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TOTAL WORK, GENDER AND SOCIAL NORMS

Michael Burda, Daniel S. Hamermesh and Philippe Weil*

*Professor of economics Humboldt-Universität zu Berlin, research associate, CEPR and IZA; Edward Everett Hale Centennial Professor of economics, University of Texas at Austin, research associate, IZA and NBER; professor of economics, Université Libre de Bruxelles and Institut d'Études Politique de Paris, research associate, CEPR and NBER. We thank Olivier Blanchard, Tito Boeri, Micael Castanheira, Deborah Cobb-Clark, Georg Kirchsteiger, Christopher Pissarides, and participants in seminars at several universities and conferences for helpful comments, and Rick Evans and Juliane Scheffel for their expert research assistance.

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ABSTRACT

Using time-diary data from 27 countries, we demonstrate a negative relationship between real GDP per capita and the female-male difference in total work time—the sum of work for pay and work at home. In rich non-Catholic countries on four continents, including the United States, there is no difference—men and women do the same amount of total work on average. This latter fact has been presented before by several sociologists for a few rich countries; but our survey results show that labor economists, macroeconomists, sociologists and the general public consistently believe that women perform more total work. The facts do not arise from gender differences in the price of time, nor from differences in intra-family bargaining, as gender equality is not associated with marital status and most of the variance in gender total work differences arises from within-couple differences. A theory of social norms could account for within-education group and within-region gender differences being smaller than inter-group differences. It is consistent with cross-national evidence using the World Values Surveys that female total work is relatively greater than men's where people believe that scarce jobs should be offered to men first. It comports with micro evidence from Australian and German couples that group averages, and even lagged group averages, affect individual wives' total work time conditional on their husbands'.

1 Introduction

It is well-known that men engage in more market work—have higher participation rates and longer workweeks conditional on participation—than women. What has not been thoroughly examined, and what has been untouched by economists, is the issue of gender differences in the total amount of work—in the market and at home. 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 affects the distribution of non-work time (Kooreman and Kapteyn, 1987; Biddle and Hamermesh, 1990); and Aguiar and Hurst (2007) have charted secular changes in the distribution of non-market time in the United States. 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 gender differences in the allocation of total work time.

Gender differences in time use is an important issue for a number of reasons. First, because the amount of work (and its obverse, the utility from leisure) is one of the crucial arguing points in the "gender wars," simply discovering new facts about it is important. Second, discovering the determinants of those facts will allow us to infer how patterns of work by gender change as economies develop. Third, by developing a new theory of gender differences in the amount of total work, we may be able to provide an impetus for using similar theories to examine other differences in the allocation of time. Finally, the facts we adduce and the theory we present to explain them can impose restrictions on a variety of models that economists employ.

In the next section we describe what we mean by market and household work, outline data sets for four Western countries and present some facts using those data sets. We then expand the comparisons to a large number of other data sets, so that in the end we are using data on the gender breakdown of work at home and in the market in 27 countries. Whether the facts that we

adduce in Section 2 are novel, and whether they are already widely known, are examined in Section 3. In Section 4 we consider some possible explanations of our findings and indicate which ones seem inconsistent with the results. This leads in Section 5 to the development of a theory based on social norms that is consistent with those results. Section 6 examines some additional cross-country and micro evidence that is consistent with the theory and difficult to rationalize otherwise, while Section 7 outlines a number of areas where the facts and theory should be used to inform how we model behavior.

2 Gender Differences in Market and Home Work

In order to examine gender differences in work we need to devise general rules that allow activities to be classified as work. We first define work as the sum of time spent in production in the market and the household. We follow standard practice and define market work as time spent for pay (or in unpaid household production for the market). We assume that people would not be working the marginal hour in the market if they were not paid, so that at the margin market work is not enjoyable (or at least is less enjoyable than any non-work activity at the margin). In the economics literature it has generally been treated as the obverse of the aggregate of all activities outside the market—implicitly all uses of non-market time have been assumed to be subject to aggregation.

We count as household production those activities that satisfy the third-party rule (Reid, 1934) that substituting market goods and services for one's own time is possible. Such activities may be enjoyable (as may work in the market), even at the margin; but they still have the common characteristics that we could pay somebody to perform them for us and that we are not paid for performing them. We define total work as the sum of time spent in market work and household production. Note that we do not and cannot examine gender differences in the consumption value of the average or marginal minute of market or household production; all we

do here is estimate, and then try to explain, differences in the total amount of time spent in productive activities.

One alternative to production is tertiary activities, those things that we cannot pay other people to do for us, but must do ourselves. Included in this category are sleeping and eating, and other biological needs. The distinction between tertiary activities and household production highlights the importance of disaggregating non-market time: a decline in non-market time due to the contracting out of more activities has different implications for well-being than a similar decline in tertiary activity. The two types of activities are imperfect substitutes, and are unlikely to be equally substitutable for market work; they should not be aggregated.

The fourth and final aggregate is leisure, all activities that we cannot pay somebody else to do for us and that we do not have to do at all if we do not wish. We include in this category television-watching, attending religious services, reading a newspaper, chatting with friends, etc. Leisure is set apart from other types of home activities because it cannot be outsourced and that one could function perfectly well (albeit not happily) with no leisure whatsoever: None is necessary for survival.

Throughout this initial empirical section we define the aggregates of activities as similarly as possible across the countries under study. All national aggregates here are based on our own aggregations of micro data collected from sets of time diaries. Respondents in these studies are given a time-diary for one or more recent days and asked to account comprehensively for all time during that day by time of day. 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. Wide-scale time-diary surveys have been conducted for nearly 70 years (Sorokin and Berger, 1939).

No matter how extensive a set of codes is, each survey will have a different 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 24 hours in a day. Also,

unlike retrospective data about last year's or even last week's time spent working, while the time-diary information is necessarily based on recall, the recall period is only one day. The shorter recall period and the implicit time-budget constraint suggest that information on market work from time diaries is likely to be more reliable than the recall data on time use from standard household surveys; and, of course, time diaries provide information on non-market activities that is generally unavailable in labor-force surveys.

As an introduction we concentrate on recent time-diary data for four countries: Germany, Italy, the Netherlands and the U.S. Details on these four data sets are contained in Statistisches Bundesamt, 1999; ISTAT, 2005; NIWI, 1993; and Hamermesh *et al*. (2005). The time diaries are collected for a single day in the U.S., three days in Germany, two or three days in Italy, and an entire week in the Netherlands. Table 1 presents the aggregates of time spent in various activities (with basic activities numbering at least 200 in each set of diaries) by gender for each country on a representative day of the week. We concentrate on individuals aged 20-74, the largest possible age range that is included in all four data sets.

The crucial thing to note from this table is the near-equality of total work by gender within Germany, the Netherlands and the U.S. There are substantial differences in average total work across these countries, perhaps real, perhaps due to inherently non-comparable classifications of activities among them; but within each country, among people from the same culture and whose activities are classified using the same basic activities and methods of aggregation, there is essentially no difference by gender in total work. Men work more in the market, women engage in more home production, but these balance out.[1] The only exception is Italy, where men work substantially less in total than women, mainly because women engage in much more household production than women elsewhere, while men engage in less. Indeed,

[1]Aguiar and Hurst (2007) calculate what they call total market work plus non-market work using the same U.S. time-diary survey. When one accounts for childcare, the excess of male total work over female total work reduces to 1.1 hours per week (9 minutes per day) in 2003. Thus even though their combination of the basic categories could not be the same as ours, the inference from their study is essentially identical to ours.

nearly two-thirds of the excess of women's total work over men's in Italy compared to the other three countries is accounted for by the time spent cleaning house (Burda *et al*, 2006).[2]

Beyond this striking ***iso-work*** fact, the other consistent difference is the gender difference in non-work activities: Men enjoy more leisure, women spend more time in tertiary activities (and, of course, in the countries other than Italy these sum to the same amount of time). Nearly all of men's excess leisure (again, except for Italy) is accounted for by their additional time in front of television screens.[3]

Given evidence that even time spent sleeping and eating responds to monetary incentives (Hamermesh, 2007), nothing requires that the total amount of non-work time (and by construction the total amount of work) be nearly identical among men and women, as it is in three of the four countries. Whether this equality is more widespread can be inferred by comparing calculations using published aggregates from recent time-diary studies from other countries, including seven wealthy EU countries (Belgium, Denmark, France, Finland, Sweden, the United Kingdom, and Norway) and three transition countries (Estonia, Hungary and Slovenia) from Aliaga and Winqvist (2003); from various published summaries describing the results of time-diary studies conducted since 1992 in Canada, Ireland, Israel, Japan and New Zealand, and a set of sub-Saharan countries, Benin, Madagascar, Mauritius and South Africa (from Blackden and Wooden,

[2]This exceptional Italian behavior appears to be well-recognized in popular literature: "Italian men… are *pueri aeterni*, who expect their wives to replace their mothers, and iron their shirts and fret about their underwear." McEwan (2006, p. 231).

[3]To address one of the many necessary arbitrary aggregations using the different categories, consider our classification of volunteer work as leisure. For the U.S. in 2003 we recalculated the means to include both volunteer work and non-household care activities. Women performed 29 minutes of these activities, men 23, so that the 4-minute excess of men's all work would be changed to a 2-minute excess of women's total work over men's if we had included these two categories as household production. Making the same calculation for the German data for 2001/02, we find that men performed 11 minutes, women 8 minutes of volunteer work. If added to the totals in Table 1, this would have reduced the 8-minute excess of female total work to an excess of only 5 minutes. The same calculation for the Italian data from 2002 shows that women performed 14 minutes, men 9 minutes of volunteer work. Doing the same thing for the Dutch 2000 data shows that men performed 9 minutes, women 12 minutes of volunteer work, which if added to household production would have reduced the 7-minute excess of male total work to only 4 minutes. In all three recent Anglo-Saxon data sets this slight expansion of the definition of total work in fact equalizes still further the gender distributions of total work, while for Italy it exacerbates the excess of female over male work.

2006), and from Mexico and Turkey. Finally, we obtained micro data sets from Spain and Australia and computed the same aggregates as presented in Table 1. The definitions of total work for each of the countries are shown in the Appendix.

