

Measuring Trends in Leisure: Evidence from Five Decades of Time Use Surveys

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Abstract

In this paper, we use five decades of time use surveys to document a set of stylized facts about the evolution of time spent in market work, time spent in non-market work, and time spent in leisure for the entire population and specific sub groups of the population. We document that a dramatic increase in leisure time lies behind the relatively stable number of market hours worked (per working age adult) between 1965 and 2003. The increase in leisure is made possible by a very large decline in time spent in non-market production. Specifically, we document that leisure for males increased by 6-8 hours per week (driven by a decline in market work hours) and for females by 4-7 hours per week (driven by a decline in home production work hours). We find that leisure increased during the last forty years for a number of sub samples of the population, including samples defined by employment status, marital status, or the level of educational attainment. However, those with a high school education or less experienced the largest increases in leisure time, complementing the fact that their market work hours decreased more (males) or increased less (females) than their more educated counterparts. This divergence in leisure between the high and low educated started to become pronounced during the 1980s. This implies a growing “inequality” in leisure that is the mirror image of the growing inequality of wages and expenditures, making welfare calculation based solely on the latter series incomplete.

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1. Introduction

The standard model has households maximizing utility over both consumption and leisure. In household surveys designed to measure labor market activity (such as the Current Population Survey (CPS) and the Panel Study of Income Dynamics (PSID)), the only category of time use that is consistently measured is market work hours.¹ As a result, almost universally, leisure is defined as time spent away from market work. However, as noted by Becker (1965), households can also allocate time towards production outside the formal market sector. To the extent that non-market (home) production is important, leisure time will be poorly proxied by time spent away from market work. Moreover, if the extent of home production has changed over time, changes in time spent in market work will provide an inaccurate picture of changing leisure.

In this paper, we use five decades of time use surveys to accurately measure not only trends in time spent in market production but also trends in time spent in non-market production and leisure. By carefully harmonizing the various time use surveys, we create consistent measures of time use over the last four decades. In doing so, we document a set of novel facts about how home production and leisure have evolved for men and women of differing work status, marital status, and educational attainment during the last forty years.

The main finding in this paper is that leisure time – measured in a variety of ways – has increased dramatically in the United States between 1965 and 2003. When measuring leisure, we separate out other uses of household time including time spent working in the market or non-market sectors, time spent obtaining human capital, and time spent in health care. Given that some categories of time use are easier to categorize as leisure than others, we create four distinct measures of leisure; the narrowest of which only includes time spent on entertainment (watching

¹ In some years, the PSID asks respondents to individually report the amount of time they spent on household chores during a given week. Getting a time series on responses to this question is hindered by the fact that the PSID changed the wording of this question numerous times up through the late 1970s. Moreover, as we discuss below, there is a strong over-reporting of time spent in home production in the PSID relative to the information provided via time diaries.

television, going to the movies, etc.), socializing (visiting with friends, going to bars, etc.), active recreation (playing golf, hiking, etc.), and general relaxation while the broadest definition includes all time not spent either in market or non-market production.

Using our preferred definition of leisure, we find that leisure has increased by 7.8 hours per week for average man and 6.4 hours per week for the average women between 1965 and 2003 (p-value of both < 0.01).² The decline in total work (the sum of total market work and total non market work) was nearly identical for the average man and the average women (9.7 and 9.1 hours per week, respectively). Two things are of note about this increase in leisure (decline in total work). First, the increase in leisure occurred essentially monotonically for both men and women during this time period. This suggests that the increase we are observing is not an artifact of random differences in measurement of leisure across the different surveys. Second, these increases in leisure are extremely large. In 1965, the average man spent 57 hours per week and the average women spent 54 hours per week in total market and non-market work. The increase in weekly leisure we document between 1965 and 2003 represents twelve to fourteen percent of the average total work week in 1965. Put another way, if the median employed individual allocates 8 hours per day towards market work, then the increase in leisure between 1965 and 2003 represents an increase on the order of magnitude of one full day of market work per week.

The adjustments that allow for greater leisure while satisfying the time budget constraint differ between men and women. Men increased their leisure by allocating less time to the market sector. Conversely, leisure time for women has increased simultaneously with market labor. This is accounted for by a sharp decline in female home production of roughly 10 hours per week between 1965 and 2003. This more than offsets the 4 hours per week increase in market labor.

² We refer to our preferred specification as the one that uses our third leisure measure and conditions the change in leisure on changing demographics over the sample period. This leisure measure adds time spent eating, sleeping, and grooming to our narrow measure. Additionally, we include some measures of child care into this measure. The reason for this is discussed in detail below. Almost all the qualitative conclusions of the paper persist regardless of our measure of leisure.

We also document that the increase in leisure is present in several sub samples of the population. For example, both working men and non-working men enjoyed leisure increases between 1965 and 2003 (4.3 and 6.0 hours per week, respectively). Due to the decline in male labor force participation, the increase for each sub group is smaller than the increase for the pooled sample. Specifically, we find that for men approximately thirty percent of the increase in leisure prior to 1975 and nearly three quarters of the increase in leisure after 1975 was due to a decline in the likelihood that men were employed.

The large declines in home production afforded both employed women and non-working women the opportunity to experience large increases in leisure during the last four decades (10.3 and 12.8 hours per week, respectively). The increase in labor force participation for women results in an average increase in female leisure that is greater than the change for either subgroup. Consistently, throughout the samples from different years, non-working women experienced roughly twenty hours per week more leisure than their non-working counterparts. We also show that the increase in leisure occurred among both single and married women, although the increase in leisure was larger for single women. This differential stems from the fact that single women have decreased market work hours while married women have increased market labor supply. To some extent, the impact of the differences in market work on leisure is mitigated by the fact that married women have decreased the amount of time they allocate to non-market production by a larger amount than single women (12.1 and 4.9 hours per week, respectively).

We also analyze changes in leisure by educational attainment. We find that men and women with more than a high school education (highly educated) and men and women with less than a high school education (less educated) all increased leisure time between 1965 and 2003. However, the increase in leisure was greatest among less educated males and less educated females. One of our most interest results is that the increases in leisure between highly and less educated men and highly and less educated women were nearly identical between 1965 and 1985.

However, after 1985, less educated individuals increased their leisure dramatically relative to their highly educated counterparts.

Lastly, we document that in 1965, the gap in leisure between highly and less educated individuals was essentially zero. Both highly and less educated men and highly and less educated women took similar amounts of leisure during a given week. However, in recent periods, less educated individuals take far more leisure than their highly educated counterparts. Collectively, these results presents an interesting set of facts for researchers trying to measure individual labor supply elasticities to explain. The data from recent cross sections tends to support a view that substitution effects dominate income effects of a real wage change. As wages (as proxied by education) increases, households allocate more time to market work. However, data from the time series leads to a different conclusion. As real incomes have increased over the last forty years for almost all sub groups of the U.S. population, leisure has correspondingly increased. This suggests that, all else equal, income effects dominate substitution effects from real wage changes.

2. A Conceptual Measure of Leisure

To better understand what we refer to when we use the term “leisure”, we describe a simple model of household optimization. Suppose each household has up to two adults indexed by $i = 1, 2$. Household’s maximize utility over a composite consumption good purchased from the market (c^m), a composite consumption good produced in the non-market (home) sector (c^n), and the leisure of both adult household members (l_1 and l_2). Formally, the household’s problem can be expressed as:

$$\max \sum_{t=k}^T \beta^{t-k} u(l_{1,t}, l_{2,t}, c_t^m, c_t^n; \chi; \theta) \quad (1)$$

subject to the following constraints:

$$A_{t+1} = A_t(1+r) + w_{1,t}h_{1,t}^m + w_{2,t}h_{2,t}^m - x_t^m - x_t^n \quad (2)$$

$$\begin{aligned}
c_t^m &= f(s_{1,t}^m, s_{2,t}^m, x_t^m; \chi) \\
c_t^n &= f(s_{1,t}^n, s_{2,t}^n, x_t^n, h_{1,t}^n, h_{2,t}^n; \chi)
\end{aligned}
\tag{3}$$

$$\begin{aligned}
h_{1,t}^m + h_{1,t}^n + s_{1,t}^m + s_{1,t}^n + l_{1,t} &= 1 \\
h_{2,t}^m + h_{2,t}^n + s_{2,t}^m + s_{2,t}^n + l_{2,t} &= 1
\end{aligned}
\tag{4}$$

where β is the time discount factor, θ is a vector of household taste variables, χ is a vector of household composition variables, A_t is the household's accumulated assets at the beginning of period t , and r is the market interest rate. Each household member i who works in the market sector earns a wage rate of w_{it} during period t . Household market consumption in period t (c_t^m) is produced using expenditures on those market goods, x_t^m , and the time spent acquiring (shopping) for the market goods by both household members, $s_{1,t}^m$ and $s_{2,t}^m$. Household non-market consumption is produced using expenditures on goods used in the production of non-market consumption, x_t^n , the time spent shopping for these goods by both household members, $s_{1,t}^n$ and $s_{2,t}^n$, and the time spent in non-market production by both household members, $h_{1,t}^m$ and $h_{2,t}^m$. We normalize the total time allocation for both adult household members to one. Notice, “shopping” time is necessary for both the consumption of market goods and non-market goods.

From a conceptual standpoint, we define leisure as the complement of time spent in market work and the time spent in the production of consumption goods. In this sense, non-leisure time is analogous to an input into production rather than directly generating utility while time spent in leisure enters the utility function directly. Given this interpretation, we assume that individuals receive no direct utility from the time spent in market or non-market production. In section 5, we discuss how we empirically implement this definition of leisure.

3. Data

To construct consistent measures of time spent in market work, time spent in non-market production, and time spent in leisure over the last forty years, we examine the following time use

surveys conducted within the United States: *1965-1966 Americas' Use of Time*; *1975-1976 Time Use in Economics and Social Accounts*; *1985 Americans' Use of Time*; *1992-1994 National Human Activity Pattern Survey*; and *2003 American Time Use Survey*. All surveys used a 24 hour recall of the previous day's activities to illicit time diary information. Great care was taken by all surveys to make sure each day of the week is equally represented within the survey. All surveys contained demographics pertaining to the survey respondents. Below, we briefly summarize the salient features of these surveys.

The *1965-1966 Americas' Use of Time* was conducted by the Survey Research Center at the University of Michigan. The survey sampled 2,001 individuals between the ages of 19 and 65 which had at least one adult person employed in a non-farm occupation during the previous year. Of the 2,001 individuals, 776 came from Jackson, Michigan. The time use data were obtained by having respondents keep a complete diary of their activities for a single 24 hour period between November 15 and December 15, 1965 or March 7 and April 29, 1966. Only one individual per household was surveyed making it impossible to compute total household time use. In our analysis, we include the Jackson, Michigan sample. However, we redid our entire analysis excluding this sample and the results are very robust to this exclusion.

The *1975-1976 Time Use in Economic and Social Accounts* was also conducted by the Survey Research Center at the University of Michigan. The sample was designed to be nationally representative excluding individuals living on military bases. Unlike any of the other time use studies, the 1975-1976 study sampled households (as opposed to individuals). That is, if a husband and a wife were present, both members were surveyed. The sample included 2,406 adults from 1,519 households. The 1975-1976 survey actually interviewed its respondents up to four different times. Of all the surveys we analyze, this is the only one that has a panel component. The first survey took place in the fall of 1975. Subsequent surveys were conducted in the winter, spring, and summer of 1976. Attrition between the original survey and the

subsequent surveys was very large. As a result, we only use the fall 1975 survey in our analysis. In doing so, we forgo the panel component of the 1975-1976 survey.

The *1985 Americans' Use of Time* was conducted by the Survey Research Center at the University of Maryland. The sample was nationally representative with respect to adults over the age of 18 living in homes with at least one telephone. Only one adult per household was sampled. The sample included 4,939 individuals. By design, the survey sampled its respondents from January 1985 through December 1985. In doing so, the survey contains respondents who were interviewed during each month of the year.

The *1992-1994 National Human Activity Pattern Survey* was conducted by the Survey Research Center at the University of Maryland and was sponsored by the U.S. Environmental Protection Agency. The sample was designed to be nationally representative with respect to households with telephones. The sample included 9,386 individuals, of which 7,514 were individuals over the age of 18. The survey randomly selected a representative sample for each 3-month quarter starting in October of 1992 continuing through September of 1994. For simplicity, we will refer to the 1992-1994 survey as the 1993 survey (given that the median respondent was sampled in late 1993). This survey contained the least detailed demographics of all the time use surveys we analyzed. Specifically, we only have the respondent's age, sex, level of educational attainment, race, labor force status (working, student, retired, etc.), and whether they have children. We do not know whether the respondent is married or the number of children that the respondent has.

The *2003 American Time Use Survey (ATUS)* was conducted by the U.S. Bureau of Labor Statistics (BLS). Participants in ATUS are drawn from the exiting sample of the Current Population Survey (CPS). Like all but the 1975 time use survey, only one individual per household is sampled (including children). The individual is sampled approximately 3 months after they complete their final CPS survey. At the time of the ATUS survey, the BLS updates the individual's employment and demographic information. Roughly 1,800 individuals complete the

survey each month yielding an annual sample of over 20,000 individuals. An advantage of the ATUS survey is that individuals can be linked to detailed earnings records from their CPS interviews. Table 1 reports a summary of the differing survey methodologies and sampling frames for the five time use surveys.

For our analysis, we pool together all five time use data sets. We restrict our sample to include only those households between the ages of 21 and 65 who are not retired and who had a completed time use survey. The non-retired requirement is necessitated by the fact that the 1965 survey restricted its sample to households where one member participated in the labor force during the previous 12 months. Furthermore, the 1965 survey did not sample anyone over the age of 65. Additionally, all individuals in our sample must have had non-missing levels for their level of educational attainment. This latter restriction was only relevant for 10 individuals in 1965, 2 individuals in 1975, 36 individuals in 1985, and 35 individuals in 1993.³ In total, our sample included 27,566 individuals. In Table 1, the sample sizes, given our sample restrictions, for each time use survey are shown.

In appendix table A1, we show that overall the samples from the time use data sets compare well against the samples from other nationally representative surveys such as the Panel Study of Income Dynamics (PSID).⁴ We restricted the PSID in a similar way as our time use data by only including non-retired individuals between the ages of 21 and 65. There are a few notable exceptions. For example, non-retired males between the ages of 21 and 65 in the 1965, 1985, 1993, and 2003 time use surveys were slightly younger than similarly defined individuals in the PSID. Additionally, individuals in the 1975 time use survey are markedly less educated

³ The restriction that all individuals had a complete time diary was also innocuous. Only 43 individuals in 1965, 1 individual in 1975, and 3 individuals in 1985 had a time diary where total time across all activities summed to a number different than 1,440 minutes (the amount of minutes in one 24 hour period).

⁴ The PSID only started in 1968. As a result, we compare the 1965 time use survey to the 1998 PSID. All demographic data from the time use surveys in appendix table A1 are weighted using the sampling weights provided within the survey. Likewise, the data from the PSID in appendix table A1 are weighted using the PSID core sampling weights.

than individuals PSID (30% of individuals in the 1975 time use survey with some college education vs. 39% of individuals in the 1975 PSID).

