Measuring Leisure:
Evidence from Five Decades of Time Use Surveys

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Abstract

In this paper, we examine the relationship between labor supplied to the market sector, labor supplied to the home sector, and leisure. Theoretically, we review how standard estimates of labor supply elasticities confound both preference parameters as well as the home production technology. We then use five decades of time use surveys to create a set of stylized facts about the evolution of time spent in market work, home production, and leisure for high and low educated men and women. We document that a dramatic increase in leisure time lies behind the relatively stable number of market hours worked 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, during this period, 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. 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

Standard utility functions have households maximizing 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 time spent in 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 examine a household's joint decision to allocate time to market work, non market work, and leisure. In the first portion of the paper, we write down a simple general equilibrium model to show that standard empirical estimates of labor supply elasticities are misconstrued when the ability to home produce is ignored. This model draws heavily on the work of Mincer (1962), Becker (1965), and Gronau (1977). Specifically, under plausible parameterizations, the decision to trade off time and expenditure within a home production function implies that increases in productivity (in either the market or home sector) will result in declining time spent in home production. We also theoretically derive the uncompensated labor supply elasticity and show that this elasticity confounds both preference parameters and parameters from the home production technology. To the extent that time spent in home production changes over time or differs across people, labor supply elasticities will differ over

[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.

time or across people even if preferences remain constant. Lastly, we show that stable aggregate time spent in market work hours, declining time spent in home production, and increasing time spent in leisure is consistent with the income resulting from a wage increase (via preferences) dominating the substitution effect from a wage increase (via preferences).

In the second part of the 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. When measuring leisure, we separate out other uses of household time including time spent obtaining human capital, time spent in heath care, or time spent providing child care.

Trends in time spent working for pay (i.e., direct market work) across the time use surveys match well trends in weekly market work hours reported by PSID respondents. This gives us confidence that our time use surveys are accurately measuring one component of household time. Specifically, between 1965 and 2003, conditional on demographic changes, direct market work hours have remained relatively constant for the average individual, fallen by 5.1 hours per week for the average male, and increased by 4.6 hours per week for the average female. Unlike data from the CPS and PSID, the time use data sets also allows us to construct a measure of time spent in total market work (which includes commuting time and ancillary work activities). Total market work fell by 3.3 hours per week for the average individual, fell by 10.8 hours per week for the average male, and increased by 3.1 hours per week for the average female.

The trends in non-market work are equally as dramatic. We define non-market production to include preparing meals, doing dishes, cleaning house, doing laundry, shopping for groceries, shopping for other goods and services, performing yard work, repairing home, etc.[2] Between 1965 and 2003, conditional on changing demographics, total time spent on non-market

[2] In section III and Table 2, we fully define the categories included in our measure of time spent on total non market production.

production fell by just under 5 hours per week for the average individual, fell by 10.4 hours per week for the average female, and increased by 1.8 hours per week for the average male.

To better examine trends in household leisure over time, we compute three different measures of leisure. The first defines leisure as time spent "in entertainment, in social activities, or relaxing" plus time spent in "active recreation". The second measure of leisure takes the first measure and adds in time spent "sleeping", "eating", or "in personal care (such as grooming)". The last measure is the broadest measure of leisure because it adds in time spent in direct child care into the measure of leisure. In total, our various measures of leisure increase by 5.1 and 7.5 hours per week for the average individual, between 6.0 and 8.1 hours per week for the average male, and between 4.1 and 6.7 hours per week for the average female. Without a doubt, time spent in leisure has dramatically increased for the average household during the past forty years. For men, the increase in leisure was driven by a decline in total market work hours. For women, the increase in leisure was drive by a decline in total non-market work hours.

We find that the leisure changes between 1965 and 2003 differed for low and high educated individuals. Between 1965 and 1985, low educated men and high educated men experienced similar increases in leisure (approximately 4.8 hours per week). However, between 1985 and 2003, low educated men experienced much large increases in leisure compared to high educated men (6.2 hours per week vs. 1.8 hours per week, p-value of difference < 0.01). A similar pattern occurred between low educated and high educated women.

Notice, the trends in total work (which includes direct market work, commuting time, ancillary market work activities, and total non-market work) and actual leisure differ dramatically from the trends in market work that can be found in household surveys such as the PSID and the CPS. Most researchers have observed the relatively constant aggregate work hours in the U.S. during the last forty years and concluded that income and substitution effects must cancel each other out. However, this is inconsistent with declining home production and increasing leisure. In the final section of the paper, we calibrate the model developed in the first portion of the paper

to match the empirical facts documented in the second portion of the paper. We show that given actual wage changes and the actual trends in market work, non-market work, and leisure, income effect likely dominating substitution effects on labor supply. The reason that aggregate market work hours have not declined more with the real wage increases during the last forty years is because home production time has decline sharply allowing households to allocate more time to both market work and leisure.

The paper is organized as follows. In section 2, we introduce a simple general equilibrium model of market work, non-market work, and leisure. In this section, we show that estimates of the labor supply elasticity will hinge critically on the amount of non-market production taking place in the economy. In section 3, we discuss how we use time use data to present stylized facts about the evolution of market work, non-market work, and leisure within the U.S. during the last forty years. In section 4, we calibrate the model presented in Section 2 to explain the facts presented in section 3 (under construction). In the final section, we conclude.

2. The Allocation of Time Between Market Work, Home Production, and Leisure

When estimating labor supply elasticities most researchers restrict the individual's choice to allocating time between only market production and leisure. However, in reality, individuals can also allocate their time to non-market production. This insight was made originally by Mincer (1962) and Becker (1965) and formalized by the likes of Gronau (1977). In this section, we review how market work, non-market work, and leisure evolve in response to changes in productivity in either the market or the home sector. We will show that standard empirical estimates of labor supply elasticities will depend on the extent that the household home produce. If the amount of home production changes over time, estimated labor supply elasticities will change even if household preferences remain constant. In section 4, we will calibrate a version of the model presented below to explain the stylized facts documented in section 3.

2.1 Description of Environment

Consider a simple general equilibrium model in which the only factor of production is labor. There are two types of agents differentiated by their skill endowment. Let $j \in \{1,2\}$ denote skill level, with 1 and 2 denoting high and low skilled agents, respectively. Let λ represent the fraction of the population of type 1, and normalize total population to one. We initially treat each agent as a representative agent for the household. This assumption is made for simplicity of exposition. In section 4, we expand the model to make it more realistic by having two individuals who maximize household utility. Again, for simplicity, we also rule out financial contracts across the two types of agent. Given the absence of capital and financial assets, it suffices to consider a static economy and represent the time series properties through comparative statics. In this sense, we abstract from issues involving inter-temporal substitution. While these considerations are important for understanding business- and life-cycles, we suppress them in order to build a simple framework to study the low-frequency data described in Section 4.