Among the 27 countries the unweighted average of total work among women is 446.4 minutes per day (standard error = 8.6), while among men it is 421.7 minutes (s.e. = 8.9). Although these averages differ significantly from one another, if we restrict the sample to the 14 wealthy (2002 real GDP/capita above $15,000, from Heston *et al*, 2002 and 2006) non-Catholic countries the averages are 440.1 (s.e. = 7.4) and 431.4 (s.e. = 7.5) respectively. The conclusion implicit in Table 1 clearly holds in rich non-Catholic countries generally.

The scatter diagram in Figure 1 compares men's and women's total work in the 27 countries. The steepest line shows what men's total work would be if it were identical to women's total work. We then estimated a regression relating the amount of total work among women to that among men. To accommodate the observation that women's total work exceeds men's in Catholic countries, we included an indicator for this religious background (equaling one in six countries). The regression results (coefficient estimates and standard errors) are:

$$\underset{}{\text{FemaleAllWork}} = \underset{(51.54)}{134.05} + \underset{(0.12)}{0.73}\text{MaleAllWork} + \underset{(13.36)}{17.72}\text{Catholic}\ ,\ N=27,\ \text{RBar}^2 = 0.590\ .$$

(The regression line through the non-Catholic points is the lower of the two parallel lines in Figure 1; the line fitting the points describing Catholic countries is the upper parallel line.) We can reject the hypotheses that the intercept is 0 and that the slope on MaleAllWork is 1, as well as the joint hypothesis.[4] Nonetheless, the slope of the relationship between total work by gender is not that much different from 1; and, as we showed, the averages for rich non-Catholic countries do not differ significantly statistically or economically.

To examine the role of economic development, Figure 2 shows a scatter of the difference in average minutes per day of female over male total work time and real GDP/capita, along with a

[4]The statistic testing the joint hypothesis is $F(2,24) = 8.18$, $p=.002$.

line describing the fit to these points. The scatter and fit suggest either that economic development is highly correlated with gender equality of total work, or that today's rich non-Catholic countries have always had a different culture along this dimension from today's poor countries and from Catholic countries.

Clearly, based on these results we cannot claim that this remarkable gender equality in total work holds at all times and in all economies. It most decidedly does not hold even today in Italy, and it does not seem to characterize other Catholic countries very well. Our results also show that it does not hold in middle- or lower-income countries; and Haddad *et al* (1995) suggest similar findings for other developing African economies, as do Goldschmidt-Clermont and Pagnossin-Aligisaks (1995) for Bulgaria in 1988. The evidence, however, does suggest strongly that iso-work characterizes average household behavior and labor markets in rich countries generally and is positively associated with average real income.

3 Novelty and Knowledge

The iso-work fact has not been noticed by economists, but it has been demonstrated by several sociologists. Robinson and Godbey (1999) employ data from a UN report (Goldschmidt-Clermont and Pagnossin-Aligisakis, 1995) to show that this fact describes the average of (recall and time-diary) data from 14 countries from the 1980s and early 1990s; and Gershuny (2000) shows that it approximates the two averages over an even larger sample of data sets covering the 1960s through mid-1990s. No study has demonstrated it using data sets that were as well harmonized as those used here, nor has one shown how closely it describes average outcomes in individual countries.

The fact is thus not new in the sociology literature, although it appears to be new in the economics literature. The difficulty, however, is that it has been swamped by claims in widely circulated sociological studies (Hochschild, 1997, and earlier work) based on ethnographic

research on a few non-randomly chosen households that women's total work significantly exceeds men's. Indeed, even sociologists who have demonstrated it (e.g., Mattingly and Bianchi, 2003, for the United States, and Bittman and Wajcman, 2000, for several countries), quickly move beyond it to focus on showing that women's work is more onerous than men's, and why women's leisure provides less pleasure.

With all this evidence demonstrating gender iso-work, one wonders whether the fact that we have demonstrated is well known among economists, other social scientists and the general public. To examine this issue, we designed a survey that asked the following question:

> "We know that American men (ages 20-75) on average work more in the market than do American women. But what is the difference between men's TOTAL WORK (in the market and on anything that you might view as work at home) and that of women? Without consulting any books, articles or raw data, PLEASE PUT AN X NEXT TO THE LINE BELOW THAT YOU BELIEVE TO BE THE CLOSEST APPROXIMATION TO THE CURRENT SITUATION IN THE US."

Respondents were allowed nine possible responses, ranging from a 25 percent excess of female total work, to symmetry around equality, to a 25 percent excess of male total work.

Early in August 2006 we emailed this survey to three groups: 1) 663 labor economists affiliated with a worldwide network of such researchers. The web-based survey allowed us to distinguish respondents who had spent at least six months in the U.S. from those who had not; 2) 255 elite macro and public finance economists, members of a mostly American network of such researchers; and 3) 210 faculty members and graduate students in a leading American sociology department. The first and third groups received follow-up emails three weeks after the initial survey. Also, early in September 2006 we asked the same question of 533 students in an introductory microeconomics class. Using the information on location in the first group, we thus have five separate sets of responses. The response rates varied, but there is no reason to believe that non-respondents were less well-informed about the facts than respondents.

The results of these surveys are shown in Table 2. The majority of respondents in each of the five groups believe that American women perform at least five percent more total work than men. Assigning half the respondents who state that there is equality to this category, we convincingly reject the null hypothesis that the proportions stating that men work less or women work less are equal. Indeed, even if we assign all those stating that there is equality to the "men work more" group, this null hypothesis is rejected in some of the samples. Finally, for each sample we strongly reject the hypothesis that members of the underlying populations are equally likely to state the men work less, the same or more than women in total.

These surveys show that sociologists, experts in labor economics, leading economists and a non-random sample of the public believe that women work more in total than do men. Indeed, the results from the survey of the economists look very similar to those from the sample of college freshmen. Perhaps the only consolation is that the distance between opinion and fact is less within the groups of economists than it is among the sociologists. Despite our demonstration of gender equality of total work in the U.S. and most rich countries using current time-diary data, and despite demonstrations using time-diary and recall data of this general fact by several sociologists, all groups considered here appear ignorant of the reality.

4 What Fails to Explain the Facts?

Assuming substitution effects dominate income effects, economic theory predicts that a rise in men's relative wage (i.e. the gender wage gap) will lead to less work in the market by women relative to men. The impact of this increase on the relative amount of home work will be in the opposite direction, so that the effect of a change in the gender gap on the relative amounts of total work should be ambiguous. Unless, however, additional market work is offset one-for-one by reduced household production (i.e., unless additional earnings are not used at all to take

additional leisure or spend additional tertiary time), a rise in the gender wage gap should reduce women's total work relative to men's.

To examine this possibility, we use Polachek and Xiang's (2006) estimates of the gender wage gap. In particular, for 19 of the 27 countries on which we have recent time-diary data they produced estimates of the difference between the logarithms of the medians of the distributions of males' and females' wages. Using these data, in the first two columns in Table 3 we present least-squares estimates of equations describing female-male differences in market and total work as a function of the gender pay gap. The results on market work are consistent with an upward-sloping relative supply curve of labor to the market. The market work effect, however, dominates the household work effect, so that we find that the female-male gap in total work is also negatively related to the male-female wage difference.

These findings are not affected by the inclusion of real GDP per capita, as the estimates in Columns (3) and (4) show, nor are they affected by the additional inclusion of the indicator for Catholic countries. Higher relative wages among men lead them to work relatively more in the market, less at home, and more in total. Despite the quality of the estimates, the equation in Column (6) describes well below half of the variance in the gender difference in total work across countries. The difficulty is that, as implied by Table 1 and the multi-country averages, in 14 of these 19 countries gender differences in total work are clustered within five percent of equality, while the gender wage gaps range from 0.07 to 0.69. Something, not equality in relative wages or differences in per-capita incomes, is causing the pervasive absence of gender differences in total work.

Taking a different view of these results, one might follow the literature on household behavior (see, e.g., Lundberg and Pollak, 1996) and view the gender relative wage gap as measuring gender differences in power in the household. By this criterion, we should expect that where the male-female pay gap is higher we would observe men enjoying relatively more leisure.

The estimates in Table 3 imply the exact opposite result. Where one might infer that men have more bargaining power, as measured by relative wages, they also work relatively more in total.

A second possible explanation for some of these facts is that husbands and wives pay attention to each other's labor and leisure, so that we observe gender equality at the means in rich countries because most adult men and women are married. To examine this possibility in the aggregate, in Table 4 we present means of market work and home work by gender and marital status for the United States in 2003 and Germany in 2001/02. While the female-male gap in total work is higher among unmarried adults, in the United States it varies across marital status within 5 percent of equality. In Germany the gap is larger among unmarried adults, but still not huge.

An explicit test of the notion that gender iso-work is generated by husbands and wives focusing on each other's work effort as part of marriage can be conducted by examining inter-household dispersion in the within-household gender total work gap. Because only one person per household was sampled, this examination is not possible for the U.S. in 2003, so instead we use the much smaller 1985 U.S. Time Use Survey, which collected data on both spouses on a single day. For the 2001/02 German data this is easy, as diaries were collected from both spouses on three separate days, which we average for each spouse. As an additional comparison we examine the 1992 Australian survey (summaries from which were included in Figure 1), in which time diaries were obtained from each spouse on two separate days and which we average across the two.

Figures 3a-3c show the frequency distributions of the differences within households between the average daily total work of wives and husbands in the U.S., Australia and Germany. While the distributions are symmetric around means of 0, the implied dispersion is huge in each case. Indeed, regressions within each country of the wife's total work time on the husband's explain only 9 percent of the variation in the U.S., 29 percent of the variation in Australia and 35 percent in Germany. While wives work more in total when their husbands work more, within-couple covariation describes only a small part of the variance in spouses' total work time.

5 Social Norms in the Theory of Total Work

What kind of mechanism could coordinate total time spent on market work and secondary activities across males and females on average, regardless of 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 a common 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.[5] If the social norm is strong enough to drive the agent to conform fully, we obtain the iso-work result we observe in the data.[6] Alternative explanations of the iso-work fact are, of course, possible; but all must involve, in one way or another, an interplay between social factors and individual tastes. This interplay might lead, of course, to multiple equilibria. We relegate multiplicity issues to the Appendix in order to focus on iso-work.

