1	7	7	1	1
Market work	**263.9 (2.0)**	**197.7 (1.7)**	**248.5 (1.8)**	**207.4 (1.4)**	**174.2 (2.4)**	**189.5 (2.5)**	**245.8 (4.6)**	**255.9 (2.1)**
Secondary time	**220.5 (1.5)**	**242.7 (1.3)**	**236.1 (1.4)**	**237.3 (1.1)**	**221.0 (1.8)**	**206.0 (1.7)**	**200.5 (3.1)**	**218.0 (1.5)**
Family care	22.6 (0.5)	29.8 (0.5)	32.1 (0.4)	29.6 (0.4)	37.0 (0.8)	34.0 (0.8)	30.0 (1.2)	44.5 (0.7)
Shopping	42.6 (0.5)	57.4 ()0.6	38.4 (0.3)	43.3 (0.3)	41.0 (0.7)	44.2 (0.7)	50.1 (1.4)	51.4 (0.6)
All work	**484.5**	**440.4**	**484.6**	**444.7**	**395.2**	**395.5**	**446.3**	**473.9**
Tertiary time	**639.3 (1.1)**	**664.9 (1.0)**	**677.6 (0.7)**	**594.0 (0.6)**	**634.9 (1.3)**	**646.8 (1.3)**	**648.0 (2.4)**	**628.5 (1.1)**
Sleep	501.2 (0.9)	503.9 (0.8)	515.0 (0.6)	497.9 (0.5)	500.1 (1.0)	513.7 (1.1)	481.2 (2.0)	503.3 (1.0)
Leisure	**316.2 (1.5)**	**334.6 (1.2)**	**278.0 (1.3)**	**401.3 (1.0)**	**409.9 (2.0)**	**397.7 (2.0)**	**345.7 (3.5)**	**337.5 (1.7)**
Radio/TV	114.3 (0.9)	117.7 (0.7)	102.4 (0.5)	101.1 (0.5)	107.9 (1.0)	108.8 (1.0)	140.8 (2.3)	147.1 (1.2)
Fraction working	0.541 (0.004)	0.371 (0.003)	0.486 (0.003)	0.422 (0.003)	0.363 (0.005)	0.389 (0.005)	0.509 (0.008)	0.521 (0.004)

*Averages of the means in Tables 1.2 weighted by the sex ratio of the population ages 20-74 in each country at each time from http://www.census.gov/ipc/www/idbpyr.html

Table 1.2M. Time Allocations (minutes), Averages and Their Standard Errors, Men Ages 20-74

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	2,947	3,377	12,211	18,228	595	646	1,647	7,750
Market work	**296.9 (3.7)**	**262.5 (2.8)**	**361.7 (2.7)**	**290.2 (2.2)**	**256.9 (4.5)**	**254.1 (4.4)**	**308.4 (7.1)**	**312.6 (3.4)**
Secondary time	**199.9 (2.3)**	**173.9 (1.6)**	**85.8 (1.1)**	**115.1 (1.0)**	**144.0 (2.3)**	**144.8 (2.2)**	**138.3 (3.8)**	**163.2 (2.0)**
Family care	21.0 (0.7)	17.9 (0.4)	18.1 (0.4)	19.3 (0.4)	18.1 (0.7)	16.9 (0.8)	15.9 (1.2)	28.2 (0.8)
Shopping	39.2 (0.8)	49.0 (0.8)	24.1 (0.4)	32.8 (0.5)	32.1 (1.1)	35.6 (0.9)	41.6 (1.8)	43.3 (0.9)
All work	**496.8**	**436.4**	**447.5**	**405.3**	**400.9**	**398.9**	**446.7**	**475.8**
Tertiary time	**627.6 (1.7)**	**654.2 (1.5)**	**683.5 (1.1)**	**595.2 (1.0)**	**624.1 (2.1)**	**634.2 (2.1)**	**642.5 (3.7)**	**616.0 (1.7)**
Sleep	494.2 (1.4)	498.6 (1.2)	517.1 (1.0)	496.7 (0.8)	491.9 (1.6)	503.7 (1.7)	480.0 (3.1)	495.5 (1.5)
Leisure	**315.7 (2.4)**	**349.3 (1.9)**	**309.3 (1.9)**	**439.6 (1.6)**	**414.9 (3.5)**	**406.9 (3.4)**	**350.8 (5.5)**	**348.1 (2.7)**
Radio/TV	115.0 (1.4)	135.0 (1.2)	110.1 (0.8)	114.5 (0.8)	123.8 (1.8)	118.9 (1.7)	148.5 (3.5)	160.4 (1.9)
Fraction working	0.584 (0.006)	0.499 (0.005)	0.656 (.004)	0.547 (0.004)	0.487 (0.008)	0.472 (0.007)	0.608 (0.012)	0.601 (0.006)

survey. Thus Table . presents these averages for all individuals in each of the four countries, while Tables . M and . F present them separately for men and women. For each of the four main aggregates, and for four large sub-aggregates, we present the averages and their standard errors. The data in Table . are population weighted averages of the data that are presented in Tables . by sex, since women are typically over-represented in time-diary surveys.

Table 1.2F. Time Allocations (minutes), Averages and Their Standard Errors, Women Ages 20-74

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	4,001	3,862	13,279	19,654	936	940	1,920	9,918
Market work	**230.1**	**132.7**	**141.5**	**133.1**	**91.5**	**124.5**	**182.7**	**200.7**
	(3.0)	**(1.9)**	**(2.0)**	**(1.6)**	**(2.3)**	**(2.7)**	**(5.6)**	**(2.6)**
Secondary time	**241.7**	**311.8**	**378.1**	**346.9**	**298.0**	**267.6**	**263.2**	**271.3**
	(2.0)	**(1.7)**	**(1.7)**	**(1.5)**	**(2.2)**	**(2.2)**	**(4.4)**	**(2.1)**
Family care	24.3	41.8	45.4	38.8	55.8	51.2	44.2	60.4
	(0.7)	(0.8)	(0.6)	(0.6)	(1.1)	(1.2)	(2.0)	(1.5)
Shopping	46.1	65.9	51.9	52.8	49.8	52.9	58.7	59.3
	(0.7)	(0.7)	(0.5)	(0.5)	(0.8)	(0.9)	(2.0)	(0.9)
All work	**471.8**	**444.5**	**519.6**	**480.0**	**389.5**	**392.1**	**445.9**	**472.0**
Tertiary time	**651.4**	**675.7**	**672.1**	**593.0**	**645.6**	**659.4**	**653.6**	**640.6**
	(1.5)	**(1.3)**	**(0.9)**	**(0.8)**	**(1.6)**	**(1.6)**	**(3.1)**	**(1.5)**
Sleep	508.3	509.2	513.0	499.0	508.2	523.8	482.4	510.7
	(1.2)	(1.0)	(0.8)	(0.7)	(1.3)	(1.4)	(2.5)	(1.3)
Leisure	**316.8**	**319.8**	**248.5**	**367.0**	**404.9**	**388.4**	**340.5**	**327.2**
	(1.9)	**(1.6)**	**(1.5)**	**(1.3)**	**(2.4)**	**(2.4)**	**(4.4)**	**(2.1)**
Radio/TV	113.6	100.4	95.2	89.1	91.9	98.7	133.0	134.1
	(1.1)	(0.9)	(0.7)	(0.6)	(1.1)	(1.2)	(3.0)	(1.5)
Fraction working	0.497	0.243	0.326	0.310	0.239	0.305	0.409	0.443
	(0.006)	(0.004)	(.004)	(0.003)	(0.005)	(0.006)	(0.011)	(0.005)

a. *Differences within country and by gender.* As we noted, the most reliable comparisons are within countries. Looking first at the United States in and , it is quite clear and unsurprising that men spend more time in market work than do women, and that women spend more time in secondary activities. Women spend more time in tertiary activities in the U.S, Germany and the Netherlands, partly because they sleep more (Biddle and Hamermesh,); but they spend less time in such activities in Italy, even though they sleep about as much as men. In the three Anglo-Saxon countries men spend somewhere between and minutes less time in leisure, with the di erence due entirely to their spending less time watching television. In Italy, however, they spend roughly one hour more than women enjoying leisure, with less than half the di erence arising from the extra time that men spend in front of the television screen.

The di erences across gender are almost the same in the two northern European countries, but are much di erent in Italy. As in all industrialized countries, however, the European women work less in the market than their male counterparts, and they do more household production (secondary activities). Like American women, they spend as much or more time in tertiary activities than their male fellow citizens, mostly because they sleep more; and they spend less time than men at leisure, partly because they spend less time watching television.

There has been a huge literature making cross-country comparisons of gender inequality in labor-force participation and hours of market work

(e.g., Bertola, Blau, and Kahn,). We can go beyond that here to examine gender inequality in all aspects of time use across countries independent of any problems in categorization. The cross-country comparisons are free of problems as long as we are satisfied that di erences in how men and women's activities are aggregated into the four aggregates do not vary across countries.

For any of the four countries define an inequality index I as:

$$I = \sum_i \left| (C_{iM} - C_{iF}) / \sqrt{C_{iM} \cdot C_{iF}} \right|, \qquad (\ .\ )$$

where the subscripts i are the four main aggregates of activities, C—, the averages of market work, secondary activities, tertiary activities and leisure, and M denotes men and F women. If the average amounts of time spent in the four aggregate activities are the same for men and women, this index will equal zero. Calculating I_{US} for yields . ; for Germany in / I_G = . ; for Italy in / I_I = . ; and for the Netherlands in I_{NL} = . . Part of the di erence in this index between the US and the other three countries is due to the greater gender similarity of time spent in the market in the US But even if we restrict the calculation in (.) to the three aggregates of non-market activities, we still find that male-female di erences are smaller in the US than in the EU countries (with the three-activity inequality index equaling . in the US and . in Germany and the Netherlands, and . in Italy). The data show not only that the United States currently approaches a unisex market for paid work more closely than these European countries, but also that gender inequality in the distributions of for household production, tertiary time and leisure are greater in these three particular EU economies than in the US.

While the genders are not equal within each country at each point in time in terms of the allocation of time across these four main aggregates, there is another, absolutely striking comparison that is apparent in these data. Let us define "All Work," or equivalently "Total Work," as the sum of time spent on the representative day on the total of market work and secondary activities. Given how we defined the category of secondary activities, All Work might be viewed as the sum of market and non-market production.

Examining Tables . M and . F one sees that All Work totals between minutes and minutes (- / to - / hours) in the samples (four countries, two years, two genders). Compare the value of All Work (again, the sum of market work and secondary activities) within each country at a point in time across genders (across Tables . M and . F). Among the three Anglo-Saxon countries, except for Germany in / the di erence in All Work across genders never exceeds minutes; and even in Germany

in / the excess of men's All Work over women's is only minutes (less than one-half hour on a total of over eight hours). In Italy, however, the difference was an excess of total work among women of minutes in / ; while total work by both men and women decreased over the fourteen years between the two surveys, the excess of total work among women remained essentially unchanged at minutes per day.

The remarkable stability of this relationship across time and space for three of the four countries merits comparisons for yet more countries to whose time-diary studies we have access. Are the three Anglo-Saxon countries typical of rich economies—is Italy an outlier? Or is the similarity among the three merely a fluke? Accordingly, we examined All Work, the total of market work and secondary activities, using time-diary data for all adults - from the Basque Country Time Budget Survey of and (as used by Ahn, Jimeno, and Ugidos,); from the Australian Time Use Survey in (ABS,); and from the Japanese Time Use Survey of (Ministry of Internal A airs and Communications of Japan,), to whose microeconomic data we lacked access but whose published tables allowed calculations for this age group. These calculations are as comparable to those presented for Germany, Italy the Netherlands and the US as is possible given the inherent di erences in the definitions of the underlying categories. Table . presents the gender breakdowns of the four main time use aggregates for these three countries, using the same age range (-) as in Tables . . Within both Australia and Japan we again find a remarkable similarity of the total amount of work time (market and secondary time) by gender. Even in Japan, where women's market work is much further below

To address one of the many necessary arbitrary aggregations using the di erent categories, consider our classification of volunteer work as leisure. For the US in we recalculated the means to include both volunteer work and non-household care activities. Women performed minutes of these activities, men , so that the -minute excess of men's All Work would be changed to a -minute excess of women's All Work over men's if we had included these two categories as secondary activities. Making the same calculation for the German data for / , we find that men performed minutes, women minutes of volunteer work. If added to the totals in Tables . , this would have reduced the -minute excess of female All Work to an excess of only minutes. The same calculation for the Italian data from shows that women performed minutes, men minutes of volunteer work. Doing the same thing for the Dutch data shows that men performed minutes, women minutes of volunteer work, which if added to secondary time would have reduced the -minute excess of male All Work to only minutes. In all three recent Anglo-Saxon data sets this slight expansion of the definition of All Work in fact equalizes still further the gender distributions of All Work, while for Italy it exacerbates the excess of female over male work.

Table 1.3. Time Allocations (minutes), Other Countries, Averages and Their Standard Errors, People Ages 20-74

		Spain 1993/98	Australia 1992	Japan 2001
Market Work	M	257.2 (4.3)	300.9 (4.0)	404
	F	121.8 (3.3)	143.5 (2.9)	204
Secondary time	M	125.0 (2.3)	154.3 (2.1)	33
	F	278.8 (3.0)	310.0 (2.5)	248
All Work	M	382.2	455.2	437
	F	400.6	453.5	452
Tertiary Activities	M	686.5 (1.9)	611.7 (1.8)	621
	F	650 (1.8)	620.0 (1.6)	629
Leisure	M	371.3 (3.2)	373.1 (3.0)	382
	F	345.4 (2.9)	366.6 (2.6)	359

men's than elsewhere, the di erence is made up by their much greater excess of household work. The di erence in All Work in Spain is larger than in most of the other countries (minutes per day), but still not that large.

Italy is the only outlier among the eleven data sets analyzed thus far. Italian men perform roughly percent less total work than do Italian women. Additional analyses show that this is not simply a matter of Italian women engaged in childcare: The di erence is only slightly smaller if one restricts the sample to individuals without children. Nor is it due to geographic di erences—the shortfall in men's total work is about the same south of Rome as it is in the North. It is not that Italian men engage in so much less total work than other Europeans or Americans; rather, Italian women, at least between the late s and the early s, worked substantially more in total than women in most other rich nations, almost entirely because they worked more in the home.

In these three data sets and the eight for Germany, Italy, the Netherlands and the US we have restricted the age ranges to be identical; but would our finding of gender equality in total work hold up if we account for di erences in the age structures by gender, di erences in marital status, or di erences in the presence of children? To answer these questions we estimated equations describing All Work in each of these samples (except Japan's) holding constant for the respondents' ages, marital status, spouse's age (if married) and presence of children by age. With the exception of Germany in , where the -minute excess of male total work turns into a two-minute excess once demographics are accounted for, and the Basque Country, where

Table 1.4. Time Allocations (minutes per Representative Day), Still More Countries*

		Belgium 1998/ 2000	Denmark 2001	France 1998/ 99	Finland 1999/ 2000	Sweden 2000/ 01	U.K. 2000/ 01	Norway 2000/ 01	Canada 1998	Israel 1992
Market Work**	M	232	302	248	252	282	278	283	306	382
	F	144	243	157	177	200	177	196	204	164
Home Work	M	163	152	149	140	172	140	144	162	106
	F	267	222	273	235	251	251	216	264	315
All Work	M	**395**	**454**	**397**	**392**	**454**	**418**	**427**	**468**	**488**
	F	**411**	**465**	**430**	**413**	**451**	**428**	**412**	**468**	**479**
Tertiary Activities	M	664	629	718	632	617	641	597	632	584
	F	683	650	731	648	642	659	621	656	624
Leisure	M	381	357	325	416	369	381	416	340	368
	F	346	325	279	379	347	353	407	316	337

SOURCE: EU data are computed from Aliaga and Winqvist (2003); Canada data are from Statistics Canada (1999); Israeli data are reproduced from Gronau and Hamermesh (2001).

*The age/demographic categories are: Belgium, 12-95; Denmark, 16-74; France, 15+; Finland, 10+; Sweden, 20-84; U.K., 8+; Norway, 10-79; Canada, 15+; Israel, married Jews. For the seven EU countries total travel time (plus a small amount of unspecified time) is prorated among market work, home work and leisure activities. In the Canadian and Israeli data the travel time is added to the activity for which it occurs.

**Market work includes time spent in study/education.

the di erences grows to minutes, the adjusted gender di erence in All Work are nearly identical to the unadjusted di erences.

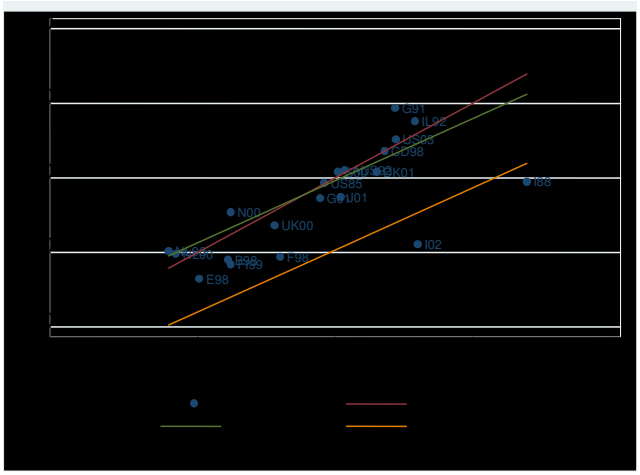
To take this fact still further we use published tabulations from time-use surveys from nine economically advanced countries, as reported in Aliaga and Winqvist ( ), Statistics Canada ( ) and Gronau and Hamermesh ( ). These tabulations, presented in Table . , are not comparable to those in the earlier Tables nor to each other, both because of the inherent problems of making cross-country comparisons that we have already discussed and because the sample definitions vary among these countries, particularly due to di erences in the ages of the respondents. Nonetheless, they appear to show the same result as implied by nine of the eleven samples for which the data have already been summarized. Except for France, the gender di erences in All Work are minimal within each country.

"Iso-work" appears to be a remarkable constant within a country at a point in time: We have found tremendous equality between the sexes in

The adjusted di erences are only slight more negative (less positive) if indicators of the presence of young children are excluded.

Taking data for the US from - from (Juster, , p.), one calculates that the average man ages - engaged in minutes of All Work on a representative day, the average woman minutes.

Figure 1. Scatter and Linear Regression of Male Total Work Against Female Total Work Non-Mediterranean (Red Line), Mediterranean (Orange Line), Equality of Total Work (Blue Line) 20 Samples from 16 Countries



most of the twenty samples, covering sixteen di erent countries, which we have examined, with only one country, Italy, being a distant outlier. Indeed, in fourteen of the twenty the di erence in total work by gender is less than four percent; in the earlier German sample, the Basque Country data and the Finnish and Norwegian data it is five percent. The largest di erence beyond the Italian case is the eight-percent discrepancy in the French data. A simple average of the percentage di erences in All Work by gender across all twenty samples yields a di erence between male and female total work of - . percent (and only - . percent if Italy is excluded, and only - . percent if France, Italy and Spain are deleted).

With twenty di erent samples covering sixteen countries, performing a meta-analysis of gender di erences in All Work time in these economically advanced countries may be justified. The scatter of the twenty points showing men's and women's total work is presented in Figure . .

The figure also presents a red line showing what men's total work would be if it were identical to women's total work in a country. Taking this meta-analysis one step further, we then estimated a regression relating the amount of total work among men to that among women. Recognizing that men in the four European Mediterranean samples (Spain, France and Italy) appear to work less in total than women, we included an indicator for Mediterranean countries.

Consider the following regression results (coe cient estimates with standard errors in parentheses):

$$\underset{}{\text{Male Work}} = \underset{(47.1)}{73.1} + \underset{(0.11)}{0.83}\ \text{FemaleWork} - \underset{(8.9)}{46.5}\ \text{Mediterranean},$$
$$N = 20, \bar{R}^2 = .793.$$

(The regression line through the non-Mediterranean points is shown in green in Figure . , the line through the Mediterranean points is shown in orange.) We cannot reject the hypothesis that the intercept is , nor can we reject the hypothesis that the slope on FemaleWork is , nor the joint hypothesis that the intercept is and the slope is . This fact is visible from a comparison of the scatter in Figure . to the red line of complete equality that is also shown. Not only is total work time nearly equal by gender in each sample in the non-Mediterranean countries; the di erences over this large part of the economically developed world are truly tiny. In the four Mediterranean samples, however, women work significantly more in total than men—the orange line lies far below the line of complete equality.

Remembering that the di erences in the underlying categories of time use across countries mean that the aggregates that we have used are necessarily di erent, the iso-work finding appears to be one of the most robust in labor economics, and something that does not appear to have received much attention generally or any attention from economists. It was noticed for the US in the s by Hill ( ), the s and s by Robinson and Godbey ( ) and for Canada by Clark ( ). It was also commented on for a number of countries in the s by Bittman and Wacjman ( ), although their data were not comparable across countries, and their main focus was on the di erence in the amounts of leisure that we have noticed here too. The few sociologists who have noticed this fact and examined one country's data sets (Mattingly and Bianchi,) have focused on the di erence in leisure time and on the possible extra burden of the mother's being "on call" when children are in the household. This latter distinction does not seem important on our three current Anglo-Saxon data sets: In the US the di erence on All Work among people without children was extra minutes among women; the Netherlands in it was extra minutes among men; and in Germany in / it was extra minutes among women. These di erences remain tiny: All Work is the same by gender whether or not children are present. Similarly, the gender di erences in Italy are essentially unchanged if we restrict the sample to individuals with none of their own children under in the household.

The statistic testing the joint hypothesis is F(,) = . , p=. .

We do not claim that this remarkable gender equality in All Work holds in all time and all economies. It most decidedly does not hold even today in Italy, and it does not seem to characterize other southern European countries very well. We believe that it arises in most economically advanced countries, with the structure of household behavior and labor markets in developing countries being su ciently di erent that this basic fact need not hold. Indeed, Apps ( ) presents evidence from time-budget surveys from Nicaragua, , and South Africa, , showing a substantial excess of total work among women over men years of seventeen and eight percent respectively in the two countries. Haddad, Brown, Richter, and Smith ( ) suggest similar findings for developing African economies. Even the calculations from Aliaga and Winqvist ( ) for the EU suggest that the new member states Estonia, Hungary and Slovenia, exhibit excesses of female over male work of , and percent respectively. Results for a country with a similar middle-income status, Mexico in , show a substantial excess (percent) of female over male total work (calculations from INEGI,). Economic development to the level of the most advanced economies is accompanied by equalization of the total amount of time spent in market and household work by gender within a country.

Of course the total amount of work varies across countries and over time within a country. Macroeconomic conditions are important, as is shown by the much higher totals for both genders in Germany in / than in / ; and market work di ers sharply by gender. Rather, if we look at All Work instead than market work alone, we see that on a representative day the average man between the ages of and in most wealthy countries spends nearly exactly as much time as his female counterpart in that country.