For our analysis, we aggregate an individual's time allocation into 15 broad categories: core market work; total market work (which sums core market work with commuting time associated with market work and other ancillary work activities); meal preparation/indoor household chores; shopping/obtaining goods and services (excluding medical services); total non-market production (which sums together meal preparation/indoor household chores, shopping/obtaining goods and services, and all other household non-market production); eating; sleeping; personal care (excluding own medical care); own medical care; education; child care; care of other adults; entertainment, social, and relaxing activities; active recreation; and religious/civic activities. Travel time associated with each activity is embedded into the total time spent on the activity. For example, time spent driving to the grocery store is embedded in the time spent "shopping/obtaining goods and services" category. Table 2 provides a list of activities captured by these broad time use categories.⁵

The ability to examine different patterns in time use over the last five decades hinges critically on the quality of data within each of the time use surveys. Specifically, we want to ensure that any trends we perceive in the time use data sets is due to actual change in behavior and not differences in measurement or sample composition across the time use surveys. Before continuing, we will benchmark one time use category from the time use surveys to the same time use category reported from another (more traditional) survey. This task is made easier by the fact that household surveys such as the PSID and the Current Population Survey (CPS) take care

⁵ All of our data and stata codes use to create the time use categories for this paper are available at http://gsbwww.uchicago.edu/fac/erik.hurst/research/timeuse_data/datapage.html. The code includes a detail description of how we took the raw data from each of the time use surveys and created consistent measures for each of the time use categories across the different surveys. Each survey up through 1993 includes nearly a 100 different sub categories of individual time use. The 2003 survey includes over 300 different sub categories of individual time use. To create consistent measures of time use over time, we harmonized the surveys sub category by sub category. Also, on that web site, we posted all the original code books (or links to the original code books) for each of the different time use surveys. Our task of harmonizing the data was made easier by the fact that the coding structure for the 1965, 1975, 1985, and 1993 data were nearly identical.

in measuring how much time individuals allocate to market work. Moreover, the time spent in market work from these large household surveys has been essentially the sole basis for creating stylized facts on the changes in time use across recent decades.

As noted in Table 2, we define “core market work” from the time use surveys as time spent working for pay on all jobs within the market sector. This measure also includes time spent in overtime, time spent in market work done at home, and time spent working on second (other) jobs. By design, this measure encompasses all time spent actually engaging in market production. Our definition of time spent in core market work is analogous to the time spent in market work reported within the CPS or the PSID.⁶

Figures 1a and 1b (coming soon) plots the average hours per week of market work reported by non-retired PSID males and females, respectively, between the ages of 21 and 65 (inclusive) between 1967 and 2002 against the average hours per week of core market work reported by non-retired males and females between the ages of 21 and 65 in the time use surveys for the years 1965, 1975, 1985, 1995, and 2003. Four things are of note with respect to the PSID data. First, within the PSID surveys, households are asked about their time spent working in the previous year. This implies that, for example, the 1986 survey is used to assess the amount of work in 1985. Second, we cannot compare the PSID directly to the time use surveys in 1965 and 2003 given that the PSID only began in 1968 (asking about 1967 hours) and is only currently available through 2003 (asking about 2002 hours). Third, the PSID surveyed its respondents annually between 1968 and 1997. Starting in 1997, the PSID sampled its respondents every other year. To compute the average time spent in market work for 1997, 1999, and 2001 (i.e., survey

⁶ Both the CPS and the PSID report measures of the amount of time individuals spent in market work during the previous year. The measurement of time spent in market work differs slightly between the CPS and the PSID. Both surveys ask respondents to report how many hours they usually work during a typical week. The CPS follows that question up by asking how many weeks the respondent was employed during the previous one year. However, the PSID follows the usual weekly hours worked question with a question asking respondents to report how many weeks they actually worked during the previous year (excluding vacation time and sick leave). To the extent that there have been increases in vacation time and sick leave within the U.S. during the last few decades, the trend in work hours within the PSID and within the CPS will differ from each other. The methodology of using time diaries to measure time spent in market work is closer to the methodology followed by the PSID. For that reason, we benchmark the time use surveys to the PSID.

years of 1998, 2000, and 2002), we assume a linear change in work hours connecting surrounding years. Lastly, the PSID reports annual hours of work for each individual within the survey. To get hours per week, we simply take the annual number and divide by 52.

Throughout the paper, we report all time use measures in hours spent within an activity during a given week.^{7,8} As seen in Figures 1a (men) and 1b (women), the level of time spent in core market work hours in the PSID is higher than that of time spent in core market work hours in the time use surveys. The fact that household surveys such as the PSID and CPS over state work hours has been documented by Juster and Stafford (1985) and Robinson and Godbey (1997). However, aside from the levels being off, the trends match up nicely between the PSID and the time use surveys. For men, the PSID shows a sharp decline in work hours between 1967 and the early 1980s of about 5 hours per week. The time use surveys show a slightly larger decline between 1965 and 1985 of about 6 hours per week. After 1985, the PSID shows that work hours are roughly constant, although there is some movement of work hours with business cycle conditions. A similar pattern is obtained from the time use surveys.

There are two things to note when comparing the time use surveys to large micro data sets like the PSID. First, as seen in Table A1, the sample coverage between the two types of surveys differs slightly. Second, and more importantly, because the time use surveys impose a time budget constraint on its respondents, the time use surveys may be more likely to capture true market work hours than large household surveys like the PSID. For the time use surveys, the time spent on all activities within the day must sum to the total time within the day. Respondents within the PSID provide approximate average work hours during a given week often providing

⁷ The raw time use data in each of the surveys are reported in units of “minutes per day” (totaling 1,440 minutes a day). We convert the minute per day reports to hours per week by multiplying the response by seven and dividing by sixty.

⁸ When presenting the means from the time use data (as we do in Figures A1 and A2), we weight the data using the sampling weights within each of the time use surveys. The weights account for differential response rates to ensure the samples are nationally representative. The 1975, 1985, 1993, and 2003 surveys all include weights to ensure that each day of the week is equally likely to be sampled. For 1965, we create our own weights to make sure each day is equally likely to be sampled. In the conditional time use regressions shown in sections 4 and 5, we also present the weighted regression results. However, we redid all the regressions without any weighting. The results were nearly identical between the weighted and unweighted regression.

focal point responses of 35, 40, 45, or 50 hours per week. However, the fact that the trends in the time use data sets match well the trends in the PSID instills confidence about the quality of data contained within the five distinct time diaries.

4. Measuring Time Spent in Market and Non-Market Production: 1965 - 2003

In this section, we measure time spent in market and non market production using two methods. First, we simply report the weighted means from the time use surveys. Second, we report how the average time spent in an activity has changed over time net of changes in demographics. During the last forty years, there have been significant changes in demographic within the U.S. population. This is evident from the data shown in Appendix Table A1. Since 1965, the American population has aged, become more educated, become more likely to be single, and has had fewer children. All of these changes may effect how an individual chooses to allocate their time. For example, historically, individuals in their late 50s spend less time in market work than individuals in their early 40s. Likewise, individuals with children spent more time in non-market production than similarly situated individuals without children.

One could ask how much has direct market work hours changed over time controlling for the fact that demographics have been changing over time. To answer this, we estimate the following:

$$T_{it}^j = \alpha + \beta_{1975}D_{i,1975} + \beta_{1985}D_{i,1985} + \beta_{1993}D_{i,1993} + \beta_{i,2003}D_{i,2003} + \gamma_{age}Age_{it} + \gamma_{family}Family_{it} + \gamma_{ed}Ed_{it} + \varepsilon_{it} \quad (4)$$

where T_{it}^j is the time spent in activity j for individual i during period t , D_{it} is a year dummy equal to one if individual i participated in a time use survey conducted in year t , Age_{it} is a vector of age dummies (whether household i is in their 20s, 30s, 40s, or 50s during year t), $Family_{it}$ is a vector of family structure dummies (whether individual i has children in year t), and Ed_i is a vector of education dummies (whether i completed 12 years of schooling, 13-15 years of schooling, or 16 or more years of schooling in year t). The coefficients on the year dummies would describe how

average time spent in direct market work has changed over time net of changes in demographics.⁹ In all years except 1993, the time use surveys asked respondents to report their marital status and the number of children that they had. Although our base results do not include these controls (because they are unavailable in 1993), we rerun all of our regressions including marital status and the number of children as additional controls on a sample that excludes the 1993 survey. We discuss these results below.

A. Trends in Market Work

To begin with, we focus on two measures of time spent on market work. As discussed above, core market work includes all time spent working in the market sector on main jobs, second jobs, and overtime including any time spent working at home. We also create a broader measure of market work which includes time spent commuting to/from work and time spent on ancillary work activities (for example, time spent at work on breaks or eating a meal). These ancillary work measures essentially include all time spent at work when individuals are “off the clock”. We refer to this broader measure as “total market work”.

The unconditional means of core market work and total market work for men and women during each time use survey are shown in Table 3. Given the similarity in trends between the unconditional and the conditional means, we will only focus our discussion on the conditional means. In Figure 2, we plot the coefficients from an estimation of (4) where the dependent variable is time spent in core market work on three different samples: all individuals, males, and females. As noted above, we restrict our sample to include only non-retired individuals between the age of 21 and 65. We chose 1965 as the omitted year dummy from the regression. As a result, the data reported in Figure 2 should be interpreted as deviations in core market work relative to 1965. As seen in Figure 2, hours per week of direct market work for the total

⁹ Notice, when reporting the coefficients on the year dummies from a regression such as (4), we are controlling for both trends in demographics over time and for the fact that the time use surveys may not be nationally representative with respect to the demographic controls included in the regression during a given individual year.

population (after adjusting for changing demographics) has been essentially constant between 1965 and 2003 (coefficient on 2003 dummy is -0.41).^{10, 11}

The trends in core work for the average individual in our sample masks a large amount of heterogeneity within the sample; core market work hours for men have fallen sharply and market work hours for women have increased sharply. Specifically, after adjusting for changing demographics, male direct market work hours have fallen by 6.3 hours per week between 1965 and 2003. As seen in figure 2, the entire decline in core market work hours for men occurred between the 1965 and 1985 surveys. This pattern is also evident in large household surveys such as the PSID (figure 1).

For women, the trends in market work go in the opposite direction. Female core market work hours, conditional on demographic changes, have increased by 4.2 hours per week (p -value < 0.01). The increase in core market work hours for women has occurred continuously between 1965 and 1993. These trends in male and female labor force participation and work hours have been well documented in the literature (see Katz and Autor, 1999).

For men, between 1965 and 2003, the conditional decline in total market work (not shown) was more pronounced than the conditional decline in core market work (-11.6 vs. -6.3 hours per week). However, unlike core market work, total market work declined by an additional 2 hours per week after 1985. The reason that the decline in total market work was greater than the decline in core market work was due to the fact that time spent at work on break or eating has fallen steadily since 1965. We hypothesize that this decline has occurred because employment has shifted away from unionized manufacturing jobs (which had employees taking breaks) to non-unionized professional or service jobs (where the frequency of on the job breaks is much less common). Given that these ancillary work activities may be harder to categorize with respect to work or leisure, we present the majority of results both including and excluding such activities

¹⁰ The difference between the conditional means in Figure 2 and the unconditional means in Table 3 is primarily due to the fact that the U.S. population has become much more educated and educated households work more.

¹¹ The standard errors for all the time dummies reported in figures 2, 3, and 4 are shown in appendix table A2.

from our total market work measure. For women, the increase in total market work was smaller than the increase in core market work (3.0 vs. 4.2 hours per week, p -value < 0.01).

B. Trends in Non-Market Work

Unlike the trends in time spent in market work, the trends in time spent in “non-market” work have been relatively unexplored between 1965 and 2003.¹² As seen in Table 2, we define three categories of time spent on non-market production. First, we define time spent in “food preparation and indoor household chores”. Broadly, this includes any time on meal preparation and cleanup, doing laundry, ironing, dusting, vacuuming, indoor household cleaning, indoor design and maintenance (including painting and decorating), etc. Second, we separately analyze time spent “obtaining goods and services”. This includes grocery shopping, shopping for other household items, comparison shopping, coupon clipping, going to the bank, going to a barber, going to the post office, buying goods on-line, etc. This category includes any time spent acquiring any goods or services (excluding medical care, education, and restaurant meals). As noted above, when constructing total time spent shopping, we not only allocate the time spent actually shopping, we also allocate the time spent traveling to obtain the goods or services. The last category we analyze is “total non-market work” which includes time spent in food preparation and indoor household chores, time spent obtaining goods and services, and any time spent on other home production including outdoor cleaning, lawn and yard care, vehicle repair, etc. This latter category is designed to be a complete measure of non-market work.

The unconditional trends in non-market work are shown in Table 3 panel A (full sample), panel B (males) and panel C (females). While total market work hours for the full sample have been relatively constant over the last forty years, time spent in non-market work has fallen sharply. Specifically, time spent in food preparation and indoor household chores has fallen by

¹² There have been some limited analyzes of time spent in non-market production. Juster and Stafford (1985) examines trends in all uses of household time using the 1965 and 1975 time use surveys. Robinson and Godby (1997) summarize time use trends using the 1965, 1975, and 1985 time use surveys. Both Roberts and Rupert (1995) and Gottschalk and Mayer (1997) use data from the PSID to measure trends in time spent on housework during the 1980s.

6.5 hours per week, time spent obtaining goods and services has fallen by 0.6 hour per week, and total non-market work has fallen by 6.7 hours per week (p -value of all declines < 0.01). Like with market work hours, there are differential trends by sex. Male non-market work hours have actually increased by 1.7 hours per week (p -value < 0.01). Female non-market work hours have fallen by almost 13 hours per week (p -value < 0.01).

Figure 3 shows the conditional change in total non market work between 1965 and 2003 for the full sample and then separately for men and women. To get the results in this figure, we re-estimate (4) replacing the dependent variable of time spent on direct market work with time spent on total non-market work. The results mimic what was found in Table 3. In the aggregate, conditional on changing demographics, total non-market work has fallen by 4.9 hours per week (p -value < 0.01). For males, total non-market work increased by 1.7 hours per week and for females, total non-market work fell by 10.4 hours per week (p -value of both < 0.01). One can disaggregate the changes in time spent on non-market work into its three components for both men and women: food preparation and indoor chores, obtaining goods and services, and all other non-market work. Conditional on changing demographics, women decreased time spent on food preparation and indoor chores by 9.4 hours per week and decreased time spent obtaining goods and services by 1.2 hours per week (p -value of both < 0.01). Women actually increased time spent on other non-market work by 0.2 hours per week (p -value = 0.30). For men, they increased their time spent on food preparation and indoor chores by 1.4 hours per week and increased their time spent on other non-market work by 0.8 hours per week (p -values = < 0.01 and 0.02, respectively). Men, however, like women, decreased their time spent obtaining goods and services by 0.5 hours per week (p -value = 0.14).

C. Trends in Total Work

Combining total market work with total non-market work, we can compute a “total work” measure. For the full sample, total work has fallen by 6.9 hours per week (p -value < 0.01).

Additionally, both males and females experienced declines in total weekly work hours (8.9 hours for men and 5.7 hours for women, p-value of both < 0.01). But, as seen above, the decline in male total work hours is driven by a decline in market work hours while the decline in female total work hours is driven by a decline in non-market work hours.

Table 3 also shows the unconditional changes in total work (total market work plus total non-market work) between 1965 and 2003. Likewise, using the same method as above, Figure 4 shows the evolution of total work conditional on changing demographics. To begin with, total market work includes direct market work, commuting, and other time spent at work on breaks and meals. The results are striking. Between 1965 and 2003, conditional on changing demographics, males and females both decreased their total work by 9.7 and 9.1 hours per week, respectively (p-value of both < 0.01). Focusing on a measure of total work that excludes ancillary work activities, male and female total work, conditional on changing demographics, fell by 4.5 and 7.9 hours per week, respectively (p-value of both < 0.01).¹³

Notice that the results in Table 3 and Figure 4 provide a dramatically different picture for the evolution of work for males and females than one usually gets from examining standard household surveys which only measure time spent in core market work. For example, when only examining trends in core market work, some researchers have concluded that female leisure has declined. Such a conclusion is not supported by the data when one expands the definition of work to include time spent on non-market activities. Conditional on demographic changes, women have experienced a decline of over 12 hours per week in the time they spend on home production – an amount that is three times as large as their conditional increase in time spent in market work. In other words, for women, changes in core market work tell us little about changes in total work. For men, both time spent in core market work and time spent in ancillary work activities have declined by roughly equal amounts. To the extent such ancillary work activities

¹³ The decline in total work is slightly mitigated if we also condition on marital status and the number of children in the household. Specifically, for men, total work with and without ancillary work activities declines by 8.6 and 3.4 hours per week, respectively. Likewise, for women, the declines were 9.4 and 7.7 hours per week respectively.

are an important component of total work, standard household surveys (which do not measure time spent on such activities) will also yield a misleading account of the changing time that men allocate to total work.