There is a single market good produced in the economy, which we take to be the numeraire. Firms produce he market good competitively with a linear production function:

$$X = A\left(sN_1 + N_2\right), \tag{2.1}$$

where A represent productivity in the market sector, N_j is the amount of total labor of type j supplied to the market sector, and $s \geq 1$ represents the "skill premium" between high and low skilled agents. Profit maximization for the representative firm facing wages w_j, $j=1,2$, implies:

$$\max_{N_j} pA\left(sN_1 + N_2\right) - w_1 N_1 - w_2 N_2 . \tag{2.2}$$

First order conditions along with the assumption that both factors are used in equilibrium imply:

$$\begin{aligned} w_2 &= A \\ w_1 / w_2 &= s \end{aligned} \tag{2.3}$$

Household preferences are defined over consumption (c) and leisure (l):

$$u = \frac{c^{1-\gamma}}{1-\gamma} + v(l), \tag{2.4}$$

where $v' > 0,\ v'' < 0$, and $\gamma > 0$.[3] If $\gamma = 1$, $u = ln(c) + v(l)$. Note that we model utility to be additively separable between consumption and leisure. This allows us to highlight some of the implications of home production. Aguiar and Hurst (2005b) show that a utility function that is separable between consumption and leisure, plus home production, does a good job of matching the lifecycle profile of expenditure. Below, we will discuss the implication of separability for balanced growth. The assumption of separability is not crucial for the general analysis, but does play a role in pinning down threshold values of key parameters in section 4.

The consumption good is produced using a combination of a market good (x) and time spent in home production (h). Specifically,

$$c = \xi\left(\alpha h^{\rho} + (1-\alpha)x^{\rho}\right)^{\frac{1}{\rho}}, \tag{2.5}$$

where ξ is the non-market productivity parameter and α is a share parameter. An important parameter is $\rho < 1$, which governs the elasticity of substitution between time and goods in home production. Specifically, the elasticity is given by $\sigma = \frac{1}{1-\rho}$. If $\sigma = 1$ (that is, $\rho = 0$), then $c_N = \xi h^{\alpha} x^{1-\alpha}$. This Cobb-Douglas specification will be an important benchmark in the analysis. Empirical studies using micro-data typically find that ρ is greater than zero (for example, see Rupert, Rogerson and Wright (199x) and Aguiar and Hurst (2005)). We assume that all households regardless of market skill face the same home production technology.

Households are endowed with a unit of time which they can devote to leisure (l), market work (n), and home production (h). The time budget constraint is therefore

$$\begin{aligned} n + h + l &\leq 1, \\ n, h, l &\geq 0, \end{aligned} \tag{2.6}$$

[3] In this expression, and when appropriate below, we suppress the subscript j.

and the expenditure constraint is

$$x \leq wn \tag{2.7}$$

The agent's problem is therefore to maximize (2.4) subject to (2.6) and (2.7).

Before we analyze the agent's problem in detail, we note that a competitive equilibrium in this economy is characterized by an allocation $(c_1, c_2, l_1, l_2, h_1, h_2, n_1, n_2)$ and prices (w_1, w_2) such that firm's maximize profits (2.2), household's maximize (2.4) subject to (2.5), (2.6) and (2.7), and market clearing:

$$\begin{aligned} X &= \lambda x_1 + (1-\lambda)x_2 \\ N_1 &= \lambda n_1 \\ N_2 &= (1-\lambda)n_2 \end{aligned} \tag{2.8}$$

To analyze the household's problem, it is useful to define the implicit price of the consumption goods. Cost minimization implies that the unit price of *c* for a household facing wage w_j and price of the market good p=1 is

$$q_j = \xi^{-1}\left(\alpha^{\frac{1}{1-\rho}} w_j^{\frac{\rho}{\rho-1}} + (1-\alpha)^{\frac{1}{1-\rho}}\right)^{\frac{\rho-1}{\rho}}. \tag{2.9}$$

If ρ=0, then $q_j = \xi^{-1} w_j{}^{\alpha} \alpha^{-\alpha} (1-\alpha)^{\alpha-1}$. An important variable is the real wage expressed in terms of consumption, which we denote $\omega_j = w_j/q_j$. Note that (2.3) and (2.9) imply $\omega_j, j=1,2$, is an increasing function of *A* and ξ for a given skill premium *s,* and, all else equal, ω_1 is an increasing function of *s*. Moreover, ω converges to $\xi\alpha^{\frac{1}{\rho}}$ as $w \to 0$ if $\rho>0$. By definition, the total cost of consumption is $qc = wh + x$. Therefore, we can combine the two budget constraints from (1.6) and (1.7) into:

$$c = \omega(1-l). \tag{2.10}$$

Letting μ denote the multiplier on this constraint, first order conditions for the household are:

$$\begin{aligned} c^{-\gamma} &= \mu q \\ v'(l) &= \mu w \end{aligned} \tag{2.11}$$

The optimal choices of *x* and *h* can be recovered using Sheppard's lemma:

$$\begin{aligned} h &= \frac{\partial q}{\partial w} c = \alpha^{\frac{1}{1-\rho}} \omega^{\frac{1}{\rho-1}} c \\ x &= \frac{\partial q}{\partial p} c = (1-\alpha)^{\frac{1}{1-\rho}} \omega^{\frac{1}{1-\rho}} c \end{aligned} \tag{2.12}$$

Condition (2.11) implies $\frac{v'(l)}{c^{-\gamma}} = \omega$. Substituting in (2.10), we have

$$v'(l)(1-l) = c^{1-\gamma}. \tag{2.13}$$

For separable utility, a constant level of leisure with technological progress in the market sector requires log utility over consumption ($\gamma=1$), as in King, Plosser, and Rebelo (1988). If $\gamma>1$, as consumption increases over time, leisure heads toward an upper bound. This upper bound is either a bliss point for leisure or the full time endowment. Likewise, if $\gamma<1$, leisure converges to zero. Under the premise that utility over consumption is iso-elastic and separable from leisure, the evidence presented later in this paper as well as a wealth of other studies on consumption and asset-pricing suggest that $\gamma>1$.