The iso-work fact contains an interesting additional implication for the e ects of macroeconomic fluctuations by gender. Given that this fact holds in di erent countries at di erent time periods, and in the same country at di erent times, it suggests that the impact of macroeconomic fluctuations

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A recent unpublished study (Aguiar and Hurst,) calculates what the authors call total market work plus non-market work using the same two US time-diary surveys plus smaller ones for and . A comparison of their tables shows that in this measure was . hours per week for men, . hours per week among women (a di erence of . weekly hours), while in it was . hours and . (a di erence of . weekly hours). The measure does not include time spent in family care, which di ered in the two samples in our calculations by one-half hour per day, i.e., - / hours per week. When one accounts for that, the excess of male total work over female total work reduces in Aguiar and Hurst to . hours per week (minutes per day) in , . hours per week (minutes per day) in . Thus even though their combination of the basic categories (in) could not be the same as ours, the inference from their study is essentially identical to what we have found in the various data sets used here.

on All Work is the same for both sexes. Macro fluctuations may increase or decrease the total amount of (market and non-market) work; but they do so nearly identically for both men and women.

b. *Comparisons over time and across countries.* Comparisons over time within the four countries for which we have detailed data at two points in time are quite sensible for the Netherlands and Germany, but may be somewhat questionable in Italy and the US because the categorization of activities di ers so sharply between the two surveys. Taking the Netherlands first, the most striking change in the s was the tremendous growth in the fraction of women who report some market work during the survey week, a rise from percent to percent of all the women ages through included in the survey. This tremendous change was accompanied by a small increase in time spent at work by women who worked, so that the average amount of time Dutch women spent at work on a representative day increased by minutes (percent) per representative day. This striking increase was accompanied by a tiny and insignificant drop in male work time (and in the propensity to work), so that the amount of market work by the average male respondent increased by over minutes per day (nearly - / hours per week).

Why this increase occurred is not the subject of our study (but see Jacobsen and Kooreman, for an argument that more lenient retail-hours laws were responsible). Perhaps too the large increase in women's part-time work in the Netherlands had this e ect, a possibility that is corroborated by the observation that the percentage increase in minutes of work is only slightly larger than the percentage increase in the fraction of women working at all. What is of interest here, however, is how this change a ected non-market time use in the Netherlands. Interestingly, looking at Table . F, we see that the increase was almost completely o set by a decline in secondary time use. Dependent care time did not change much, and shopping time did not change at all; rather, other secondary activities, cleaning/cooking and other household activities (gardening, home repair, etc.) decreased substantially. This "Dutch Revolution" was accompanied by a decrease in leisure (not due to decreased television-watching), but that decline was o set by an equal increase in tertiary time (due to increased time reported sleeping). The shift toward market work and away from household production reported by Dutch women was rapid and striking and provides the best evidence for the substitutability of these two types of activity in the aggregate and for the need to go beyond the work non-work distinction.

Over this decade West Germany saw a striking decline in the average amount of market work, which dropped by nearly one hour per day (

hours per week). Most of this drop occurred among women, and most of the change among women resulted from a large decline in the fraction of women who reported that they were working on the diary day.

Comparing the Italian data across the two years is somewhat di cult, so that any trends should be taken with some skepticism. This is more the case for the categories of tertiary activities and leisure, as there were more changes in the coding of these activities across the surveys. Market work seems the most consistently defined in the two samples, with secondary activities falling in between. There does appear to have been a decline in market work of about minutes per representative day over this period; and it has not been accompanied by any change whatsoever in household productive (secondary time). Rather, the entire drop has been included, along with a shift out of tertiary time, in the large rise in measured leisure. While the part of this increase leisure resulting from a shift away from tertiary time may be a classification issue, the part resulting from the decline in All Work seems real.

Comparisons over time in the US are still more problematic because the classifications di er greatly across the two surveys; but it does appear that Americans were doing a bit more market work by , mainly because of the continued increased in the propensity of women to work for pay. The bigger changes, which underline the importance of distinguishing among types of non-market time use, are within non-market time itself. In particular, secondary activities increased substantially, mainly because dependent care appears to have increased; while tertiary activities decreased, even though time spent sleeping went up. Finally, women's leisure activities decreased, although this was not due at all to a change in the amount of time spent watching television. The changes in men's activities appear to be in the same direction as women's, and for them too non-television leisure declined. Issues of comparability across the surveys make any of these comparisons for the US somewhat shaky. Probably the most reliable comparisons are of the activities sleeping and radio/TV, which are the most specific of those listed here, so that it seems fair to conclude that Americans are now sleeping more than in the mid- s and that American men are watching even more television than before.

Over a longer time period we are doubtful whether the drop in leisure that we have demonstrated for the US would be observed. Indeed, the point of Aguiar and Hurst ( ), based on their attempts to make various diverse time-diary data sets commensurable, is precisely that there was a rise in the

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The decline was also one hour per representative day in the former East Germany.

The pattern of change was the same, although the levels di ered substantially, in the former East Germany.

total amount of leisure consumed by the average American between and . Perhaps better evidence on this is from Norway, which has conducted four time-diary surveys, , , and suing essentially identical survey instruments. Among Norwegian men ages - the total amount of work performed fell by minutes between and , then stayed constant or even rose slightly. Among women ages - total work fell nearly steadily, from hours minutes in to hours minutes in . Without comparable data sets for other countries we cannot be sure about trends; but there is at least a hint of declining total work on both sides of the Atlantic.

Although the comparisons over time are problematic in some of these cases, it is worth noting that the sums of market work and secondary time are by no means constant over time the these four countries. While the Netherlands does exhibit this constancy, with the rise in market work perfectly o set by the drop in household work, changes of more than minutes per day in total work are exhibited in the other three countries.

We can calculate the gender inequality indexes in (.) for each of the countries for the earlier years as well as for the later years presented above. The index fell from . to . in the US, from . to . in the Netherlands, and from . to . in Italy, but it rose from . to . in Germany. The degree of gender inequality in all activities has converged substantially among the four countries. Of course, with only two observations on each, and with a concern about the tremendous change in the macroeconomy in Germany over this period, we cannot say anything about whether or not this represents a trend.

The most problematic comparisons are across countries. It is absolutely clear that Americans watch substantially more television than do Europeans, at least the Dutch, Italians and Germans that we present (and see also Corneo,); much of the extra roughly to minutes per day (to - / hours per week) comes from less time sleeping in the United States. More important, however, Americans of both sexes spend substantially less time in other, non-television forms of leisure than do Germans, Italians or Dutch.

Going further than this is di cult for all the reasons discussed in the last section. These problems did not prevent Freeman and Schettkat ( ) from advancing what they called the "marketization hypothesis," namely that the amount of what we have called All Work does not di er between the US and European countries. This may be the case for some comparisons, but it certainly does not seem valid in the six possible comparisons one can make using Table . . Taking the earlier years for each country, we see from

Calculated from http://www.ssb.no/english/subjects/ / / /tidsbruk_en/.

Table . that All Work in Germany was minutes more than in the US at that time, and minutes more in Italy, while All Work in the Netherlands was minutes less. In the later period All Work in Germany was minutes less than in the US, while All Work in Italy was minutes less and in the Netherlands was minutes less per day than in the US. In other words, these comparisons suggest that there is no particular equality in total work across countries at a point in time, nor is total work constant within countries over time. The "fact" cited by Freeman and Schettkat ( ) appears to little more than a historical coincidence. They also suggest that total work in the US currently exceeds that in these three European countries.

The international comparisons are only of behavior on the days when diaries are recorded. Substantial research in the collection of time diaries has made it abundantly clear that diaries are much less likely to be collected on days when the individual is on vacation. Thus the cross-country comparisons based on Table . and Tables . ignored any international di erences across countries accounted for by vacation time. This is not just a matter (Freeman and Schettkat,) of diaries being collected only over part of the year (i.e., as in the one or two weeks in the Netherlands or the eight months in Germany). Rather, it is that respondents have been shown to be unlikely to complete diaries while they are on vacation.

We know that annual vacation time is generally shorter in the United States than in continental Europe (Altonji and Oldham,). This di erence suggests that even the inference that more market work is conducted in the US, and less leisure is taken there, is understated. Were we to obtain diaries from days distributed randomly across the year and independent of whether the respondent is at home or away from home, assuming that vacation days include little if any market work, we would observe a still larger excess of market work in the US over the Netherlands and Germany, and a still larger shortfall of leisure in the US. Whether the di erences in secondary or tertiary time would be magnified or reduced cannot be inferred *a priori.*

An interesting question is why their apparent equality of All Work between the US and a number of EU countries in the early s seems so di erent from our conclusion. First, one should note that, based on a simple average of the measures of All Work in the data in Tables . and . for the early s for Germany, Italy, the Netherlands, and the Basque Country, one observes simple averages for the four countries of minutes of total work for both men and women, about one-half hour per day, or - / hours less per week, than in the US data for . In Freeman and Schettkat's comparison using an average of more EU nations, the di erences are a US excess of - / hours per week among men in the US, and a shortfall of - / hours among women in the US compared to their EU counterparts. Thus the only real di erence between our results and theirs on this (side) issue is among women. Second, of course, any such comparisons are highly speculative for the wide array of reasons that we have discussed in the text.

Table 1.5M. Predicted Time Use (minutes), Men, if All Samples Had U.S. 2003 Demographic Characteristics

	Germany		Italy		The Netherlands		U.S.	
	$\hat{G}^{1991}_{US\,2003}$	$\hat{G}^{2001}_{US\,2003}$	$\hat{I}^{1988}_{US\,2003}$	$\hat{I}^{2002}_{US\,2003}$	$\hat{N}^{1990}_{US\,2003}$	$\hat{N}^{2000}_{US\,2003}$	$\hat{U}^{1985}_{US\,2003}$	$\hat{U}^{2003}_{US\,2003}$
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	294.1	251.9	362.4	308.0	248.7	270.2	303.0	312.6
Secondary time	193.8	182.7	91.8	120.0	151.9	149.2	142.3	163.2
All work	487.9	434.6	454.2	428.0	400.6	419.4	445.3	475.8
Tertiary time	631.1	652.0	681.0	591.6	631.0	623.2	643.1	616.0
Leisure	321.0	353.4	304.9	420.4	408.3	397.3	351.6	348.1

Table 1.5F. Predicted Time Use (minutes), Women, if All Samples Had U.S. 2003 Demographic Characteristics

	Germany		Italy		The Netherlands		U.S.	
	$\hat{G}^{1991}_{US\,2003}$	$\hat{G}^{2001}_{US\,2003}$	$\hat{I}^{1988}_{US\,2003}$	$\hat{I}^{2002}_{US\,2003}$	$\hat{N}^{1990}_{US\,2003}$	$\hat{N}^{2000}_{US\,2003}$	$\hat{U}^{1985}_{US\,2003}$	$\hat{U}^{2003}_{US\,2003}$
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	246.8	130.9	149.8	133.2	83.8	121.2	189.5	200.7
Secondary time	242.1	315.7	373.4	374.1	291.6	271.6	262.2	271.3
All work	488.9	446.6	523.2	507.3	375.4	392.8	451.7	472.0
Tertiary time	641.8	672.5	671.4	587.8	646.8	660.1	653.4	640.6
Leisure	309.2	320.9	245.4	344.9	417.7	387.0	335.0	327.2

B. Do these differences and changes stem from differences and changes in demographic characteristics? How much of the di erences between the amounts of time allocated to the di erent activities in each country and over time are due to cross-country and temporal di erences in the observable demographic characteristics of the sample respondents? In other words, how much of the di erences that we observe across countries are true di erences in behavior, and how much are due to di erences in the heterogeneous characteristics of the populations? We thus ask what the allocation of time would look like in Germany, Italy, the Netherlands and the US in each year and for each sex if the sample respondents had the same characteristics on average as did Americans of the same sex and ages in . Viewed obversely, we are asking how much of the di erence between time allocation in the other country/at another time and the US in results from di erences in underlying demographic characteristics.

In Tables . we present the means of each of the four aggregates for the three European countries measured at the means of a number of demographic variables in the United States in . The averages are adjusted to account for di erences in age (a quadratic relationship), marital status, the age of one's spouse if married (again a quadratic relationship), spouse's

hours of market work or work status (if married), and the presence of children under age , and between ages and . Calling this vector of control variables X, we are thus making the adjustment for, e.g., Germany in / as:

$$\hat{G}^{1991}_{US2003} = \beta^{G1991} X^{*}_{US2003}, \qquad (\ .\ )$$

where $X*$ is the vector of means of the control variables X, measured for the US in .

Tables . make it clear that these adjustments to account for cross-sectional di erences in the underlying characteristics of the populations are not what lead us to observe the di erences that we have shown across countries or over time. Just as one example, comparing the Dutch data in Tables . and . , we see that there are some di erences (never more than minutes per category) between the adjusted means and the unadjusted means. These di erences are not large, even though they are among the larger of those in the tables, and in no way do they alter any of our conclusions about the sharp changes in time allocation in the Netherlands over the decade. The Netherlands would have seen a sharp increase in market work (among women) even if the Dutch had on average possessed the same demographic characteristics in both and as the US had in .

The inferences about Germany in Tables . and . would not be altered if German demographics were the same as those in the United States in . West Germany experienced a tremendous economic boom in the early s as a result of the re-unification, which was followed by more than a decade of very slow growth. The substantial drop in market work among women and the rise in their secondary time would have occurred had the women's characteristics not changed. To the extent that one believes the classifications of activities that we have made, the di erences implicit in Tables . and . are real, the result of changing behavior, and are not an artifact of underlying di erences in demographic characteristics among the countries.

The quantitative conclusions about the changes over time in Italy would be somewhat a ected had the demographic structure remained the same over time (and the same as in the US). In particular, the observed drop in men's market work would not have been so large, and the observed decline in women's secondary time would not have occurred, if the demographic characteristics of the Italian sample had remained unchanged. Nonetheless, the comparisons to the US for the early part of this decade remain unchanged: If Italy had the same demographic structure as the US we would still observe less total work among Italian men and more among Italian women than among their American counterparts.

Because of the lack of comparability of the data in the two surveys, the decompositions for the US shown in Tables . are less reliable than those

for the two European nations. Nonetheless, they are interesting too. Among both men and women demographic change alone would have led us to expect only tiny changes in time allocation. In fact, leisure time and tertiary time dropped, while market work and secondary activities increased.

Do these changes in the US represent a still more harried existence for Americans? Perhaps; but, as noted above, issues of comparability may be important here. Even if they are not important, it is quite possible that secondary activities took on new meaning over the nearly two decades covered by the data. Shopping may have become more enjoyable—high-end shopping may have replaced grocery shopping (and there is strong evidence that the latter did decrease between these surveys; see Hamermesh, a). The unexpected drop in leisure time may have resulted from a shift at the margin toward enjoyable secondary activities and away from less pleasant leisure activities. The lack of comparability of the detailed categories in the two surveys in the US precludes distinguishing these possibilities and renders any comparisons somewhat dubious.

V. Weekdays or weekends, days or hours, nights or days—does it matter?

All of the comparisons thus far are for the representative day in the week. We have made no distinctions among when the activities are performed. But **when** people do things does matter: Doing an activity on the same time each day reduces set-up costs, but generates boredom (Hamermesh,); undertaking an activity when others, especially one's spouse, are doing it is more enjoyable in many types of tertiary activities and leisure; and jointly undertaking an activity increases productivity in many kinds of market and household production (Hamermesh, ; Jenkins and Osberg,). While there are many possibilities for comparisons of di erences and changes in the timing of activities in these four economies, here we deal only with three of the simplest: How do the amounts of the di erent activities performed di er among the countries and between sexes on weekdays as compared to weekends, and how did these di erences change over the past years? How does the pattern of activities vary across the days of the week more generally? How does the timing of market work over the twenty-four hours of the working day di er among countries?

Unlike the cross-country comparisons in Section IV, where potential differences in the underlying categorizations required us to exercise caution, here such comparisons are less problematic. Most di erences in categorizations will wash out when we compare weekday-weekend di erences in time

Table 1.6M. Time Allocations (minutes), Men, Averages and Their Standard Errors, Weekdays and Weekends Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
	No. weekday diaries	4,369	6561	4238	6424	2975	3230	1177	3844
	No. weekend diaries	1,485	3546	7973	11,804	1190	1292	470	3906
Market work	Weekdays	**385.4**	**340.4**	**438.4**	**357.1**	**340.3**	**332.8**	**373.0**	**392.0**
		(4.1)	**(3.5)**	**(4.3)**	**(3.6)**	**(5.3)**	**(5.3)**	**(8.2)**	**(4.7)**
	Weekends	**77.5**	**67.6**	**172.7**	**123.5**	**48.4**	**57.4**	**152.5**	**112.0**
		(4.6)	**(2.8)**	**(2.8)**	**(2.1)**	**(4.2)**	**(4.5)**	**(11.2)**	**(3.6)**
Secondary time	Weekdays	**194.6**	**172.1**	**80.1**	**110.1**	**137.4**	**138.3**	**132.7**	**146.0**
		(2.8)	**(2.0)**	**(1.8)**	**(1.7)**	**(2.6)**	**(2.6)**	**(4.6)**	**(2.6)**
	Weekends	**213.0**	**178.4**	**99.9**	**127.3**	**160.7**	**159.6**	**152.0**	**206.5**
		(4.3)	**(2.6)**	**(1.4)**	**(1.3)**	**(4.5)**	**(4.2)**	**(7.1)**	**(3.1)**
Family care	Weekdays	18.9	17.1	17.1	18.9	16.6	15.6	15.7	27.7
		(0.8)	(0.5)	(0.6)	(0.6)	(0.8)	(0.9)	(1.4)	(1.1)
	Weekends	26.4	20.1	21.0	20.4	21.9	20.1	16.3	29.5
		(1.68)	(0.8)	(0.5)	(0.5)	(1.5)	(1.6)	(2.2)	(1.3)
Shopping	Weekdays	40.6	52.5	23.0	31.6	32.1	34.9	40.5	39.5
		(0.9)	(1.0)	(0.7)	(0.8)	(1.2)	(1.1)	(2.1)	(1.2)
	Weekends	35.7	40.2	26.6	35.7	32.1	37.1	44.2	52.9
		(1.5)	(1.32)	(0.6)	(0.6)	(2.2)	(2.0)	(3.4)	(1.5)
All work	Weekdays	**580.0**	**512.5**	**518.4**	**467.2**	**477.7**	**471.1**	**505.7**	**538.0**
	Weekends	**290.5**	**246.0**	**272.6**	**250.8**	**209.1**	**217.0**	**304.5**	**318.5**
Tertiary time	Weekdays	**597.5**	**623.4**	**667.3**	**577.5**	**603.3**	**611.3**	**628.1**	**598.2**
		(1.4)	**(1.6)**	**(1.8)**	**(1.5)**	**(2.3)**	**(2.3)**	**(4.2)**	**(2.4)**
	Weekends	**702.3**	**731.7**	**723.2**	**639.3**	**676.2**	**691.5**	**677.0**	**661.4**
		(3.4)	**(2.6)**	**(1.4)**	**(1.3)**	**(3.9)**	**(4.2)**	**(7.2)**	**(2.5)**
Sleeping	Weekdays	471.2	478.2	504.5	484.8	477.0	486.7	469.1	478.3
		(1.4)	(1.4)	(1.5)	(1.3)	(1.7)	(1.9)	(3.5)	(2.0)
	Weekends	551.1	549.8	548.1	526.6	529.1	546.2	506.2	538.9
		(3.0)	(2.1)	(1.3)	(1.1)	(3.1)	(3.4)	(6.1)	(2.2)
Leisure	Weekdays	**262.5**	**304.1**	**254.6**	**395.3**	**359.0**	**357.1**	**306.2**	**303.8**
		(2.3)	**(2.1)**	**(3.1)**	**(2.5)**	**(3.8)**	**(3.7)**	**(5.9)**	**(3.6)**
	Weekends	**447.3**	**462.4**	**444.4**	**549.9**	**554.6**	**531.5**	**458.6**	**460.0**
		(5.1)	**(3.2)**	**(2.5)**	**(1.92)**	**(5.7)**	**(5.8)**	**(10.4)**	**(3.8)**
Radio/TV	Weekdays	104.7	122.7	104.8	108.4	113.2	105.0	134.8	142.8
		(1.4)	(1.3)	(1.3)	(1.2)	(2.0)	(1.8)	(3.8)	(2.5)
	Weekends	140.6	165.9	123.2	129.9	150.5	153.6	181.6	204.9
		(3.2)	(2.3)	(1.15)	(1.0)	(3.7)	(3.9)	(7.7)	(3.0)

allocations in one country to weekday-weekend di erences in time allocations in another. In this Section we thus start with these international comparisons, since they are striking. Tables . M and . F present the average time allocations for the four major aggregates and the four sub-aggregates, in the same four countries for the same two years as in Section IV. Here, however, we present these averages separately for weekdays and weekend days.