There are a few things to note with respect to the results presented thus far. First, since 1965, real incomes have tripled within the United States. As we have shown, during this same time period, both men and women have allocated less of their time towards total work. This data, by itself, supports the predictions of standard labor supply models in which income effects from a real wage increase dominates substitution effects (cite standard labor supply model). The second thing to note is that the decline in total work for both men and women has occurred monotonically during this period. This point is important. To the extent that each individual survey may include some measurement error, due to potential differences in how activities are classified, the fact that total work is declining persistently within each subsequent survey further suggests that the decline in total work since 1965 is real and not an artifact of survey design. Third, as shown in Figure 4, the evolution of total work between men and women has been nearly identical during this time. Such evidence suggests a key prediction of many household bargaining theories is not supported by the data.¹⁴ << Fourth, say something about balanced growth models.....>> Lastly, the decline in total work during this time period is economically large. Given that the average individual allocated 57.4 hours per week to total work in 1965 (Table 3), total work declined by roughly 16.5% between 1965 and 2003 (9.4/57.4).

D. Trends in Child Care

Up until this point, we have not included time spent in child care in our measure of time spent in non-market production. The reason for this is two fold. First, from a theoretical standpoint, time spent on child care has both a non-market production and a leisure component to it. For example, one may pay someone to watch their child while they are at work or when they

¹⁴ <<footnote on bargaining theories.....>>

go to a movie, but very few people pay someone to completely rear their child. Put another way, many individuals would value a walk in the park with their child more than they would value a round of golf or an evening of pleasure reading. There is no denying that a large component of time spent on child care should be considered as home production. However, it is unclear whether the marginal time spent on child care should be considered home production or leisure.

More importantly, however, there appears to be a discontinuity in how child care is measured between the 2003 time use survey and all other surveys. The BLS has explicitly stated that collecting accurate measures of time inputs into child development as being a primary goal of their American Time Use Survey. As a result, there is a potential for there to be an increase in time spent in child care activities between the 2003 time use survey and the other surveys. For example, if you were reading a book to your children, in previous surveys it may have been classified as “pleasure reading”. In the 2003 survey, however, it would have likely been classified as “reading to your children”. The former would not necessarily show up in a composite measure of child care, while the latter would. Likewise, if one fell asleep while nursing their child, this may have formally been classified as “sleep” while the 2003 survey may classify this as “nursing a child”.

Table 4 shows that there appears to be a large increase in time spent in child care between the 2003 survey and all other surveys. We define four child care categories. We define “primary” child care as any time spent on providing for the basic needs of child including breast feeding, rocking the child to sleep, general feeding, changing diapers, providing medical care (either directly or indirectly), grooming, etc. Note that preparing a child’s meal is included in general “meal preparation” which we included as a component of non-market production. The second child care category we define is “educational” child care. A few of the activities included in this measure are reading to a child, teaching a child, helping the child with homework, and attending meetings at a child’s school. The third measure is defined as “recreational” child care. Among the activities included in this measure are playing games with the child, playing outdoors

with the child, attending the child's sporting event or dance recital, going to the zoo with the child, and taking walks with the child. The fourth measure is total child care and is simply the sum of the other three measures.

In table 4, we show the unconditional evolution of hours per week spent in these child care measures for three different groups: working females, non-working females, and all males. We define working as self reported having a job for pay (regardless of whether the job is full time or part time). Notice that for working women, the time they spend on all measures of child care was nearly constant between 1965 and 1993 (panel A). This occurs despite the fact that the incidence of having a child fell from 46% in 1965 to roughly 38% in 1993. Moreover, conditional on having a child, the number of children in the household fell slightly from 2.3 to 1.6. However, the incidence of having a child in the household only increased slightly between 1993 and 2003. Yet, the total time working females spent on child care increased dramatically over this 10 year period. Between 1993 and 2003, the increase in time spent in child care occurred in all categories: time spent on primary child care increased by 1.7 hours per week, time spent on educational child care increased by 0.5 hours per week, and time spent on recreational child care increased by 0.4 hours per week.

A similar pattern is observed for non-working females (panel B). Between 1965 and 1993, the incidence of having a child in the household fell dramatically from 76% to under 50%. As a result, the time spent on child care fell by 2.6 hours per week during this time period. However, between 1993 and 2003, the surveys suggest that non-working females *increased* the time they spent in total of child care by over 4 hours per week. Even males had a large increase in total child care between 1993 and 2003 after experiencing little increase during the previous thirty years (panel C).

While the increase in child care between 1993 and 2003 may have resulted from an actual change in household behavior, it is also likely that this increase is simply an artifact of the emphasis that the 2003 data placed on collecting the amount of time individuals spend in child care. This

fact can pose a problem for our analysis given that, as we noted above, these time use data sets ensure that the daily time budget constraint is met. If the 2003 time use survey is over estimating the amount of time individuals spend in child care relative to the previous surveys, the 2003 survey must, by definition, be under representing the amount of time that the individual is spending in other activities relative to the earlier surveys. However, this measurement issue will only be present for activities which are conducted in the presence of children. If children are not present while the activity is taking place, it is not possible to classify that activity as being child care. For that reason, almost all measures of time spent in market work will be exempt from this measurement issue. Our prior is that many of the activities that were previously coded as leisure activities in the earlier surveys (reading, taking walks, sleeping, going to the park) were coded as child care in the later surveys. For this reason, in the following section, we will create multiple measures of leisure, some of which will embed child care in the definition.¹⁵

5. Trends in Leisure: 1965 to 2003

Given the detail in our time use surveys, we can examine the evolution of an individual's leisure directly. Given the conceptual framework laid out in section 2, leisure is defined as any time spent not used as an input into production of other goods and services. In other words, under a strict interpretation of the model, leisure can be measured as any time not spent in either market or non-market production. Under that scenario, the results in Figure 4 would suggest that leisure increased by 10 hours per week for men and 9 hours per week for women. However, many time use categories that are not included in our measures of market and non-market work map intuitively into the conceptual definition of leisure. For example, time spent on education is likely less leisure and more an input into human capital accumulation. Or, a portion of the time

¹⁵ It is possible that some of the decline in total non-market work between 1965 and 2003 was due to the coding of home production activities as child care activities in 2003. To examine this, we define a measure of total time spent on non-market work which includes time spent on child care. Conditional on demographics, this measure of total non-market work fell by 10.3 hours per week for women and increased by 3.6 hours per week for men. These numbers should be considered upper bounds because it would imply that all of the increase in child care between 1993 and 2003 was either a true structural change in behavior or was replacing previously measured activities which were classified as home production.

spent sleeping can be considered leisure but a portion can also be considered as time spent on biological maintenance (Biddle and Hamermesh (1990)) .

Given that many time use categories could potentially have both leisure and a non-leisure component, we measure leisure in three additional ways. Our first measure of leisure, “leisure measure 1”, sums together all time spent on “entertainment/social activities/relaxing” and “active recreation”. We consider this measure to include activities that are most closely related to a pure conceptual definition of leisure. These activities include television watching, leisure reading, going to parties, relaxing, going to bars, playing golf, surfing the web, recreational child care, visiting friends, etc. The unconditional means of leisure measure 1 for the five different time use surveys are shown in Table 5a (all individual), 5b (males), and 5c (females).

As above, we will focus on the changes in leisure adjusting for the changing demographic composition of the population. In figures 5a (full sample), 5b (males), and 5c (females), we plot the coefficients on the year dummies for a regression of different leisure measures on year dummies and individual demographics. As with figures 2-4, all changes in leisure are relative to 1965. As seen in figures 5a – 5c, leisure measure 1 has increased by 5.3 hours per week for the full sample, 6.3 hours per week for men, and 4.0 hours per week for women (p-value of all < 0.01). Appendix Table A2 summarizes the coefficients and standard errors for the regressions used to generate these figures.¹⁶ Leisure 1 monotonically increased for men between 1965 and 2003. However, for women, leisure 1 increased monotonically between 1965 and 1993 and then declined slightly between 1993 and 2003. As we will show later, the entire decline between 1993 and 2003 was due to the rapid increase in child care between 1993 and 2003. However, regardless of such measurement issues, our basic measure of leisure increased dramatically for both men and women between 1965 and 2003.

¹⁶ One may believe that religious, civic, and volunteering activities are a pure form of leisure. Including civic and religious activities into our leisure measure 1 does not change the results at all. The conditional change in leisure measure 1 including civic and religious activities is 4.9 hours per week for all individuals, 6.2 hours per week for males, and 3.5 hours per week for females (p-value for all < 0.01). For the average individual, civic and religious activities actually declined slightly between 1965 and 2003 (by about 22 minutes per week).

Biddle and Hamermesh (1990) speculate that certain time activities may enhance production in the market and non-market sectors. For example, they provide a model where time spent sleeping is a choice variable that both augments productivity and enters the utility function directly. Furthermore, they provide strong empirical evidence showing that sleep time is, in fact, a choice variable over which individuals optimize. For example, individuals sleep more on the weekends and on vacations when time spent in market production is lower. Although not the focus of Biddle and Hamermesh, similar stories can be told with respect to time spent eating and time spent in personal care.¹⁷ Broadly, Biddle and Hamermesh suggest that while time spent sleeping, eating, and in personal care enhance productivity, these factors also are normal goods that enter the utility function directly.

To account for the fact that time spent sleeping, eating, and in personal care can enter the utility function directly, we create “leisure measure 2” which defines leisure as any time spent in leisure measure 1 plus time spent sleeping, eating, and in personal care. As noted in Table 2 and the accompanying discussion, we excluded any measures of own medical care from our measure of personal care. However, these activities including time spent grooming, time spent having sex, time spent sleeping or napping, time spent eating at home or eating in restaurants, etc. The unconditional means for leisure measure 2 are also shown in Tables 4a-c. For the full sample, the trend in leisure measure 2 conditional on changing demographics is shown in Figure 5a. By 2003, leisure time as measured by leisure measure 2 had increased by 5.9 hours per week (p-value < 0.01). In other words, sleeping, eating and personal care time increased by an additional 0.6 hours per week between 1965 and 2003 (p-value < 0.01). The patterns are similar between men and women. As seen in figures 5b and 5c, conditional on changing demographics, time use spent in leisure measure 2 increased by 6.4 hours per week for men and 5.3 hours per week for women relative to 1965 (p-value of both < 0.01). Note the comparable numbers for the change in leisure

¹⁷ Notice, we are making a distinction between preparing the meal and eating the meal. Preparing the meal is an input in the production of the meal. Eating the meal generates the utility flow. For that reason, we separately analyze meal production (a component of non-market work) and eating (a component of leisure).

measure 1 were 6.3 hours per week for men and 4.0 hours per week for women. As a result, of the total increase in leisure measure 2 between 1965 and 2003, only 2% for men and 33% for women was due to increases in time spent sleeping, eating, and in personal care.

In “leisure measure 3”, we add time spent in “primary” and “educational” child care (defined in section 4) to our leisure measure 2. As noted above, the reason for doing this is to account for differences in measurement of child care between the 2003 survey and the other surveys. As seen in figures 5a – 5c, including child care in our measure of leisure has only modest effects on our conclusions. Specifically, the time spent in leisure as measured by leisure measure 3 for the full sample, men, and women are 7.1 hours per week, 7.8 hours per week, and 6.4 hours per week, respectively. In other words, compared to the conclusions drawn from examining the trends in leisure measure 2, including child care in our measure of leisure increases total measured leisure time for both men and women by only small amounts. Notice the increases in leisure measure 3 for the full sample, for men, and for women are similar to the declines in the sum of total market and total non market work experienced by each group (figure 4). This is not surprising given leisure measure 3 and the complement to total market and total non-market work only differ by time spent in education, time spent in religious and civic activities, time spent caring for other adults, and time spent in own medical care.

There are two further facts to note from the increase in leisure measure 3 between 1965 and 2003. First, the increase in leisure measure 3 has been essentially monotonic during this time period for both men and women. Again, this suggests that the increase in leisure is not due to differences in measurement across the five time use surveys. It is unlikely that each successive survey became more likely to classify a given activity as being leisure as opposed to work. Second, roughly one half of the increase in leisure measure 3 occurred between 1965 and 1975. This is likely the result of 1975 being in the midst of recession when time spent working was low. Regardless, since 1975, there still have large increases in leisure for both men and women.

In summary, since 1965, leisure has increased by a minimum of 5.1 hours per week (leisure measure 1) to a maximum of 7.1 hours per week (leisure measure 3) for the average non-retired individual between the ages of 21 and 65. It should be stressed that these magnitudes are economically large. In 1965, the average individual spent 28.2 hours per week in direct market work (roughly 4 hours per day). The gain in total leisure between 1965 and 2003 is equal to between 1¼ and nearly 2 days of 1965 direct market work. Moreover, in 1965, the average individual spent 56.2 hours per week in total work (total market work plus total non-market work). The increase in leisure measures 2 and 3 between 1965 and 2003 is roughly the same order of magnitude as one full 1965 total work day.

6. Changes in Leisure by Employment Status, Marital Status, and Education

There is one further piece of information to note about the increase in leisure since 1965. The increase in leisure occurred for individuals throughout the leisure distribution. In figure 6, we plot the evolution of leisure measure 3 at different points in the leisure distribution.¹⁸ Again, like figures 2-5, we adjust for changing demographics over time. To do this, we re-estimate (4) on our pooled time use data set replacing the dependent variable with leisure measure 3 and excluding the year dummies. We then obtain the residuals from this regression. Then, by year, we take different percentile points of the residual leisure measure 3 distribution. In figure 6, we normalize the given percentile point in 1965 to zero and, as a result, all percentile points in future years are deviations from the corresponding percentile of the 1965 residual distribution.

The results in figure 6 are striking. All percentiles of the residual leisure distribution increased since 1965. The lower part of the leisure distribution (the 10th, 25th, and 33rd percentiles) experienced increases of leisure by between 2 and 4 hours per week. The median percentile increased their time spent in leisure by nearly 6 hours per week. The upper percentile

¹⁸ This figure drawn for leisure measure 2 is nearly identical to the one drawn for leisure measure 3. Given the data on the evolution of the means of leisure measures 2 and 3 shown in figures 5a-5c, this is not surprising.

points experienced very large increases in leisure. Specifically, the 66th, 75th, and 90th percentiles increased their leisure by essentially 9.5, 10, and 14 hours per week, respectively.

Which individuals experienced the largest increases in leisure between 1965 and 2003? To examine this question, we explore trends in market work, non-market work, and leisure by work status, marital status, and educational attainment.

A. Trends in Leisure by Work Status

One may be interested to know how much of the increase in leisure was due to individuals entering or exiting the labor force. Additionally, did non-working women experience as strong a decline in home production as their working counterparts? Table 6 shows the conditional change in leisure for working men, working women, non-working men and non-working women. The sample restrictions made for the results in Table 6 were the same as those made early aside from the additional restriction that we excluded students from both the working and non-working categories.¹⁹ For conciseness, we present the results in table form as opposed to figures. In the table, we list the coefficients on the year dummies for a regression of time spent in a given activity on year dummies and demographics for the different samples. The demographic controls were the same as the ones used to create figures 2 – 6. All coefficients should be interpreted as hour per week deviations from 1965.

Panel A of Table 6 shows that conditional on demographics, employed males increased the time they spent in leisure by 3.2 hours per week. Of that increase, 2.8 hours per week occurred prior to 1975. For non-working men, conditional on demographics, time spent on leisure increased by nearly 4 hours per week, 2 hour of which occurred prior to 1975 (panel B). During the last 40 years, employed men were able to increase their leisure because they decreased

¹⁹ We exclude students because intuitively they do not fit directly into the working or unemployed/homemaker category. Given that students are such a trivial fraction of our sample, the results do not change significantly if we include students in the non-working categories. We define students as any individual who self reports their employment status as being a full time student. However, in 1965, the student question was asked separately from the employment status questions. For consistency across the surveys, we also defined students as anyone who spent positive time on education.

the time they spent in total market work while non-working men (like women) increased their leisure because they spent less time on non-market work.