It is important to note, however, that constant leisure does not necessarily imply a constant level of market hours worked. That would only be the case if hours spent in home production were constant as well. From (2.12), we have

$$\frac{h}{x} = \left(\frac{\alpha}{1-\alpha} \right)^{\frac{1}{1-\rho}} w^{\frac{1}{\rho-1}}. \tag{2.14}$$

Substitution into the home production function gives

$$c = h\xi\left(\alpha + (1-\alpha)\left(\frac{x}{h}\right)^{\rho}\right)^{\frac{1}{\rho}} \qquad (2.15)$$
$$= h\alpha^{\frac{1}{\rho-1}}\omega^{\frac{1}{1-\rho}}$$

Using the budget constraint condition $c=\omega(1-l)$, we have, with some rearranging,

$$\frac{h}{1-l} = \alpha^{\frac{1}{1-\rho}}\omega^{\frac{\rho}{\rho-1}}. \qquad (2.16)$$

Therefore, a constant level of leisure and home production requires that $\rho=0$ as well as $\gamma=1$. The intuition stems from the fact that when $\rho=0$, agents devote a constant fraction of expenditure to time and goods (from (2.14), $(1-\alpha)wh=\alpha x$ when $\rho=0$). If the wage increases one-for-one with technology, and market hours are constant, then w and x grow at the same rate. This implies that h is also stable. If the elasticity of substitution is greater than one ($\rho>0$), then the share of time in home production decreases as the wage increases. As mentioned above, micro-based estimates of ρ are typically greater than zero. This suggests that home production as a fraction of non-leisure time is decreasing in the real consumption wage. This is consistent with the evidence on home production presented later in the paper.

We can use equations (2.13), (2.15) and (2.16) to solve for leisure as a function of the wage in terms of the cost of consumption

$$v'(l)(1-l)^{\gamma} = \omega^{1-\gamma} \qquad (2.17)$$

If $\gamma>1$, then an increase in the consumption-based real wage leads to an increase in leisure. If $1>\rho\geq 0$, we see that an increase in the consumption-based real wage plus an increase in leisure implies h must fall. Recall that the consumption real wage will increase if either market technology or home production technology increases.

In the context of this simple model, the standard estimates of γ and ρ from the literature imply the leisure should increase and home production decrease as (either) technology advances. Specifically, an increase in w due to improvements in market-based technology (A) or a decline

in q due to improvements in the home production technology (ξ) imply that agents consume more leisure (the income effect dominates the substitution effect) and engage in less home production (due to the ease of substitution of x for h). We will verify this prediction later in the paper.

However, the increase in leisure and decline in home production has an ambiguous impact on market labor. To make progress on this question, assume that utility over leisure takes the standard iso-elastic form of disutility of (total) work:

$$v(l) = -\theta \frac{(1-l)^{1+\upsilon}}{1+\upsilon} \tag{2.18}$$

with $\upsilon>0$. Substituting into ((, using $n=1-l-h$ and (2.16), and rearranging gives

$$n = \theta^{\frac{-1}{\upsilon+\gamma}} \omega^{\frac{1-\gamma}{\upsilon+\gamma}} \left(1 - \alpha^{\frac{1}{1-\rho}} \omega^{\frac{\rho}{\rho-1}} \right) \tag{2.19}$$

The (uncompensated) elasticity of labor supply to the consumption-based real wage can be calculated from this expression to be

$$\frac{dn}{d\omega}\frac{\omega}{n} = \frac{1-\gamma}{\upsilon+\gamma} + \frac{\rho}{1-\rho} \frac{\alpha^{\frac{1}{1-\rho}} \omega^{\frac{\rho}{\rho-1}}}{1-\alpha^{\frac{1}{1-\rho}} \omega^{\frac{\rho}{\rho-1}}} \tag{2.20}$$

This expression has important implications for understanding empirical labor supply elasticities. First, we typically observe the market-good real wage, w, and not the consumption-good real wage, ω. Particularly in the time series, we would expect that changes in home production technology drive a wedge between the two wages. Perhaps more importantly, if $\rho\neq0$, the trade-off between time and goods in home production enters the labor-supply elasticity directly in the second term on the right. Note that this is positive if $\rho>0$. Moreover, as $\omega \to \infty$, this last term goes to zero. Therefore, in the long-run (assuming technological progress) or at high wages, agents rely more heavily on market goods and less on home production and eventually labor supply is governed by the standard preference parameters γ and υ. However, while home production remains an important input into consumption, the labor supply elasticity

will be above its long run level. Indeed, it may be the case that market labor is increasing in the wage despite $\gamma>1$. To see this, note that for w close to zero, $\omega \to \xi\alpha^{\frac{1}{\rho}}$ and the last term approaches $\frac{\rho}{1-\rho}$ which will be larger than the first term in absolute value if γ is close enough to one.

III. Measuring Market Work, Non-Market Work, and Leisure Over Time

A. 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 detailed demographics about the survey respondents. Below, we briefly summarize the salient features of these surveys. Additional information on these surveys can be found in the data appendix.

The *1965-1966 Americans' 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 have redone 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). In other words, 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. 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.

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.

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).

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.

The data appendix summarizes the detailed time use categories within the five time use surveys and the steps we took to harmonize the data sets. In appendix table A1, we show that 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). For our analysis, we aggregate an individual's time allocation into 13 broad categories: direct market work; total market work (including commuting time and other ancillary work activities); meal preparation/indoor household chores; shopping/obtaining goods and services; total non-market production; eating; sleeping; personal care; education; child care; entertainment, social, and relaxing activities; active recreation; and religious/civic activities. Travel time associated with the activity is embedded into the activity. For example, time spent driving to the grocery store is embedded in the "shopping" category. Table 2 provides examples of activities captured by these broad time use categories.

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 full time students and

who are not retired. 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 1965. In total, our sample included 25,221 individuals. In table 1, the sample sizes, given our sample restrictions, for each time use survey are shown.

B. Trends in Time Spent in Market and Non-Market Production: 1965 - 2003

Table 3 shows the mean level of time spent in market and non-market production for all individuals and disaggregated by sex for the five time use surveys. Throughout the paper, we report all time use measures in hours spent within an activity during a given week.[5,6] As noted in Table 2, we define "direct market work" as time spent working for pay on all jobs within the market sector. This measure includes time spent in overtime, time spent in market work done at home, and time spent working on second (other) jobs. By design, this measures encompasses all time spent actually engaging in market production. Our category of direct market work is most analogous to annual work hours divided by 52 reported within the Current Population Survey (CPS) or the Panel Study of Income Dynamics (PSID).[7] We also create a broader measure of market work which includes time spent commuting to work and time spent on ancillary work

[5] 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. Also, in the data appendix we show that each of the surveys sampled a similar number of individuals on each day of the week.