Unsurprisingly, there is less market work by both men and women in all three countries on weekends than on weekdays. What is somewhat surprising is how much more work is performed in the United States on weekends than in the two northern European countries, and how little Italy di ers from the US in this regard. In both the Netherlands and Germany the weekly increase in leisure time on the weekends is much more pronounced than in

Table 1.6F. Time Allocations (minutes), Women, Averages and Their Standard Errors, Weekdays and Weekends Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
	No. weekday diaries	5871	7494	4664	6879	4680	4700	1390	4869
	No. weekend diaries	2131	4076	8615	12,775	1872	1880	530	5049
Market work	Weekdays	**304.4**	**172.9**	**173.3**	**164.6**	**118.4**	**161.3**	**224.8**	**256.6**
		(3.6)	**(2.6)**	**(3.5)**	**(2.8)**	**(3.0)**	**(3.4)**	**(6.8)**	**(3.9)**
	Weekends	**58.6**	**32.7**	**61.6**	**55.2**	**24.4**	**32.6**	**76.5**	**62.5**
		(3.3)	**(1.7)**	**(1.7)**	**(1.4)**	**(2.3)**	**(2.7)**	**(7.9)**	**(2.3)**
Secondary time	Weekdays	**240.5**	**330.1**	**385.6**	**354.8**	**318.3**	**281.8**	**260.6**	**264.6**
		(2.4)	**(2.2)**	**(3.0)**	**(2.5)**	**(2.7)**	**(2.7)**	**(5.2)**	**(3.0)**
	Weekends	**244.5**	**266.1**	**359.2**	**327.5**	**247.1**	**232.3**	**269.6**	**288.0**
		(3.5)	**(2.5)**	**(2.0)**	**(1.7)**	**(3.6)**	**(3.8)**	**(8.2)**	**(2.8)**
Family care	Weekdays	22.5	46.0	45.9	42.1	60.1	55.7	47.0	66.0
		(0.7)	(1.0)	(1.0)	(1.0)	(1.4)	(1.4)	(2.5)	(1.6)
	Weekends	28.0	31.3	54.4	30.9	45.2	40.1	37.1	46.5
		(1.4)	(1.1)	(0.8)	(0.7)	(1.8)	(1.9)	(3.2)	(1.4)
Shopping	Weekdays	50.5	76.1	45.6	55.3	54.2	56.3	57.9	55.3
		(0.8)	(0.9)	(0.7)	(0.8)	(1.0)	(1.1)	(2.3)	(1.2)
	Weekends	36.0	40.5	33.2	46.8	38.6	44.4	60.7	69.4
		(1.2)	(1.0)	(0.7)	(0.7)	(1.6)	(1.8)	(4.1)	(1.4)
All work	Weekdays	**544.9**	**503.0**	**558.9**	**519.5**	**436.7**	**443.1**	**485.4**	**521.2**
	Weekends	**303.1**	**298.8**	**420.9**	**382.8**	**271.5**	**264.9**	**346.1**	**350.5**
Tertiary time	Weekdays	**626.7**	**647.5**	**660.0**	**579.3**	**630.5**	**641.7**	**641.8**	**620.6**
		(1.6)	**(1.4)**	**(1.5)**	**(1.3)**	**(1.8)**	**(1.8)**	**(3.6)**	**(2.0)**
	Weekends	**708.5**	**745.9**	**702.5**	**626.8**	**683.1**	**703.8**	**683.5**	**689.9**
		(2.7)	**(2.2)**	**(1.2)**	**(1.1)**	**(3.2)**	**(3.2)**	**(5.9)**	**(2.1)**
Sleeping	Weekdays	488.4	491.1	505.1	491.0	498.3	510.2	472.0	494.3
		(1.3)	(1.2)	(1.3)	(1.1)	(1.4)	(1.6)	(2.9)	(1.7)
	Weekends	554.5	554.1	532.7	518.6	533.0	557.8	508.6	551.3
		(2.3)	(1.7)	(1.1)	(1.0)	(2.4)	(2.8)	(4.8)	(1.8)
Leisure	Weekdays	**268.4**	**289.5**	**221.3**	**341.3**	**372.7**	**355.3**	**312.7**	**298.0**
		(1.9)	**(1.8)**	**(2.4)**	**(2.1)**	**(2.7)**	**(2.7)**	**(5.1)**	**(3.0)**
	Weekends	**428.5**	**395.4**	**316.8**	**430.5**	**485.5**	**471.3**	**410.4**	**399.4**
		(3.8)	**(2.7)**	**(1.9)**	**(1.6)**	**(4.4)**	**(4.5)**	**(8.2)**	**(3.0)**
Radio/TV	Weekdays	138.4	93.7	94.4	87.9	85.6	93.9	130.8	128.5
		.2.4)	(1.0)	(1.1)	(1.0)	(1.3)	(1.3)	(3.6)	(2.0)
	Weekends	117.3	116.9	97.2	92.0	107.8	110.8	138.6	147.9
		(2.0)	(1.6)	(0.2)	(0.8)	(2.4)	(2.5)	(5.4)	(2.2)

the US. Northern Europeans work in the market (less than Americans) during the week, and concentrate their leisure (much more than Americans) on weekends. No doubt some of this is due to di erent rules on store-opening hours that generate increased retail employment on weekends. Given the size of the retail sector, however, the much smaller di erence in market work between weekdays and weekends in the US than in northern Europe must be due to di erences in other industries, most likely services. Perhaps that explains the similarity between the Italian and US results too.

International di erences in the hebdomadal patterns of secondary and tertiary activities are also fascinating. Tertiary activity is greater on weekends in all four countries, due almost entirely to the extra nearly one hour of sleep that the typical adult gets each weekend day compared to each weekday. The major cross-country di erence is in the distribution of secondary time over the week. In all three European countries women undertake more secondary activities on weekdays than on weekends; the opposite is true

among American women. We believe this result stems at least in part from the di erences in store-opening hours (Burda and Weil,) between Europe and the US, since much of the di erence we observe occurs in time spent shopping. Evidently, the loosening of store-opening restrictions in the Netherlands did not result in much of a convergence in time spent shopping on weekdays and weekends there.

The much greater distinction between weekdays and weekends that we have observed for market work carries over to the weekly distinction in All Work—it is not simply due to di erences in market behavior that are o set by household production. As the averages in Table . M for All Work show, in both the Netherlands and Germany men perform over twice as much total work on weekdays than on weekends, and Italian men perform nearly percent more market work on weekdays than on weekends. In the US, men perform only percent more work on weekdays than on weekends. The international di erences among women are somewhat smaller: German and Dutch women perform roughly percent more total work on weekdays than on weekends, American women perform only percent more total work on weekdays. Italian women perform only percent more work on weekdays—their secondary activities decrease relatively little on weekends.

Is the huge di erence in weekday/weekend patterns of All Work by men between the United States on the one hand, and Germany, Italy and the Netherlands a mere artifact of our focusing on three European countries (albeit at two distinct times)? The answer is negative: In Spain in / , All Work accounts for minutes among men on weekdays, minutes on weekends. Spanish women spent minutes per day on All Work (market and household) on weekdays, minutes per day on weekends. Very clearly, the European norm, at least among men, is to perform on weekdays a much greater fraction of the total work (both in the market and at home) than is performed on weekends, leaving weekends especially free for personal care and leisure. Americans—especially men—mix their work and non-work (tertiary activities and leisure) much more between weekdays and weekends than do Europeans.

Interestingly, the only available evidence suggests this homogenization of the week among Americans was not always the case. Using the data in (Szalai, , , Tables III. and III.), one can calculate that among employed men in the US in the ratio of total work time on weekdays to that on weekends was . ; among working women it was . ; and even among housewives it was . times weekend work. While the data are not entirely comparable to those in the Table, it does seem likely that the weekly allocation of time in the US nearly one-half century ago was much more concentrated than it is now.

Table 1.7. Indexes of Similarity, Weekday and Weekend Activities

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Men	**2.57**	**2.42**	**1.83**	**1.69**	**2.98**	**2.66**	**1.54**	**2.20**
Women	**2.45**	**2.53**	**1.58**	**1.54**	**2.35**	**2.34**	**1.50**	**2.02**

Table . calculates indexes similar to those based on (.), but instead of measuring the extent of similarity in time allocations across gender, for each gender and within each country and year we are inferring the degree to which the allocation of time on weekdays across the four aggregates is like that on weekends. A lower value of the index implies that the representative individual's time allocations on weekdays and weekends are more similar. The calculation of this index reinforces our inference from Tables . that Americans do not distinguish between weekdays and weekends nearly so much as northern Europeans—that the distribution of activities on di erent days of the week is more similar in the US than in northern Europe. Italians, on the other hand, distinguish even less in their weekly distribution of all activities.

Despite the lower degree of temporal specialization of activities in the US than in northern Europe, clear-cut changes have occurred in the recent past. The index rose substantially in the US over the eighteen years to , especially among men. Among Dutch men, on the other hand, it fell during the s, but there was no change among Dutch women. The changes in Germany were small for both genders, as they were in Italy. While there has been convergence across the Atlantic Ocean, the change has resulted from changed behavior in the US alone.

There is no reason for the optima to be the same in the two areas. While technologies are undoubtedly similar, or at least approximate each other rapidly in response to technological shocks, the optima that result from the interactions of di ering preferences (including those expressed in governmental mandates) and technology will surely di er. Thus while the sharp decline in weekend work in the US is consistent with the observation that work at unusual times is undesirable (Hamermesh,) and will diminish in a growing economy with unchanging preferences and time-neutral technologies, the increase in weekend work in the Netherlands cannot be explained without reference to changes outside the workplace that have affected the timing of other activities and work too. Drawing inferences about changes in welfare from even such clear-cut changes as are shown in the tables in this Section is very tricky.

Table 1.8. Percent of Difference from U.S. in Average Daily Minutes of Market Work Due to Difference in Fraction of Adults Working

	Germany		Italy		The Netherlands	
	1991/92	2001/02	1988/89	2002/03	1990	2000
All adults	86.2	137.3	435.6	100.3	97.8	96.8
Men	104.2	107.3	129.5	49.6	124.0	118.8
Women	85.8	160.6	84.1	88.2	71.4	74.0

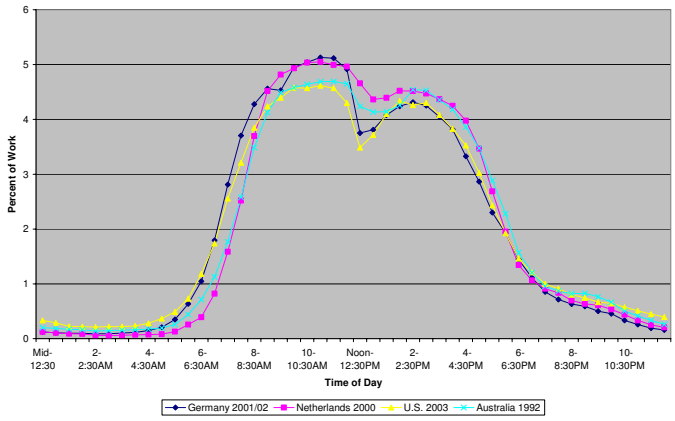
Comparisons of weekday-weekend di erences in the timing of activities by gender yield fairly unsurprising results. Because there is much less market work in the European countries on weekends which is disproportionately performed by men, the gender inequality indexes there are lower on weekends than on weekdays. In the US, where gender di erences in time devoted to market work, are less, the inequality indexes are roughly the same on weekdays and weekends.

There is also no reason to expect the iso-work fact—the same amount of All Work by men and women—to hold on a particular day (any more than one might expect it to hold at a particular point in time during any day). In fact, it does not: On weekdays in each country at each point in time All Work among men exceeds that among women; on weekends All Work among women exceeds that among men (except in Italy, by almost exactly the amount that balances o the male excess during the week).

The comparisons show that weekends and weekdays are more distinct in Europe than in the US. But is that true for all days across the week? More generally, how much of the di erences in the number of minutes worked in the market on a representative day in the US and the European countries is due to di erences in the probabilities that people work in the market and, given that they do, that they work on a particular day? We are thus asking how much of the gap between minutes worked on a representative day is attributable to di erences in the fraction of adults working on that day.

For the two German, Italian and Dutch samples Table . shows how much of the di erence between the US in the year closest to the survey in the average amount of time worked per adult is due to di erences in the probability of working on the day between the US and the particular country. The percentages cluster around , with Italian men in the recent survey being the only exception. These results suggest that the major di erence across the Atlantic is in the probability that the representative adult is working in the market on a particular day, not in the amount of time spent on a day when that person is working. Since in the recent surveys that we have used the average minutes of market work are greater in the US than in Germany, Italy or the Netherlands, the table implies that the result is due entirely to

Figure 1.2. Percent of Working Time Spent at Each Half-Hour of the Day, Germany, Netherlands, U.S. and Australia



Germans and Dutch, and to Italian women being less likely to work on a particular day (and less likely to work in the market at all during the week). When they do work in the market they work just as long as Americans. This corroborates the weekend/weekday di erence that we demonstrated earlier in this Section, since it implies more concentration of work activities across days of the week in Europe than in the US.

Having seen that Americans tend to mix market work and non-market activities more evenly over the week, one wonders whether they also mix them more evenly over the day. To examine this issue we considered the timing of work at each minute of the day among those who work on the particular day. We again consider Germany in / , the Netherlands in and the US in . For purposes of comparison to another English-speaking country, we also examine how Australians spread their work time over the day, using data from . We examine the allocations of working timing on Wednesdays, the weekday on which the largest fractions of workers in these data perform at least some work. (The international comparisons are essentially identical on other weekdays.)

Figure . presents the results for every half-hour interval on the hour over the day between midnight and the subsequent midnight.

The Figure shows the percent of the day's work done at each half-hour; it thus abstracts from cross-national di erences in the amount of time the average worker spends on the job during the day. Until AM, and after PM,

Because the activities are coded in -minute intervals in the Dutch data, and to avoid masses of repetitive information, we aggregate the time intervals to half-hour periods in this analysis.

a higher fraction of those who work at all on the day are at work in the US than in the other three countries. Workers in Germany and the Netherlands are at work disproportionately only during prime daylight hours—very few are working between midnight and AM, and not very many are working after PM. The timing of work in Australia is somewhere between that in the US and northern Europe. The main conclusion from these results is that, just as with their timing of work over the week, so too do Americans mix their market work and non-work over the day. Unlike northern Europe, where most workers are either at work or not, in the US many workers are working at non-standard times of the day.

VI. What do we now know?

As noted in the Introduction, EU-US di erences in patterns of market work have been studied nearly *ad nauseam*; we thus refrain from repeating those findings that simply reproduce what others in that vast literature have shown. Instead, we can divide our novel, or at least somewhat novel results into two categories.

A. EU vs. US.

( ) *Americans enjoy less leisure (not merely less time away from market work) than Europeans.* The di erence in non-television leisure time is even greater, since Americans watch TV over one-half hour more per day than Europeans.

( ) *Americans work more than Europeans—the American excess of market work is not fully offset by less home work.*

( ) *Americans mix their activities over the week more than Europeans.* Their weekends look more like their weekdays than do those in northern Europe.

( ) *Market work is more spread out over the twenty-four hours of the day in the US than in Europe.*

B. Gender differences.

( ) *Women spend less time in leisure than men in each of the 16 countries* we examined. They spend much more time in household production, slightly more time in tertiary activities.

( ) *Gender differences in how people spend time are smaller in the US than in the European countries studied here.* This di erence is partly due to the lesser di erence in market work time in the US, partly to

A similar calculation by Callister and Dixon ( ) using the New Zealand Time Use Survey shows a pattern that is more tilted toward standard business hours than is Australia's.

a greater similarity across genders in the US in the distribution of time spent outside the market.

( ) *The sums of market work and secondary activities are almost identical by gender within a country at a point in time over the week.* Men's excess of market work is almost perfectly balanced by their shortfall of household work. Only in the Mediterranean countries, with Italy being a particularly severe outlier, does men's excess market work fail to match women's excess home production.

Appendix: classification of basic activities into the main aggregates in the eight samples

Note: In many of the survey a very small part of the day was not classified or truly miscellaneous. In each case those totals were prorated across the four main aggregates.

Activity	Description
Market work	Employment and job search
Secondary	Home work activities; handicraft/gardening; care and sitting
Tertiary	Personal activities; physiological regeneration
Leisure	Volunteer and other social help; education; contacts/conversation/friendship; media usage/free-time activities

Table 1.1. Germany: / , /

Activity	Description
Market work	Professional activities; training
Secondary	Domestic activities; family care; purchasing goods and services
Tertiary	Sleeping eating, including at work
Leisure	Nonwork-related education; religious/civic/political activities; free time. Travel time is prorated across market work, secondary time and leisure in / , and is specifically assignable in /

Table 1.2. Italy: / , /

Activity	Description
Market work	Occupational work and related travel
Secondary	Household work, do-it yourself, gardening, etc; childcare; shopping
Tertiary	Personal needs
Leisure	All else

Table 1.3. Netherlands: ,

Activity	Description
Market work	All working and work-related activities; travel related to work
Secondary	Cooking, cleaning, child care, shopping; travel related to these
Tertiary	Personal care outside the house; eating and drinking; sleeping, sex; travel related to these
Leisure	Schooling and training; organized activities; entertainment; sports; reading, writing; travel related to these

Table 1.4. US:

Activity	Description
Market work	All working and work-related activities; travel related to work
Secondary	All household activities; caring for and helping household members; consumer purchases; professional and personal care services; household services; government services; travel related to these
Tertiary	Sleeping, other personal activities; eating and drinking; travel related to these
Leisure	Non-household care activities; education; socializing-relaxing-leisure; sport; religious; etc.; volunteering; travel related to these

Table 1.5. US:

CHAPTER

Iso-work and social norms

I. Time allocation: the iso-work fact

In the previous chapter, we have established a fundamental feature of time use: *total work*, defined as the sum of time spent on market work and on secondary activity (or, to use a somewhat more common terminology, the total time spent on market and home production) is almost invariant, in most economically advanced countries, at a given point in time, to gender. This is what we called the *iso-work fact*.

This invariance is striking: as shown in the previous chapter, in fourteen of the twenty samples we have examined the di erence in total work by gender is less than four percent, with only one country, Italy, being a distant outlier.

To understand the economic content of the equal work fact, it is best to point out what it does *not* mean:

- It does not mean that total work is the same across countries. This is simply not true. There is little support in the data for the Freeman and Schettkat ( ) "marketization hypothesis."
- It does not mean that total work is constant over time in a given country. Quite on the contrary, there is some evidence in our data that total work might be sensitive to the state of the business cycle, and it stands to reason that it should have a downward secular trend.
- It does not mean that all individuals choose, in a given country and at a given date, the same allocation of time between market and home production. Time use does depends on gender, but the point is that, in the aggregate, total work does not: gender only a ects the division of total work between market work and secondary activity, not its level.

The invariance of total work to gender means that there is a mechanism at work, at a given date and in a given country, that on average leads both

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Our total work fact is thus much stronger the Freeman and Schettkat ( ) "marketization hypothesis."

Table 2.1M. Time Allocations (minutes), Married People, Means and Their Standard Errors, Men and Women Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	Men	**340.9 (4.8)**	**269.8 (3.3)**	**373.5 (3.1)**	**228.2 (2.9)**	**266.5 (5.1)**	**258.6 (5.3)**	**314.8 (8.7)**	**329.1 (4.4)**
	Women	**253.3 (3.8)**	**111.1 (2.1)**	**124.9 (2.2)**	**95.6 (1.9)**	**87.0 (2.6)**	**111.0 (3.1)**	**159.9 (16.9)**	**182.4 (3.4)**
Secondary time	Men	**174.0 (2.6)**	**175.1 (1.8)**	**94.5 (1.3)**	**133.7 (1.5)**	**152.7 (2.7)**	**155.0 (2.7)**	**149.9 (4.8)**	**179.0 (2.6)**
	Women	**222.0 (2.3)**	**336.3 (2.0)**	**435.5 (1.8)**	**391.2 (1.9)**	**321.9 (2.5)**	**302.3 (2.7)**	**305.0 (5.8)**	**313.8 (2.8)**
Male Total Work - Female Total Work		**39.6**	**-2.5**	**-92.2**	**-123.9**	**10.3**	**0.3**	**-0.2**	**11.9**
Tertiary time	Men	**624.1 (2.1)**	**655.9 (1.7)**	**685.2 (1.3)**	**611.3 (1.4)**	**623.7 (2.3)**	**633.6 (2.5)**	**645.3 (4.3)**	**609.3 (2.0)**
	Women	**652.4 (1.8)**	**680.9 (1.5)**	**663.0 (1.0)**	**592.3 (1.1)**	**642.8 (1.8)**	**660.2 (1.9)**	**653.3 (3.8)**	**635.5 (1.8)**
Leisure	Men	**300.9 (2.9)**	**339.1 (2.1)**	**287.0 (2.2)**	**466.8 (2.2)**	**397.1 (3.8)**	**392.8 (3.8)**	**329.9 (6.4)**	**322.5 (3.2)**
	Women	**312.4 (2.4)**	**311.7 (1.8)**	**216.9 (1.5)**	**360.9 (1.6)**	**388.4 (2.7)**	**366.5 (2.8)**	**322.6 (5.2)**	**308.1 (2.7)**
		Spain	**Australia**						
		1993/98	**1992**						
Market work	Men	**268.1 (5.2)**	**306.7 (4.9)**						
	Women	**117.2 (4.3)**	**125.8 (3.4)**						
Secondary time	Men	**135.0 (2.9)**	**169.6 (2.6)**						
	Women	**317.4 (3.9)**	**347.3 (2.9)**						
Male Total Work - Female Total Work		**-31.5**	**3.1**						

gender groups to choose the same amount of total work. What could this mechanism be?

A. Specialization and fairness within the household. A first possibility is that the equality of male and female total work results from the interaction between optimal specialization and a desire for fairness within the household, as suggested by Table . M.

Imagine, for instance, that John might has a comparative advantage in home production over his lawyer wife Helen. As a result, they have decided that he would be a househusband while she would practice law in a firm. The implicit contract between them stipulates that while John spends his days taking care of the kids and cleaning up the house, Helen should really work, and not spend her afternoon playing golf with her partners. In return, John has promised Helen, who comes back exhausted from a full day at the o ce, that the kids will be clean, the house tidy and dinner ready when she returns home from the o ce in the evening. John starts his day of home work when Helen leaves the house, and is done by the time she comes back

Table 2.1U. Time Allocations (minutes), Unmarried People, Means and Their Standard Errors, Men and Women Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	Men	**226.6 (5.7)**	**241.1 (5.5)**	**324.9 (5.5)**	**348.3 (3.1)**	**222.6 (9.2)**	**243.6 (8.0)**	**294.80 (12.5)**	**283.8 (5.5)**
	Women	**182.9 (4.8)**	**175.0 (3.8)**	**182.4 (4.2)**	**171.1 (2.5)**	**105.2 (5.1)**	**152.2 (5.2)**	**217.4 (19.3)**	**223.5 (4.1)**
Secondary time	Men	**241.1 (4.3)**	**170.4 (3.5)**	**58.5 (1.9)**	**97.6 (1.4)**	**113.0 (4.1)**	**120.5 (3.7)**	**113.7 (4.1)**	**135.6 (3.0)**
	Women	**281.9 (3.5)**	**263.9 (2.9)**	**237.3 (3.0)**	**302.0 (2.1)**	**226.3 (4.1)**	**196.9 (3.5**	**202.1 (6.0)**	**218.5 (2.8)**
Male Total Work - Female Total Work		**2.9**	**-27.4**	**-36.3**	**-27.3**	**-4.1**	**15.0**	**-11.0**	**-22.6**
Tertiary time	Men	**633.1 (2.8)**	**649.3 (3.2)**	**678.2 (2.2)**	**580.0 (1.4)**	**625.7 (4.7)**	**635.6 (4.2)**	**636.4 (6.9)**	**627.8 (3.1)**
	Women	**649.5 (2.4)**	**665.4 (2.3)**	**694.6 (1.8)**	**593.7 (1.3)**	**653.9 (3.2)**	**657.8 (3.1)**	**654.1 (5.3)**	**646.9 (2.4)**
Leisure	Men	**339.2 (4.2)**	**379.3 (4.0)**	**378.9 (4.5)**	**414.1 (2.3)**	**478.7 (7.8)**	**440.3 (6.7)**	**395.0 (10.1)**	**392.6 (4.7)**
	Women	**325.7 (3.9)**	**335.6 (1.6)**	**326.0 (3.2)**	**373.2 (2.0)**	**454.7 (4.9)**	**433.2 (4.7)**	**366.5 (7.8)**	**351.0 (2.5)**
		Spain	**Aus-tralia**						
		1993/98	**1992**						
Market work	Men	**225.5 (7.3)**	**288.4 (7.0)**						
	Women	**127.6 (5.3)**	**180.1 (5.7)**						
Secondary time	Men	**95.8 (3.5)**	**121.3 (3.2)**						
	Women	**229.5 (4.4)**	**232.6 (4.1)**						
Male Total Work - Female Total Work		**-35.9**	**-3.0**						

in the evening. As a result, total work is identical for both spouses in the Helen and John household, but its is allocated di erently for each across market and secondary activities. If Helen and John both worked in the market and split housework, they would arrange their working days so that, in the end, they enjoy the same total amount tertiary and leisure activities, i.e., the same amount of total work in the market and at home.