However, it should be noted that the increase in leisure for either employed men or for non-working men was smaller than the increase in leisure for the pooled sample of all men. The reason that the increase in leisure for the pooled male sample was greater than the increase for either of these sub-samples was that the probability that males were employed decreased substantially between 1965 and 2003. Specifically, 97% of men were employed in 1965 and only 88% of men were employed in 2003. Non-working men spend much more time in leisure than employed men. Unconditionally, employed men had 108.0 hours per week of leisure³ in 2003. The comparable number for non-working men was 140.3 hours per week. This implies that a portion of the increase in leisure for men over the last four decades was due to the fact that males have exited the work force. Specifically, the results in Table 6, along with the results in Table 3, suggest that for men approximately thirty percent of the increase in leisure prior to 1975 and approximately three quarters of the increase in leisure after 1975 was due to a decline in the likelihood that men were employed. However, we wish to stress that even employed men experienced increases in leisure during this time period.

Panels C and D of Table 6 show the change in leisure for employed women and unemployed women. Specifically, between 1965 and 2003, leisure increased dramatically by 10.3 hours per week for employed women and 12.8 hours per week for non working women.²⁰ Both of these increases were spurred on by the rapid decline in time spent engaging in non-market work (a decline of 6.4 hours per week for employed women and a decline of 15.9 hours per week for non-working women). However, like men, employed women also decreased the amount of time they spend in total market work between 1965 and 2003. The increase in leisure for both employed women and non working was greater than the increase in leisure for the total pooled sample of women. This is because during the last forty years there has been a shift in the

²⁰ total non - market work...in 1965 and 2003

composition of women who work. Specifically, in 1965 only 48% of women worked while in 2003 74% of women worked. Like men, non-working women in 2003 spent more time in leisure than working women (109.7 hours per week vs. 132.7 hours per week).

B. Trends in Leisure by Marital Status

In Table 7, we examine the increase in leisure for both married and single women. To examine the conditional change in time spent in market work, non market work, and leisure for married and single women, we regressed the time spent in the given activity on a set of year dummies and demographic controls for samples that included either only married women or only single women. The sample restrictions imposed on these regressions were identical to the sample restrictions imposed for the results presented in tables 3 – 5 except that we did not include any observations from the 1993 sample. This restriction was necessary given the 1993 sample did not include the individual's marital status. The demographic controls in the regression were identical to the controls used above except that we also included the number of children in the household as an additional regressor. The coefficients on the year dummies from these regressions are presented in Table 7. In the table, we also separately show the change in time spent in the given activity between 1975 and 2003.

Panel A of Table 7 shows that during the last 40 years, married women, conditional on demographic changes, have increased their work hours by 6.2 hours per week (3.5 of which occurred post 1975). Conversely, since 1975, single women have actually decreased their work hours by 2.5 hours per week.²¹ These results have been emphasized in the work by ... However, what is new is the trends in non-market production between single and married women. Specifically, married women decreased the amount of time they spent on non-market production by nearly two and a half times the amount of single women between 1965 and 2003 (12.1 vs. 4.9 hours per week). Unconditionally, in 1965, married women and single women spent 37.7 and

²¹ Have footnote discussing 1965 data for single women --- compare to PSID?? Small sample size??

23.8 hours per week, respectively, on non market production. The comparable numbers for 2003 were 23.3 and 17.0 hours per week. During the last forty years, the gap in the time spent on non-market production between married and single women has narrowed dramatically from a 14 hour per week difference down to only 7 hour per week difference.

The results on time spent on market and non-market production for single and married women stem from changes in the extent to which females entered to work force during the last forty years. In 1965, 93% of single women and only 36% of married women were employed. By 2003, 77% of single women and 72% of married women were employed.

The one thing that should be stressed from the results in Table 7 is that both married women and single women have increased the time they spend in leisure during the last forty years. So far, no matter how we have cut the data, working men, working women, non-working men, non-working women, single women and married women, have all increased the time they have been spending in leisure during the last forty years.

C. Trends in Leisure by Educational Attainment

Table 8 shows the unconditional time spent in direct market work, total market work, food preparation and indoor chores, total non-market work, and our three leisure measure for low educated men, high educated men, low educated women, and high educated women during 1965 (panel A), 1985 (panel B), and 2003 (panel C). We define high educated as having more than a high school degree (or GED equivalent). In 1965, low educated men and high educated men spent the same average hours per week in direct market work as low educated men (42.2 and 42.4 hours, respectively). Moreover, in 1965, the time spent in leisure was nearly identical. Low educated men spent 104.5 hours per week and high educated men spent 103.0 hours per week in leisure measure 3 (p-value of difference = 0.39).

In 1965, total work (sum of total market work and total non market work) between high and low educated women is also identical (52.5 vs. 52.8 hours per week, respectively). However,

the composition does differ slightly. Low educated women engage in more food preparation/indoor household chores (26.0 vs. 20.9 hours per week, p-value of difference < 0.01) and more total non-market work (33.3 vs 30.7 hours per week, p-value of difference = 0.05). Conversely, high educated women spend more time in total market work. Leisure times are nearly identical between high and low educated women in the 1965 cross section. In summary, as of 1965, low educated men spent a similar amount of time in leisure as high educated men and low educated women spent a similar amount of time in leisure as high educated women.

However, the unconditional allocation of time between low and high educated men and women starts to diverge in 1985 (panel B of Table 8) and is dramatically different by 2003 (panel C of Table 8). We show the evolution of time spent in total market work and total non-market work, conditional on demographics, between 1965 and 2003 for low and high educated males (figure 7a) and low and high educated females (figure 7b). These figures are constructed similarly as figures 2-6. The figures report deviations from time spent in 1965.²² Low and high educated males both increased total non-market work by nearly identical amounts by 2003 (1.5 hours per week vs. 1.9 hours per week). However, total market work fell by a much greater amount between 1965 and 2003 for low educated males (-14.4 vs. -8.0 hours per week).

For women, between 1965 and 2003, the change in total time spent on home production was nearly identical regardless of educational attainment. Low educated women experienced a decline of 13.1 hours per spent in total market work. The comparable number for high educated women was 12.0 hours. However, during this time period, total market work increased much more for high educated females than for low educated females (6.7 vs 2.0 hours per week, respectively). As before, we can do the same analysis controlling for changes in marital status and the number of children in the household. The drawback to this approach is that we cannot use the 1993 data. Including marital status and the number of children in the household to our

²² The coefficients on the time dummies and standard errors for figures 7a and 7b are in Appendix Table A3.

demographic controls, high educated females increased their total market work by 4.1 hours per week and decreased their total non market work by 11.4 hours per week between 1965 and 2003 (p-value of both < 0.01). With the additional controls, low educated women decreased both the time they spend on market work and non market (0.3 and 10.0 hours per week respectively). Regardless of the additional controls, the relative difference between high and low educated women is essentially the same.

Looking at figures 7a and 7b, it appears that that the dispersion in total work between high and low education men and high and low education women became amplified after 1985.²³ If so, this would be consistent with the period when the wages of high educated workers relative to their low educated counter parts started to diverge (see survey by Katz and Autor, 1999). To analyze this formally will compare the change in time use between 1965 and 1985 and then between 1985 and 2003 for low educated men and high educated men and for low educated women and high educated women. These results are shown in Table 9. As before, we present conditional changes accounting for the same demographics used in the regressions which generated figures 7a and 7b. The results for men are shown in panel 9A and the results for women are shown in panel 9B. Between 1965 and 2003, low educated males experienced the largest increase in leisure (9.3 hours per week increase) followed by low educated women, high educated men, and high educated women (7.0, 4.3, and 4.1 hours per week, respectively).

The interesting fact within Table 9 is that the change in time use between high and low educated men and high and low educated women were nearly identical between 1965 and 1985. For example, between 1965 and 1985, low and high educated men decreased their hours in market by 8.8 and 7.8 hours per week, respectively (p-value of difference = 0.61). Moreover, during the same time period, the increase in hours per week spent in leisure measure 3 was identical for low and high educated men (at 5 hours per week). However, after 1985, low

²³ In 1975, the U.S. economy was in a recession. Most groups took a sharp increase in leisure time during the recession. However, the increase was smaller for high educated females. This is because there was such a sharp increase of high educated women into the labor force between 1965 and 1975.

educated men decreased their time spent in market work by an additional 4.2 hours per week. Between 1985 and 2003, time spent in market work for high educated men declined by only 0.6 hours per week. The patterns are similar for the evolution of leisure.²⁴ Prior to the early 1980s, low and high educated men took roughly the same amount of time per week in leisure. However, after the early 1980s, low educated men increased their leisure rapidly compared to high educated men.

In panel B of Table 9, we see the results are similar for women. High educated and low educated women had nearly identical evolutions in non-market work between 1965 and 1985 and between 1985 and 2003. However, the evolution of market work was different between the two periods. Between 1965 and 1985, both high and low educated women increased the hours they allocated to market work by statistically similar amounts. However, after 1985, low educated women only increased their hours in market work by 0.6 hours per week while high educated women increased their labor supply by 3.7 hours per week (p-value of difference = 0.05).

Two things are of note about these facts. First, there has been growing research showing that consumption inequality has increased starting in the early 1980s. High educated individuals have increased their consumption much more rapidly than low educated individuals. When making welfare calculations resulting from changes in the skill premium, one needs to focus on both the relative decline in consumption and the relative increase in leisure for low educated individuals. Valuing the increase in leisure in welfare terms will likely be a difficult task. That does not imply that it should be ignored. Second, if the change in the skill premium is solely driving the differences in market work (and consequently leisure) between low and high educated men it would imply that the substitution effect would be dominating the income effect from a real wage change. As wages increase for high educated men relative to low educated men, high educated men will work more and take less leisure than their low educated counter parts.

²⁴ The reason that the decline in total work did not equal the increase in leisure for high educated men between 1985 and 2003 is that high educated men also increased the amount of time they spent in civic and religious activities and on their own medical care. This explanation also applies to high educated women between 1985 and 2003.

The implications from the cross sectional data, however, are at odds with the implications of the time series data. As noted above, over the last forty years, as real wages have tripled, nearly all sub groups of individuals have increased the amount of leisure they enjoy. As noted above, this lends support for a strong income effect on labor supply of a real wage change (all else equal). However, recent cross sectional data finds that low educated individuals are taking more leisure than high educated individuals. This pattern was not observed in up through the early 1980s. The response of work and leisure to real wage changes resulting from an increased skill premium in the cross section suggests that, all else equal, a strong substitution effect on labor supply from real wage changes. Obviously, all else is not equal. It is important for researchers working on labor supply to have models that match both the time series and cross sectional dimensions of the data. Moreover, as noted by Mincer (1962) and Gronau (1977), estimates of labor supply elasticities, particularly for women, need to account explicitly for a women's ability to choose to allocate her labor to the non-market sector. As a result, understanding the home production technology is essential for correctly backing out preference parameters from the utility function from labor supply elasticities.

7. Discussion and Conclusion (Under Construction)

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Table 1: Description of Time Use Surveys

Survey	Survey Coverage	Sample Coverage	Panel	Total Sample Size	Analysis Sample Size
American's Use of Time	Fall 1965 and Spring 1966	Individuals aged 19-65. One person in family must have been employed during previous 12 months. Two samples: one that was nationally representative and one which over sampled individuals in Jackson, Michigan. Conducted at the Survey Research Center at the University of Michigan.	No	2,001 Individuals	1,862 Individuals
Time Use in Economic and Social Accounts	Fall 1975 – Summer 1976	Nationally representative excluding households on military bases. Surveys both spouses if a spouse is present. Conducted at the Survey Research Center at the University of Michigan.	Yes	2,406 Individuals	1,712 Individuals
American's Use of Time	January 1985 - December 1985	Nationally representative with respect to adults over the age of 18 living in homes with at least one telephone. Conducted by the Survey Research Center at the University of Maryland.	No	4,939 Individuals	3,283 Individuals
National Human Activity Pattern Survey	Fall 1992 - Summer 1994	Nationally representative with respect to households with telephones. Conducted by the Survey Research Center at the University of Maryland. Sponsored by the U.S. Environmental Protection Agency.	No	9,383 Individuals	5,465 Individuals
American Time Use Survey	January 2003 - December 2003	Nationally representative. Participants are drawn from the exiting sample of the Current Population Survey (CPS). Survey is conducted approximately three months after the individual's last CPS survey. Conducted by the U.S. Bureau of Labor Statistics.	No	20,720 Individuals	15,244 Individuals

Notes: Analysis sample refers to the number of observations from each survey that we will use in our main empirical analysis. We restrict the sample to include only non-retired individuals between the ages of 21 and 65 (inclusive). All surveys, except for the 1965 survey, included sample weights. Of the 2,001 individuals in the 1965-1966 American's Use of Time survey, 776 came from the Jackson, Michigan over sample. The 1975-1976 Time Use in Economic and Social Accounts survey was the only survey to follow the same individuals over time. Each household was sampled four times between 1975 and 1976 (once each quarter). The sample attrition between Fall 1975 and Winter 1976 was large. To avoid issues of sample attrition in the 1975-1976 panel time use, we only focus on the first time the household was interviewed (which occurred in Fall 1975). All other surveys only included one time diary per household. Only the 1975-1976 time use survey sampled multiple adults per household.

Table 2: Time Use Classifications

<i>Time Use Classification</i>	<i>Examples of Activities Included</i>
“Core Market Work”	Work for pay, main job (including time spent working at home); Work for pay, other jobs;
“Total Market Work”	“Direct market work” plus other work related activities such as: Commuting to/from work; Meals/breaks at work; Searching for a job; Applying for unemployment benefits.
“Food Preparation and Indoor Household Chores”	Food preparation; Food presentation; Kitchen/food cleanup; Washing/drying clothes; Ironing; Dusting; Vacuuming; Indoor cleaning; Indoor painting; etc.
“Shopping/Obtaining Goods and Services”	Grocery shopping; Shopping for other goods; Comparison shopping; Clipping coupons; Going to bank; Going to post office; Meeting with lawyer; Going to veterinarian; etc. (excluding any time spent acquiring medical care).
“Total Non-Market Work”	“Food preparation and Indoor Household Chores” plus “Shopping/Obtaining Goods and Services” plus all other home production including: Vehicle repair; Outdoor repair; Outdoor painting; Yard work; etc.
“Education”	Taking classes for degree; Personal interest courses; Homework for coursework; Research for coursework; etc.
“Sleeping”	Sleeping; Naps
“Personal Care”	Grooming; Bathing; Sex; Going to the bathroom; etc (excluding any time spent on own medical care).
“Own Medical Care”	Visiting doctor’s/dentist’s office (including time waiting). Dressing wounds. Taking insulin.
“Eating”	Eating meals at home; Eating meals away from home; etc.
“Child Care”	Feeding children; Reading to children; Changing diapers; Rocking child to sleep; Teaching children; Helping with homework; Taking child to doctor; etc.
“Entertainment/Social Activities/Relaxing”	Going to movies; Going to theater; Watching television; Reading (non coursework); Hobbies; Thinking; Resting; Playing games; Using computer (non work); Talking on the telephone; Going to parties; Conversing; Visiting relatives; Plant Care; Pet care; Playing with children; etc.
“Active Recreation”	Playing sports; Walking; Exercise
“Religious/Civic Activities”	Religious practice/participation; Fraternal organizations; Volunteer work ; Union meetings; AA meetings; etc.

Note: Aside from commuting to work; travel times are embedded in the activity. See text for additional details.