[6] When presenting the means, 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. In the conditional time use regressions below, we also present the weighted regression results. However, we redid all the regressions without weighting. The results were identical between the weighted and unweighted regression results. Given our regression results controlled for demographics, this is not surprising.

[7] 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. As a result, we examine the reliability of trends in time spent in market work within the time diary data sets by comparing them with the trends found in market work hours within the PSID.

activities (for example, time spent at work on breaks or eating a meal). We refer to this broader measure as "Total Market Work".

As seen in Table 3, direct market work hours for non-retired, non-full time students between the ages of 21 and 65 have increased slightly between 1965 and 2003 (increase of 2.94 hours per week, p-value < 0.01). However, total market work has remained essentially constant over this period (-0.15 hours per week, p-value = 0.85). However, the trend in direct market work for the average individual in our sample masks a large amount of heterogeneity. As seen in Panels B and C of Table 3, market work hours for men have fallen sharply and market work hours for women have increased sharply. Specifically, men decreased their direct market work hours by 4.84 hours per week and decreased their total work hours by 10.58 hours per week (p-value of both < 0.01). The difference in the decline in direct work hours and the decline in total work hours is due both to commuting time declining (roughly 2.5 hours per week) and ancillary work time declining (roughly 3 hours per week).[8]

For women, the trend has gone in the opposite direction. Female direct work hours have increased by 8.11 hours per week and total work hours have increased by 7.01 hours per week (p-value of both > 0.01). The trends in male and female labor force participation and work hours have been well documented in the literature (see Katz and Autor, 1999).

The trends in "non-market" work hours, however, have been relatively unexplored between 1965 and 2003.[9] 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,

[8] Census data has shown that reported time spent commuting has increased slightly between 1990 and 2000. The numbers reported by census are conditional on having a job and working away from home. The evidence on commuting from the time use surveys discussed above shows that aggregate commuting times have fallen slightly between 1993 and 2003. The difference in results is due to the fact that in the analysis above, we do not condition on working away from home. For men, labor market participation has fallen. Moreover, the increase in communication technology has resulted in more individuals working at home. Both of these trends have caused aggregate commuting times to have fallen during the last decade.

[9] 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.

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/obtaining goods and services, 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 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 6.46 hours per week, time spent obtaining goods and services has fallen by 0.64 hour per week, and total non-market work has fallen by 6.74 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 1.66 hours per week (p-value < 0.01). Female non-market work hours have fallen by almost 13 hours per week (p-value < 0.01).

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 6.89 hours per week (p-value < 0.01). Additionally, both males and females experienced declines in total weekly work hours (8.93 hours for men and 5.67 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.

One question that we will return to throughout this paper is the quality of the data within the time use surveys. To explore this directly, we plot reported hours per week of direct market work for males in the PSID against reported hours per week of direct market work for males in the time use surveys.[10] When comparing the PSID to the time use surveys, we restrict the PSID to only the years 1967, 1975, 1985, 1993, and 2000. There is one small problem when comparing direct market work hours in the PSID with direct market work hours in the time use surveys. As seen in Appendix Table A1, the demographic composition of respondents in the PSID in a given year differs slightly from the demographic composition of respondents in the time use surveys during that same year. For example, only 30% of non-student, non-retired males between the ages of 21 and 65 in the 1975 time use survey had a completed more than 12 years of schooling. The comparable number in the 1975 PSID is 39%. This suggests that while the time use data sets are designed to be nationally representative, they may not be fully representative even after using the sampling weights.

To better compare the data between the two surveys, we adjust the time use surveys so that they match the demographic profile of the PSID. To do this, we pool together non-student, non-retired males between the ages of 21 and 65 in the time use surveys and regress direct market work on year dummies, and age, education, and family composition controls. Formally, we estimate:

$$Work_{it} = \alpha + \beta_{1975} D_{i,1975} + \beta_{1985} D_{i,1985} + \beta_{1993} D_{i,1993} + \beta_{i,2003} D_{i,2003} + \gamma_{age} Age_i + \gamma_{family} Family_i + \gamma_{ed} Ed_i + \varepsilon_{it} \quad (3.1)$$

where D_{it} is a year dummy equal to one if individual i participated in a time use survey conducted in year t, Age_i is a vector of age dummies (whether household i is in their 20s, 30s, 40s, or 50s),

[10] Remember, the time use responses are reported as "minutes per day" and the PSID is "annual hours per year". We convert both of these measures to hours per week.

$Family_i$ is a vector of family structure dummies (whether individual *i* is married or whether they have children), and Ed_i is a vector of education dummies (whether *i* completed 12 years of schooling, 13-15 years of schooling, 16 years of schooling, or more than 16 years of schooling).

Using (1), we can estimate the adjusted hours of direct work in a give time use survey evaluated at the mean demographic characteristics found in the PSID. Specifically,

$$\hat{Work}_t = \hat{\alpha} + \hat{\beta}_t + \hat{\gamma}_{age} Age_{PSID,t} + \hat{\gamma}_{family} Family_{PSID,t} + \hat{\gamma}_{ed} Ed_{PSID,t} \quad (3.2)$$

where $\hat{Work}_t$ is the predicted amount of direct market work in time use survey *t* and $Age_{PSID,t}$ is the proportion of non-retired, non-student males in the sample between 20 and 30 years olds, 30 and 40 years olds, 40 and 50 years olds, and 50 and 60 years old found in the PSID during year *t*. Likewise, $Family_{PSID,t}$ and $Ed_{PSID,t}$ are defined similarly. Lastly, $\hat{\alpha}$, $\hat{\beta}$, $\hat{\gamma}_{age}$, $\hat{\gamma}_{family}$, *and* $\hat{\gamma}_{ed}$, are the coefficients estimated from (1).

Figure 1 plots the average hours per week of direct market work reported by PSID males between the ages of 21 and 65 in 1967, 1975, 1985, 1993, and 2000 against the average hours per week of direct market work reported by males between the ages of 21 and 65 in the time use surveys for the years 1965, 1975, 1985, 1995, and 2003 as predicted by (2). 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 2001 (asking about 2000 hours).