B. Unmarried agents. However seductive and intuitive this explanation might sound, it however does not account for another feature of the data, exhibited in Table . U: total work is also invariant across gender for the *unmarried*.

Thus, while the unmarried specialize less than the married, the amount of total work that unmarried men perform is very close to that of unmarried women in a given country and in a given year. This implies that we cannot invoke the interaction of specialization and fairness within the household to explain the equal work fact. There must be a mechanism that coordinates

the total time spent on market work and secondary activities across males and females, whether they are married or unmarried.

The simplest coordination device that equalizes total work across agents is a *social norm for leisure* that serves as focal point for the determination of total work. Peer pressure or a strong desire to conform to social norm for time allocation mute market incentives and weaken the impact of individual tastes. As a result, time use becomes more similar across individuals.

If the social norm is strong enough to drive the agent to fully conform, we obtain the equal work result we have observed in the data. For that to occur, the cost of deviating from the social leisure norm must be high.

II. Social norms for leisure

To illustrate the e ect of social leisure norms on individual behavior, we consider two models of social norms. We neglect in this chapter the distinction between market and home work to concentrate on the e ect of social norms on the allocation of time between work and leisure.

A. One norm for all, no within-gender heterogeneity. Imagine that, *in the absence of a social norm*, the demand for leisure of an agent depends negatively (and linearly) on the wage rate:

$$L = 1 - \epsilon w.$$

The amount of time available (say, in a week) is normalized to 1, and $\epsilon > 0$ measures the sensitivity of leisure to the wage rate w. We call this outcome the agent's *intrinsic optimum*.

Now suppose that there is a social norm that influences, but does not mandate, individual leisure. We mean by this that agents have the choice of

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For a survey of social norms and economic theory, see Elster ( ). Social norms have been studied, among others, by Akerlof ( ), Jones ( ), Cole, Mailath, and Postlewaite ( ), Kandori ( ), Young ( ), Lindbeck ( ), and Lindbeck, Nyberg, and Weibull ( ).

In this simple story, total conformity only occurs in this first model in the limit when the desire to conform is infinitely strong. The literature (Bernheim,) has sought ways to obtain full conformity without assuming an infinite cost of deviance. We examine these issues below.

This issue will be taken up in chapter .

This would result from the case in which consumers maximize in each period the utility function $C - (1/2\epsilon)(1-L)^2$ subject to the budget constraint $C = \Omega + w(1-L)$, where Ω is non-labor income.

By assuming $\epsilon > 0$, we rule out for simplicity cases in which the labor supply curve is backward-bending. Leisure demand, and labor supply, become wage-inelastic when $\epsilon \to 0$. In that case, our specification implies, somewhat unpleasantly, that $L = 1$ so that agents do not work. This could be fixed by writing instead $L = L_0 - \epsilon w$ with $L_0 \in (0, 1)$. We keep the formulation $L_0 = 1$ in order to lighten the notational burden.

the extent to which they stick to the norm, and optimally balance the marginal costs and benefits of deviating from the norm. The cost of deviating may stem from guilt (an internal psychological process) or shame (an external peer pressure mechanism or reputational mechanism). The benefit of deviating results from the joy of following one's own unbridled inclinations that in general di er from the norm.

Formally, let us measure the strength of the social norm by a coe cient $\phi \geq 0$. When $\phi = 0$, there is no social norm, and agents choose $L = 1 - \epsilon w$. When $\phi = +\infty$, the hold of norm on the agent's behavior is infinitely powerful so that, if we call L^* the social norm for leisure, agents pick $L = L^*$ regardless of their w and ϵ. For ϕ between zero and infinity, the social norm pulls optimal leisure choice away from $1 - \epsilon w$ and towards L^*: Hence

$$L = \alpha(1 - \epsilon w) + (1 - \alpha)L^* \equiv L(w),$$

with the weight α, between 0 and 1, given by

$$\alpha = \frac{1}{1 + \phi\epsilon.}$$

The coe cient α is large, and optimal leisure is far from the norm, if the social norm is weak (ϕ small) or leisure is not very elastic (ϵ small). Higher wages, keeping α constant, increase the distance between L and L^*.

Now assume that male (M) and female (F) wages di er, but that the wage sensitivity of leisure (α) is identical across sexes. The resulting *leisure gap* between man and women is

$$\begin{aligned} L^m - L^f &= L(w^m) - L(w^f) \\ &= -\alpha\epsilon(w^m - w^f). \end{aligned}$$

Explaining the iso-work fact requires examining under which circumstances the leisure gap $L^m - L^f$ may be zero (or indeed very small). Since α collapses to zero as ϕ goes to infinity, this requires that the strength of the norm be infinitely (or very) strong, for

$$\lim_{\phi \to \infty} (L^m - L^f) = 0.$$

In words, a very strong norm mutes the e ect of wages on leisure, and equalizes male and female leisure.

The strength of the norm for an individual may depend on the number of people who have adopted it. We examine this possibility below.

This linear formulation follows from assuming that a deviation from the norm entails a quadratic utility loss, i.e., from maximizing $C - (1/2\epsilon)(1 - L)^2 - (\phi/2)(L - L^*)^2$ with respect to L.

This last assumption, which is of course at odds with estimates of labor supply elasticities for males and females, can easily be relaxed.

While this result may appear trivial, its derivation reveals what is perhaps the most crucial ingredient of a norm-based explanation of the total work fact: the assumption that men and women share a *gender-neutral norm*. It is because the leisure norm of males and females is gender-neutral that a larger ϕ wipes out the di erences between male and female leisure. Were the norm correlated with gender, we would in general observe, ceteris paribus, di erent male and female leisure even when $\phi = +\infty$. Hence the fact that total work is relatively invariant to gender in high-income countries (but less so in poorer economies) suggests, if the social norm story is correct, that a fundamental change of norms takes place in the process of economic development: gender-neutral, or gender-blind norms replace gender-specific references for leisure (and more generally for consumption). We will return below to the theme of gender-neutral norms.

B. One norm for all, within-gender heterogeneity. The toy model we have just outlined, even though it provides us with an important insight, is not su cient to rationalize all the facts in our possession. The empirical di culty we are facing is that the iso-work fact coexists with widespread within-gender (and more generally within-group) heterogeneity of leisure. This is inconsistent with the simple story told above because as $\phi \to +\infty$, the labor supply of each individual, whether male or female, converges to the common, gender-neutral norm L^* regardless of the wage. As a result, while a strong norm bridges the gap between male and female leisure, it also eliminates any within-gender heterogeneity of leisure that would otherwise arise from heterogenous wages.

To make this point more precisely, amend the model of the previous section by relaxing the assumption that all men, and all women, have the same wage. Call $F^i(\cdot)$, $i = m, f$, the cumulative distribution of wages in the population of gender i. Average leisure for agents of gender $i = m, f$ is

$$\begin{aligned}\bar{L}^i &= \int_w L(w)\, dF^i(w) \\ &= \alpha(1 - \epsilon\bar{w}^i) + (1 - \alpha)L^*,\end{aligned}$$

where $\bar{w}^i$ is the mean wage of agents of gender i. Hence, the gap between average male and female leisure is simply

$$\bar{L}^m - \bar{L}^f = -\alpha\epsilon(\bar{w}^m - \bar{w}^f).$$

Note that no causal statement is being made here. One can easily write models in which gender-specific norms cause economic backwardness, and models in which competition and development causes gender-equality.

This is also true if ϵ, the sensitivity of leisure to the wage, di ers across sexes.

We conclude that, regardless of the distribution functions $F^i(\cdot)$, the leisure gap goes to zero, and the iso-work holds precisely, if the social norm for leisure is gender-neutral and infinitely strong ($\phi \to \infty$). This conclusion is qualitatively identical to that of the previous section.

The difficulty with this model, however, is that within-group heterogeneity also gets wiped out when $\phi \to \infty$. To see this, let us compute the variance of leisure across the population of males, and across the population of females:

$$\begin{aligned}\mathrm{Var}(L^i) &= \int_w [L(w) - \bar{L}^i]^2 \, dF^i(w) \\ &= (\alpha\epsilon)^2 \int_w [w - \bar{w}^i]^2 \, dF^i(w).\end{aligned}$$

The term under the second integral sign is the variance of wages across individuals of gender i. Thus, as ϕ rises and α falls to zero, the variance of leisure shrinks quadratically to zero. Hence, the very same mechanism that pulls leisure together across gender (a strong gender neutral norm) also wipes within group heterogeneity.

We now show that this unpleasant feature of our model can be avoided by introducing non-gender based *social clusters*, or several social norms.

C. Social clusters. Imagine now that men and women are stratified into two categories: high wage and low wage earners. Note that the names of the categories are just illustrative: we could just as well be splitting agents according to the color of their eyes, or the month in which they are born.

The question is of course why one might want to develop such an extension of our basic model. The answer, beyond the need that was evoked above to generate within-gender heterogeneity of leisure, is simple: it is reasonable to hypothesize that different agents may have different reference groups for leisure (a region, a family, co-workers, a church etc.).

Remember, however, the point we made above: in order to explain the iso-work fact by social norms, we *must* assume that the norms adopted by agents are uncorrelated with gender. This would happen, for instance, in a world in which individuals want to keep up with the leisure of Joneses. Since the Joneses are our neighbors, social norms will depend on neighborhood. But while there are rich and poor neighborhoods, there are no predominantly male or female neighborhoods. As a result, a neighborhood-based norm would create social clusters that are uncorrelated with sex, and would deliver the iso-work fact.

How do we translate this requirement that normative clusters be uncorrelated with gender in a simple model in which the only difference between

We thank Georg Kirchsteiger for a very helpful discussion on this topic.

agents, besides sex, is the wage? Suppose we defined "rich," or highly productive agents, as those whose wage is above the *mean* wage of people of their gender, and that rich agents, whether male or female, adopt one norm, and poor agents, whether male or female, adopt another. If the wage distributions of males and females are di erent and asymmetric, we will in general find di erent proportions of male and females in each social group. For instance, if the distribution of male wages is more skewed to the right (to the top) than the distribution of female wages, there will be proportionately more males adopting the high wage norm (and of course more females adopting the low wage norm). As a result, a high/low wage social norm defined in terms of position relative to the mean will deliver norms whose adoption is correlated with gender. Any model based on such a specification will not be able to replicate the iso-work fact.

To match the data, we need to define the high- and low-wage categories in terms of *quantile* position in the wage distribution. Suppose, to be specific, that a high-wage individual is defined as one whose wage is the upper decile of the wage distribution of her/his sex. By construction, percent of the men and percent of women are then in the high-wage category, and percent of the men and percent of women in the low-wage category. As a result, each category is gender-balanced, and comprises equal proportions of men and women even though there are, in this example, many more individuals in the low-wage category. The categories could be defined in terms of any other quantile, or there could be more than two categories: the iso-work fact would still hold. If thee gender-specific wage distributions were symmetric, picking the mean would also do but only because it would equal the median. We have seen above, however, that the mean is not an appropriate choice for asymmetric distributions.

Let us briefly take stock formally of this discussion. Suppose we adopt quantile q, $0 < q < 1$, as the watershed between what we call high and low wages. This means that individuals of gender i will be in the high-wage category if their wage is above the minimum level $\mathbf{w}^i$ defined by

$$1 - F^i(\mathbf{w}^i) = q.$$

Call L_j^*, $j = h, l$, the leisure norm for high (h) and low (l) wage earners. Assume that the strength of the two norms is the same (i.e, that the same ϕ applies to the high and low wage norms). Leisure of an agent of wage type j is simply

$$L_j(w) = \alpha(1 - \epsilon w) + (1 - \alpha)L_j^*.$$

If they are identical, males and females are identical, and the whole discussion is moot as the iso-work fact holds trivially. See below for the symmetric case.

This assumption would be problematic in a model in which the strength of the norm depends on the number of individuals who have adopted it.

As a result, average leisure of agents of gender i is

$$\begin{aligned}\bar{L}^i &= \int_{w<\mathbf{w}^i} L_l(w)\, dF^i(w) + \int_{w>\mathbf{w}^i} L_h(w)\, dF^i(w) \\ &= \alpha(1-\epsilon\bar{w}^i) + (1-\alpha)[(1-q)L_l^* + qL_h^*].\end{aligned}$$

We immediately conclude that the leisure gap between men and women is

$$\bar{L}^m - \bar{L}^f = -\alpha\epsilon(\bar{w}^m - \bar{w}^f).$$

This is the exact same formula as when there is a single social norm. We thus conclude that the leisure gap goes to zero and the iso-work fact holds asymptotically (when $\phi \to +\infty$ and $\alpha \to 0$) in the presence of many social norms — provided the categories defined by the norms are uncorrelated with gender.

The existence of social clusters (delineated by the high and low wage categories) ensures that *within-gender* heterogeneity of leisure does not get shrink to zero when ϕ becomes very large.

D. Even more heterogeneity. Although the previous model of social clusters maintains within-gender heterogeneity, one might be worried that it does not preserve *within-category* variance: within each (high, low) wage category, leisure indeed becomes identical for agents of the two sexes as the corresponding leisure norm becomes infinitely compelling ($\phi \to \infty$).

One way to avoid this problem is to define yet more dimensions of clustering based on other characteristics of agents, and to repeat the reasoning of this section for this finer partitioning of the population. By doing so — provided of course the resulting categories are uncorrelated with sex — we could again replicate the iso-work fact yet generate as much within-gender heterogeneity as desired by making each social norm infinitely compelling. Of course, we would still find that within-category heterogeneity would go to zero, but this would not be much of a problem anymore as the categories would be finely grained.

Another way to maintain within-category heterogeneity as norms become more and more binding would be to introduce a dimension of idiosyncratic heterogeneity in the population. This heterogeneity could stem from di erent tastes, or from a noisy individual observation of the societal leisure norm. To illustrate how this line of reasoning would play out in our setup, let us go back to the first of our models with one norm L^* for all, identical wages for all members of a given sex, and a di erent wage for male and female workers. Imagine that individual k observes the norm with

As we do not wish to transform the quest for a theoretical explanation of the iso-work fact into a futile data-fitting exercise, we prefer the second interpretation, which is potentially falsifiable, to the first, which multiplies unobservable parameters.

some measurement error λ_k, in the sense that he thinks the desirable norm is $L^* + \lambda_k$ instead of L^*. As a result, optimal leisure for that individual becomes

$$L_k = \alpha(1 - \epsilon w) + (1 - \alpha)(L^* + \lambda_k),$$

with α defined exactly as above. Hence $L_k \to L^* + \lambda_k$ as $\phi \to \infty$ (and $\alpha \to 0$) regardless of the wage, i.e. regardless of whether one is male or female. Now suppose measurement errors are idiosyncratic in the sense that the λ' average to zero for each sex. Then it is straightforward to show the leisure gap is zero, and the iso-work fact holds exactly when $\phi \to \infty$—in spite of the fact that each agent ends up consuming a di erent amount of leisure due to her/his idiosyncratic perception of the norm.

III. Accounting for variations in total work

The data presented in Chapter make it abundantly clear that although total work is strikingly equal across men and women, it does vary, sometimes substantially, across countries and over time. Since we have attempted in the previous section to rationalize the iso-work fact by social norms by arguing that they serve as a coordination device between males and females total work, we must now undertake the task of explaining why norms may vary across countries and dates.

We take as our starting point the fact that we have so far treated social norms as *exogenous*. One could of course argue that this is appropriate because norms reflect moral or religious imperatives that have little or nothing to do with economics. We could then conclude that total work is not the same in all places and at all times because norms vary as a function of culture or circumstances. This would be akin to the account given by Solow ( ) of the secular improvement of GDP per capita: standards of living keep improving, and capital remains productive enough at the margin to justify investment, because technical progress exogenously shifts up the production function over time. This explanation, like Solow's, would not be trivial: it would focus our attention on norms as the engine of change of total work (changing norms) in very the same way that Solow made us realize that ideas could be the engine of long-run growth.

However, in the same way that bringing back the determination of technological progress within the fold of economics has been a significant

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I.e., an individual of type k has utility function $C - (1/2\epsilon)(1 - L)^2 - (\phi/2)[L - (L^* + \lambda_k)]^2$.

This leaves open the possibility that females and males perceive the social norm with di erent precision.

milestone for endogenous growth theory, we believe that endogenizing the norms that explain the iso-work fact is the right tack to take.

To that e ect, let us return yet again to our simplest model of social norms: men and women have the same preferences but a di erent wage, there are no within-gender wage di erences, and men and women adopt a common leisure norm L^*. Remember that in that model male and female leisure are given by

$$L^m = \alpha(1 - \epsilon w^m) + (1 - \alpha)L^*,$$
$$L^f = \alpha(1 - \epsilon w^f) + (1 - \alpha)L^*.$$

Now if we view the gender-neutral norm L^* as reflecting *average leisure* across males and females in society, and there are equal proportions of men and women in the economy, it must be the case that, in equilibrium,

$$\frac{1}{2}(L^m + L^f) = L^*$$

Combining the last three equations and solving for L^*, we conclude that the *equilibrium social norm for leisure* is simply

$$L^* = 1 - \epsilon w^*,$$

where

$$w^* = \frac{w^m + w^f}{2}$$

is the average wage in the whole (male *and* female) population.

The story we are telling is very simple:

- The equilibrium social norm for leisure is independent of its impact on the agent's tastes (ϕ), but it depends on the sensitivity of individual leisure to the wage (ϵ) and on the average wage rate in the economy ($\bar{w}$). Whenever these magnitudes change, across countries or over time, the social norm for leisure varies.
- The extent to which individual leisure ends up in equilibrium close to the social norm depends on the parameter ϕ. In the limit, when $\phi \to +\infty$, the iso-work fact hold exactly (the leisure gap between men and women is zero).

IV. Fixed costs

A drawback of the linear-quadratic formalization adopted in the previous section is that social norms only mute individual leisure di erences: exact conformity between men and women (possibly with a specific social

This endogenization of norms is at the heart of the recent literature on conformity. See Bernheim ( ).

cluster) occurs only if the penalty attached to even minute deviations from the norm is infinite ($\phi \to \infty$).

Fortunately, it is easy to remedy this defect by introducing *fixed utility costs* of deviating from the social norm, which are meant to capture the idea that reputation constitutes, at least to some extent, an all-or-nothing phenomenon: one is, or one is not, a male chauvinist pig. If the cost of deviance includes a fixed element, it generates, as fixed costs always do, optimal inaction (here conformity) bands in which the benefit of deviating from the norm to follow the intrinsic optimum falls short of the cost of deviance. As a result, an individual will conform to the norm whenever it is not "too far" from the intrinsic optimum— for the cost of deviating from the intrinsic optimum is then small relative to the cost of losing one's reputation. Contrariwise, consumers ignore the norm in favor of the intrinsic optimum if the former is not too distant from the latter.

To formalize this straightforward cost-benefit argument, suppose that the cost of deviating from the norm L^* takes the form of a *fixed utility cost* ψ, with ψ positive and finite. Define, as above, w^* as the wage rate at which the intrinsic optimum and the norm coincide, i.e., the wage rate that would make our consumer choose leisure L^* if there were no norm. Letting $\epsilon = 1$ for simplicity in what follows, we have

$$L^* = 1 - w^*.$$

Since the cost of deviance is fixed, an agent with wage w who does not conform to the leisure norm L^* always picks a level of leisure that coincides with his/her intrinsic optimum $L = 1 - w$. If we stick to the linear-quadratic framework of the previous section, we can easily calculate the utility of a non-conformist:

$$U^N = \Omega + w(1 - L) - \frac{1}{2}(1 - L)^2 - \frac{\psi}{2} = \Omega + \frac{1}{2}w^2 - \frac{\psi}{2}.$$

A conformist can avoid the cost of losing his/her reputation but this requires adopting the norm L^*. This entails a utility level

$$U^C = \Omega + w(1 - L^*) - \frac{1}{2}(1 - L^*)^2 = \Omega + ww^* - \frac{1}{2}w^{*2}.$$

The reasoning extends to the hybrid case in which the cost of deviance comprises both a fixed cost and a variable cost (for instance, the sum of a constant and of the quadratic term $(L - L^*)^2$). The only di erence is that, outside of the inaction band, consumers choose a level of leisure intermediate between their intrinsic optimum and the norm.

Any other level (except for the norm itself) would entail the same reputation loss but lower intrinsic utility.

Conformity is the optimal strategy if and only if $U^C > U^N$. From the last two equations, we conclude (after some elementary algebraic manipulations) that this occurs whenever

$$\psi > \frac{1}{2}(w - w^*)^2.$$

This condition holds if and only if the wage rate is within the *conformity band*

$$[w^* - \sqrt{2\psi}, w^* + \sqrt{2\psi}]$$

that surrounds w^*. Inside this band, it is optimal to stick to the norm L^*, and to completely ignore intrinsic preferences.

To close the model as we did earlier, imagine that all men have wage w^m, and all women wage w^f. Furthermore, assume the social norm corresponds to the mean of male and female intrinsic leisure, so that

$$w^* = \frac{w^m + w^f}{2}.$$

Then men *and* women adopt the norm provided that

$$\psi > \frac{1}{2}\left(\frac{w^m - w^f}{2}\right)^2.$$

This inequality is more likely to be violated, given ψ, in economies, or in social clusters, in which the wage gap between genders is high. This result might contribute to rationalize the evidence gathered in chapter that the iso-work fact holds less strongly in middle-income countries.

V. Strategic complementarities: a model of Stakhanov

We have so far assumed that the cost of being non-conformist does not depend on how many people conform. One could argue that this is not reasonable, as the stigma attached to deviating from a social norm (or the very existence of a social norm) plausibly depends on how widely accepted the norm is. For instance, being a male chauvinist pig in a society composed of male chauvinist pigs presumably entails less of a reputation loss than being the sole sexist male in a metrosexual environment. Similarly, the productivity norm established by Stakhanov, the legendary and probably mythical Soviet coal miner who in extracted fourteen times his quota, was compelling to individuals because his example was emulated, under the pressure of Soviet propaganda, by a large number of workers.

This consideration opens the possibility of multiple equilibria through the existence of strategic complementarities: if the reputation loss that we experience when we deviate from the norm depends on how widely the

For more on Stakhanov, see Schmemann ( ).

Figure 2.1. Stakhanov (cover of Time Magazine, / /)

norm is followed, whether or not we choose to conform depends on our perception of the prevalence of the norm among our fellow citizens. If we expect them to conform, we have an incentive to act as they do, for the cost of deviance is then high. If we anticipate that others will disregard the norm, however, the cost of deviance is small, and it is more likely that we will find it optimal to follow our intrinsic optimum. The question then arises whether conformism, or deviance is the stable outcome that will emerge endogenously from a population of self-interested individuals. The answer, as we now establish, depends crucially on the shape of the wage distribution.

This easiest way to formalize this argument is to amend the fixed cost model of the previous sections. Let us assume, as before, that the cost of deviance is fixed from the point of view of individuals. However, imagine that it depends, socially, on the fraction $\pi \in (0, 1)$ of conformists in the population:

$$\psi = \pi^2/2.$$

This section is inspired by the work of Cartwright ( ) and Wooders, Cartwright, and Selten ( ) on the emergence of social conformity.