Table 3: Hours per Week Spent in Market and Non Market Work Over Time: Full Sample, Men and Women

Panel A: Hours per Week Market and Non-Market Work (All Individuals)							
Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	<i>p</i> -value difference
Direct Market Work	28.25	27.37	27.29	30.61	29.82	1.57	<0.01
Total Market Work	34.24	32.13	32.13	34.02	33.01	-1.23	0.02
Food Preparation and Indoor Household Chores	14.42	11.55	10.55	8.23	8.01	-6.41	<0.01
Shopping/Obtaining Goods and Services	6.09	5.26	5.97	5.35	5.22	-0.87	<0.01
Total Non Market Work	23.13	19.78	19.90	17.17	16.09	-7.04	<0.01
Direct Market Work Plus Total Non Market Work	51.38	47.15	47.19	47.77	45.90	-5.48	<0.01
Total Market Work Plus Total Non Market Work	57.38	51.90	52.03	51.19	49.10	-8.26	<0.01
Sample Size	1,862	1,712	3,283	5,465	15,244		

Panel B: Hours per Week Market and Non-Market Work (Men)							
Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	<i>p</i> -value difference
Direct Market Work	42.07	38.75	35.69	38.08	35.87	-6.20	<0.01
Total Market Work	51.42	45.36	44.88	42.35	39.94	-11.49	<0.01
Food Preparation and Indoor Household Chores	1.97	1.98	3.83	2.85	3.46	1.50	<0.01
Shopping/Obtaining Goods and Services	4.73	4.32	4.64	3.90	4.35	-0.38	0.04
Total Non Market Work	9.49	10.24	12.93	11.45	11.42	1.93	<0.01
Direct Market Work Plus Total Non Market Work	51.56	48.99	48.62	49.53	47.29	-4.27	<0.01
Total Market Work Plus Total Non Market Work	60.92	55.60	54.80	53.80	51.36	-9.56	<0.01
Sample Size	840	776	1,465	2,533	6,752		

Table 3 (continued): Hours per Week Spent in Market and Non Market Work Over Time: Full Sample, Men and Women

Panel C: Hours per Week Market and Non-Market Work (Women)							
Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	<i>p</i> -value difference
Direct Market Work	16.90	17.06	20.51	24.25	23.94	7.04	<0.01
Total Market Work	20.14	20.13	24.28	26.94	26.30	6.16	<0.01
Food Preparation and Indoor Household Chores	24.65	20.23	15.96	12.81	12.43	-12.22	<0.01
Shopping/Obtaining Goods and Services	7.20	6.12	7.05	6.58	6.05	-1.15	<0.01
Total Non Market Work	34.33	28.43	25.52	22.03	20.61	-13.72	<0.01
Direct Market Work Plus Total Non Market Work	51.23	45.48	46.04	46.28	44.56	-6.67	<0.01
Total Market Work Plus Total Non Market Work	54.47	48.56	49.80	48.97	46.91	-7.56	<0.01
Sample Size	1,022	936	1,818	2,932	8,492		

Notes: This table presents unconditional means for each time use category in each survey year. See Table 2 for a description of time use categories. Sample includes all individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired. We also restrict the sample to include only those households who had time diaries that summed to a complete day (i.e., 1440 minutes). Lastly, we excluded any household who did not report their level of education. All data weighted to be nationally representative using the weights within each time use survey. Additionally, we weighted the data to ensure that each day of the week was equally likely to be sampled.

**Table 4: Time Spent in Child Care By Category:
Working Females, Non-Working Females, and Males**

Panel A: Working Women (Hours Per Week)							
Child Care Category	1965	1975	1985	1993	2003	Change 65-93	Change 93-03
Total	2.89	3.47	3.67	3.13	5.74	0.24	2.61
Primary	2.38	2.66	2.89	2.36	4.04	-0.02	1.68
Educational	0.30	0.48	0.46	0.33	0.83	0.03	0.50
Recreational	0.21	0.34	0.33	0.44	0.87	0.23	0.43
Sample Size	497	474	1,203	2,196	6,264		

Panel B: Non-Working Women (Hours Per Week)							
Child Care Category	1965	1975	1985	1993	2003	Change 65-93	Change 93-03
Total	9.75	7.17	7.91	7.12	11.36	-2.63	4.24
Primary	8.17	5.69	6.00	5.38	8.02	-2.79	2.64
Educational	0.91	0.78	0.71	0.46	1.48	-0.45	1.02
Recreational	0.67	0.70	1.20	1.28	1.86	0.61	0.58
Sample Size	525	462	615	736	2,228		

Panel C: Men (Hours Per Week)							
Child Care Category	1965	1975	1985	1993	2003	Change 65-93	Change 93-03
Total	1.17	1.51	1.59	1.41	3.1	0.24	1.69
Primary	0.94	1.18	1.01	0.81	1.84	-0.13	1.03
Educational	0.14	0.12	0.16	0.21	0.41	0.07	0.20
Recreational	0.60	0.21	0.41	0.39	0.81	-0.21	0.42
Sample Size	840	776	1,465	2,533	6,752		

Notes: This table presents unconditional means for different measures of child care activities in each survey year for working women, non-working women, and all males. Working women are defined as any women who self reports her employment status as having a job. We restrict all samples to include non-retired individuals between the age of 21 and 65. See the note to Table 3 for additional sample restrictions. Primary child care include activities such as feeding a child, nursing, bathing a child, taking a child to the doctor, and rocking a child to sleep. Educational child care includes activities such as reading to the child, helping with homework, and attending parent teach conferences. Recreational child care includes activities such as playing with the child. Total child care is just the sum of primary, educational and recreational child care. See text for full details of child care measures.

Table 5: Hours per Week Spent in “Leisure” Over Time: Full Sample, Males and Females

Panel A: Hours per Week in Leisure (All Individuals)							
Time Use Category	1965	1975	1985	1993	2003	Difference: 2003-1965	<i>p</i> -value difference
Leisure Measure 1	31.04	33.58	35.53	37.29	35.65	4.61	<0.01
Leisure Measure 2	102.68	107.47	108.50	109.65	107.49	4.81	<0.01
Leisure Measure 3	106.45	110.60	111.51	112.06	111.69	5.24	<0.01
Panel B: Hours per Week in Leisure (Males)							
Time Use Category	1965	1975	1985	1993	2003	Difference: 2003-1965	<i>p</i> -value difference
Leisure Measure 1	31.47	33.65	36.11	37.93	37.56	6.09	<0.01
Leisure Measure 2	101.86	105.87	107.89	108.46	107.80	5.94	<0.01
Leisure Measure 3	102.98	107.17	109.07	109.49	110.05	7.07	<0.01
Panel C: Hours per Week in Leisure (Females)							
Time Use Category	1965	1975	1985	1993	2003	Difference: 2003-1965	<i>p</i> -value difference
Leisure Measure 1	30.68	33.52	35.07	36.75	33.78	3.10	<0.01
Leisure Measure 2	103.34	108.93	109.00	110.66	107.19	3.85	<0.01
Leisure Measure 3	109.31	113.71	113.48	114.24	113.29	3.98	<0.01

Notes: This table presents unconditional means different measures of leisure in each survey year. The samples are exactly the same as those used in Table 3. See Table 3 for relevant sample sizes for each cell. "Leisure Measure 1" refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, in political and religious activities, in pet care, gardening, and recreational child care. "Leisure Measure 2" refers to the time individuals spent in leisure measure 1 plus time spent sleeping, eating, and in personal activities (excluding own medical care). "Leisure Measure 3" includes leisure measure 2 plus time spent in basic and educational child care.

**Table 6: Hours per Week Spent in Work and Leisure
By Employment Status and Year**

Panel A. Working Men (Hours per week relative to 1965)				
Time Use Category	1975	1985	1993	2003
Total Market Work	-4.07 (0.98)	-4.47 (1.06)	-4.97 (1.01)	-6.32 (1.00)
Leisure Measure 3	2.76 (0.83)	2.45 (0.89)	3.72 (0.86)	3.24 (0.85)
Panel B. Non Working Men (Hours per week relative to 1965)				
Time Use Category	1975	1985	1993	2003
Leisure Measure 3	2.12 (4.29)	-0.39 (3.99)	6.84 (4.00)	3.79 (3.91)
Panel C. Working Women (Hours per week relative to 1965)				
Time Use Category	1975	1985	1993	2003
Total Market Work	-2.37 (1.06)	-5.45 (1.01)	-4.58 (0.98)	-5.52 (1.00)
Total Non-Market Work	-4.26 (0.59)	-2.78 (0.56)	-5.14 (0.55)	-6.43 (0.56)
Leisure Measure 3	6.23 (0.86)	8.08 (0.82)	10.16 (0.80)	9.42 (0.82)
Panel D. Non Working Women (Hours per week relative to 1965)				
Time Use Category	1975	1985	1993	2003
Total Non-Market Work	-6.13 (0.78)	-8.14 (0.90)	-11.55 (0.92)	-15.85 (0.98)
Leisure Measure 3	3.13 (0.82)	8.14 (0.95)	10.90 (0.97)	11.43 (1.03)

Notes: This table presents the coefficients from a time use measure on year dummies and demographics. The demographics include a series of age, education, and family structure variables. The omitted year is 1965. The coefficients should be interpreted as hour per week deviations from 1965. The regressions in panel A only includes working males. The regressions in panels B, C, and D only include non-working men, working women, and non-working women, respectively. We define an individual to be working if they self-report their employment status to be employed. Additional sample restrictions are the same as those use to generate the means in Table 3. See the notes to Table 3 for a full description. The sample sizes for each panel are 10,620, 1,175, 10,165, and 4,192, respectively. Standard errors are in parenthesis.

**Table 7: Hours per Week Spent in Work and Leisure For Women
By Marital Status and Year**

Panel A. Married Women (Hours per week relative to 1965)					
Time Use Category	1975	1985	2003	Change 1975 - 2003	p-value of Change
Total Market Work	2.77 (1.06)	3.07 (1.01)	6.24 (1.00)	3.47	<0.01
Total Non-Market Work	-5.92 (0.59)	-6.64 (0.56)	-12.12 (0.56)	-6.20	<0.01
Leisure Measure 3	1.71 (0.71)	3.29 (0.77)	3.04 (0.81)	1.33	0.10

Panel B. Single Women (Hours per week relative to 1965)					
Time Use Category	1975	1985	1993	Change 1975 - 2003	p-value of Change
Total Market Work	-9.56 (1.46)	-11.14 (1.34)	-12.08 (1.31)	-2.52	0.08
Total Non-Market Work	-2.75 (0.77)	-0.73 (0.70)	-4.90 (0.69)	-2.15	<0.01
Leisure Measure 3	11.19 (1.25)	12.33 (1.15)	14.76 (1.11)	3.57	<0.01

Notes: This table presents the coefficients from a time use measure on year dummies and demographics. The demographics include a series of age, education, and family structure variables. The omitted year is 1965. The coefficients should be interpreted as hour per week deviations from 1965. The regressions in panel A only includes married women. The regressions in panels B only include single women. We exclude data from the 1993 time use sample for this analysis. The reason is that the 1993 sample did not ask respondents if they were married. Additional sample restrictions are the same as those use to generate the means in Table 3. See the notes to Table 3 for a full description. The sample sizes for each panel are 7,614 and 4,653, respectively. Standard errors are in parenthesis.

Table 8: Unconditional Mean Levels of Time Use in 1965 and 2003 by Sex and Educational Attainment Reported in Hours per Week

Panel A: 1965								
Time Use Category	Males				Females			
	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference
Direct Market Work	42.46	42.51	0.05	0.98	16.13	18.43	2.30	0.22
Total Market Work	51.92	51.85	-0.07	0.98	19.30	21.69	2.39	0.28
Food Prep/ Household Chores	1.87	2.23	0.36	0.36	26.02	21.49	-4.53	<0.01
Total Non-Market Work	9.44	10.24	0.80	0.41	35.18	33.44	-1.74	0.24
Total Work	61.36	62.10	0.74	0.74	54.47	55.11	0.64	0.73
Leisure Measure 1	32.53	31.03	-1.50	0.36	31.02	31.53	0.51	0.71
Leisure Measure 2	103.13	101.38	-1.75	0.40	103.77	103.47	-0.30	0.87
Leisure Measure 3	104.09	102.75	-1.34	0.52	110.07	108.64	-1.43	0.41
Sample Size	576	222			763	226		

Notes: This table presents unconditional means for each time use category by educational attainment for survey year 1965 (Panel A), survey year 1985 (Panel B), and survey year 2003 (Panel C). See Table 2 and footnote to Table 4 for definitions of direct market work, total market work, food preparation and indoor household chores, total work, and leisure measures 1 – 3. Sample includes all non-retired, non-student individuals between the ages of 21 and 65. Education > 12 refers to the individual having more than 12 years of schooling.

Table 8: Unconditional Mean Levels of Time Use in 1965 and 2003 by Sex and Educational Attainment Reported in Hours per Week (Continued)

Panel B: 1985								
Time Use Category	Males				Females			
	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference
Direct Market Work	36.58	37.85	1.27	0.44	19.35	22.90	3.55	<0.01
Total Market Work	42.90	44.26	1.36	0.46	22.83	27.06	4.23	<0.01
Food Prep/ Household Chores	3.63	4.29	0.22	0.13	17.75	14.27	-3.48	<0.01
Total Non-Market Work	12.58	13.81	0.66	0.16	26.84	24.67	-2.17	0.02
Total Work	55.48	58.07	2.59	0.11	49.67	51.73	2.06	0.11
Leisure Measure 1	37.27	35.00	-2.27	0.07	36.28	34.44	-1.84	0.08
Leisure Measure 2	108.83	106.56	-2.27	0.14	111.02	107.60	-3.42	<0.01
Leisure Measure 3	109.89	107.98	-1.91	0.22	115.65	111.96	-3.69	<0.01
Sample Size	754	614			1029	654		

**Table 8: Unconditional Mean Levels of Time Use in 1965 and 2003 by Sex and Educational Attainment
Reported in Hours per Week (continued)**

Panel C: 2003								
Time Use Category	Males				Females			
	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference	Education ≤ 12	Education > 12	difference	<i>p</i> -value of difference
Direct Market Work	33.90	38.80	4.90	<0.01	20.79	27.16	6.37	<0.01
Total Market Work	37.54	43.39	5.85	<0.01	22.82	29.82	7.00	<0.01
Food Prep/ Household Chores	3.31	3.57	0.26	0.15	14.86	10.91	-3.95	<0.01
Total Non-Market Work	11.14	11.81	0.67	0.08	22.58	19.66	-2.92	<0.01
Total Work	48.68	55.20	6.52	<0.01	45.40	49.48	4.08	<0.01
Leisure Measure 1	40.95	35.13	-5.82	<0.01	36.53	32.49	-4.04	<0.01
Leisure Measure 2	112.20	104.60	-7.60	<0.01	110.48	105.73	-4.75	<0.01
Leisure Measure 3	114.04	107.23	-6.81	<0.01	116.47	112.04	-4.43	<0.01
Sample Size	2,570	3,972			3,060	5,030		

Table 9: Conditional Change in Time Use By Educational Status 1965 – 2003, 1965–1985 and 1985-2003

Panel A: Males				
	I.	II.	III.	IV.
	Change in Time Use Education \leq 12	Change in Time Use Education $>$ 12	Low Educated Change – High Educated Change (Diff-Diff)	<i>p</i> -value of Diff- Diff
Change in Hours Per Week: 1965-2003				
Total Market Work	-14.09	-8.36	-5.73	<0.01
Total Non-Market Work	2.11	1.62	0.49	0.54
Leisure Measure 3	9.26	4.26	5.00	<0.01
Change in Hours Per Week: 1965-1985				
Total Market Work	-8.78	-7.79	-0.99	0.61
Total Non-Market Work	3.64	3.80	-0.17	0.84
Leisure Measure 3	5.09	4.92	0.17	0.92
Change in Hours Per Week: 1985-2003				
Total Market Work	-5.31	-0.57	-4.74	0.01
Total Non-Market Work	-1.53	-2.18	0.66	0.42
Leisure Measure 3	4.17	-0.66	4.83	<0.01

Notes: This table presents the coefficients from a regression of the time use category on year dummies and demographics by educational status. Specifically, with the Panel A Education $>$ 12 results, we ran the regression of the time use category on year dummies and demographics on a sample that only included males who completed more than 12 years of schooling. In Panel Education \leq 12, we ran similar regressions on a sample that only included males who completed 12 or less years of schooling. Likewise, Panel B is defined similarly but for women. Otherwise, the sample restrictions were identical to the one used in Table 8. See Table 8 for the relevant sample sizes. The coefficients in this table should be interpreted as the conditional change in the time use category over a given time period. In column III (Diff-Diff), we present the differential change in the time use category over the time period between high and low educated individuals.