The pattern of direct market work in the time use surveys is nearly identical to the pattern of direct market found within the PSID for similar year with two exceptions. First, in each year, the level of direct market work hours in the PSID is higher than that of direct market work hours in the time use surveys. This is not surprising given that it is well documented that work hours are over stated in household surveys such as the PSID and CPS (Juster and Stafford (1985) and Robinson and Godbey (1997)). Second, the increase in work hours between 1993 and the early 2000s is more pronounced in the PSID than it is in the time use surveys. Again, this is not

surprising given that 2000 (the PSID comparison year) was a peak of a business cycle and 2003 (the time use data) was on the back side of a recession. One could speculate that the two surveys would be more in line if we actually measured work hours in the PSID during 2003. The fact that the trends in the time use data sets match well the trends in the PSID (once adjusting for differences in sample coverage) instills confidence about the quality of data contained within the five distinct time diaries.

During the last forty years, there have been significant changes in the demographic composition of the U.S. population. This is evident from the PSID 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 kids. All of these changes may effect how an individual chooses to allocate their time. 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 would estimate an equation similar to (1). 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.[11]

In Figure 2, we plot the coefficients from an estimation of (1) on three different samples: all individuals, males, and females.[12] As before, we focus only on non-retired, non-student individuals between the age of 21 and 65. We chose 1965 as the omitted year dummy from the regression. As a result, the coefficients are deviations in time use category relative to 1965. As seen in Figure 2, hours per week of direct market work for the total population (after adjusting for changing demographics) has been essentially constant between 1965 and 2003. The difference

[11] Notice, when reporting the coefficients on the year dummies from a regression such as (1), 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.

[12] There were two additional controls added to our estimation of (1). First, for the estimation on the full sample, we included a sex dummy. Second, for all regressions, we added day of week controls for when the individual was surveyed. Neither of these inclusions altered the results in any significant way.

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. After adjusting for changing demographics, male direct market work hours have fallen by 5.10 hours per week and female direct market work hours have increased by 4.59 hours per week (p-value of both < 0.01). For both men and women, the trends in direct market work hours were monotonic up through 1993 and then both trends leveled off. The decline in total market work hours was more extreme for men (10.8 hours per week, p-value < 0.01). For women, the increase in total market work was smaller than the increase in direct market work (3.1 hours per week, p-value < 0.01).

Figure 3 shows the change in total non market work for the full sample and then separately for men and women. To get the results in this figure, we re-estimate (1) 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, 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. 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).

Using the same method, Figure 4 shows the evolution of total work (total market work plus total non-market work) between 1965 and 2003. Total market work includes direct market work, commuting, and other time spent at work on breaks and meals. The results are striking. For our sample, all individuals, males and females decreased their total work by 8.2, 9.0, and 7.3 hours per week, respectively (p-value of all < 0.01).

C. Trends in Leisure: 1965 - 2003

Given the detail in our time use surveys, we can examine the evolution of an individual's leisure directly. As discussed above and described in Table 2, we have created eight additional time use classifications: "education", "child care", "entertainment/social activities/relaxing", "active recreation", "civic and religious activities", "sleeping", "eating", and "personal care". Given the conceptual framework laid out in section II, leisure is defined as any time spent that directly enters the utility function where as non-leisure time is time used as an input into production of other goods and services. The above categories differ in the extent to which they can be classified as leisure time or production time. For example, there is little dispute that time spent on "entertainment/social activities/relaxing" maps directly into our definition of leisure. However, time spent on education is likely an input into human capital accumulation. However, education time could have a leisure component to it. Many individuals take courses for personal interest (like foreign language classes or art classes) that yield direct utility and thus, should be classified as leisure.

Given that many of the above categories could potentially have both a production and leisure component, we measure leisure in four distinct ways. Our first measure of leisure "leisure measure 1" sums together all time spent on "entertainment/social activities/relaxing", "active recreation", and "religious and civic activities". We consider this to be activities that are most closely related to our definition of leisure. These activities include television watching, leisure reading, going to parties, relaxing, going to bars, playing golf, engaging in volunteer work, etc.

Formally, this definition is analogous to defining leisure as time not spent in total market work, total non-market work, education, child care, sleeping, eating, or personal care. The unconditional means of leisure measure 1 for the five different time use surveys are shown in Table 4.

To adjust for changing demographics over time, we implement the same strategy as we did for market and non market work hours. We estimate a regression similar to (1) on the pooled time use sample replacing time spent in work as the dependent variable with time spent in leisure. In figures 5a (full sample), 5b (males), and 5c (females), we plot the coefficients on the year dummies for different leisure measures. 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 5.1 hours per week for the full sample, 6.0 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.[13] The increase in leisure has been essentially monotonic since 1965. The decline in total work documented in the previous section has allowed individuals to enjoy more direct measures of leisure.

Biddle and Hamermesh (1990) speculate that certain time activities may enhance production. 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

[13] Removing civic and religious activities from this measure of leisure does not change the results at all. The conditional change in leisure measure 1 excluding civic and religious activities is 5.3 hours per week for all individuals, 6.2 hours per week for males, and 4.4 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 21 minutes per week).

personal care.[14] 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. We excluded any measures of own medical care from our measure of personal care. As seen in Table 2, personal care includes activities such as grooming and sex. The unconditional means for leisure measure 2 are shown in Table 4. 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 6.6 hours per week (p-value < 0.01). In other words, sleeping, eating and personal care time increased by an additional 2 hours per week between 1965 and 2003 (p-value < 0.01) . The patterns are similar between men and women. Conditional on changing demographics, time use spent in leisure measured by leisure measure 2 had increased by 6.8 hours per week for men and 6.1 hours per week for women (p-value of both < 0.01). These results are shown in Figure 5b (men) and Figure 5c (women) and in Table 5. Note the comparable numbers for the change in leisure measure 1 were 6.0 hours per week for men and 4.1 hours per week for women. As a result, of the total increase in leisure measure 2 between 1965 and 2003, 12% for men and 33% for women was due to increases in time spent sleeping, eating, and in personal care.

In "leisure measure 3", we measure leisure time as any time spent away from total market work, total non-market work, and education. This implies that leisure measure 3 is leisure measure 2 plus time spent in child care. While child care definitely has a non-market production

[14] 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).

[16] Remember, that our main sample excludes full time students. Although post-secondary education has increased sharply since 1965, the trend in education for non-full time students over the age of 21 has been flat. Moreover, the mean level of education time in both 1965 and 2003 was small (only 0.7 hours per week).

component to it, there also exists a potential leisure component. In other words, while some individuals may pay someone to watch their children while they go to work, most individuals are unwilling to pay for someone to totally raise their children. This fact (along with introspection) suggests that there is some direct utility from spending time with children.