If no one in society conforms, there is no cost of being deviant. The cost of deviance is increasing in π, and thus maximal when everyone else conforms ($\pi = 1$).

From the results of the previous section, we know that an individual with wage w chooses to conform if and only if

$$\psi = \frac{1}{2}\pi^2 > \frac{1}{2}(w - w^*)^2,$$

that is, if and only if his/her wage is in the conformity band

$$[w^* - \pi, w^* + \pi].$$

Crucially, the more widely adopted the norm is, the wider is the conformity band, and the more likely it is that an individual with an arbitrary wage will conform. Conversely, when fewer people conform, the narrower is the band, and the more likely is individual deviance. This strategic complementarity opens the door to multiple equilibria, very much as in Cooper and John ( ).

To prove this is the case, suppose male and females have the same cumulative wage distribution $F(w)$ over the interval $[0, 1]$. The fraction of the population with wages in the conformity band is then

$$F(w^* + \pi) - F(w^* - \pi).$$

Since this fraction must coincide with π in equilibrium, the fraction of conformists in the population solves

$$F(w^* + \pi) - F(w^* - \pi) = \pi.$$

Regardless of the exact shape of $F(\cdot)$, this equation always has (at least) two solutions, $\pi = 0$ and $\pi = 1$. The former corresponds to a *nonconformist* equilibrium in which no one conforms, and a *conformist equilibrium* in which everybody adheres to the norm.

Which of these equilibria is stable depends on the shape of the cumulative distribution function $F(\cdot)$. To illustrate this point, assume wages are distributed uniformly over $[0, 1]$, so that $F(z) = z$ for $0 < z < 1$, and $F(z) = 1$ for $z > 1$. In addition, assume for the moment being that the norm is the mean of intrinsic leisures, so that $w^* = 1/2$ (i.e., the mean of the individual w's). Then

$$F(w^* + \pi) - F(w^* - \pi) = \begin{cases} 2\pi, & \text{for } 0 \leq \pi \leq 1/2; \\ 1, & \text{for } 1/2 < \pi \leq 1. \end{cases}$$

These two properties are crucial. The quadratic specification is adopted for simplicity but it is not innocuous, as the number and stability of equilibria depend jointly, as we will see below, on the shape of the cost function and on the distribution of wages.

If $\pi = 1$, $w^* + \pi > 1$ so that $F(w^* + \pi) = 1$, while $w^* - \pi < 0$ so that $F(w^* - \pi) = 0$.

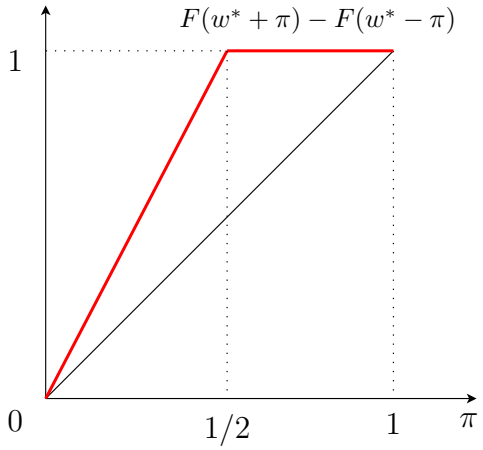

Figure 2.2. Multiple equilibria ($w^* = 1/2$; uniform distribution of wages over $[0, 1]$)

Figure . shows that for a uniform distribution of wages there are exactly two equilibria, $\pi = 0$ and $\pi = 1$. Crucially, only the conformist equilibrium is stable as $F(w^* + \pi) - F(w^* - \pi) > \pi$ for all π strictly between 0 and 1. Hence full conformity to $L^* = 1 - w^* = 1/2$ will emerge endogenously in this economy, and the iso-work fact will hold in its strictest form even though agents have di erent wages and the cost of deviating from the norm is finite.

Remarkably, this reasoning holds regardless of the value of the norm. Suppose w^* is di erent from $1/2$. Then, if we maintain the assumption that the distribution of male and female wages is identical and uniform over the interval $[0, 1]$, one can easily show that

$$F(w^* + \pi) - F(w^* - \pi) = \begin{cases} 2\pi, & \text{for } 0 \leq \pi \leq \min(w^*, 1 - w^*); \\ w^* + \pi, & \text{for } \min(w^*, 1 - w^*) < \pi \leq \max(w^*, 1 - w^*); \\ 1, & \text{for } \max(w^*, 1 - w^*) < \pi \leq 1. \end{cases}$$

As before, there are two equilibria, illustrated in Figure . : a stable one in which everybody conforms, and an unstable one in which nobody conforms. Remarkably, nothing pins down the norm: w^*, and thus L^*, can take any value in the interval $[0, 1]$. Hence there is a continuum of equilibria with full conformity over $[0, 1]$, indexed by the social norm L^*.

The easiest way to see this is to observe that the di erence equation $F(w^* + \pi_t) - F(w^* - \pi_t) = \pi_{t+1}$ converges to $\pi = 1$ as $t \to \infty$ for any $0 < \pi_0 < 1$.

Note, however, that for other distributions (for instance, distributions with mass concentrated on extreme values), the non-conformist equilibrium might emerge as the

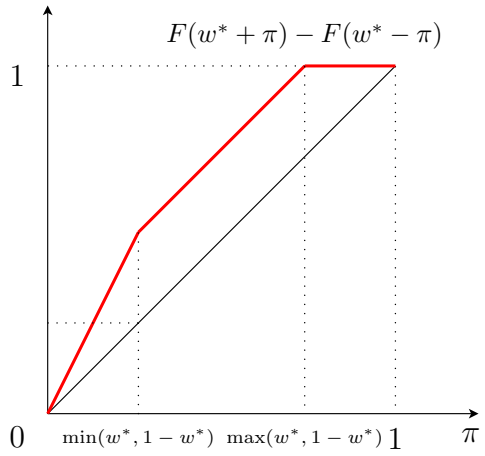

Figure 2.3. Multiple equilibria (w^* arbitrary; uniform distribution of wages over $[0, 1]$)

What can we say about the welfare properties of these conformist equilibria? Can they be Pareto-ranked? To answer that question, we need only look at the welfare of an agent with wage w in the conformist equilibrium indexed by w^*, and examine how it depends on w^*. We established earlier that

$$U^C = \Omega + ww^* - \frac{1}{2}w^{*2},$$

so that

$$\frac{\partial U^C}{\partial w^*} = w - w^*.$$

Since $L^* = 1 - w^*$, this implies that

$$\frac{\partial U^C}{\partial L^*} = w^* - w.$$

Hence low-wage agents ($w^* - w > 0$) are better o in an economy in which social pressure dictates high leisure. Conversely, high-wage individuals ($w^* - w < 0$) are better o in a "stakhanovist" society in which L^* is high. This di erence in welfare stems only, in our model, from the fact that agents prefer norms that are congruent with their intrinsic tastes. Differing social norms may thus contribute, beyond the existence of a welfare state, to the rationalization of the commonly held perception that Europe

stable one. In addition, one can construct examples in which $\pi = 0$ and $\pi = 1$ are not the only possible solutions, and in which the equilibrium fraction of conformists is strictly between zero and one, and stable. We do not explore these refinements here, but they might help us explain why some groups or countries experience less conformism than others.

is more congenial than the US to low-productivity individuals. At any rate, these results establish that the continuum of conformist equilibria cannot be Pareto-ranked.

VI. US vs. Europe: A model of coordinated leisure

Chapter has documented that Americans work more than Europeans, and that, in addition, the hebdomadal pattern of work di ers substantially between the two continents: in contrast with Europe, weekends look a lot like weekdays in the US.

One could of course argue that this is due to di ering tastes, but as usual explanations based on unobservable variables are not very persuasive—especially since Europeans actually worked more than Americans as recently as the s, as noted by Alesina, Glaeser, and Sacerdote ( ). Instead, we wish to show that wide divergence in leisure is possible across two otherwise identical economies if one is willing to entertain the possibility that there are leisure externalities across agents.

Imagine that consumers prefer, at the margin, spending their free time in the company of others rather than alone, i.e., that individuals have a preference for *coordinated leisure*. This preference for social leisure introduces an additional dimension of *strategic complementarity* between agents. If a consumer expects others to be working a lot, she prefers to also work (and consume) a lot, as most of the leisure she so foregoes so is solitary and not very valuable. Conversely, a consumer who expects others to rest a lot finds leisure more attractive, as it is more likely that it will be taken in its most valuable, i.e., common, form.

This strategic complementarity leads, under conditions that we will outline below, to *multiple Pareto-ranked competitive equilibria*. In the presence of a preference for social activities, the economy might end up either in a low-leisure, high-consumption equilibrium, or in high leisure, low-consumption equilibrium. Crucially, welfare is lower in the former equilibrium than in the latter outcome.

To make these points formally, we first examine optimal labor supply and consumption choice of households in the presence of a preference for

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In this section, we abandon for simplicity considerations related to social norms.

Weiss ( ) has studied related issues in the context of production externalities. Implications of the desire for coordinated leisure for the regulation of working hours is explored in Burda and Weil ( ). Alesina, Glaeser, and Sacerdote ( ) analyze the macroeconomic implications of "social multiplier," á la Glaeser, Scheinkman, and Sacerdote ( ), that stems from leisure externalities. Hamermesh ( ) has shown the role of leisure externalities within the household, and Jenkins and Osberg ( ) demonstrate their existence within regions.

common over solitary leisure. Second, we determine under which conditions multiple competitive equilibria arise in our economy, and we show how they can be Pareto-ranked. Finally, we characterize the economic rationale and e ects of blue laws.

A. Household preferences and the structure of time. The economy consists of a continuum of identical agents distributed over the interval $[0, 1]$. The utility function of a typical consumer is

$$u(C) + v(\ell), \qquad (\ .\ )$$

where C denotes consumption and ℓ is an *index* of total leisure to be defined below. We assume that

$$u(C) = \begin{cases} -\infty, & c = 0; \\ C, & c > 0, \end{cases}$$

and that $v(.)$ is increasing and concave, with $v(0)$ finite. This specification would yield, in a traditional model of consumption and leisure choices, an upward-sloping labor supply curve. It rules out uninteresting corner solutions with zero consumption, as no finite amount of leisure can compensate the consumer for the infinite negative utility felt when $C = 0$. Since $v(0)$ is finite, our model does not exclude, however, solutions with zero leisure. This means that we are only discussing here non-essential leisure, and that time that must be devoted to vital activities (say, sleep) is left outside of the model for simplicity.

The total leisure index ℓ depends linearly on solitary leisure ℓ_s (idle time spent alone) and common leisure ℓ_c (idle time spent with others):

$$\ell = \ell_s + \sigma \ell_c. \qquad (\ .\ )$$

We assume that the parameter σ is greater than 1, i.e., that agents find a unit of common leisure more pleasurable than one unit of solitary leisure. Thus, σ measures the desire for *conviviality*. Without the assumption that $\sigma > 1$, it would be impossible to plausibly explain why we observe that consumers voluntarily coordinate their leisure activities (husband with wife, parents with children, friends, etc.). The case where $\sigma = 1$, in which agents do not distinguish between solitary and common leisure, is the one studied in standard models of consumption-leisure choice.

The model could be generalized, without significantly a ecting the results, to more general utility functions.

The assumption of linearity is only made for analytical convenience. All that matters for our results is that neither form of leisure be essential in utility.

An alternative, but implausible explanation, would be that there are large economies of scale in leisure.

Assume that the day (or the week) is divided into two shifts: day and night (or weekdays and weekend). The length of each day is normalized to 2, and we assume the two shifts are of equal unit length. Individuals can choose to work in either or both of the shifts. Furthermore, assume that shifts are indivisible: an individual either works, or not, during a shift. Labor supply in shift $t = 1, 2$ is thus an indicator variable x_t that takes value 1 if the individual works in shift t, 0 otherwise. Hence, total labor supply is $x_1 + x_2$, and the consumer's budget constraint is accordingly

$$C = w(x_1 + x_2), \qquad (\ .\ )$$

where we have assumed, for simplicity, the wage rate w to be the same in both shifts. In words, consumption is w or $2w$ depending on whether the consumer works one or two shifts.

Let X_t denote the average labor supply of *other* agents during shift t. In a pure-strategy Nash equilibrium, $X_t = 1$ if other agents work is thus

$$\ell_s = (1 - x_1)X_1 + (1 - x_2)X_2, \qquad (\ .\ )$$

while common leisure equals

$$\ell_s = (1 - x_1)(1 - X_1) + (1 - x_2)(1 - X_2). \qquad (\ .\ )$$

Obviously, the sum of solitary and coordinated leisure equals $2 - (x_1 + x_2)$, the di erence between the time endowment and labor supply.

B. Multiple equilibria. We now show that there is a range of wage rates w and of conviviality parameters σ for which there are two possible equilibrium outcomes. In one equilibrium, consumers work both shifts and consume a lot. In the other, they work only one shift, consume less and but enjoy coordinated leisure.

If a consumer expects *other* consumers to work two shifts (i.e., she anticipates $X_1 = X_2 = 1$), she gets utility $2w + v(0)$ if she also decides to also work two shifts, since this results in high consumption but no leisure. Under the same expectation that other will be working non-stop, she gets utility $w + v(1)$ if she decides to only work one shift, as she receives a low labor income and has no choice but to enjoy her one unit of leisure alone (the others being at work all the time). As a result, working two shifts if others work two shifts is an equilibrium if $2w + v(0) > w + v(1)$, that is, when the wage rate is high enough:

$$w > v(1) - v(0). \qquad (\ .\ )$$

We assume for simplicity that sleep is not necessary.

We do not discuss mixed strategy equilibria here.

Remember that, because of the way we specified the utility function, it is always optimal to work at least one shift.

In that case, $\ell_s = 1$ regardless of whether x_1 *or* x_2 equals 1.

If a consumer expects others to work one shift, say the first shift, and rest during the second, she gets utility $2w + v(0)$ if she breaks ranks with the rest of the population, works both shifts, and accordingly enjoys high consumption at the cost of no leisure whatsoever. If she chooses instead work for only one shift, like the others, she will always pick the same shift as the others because the desire for conviviality ($\sigma > 1$) makes common leisure more pleasurable than solitary leisure. She will thus end up with low consumption but with one unit of common leisure, which yields utility $w + v(\sigma)$. As a result, working only one shift (and synchronizing leisure with the others) when others are only working one shift is an equilibrium if $w + v(\sigma) > 2w + v(0)$, that is, when the wage rate is low enough:

$$w < v(\sigma) - v(0). \qquad (\ .\ )$$

We conclude from inequalities (.) and (.) that both high consumption with no leisure, and low consumption with common leisure are equilibria if and only if

$$v(1) - v(0) < w < v(\sigma) - v(0). \qquad (\ .\ )$$

This is a "Goldilocks inequality:" multiple equilibria are possible if and only if the wage rate is neither so low that it leads consumers to work one period regardless of what the others are doing, nor so high that it encourages them to work both shifts independently of the actions of their fellow citizens.

What is at work here is again a *strategic complementarity*. Were solitary leisure less pleasurable than, or as pleasurable as, common leisure ($\sigma \leq 1$), multiplicity would never arise, as inequality (.) could never be satisfied. But as soon as the desire for conviviality makes common leisure more pleasurable than solitary leisure ($\sigma > 1$; i.e., as soon as the common leisure externality is strong enough), and provided the wage is not to extreme, consumers wish to follow each other's actions. As a result, society might end up coordinating on either an equilibrium with high consumption with no leisure, or on one with low consumption with common leisure.

Figure . illustrates these results in the space (σ, w). In region I, a region with high wages in the sense of inequality (.), the only equilibrium is one in which everyone works two shifts and consumes a lot, while low

When multiplicity condition (.) is satisfied, there is also a third equilibrium in which a fraction of the population works two shifts, a fraction works the first shift only, and the remainder works the second shift only. Given these proportions, consumers are indi erent between working full-time, or in one of the two shifts only. We do not study this equilibrium here, since it is unstable: the deviation of a single individual makes the equilibrium collapse to one of the two fully-coordinated equilibria studied in the text.

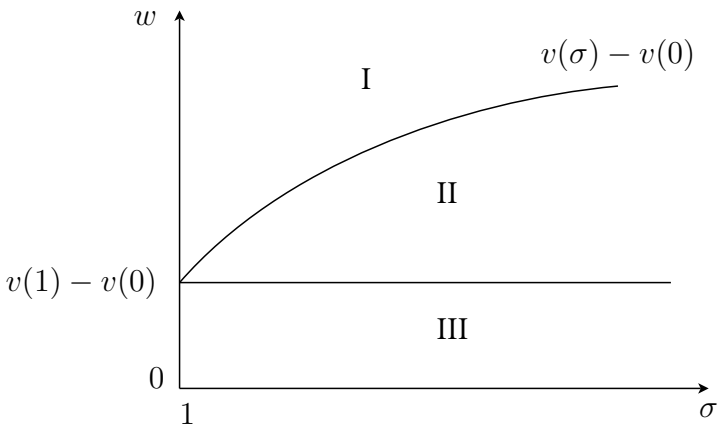

Figure 2.4. Multiple equilibria

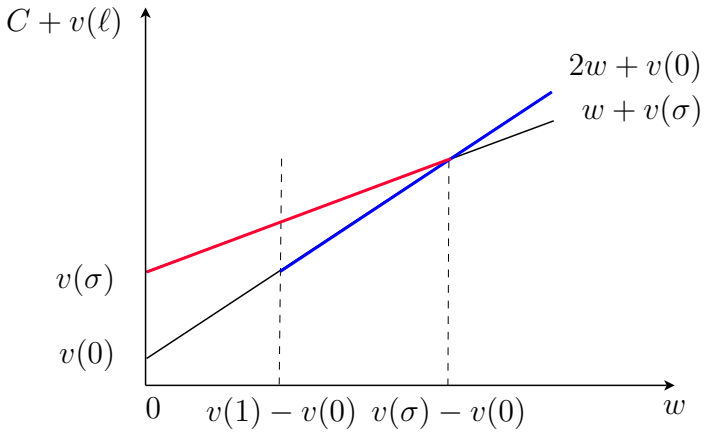

Figure 2.5. Welfare

consumption with one period of common leisure is the only equilibrium in the low-wage region III. Multiplicity arises in the "intermediate" region II.

C. Coordination failure. We can Pareto-rank the two equilibria that can arise when the multiplicity condition (.) is satisfied. Welfare in the equilibrium with high consumption and no leisure is

$$2w + v(0),$$

while utility in the low consumption, common leisure, equilibrium is

$$w + v(\sigma).$$

But, when inequality (.) is satisfied, the latter is larger than the former. Accordingly, the low consumption, common leisure, equilibrium Pareto-dominates the high consumption, no leisure, equilibrium when both are equilibria. We therefore conclude that, when the desire for conviviality is strong ($\sigma > 1$) and the wage is intermediate (condition .), consumers just might end up working and consuming too much for their own good—simply because of the high valuation they place on communal leisure activities! Paraphrasing Schor ( ), we can say that people might truly be "overworked" in equilibrium. Unlike Schor, however, this results from their own preferences and the nature of the externalities. As such, it is more like Akerlof's ( ) rat-race equilibrium.

Figure . shows, for a given $\sigma > 1$, how welfare changes as a function of the wage rate.

D. Summary. We have shown that preference for coordinated leisure gives rise to multiple, Pareto-ranked equilibria. In the "US" equilibrium, individuals work a lot, consume a lot, and have little time for communal activities. In the "European" equilibrium, consumers work less and consume less, but enjoy more common leisure. The European equilibrium Pareto-dominates the US outcome.

Hence, the reason why Americans today work more than Europeans may not be that Europeans are lazier than Americans. History (e.g., the first oil shock) and institutions (labor-market regulations) might have simply led otherwise identical Americans and Europeans to coordinate on different equilibria—as emphasized by Alesina, Glaeser, and Sacerdote ( ). Americans might nevertheless be crazy, as the low-activity equilibrium with coordinated leisure Pareto-dominates the high-activity outcome in which individuals "bowl alone," as deplored by Putnam ( ).

CHAPTER

Home production, setup costs and welfare

I. The link between market and secondary work

In the first chapter, we identified several stylized facts about work and leisure in the US and the EU. Three of these have figured most prominently in our discussion. The first was the iso-work fact, the remarkable tendency of both genders to work the same number of minutes per day, on average, in developed economies. The second, the "overworked American" fact, showed that despite inherent problems in comparing data sets internationally, Americans seem to work more both in the market and at home. Third, Americans tend to bunch their work less than Europeans, preferring instead to work all the time, including weekends and at odd hours of the day and night (and do so in a more gender-neutral fashion than Europeans). Chapter proposed a series of explanations of the stylized facts gathered in Chapter . One finding was a *social norm* which holds sway over individuals, whether married couples or single households, represents the most promising and coherent explanation for the iso-work fact. In this final chapter, we examine how home production (secondary work) interacts with social norms and fixed costs, and explore the welfare implications of secondary work for households in the EU and US.

The iso-work fact implies a central role for secondary work, or home production, in total work. It is thus appropriate to begin by reviewing and extending the theory of home production. Since the seminal contribution of Gronau ( ), home production has been recognized as a potential source of valuable, if not always well-appreciated, non-marketed output. The empirical evidence presented in Chapter confirms both that secondary work is a significant component of All Work, and that it varies considerably across households and across persons within households. By sex, average time in secondary work as a fraction of All Work in a given country and year ranges in our data from percent (US men in) to percent (Dutch women in). Moreover, variation in total hours work and their distribution turn out to be important features characterizing the US versus EU experiences.

The iso-work regularity holds at di erent points in the business cycle. For the eight major time use surveys we consider, six were conducted in a context of high growth, while two were taken in periods of economic slump.

The iso-work hypothesis implies that at a point in time, the sum of variation in market and secondary work individually in our data will be significantly larger than the variation of their sum (total work): within a country and in a period, market and secondary work will tend to be negatively correlated across individuals and especially across individuals within families. The iso-work fact forces these two types of work to o set each other. Secondary work is not only a productive use of time, but can be used as a bu er for labor which is not employable in a market with incomplete information and search frictions. Evidently, an assessment of cross-country di erences in market work is incomplete without considering the substitution margin between market and secondary work.

While we have cautioned against comparing US and European time-use data, EU-US di erences in total work are significantly smaller than for market hours. For example, German men averaged minutes of All Work in / , usually considered a slump period, compared with minutes in the US in , a period of strong growth. Moreover, German males actually worked more minutes per day in secondary activities ( ) than their US counterparts ( ). Generally, European time-use data reveal a much larger share of secondary work in total work than in the United States. Explicit consideration of incentives which determine the division of labor within household is necessary to account for this variation. Comparative statics analysis suggests that labor taxation should play an role in explaining cross country di erences in this division. We confirm this suspicion. Secondary labor responds to taxation and can account for cross country di erences, at least for the G- countries considered by Prescott ( ).