5.1 Baseline model

Imagine that, *in the absence of a social norm*, consumers maximize the linear-quadratic utility function

$$C - (1/2\epsilon)(1 - L)^2 \tag{1}$$

subject to constraints

$$C = \Omega + wH, \tag{2}$$

$$H + L = 1, \tag{3}$$

where C and L denote consumption and leisure, w is the wage rate, Ω represents non-labor income, the parameter $\epsilon > 0$ is an (inverse) index of the disutility of work, and without loss of generality the

[5] For a survey of social norms and economic theory, see Elster (1989). Social norms have been studied, among others, by Akerlof (1980), Jones (1984), Cole et al. (1992), Kandori (1992), Young (1996), Lindbeck (1997), and Lindbeck et al. (1999).

[6] In this simple story, total conformity only occurs if the desire to conform is infinitely strong. The literature on conformity (Bernheim, 1994) has sought ways to obtain identical behavior without assuming an infinite cost of deviation.

amount of available time is normalized to 1.[7] Optimal leisure is then

$$L = 1 - \epsilon w. \tag{4}$$

We call this the agent's *intrinsic* leisure optimum. It is determined by private incentives, prices and budget constraints.

5.2 Linear-Quadratic Leisure Norm

Now suppose that there is a social norm that influences, but does not mandate, individual leisure. We mean by this that agents can choose the extent to which they adhere to the norm, and that they balance the marginal costs and benefits of deviating from it. The cost of deviating may stem from guilt (an internal psychological process) or shame (an external peer pressure or a reputational mechanism). The benefit of deviating results from the joy of following one's own unbridled inclinations that in general differ from the norm.

Formally, assume that there is a quadratic cost of deviating from the leisure norm L^*, and parameterize the strength of the social norm by the coefficient $\phi \geq 0$,[8] so that the utility function becomes

$$C - (1/2\epsilon)(1 - L)^2 - (\phi/2)(L - L^*)^2. \tag{5}$$

Optimal leisure is

$$L = \alpha(1 - \epsilon w) + (1 - \alpha)L^* \equiv L(w), \tag{6}$$

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

$$\alpha = \frac{1}{1 + \phi\epsilon.} \tag{7}$$

Intuitively, the social norm pulls optimal leisure away from the intrinsic optimum $1 - \epsilon w$ and towards L^*. The coefficient α will be small, and optimal leisure will be close to the norm, if the social norm is strong (ϕ large) or leisure is not too wage inelastic (ϵ large). Higher wages, holding α

[7] We impose the restriction $\epsilon > 0$ to exclude backward-bending labor-supply curves. Here, and in what follows, we assume that non-negativity constraints on consumption and leisure are satisfied. In particular, we assume that the wage is always below $1/\epsilon$ to avoid corner solutions at $L = 0$.

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

constant, increase the distance between L and L^* by making it more costly to deviate from the intrinsic optimum.

Now suppose male (m) and female (f) wages differ, but that there are no within-gender wage differences, and therefore no within-gender leisure difference. Assume also, to simplify, that the wage sensitivity of leisure (α) is the same for both sexes.[9] As a result, the average (and individual) leisure of agents of gender i is simply $\bar{L}^i = L(w^i)$, and aggregate *leisure gap* is

$$\bar{L}^m - \bar{L}^f = L(w^m) - L(w^f) \tag{8}$$

$$= -\alpha\epsilon(w^m - w^f). \tag{9}$$

Since α is decreasing in ϕ, equation (8) implies iso-work—a leisure gap close to zero—if the norm is very strong. In the limit, $\lim_{\phi\to\infty}(L^m - L^f) = 0$. In words, a very strong norm mutes the effect of differing male and female wages on leisure, thereby leading to iso-work by equalizing male and female leisure in the aggregate.

This result reveals an essential ingredient of any norm-based explanation of the iso-work fact: the fact that the fraction of men and women that share a given norm is identical. We call this feature the *gender-neutrality* of norms, and we will show below that it is crucial for iso-work to emerge in the presence of many norms and within-gender wage heterogeneity. In the current example, it is because all males and all females have the same leisure norm that a larger ϕ eliminates the differences between male and female leisure. Were the fraction of men and female who adopt the norm L^* different, we would, *ceteris paribus*, observe different male and female average leisure even when $\phi = +\infty$. Hence the fact that total work is essentially 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 social reference.[10]

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

[10] 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 cause gender equality.

5.3 Accounting for Within-Gender Heterogeneity

Although it provides us with an important insight, the small model we have just outlined is not sufficient to rationalize all the facts. The empirical difficulty we face is that the iso-work fact coexists with significant 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.[11] As a result, while a strong norm bridges the gap between male and female leisure, it also eliminates any within-gender heterogeneity of leisure.[12] This unpleasant feature can be avoided by allowing for non-gender based *social clusters*, or multiple social norms.

5.3.1 Social Clusters

Imagine that each gender can be stratified into social clusters that are defined by the *relative* position in the wage distribution. Assume, for instance, that males and females above their gender's *median* wage share a common leisure norm, and that there exists another leisure norm for males and females below the median wage. Note that we could just as well cluster agents according to the color of their eyes, the month in which they are born, or the neighborhood in which they live. The crucial assumption, as hinted above, is that the clusters are defined by gender-neutral characteristics: the fractions of men and women above the median wage of their respective gender are identical, and so are (presumably) the proportions of men and women who have blue eyes, are born in December, or live in Austin, TX.[13]

Suppose, to be more formal, that there are *two* leisure norms L_h^* and L_l^*,[14] and that an individual, male or female, adopts norm L_h^* (resp., L_l^*) if he/she is in the upper q-th (resp. lower upper $1-q$-th) percentile of the respective gender's wage distribution. Define the threshold wages $\mathbf{w}^i$ by

$$1 - F^i(\mathbf{w}^i) = q, \tag{10}$$

[11] This is also true if ϵ, the sensitivity of leisure to the wage, differs across sexes.

[12] Note that the theory of conformity developed by Bernheim (1994) to explain why people with different intrinsic preferences behave identically suffers, from the perspective of iso-work, from the same weakness as the linear-quadratic model with one norm $\phi = \infty$: it wipes out all within-group heterogeneity.

[13] By contrast, social leisure norms defined in terms of position of the wage above or below some arbitrary *levels* (i.e., a leisure norm for "high" wage males and females, another one for "low" wage ones) will be in general gender-biased, as the proportions of males and females adopting a given norm will differ unless the separating levels happen to coincide with median wages.

[14] The analysis can be generalized readily to many norms.

where $F^i(\cdot)$, $i = m, f$, is the cumulative distribution of wages for gender i. Thus, men with wages above (below) $\mathbf{w}^m$ and women with wages above (below) $\mathbf{w}^f$ adopt norm L_h^* (L_l^*). Assume that the strength ϕ of the social norm is the same for all individuals. Leisure of an agent of wage type j with wage w is simply, as before,

$$L_j(w) = \alpha(1 - \epsilon w) + (1 - \alpha)L_j^*, \tag{11}$$

so that the average leisure of agents of gender i and wage w is

$$\bar{L}^i = \int_{w<\mathbf{w}^i} L_l(w)\, dF^i(w) + \int_{w>\mathbf{w}^i} L_h(w)\, dF^i(w) \tag{12}$$

$$= \alpha(1 - \epsilon\bar{w}^i) + (1 - \alpha)[(1 - q)L_l^* + qL_h^*]. \tag{13}$$

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

$$\bar{L}^m - \bar{L}^f = -\alpha\epsilon(\bar{w}^m - \bar{w}^f). \tag{14}$$

This is the same formula we obtained with a single social norm. As before, the leisure gap goes to zero and the iso-work fact holds asymptotically when the social norm becomes infinitely compelling ($\phi \to \infty$, so that $\alpha \to 0$). However, the existence of many social clusters (delineated by categories that are orthogonal to gender) ensures that *within-gender* heterogeneity of leisure does not shrink to zero as ϕ becomes large.

5.3.2 Even More Heterogeneity

In Section 4 we demonstrated significant heterogeneity of total work, even within couples. One way to capture this aspect of the data is to define higher dimensions of clustering based on other characteristics of agents, and to repeat the foregoing reasoning 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 increasingly 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 arbitrarily fine.

Alternatively, within-category heterogeneity as norms become more binding may reflect idiosyncratic heterogeneity in the population. This heterogeneity could stem from different tastes, or from a noisy individual observation of the societal leisure norm.[15] To illustrate how this line of reasoning would play out in our setup, return to the first of our models with one norm L^* for all, identical wages for all members of a given sex, and a different wage for male and female workers. Imagine that individual k observes the norm with some measurement error λ_k, believing that the desirable norm is $L^* + \lambda_k$ instead of L^*.[16] As a result, optimal leisure for that individual becomes

$$L_k = \alpha(1 - \epsilon w) + (1 - \alpha)(L^* + \lambda_k), \tag{15}$$

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 further that measurement errors are idiosyncratic in the sense that the λ's average to zero for each sex.[17] 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 taking a different amount of leisure due to an idiosyncratic perception of the norm.

5.4 Accounting for Variations in Total Work

The data presented in Section 2 make it clear that, although total work is strikingly equal across men and women, it does vary, sometimes substantially, across countries, region 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 male and female total work, we must also explain how norms can vary. This is most simply done by endogenizing the leisure social norm.

Let us return yet again to our simplest model of social norms: men and women have the same preferences, they face a gender-specific wage, there are no within-gender wage differences, and men and women adopt a common leisure norm L^*. Remember that in that model average male and female

[15] 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 increases the number of unobservable parameters.

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

[17] This leaves open the possibility that females and males perceive the social norm with different precision.

leisure are given by

$$\bar{L}^m = \alpha(1 - \epsilon w^m) + (1 - \alpha)L^*, \tag{16}$$

$$\bar{L}^f = \alpha(1 - \epsilon w^f) + (1 - \alpha)L^*. \tag{17}$$

Now close the model by assuming that that the gender-neutral norm L^* reflects *average leisure* across males and females in society. Since there are equal proportions of men and women, in equilibrium we have

$$L^* = \frac{1}{2}(\bar{L}^m + \bar{L}^f) = L^*. \tag{18}$$

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

$$L^* = 1 - \epsilon\bar{w}, \tag{19}$$

where

$$\bar{w} = \frac{w^m + w^f}{2} \tag{20}$$

is the average wage in the overall (male *and* female) population. The equilibrium social norm is independent of the strength of the norm, but it is negatively affected by the average wage rate $\bar{w}$, with a response coefficient that depends on the sensitivity ϵ of individual leisure to the wage. Whenever these magnitudes change, across countries or over time, the social norm for leisure varies. There is no reason to expect it to remain to be constant.