Moreover, from a data stand point, unlike the prior time use surveys, the 2003 time use survey seems to have put in more effort to measure time spent with children. Time spent in "child care" was essentially flat from the 1965 survey through 1993 survey and then increased sharply in 2003 (for both men and women). This is shown in appendix figure A1. It is unclear whether this was an artifact of the increased efforts to measure child care in 2003 or whether there has been a shift towards time spent in child care during this time period. Given this fact, we decided to create an additional measure of leisure that includes time spent in child care.

As seen in figures 5a – 5c, including child care in our measure of leisure has only slight effects on our conclusions. Specifically, the time spent in leisure as measured by leisure measure 3 for the full sample, men, and women are 7.5 hours per week, 8.1 hours per week, and 6.7 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 job search, and time spent in medical care. For example, time spent in education has been essentially flat between 1965 and 2003.[16]

In summary, direct leisure measures (i.e., leisure measure 1) have increased by over 5.1 hours per week since 1965. A more inclusive leisure measure (i.e., leisure measure 2), which includes increased time spent eating, sleeping, and in personal care, increased by over 6.6 hours per week. Both of these magnitudes are economically large. 1n 1965, the average individual

spent 28.2 hours per week in direct market work (4.0 hours a day). The gain in total leisure between 1965 and 2003 (between 5.1 and 6.6 hours per week) is equal to between 1¼ and 1¾ days spent in direct market work in 1965. 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.

There is one further piece of information to note about the increase in leisure since 1965. The increase in leisure occurred for all individuals throughout the leisure distribution. In figure 6, we plot the evolution of leisure measure 3 (time spent away from total market work, total non market work, and education) at different points in the leisure distribution.[17] Again, like figures 2-5, we adjust for changing demographics over time. To do this, we reestimate a regression like (1) 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 10^{th}, 25^{th}, and 33^{rd} percentiles) experienced increases of leisure by less than 4 hours per week. The median time spent in leisure increased by nearly 6 hours per week. However, the upper percentile points experienced very large increases in leisure. Specifically, the 66^{th}, 75^{th}, and 90^{th} percentiles increased their leisure by over 10, 12, and 16 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

[17] 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.

educational attainment. Table 5 shows 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 in 1965. 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 total non-market work between low and high educated men is identical (8.8 hours per week for both). Given this, it is not surprising that in 1965 time spent in leisure is nearly identical between low and high educated men.

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.

In figures 7a and 7b, 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. Low and high educated males both increased total non-market work by nearly identical amounts by 2003 (1.6 hours per week vs. 1.8 hours per week). However, total market work fell by a much greater amount between 1965 and 2003 for low educated males (-13.1 vs. -7.2 hours per week). Similarly, for women, the change in total non-market work was nearly identical regardless of

educational attainment. Low educated women experienced a decline of 9.9 hours per spent in total market work. The comparable number for high educated women was 11.5 hours. Total market work, however, increased much more for high educated females than for low educated females (7.0 vs 1.4 hours per week).

Figure 8 shows the evolution of time spent away from either market work or non market work (i.e., the complement to total work) conditional on demographics by educational attainment and sex.[18] This measure is the broadest of our potential leisure measures. As seen in figure 6, there is tremendous heterogeneity in the evolution of leisure between 1965 and 2003 between different sub groups of the population. Low educated men increased their leisure time by a staggering 11.1 hours per week over this period (p-value < 0.01). Low educated women increased their leisure by 8.1 hours per week (p-value < 0.01). High educated men and high educated women increased their time spent on leisure by 6.2 and 4.3 hours per week (p-value of both < 0.01).

Looking at figure 8, it appears that that the dispersion between high and low education men and high and low education women became amplified after 1985.[19] To analyze this formally will compare the change in leisure measure 3 between 1965 and 1985 for low educated men and high educated men and for low educated women and high educated women. The results are shown in Panel A of Table 6. The coefficients in this table come from a regression such as Table 1 estimated for separately for each age sex group. Low educated men increased leisure by 4.9 hours per week between 1965 and 2003. The comparable number for high educated men is 4.7 hours per week. The difference (between high and low educated men) in the difference (between 1965 and 2003) is 0.21 hours per week (p-value = 0.85). In essence, the change in leisure between 1965 and 2003 between high and low educated men was nearly identical. The results are

[18] The coefficients and standard errors underlying figure 8 are shown in appendix table A3.

[19] 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.

similar for women. Between 1965 and 2003, low and high educated women increased their leisure hours by 3.9 and 3.4 hours per week, respectively (p-value of difference = 0.47).

However, starting in 1985, leisure has evolved differentially for low educated men and women compared to their high educated counterparts. As seen in Panel B of Table 6, low educated males increased their leisure by 6.2 hours per week between 1985 and 2003 while high educated males increased their leisure by 1.7 hours per week (difference of 4.5 hours per week, p-value < 0. 01) . Low educated women increased their leisure by 4.2 hours per week between 1985 and 2003. The increase in leisure for high educated women over the same period was only 1 hour per week (a difference in difference of 3.2 hours per week, p-value 0.02). The widening gap in leisure between low and high educated households appears to have started post 1985. This is the same period in which the well documented skill premium began. The wages of high educated workers relative to their low educated counter parts began to diverge starting in early 1980s (see survey by Katz and Autor, 1999).

Much of the difference in leisure between low and high educated workers also showed up in differences in direct market work hours. The difference in work hours between 1965 and 1985 and 1985 and 2003 for low and high educated men and women are shown in Table 7. There is no statistical difference in the change in direct hours of market work between low educated men and high educated men and between low educated women and high educated women. However, the decline in direct market work hours post 1985 is significantly larger for both low educated men and low educated women.

VI. Explaining Trends in Market Work, Non Market Work, and Leisure

(under construction)

VII. Conclusion

In this paper, we use detailed time diaries to create a set of stylized facts about how time spent in market work, non-market, and leisure have evolved over the past four decades by sex and level of educational attainment. While there exists a literature examining the trends in market work hours, trends in time spent in non-market work hours and leisure have been essentially unexplored. Reassuringly, trends in direct market work hours within our time use surveys match the trends in direct market work hours found in large household surveys such as the PSID.

We find that total work hours (summing together market work plus non market work) have fallen between 1965 and 2003 for all sub-groups that we examined. For example, total work hours for women fell by 7.3 hours per week and for men by 9.0 hours per week. The decline in work hours for women was driven by sharp declines in time spent in non-market work. However, for men, the decline was driven by sharp declines in time spent in total market work.