Secondary work not only represents an important source of slack in the economy which has important implications for welfare assessments of the costs of business cycles and unemployment. After considering the economics of secondary work in the household, we turn finally to welfare implications of secondary work and the role of non-convexities in the work decision. In particular, there are good theoretical reasons to suspect that the decision to move from no market work (and thus all secondary work) to some market work involves the expenditure of time and material resources. This suggests a natural econometric test, namely to see whether the decision to work changes the allocation of time in a smooth fashion or in fact "disrupts" the allocation time and material resources to other activities. We then conclude with some speculation as to what we can say about these EU-US di erences in work and time use.

For example, the correlation coe cient between daily market and secondary work across all individuals in the German / time use survey was - . , and - . in the / survey. In a sample pooling the two years, the correlation was - . for unmarried women, - . for unmarried men, - . for married women, and - . for married men.

II. Household labor supply with home production

A. A graphical treatment. In this section, we o er a review of the theory of home production and propose some more general implications of home production for total labor supply ("All Work"). The central objective is to account more completely for total labor supply and understand how expanding the range of choices taken by the household a ect the results of the previous section. It follows that the iso-work fact restricts the models which can account for the fact.

We begin by thinking about a household as a single decision-making unit; in subsequent sections we discuss the implications of specialization in a household, which may or may not be a couple with each member specialized in one type of labor. We begin the analysis with a household oriented on an exogenous leisure norm. In the spirit of the previous chapter, we continue to use a "toy model" with simple functional forms to give a flavor of the principle economic e ects under consideration.

A diagrammatic presentation of the model is the best place to start. Figure . reproduces the standard labor supply analysis as a choice between consumption (C) and leisure (L). Consumption is equal to the sum (more generally, a separable function) of goods and services obtained from the market (C^M) and home (C^H) production. Market goods are purchased at a price of unity, while home goods are produced with time H with a concave production technology. The household, with preferences summarized by the indi erence curves in the figure, has three alternative uses of time: it can supply H hours for secondary work (home production), work M hours in the market, and takes L hours of leisure, which is understood here as a combination of true leisure and tertiary time. For convenience, H, M and L are measured as a fraction of the fundamental unit of time, i.e. a day or week, so $H + M + L = 1$. Households receive non-labor income Ω and can work at a real after-tax wage real wage $(1 - \tau)w$, where τ is the rate of labor taxation.

The household's interior optimum—with strictly positive values of M, H, and L—is shown in Figure . and can be summarized as follows: Given the availability of market work at after-tax wage $(1 - \tau)w$, the household works secondary hours to equate the marginal productivity of that work to the net after tax wage. This results in a tangential "pasting" of the market budget line with the home production function at the point where the slope of the latter is equal to $-(1 - \tau)w$. Home production, to the extent that

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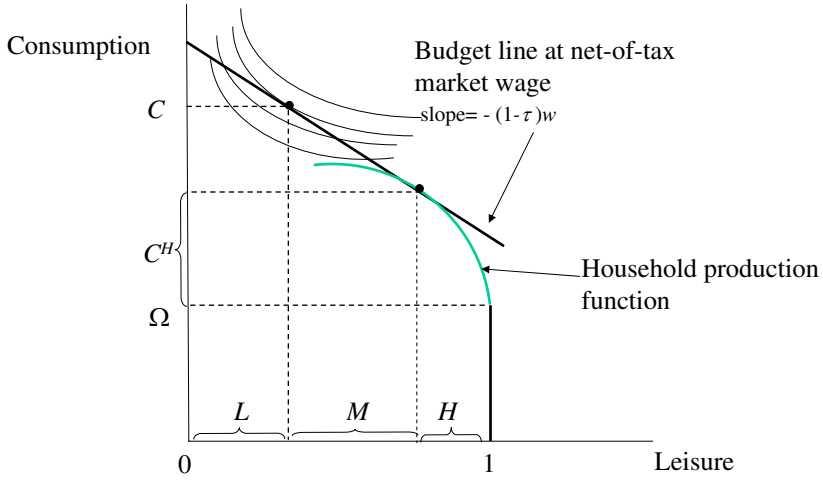
The classic references are Becker ( ) and Gronau (,). Benhabib, Rogerson, and Wright ( ) show conditions under which the model with home production can be replicated by the standard neoclassical growth model.

Tax revenue is not rebated to the household.

Figure 3.1. The Gronau Model of Home Production with Taxes



for some values is more productive than the market wage, leads to an expansion of the budget set for the household and an increase in its welfare. In general, the higher the marginal product of household work, the more household time will be devoted to home production. On the other hand, an increase in the marginal productivity of secondary work might be accompanied by more or less total output, so that one must distinguish between labor augmenting and labor-saving technical progress (Gronau,). Consumption and leisure are then chosen on the basis of this new augmented budget set. Note that in this particular setup, there is a separation of the decision to work in the market and the consumption bundle chosen.

B. Some general comparative statics propositions. The model with home production is generally more complex than the impression conveyed by Figure . . Comparative static analysis of market, secondary and total work to changes in market prices, productivity, wealth and other determinants does not always yield unambiguous results (Gronau,). This is especially true if market and home consumption are not highly substitutable. Nevertheless, the case of perfect substitutability is a good starting point for analysis and finds some support in the data (Benhabib, Rogerson, and Wright,). Using general functional forms

under the assumptions of perfect substitution of consumption and separability of consumption with leisure, it is possible to show a number of interesting propositions about secondary work. This section reports briefly on those propositions, which are derived formally in appendix A.

a. *Secondary work.* Using the notation $\widehat{x} \equiv dx/x$ to denote percentage deviations from equilibrium values, we can characterize the most important results for secondary work as follows:

S . *The supply elasticity of secondary work* (H) *with respect to the gross-of-tax market wage* (w) *is unambiguously negative:* $\widehat{H}/\widehat{w} < 0$.

S . *The (uncompensated) supply elasticity of secondary work* (H) *with respect to labor taxation* (τ) *is unambiguously positive:* $\widehat{H}/\widehat{\tau} > 0$.

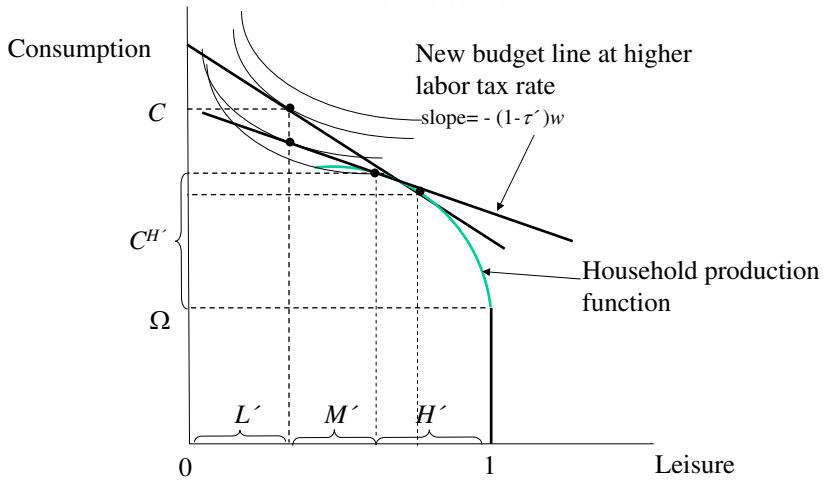
S . *The elasticity of secondary work* (H) *with respect to its productivity* (θ) *is unambiguously positive (negative) if that productivity is labor augmenting (saving):* $\widehat{H}/\widehat{\theta} > 0$ $(\widehat{H}/\widehat{\theta} < 0)$.

S . *When market and household production are close substitutes, non-labor income* (Ω) *and the leisure norm* (L^*) *have no effect on secondary employment:* $\widehat{H}/\widehat{\Omega} = \widehat{H}/\widehat{L^*} = 0$.

The economic mechanisms behind these propositions are straightforward. One interesting and representative case, depicted in Figure . , is an increase in the rate of labor taxation (which is qualitatively equivalent to a decrease in the gross wage, ceteris paribus). An increase in the tax rate (or, holding the wage constant, a decrease in the net wage) increases incentives to move hours back to household production, while decreasing market work unambiguously. Conversely, a cut in taxes (an increase in the gross market wage given taxes) increases incentives to work in the market at the expense of secondary work, and makes the household better o . An increase in home productivity also increases secondary hours worked. Since non-labor income/wealth and the social norm a ecting tastes for leisure do not a ect the pure e ciency condition for home production, they do not a ect the household's choice of work at home.

The elasticities are derived from log-linearized versions of the first-order conditions of the formal problem. For simplicity, we consider here only interior solutions in which positive amounts of market, household and leisure time are observed. This is entirely consistent when the model is viewed as a stand-in for the representative or average household in the economy. Later we will consider corner solutions explicitly.

Figure 3.2. E ect of a Labor Tax Increase in the Gronau Model



b. *Market work.* The determinants of secondary work also a ect the household's decision to work in the market. The e ects of various exogenous variables on market hours M can be summarized as follows:

M . *The uncompensated elasticity of market work with respect to the gross-of-tax wage w is ambiguous, but larger than in the absence of secondary work:* $\left(\frac{\widehat{M}}{\widehat{w}}\right)_{H>0} > \left(\frac{\widehat{M}}{\widehat{w}}\right)_{H=0}$.

M . *The uncompensated elasticity of market work with respect to labor taxation is also ambiguous, but smaller (algebraically) than when secondary work is absent:* $\left(\frac{\widehat{M}}{\widehat{\tau}}\right)_{H>0} < \left(\frac{\widehat{M}}{\widehat{\tau}}\right)_{H=0}$.

M . *The elasticity of market work with respect to wealth is unambiguously negative:* $\widehat{M}/\widehat{\Omega} < 0$.

M . *The elasticity of market work with respect to the leisure norm is unambiguously negative:* $\widehat{M}/\widehat{L^*} < 0$.

M . *The elasticity of market work with respect to secondary work productivity is negative:* $\widehat{M}/\widehat{\theta} < 0$.

The central results thus far can be summarized as follows:

- Secondary work (home production) is an unambiguously positive function of the tax rate and secondary work productivity. It is an unambiguously negative function of the real before-tax wage. For interior solutions, secondary work is independent of both non-earned income/wealth and the leisure norm.
- Market work depends unambiguously negatively on non-labor income/wealth, on the leisure norm, and on productivity in secondary work.
- For interior solutions, the e ect of the gross market wage and of labor taxation on market work is ambiguous, as would be expected; an increase in the wage induces incentives to work more (the substitution e ect) but also to work less (the income e ect). The presence of secondary work, however, unambiguously increases the supply elasticity of market hours.

c. *All work.* We now turn to the comparative statics e ects on All Work and leisure of changes in the market wage, in labor taxation, in productivity of home production, and of wealth. The elasticity of total work with respect to some variable x is a weighted average of the elasticities of market and secondary work:

$$\frac{\widehat{1-L}}{\widehat{x}} = \frac{M}{1-L}\frac{\widehat{M}}{\widehat{x}} + \frac{H}{1-L}\frac{\widehat{H}}{\widehat{x}} = \frac{M}{M+H}\frac{\widehat{M}}{\widehat{x}} + \frac{H}{M+H}\frac{\widehat{H}}{\widehat{x}}.$$

It follows that the elasticity of leisure (L) is simply a rescaling of $\frac{\widehat{1-L}}{\widehat{x}}$:

$$\frac{\widehat{L}}{\widehat{x}} = -\frac{1-L}{L}\frac{\widehat{1-L}}{\widehat{x}}..$$

Given the ambiguity for market work and the unambiguous results for secondary work, it would be surprising if the reaction of total work to the wage and to taxation yielded unambiguous answers. In fact, it is convenient to use the results of the previous section to summarize the influences on total work and leisure as follows:

$$\widehat{1-L} = -\frac{L}{1-L}\left[\alpha_1\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) - \alpha_2\widehat{\Omega} - \alpha_3\,\widehat{\theta} - \alpha_4\widehat{\overline{L}}\right]$$

and

$$\widehat{L} = \alpha_1\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) + \alpha_2\widehat{\Omega} + \alpha_3\,\widehat{\theta} + \alpha_4\widehat{\overline{L}}$$

where $\alpha_1 \lessgtr 0, \alpha_2 > 0, \alpha_3 > 0$, and $\alpha_4 > 0$.

For details, see Appendix A.

Comparison with the formal results of the previous section in Appendix A shows that total work elasticities are values for the market work elasticities "shrunk" by a factor M/L. Surprisingly, many results are unambiguous. An increase in non-labor wealth, in home productivity and in the norm unambiguously increase leisure and decrease total labor supply (total work). As expected, total work is an ambiguous function of the net wage—depending on whether the income or substitution e ect dominates.

The negative elasticity of total work with respect to wealth is consistent with evidence over longer periods presented by Aguiar and Hurst ( ), who document a secular increase in leisure when measured as the complement of total work, since the s. They associate this with a dramatic drop in household work in the US, due both to increases in after-tax, real wages as well as to labor-saving technical progress in home production (see Greenwood, Seshadri, and Yorukoglu,).

C. A simple model. To capture the most important aspects of the household's decision when secondary work is possible and there is a leisure norm, we now present a simple extension of the linear-quadratic model of section .II.A. The utility of the household is given by the following separable function of consumption of market goods C_M, home production C_H, and leisure L:

$$C_M + C_H - \frac{1}{2\epsilon}(1-L)^2 - \frac{\phi}{2\epsilon}(L-L^*)^2 \qquad (\ .\ )$$

The utility function has the standard properties and notation is as in the previous chapter. If the household works M hours in the market at a real, gross-of-tax hourly wage w, and τ is the rate of labor taxation including social contributions, then market goods obey the budget constraint

$$C_M = (1-\tau)wM + \Omega \qquad (\ .\ )$$

where Ω stands for non-labor income or wealth. Household production occurs using secondary work input according to

$$C_H = \theta \ln H \qquad (\ .\ )$$

It should be stressed that we have restricted our attention to interior solutions.

Separability is an important assumption, and is not innocuous in models of home production. Greenwood and Hercowitz ( ) replace leisure with "home produced" goods and services which enter utility non-separably with market-purchased commodities. In contrast, we will treat secondary time as an input to a production function for home consumption goods. Separability of utility over goods and leisure is necessary (but not su cient) for stationary steady states in environments with economic growth (King, Plosser, and Rebelo,).

where $\theta > 0$ is a productivity shifter. Note that after substitution of (.), the utility function (.) is indistinguishable from $C_M + \ln C_H$, with production function $C_H \equiv H^\theta$.

Restricting attention to an interior solution, we can write first- order conditions as:

$$\frac{\theta}{H} = \frac{1}{\epsilon}(H + M) - \frac{\phi}{\epsilon}(1 - L^* - H - M) \qquad (\ .\ )$$

$$(1 - \tau)w = \frac{1}{\epsilon}(H + M) - \frac{\phi}{\epsilon}(1 - L^* - H - M) \qquad (\ .\ )$$

It follows immediately that secondary work is given by:

$$H = \frac{\theta}{(1 - \tau)w}. \qquad (\ .\ )$$

As in the more general case, home production is separable from the total and market work decisions; the household's optimal use of time in secondary work is a function of the opportunity cost of labor in e ciency units. Here, separability follows from the fact that market and household goods are perfect substitutes. Note that $\frac{\partial H}{\partial w} < 0$ and $\frac{\partial^2 H}{\partial w^2} > 0$. At the margin, the household equates the output an hour of secondary work to the opportunity cost of that time in the market, the net-of-tax wage. High-wage households will tend to cut back on household production and purchase substitutes in the market, so that the higher income is "eaten up" to some extent by a higher e ective cost of living. Households with lower opportunity costs of time in the market will tend to substitute home production for market goods and services, such as meals, laundry, child-care, and house-cleaning.

All work is given by:

$$H + M = \frac{\epsilon}{1 + \phi}(1 - \tau)w + \frac{\phi}{1 + \phi}(1 - L^*) \qquad (\ .\ )$$

and market hours by

$$M = \frac{\epsilon}{1 + \phi}(1 - \tau)w + \frac{\phi}{1 + \phi}(1 - L^*) - \frac{\alpha}{(1 - \tau)w}. \qquad (\ .\ )$$

Up to a constant, this is equivalent to writing utility as $C_M + \ln C_H - \frac{1}{2\epsilon}(1 - L)^2 - \frac{\phi}{2\epsilon}(L - L^*)^2$ with $C_H = AH^\theta$. The central aspect to be captured is declining marginal utility or declining e ciency of home production. While most of us find too much home production unpleasant, most are willing to do some of it in some amount, and the first few units of home production are usually cheaper than those purchased in the market. Note that in the special case of inelastic production, labor augmenting and labor saving technical progress are formally identical, $C_H = AH^\theta = \left(\widetilde{A}H\right)^\theta$ with $\widetilde{A} = A^{1/\theta}$. See Gronau ( ) for more details.

For a thorough discussion of other implications of imperfect substitutability of market and home production, see Gronau ( ).

As before, All Work and market work are influenced by the norm, while the home production is independent of it.

D. Empirical evidence: Labor taxation and secondary work. Both the verbal analysis in the text as well as the two models presented in the preceding sections contain a simple empirical prediction: the reaction of secondary work to market incentives—here, wages and labor taxes—should be much stronger and unambiguous than that of All Work or market work. This is because, plausibly, while o setting income and substitution e ects are operative for total work (and thus for leisure), only the e ciency driven substitution e ect is relevant for the household production decision (as long as market goods and home production are highly substitutable and the individual is not at a corner). The literature has generally confirmed predictions of this type using micro data (see Gronau, for examples), but to our knowledge this test has not been confronted with cross-country data.

This line of thinking is suggestive of the following empirical specification for observations in country i for gender grouping $j \in \{m, f, all\}$ (male, female, all pooled):

$$\ln(H/M)_{ij} = a + b \ln w_i + c \ln \tau_i + u_{ij}.$$

This relation can be derived from a more general version of the model presented in Appendix A, in which market and home-produced goods are *not* perfect substitutes. The prediction of the model is that b and c have indeterminate signs, but that c is more likely to be negative due to the existence of home production.

For a number of reasons, especially given by the recent discussion about "lazy Europeans" initiated by Prescott ( ), it seemed reasonable to start with the G countries, which have similar economic sizes, wealth levels, etc.so that other determinants are relegated to the constant. Table . displays the data. Estimates of the model presented for each $j \in \{m, f, all\}$ are presented in Table . . The elasticity with respect to the tax rate is positive and ranges between . and . ; moreover it is highly significant for women and insignificant for men. At the same time, an indicator of the

Consider the following special case of CES preferences over market goods and home production given by $\ln[\alpha \left(C^M\right)^\rho + (1-\alpha)\left(C^H\right)^\rho] - v(M+H)$, where $v()$ is some convex function of All Work, subject to a budget restriction (.) and with linear household production $C^H = \theta H$, and let $\Omega = 0$. Then it is straightforward to show that optimal choice implies

$$\ln(H/M) = \frac{1}{1-\rho}\left[\ln\left(\frac{\alpha\theta^\rho}{1-\alpha}\right)\right] + \frac{\rho}{1-\rho}\ln w + \frac{\rho}{1-\rho}\ln(1-\tau)$$

Table 3.1. Labor Taxation, Manufacturing wages, and average market and secondary work, G-7 countries

Country	*Labor tax rate*	*Avg. gross mfg. earnings ($/hr), 2000*	*Avg. minutes of market work (M)*	*Avg. minutes of secondary work (M)*	*Avg. minutes of market work (F)*	*Avg. minutes of secondary work (F)*
Canada	0.52	16.5	270	162	168	264
France	0.59	15.5	227	136	145	253
Germany	0.59	23.7	263	174	133	312
Italy	0.64	13.8	327	80	131	365
Japan	0.37	22.0	404	33	204	248
UK	0.44	16.7	245	123	156	221
US	0.40	19.7	313	163	201	271

Note: Labor tax rate is taken from Prescott (2004, Table 2). Wage is total compensation per hour in 2000 in manufacturing industry, in US dollars, published by the US BLS ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/ichccsuppt02.txt. Minutes of market and secondary work are taken from the constituent country studies taken used in the paper. Data and dates of relevant survey are described in the appendix to Chapter 1.

Table 3.2. Secondary-Market Work Ratios and Labor Taxation in the G-7
(standard errors in parentheses)

Dep.variable:	*Const.*	$\ln(w)$	$\ln(\tau_{Prescott})$	$\bar{R}^2$
$\ln(H/M)_m$	0.1465 (1.03)		1.579 (1.43)	0.037
$\ln(H/M)_m$	-0.5412 (5.23)	0.2661 (1.97)	1.695 (1.81)	-0.199
$\ln(H/M)_f$	1.430 (0.196)		1.284 (0.270)	0.782
$\ln(H/M)_f$	0.8289 (0.946)	0.2324 (0.357)	1.386 (0.328)	0.754
$\ln(H/M)_{all}$	0.6809 (0.284)		1.159 (0.391)	0.565
$\ln(H/M)_{all}$	0.1220 (1.410)	0.2162 (0.532)	1.254 (0.487)	0.478

Note: OLS cross-sectional regressions, n=7. For details on data, see Table 3.1.

hourly wage was never significant. Despite the modest data set, these results are consistent with the theory presented and suggest a role for taxation beyond that suggested by the conventional neoclassical growth model (Prescott,).

E. Fixed cost of deviance and secondary work. As was noted in Chapter , the convex cost of deviation from the norm has one notable theoretical drawback: it suppresses all individual level heterogeneity. Since we observe considerable heterogeneity in the data, a credible theory must allow for individual-level heterogeneity while inducing equality of gender averages. Although the consideration of multiple norms would help account for idiosyncratic variance, it still does not solve the problem that within-group heterogeneity is eliminated as the strength of the norm increases. Chapter concluded that a fixed cost of deviation in the sense of the last chapter has

the best chance of replicating the data by creating a "band of compliance" or "band of conformity" around which households congregate.