5.5 Accounting for the Relationship between GDP Per Capita and the Female-Male Total Work Difference

We have argued above that female-male differences in total work are negatively related to GDP per capita. A social norm theory of leisure can deliver this fact in at least two ways. The first relies on the link between economic development and the increased gender-neutrality of social reference groups. The second, which is slightly more *ad hoc*, assumes that the cost of deviating from a social norm is positively related to the wage.

First, a model of social clusters can account for the reduction in the female-male total work difference as GDP per capita grows provided economic growth is positively correlated with the adoption

of gender-neutral reference groups. Suppose for instance that at low income levels there are two leisure reference groups: one for men, and one for women, each with a different (gender-specific) leisure norm. This might be due to a taste for discrimination, for example, which is correlated with income level. Then, trivially, iso-work does not hold at low income levels. If gender-defined social clusters are replaced by gender-neutral reference groups as income rises (e.g., at quantiles of income distributions), then development will be associated with a convergence of the total work difference across genders to zero.

An alternative, possibly complementary explanation relaxes the assumption that deviating from the norm entails a utility cost that is independent of the level of the individual's wage. Let us consider in the simple one-norm model what happens if people get are harassed when they deviate from the norm. That is, imagine that, instead of suffering a direct utility loss as envisaged above, deviants lose time fending off their critics, mending their reputation, or battling inner guilt feelings at the cost of time available for work or leisure. Namely, they solve:

$$C - (1/2\epsilon)(1-L)^2 \tag{21}$$

subject to constraints

$$C = \Omega + wH, \tag{22}$$

$$L + H + \frac{\phi}{2}(L - L^*)^2 = 1. \tag{23}$$

It is straightforward to show that the solution to this problem is formally equivalent to that of the utility-loss model, with the parameter ϕ replaced by ϕw. In other words, the "harassment" model is just the utility loss model with a cost of deviation proportional to the wage. Therefore, adapting equation (6), we conclude that optimal leisure in this model is

$$L = \alpha(w)(1 - \epsilon w) + [1 - \alpha(w)]L^*, \tag{24}$$

with the weight $\alpha(w)$ given by

$$\alpha = \frac{1}{1 + \phi\epsilon w.} \tag{25}$$

At low wage or development levels (w close to zero), the weight $\alpha(w)$ is close to 1 so that the intrinsic

optimum $1 - w$ is the main determinant of leisure. At high wage or development levels (w high), and given the parameter φ, the weight $\alpha(w)$ approaches zero, and the social norm becomes the sole determinant of optimal leisure. As the value of time increases, so does the cost of deviating from the norm, resulting in smaller deviations from the norm with higher wages.

6 Some Evidence on the Role of Social Norms in Iso-Work

The theory developed in the last section is not easy to test directly. We can, however, perform a number of additional examinations that can allow us to infer whether the role of social norms is consistent with observed behavior in various data sets. If the notion of social clusters or reference group norms is correct, we should expect that differences in total work across various cuts of the data will be large compared to gender differences within a cluster. Consider first cutting the data by educational category. In the 2003 U.S. data we divide the adult population into those with fewer than 12 years of school, 12 years of school, some college, and college or more. In the German data we create four categories: *Volksschule/Hauptschule* (basic), *Mittlere Reife/Realschule* (high school), *Fachoberschule/Fachabitur* (vocationally qualified), and *Abitur* (university preparatory).

Table 5 shows average minutes of market and total work by gender for each of the education categories in the U.S. and Germany. In both countries, gender differences in total work within education categories are small, with the highest being the 5 percent excess of female over male total work among the least educated Americans. Differences across categories in total work independent of gender are significantly larger: In the United States the gap between the highest and lowest education categories in the average amount of total work is 39 percent, while in

Germany it is 13 percent.[18] Clearly, gender differences are tiny compared to those resulting from differences in educational attainment.

Similarly, the data could be cut by region. To the extent that there are inter-regional cultural differences, we might expect different norms regarding total work across regions, even though gender differences within regions are small. The possibilities for examining this notion are limited in both data sets by sample size. Also, confidentiality restrictions on the German data prevent us from obtaining a finer geographic breakdown than West and East. With these data limitations, we divide the U.S. sample into the South and non-South Census regions, and the German data into West and East.

Averages of market and total work by gender within geographic area are shown in Table 6. Notice first that within-region differences in total work by gender are not large. While those in the South and within each German region are statistically significant, none exceeds 3 percent. Among Southern women, total work is over 5 percent below that in the rest of the nation, while among Southern men it is 3 percent below. For Germany we observe a qualitatively similar outcome: West-East differences in total work are 4 percent among women and 3 percent among men. The contrast between inter-regional differences in average total work and within-region differences by gender is consistent with the notion of clustering on norms, although the it is not as stark as that observed when we cut the data by educational attainment.

An additional piece of evidence based on aggregated data asks, without any claims of causation, whether attitudes about gender roles are related to gender differences in total work. To examine this relationship we use data collected at various times by the World Values Surveys (WVS). Respondents in various countries were asked whether they agreed with the statement that men should have more right to scarce jobs than women. Taking averages of these data for each country for the most recent year before the time-diary survey, in Figure 4a we present a

[18]That the spread across education categories is so much greater in the U.S. may be due to the fact (Devroye and Freeman, 2001) that differences in educational attainment imply much greater differences in literacy in the U.S. than in Germany.

scatter diagram relating them to female-male difference in total work for the 21 countries (of the 27 used in Figure 1) for which they are available.[19] The scatter and the highly significant relationship between the gender total work difference and this attitudinal variable that we might interpret as representing beliefs in male dominance suggest that where the expressed norm favors men, women perform a greater share of the total amount of market and household work.

One might argue that this diagram merely reflects generalized cultural differences rather than specific attitudes about gender work roles. To examine this possibility we use a general measure of attitudes toward work in the WVS, the fraction of respondents agreeing that it would be unfortunate if there were less emphasis on work in the future. The scatter of this variable and the gender difference in total work is shown in Figure 4b, along with the regression relating the two. The fit is much worse than with the variable measuring attitudes about gender work roles. Taking this line of argument one step further, we obtained an attitudinal measure from the WVS that reflects culture but is unrelated to attitudes about work, the fraction of respondents stating that they are very proud of their nationality.[20] The scatter and regression of this variable and the gender difference in total work presented in Figure 4c show no relation between the two.[21] While we do not claim causation from these measures of attitudes to behavioral outcomes, the exercise does suggest a link between those outcomes and specific attitudes about gender roles in work.

We can go further toward examining the unique causative role of norms in generating gender differences in total work using the micro data on couples in Australia and Germany that underlay the histograms in Figures 3b and 3c. For each couple (3080 in Germany, 1966 in Australia), we initially simply regress wife's total work (averaged over three diary days in

[19]The importance of international differences in culture in generating labor-market outcomes has been documented by Fernandez (2007).

[20]All the data can be downloaded from http://www.worldvaluessurvey.com/. The questions are: 1) "Do you agree or disagree with the following statement, When jobs are scarce, men should have more right to a job than women." 2) "Please tell me, if it were to happen, whether you think it would be a good thing, a bad thing, or don't you mind: Less importance placed on work in our lives." 3) "How proud are you to be [Nationality]?"

[21]If we replace national averages of attitudes in each of these scatters with gender-specific national averages the results are hardly unchanged, as the correlations of averages of female and male attitudes in each case exceed 0.9.

Germany, two in Australia) against husband's, with the results shown in Columns (1) and (5) of Table 7. Following up on a now-substantial literature on the role of peer effects in behavior (see Borjas, 1992, for an early example), in Columns (2) and (6) we add to these regressions variables measuring the average work of wives in the particular wife's education group (four in Germany; three in Australia), age group (<40, 40-54, 55+) and region (West and East in Germany; New South Wales, Victoria, Queensland, and the rest of the country in Australia). Columns (3) and (7) present the same regressions with controls for the wife's own demographic and family characteristics. In both countries the addition of these peer outcomes improves the ability of the equations to describe the wife's total work conditional on her husband's. Except for the peer age outcome for Germany in Column (3), peer outcomes of similarly-situated wives have significant impacts on the total work behavior of individual wives.

One might argue that these results merely indicate the importance of Manski's (1995) reflection problem. We cannot demonstrate causation conclusively, but indirect evidence does suggest that our results do not arise solely from the reflection of one's own behavior. First, while we cannot construct finer education and region groups in these samples, we can disaggregate wives' peer outcomes more finely by age—into seven age groups in the larger German sample and six in the Australian sample. Re-estimating the equations in Columns (2), (3), (6) and (7) using this finer distinction on the age peer effects, we find that the adjusted R^2 increases in all cases, by about 0.004 for the estimates for Germany and by 0.001 in the estimates for Australia.

This first test does not avoid the reflection problem and indeed might arguably exacerbate it. The problem is at least directly avoided if we randomly partition the German and Australian samples into halves, calculate peer averages for one half-sample and include them in regressions like those in Columns (3) and (6) based only on the other half-sample. The results of re-estimating the equations on the second half-samples differ little from those shown in the Table. These similar results cannot be based on reflections, as the half-samples are different. Individuals in the half-samples may, however, be responding to their own unmeasured common

characteristics rather than to the behavior of their peers. There is no way of circumventing this potential difficulty completely, just as in the larger peer-effects literature extricating common effects from responses to peers' outcomes is exceedingly difficult. In the case of Germany, however, we can probe a bit further by including in the regressions describing wives in the 2001/02 sample peer outcomes based on wives on whom time diaries were obtained in a nearly identical survey in 1991/92. Those results are presented in Column (4) of Table 7 and should be compared to the results in Column (2). While the impact of wives' peers' education has been vitiated when we include lagged values, the impacts of peer outcomes in the same age group and region, although attenuated, are still highly significant statistically.

7 Conclusion: The Importance of the Iso-Work Phenomenon for Economic Modeling

In Section 5 we showed that the iso-work fact and its link to economic development place tight constraints on the modeling of labor supply behavior by gender. Any nontrivial gender-neutral model of labor supply must rely on the existence of strong cluster norms which coordinate behavior, or rely on implausible mean-preserving transformations of underlying distributions which are in turn unlikely to be common across gender. Consequently, iso-work gives rise to a number of conundrums for economic models that rely on work-leisure choices to characterize economic behavior in both the short- and long-run.