Table 9: Conditional Change in Time Use By Educational Status 1965 – 2003, 1965–1985 and 1985-2003 (continued)

Panel B: Females				
	I.	II.	III.	IV.
	Change in Time Use Education ≤ 12	Change in Time Use Education > 12	Low Educated Change – High Educated Change (Diff-Diff)	<i>p</i> -value of Diff- Diff
Change in Hours Per Week: 1965-2003				
Total Market Work	2.54	6.76	-4.22	<0.01
Total Non-Market Work	-12.15	-13.12	0.97	0.30
Leisure Measure 3	6.99	4.07	2.91	0.02
Change in Hours Per Week: 1965-1985				
Total Market Work	1.94	3.10	-1.16	0.45
Total Non-Market Work	-6.98	-7.18	0.20	0.84
Leisure Measure 3	5.83	3.61	2.21	0.11
Change in Hours Per Week: 1985-2003				
Total Market Work	0.60	3.66	-3.06	0.05
Total Non-Market Work	-5.17	-5.94	0.77	0.42
Leisure Measure 3	1.16	0.46	0.70	0.58

Appendix Table A1: Comparing Males in PSID with Males in Time Use Data Sets

Variable	1965 Time Use Survey	1968 PSID	1975 Time Use Survey	1975 PSID	1985 Time Use Survey	1985 PSID	1993 Time Use Survey	1993 PSID	2003 Time Use Survey	2003 PSID
Age 21 – 29	0.25	0.21	0.27	0.30	0.28	0.23	0.26	0.18	0.21	0.15
Age 30 – 39	0.23	0.25	0.28	0.22	0.31	0.33	0.30	0.33	0.25	0.25
Age 40 – 49	0.26	0.27	0.20	0.24	0.20	0.20	0.26	0.28	0.27	0.30
Age 50 – 59	0.19	0.19	0.19	0.18	0.16	0.18	0.14	0.15	0.26	0.23
Age 60 – 65	0.07	0.08	0.06	0.05	0.05	0.05	0.04	0.05	0.06	0.06
Education > 12	0.30	0.31	0.30	0.39	0.47	0.48	0.58	0.53	0.56	0.59
Married	0.87	0.92	0.85	0.85	0.68	0.76	N/A	0.73	0.63	0.69
Have Child	0.65	0.64	0.55	0.60	0.42	0.51	0.36	0.46	0.42	0.44
Number of Children	1.57	1.66	1.24	1.30	0.76	0.96	N/A	0.89	0.80	0.86
Employed	0.97	0.96	0.93	0.93	0.86	0.90	0.87	0.90	0.87	0.90
Sample Size										

Notes: This table compares the means of different demographic variables within the time use sample to the corresponding year of the PSID. Sample includes only non-retired males between the ages of 21 and 65 from each survey. Given that the PSID only started in 1968, we compare the 1965 time use survey to the 1968 PSID. The 1993 time use survey did not ask marital status or number of children of its respondents. All data are weighted using the survey's sampling weights. See the text for details. <<Comparison of women coming soon.....>

**Appendix Table A2: Coefficients on Year Dummies Displayed in Figures 2-5
(Standard Errors in Parenthesis)**

Regression	Coefficient on Year Dummy (Hours Per Week Relative to 1965)			
	1975	1985	1993	2003
<u>Direct Market Work (Figure 2)</u>				
All	-1.04 (0.56)	-2.67 (0.58)	-0.11 (0.56)	-0.41 (0.57)
Men	-3.25 (0.85)	-6.48 (0.89)	-4.17 (0.86)	-6.32 (0.85)
Women	0.22 (0.66)	0.94 (0.67)	3.63 (0.66)	4.23 (0.68)
<u>Total Non Market Work (Figure 3)</u>				
All	-2.99 (0.36)	-1.96 (0.37)	-4.31 (0.36)	-5.97 (0.36)
Men	0.88 (0.42)	3.57 (0.44)	2.12 (0.42)	1.82 (0.42)
Women	-5.59 (0.48)	-6.82 (0.48)	-9.82 (0.47)	-12.09 (0.49)
<u>Total Work (Figure 4)</u>				
All	-5.30 (0.53)	-5.99 (0.55)	-7.33 (0.53)	-9.44 (0.54)
Men	-5.07 (0.85)	-6.00 (0.89)	-7.08 (0.86)	-9.73 (0.85)
Women	-5.54 (0.66)	-5.77 (0.67)	-7.29 (0.66)	-9.14 (0.68)

Notes: These are the coefficients and standard errors for the time dummies that are plotted in Figures 2, 3, 4 and 5. See notes to the figures for full sample and methodological descriptions.

**Appendix Table A2 (continued): Coefficients on Year Dummies Displayed in Figures 2-5
(Standard Errors in Parenthesis)**

Regression	Coefficient on Year Dummy (Hours Per Week Relative to 1965)			
	1975	1985	1993	2003
<u>All (Figure 5a)</u>				
Leisure Measure 1	2.36 (0.43)	4.55 (0.44)	6.71 (0.43)	5.27 (0.43)
Leisure Measure 2	4.58 (0.50)	6.21 (0.52)	7.86 (0.51)	5.85 (0.51)
Leisure Measure 3	4.04 (0.51)	6.16 (0.53)	7.46 (0.51)	7.10 (0.52)
<u>Males (Figure 5b)</u>				
Leisure Measure 1	1.83 (0.68)	4.41 (0.71)	6.42 (0.69)	6.31 (0.68)
Leisure Measure 2	3.69 (0.80)	6.07 (0.85)	6.87 (0.82)	6.35 (0.81)
Leisure Measure 3	4.03 (0.81)	6.44 (0.85)	7.14 (0.82)	7.79 (0.82)
<u>Females (Figure 5c)</u>				
Leisure Measure 1	2.72 (0.54)	4.68 (0.55)	6.89 (0.54)	4.03 (0.56)
Leisure Measure 2	5.36 (0.64)	6.27 (0.65)	8.63 (0.64)	5.30 (0.66)
Leisure Measure 3	4.06 (0.64)	5.72 (0.65)	7.48 (0.63)	6.37 (0.66)

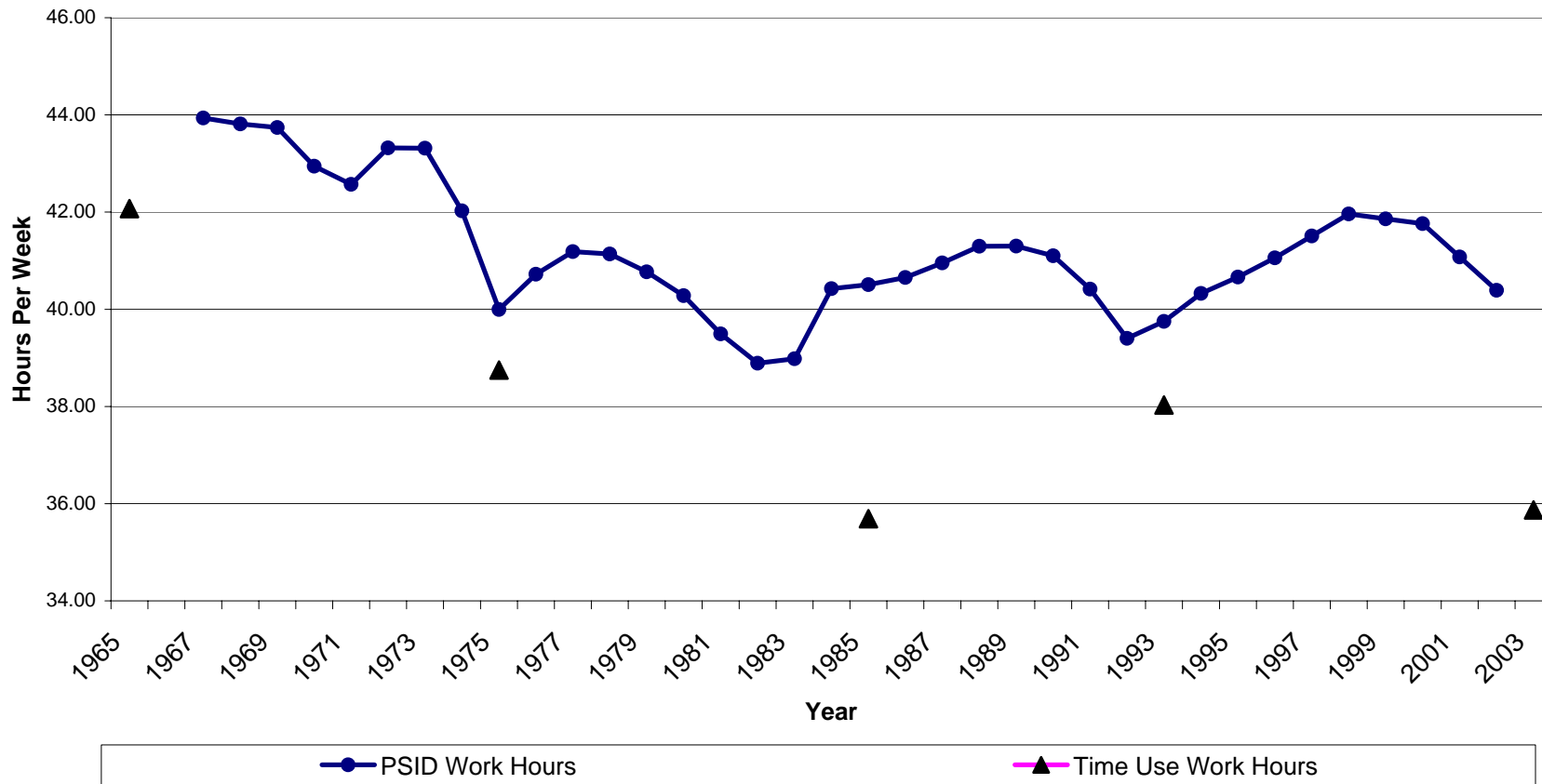
Notes: These are the coefficients and standard errors for the time dummies that are plotted in Figures 2, 3, 4 and 5. See notes to the figures for full sample and methodological descriptions.

**Appendix Table A3: Coefficients on Year Dummies Displayed in Figures 7a and 7b
(Standard Errors in Parenthesis)**

Regression	Coefficient on Year Dummy (Relative to 1965)			
	1975	1985	1993	2003
<u>Men with Education ≤ 12</u>				
Total Market Work	-5.35 (1.29)	-8.80 (1.48)	-9.52 (1.51)	-14.42 (1.47)
Total Non-Market Work	1.06 (0.56)	3.28 (0.64)	2.45 (0.65)	1.85 (0.64)
<u>Men with Education > 12</u>				
Total Market Work	-5.24 (1.59)	-7.87 (1.47)	-7.07 (1.35)	-8.14 (1.35)
Total Non-Market Work	0.45 (0.73)	3.75 (0.68)	1.49 (0.62)	1.51 (0.62)
<u>Women with Education ≤ 12</u>				
Total Market Work	-0.29 (0.98)	1.44 (1.07)	0.98 (1.13)	2.03 (1.20)
Total Non-Market Work	-5.94 (0.64)	-6.89 (0.71)	-9.15 (0.74)	-12.04 (0.79)
<u>Women with Education > 12</u>				
Total Market Work	2.38 (1.43)	2.82 (1.27)	6.99 (1.15)	6.67 (1.15)
Total Non-Market Work	-5.67 (0.85)	-7.07 (0.75)	-11.06 (0.69)	-13.13 (0.69)

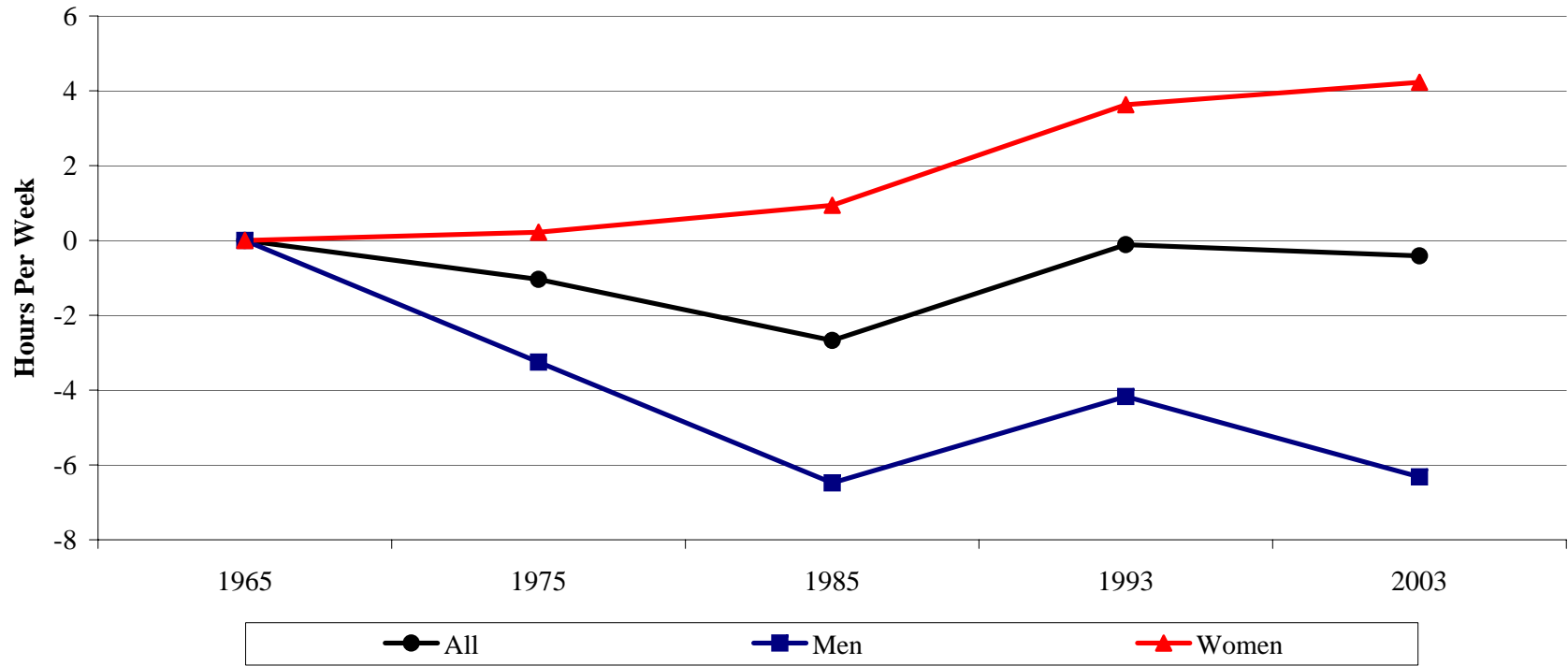
Notes: These are the coefficients and standard errors for the time dummies that are plotted in Figures 7a and 7b. See notes to the figures for full sample and methodological descriptions.