How does the addition of secondary work change the conclusions of Chapter ? Modify the model of section .IV in the following fashion: Let utility of agents now be

$$C_M + C_H - \frac{1}{2\epsilon}(1-L)^2 \qquad (\ .\ )$$

if the norm is adhered to $(L = L^*)$, or

$$C_M + C_H - \frac{1}{2\epsilon}(1-L)^2 - \psi \qquad (\ .\ )$$

if $L \neq L^*$, i.e. if leisure (and thus All Work) is chosen freely; there is, however, a fixed penalty or cost ϕ associated with violating the norm. Now the optimization problem is somewhat more involved than before, since a discrete choice as well as the possibility of corner solutions is relevant. As before, the budget restriction (.), the time constraint $(M + H + L = 1)$, and the home production function (.) are binding. We now consider the solutions to first order conditions under all cases and then compare utility under those options.

a. *Work in the market and at home* $(M > 0, H > 0)$, *nonconformity* $(L \neq L^*)$. This is the first of two cases in which there is an interior solution. The solution to the unrestricted option dictates:

$$\begin{aligned} H &= \frac{\theta}{(1-\tau)w} \\ M &= \epsilon(1-\tau)w - \frac{\theta}{(1-\tau)w} \\ H + M &= \epsilon(1-\tau)w \end{aligned}$$

Utility under this option is then:

$$\Omega + \frac{\epsilon}{2}(1-\tau)^2 w^2 + \theta\left(\ln\frac{\theta}{(1-\tau)w} - 1\right) - \psi$$

b. *Work in the market* $(M > 0, H > 0)$ *and at home, conformity* $(L = L^*)$. Now the household is further restricted to choose H and M subject to the additional constraint that $H + M = 1 - L^*$. The result is:

$$\begin{aligned} H &= \frac{\theta}{(1-\tau)w} \\ M &= 1 - L^* - \frac{\theta}{(1-\tau)w} \\ H + M &= 1 - L^* \end{aligned}$$

and utility is

$$\Omega + (1-\tau)w\,(1-L^*) + \theta \ln \frac{\theta}{(1-\tau)w} - \theta - \frac{1}{2\epsilon}(1-L^*)^2$$

In one important respect the introduction of home production does not matter at all. For interior solutions, it is evident that all that matters is All Work $(M+H)$; the secondary work decision is taken independently to fulfill the marginal product condition. Comparing utility under the two options reveals that for the household to abrogate the norm, it must be that

$$\frac{\epsilon}{2}(1-\tau)^2 w^2 - (1-\tau)w\,(1-L^*) + \frac{1}{2\epsilon}(1-L^*)^2 > \psi$$

which can be manipulated in a straightforward way to read

$$\frac{1}{2\epsilon}(1-L^*-M-H)^2 > \psi$$

or that the absolute value of the di erence between unconstrained All Work $(1-M-H)$ and the leisure norm L^* exceeds a critical value $\sqrt{2\epsilon\psi}$. This result is similar to that of the previous chapter: Gains to nonconformity are increasing in labor supply responsiveness ϵ, the wage w and the leisure norm L^*, while decreasing in the labor tax rate τ and the penalty for nonconformity ϕ.

c. *Work only at home* $(M=0, H>0)$*, nonconformity* $(L \neq L^*)$. What about corner solutions? For the individual or household who works only in the market with $H=0$, nothing changes; this case will not be discussed further. On the other hand, for households at the "stay at home" corner $(M=0)$, the optimal choice without obeying the norm is

$$H = \sqrt{\theta\epsilon}.$$

Household production is now no longer linked to the after-tax market wage. In fact, the wage level in the economy as well as the tax rate become *irrelevant.* Home production is a type of tax-free activity like leisure (not necessarily but naturally also including the underground economy!). Thus, gross wages and taxes do not matter.

Utility is given by

$$\Omega + \frac{\theta}{2}\left(\ln(\theta\epsilon) - 1\right) - \psi \qquad (\ .\ )$$

d. *Work only at home* $(M=0, H>0)$*, conformity* $(L=L^*)$. Now the household works only at home:

$$H^* = 1 - L^*.$$

Utility is now simply

$$\Omega + \theta \ln(H^*) - \frac{1}{2\epsilon}(H^*)^2$$

The household violates the leisure norm when

$$\left(\theta \ln(H) - \frac{1}{2\epsilon}(H)^2\right) - \left(\theta \ln(H^*) - \frac{1}{2\epsilon}(H^*)^2\right) > \psi$$

or

$$\theta \ln(\frac{\sqrt{\theta\epsilon}}{1-L^*}) - \frac{\theta}{2} + \frac{1}{2\epsilon}(1-L^*)^2 > \psi, \qquad (\ .\ )$$

where H is the notional household work when the norm is violated. When $H > H^*$ (that is, if $\sqrt{\theta\epsilon} > 1 - L^*$), the condition is more likely to be met, for households with high labor productivity θ, greater insensitivity of utility to work ϵ, or when the norm value of leisure L^* is large.

III. Household labor supply with setup costs of work

A. Motivation. The response of a household to a fixed cost of disregarding a norm was analyzed in Chapter and again in this chapter, in the presence of an option of home production. The analysis of decision-making in the presence of fixed costs can be applied fruitfully to the participation decision in general, especially when the utility gain from additional employment in secondary activities is non-negligible. We have seen in Chapter that Europeans tend to be work more at home than in the market. Could it not be the case that they concentrate their nonemployment on a smaller number of individuals or households as a rational response to relative prices and institutions in their respective countries, preferring secondary work? In the previous section, we showed that labor taxation, which is only imposed on market hours, is more likely to a ect the *distribution* than the overall level of hours worked ("All Work"). This is because standard theory predicts that given that one is already working positive hours, the home production decision is likely to be governed by e ciency considerations, so the elasticity of substituting secondary for market work should be high. Evidence from the G- countries supports this conclusion.

In this section we will explore a related aspect of the home production decision. In general, the decision to work in the market entails discrete, one-time setup costs or costs of "reorganizing one's life" which must be expended regardless of whether that work is part-time or full-time. Most

If we call Υ the lefthand side of inequality (.), then $\partial\Upsilon/\partial\theta = \ln(H/H^*)$, $\partial\Upsilon/\partial\epsilon = (H^2 - H^{*2})/(2\epsilon^2)$, and $\partial\Upsilon/\partial L^* = [(H/H^*)^2 - 1]H^*/\epsilon$. All of these expressions are positive if $H > H^*$.

See for example Cogan ( ). These costs lead to non-convexities in the budget constraint which have received considerable attention in the macro literature (Hansen, ;

obviously, going to work an increase in tertiary time dedicated to taking better care of one's appearance and health, getting more (or less) sleep, and possibly less time eating. Less obviously but equally relevant is an absolute shift in the time devoted to secondary work. Going to work often means skipping or economizing on cooking, house-cleaning, gardening and child-care that would have occurred in constant amounts in any event. It could however, mean *more* secondary work, however: certain types of shopping might be necessary, or more production of certain personal services which, for any number of reasons, are unavailable or too expensive to purchase in the market. Going to an o ce job usually requires wearing well-pressed shirts and blouses; in many continental European countries with high minimum wages, product market regulations and environmental restrictions, these services are expensive and border on being a luxury.

In the following sections, we sketch a model with such setup costs, first graphically, then formally using an extension of the toy model of previous sections. Then we estimate the impact of going to work in the four data sets we have examined. In the concluding section we summarize the implication of home production, fixed costs of going to work and more generally external e ects for welfare.

B. A model of household labor supply with fixed setup costs: A graphical representation. Setup costs that must be paid when households work positive hours can introduce non-convexities in the budget constraint relevant for the labor supply decision (Cogan,). These costs can take the form of material resources or time. In Figure . this means shifting the market budget line of down or to the left or both, previous consumption possibilities at zero market labor supply $(M = 0)$ are maintained. When home production is possible, the attractiveness of not working in the market is further enhanced, especially for households with two or more workers, with potential for specialization (Cho and Rogerson,)). In general, the first hours spent in home production are productive, so this option is likely to enable many agents to achieve high levels of utility without working in the market at all.

The e ect of fixed costs on the labor supply decision is summarized in Figures . and . . We have drawn the figures such that the household's preferences are identical in both cases—the di erence arises entirely from the opportunity costs of time, summarized by the net real wage available

Rogerson, ; Cho and Rogerson,). A non-convex budget set is one which does not necessarily contain all linear combinations of its elements. For example, working overtime only pays extra for the last hours worked, or going to work requires the expenditure of time and money from the first minute on.

Figure 3.3. Fixed costs and budget set non-convexity: positive market hours

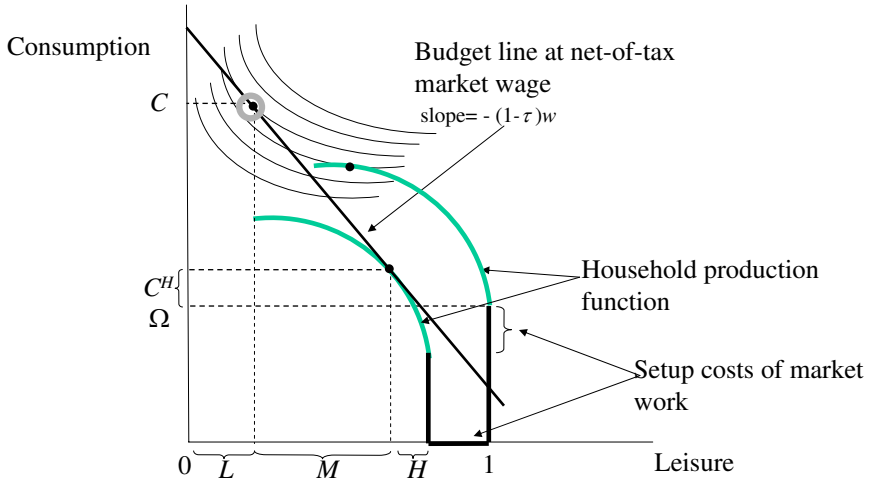
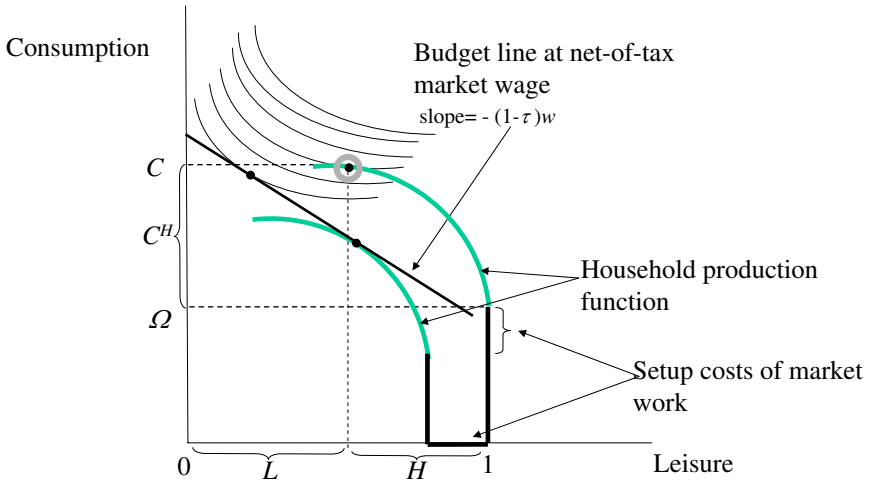


Figure 3.4. The decision to work under: zero market hours



from working in the market, which in turn depends positively on the nominal real wage (w) and the tax rate (τ), but also on shifts in the budget set induced by "setup costs." In the first case depicted in Figure . the returns to market work time are high and the individual chooses to work positive hours in the market, works relatively little in home production, and uses market income to purchase these goods and services. The circled tangency

point of consumption-leisure indi erence curves with the linear segment of the budget set yields higher utility, despite the shift downward and inward of the budget set implied by any positive value of market work M.

In Figure . , the net returns from market work are low. The household opts for no market work at all, working exclusively at home $M = 0, H > 0$. Even though an hour of work—as secondary work—is relatively unproductive at the margin, the household achieves a level welfare which is higher than that attainable in the market, as seen by the higher level of utility at the circled tangency point.

Under which conditions are agents likely to exclude market work entirely? In the next section we formalize, in a fashion analogous to the norm model elaborated in Chapter , the household's decision as a choice between maximizing utility working positive market hours ($M > 0$, $H > 0$) versus not working at all ($M = 0, H > 0$).

C. A formal model of fixed setup costs. As before, the household is the decision-making unit, but we introduce a richer structure of costs. Utility is given by the linear-quadratic function

$$C_M + C_H - \frac{1}{2\epsilon}(1 - L)^2. \qquad (\ .\ )$$

Now consider the following modifications: First, market work implies a one-o , fixed shift in time allocation Ψ_L which comes at the expense of some other use of time (leisure (L), secondary work (H) or market work (M)). In the language of the first chapter, this might be thought of as a fixed loss of leisure or tertiary time necessary for work ($\Psi_L > 0$), or the time actually freed up by working ($\Psi_L < 0$).

Second, working in the market implies a one-o input of secondary time Ψ_H, which also comes at the expense of leisure enjoyed (or must be thought of as work e ort in the general sense. For a given home production technology, this is equivalent to a fixed expenditure of home production (think of the very first shirts that need to be ironed). In addition, we assume the existence of a "barrier to home production"—to use the language of Parente, Rogerson, and Wright ( )—a relative price μ_H with

It is important to stress that the net real return from market work is not only determined by the gross wage and taxes, also by the relative price of market goods to home production.

This could be extended to a multiple-person household with specialization (Cho and Rogerson,), with some members working exclusively in the market and others specializing in home production.

For simplicty, we have grouped leisure and tertiary time together. Allowing Ψ to take negative or positive values may be interpreted as deviations from a fixed "base" requirement of tertiary time.

$0 < \mu_H \leq 1$ which captures the reduced e ectiveness of home production when working at all in the market. Now the home production function reads

$$C_H = \theta \ln(\mu_H H - \Psi_H).$$

There is no reason to assume that Ψ_H is always positive. In any case, however, the time restriction holds with equality:

$$M + H + L + \Psi_H + \Psi_L = 1.$$

We show in Appendix B that indirect utility for an interior solution with $M > 0$ is

$$\Omega + \frac{\epsilon}{2\mu_L^2}(1-\tau)^2 w^2 + \theta - \frac{\Psi_H}{\mu_L^2}(1-\tau)w, \qquad (\ .\ )$$

where μ_L, analogous to μ_H, captures changes in e ectiveness or relative price that obtain when market hours are positive.

Utility when $M = 0$ and $H = \sqrt{\theta\epsilon}$ is:

$$\Omega + \frac{\theta}{2}\left(\ln(\theta\epsilon) - 1\right). \qquad (\ .\ )$$

Hence, it is optimal for the household to work in the market when

$$\frac{\epsilon}{2}(1-\tau)^2 w^2 - \Psi_H(1-\tau)w > \frac{\theta\mu_L^2}{2}\left(\ln(\theta\epsilon) - \frac{3}{2}\right)$$

By inspection, greater home productivity , higher labor taxation, fixed secondary time costs of work Ψ_H and the leisure-loss parameter μ_L all depress the propensity to work positive hours, while the wage itself increases the propensity to work. Neither the fixed leisure parameter Ψ_L, which works like a lump-sum tax, nor the secondary time loss parameter μ_H, which is neutral, have an e ect on the decision to work positive market hours. The model also implies that Ψ_H and μ_L both reduce welfare of those in work.

D. Empirical evidence: Estimating costs of market work. In this section, the four principal countries time-use data sets—for Germany, Italy, the Netherlands and the US—are employed to study "where working time comes from" as well as the issue of setup costs arising from market work. This is potentially important for welfare analysis. It could be argued, for example, that Europeans rationally concentrate their unemployment by restricting labor force participation, and economize on fixed costs associated with working. If these costs are significant, there may be welfare gains to concentrating unemployment on the young and less skilled, who are likely

The computations are the same as those leading to equation (.) but with $\psi = 0$ instead.

For this result θ and/or ϵ must be su ciently large; in particular, $\theta\epsilon > e^{1.5} \approx 4.48$. This in itself implies that the household is at the corner, since $H \leq 1$.

to be more productive at home anyway. In particular, the model of the last section suggested that Ψ_H and μ_L not only reduce the attractiveness of work, but they actually reduce welfare of those in work.

We proceed in the spirt of the model, but follow a general, agnostic specification suggested by Hamermesh (a), who has examined issues related to fixed costs of work in a similar framework for the e ect of ageing on the labor supply decision. The model in the last section considered three different uses of time, while the data sets present us with a fourth—tertiary time—which might be considered "partially unavoidable" leisure (eating, personal hygiene, sex, and sleep fall into this category). In the empirical work that follows, we allow for separate consideration of both conceptualizations of leisure. As might be expected, there are di erences, and these are sometimes significant and merit additional analysis and interpretation.

The econometric model is a system of three equations relating the minutes allocated by an individual to each of secondary, tertiary and leisure activities, as defined in Chapter , to (i) minutes spent in market work, (ii) a dummy variable indicating whether *any* time was worked in the market, as well as a number of controls that are as similar as possible across the data sets. By construction—and by nature of the survey, which leaves few minutes unaccounted for—the estimated coe cients on (i) across the three equations will sum to - , while the fixed cost/setup cost coe cients associated with (ii) will sum to zero. Because the equations are based on weighted observations, the estimates reflect the relevant e ects on a representative day of the week. The results are presented in Table . .

Turning first to the question "where does the working time come from?" we find that all coe cients on market time are negative, just as in Hamermesh's (a) analysis of US data, and are all highly significant and significantly di erent from each other, strongly suggesting qualitative di erences in taking time from leisure than from secondary or tertiary activities. Remarkably, the rank ordering of the coe cients is the same for all data sets except Germany : the "cost" of an extra minute of market work is greatest in leisure, followed by secondary time, with the smallest sacrifice coming

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Controls for the US regression: age, age squared, race, children - , children - , children - , children - , gender, marital status, spouse's work hours. Controls for Germany: age, age squared, spouse's age squared, marital status, gender, marital status x gender, children in the household younger than , children in household between and . Controls for Italy: age, age squared, marital status, sex, marital status x gender, children in household younger than , children in household between and , and spuworkm. Controls for Netherlands: age, age squared, spuhrs, age of spouse, age of spouse squared, marital status, gender, marital status x gender, children in household younger than , children in household between and .

Table 3.3. Estimates of the Effect of Working and the Amount of Market Work Time on Time Aggregates

		Germany		Italy		The Netherlands		U.S.	
		1991	2001	1988/89	2002/03	1990	2000	1985	2003
Dep. var.	**Ind. Var.**								
Secondary	Whether worked	16.10 (4.43)	22.60 (4.14)	-28.98 (3.71)	-34.44 (3.53)	11.58 (7.74)	26.99 (7.22)	-14.82 (10.09)	2.74 (5.13)
	Minutes worked	-0.396 (0.0079)	-0.337 (0.0083)	-0.222 (0.007)	-0.251 (0.007)	-0.299 (0.014)	-0.312 (0.013)	-0.288 (0.016)	-0.324 (0.0081)
Tertiary	Whether worked	-0.401 (3.30)	-18.44 (3.38)	17.26 (2.75)	-24.34 (2.78)	-3.68 (6.30)	-5.33 (5.64)	37.27 (9.65)	14.48 (4.58)
	Minutes worked	-0.259 (0.0059)	-0.277 (0.0068)	-0.219 (0.005)	-0.160 (0.005)	-0.211 (0.011)	-0.233 (0.010)	-0.264 (0.017)	-0.228 (0.0078)
Leisure	Whether worked	-15.70 (4.47)	-4.16 (4.12)	11.81 (3.75)	59.45 (3.57)	-7.89 (8.84)	-21.66 (7.86)	-22.44 (10.70)	-17.29 (5.37)
	Minutes worked	-0.344 (0.0079)	-0.386 (0.0083)	-0.559 (0.007)	-0.590 (0.007)	-0.490 (0.016)	-0.455 (0.014)	-0.448 (0.018)	-0.448 (0.0085)
Test $\chi^2(2)$ $\beta^{Sec}_{worl} = \beta^{Ter}_{worl} = \beta^{Lei}_{worl} = 0$ (p-value in parentheses)		14.84 0.001	42.00 <0.001	75.16 <0.001	275.61 <0.001	2.31 0.316	13.97 <0.001	14.94 <0.001	46.97 <0.001

in terms of tertiary time. It is interesting to note that the absolute value of the leisure-cost coe cient is the largest in Italy (- . to - .), followed by the Netherlands (- . to - .), then the US (- . to - .), and Germany (- . to - .).

Now we turn to the fixed-cost parameters, which originate from Ψ_H and Ψ_L in the setup cost model. The model predicts that positive values of these fixed costs would generate shifts in the time allocated to the other major categories of activity whenever a person begins market work. In contrast to the coe cients on the volume of market work described above, the estimates of the discrete shifts due to market work do not exhibit a simple pattern. In continental Europe, the fixed cost of work tends to be paid for by lost tertiary time (sleep). For example, in Italy on an average day, working in / meant a sacrifice of minutes tertiary time (bathing, sleeping, eating, etc.). It also meant a reduction of one half-hour of secondary work. The gain of work was an increase in leisure of almost one hour! We cannot help suspecting that this reflects in part the increased propensity of working Italian women to stop or defer cleaning and other chores, to delegate them to other household members, or to purchase these services in the market. In the US, market work comes primarily at the expense of leisure (between and minutes and statistically significant) while tertiary time use *increases* and secondary time falls or remains constant. In the Netherlands and Germany, in contrast, working in the market is associated with a significant increase in secondary time at the expense of tertiary time plus leisure time. In practice this might take the form of ironing one's clothes more often and forsaking the daily shower and shave or makeup session. Interestingly, in the later data set for the Netherlands, this country appears more like the United States in terms of fixed leisure loss of work, and more like Germany in terms of the increase in secondary time. Again, these estimates should be seen in the

context of country-specific institutions such as market regulations, public provision of work-related services, subsidies (including mass transit).

There are a number of issues that arise in the econometrics of estimating such an system, which we are glossing over. In the first instance, the wage, taxes, productivity in the household and measures of preferences are important theoretical determinants of the allocation of time in its various uses and are not included at all. Treating the decision to work in the market, and given that, the number of hours to work as predetermined is a heroic simplification. Yet, re-estimating our specification on various sub-samples of the data, especially those individuals with positive but low hours in the market does not result in significantly di erent estimates. As Hamermesh (b) finds for the US, very modest involvement with the labor market implies significant reallocations of time for individuals which are likely to be associated with welfare costs. Without knowing much more about preferences, however, it is di cult to quantify those costs. In the next section we take some modest steps in that direction.

E. Summary. This chapter has examined secondary work and home production. In Chapter , we saw that such unremunerated work takes up a significant fraction of an average individual's day, both in Europe and the US. While women tend to perform more secondary work than men, this asymmetry is shrinking in most countries—with the possible exception of Germany—as more women enter the labor market. By definition, secondary work does not involve a formal market, and therefore represents a degree of freedom facilitating the All Work/leisure norm studied in Chapter . It is likely that in societies with a strong operative leisure norm, household production may appear excessive or ine cient, deviating from optimality conditions implied by the Gronau model in the absence of social norms.

Can the existence of the secondary work option explain why Americans work more in total than Europeans? Not really. As long as market goods and secondary output are readily substitutable at the margin, theory does not yield such a prediction for All Work. Overall labor supply is determined by the net market price of labor, non-labor income and wealth, plus norms which can condition labor supply at any given set of incentives. The theory can however, tell us why Europeans tend to spend more a greater fraction of their time in secondary work as a fraction of all work. In the first instance, all factors a ecting the real, take-home wage for market work will a ect the choice of secondary versus market work. These include labor taxes and the relative price of commodities most easily substituted using home production: child care, gardening, home cleaning, food preparation and cooking. Our modest cross country analysis of the G- countries does suggest a strong

association of the fraction of secondary work in all work with the rate of labor taxation used by Prescott ( ) to study the determinants of market hours. A more thorough investigation would need to examine international di erences in product market regulation and governmental subsidies of services.

A skeptic might argue that this is not remarkable, given that Europeans are more likely to be unemployed and have lower overall employment and labor force participation rates. While unemployment is likely to be one determinant of secondary work in the short run, it cannot explain certain patterns in the countries we examine. It cannot explain, for example, why German men in / worked a mere minutes less in the market than US-American men in , both periods when real growth in both economies was virtually identical (. - percent per annum), while German men worked *one full hour more than American men in home production*.