Consider first the implications for business-cycle theories and macroeconomics. Although we have not emphasized it, the evidence supports the iso-work phenomenon over the business cycle.[22] Business-cycle fluctuations are typically characterized by movements of market employment of 2-3 percent around a secular trend. It is thus unavoidable that the business cycle

[22]The evidence adduced in Burda *et al* (2006) for Germany, the Netherlands and Italy observed in two different years with few changes in the structure of the time-diary surveys supports the conclusion that iso-work holds at different phases of the business cycle. Across the rich countries for which data are presented in Figure 1 the correlation of the female-male difference in total work with the deviation of the OECD standardized unemployment rate from its country-specific average from 1986-2004 was practically zero.

spills over into the home, shifting gender differences in the mix of household and market activities for the "representative agent." Because it is very unlikely (Greenwood *et al.*, 1995) that there is a stronger than one-for-one substitution of home for market production, a business-cycle downturn will reduce men's total work effort. This is inconsistent with earlier theoretical work on the macroeconomics of total labor supply. Average women's market hours are much more strongly pro-cyclical than men's, so iso-work must tend to render women's home production time countercyclical, relative to men's and possibly even absolutely. Iso-work will generally increase the elasticity of labor supply to the market if the marginal product of home production declines sharply in hours worked.

A second implication is linked to long-run economic development. Our evidence documents a convergence of total work across gender with GDP per capita. We show in Section 5 that this convergence can derive either from increasingly gender-blind assignment to reference clusters with strong norms, or from a convergence of gender wage-offer distributions to a common one. The past half century has also seen secular, albeit slow convergence in gender wage differentials. These two phenomena are probably related, but what is their source? Has technical change augmented female market production relative to that of men? Is technical change in home production generally labor-saving (see Greenwood *et al*, 2005)? More likely, how have interactions of these two types of innovation combined to generate the convergence in total work and the returns to market work? Examining these interactions without considering gender roles (e.g., Ngai and Pissarides, 2006) is a useful first step; but given the significant differences in gender roles in less developed countries, understanding growth and development will require accounting better for the convergence of total work and changes in the relative amounts of market and household work performed by men and women. This is especially true if one considers the different roles played by physical and intellectual attributes over the agricultural, industrial and service-sector phases of economic development (Clark, 1940; Fourastié, 1949).

In household models, we typically assume that a spouse's bargaining power is a function of her/his market earnings. Yet we have shown here, at least for most rich economies, that gender differences in the amounts of leisure consumed are tiny. How can this be true if, as is still the case, men have substantially higher wage rates and market earnings? Three logical possibilities present themselves: 1) Men have more power, but are altruistic toward their spouses and toward women generally, and do not take advantage of it;[23] 2) Economists' modeling of the household has been incorrect, and market earnings do not generate power in the household; or 3) Earnings do generate power, men are not altruistic, but the average man's utility from his market and home work exceeds that of the average woman's from the same total amount of work. In other words, iso-work may not imply iso-utility from the same amount of work. This last possibility implies a formal version of what is implicit in the writings of some sociologists who have confronted the iso-work phenomenon (e.g., Mattingly and Bianchi, 2003), but then shifts the discussion to why one type of work is more onerous than another. Why, e.g., is the marginal minute spent in an office dealing with recalcitrant colleagues and demanding supervisors more pleasurable than the marginal minute spent shopping, cooking or taking care of children?

A social norm of iso-work imposes restrictions on older household bargaining models (e.g., McElroy and Horney, 1981). With gender equality in total work, the only room for changing prices and threat points to have any effect on choices is through gender differences in the valuation of marginal changes in time spent in market or home work. While these are possible, their implications are much harder to trace than in the absence of an iso-work norm. Consider too the choice of home versus market work, which is generally determined by equating the marginal value product of household time to the real wage measured in terms of comparable market output (e.g., Gronau, 1980). To the extent that social norms constrain agents to a value of labor supply that ignores productivity in household production, one or more efficiency conditions in the standard model of household behavior might be violated, or need to be modified.

[23]Doepke and Tertilt (2007) present a model in which self-interest motivated by inter-generational concerns leads men to use their power to grant equal rights to women.

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Appendix. Strategic complementarities: A Model of Stakhanov

In the text we have assumed that the cost of deviating does not depend on how many people conform. Plausibly, the stigma attached to deviating from a social norm (or the very existence of a social norm) depends on how widely accepted the norm is. For instance, the productivity norm established by Alexei Stakhanov (1906-1977), the legendary Soviet coal miner who in 1935 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 loss that we experience when we deviate from the norm depends on how widely the 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 deviating is then high. If we anticipate that others will disregard the norm, however, the cost of deviating is small, and it is more likely that we will find it optimal to follow our intrinsic optimum. The question then arises whether deviating is the stable outcome that will emerge endogenously from a population of self-interested individuals. The answer, as we establish now, depends crucially on the shape of the wage distribution.[24]

For simplicity, let us depart from the linear-quadratic model in the text, and assume instead that the cost of deviating is *fixed* from the point of view of individuals. However, let us imagine that it depends on the fraction $\pi \in (0,1)$ of "conformists" in the population:

$$\psi = \pi^2/2. \tag{26}$$

If no one in society conforms, there is no cost of deviating. The cost of deviating from the norm is increasing in π, and thus maximal when everyone else conforms ($\pi = 1$).[25] One can easily show that an individual with wage w conforms if and only if

$$\psi = \frac{1}{2}\pi^2 > \frac{1}{2}(w - w^*)^2, \tag{27}$$

[24]This Appendix is inspired by the work of Cartwright (2005) and Wooders *et al.* (2006) on the emergence of social conformity.

[25]These two properties are crucial. The quadratic specification for ψ 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.

that is, if and only if his/her wage is in the band $[w^* - \pi, w^* + \pi]$. 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 it is that an individual will deviate. This strategic complementarity opens the door to multiple equilibria.

To illustrate this point, 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 the equation

$$F(w^* + \pi) - F(w^* - \pi) = \pi. \tag{28}$$

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 *non-conformist* equilibrium in which no one conforms, and a *conformist equilibrium* in which everybody adheres to the norm.[26]

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 that the norm is the median value of intrinsic leisure, so that $w^* = 1/2$ (i.e., the median of the individual w's). Then

$$F(w^* + \pi) - F(w^* - \pi) = \begin{cases} 2\pi, & \text{for } 0 \leq \pi \leq 1/2; \\ 1, & \text{for } 1/2 < \pi \leq 1. \end{cases} \tag{29}$$

Figure A1 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.[27] 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 different 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 different

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

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

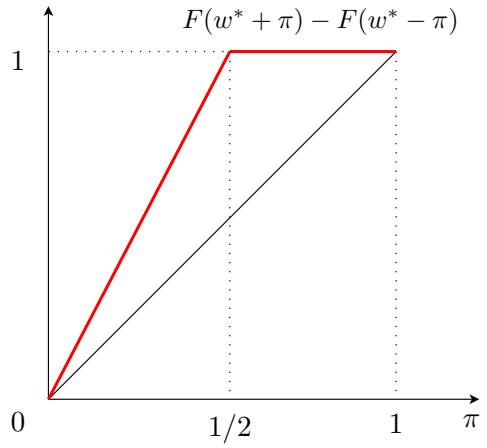

Figure A1: Multiple equilibria ($w^* = 1/2$; uniform distribution of wages over $[0, 1]$)

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 show that

$$F(w^* + \pi) - F(w^* - \pi) = \begin{cases} 2\pi, & \text{for } 0 \leq \pi \leq \min(w^*, 1 - w^*); \\ w^* + \pi, & \text{for } \min(w^*, 1 - w^*) < \pi \leq \max(w^*, 1 - w^*); \\ 1, & \text{for } \max(w^*, 1 - w^*) < \pi \leq 1. \end{cases} \tag{30}$$

As before, there are two equilibria, illustrated in Figure A2: a stable one in which everybody conforms, and an unstable one in which nobody conforms. 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^*.[28]

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

$$U^C = \Omega + ww^* - \frac{1}{2}w^{*2}, \tag{31}$$

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

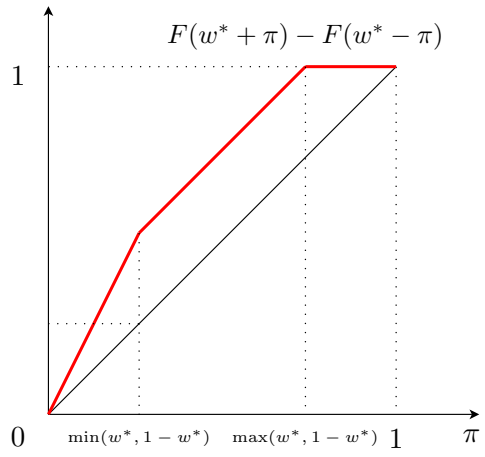

Figure A2: Multiple equilibria (w^* arbitrary; uniform distribution of wages over $[0, 1]$)

so that

$$\frac{\partial U^C}{\partial w^*} = w - w^*. \tag{32}$$

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

$$\frac{\partial U^C}{\partial L^*} = w^* - w. \tag{33}$$

Hence low-wage agents ($w^* - w > 0$) are better off in an economy in which social pressure dictates high leisure. Conversely, high-wage individuals ($w^* - w < 0$) are better off in a "stakhanovist" society in which L^* is high. This difference in welfare stems only, in our model, from the fact that agents prefer norms that are congruent with their intrinsic tastes. Hence, the continuum of conformist equilibria cannot be Pareto-ranked.