We define leisure as time not spent in either market work or non-market work. In other words, any time allocation that yields instantaneous utility (as opposed to being an input into something else) is counted as leisure. Using our time use data sets, we create three measures of leisure that match our conceptual framework. All three of these measures have increased sharply between 1965 and 2003. Low educated males have seen the largest increase in leisure (11.2 hours per week) followed by low educated females (8.1 hours per week), high educated males (6.4 hours per week), and high educated females (4.4 hours per week). These numbers are economically large. The average individual in 1965, unconditionally, spent 28 hours per week in market work.

Up through 1985, the level and the trends in leisure between high educated men and low educated men and high educated women and low educated women were very similar. However, after 1985, low educated individuals experienced much greater increases in leisure than their high educated counterparts. The widening gap in leisure between the high and low educated mirrors the widening gap in wages between the high and low educated.

In the final section of the paper, we calibrate a standard optimization model augmented to include non-market production. We show that…..

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Data Appendix (under construction)

After the time diaries are completed in each of the time use surveys, the survey administrators allocate the responses into detailed time use categories. The 1965, 1975, 1985, and 1993 surveys use very similar time use categories. This is not surprising given that the same researcher was a principal investigator on the four early time use surveys.[20] In Appendix Table A2, we list the detailed time use categories for the five time use surveys. When they occur, differences in coding between the four early surveys are small. For example, in the 1965, 1975 and 1985 surveys, time spent eating at home and time spent eating away from home are coded separately. In 1992, there is only a broad time spent eating category which includes both time spent eating at home and time spent eating away from home. Given the similarity in classification between the 1965, 1975, 1985, and 1993 surveys, it is rather easy to make intertemporal comparisons in specific components of time use.

The coding system for the 2003 ATUS data differed from the others. The BLS implemented a 3-tier coding system (similar to SIC industry and occupation codes).[21] For the most part, the codes can be directly compared between the 2003 survey and the other time use surveys. For example, the 2003 ATUS data directly codes time spent on interior clean, time spent on laundry, time spent on food preparation and food cleanup, time spent working on main job, time spent working on other jobs, time spent commuting to work, time spent at work breaks, etc. There are, however, a few differences between the surveys. The major difference between the 2003 survey and the other surveys is that the ATUS data has many more time use categories. For example, the ATUS data records separately "sleep" time from "sleeplessness" time. This latter category records the amount of time you spend trying to sleep or waking up in the middle of the night, yet wishing you were asleep. No such category exists in the early time use categories. So, if an individual from the early survey has trouble sleeping it is unclear whether that would be

[20] John Robinson was the co-PI on the 1965 and 1975 time use surveys and the PI on the 1985 and 1993 survey. See Robinson and Godbey (1997) for a discussion of the collection efforts on the 1965, 1975 and 1985 time use surveys. See Klepis et al (1998) for a discussion of the collection efforts on the 1993 time use survey. Juster and Stafford (1991) also discusses the collection efforts of the 1965 and 1975 time use surveys.

[21] The 3-tier codes can be found at http://www.bls.gov/tus/lexiconnoex2003.pdf.

coded as “sleep” or whether it would be coded as another activity (such as “thinking” or “resting” which are classified under the passive leisure category). Moreover, the ATUS data has a much greater detail with respect to child care activities. One of the goals of the ATUS data was to track parental inputs into child development.

To be completed….

Table 1: Description of Time Use Surveys

Survey	Survey Dates	Sample Coverage	Sample Size (Total)	Sample Size (Restricted)
American's Use of Time	1965: Fall 1966: Spring	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.	2,001 Individuals	1,854 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.	2,406 Individuals	1,675 Individuals
American's Use of Time	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.	4,939 Individuals	3,203 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.	9,383 Individuals	5,342 Individuals
American Time Use Survey	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.	20,720 Individuals	13,137 Individuals

Notes: 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. Of the 2,001 individuals in the 1965-1966 American's Use of Time survey, 776 came from the Jackson, Michigan over sample. Sample size (restricted) refers to the actual sample size we will use in our empirical analysis. We restrict the sample to include only non-retired, non-full time students between the ages of 21 and 65 (inclusive). All surveys, except for the 1965 survey, included sample weights.

Table 2: Time Use Classifications

Time Use Classification	*Examples of Activities Included*
"Direct 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; Time spent at work on breaks/meals.
"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.
"Total Non-Market Work"	"Food preparation and Indoor Household Chores" plus "Shopping/Obtaining Goods and Services" plus 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.
"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 and data appendix for additional details. Excluded categories that we do not discuss include: personal medical care, education, and job search.

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

Panel A: Hours per Week Market and Non-Market Work (All Individuals)

Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	*p*-value difference
Direct Market Work	28.28	27.86	29.33	30.77	31.22	2.94	<0.01
Total Market Work	34.29	32.61	34.39	34.11	34.14	-0.15	0.85
Food Preparation and Indoor Household Chores	14.50	11.70	9.99	8.44	8.04	-6.46	<0.01
Shopping/Obtaining Goods and Services	6.17	5.45	6.04	5.45	5.53	-0.64	<0.01
Total Non Market Work	21.96	19.40	17.98	16.29	15.21	-6.74	<0.01
Direct Market Work Plus Total Non Market Work	50.24	47.26	47.31	47.05	46.43	-3.80	<0.01
Total Market Work Plus Total Non Market Work	56.25	52.01	52.37	50.40	49.35	-6.89	<0.01
Sample Size	1,845	1,675	3,203	5,342	13,147		

Panel B: Hours per Week Market and Non-Market Work (Males)

Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	*p*-value difference
Direct Market Work	42.35	39.66	37.36	38.28	37.51	-4.84	<0.01
Total Market Work	51.79	46.29	43.73	42.51	41.21	-10.58	<0.01
Food Preparation and Indoor Household Chores	1.97	1.96	3.79	2.93	3.45	1.48	<0.01
Shopping/Obtaining Goods and Services	4.77	4.40	4.77	4.13	4.52	-0.26	0.43
Total Non Market Work	8.79	9.45	11.54	10.91	10.44	1.66	<0.01
Direct Market Work Plus Total Non Market Work	51.14	49.11	48.90	49.19	47.95	-3.19	<0.01
Total Market Work Plus Total Non Market Work	60.57	55.74	55.27	53.42	51.65	-8.93	<0.01
Sample Size	832	757	1,428	2,477	5,913		

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

Panel C: Hours per Week Market and Non-Market Work (Females)							
Time Use Category	1965	1975	1985	1993	2003	Difference 2003-1965	*p*-value difference
Direct Market Work	16.82	16.57	21.60	24.49	24.93	8.11	<0.01
Total Market Work	20.04	20.30	25.42	38.77	27.06	7.01	<0.01
Food Preparation and Indoor Household Chores	24.71	20.46	15.95	13.73	12.62	-12.09	<0.01
Shopping/Obtaining Goods and Services	7.30	6.38	7.27	6.55	6.55	-0.76	0.02
Total Non Market Work	32.67	28.33	24.19	20.77	19.99	-12.68	<0.01
Direct Market Work Plus Total Non Market Work	49.49	44.89	45.78	45.26	44.92	-4.57	<0.01
Total Market Work Plus Total Non Market Work	52.71	48.63	49.61	59.54	47.04	-5.67	<0.01
Sample Size	1,022	918	1,775	2,865	7,234		

Notes: Sample includes all individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. Table presents unconditional means for each time use category in each survey year. See Table 2 for a description of time use categories.