Figure 1: Comparison of Weekly Core Market Work Hours in PSID and Time Use Surveys: Sample: All Non-Retired Men Between Ages of 21 and 65



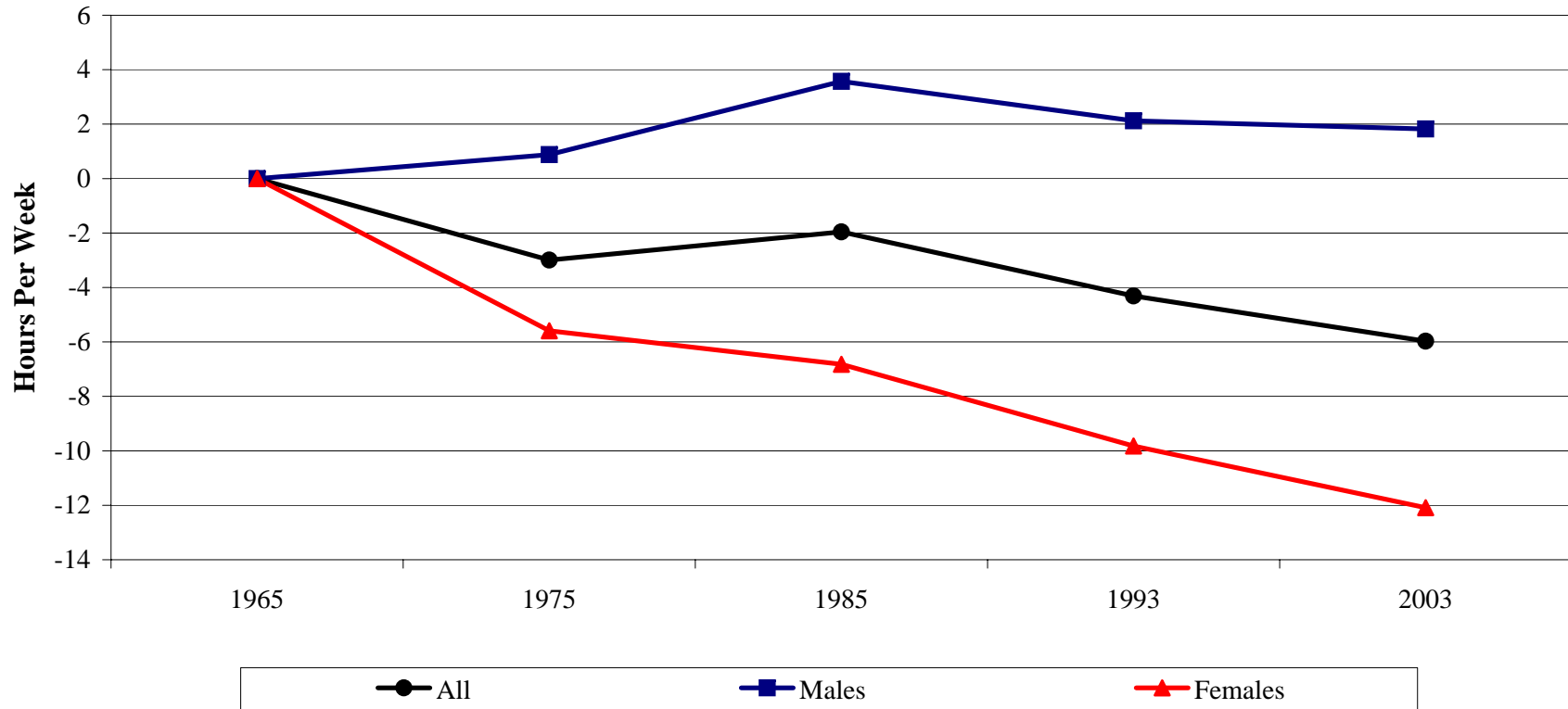
Notes: Figure shows hours per week in core market work for non-retired males between the ages of 21 and 65 in the PSID (solid line) and the time use surveys (triangle). The time use surveys are only from 1965, 1975, 1985, 1992-1994, and 2003. The PSID asks respondents about work hour during a typical week and how many weeks they were at work during the previous year. We multiply these two numbers and divide by 52 to get annual work hours in the PSID.

**Figure 2: Time Spent in "Core Market Work" By Sex Conditional on Demographics,
Change in Hours Per Week Relative to 1965**



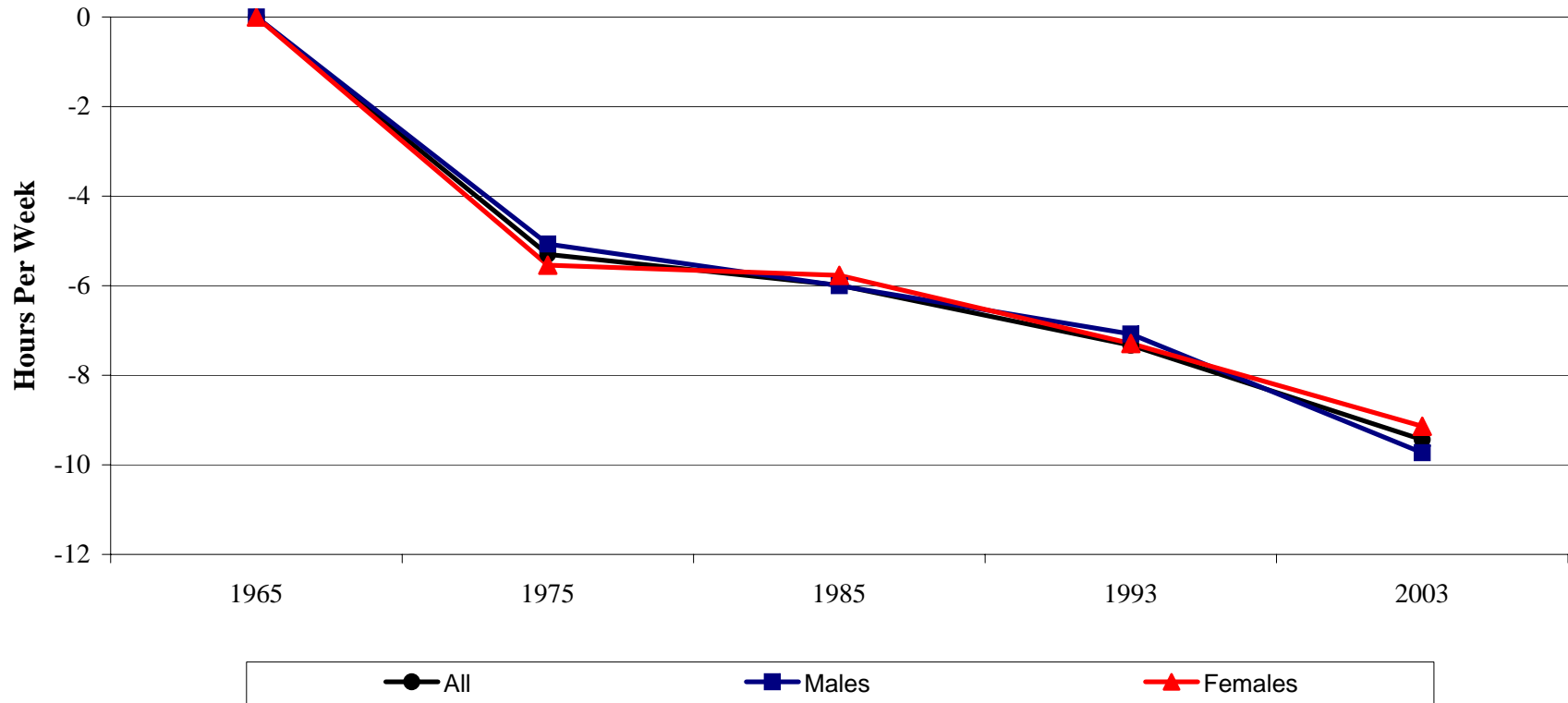
Notes: This graph plots the coefficients on year dummies from a regression of time spent in core market work on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. To get the conditional trends in core market work hours by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively). Table 3 for a description of the sample and the definition of core market work.

Figure 3: Time Spent in "Total Non-Market Work" By Sex Conditional on Demographics, Change in Hours Per Week Relative to 1965



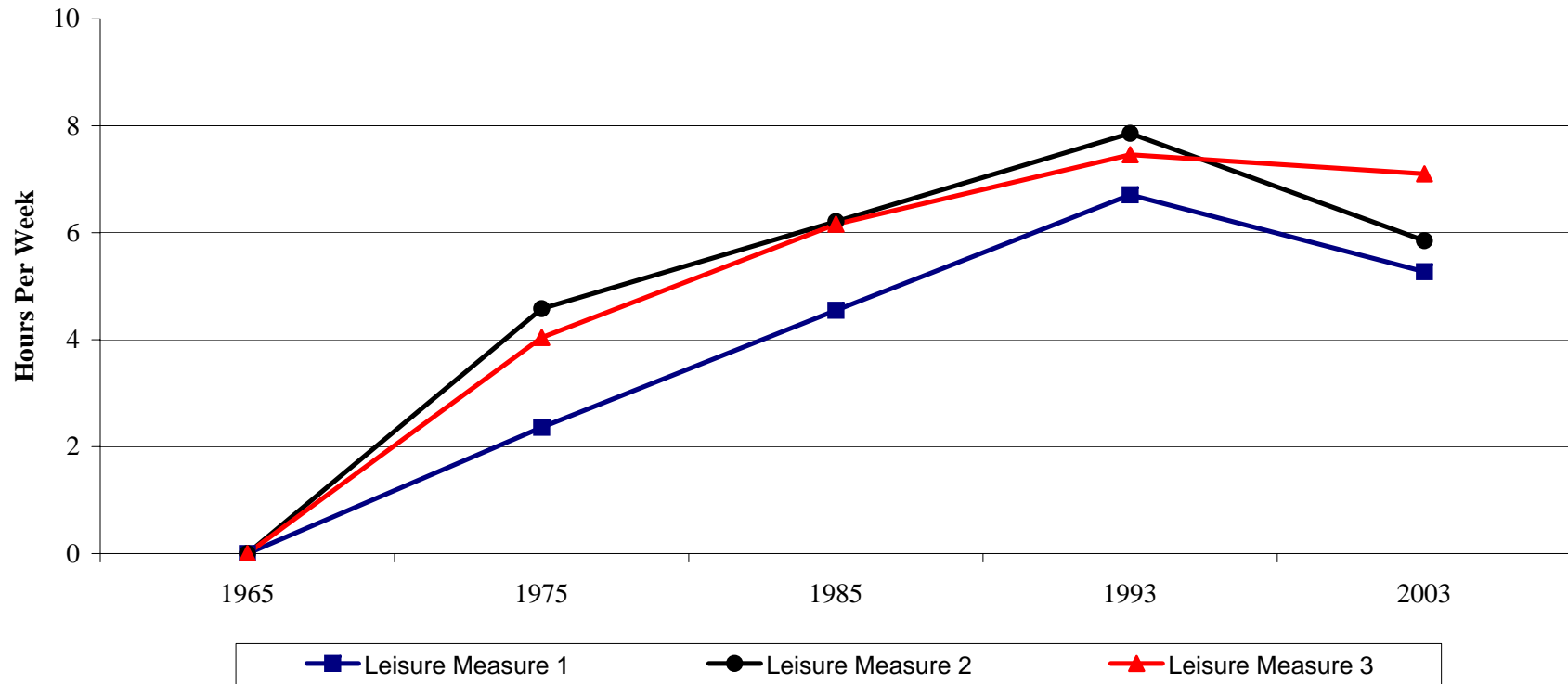
Notes: This graph plots the coefficients on year dummies from a regression of time spent in total non market work on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. To get the conditional trends in total non-market work hours by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively). Table 3 for a description of the sample and the definition of total non-market work.

**Figure 4: Time Spent in "Total Work" By Sex Conditional on Demographics,
Change in Hours Per Week Relative to 1965**



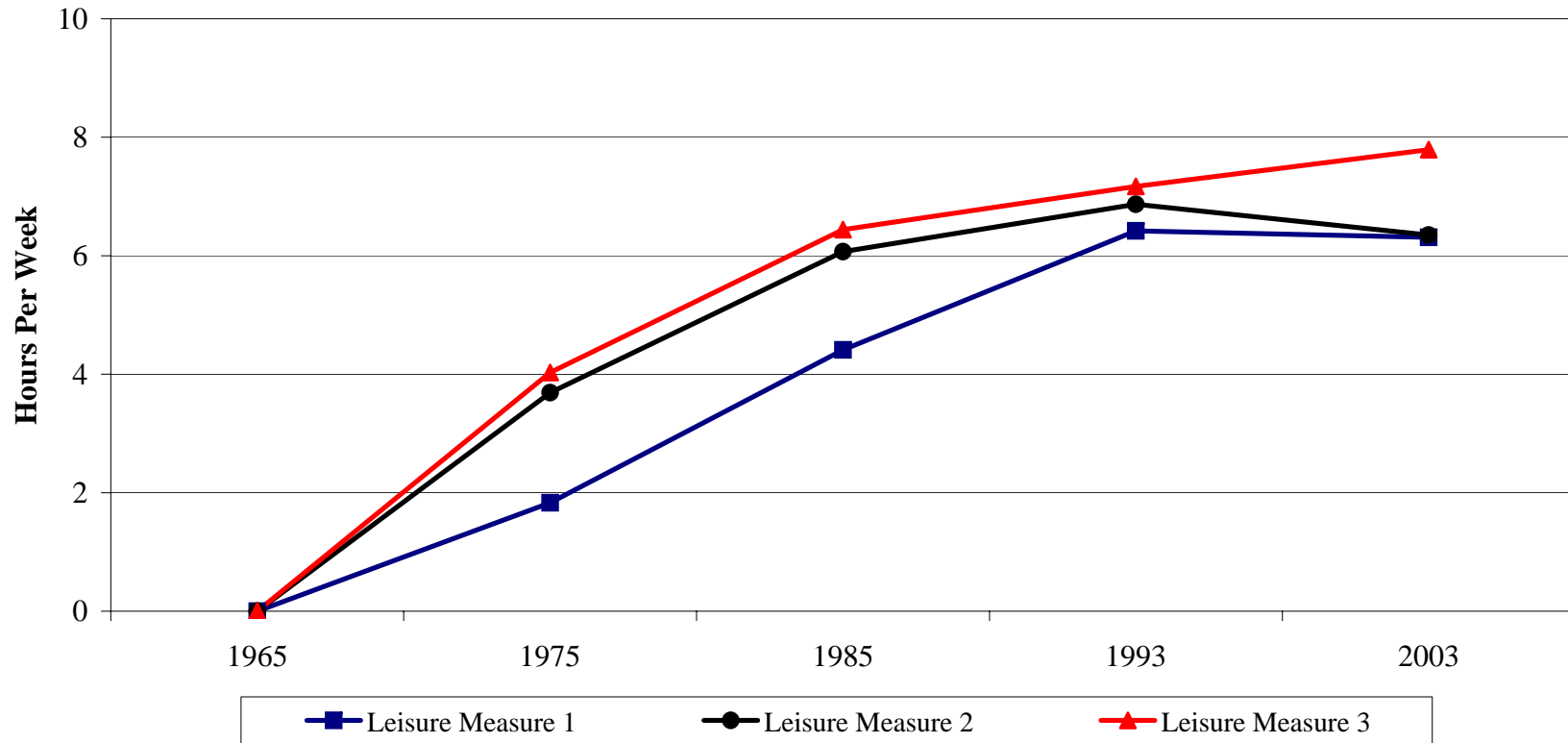
Notes: This graph plots the coefficients on year dummies from a regression of time spent in total work on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. To get the conditional trends in total work hours by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively). Table 3 for a description of the sample and the definition of total work.