Labor taxation is one plausible explanation that has been invoked elsewhere to explain the low absolute level of market time in OECD economies (Daveri and Tabellini,). Yet the high taxation is only one possible distortion against market work that might distinguish Europe from the US. It is well-known that growth of the European service sector has been lackluster compared with the US, and many have cited labor and especially product market regulations as a cause. It is interesting to note that the Scandinavian countries do not fit the pattern of the G- , and this is likely due to the high level of subsidy of child care for working parents and public services, despite high income taxation, which e ectively raise the real net return from working in the market relative to the European continent.

The data from Chapter suggest not only that Americans work more hours and have higher levels of labor force participation than most EU citizens, but they also work more odd hours and more on weekends. If so, is that necessarily e cient? It could be, if fixed costs associated with market work are significantly lower in the US than in Europe. Estimated fixed costs

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For example, Benhabib, Rogerson, and Wright ( ) show that home production is countercyclical.

Schneider and Enste ( ) have argued that the underground economy can explain a large component of the EU-US labor and product market divide. Davis and Henrekson ( ) link the size of the underground economy in rich countries to the overall level of taxation. To the extent that survey respondents declare time in their diaries as secondary when in fact it is primary could also account for the secondary-heavy European orientation. In fact, the especially large underground economy in Italy (estimated at - percent) o ers yet another explanation for their lone violation of the iso-work fact: Italian men are reluctant to admit to this activity for fear of detection by the fiscal authorities.

of starting market work suggest that these costs are high in Europe, especially the additional burden of secondary work in Germany and the Netherlands, as compared with the US (Italy is, as usual, *sui generis*). Moreover, lower gasoline and automobile taxation in the US mean lower transportation costs and probably also tilt the decision at the extensive margin to work in the market there. Tax and social insurance systems in EU countries often introduce significant fiscal costs of secondary worker's market participation.

The real issue is whether Europeans bear significant welfare costs for working so much in secondary activities as opposed to the market. Answering this question requires us to revisit issues raised in Chapter as well as in this chapter. We will return to this in our concluding remarks and resume of the report. Indeed, both serious and not-so-serious research has valued home production at a significant fraction of total national income. If these estimates are valid, home production certainly mitigates the lost value of the European slump, as well as the business cycle in general. Home production may not be as e cient in Europe as it could be if delivered by the market, yet the problem may indeed be, to quote Tobin, more an issue of Harberger triangles than Okun's rectangles.

Appendix A: Household labor supply with market work and home production

The household is assumed to maximize utility which is separable in arguments relating to a single consumption aggregate C goods and leisure L:

$$u(C) + v(L, \overline{L})$$

where the utility function has the standard properties. In particular, we require that $u(.)$ and $v(.)$ are increasing and concave in consumption and own leisure:$u' > 0, u'' < 0,\ v_L > 0$, and $v_{LL} < 0$. The "leisure norm" argument

In an early NBER study, King ( ) assessed the value of services performed by in the United States at the beginning of the th century at one-quarter to one-third of national income. In a frequently cited estimate, Gronau ( ) estimates that the value of home production represents roughly two-thirds of total household income. More recently, the internet website salary.com estimates that the market value of services provided by "stay at home moms" was $, annually, an increase from $, in . "Working moms" would earn $, for the home production component of their work.

Separability is an important assumption, and is not innocuous for its treatment of time in home production. Rather than considering secondary time as leisure, we treat it as an input to a production function for home consumption goods, and assume perfect substitutability of market goods and home production. Benhabib, Rogerson, and Wright ( ) adduce arguments for perfect substitutability of market and home-produced consumption goods. Moreover, separability of utility over goods and leisure is necessary (but not su cient) for stationary steady state property in environments with economic growth. See King, Plosser, and Rebelo ( ).

$\overline{L}$ is taken as parametric, and is an anchor for the utility of leisure. Several assumptions with respect to $\overline{L}$ are possible. In general $v_{L\overline{L}} > 0$ implies that the marginal utility of leisure is always increasing in the norm, regardless of whether di erence between the two $(L - \overline{L})$ is positive or negative. This is contrasted with the treatment in the previous chapter, which considered symmetric losses from departures from the norm. Note that among all the conditions, the one called into question is that marginal utility is everywhere positive. If the deviation from the norm is significant, v_L could be negative.

The household chooses labor supply to the market and to secondary activities subject to the budget restriction that consumption be obtained either on the market (C_M) or by home production (C_H):

$$C = C_M + C_H$$

If our household works M hours at real, gross-of-tax hourly market wage w, and τ is the rate of labor taxation including social contributions, then market goods obey the budget constraint

$$C_M = (1 - \tau)wM + \Omega$$

where Ω stands for non-labor income or wealth. Household production requires secondary work input according to

$$C_H = \theta f(H),$$

where $\theta > 0$ is a productivity shifter and $f'(H) > 0, f''(H) < 0$. Finally, the overall time restriction implies $1 = M + H + L$. Focusing on interior solutions, the problem reduces to:

$$\max_{M,H} \; u\left[(1 - \tau)wM + \theta f(H) + \Omega\right] + v(1 - M - H, \overline{L}).$$

First-order conditions are given by:

$$(1 - \tau)wu'(C) = v_L(L, \overline{L}) \qquad (\ .\ )$$

$$u'(C)\,\theta f\,'(H) = v_L(L, \overline{L}) \qquad (\ .\ )$$

with total consumption C defined as the sum of expenditure on market goods $(1-\tau)wM+\Omega$ and home production $\theta f(H)$. It follows immediately that

$$(1 - \tau)w = \theta f'(H) \qquad (\ .\ )$$

For example, consider the version $v(L, \overline{L}) = -0.5(1 - L)^2 - 0.5\phi(L - \overline{L})^2$. Now $v_L = (1 - L) - \phi(L - \overline{L})$ and $v_{L\overline{L}} = \phi$ and $v_{LL} = -(1 + \phi)$.

This is one way of expressing the increasing disutility as well as declining e ciency of home production. While most of us find too much home production unpleasant, most are willing to do some of it in some amount. It should be noted that this is one special case of labor augmenting technical progress: productivity can also be labor saving, for example in the form $C_H = f(\theta H)$. See Gronau ( ) for more details.

In words, the household should equate, at the margin, the output an hour of secondary work to the opportunity cost of that time in the market, measured at its opportunity cost, the net wage. High wage households will tend to cut back on household production and purchase these goods in the market, meaning that high income to some extent is "eaten up" by a higher e ective cost of living. Lower income households will tend to economize on services that can be produced at home, such as meals, laundry, childcare, and house-cleaning. The decision of the household to supply labor to secondary activities is separable from the decision of total labor and leisure and follows from the fact that goods produced in the household are perfect substitutes for market goods. We can thus write the household's optimal use of time in secondary work as a function of the opportunity cost of labor in e ciency units, that is, $H = H\left(\frac{(1-\tau)w}{\theta}\right)$ with $H' < 0, H'' > 0$.

Using the notation $\widehat{x} \equiv dx/x$ to denote percentage deviations from equilibrium values, we derive elasticities from log-linearized versions of the first-order conditions (.) and (.), which are solved for $\widehat{M}$ and $\widehat{H}$, the percentage responses of market and secondary work to changes in the following exogenous variables: non-labor income or wealth $\widehat{\Omega}$, the social norm $\widehat{\overline{L}}$, productivity in secondary work $\widehat{\theta}$, labor taxation $\widehat{\tau}$, and the market wage $\widehat{w}$.

Log-linearize the first-order conditions and arrange these to obtain the following system of equations expressing $\widehat{H}$ and $\widehat{M}$ as a function of exogenous influences $\widehat{w}, \widehat{\tau}, \widehat{\Omega}, \widehat{\theta}$, and $\widehat{\overline{L}}$:

$$\begin{bmatrix} \eta & 0 \\ \gamma\frac{C^H}{C} + \frac{\nu H}{\rho L} & \frac{(1-\tau)wM}{C} + \frac{\nu M}{\rho L} \end{bmatrix} \begin{bmatrix} \widehat{H} \\ \widehat{M} \end{bmatrix} = \begin{bmatrix} \widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau} \\ \left(\rho^{-1} - \frac{(1-\tau)wM}{C}\right)\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) - \frac{\Omega}{C}\widehat{\Omega} + \frac{C^H}{C}\widehat{\theta} - \frac{\zeta}{\rho}\widehat{\overline{L}} \end{bmatrix}$$

where:

$\eta \equiv \frac{-Hf''(H)}{f'(H)}$, the curvature of the home production function

$\gamma \equiv \frac{Hf'(H)}{f(H)}$ is the elasticity of home production to employment;

$\rho \equiv \frac{-u''(C)C}{u'(C)}$ is the curvature of utility derived from consumption;

For a thorough discussion of other implications of imperfect substitutability of market and home production, see Gronau (,).

$\nu \equiv \frac{-v_{LL}L}{v_L}$ is the curvature of utility derived from leisure;

$\zeta \equiv \frac{v_{L\overline{L}}\overline{L}}{v_L}$ is the elasticity of the marginal utility of leisure with respect to the leisure norm.

The solution is given by

$$\widehat{H} = \eta^{-1}\left(\widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau}\right)$$

$$\widehat{M} = \Delta^{-1}\eta\left[\left(\rho^{-1} - \frac{(1-\tau)wM}{C}\right)\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) - \frac{\Omega}{C}\widehat{\Omega} + \frac{C^H}{C}\widehat{\theta} - \frac{\zeta}{\rho}\widehat{\overline{L}}\right] - \Delta^{-1}\left(\widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau}\right)\left(\gamma\frac{C^H}{C} + \frac{\nu H}{\rho L}\right)$$

where

$$\Delta \equiv \eta\left(\frac{(1-\tau)wM}{C} + \frac{\nu M}{\rho L}\right) > 0.$$

It follows from these expressions that:

. *The elasticity of secondary work with respect to secondary productivity is unambiguously positive*

$$\frac{\widehat{H}}{\widehat{\theta}} = \eta^{-1} > 0$$

. *The elasticity of secondary work with respect to the gross-of-tax market wage is unambiguously negative:*

$$\frac{\widehat{H}}{\widehat{w}} = -\eta^{-1} < 0$$

. *The elasticity of secondary work with respect to labor taxation is positive:*

$$\frac{\widehat{H}}{\widehat{\tau}} = \left(\tfrac{\tau}{1-\tau}\right)\eta^{-1} > 0.$$

Elasticity of market work with respect to the gross-of-tax wage:

$$\frac{\widehat{M}}{\widehat{w}} = \frac{\eta\left(\rho^{-1} - \frac{(1-\tau)wM}{C}\right)}{\Delta} + \frac{\gamma\frac{C^H}{C} + \frac{\nu H}{\rho L}}{\Delta}$$
$$= \left(\frac{\widehat{M}}{\widehat{w}}\right)_{H=0} - \frac{\gamma\frac{C^H}{C} + \frac{\nu H}{\rho L}}{\frac{(1-\tau)wM}{C} + \frac{\nu M}{\rho H}}\left(\frac{\widehat{H}}{\widehat{w}}\right) \lesseqgtr 0 \quad \text{simplify}$$

. *The elasticity of market work with respect to wealth is unambiguously negative:*

$$\frac{\widehat{M}}{\widehat{\Omega}} = -\frac{\Omega}{C}\frac{\eta}{\Delta} < 0$$

. *Elasticity of market work with respect to the norm is negative:*

$$\frac{\widehat{M}}{\widehat{\overline{L}}} = -\frac{\zeta}{\rho}\frac{\eta}{\Delta} < 0$$

Elasticity of market work with respect to secondary work productivity is negative:

$$\begin{aligned}\frac{\widehat{M}}{\widehat{\theta}} &= -\frac{\frac{C^H}{C}(\eta+\gamma)+\frac{\nu H}{\rho L}}{\Delta} \\ &= \eta\frac{C^H}{\Omega}\left(\frac{\widehat{M}}{\widehat{\Omega}}\right) - \frac{\gamma\frac{C^H}{C}+\frac{\nu H}{\rho L}}{\Delta} < 0 \text{ simplify}\end{aligned}$$

Elasticity of market work with respect to labor taxation:

$$\frac{\widehat{M}}{\widehat{\tau}} = -\left(\frac{\tau}{1-\tau}\right)\left[\frac{\eta\left(\rho^{-1}-\frac{(1-\tau)wM}{C}\right)}{\Delta}+\frac{\gamma\frac{C^H}{C}+\frac{\nu H}{\rho L}}{\Delta}\right] \lessgtr 0$$

Note that the All Work elasticities can be derived from

$$\widehat{1-L} \equiv \frac{M\widehat{M}+H\widehat{H}}{1-L}.$$

Similarly, the elasticity of leisure is defined as:

$$\widehat{L} \equiv -\left(\frac{M}{L}\widehat{M}+\frac{H}{L}\widehat{H}\right) = -\frac{1-L}{L}\widehat{1-L}.$$

Using the results of the previous section , we can summarize the influences on total work as follows:

$$\widehat{1-L} = \alpha_1\left(\widehat{w}-\frac{\tau}{1-\tau}\widehat{\tau}\right)-\alpha_2\widehat{\Omega}-\alpha_3\widehat{\theta}-\alpha_4\widehat{\overline{L}}$$

In particular,

$\widehat{H} = \eta^{-1}\left(\widehat{\theta}-\widehat{w}+\frac{\tau}{1-\tau}\widehat{\tau}\right)$

$\widehat{M} = \frac{\eta\left[\left(\rho^{-1}-\frac{(1-\tau)wM}{C}\right)\left(\widehat{w}-\frac{\tau}{1-\tau}\widehat{\tau}\right)-\frac{\Omega}{C}\widehat{\Omega}-\frac{C^H}{C}\widehat{\theta}-\frac{\zeta}{\rho}\widehat{\overline{L}}\right]-\left(\widehat{\theta}-\widehat{w}+\frac{\tau}{1-\tau}\widehat{\tau}\right)\left(\gamma\frac{C^H}{C}+\frac{\nu H}{\rho L}\right)}{\Delta}$

where $\Delta \equiv \eta\left(\frac{(1-\tau)wM}{C}+\frac{\nu M}{\rho L}\right) > 0.$

where

$$\alpha_1 = \frac{\rho^{-1} - \frac{(1-\tau)wM}{C}}{\frac{\nu}{\rho}\frac{1-L}{L} + \frac{(1-\tau)w(1-L)}{C}} \gtrless 0$$

$$\alpha_2 = -\frac{\Omega/C}{\frac{\nu}{\rho}\frac{1-L}{L} + \frac{(1-\tau)w(1-L)}{C}} < 0$$

$$\alpha_3 = -\frac{C^H/C}{\frac{\nu(1-L)}{\rho L} + \frac{(1-\tau)w(1-L)}{C}} < 0$$

$$\alpha_4 = -\frac{\zeta/\rho}{\frac{\nu(1-L)}{\rho L} + \frac{(1-\tau)w(1-L)}{C}} < 0$$

For leisure, we have:

$$\widehat{L} = \beta_1 \left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau} \right) + \beta_2 \widehat{\Omega} + \beta_3 \, \widehat{\theta} + \beta_4 \widehat{\overline{L}}$$

where

$$\beta_1 = -\frac{\rho^{-1} - \frac{(1-\tau)wM}{C}}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} \lesseqgtr 0$$

$$\beta_2 = \frac{\Omega/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\beta_3 = \frac{C^H/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\beta_4 = \frac{\zeta/\rho}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\widehat{1-L} = -\frac{L}{1-L}\left[\alpha_1 \left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau} \right) - \alpha_2 \widehat{\Omega} - \alpha_3 \, \widehat{\theta} - \alpha_4 \widehat{\overline{L}} \right]$$

and

$$\widehat{L} = \alpha_1 \left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau} \right) + \alpha_2 \widehat{\Omega} + \alpha_3 \, \widehat{\theta} + \alpha_4 \widehat{\overline{L}}$$

where

$$\alpha_1 = -\frac{\rho^{-1} - \frac{(1-\tau)wM}{C}}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} \lessgtr 0$$

$$\alpha_2 = \frac{\Omega/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\alpha_3 = \frac{C^H/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\alpha_4 = \frac{\zeta/\rho}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0.$$

Appendix B: Utility with fixed setup costs

Utility for an interior solution with $M > 0$ can be written as

$$\Omega + (1-\tau)wM + \theta \ln(\mu_H H - \Psi_H) \\ - \frac{1}{2\epsilon} \left\{ 1 - \mu_L \left[1 - (M + H + \Psi_H + \Psi_L) \right] \right\}^2 . \quad (\ . \ )$$

The first-order conditions yield the following optimal supplies of total work, market time, secondary time and leisure, when $M > 0$:

$$\begin{aligned} M + H &= \frac{1}{\mu_L^2}\epsilon(1-\tau)w - (\frac{1}{\mu_L} - 1) - \Psi_L - \Psi_H \\ M &= \frac{1}{\mu_L^2}\epsilon(1-\tau)w - (\frac{1}{\mu_L} - 1) - \Psi_L - \Psi_H - \frac{\theta}{(1-\tau)w} - \frac{\Psi_H}{\mu_H} \\ H &= \frac{\theta}{(1-\tau)w} + \frac{\Psi_H}{\mu_H} \\ L &= \frac{1}{\mu_L} - \frac{1}{\mu_L^2}\epsilon(1-\tau)w \end{aligned}$$

First, this simple model implies that total work $M + H$ is a negative function of the fixed cost *given that the household is working in the market.* Those who work will work fewer hours. Second, All Work is a positive function of the e ectiveness of leisure when market work is positive; as μ_L approaches unity, All Work approaches $\epsilon(1-\tau)w - \Psi_L$. The all-work decision, however, is independent of the parameters a ecting e ciency of secondary labor Ψ_H and μ_H. As might be expected, these do a ect secondary work and

home production. The fixed-cost element increases it, while its e ectiveness reduces it. In this model, these two parameters are not independently identified.

General conclusion

The rise in unemployment in Europe has attracted the attention of continuing generations of economists since the s. Even as a number of European countries—Ireland, Denmark, the Netherlands, and the United Kingdom in particular—have brought unemployment rates back to levels of the s and early s, most major continental countries, including France, Germany, Italy and Spain, seem to have capitulated, accepting permanent high unemployment as inevitable. In response to this development, some economists have argued that Europeans have di erent tastes for leisure than Americans. Others have blamed high, almost punitive rates of labor taxation and the welfare state. Still others have pointed to equilibria which, while unambiguously inferior, are the outcome of political processes in which a majority of political actors or voters can block any e ort to reform.

The emphasis on unemployment as an indicator of well-being may be misplaced, since it represents only an absence from the labor market, which is a modest time commitment in most modern economies. In , the average man in the US spent about percent of the average day in market work, compared with percent in sleep, percent in leisure and percent in secondary labor activities; for women, these proportions were percent in paid work, percent in sleep, percent in leisure and percent in secondary (home production) activities.

It thus seemed useful to gather systematically more general stylized facts about time use in a number of countries. In one respect, the data confirm what we already knew: US-Americans do work more than Europeans, and tend to work at odd hours of the day and on weekends more often than Europeans do. Our detective work turned up an even more interesting aggregate regularity in high-income countries which had gone generally unnoticed and, by economists, uninvestigated: the iso-work fact. The sum of market and secondary work for men and women tends to be equal at a point in time, even while this may change over time and di er across countries. In the US example above, both men and women in spent a third of their

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For recent contributions to this debate, see for instance Blanchard ( ) and Nickell, Nunziata, and Ochel ( ).

time on All Work. In Germany, men and women spent about percent of their average day in All Work.

The iso-work fact is challenging for economic theory for a number of reasons. First, economic theory should be able to explain why total work di ers so little at the aggregate level between genders, when there is so much variation within-gender. Since the market o ers little hint at the rationale for such a coordination mechanism, we propose social norms in Chapter and investigate the power of this theory to explain the facts. Second, All Work is the sum of two di erent types of labor with sharply di erent productivities—why should their *sum* be equal across gender, without regard to the mix? In Chapter , we examine the theory of home production and adapt it to allow for both norms as well as fixed costs of market work. These fixed costs have a significant impact on the labor supply of households. Indeed, the most commonly invoked models of home production imply a high elasticity of substitution between market and secondary work for those households in which both market and home work are performed. We are able to validate this sensitivity in our finding of a high elasticity of response of female home work to labor taxation in the G- countries. This fact makes secondary work a useful "sink" that enables members of society to meet the norm. Yet under certain conditions, the norm may be di cult to adhere to. If market work is not very productive or market wages are low relative to home production, or if fixed costs are high, households may choose to perform only secondary-work. In this case, only very costly norms will lead to iso-work, especially across genders. Indeed our meta-analysis of data sets around the world suggest that the iso-work fact does not hold in less-developed countries. Evidently, iso-work is a fact for developed countries only.

We hope that the data that we have assembled and analyzed, the stylized facts on time use we have established, and the theoretical vistas we have opened will prove valuable to labor economists and macroeconomists alike. Our claim that social e ects are a crucial and heretofore little noticed determinant of labor supply and time use, for both single and married agents, will certainly awaken the interest of labor economists. The theory and empirics of home production have already attracted the attention of macroeconomists, who have recognized that they are vital to understanding the propagation and the cost of business cycles. The reason is that non-convexities in household budget sets increase the relative importance of the extensive

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Norms in labor supply represent a logical solution to one of the most uncomfortable challenges to labor economics: explaining why the standard workweek appears to enforce itself, even in European countries without explicitly legislated standard workweeks.

margin for labor supply in cyclical fluctuations, which accounts for three-fourths of total fluctuations in hours in the US (Cho and Rogerson,).

Note that we have said nothing about the thorny issue of the "double burden" of market and home production by working women. Even though men and women perform the same total work in the aggregate, the types of market and secondary activities that they perform do di er, sometimes considerably. It would seem unwarranted, then, to draw welfare inferences from the iso-work fact at this stage. We have no choice, however, to reiterate the central importance of secondary work for an economy and the role of labor taxation in shaping that importance. Secondary work—be it child care, garden work or house-cleaning—probably represents the largest labor tax loophole granted to households. Furthermore, it is largest in precisely those countries which tax labor most heavily. It is noteworthy that in economies in which both males and females are heavily involved in the labor market—Denmark and Sweden for example—the government has actively intervened to o set the negative incentives created by high labor taxation by providing day care and related services for working mothers.

Overall, the issue of whether Europeans are lazy or Americans are crazy seems of second-order importance relative to understanding the determinants of individual behavior. A more useful, scientific approach is to assume that underlying tastes are common to both continents, while technologies, institutions, or interpersonal influences like norms or externalities may differ and evolve di erently. The fact that Americans work on weekends or more often at odd hours of the day may simply represent a bad equilibrium that no individual agent can improve upon—and would certainly not wish to deviate from, given what all others are doing. Especially if norms and other externalities are important (recall the model of common leisure in Chapter), one should recognize that the invisible hand may lead agents to places like this. If our claim that social e ects play a central role in the determination of economic activity is confirmed by new data and/or further work, policy makers and economists alike will have to remember that multiple equilibria, and social multipliers, determine the impact of labor market policies and taxes rather than simple-minded applications of more traditional models.

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