Table 1. Time Allocations (minutes per representative day), Averages and Their Standard Errors, Women, Men Ages 20-74*

	Germany, 2001/02		Italy, 2002/03		The Netherlands, 2000		U.S., 2003	
	F	**M**	**F**	**M**	**F**	**M**	**F**	**M**
Individuals in survey	3,862	3,377	19,654	18,228	940	646	9,918	7,750
Market work	**133 (1.9)**	**262 (2.8)**	**133 (1.6)**	**290 (2.2)**	**124 (2.7)**	**254 (4.4)**	**201 (2.6)**	**313 (3.4)**
Home work	**312 (1.7)**	**174 (1.6)**	**347 (1.5)**	**115 (1.0)**	**268 (2.2)**	**145 (2.2)**	**271 (2.1)**	**163 (2.0)**
Family care	42 (0.8)	18 (0.4)	39 (0.6)	19 (0.4)	51 (1.2)	17 (0.8)	60 (1.5)	28 (0.8)
Shopping	66 (0.7)	49 (0.8)	53 (0.5)	33 (0.5)	53 (0.9)	36 (0.9)	59 (0.9)	43 (0.9)
Total work	**444**	**436**	**480**	**405**	**392**	**399**	**472**	**476**
Tertiary time	**676 (1.3)**	**654 (1.5)**	**593 (0.8)**	**595 (1.0)**	**659 (1.6)**	**634 (2.1)**	**641 (1.5)**	**616 (1.7)**
Sleep	509 (1.0)	499 (1.2)	499 (0.7)	497 (0.8)	524 (1.4)	504 (1.7)	511 (1.3)	496 (1.5)
Leisure	**320 (1.6)**	**349 (1.9)**	**367 (1.3)**	**440 (1.6)**	**388 (2.4)**	**407 (3.4)**	**327 (2.1)**	**348 (2.7)**
Radio/TV	100 (0.9)	135 (1.2)	89 (0.6)	114 (0.8)	99 (1.2)	119 (1.7)	134 (1.5)	160 (1.9)

*Standard errors of means here and in Tables 4, 5 and 6

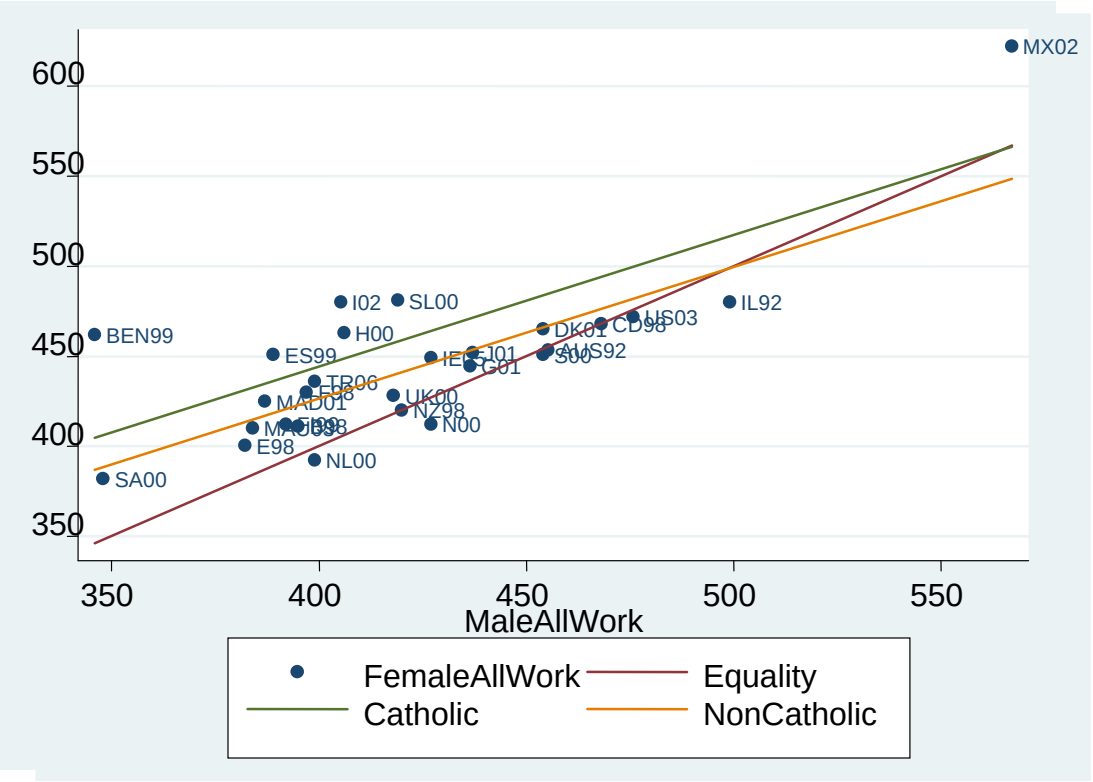

Figure 1. Scatter and Linear Regression of Female Total Work Against Male Total Work and Non-Catholic (Orange Line), Catholic (Green Line), Equality of Total Work (Red Line) 27 Countries

Table 2. Expert and Other Opinion About Men's and Women's Total Work, Percent Distributions and Statistical Tests

Men work:	Labor economists familiar with US	Labor economists unfamiliar with US	Elite macro and public finance economists	Sociology faculty and graduate students	Economics principles students
25% less	5.2	5.6	2.6	20.0	6.1
15% less	18.8	20.4	23.7	26.7	18.9
10% less	17.8	24.6	18.4	13.3	18.7
5% less	11.7	11.3	10.5	11.7	12.8
Differ by less than 2.5%	25.8	25.4	34.2	20.0	23.1
5% more	6.1	4.9	3.9	1.7	9.2
10% more	8.5	4.2	5.3	3.3	7.0
15% more	5.2	2.1	0	3.3	3.4
25% more	0.9	1.4	1.3	0	0.9
N =	213	142	76	60	445
Fraction with men < women	0.535	0.620	0.553	0.717	0.564
t-statistic on binomial if "equal" answers are split evenly	5.47	6.73	4.08	6.08	8.98
t-statistic on binomial if "equal" answers are assumed men > women	1.03	2.93	0.92	3.69	2.72
Trinary t-statistic (equal probability of <, = and >)	6.01	8.25	5.73	7.70	9.48
RESPONSE RATE	0.535		0.298	0.286	0.873

Responses are to the question: "We know that American men (ages 20-75) on average work more in the market than do American women. But what is the difference between men's TOTAL WORK (in the market and on anything that you might view as work at home) and that of women? Without consulting any books, articles or raw data, PLEASE PUT AN X NEXT TO THE LINE BELOW THAT YOU BELIEVE TO BE THE CLOSEST APPROXIMATION TO THE CURRENT SITUATION IN THE US."

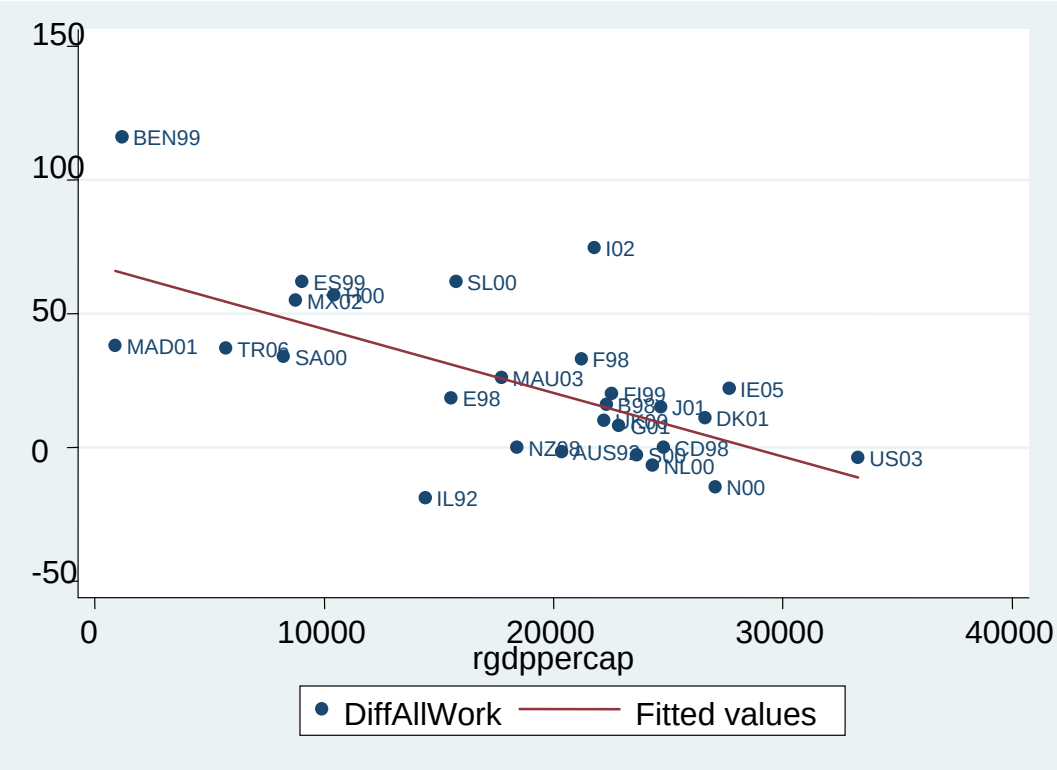

Figure 2. Difference between Female and Male Total Work Compared to Real GDP per Capita, 27 Countries

DiffAllWork = 68.16 – 2.39RealGDP/Capita; $RBar^2 = 0.394$
(0.56)

Table 3. Impact of the Gender Pay Gap on the Gender Total Work (minutes per day), N = 19*

Dep. Var., Female – Male Total Work:	(1) Market work	(2) Total work	(3) Market work	(4) Total work	(5) Market work	(6) Total work
Log (Male/Female Wage)**	-135.5 (73.02)	-44.0 (38.54)	-182.8 (66.96)	-23.47 (37.42)	-162.68 (71.71)	-55.00 (32.34)
Real GDP per capita ($000)***			4.38 (1.78)	-1.90 (1.00)	3.98 (1.92)	-1.20 (0.87)
Catholic					-17.22 (26.07)	33.78 (11.76)
Adj. R^2	0.120	0.017	0.321	0.149	0.293	0.423

*Standard errors in parentheses here and in Table 7.
**From Polachek and Xiang (2006).
***From Heston *et al* (2006).