**Figure 5a: Time Spent in "Leisure" Conditional on Demographics
Change in Hours Per Week Relative to 1965**



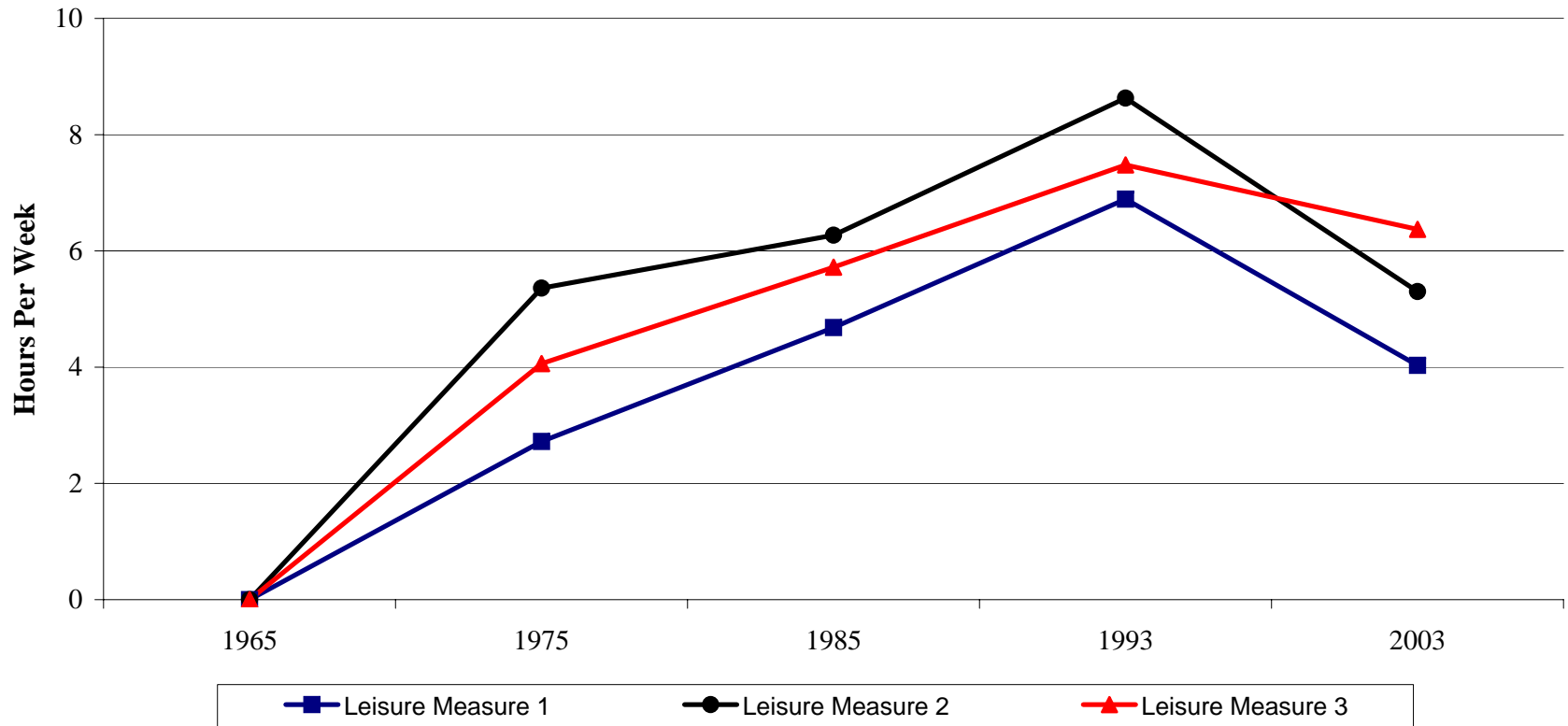
Notes: This graph plots the coefficients on year dummies from a regression of time spent in various measures of leisure on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. See Table 5 for a description of the sample and the definitions of leisure measures 1- 3.

**Figure 5b: Time Spent in "Leisure" for Males Conditional on Demographics
Change in Hours Per Week Relative to 1965**



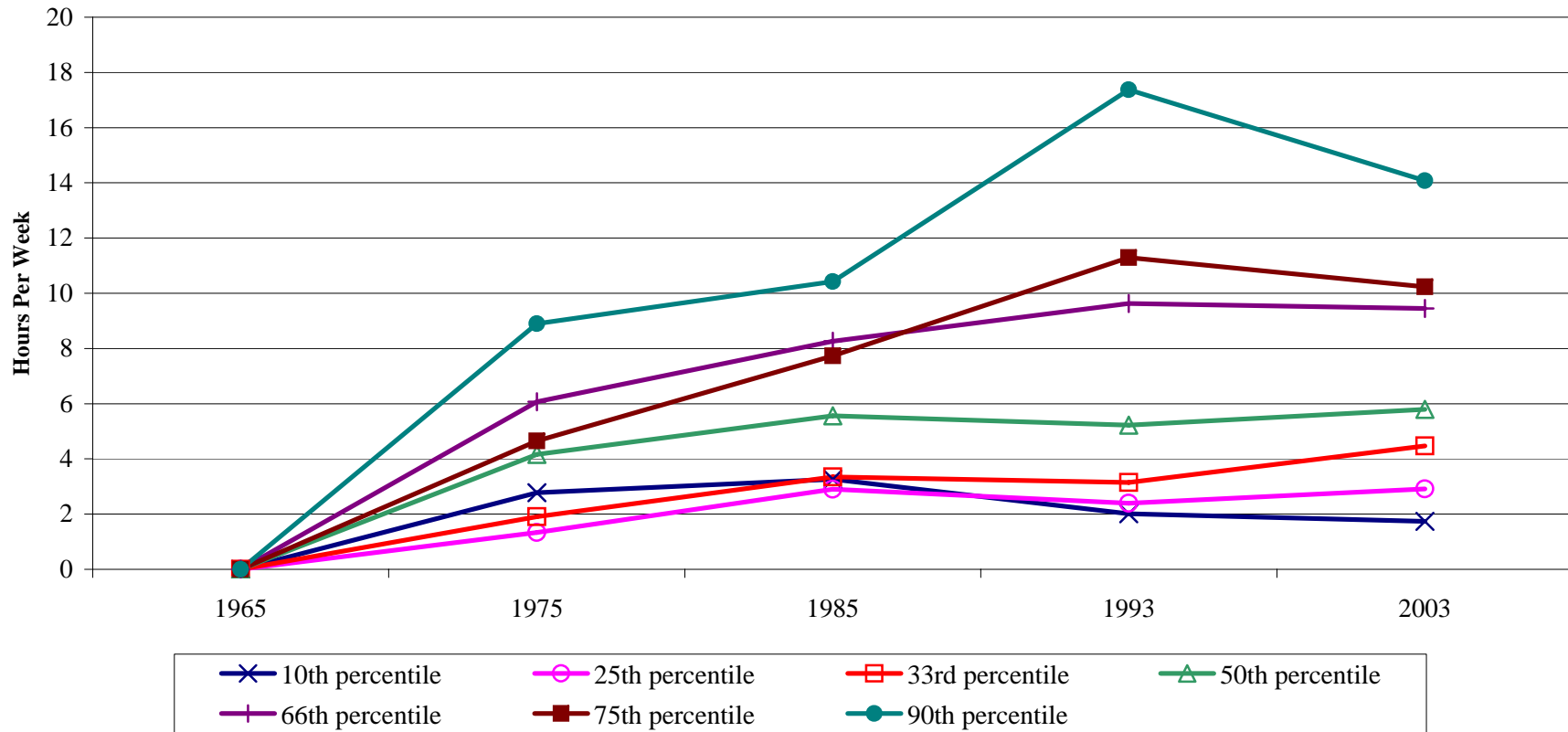
Notes: This graph plots the coefficients on year dummies from a regression of time spent in various measures of leisure on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. See Table 5 for a description of the sample and the definitions of leisure measures 1- 3.

**Figure 5c: Time Spent in "Leisure" for Females Conditional on Demographics
Change in Hours Per Week Relative to 1965**



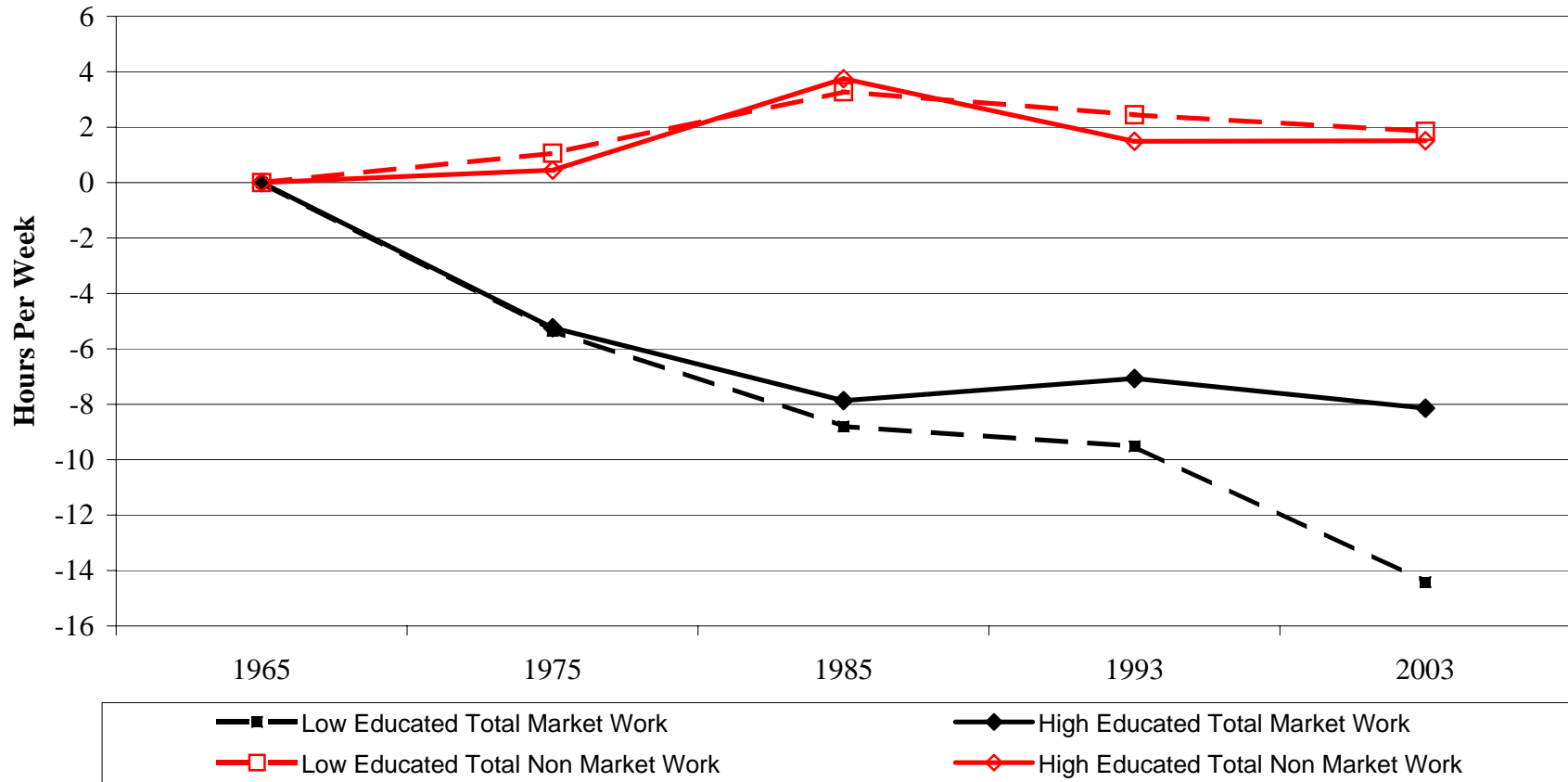
Notes: This graph plots the coefficients on year dummies from a regression of time spent in various measures of leisure on year dummies (with 1965 being the omitted year), age controls, education controls, and family composition controls. The coefficients should be interpreted as hour per week deviations from 1965. See Table 5 for a description of the sample and the definitions of leisure measures 1- 3.

**Figure 6: Change in Distribution of Time Spent in "Leisure Measure 3"
Change in Hours Per Week Relative to 1965**



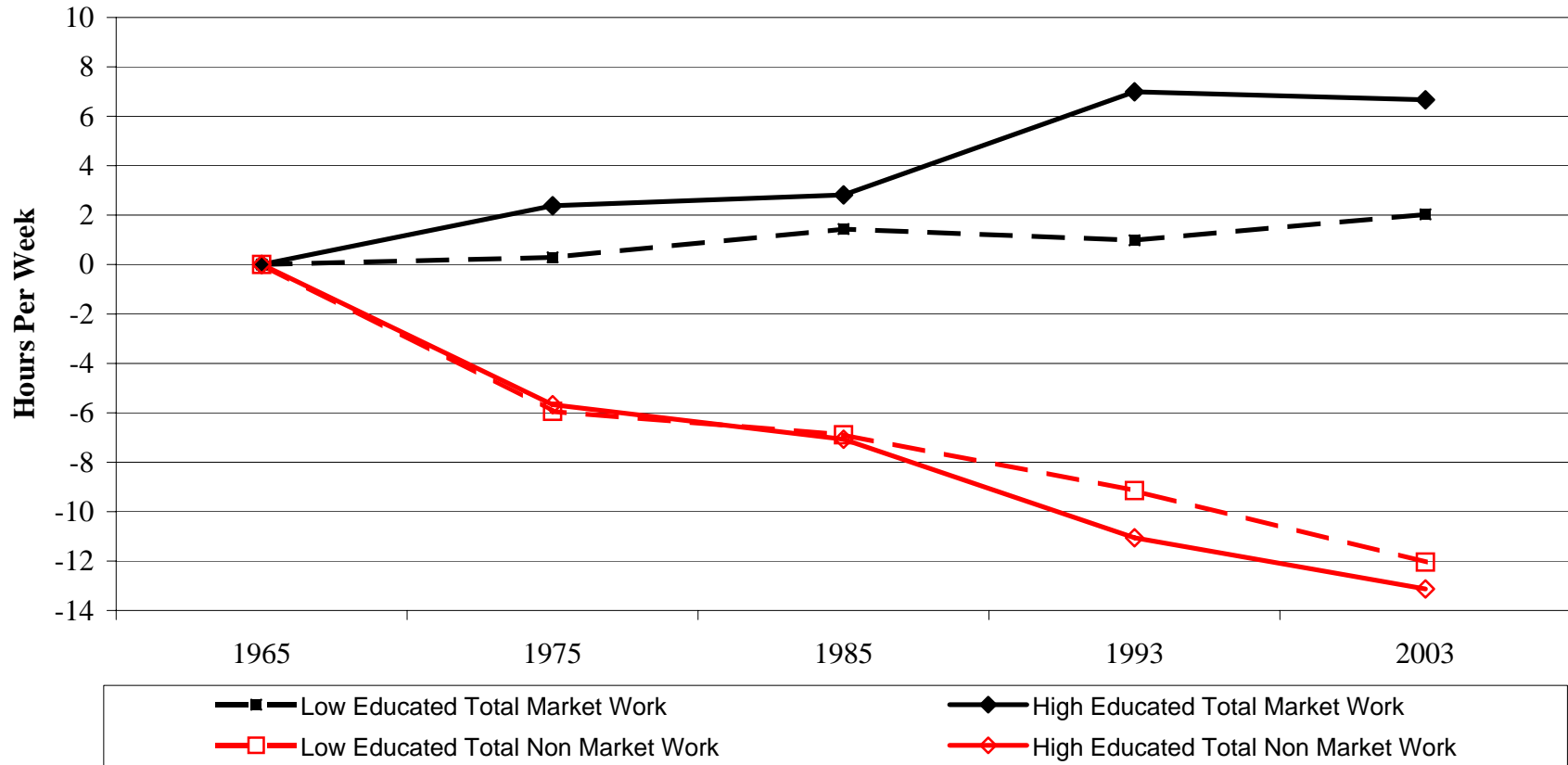
Notes: To construct this plot, we ran a regression of leisure measure 3 on age, education and family composition controls on our pooled time use data set. We then took the residuals of this regression by year and compute the percentile points of the residual leisure distribution. The distribution points for survey years 1975, 1985, 1993, and 2003 are all relative to the distribution points in 1965. As a result, the graph plots deviations of percentile points from the 1965 time use survey over time.

**Figure 7a: Male Time Spent in "Total Market Work" and "Total Non Market Work"
By Educational Attainment Conditional on Demographics**



Notes: This graph plots the coefficients on year dummies from regressions of time spent in either total market work or total non-market work on year dummies (with 1965 being the omitted year) and demographic controls. The sample either included low educated or high educated males who were non-retired and non-students between the age of 21 and 65. The coefficients can be interpreted as hour per week deviations from 1965. See the notes to Table 8 for a full description of the sample.

**Figure 7b: Female Time Spent in "Total Market Work" and "Total Non Market Work"
By Educational Attainment Conditional on Demographics**



Notes: This graph plots the coefficients on year dummies from regressions of time spent in either total market work or total non-market work on year dummies (with 1965 being the omitted year) and demographic controls. The sample either included low educated or high educated males who were non-retired and non-students between the age of 21 and 65. The coefficients can be interpreted as hour per week deviations from 1965. See the notes to Table 8 for a full description of the sample.