Table 4. Time Allocations (minutes per representative day), Averages and Their Standard Errors, Women, Married and Unmarried Separately, U.S. 2003, Germany 2001/02

	U.S. 2003, Married		U.S. 2003, Unmarried		Germany, 2001/02, Married		Germany, 2001/02, Unmarried	
	F	**M**	**F**	**M**	**F**	**M**	**F**	**M**
Market work	182 (3.4)	329 (4.4)	224 (4.1)	284 (5.5)	111 (2.1)	270 (3.3)	175 (3.8)	241 (5.5)
Home work	314 (2.8)	179 (2.6)	218 (2.8)	136 (3.0)	336 (2.0)	175 (1.8)	264 (2.9)	170 (3.5)
Female-Male Total work		**-12**		**22**		**2**		**28**

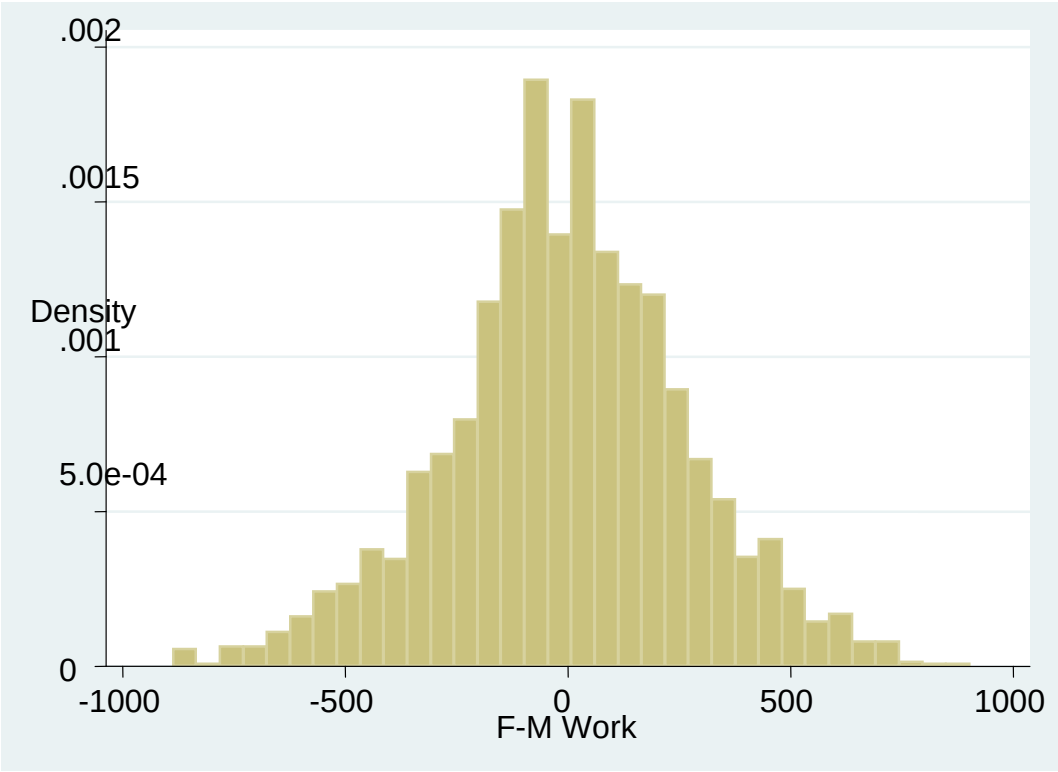

Figure 3a. Histogram of Wife-Husband Differences in Total Work, United States 1985

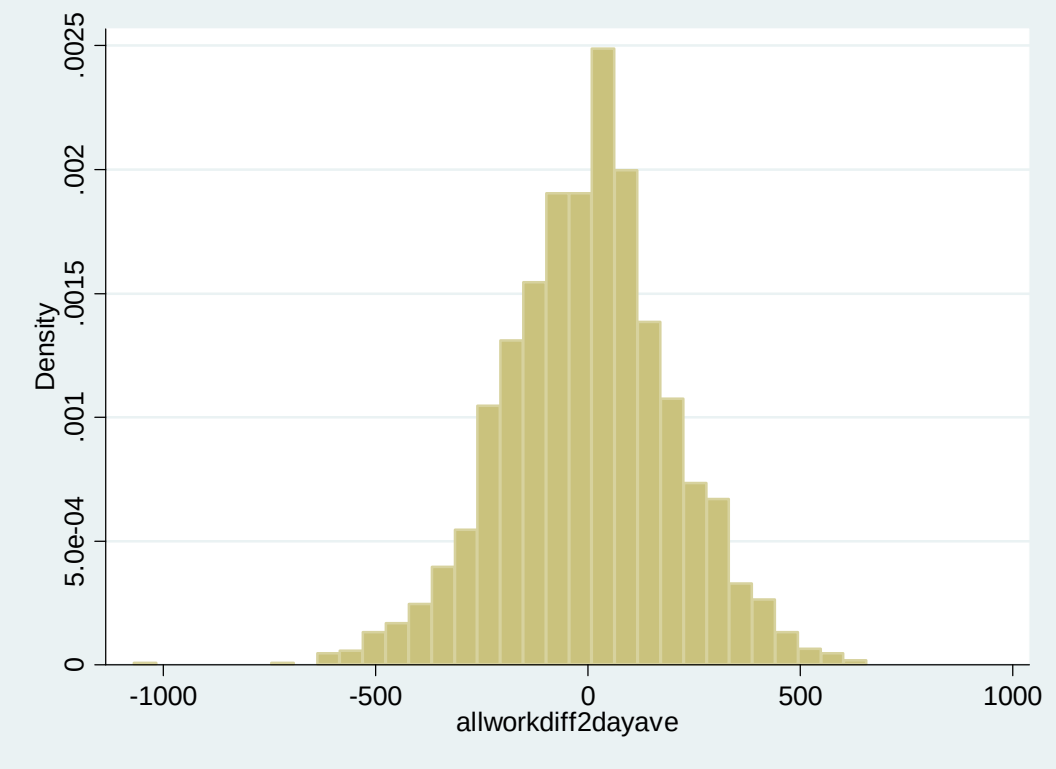

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Figure 3b. Histogram of Wife-Husband Differences in Average Total Work per Day over Two Days, Australia 1992

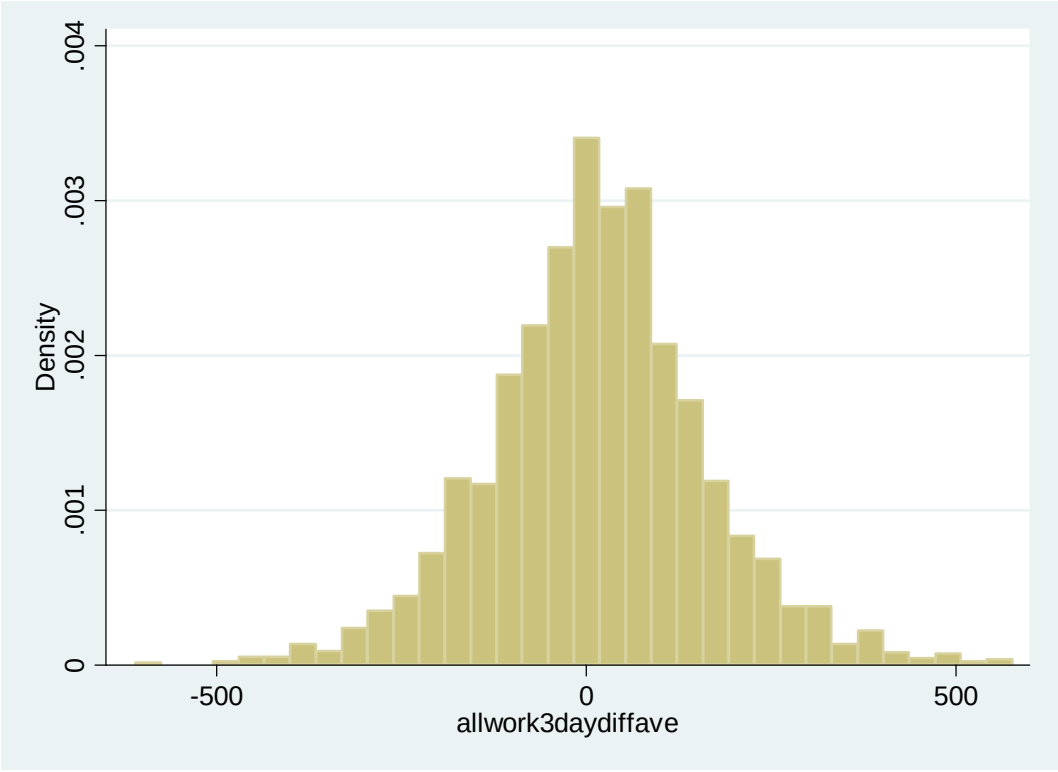

Figure 3c. Histogram of Wife-Husband Differences in Average Total Work per Day over Three Days, Germany 2001/02

Table 5. Total Work by Education Level, U.S. 2003, Germany 2001/02

		Highest	2nd	3rd	Lowest
			United States		
Market Work	F	241 (5.1)	215 (4.8)	180 (4.6)	108 (6.3)
	M	350 (6.0)	306 (6.6)	307 (6.4)	234 (9.4)
Total Work	F	518 (4.33)	474 (4.4)	455 (4.5)	386 (7.6)
	M	524 (5.1)	470 (6.1)	468 (5.9)	366 (9.2)
			Germany		
Market Work	F	172 (2.8)	152 (6.5)	147 (2.9)	98 (3.0)
	M	270 (4.8)	290 (8.2)	273 (4.9)	237 (4.4)
Total Work	F	475 (3.6)	465 (6.2)	456 (2.8)	406 (3.3)
	M	455 (4.2)	456 (7.2)	448 (4.2)	416 (4.0)

Table 6. Total Work by Region, Ages 20-74, U.S. 2003, Germany 2001/02

		United States	
		Non-South	**South**
Market Work	F	202 (3.2)	199 (4.4)
	M	312 (4.2)	313 (6.0)
Total Work	F	480 (3.0)	457 (4.2)
	M	480 (3.8)	467 (5.5)
		Germany	
		West	**East**
Market Work	F	133 (1.9)	175 (4.5)
	M	262 (2.8)	254 (6.0)
Total Work	F	445 (2.0)	465 (4.0)
	M	436 (2.5)	451 (5.2)

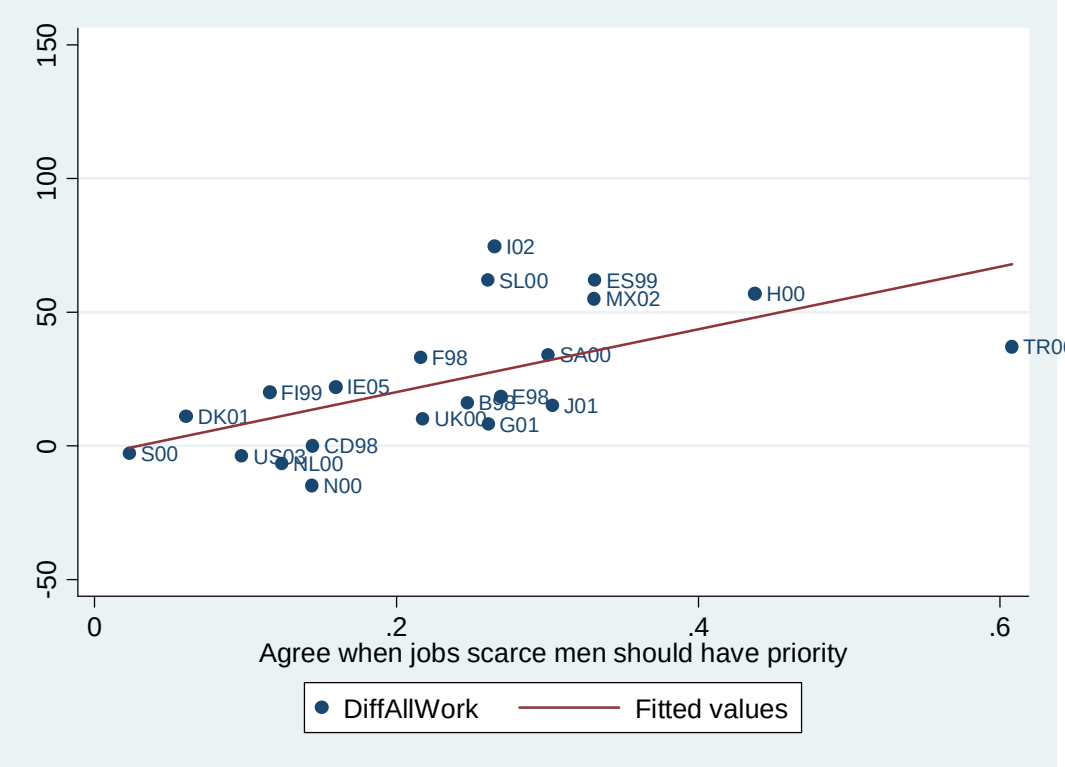

Figure 4a. Gender Total Work Differences and Average Attitudes to Job Scarcity, 21 Countries

DiffAllWork = -3.39 + 117.50AgreeJobsMen; $RBar^2$ = 0.337
(35.16)

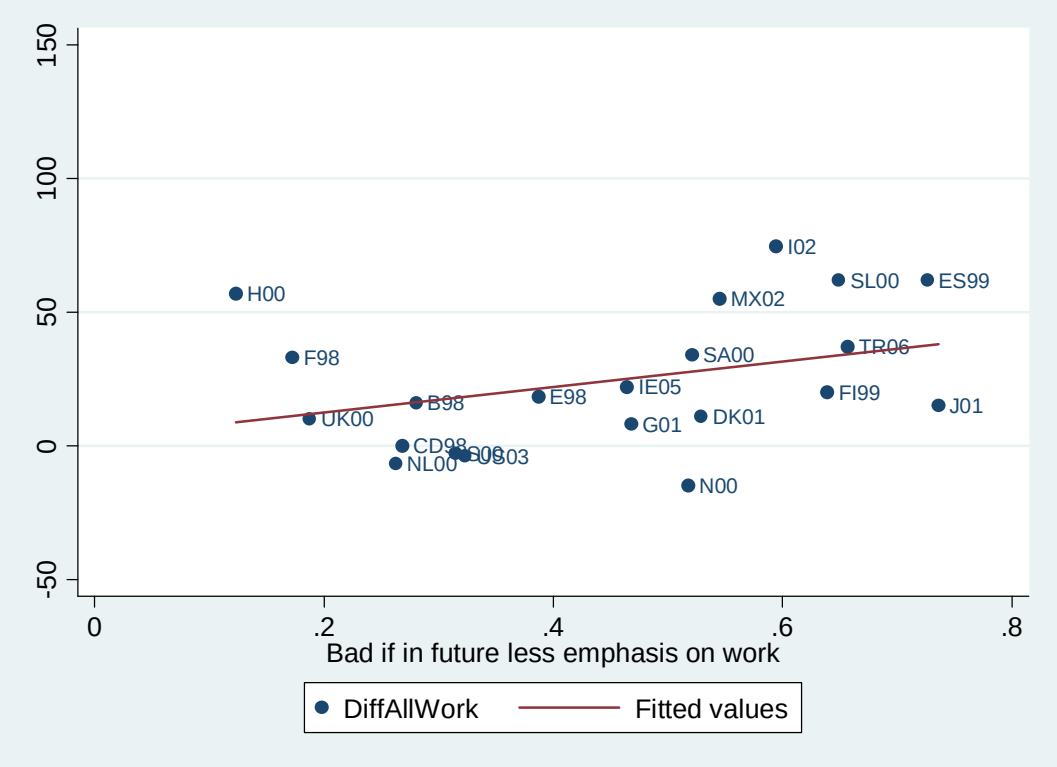

Figure 4b. Gender Total Work Differences and Average Attitudes to Value of Market Work, 21 Countries

DiffAllWork = 2.87 + 47.67LessWorkBad ; $RBar^2$ = 0.078
(29.32)

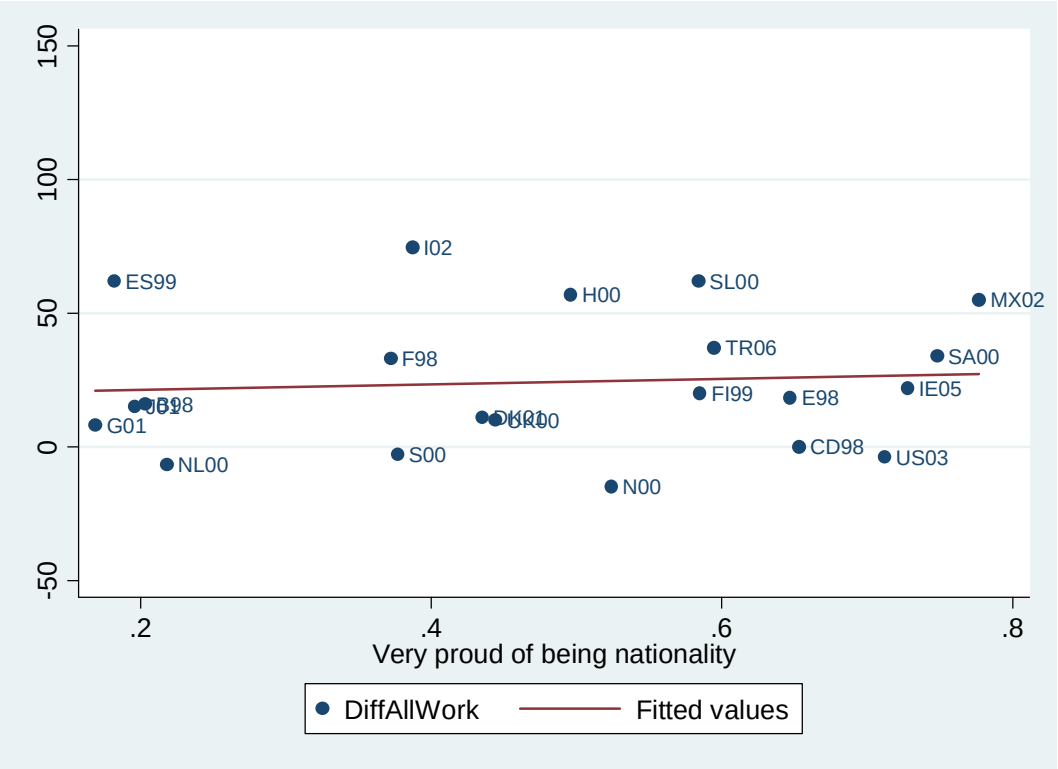

Figure 4c. Gender Total Work Differences and Average Pride in Nationality, 21 Countries

DiffAllWork = 19.24 + 10.22VeryProudNationality; $RBar^2$ = -0.046
(29.11)

Table 7. Direct Tests for the Effects of Social Norms, Married Couples Germany 2001/02, Australia 1992 (Dep. Var. is Wife's Total Work Time)[a]

	Germany				Australia		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Work Husband	0.491	0.441	0.432	0.447	0.416	0.358	0.355
	(0.012)	(0.013)	(0.013)	(0.013)	(0.015)	(0.016)	(0.016)
Average Total Work in Wife's:							
Education Group		0.298	0.252	-0.404		0.466	0.587
		(0.081)	(0.075)	(0.231)		(0.111)	(0.129)
Age Group		0.281	0.055	0.216		0.431	0.231
		(0.046)	(0.065)	(0.033)		(0.056)	(0.070)
Region		0.722	0.873	0.443		1.276	1.668
		(0.159)	(0.161)	(0.098)		(0.518)	(0.812)
Norm Used		Current	Current	Lagged		Current	Current
Wife's Education, Age, Region			Yes				Yes
Family's Number and Ages of Children			Yes				Yes
$RBar^2$	0.353	0.372	0.377	0.368	0.292	0.325	0.336
N=			3080			1966	

[a]In Germany total work is the average over three days, in Australia it is the average over two days. For both countries the age groups are under 40, 40-54 and 55+. There are four education groups in Germany, three in Australia. Germany is divided into West and East, Australia in New South Wales, Victoria, Queensland and the rest of the country.

DATA APPENDIX: Definitions of Total Work in 27 Countries

United States: Market work and work-related activities; travel related to work; all household activities; caring for and helping household members; consumer purchases; professional and personal care services; household services; government services; travel related to these.

Australia: Market work; cleaning and cooking; family and child care; shopping; and travel associated with each.

Belgium, Denmark, France, Finland, Sweden, United Kingdom, Estonia, Hungary, Slovenia, Norway:
Gainful work; study; household work + family care; proratio of travel time based on gainful work time.

Benin, Madagascar, Mauritius, South Africa: Market work; domestic and care activities; commuting.

Canada: "Total work" (paid work and related activities; unpaid work and related activities).

Germany: Market work: employment and job search; home work activities; handicraft/gardening; care and sitting.

Ireland: Care; employment and study; household work; proratio of travel time based on gainful work time.

Israel: Market work; cooking and cleaning at home; child care.

Italy: market work; professional activities; training; domestic activities; family care; purchasing goods and services.

Japan: Work, school work; house work, caring or nursing, child care, shopping.

Mexico: Domestic work; care of children and other household members; market work.

Netherlands: Occupational work and related travel; household work, do-it yourself, gardening, etc; childcare; shopping.

New Zealand: Paid work; household work, care-giving for household members, purchasing goods or services, unpaid work for people outside the home.

Spain: Market work; house work, child care, adult care.

Turkey: Employment and job seeking; study; household and family care; proratio of travel time based on gainful work time.