Table 4: 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	*p*-value difference
Leisure Measure 1	33.69	36.45	37.38	39.62	38.48	4.78	<0.01
Leisure Measure 2	105.90	111.02	110.31	112.27	111.71	5.81	<0.01
Leisure Measure 3	109.53	113.90	112.98	114.58	115.22	5.69	<0.01
Panel B: Hours per Week in Leisure (Males)							
Time Use Category	1965	1975	1985	1993	2003	Difference: 2003-1965	*p*-value difference
Leisure Measure 1	33.67	35.51	37.40	40.12	39.75	6.08	<0.01
Leisure Measure 2	104.59	108.57	109.10	110.87	111.25	6.66	<0.01
Leisure Measure 3	105.63	109.78	110.22	111.76	113.14	7.51	<0.01
Panel C: Hours per Week in Leisure (Females)							
Time Use Category	1965	1975	1985	1993	2003	Difference: 2003-1965	*p*-value difference
Leisure Measure 1	33.73	37.30	37.35	39.21	37.19	3.47	<0.01
Leisure Measure 2	106.95	113.23	111.48	113.44	112.16	5.21	<0.01
Leisure Measure 3	106.95	113.23	111.48	113.44	112.16	5.21	<0.01

Notes: "Leisure Measure 1" refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, political and religious activities, pet care, and gardening. "Leisure Measure 2" refers to the time individuals spent in leisure measure 1 plus time spent sleeping, eating, and in personal activities. "Leisure Measure 3" includes leisure measure 2 plus time spent in child care. Sample for Panel A includes all individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. Samples for Panels B and C restrict the sample in panel A by only including males and females respectively. See Table 3 for relevant sample sizes for each cell.

Table 5: Mean Levels of Time Use in 1965 by Sex and Educational Attainment Reported in Hours per Week

	Males			Females		
Time Use Category	Education ≤ 12	Education > 12	p-value of difference	Education ≤ 12	Education > 12	*p*-value of difference
Direct Market Work	42.4	42.2	0.92	16.3	18.5	0.21
Total Market Work	51.9	51.6	0.90	19.5	21.8	0.27
Food Prep/Indoor Household Chores	1.9	2.2	0.38	26.0	20.9	<0.01
Total Non-Market Work	8.8	8.8	0.99	33.3	30.7	0.05
Total Work (Market + Non-Market)	60.7	60.4	0.88	52.8	52.5	0.87
Total Work (Excluding Work Related Activities)	55.8	55.4		50.8	51.0	
Leisure Measure 1	34.2	32.5	0.32	33.6	34.1	0.71
Leisure Measure 2	105.3	102.9	0.24	107.0	106.7	0.84
Leisure Measure 3	106.2	104.3	0.35	113.1	111.6	0.40
Sample Size	582	250		773	249	

Notes: 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 individuals from the 1965 time use survey between the ages of 21 and 65 who report not being retired and not being a full time student.

Table 6: Change in Leisure 3 By Educational Status 1965–1985 and 1985-2003 Adjusted for Changing Demographics

	I.	II.	III.	IV.
Panel A: Change in Leisure Hours per Week 1965 – 1985				
	Change in Leisure Hours Education ≤ 12	Change in Leisure Hours Education > 12	Low Educated Change – High Educated Change (Diff-Diff)	*p*-value of Diff- Diff
Males	4.4	3.7	0.7	0.77
Females	4.2	3.3	0.9	0.68
Panel B: Change in Leisure Hours per Week 1985 – 2003				
	I.	II.	III.	IV.
	Change in Leisure Hours Education ≤ 12	Change in Leisure Hours Education > 12	Low Educated Change – High Educated Change (Diff-Diff)	*p*-value of Diff- Diff
Males	5.8	1.4	4.4	<0.01
Females	3.4	1.0	2.4	0.09

Notes: See footnote to table 4 for definition of leisure measure 3.

Table 7: Change in Direct Market Work by Educational Status 1965–1985 and 1985-2003 Adjusted for Changing Demographics

Panel A: Change in Direct Market Work Hours per Week 1965 - 1985				
	I.	II.	III.	IV.
	Change in Direct Market Work Hours Education ≤ 12	Change in Direct Market Work Hours Education > 12	Low Educated Change – High Educated Change (Diff-Diff)	*p*-value of Diff- Diff
Males	-5.18	-3.45	-1.73	0.52
Females	2.02	2.56	-0.54	0.80
Panel B: Change in Direct Market Work Hours per Week 1985 - 2003				
	I.	II.	III.	IV.
	Change in Direct Market Work Hours Education ≤ 12	Change in Direct Market Work Hours Education > 12	Low Educated Change – High Educated Change (Diff-Diff)	*p*-value of Diff- Diff
Males	-1.90	1.51	-3.41	0.04
Females	1.06	5.48	-4.42	<0.01

Notes: See Table 2 for definition of "Direct Market Work". Sample for Panel A includes all male individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student (11,407 individuals). Sample for Panel B includes all female individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student (13,814 individuals). The coefficients in the panel are estimated from a regression of direct market work on year dummies interacted with a dummy for low educational attainment, year dummies interacted with a dummy for high educational attainment, demographics interacted with a dummy for low educational attainment, and demographics interacted with a dummy for high educational attainment (with 1965 being the omitted year dummy). The demographics are the same as those used in the estimations in figures 2-8. Columns I and II report the increase in direct work hours per week by educational attainment. Column III reports the difference in the change in work hours between low and high educated individuals. Column IV reports the *p*-value of the difference in difference.

Appendix Table A1: Comparing Males in PSID with Males in Time Use Data Sets
Sample: All Males Between Age of 21 and 65 (inclusive), Non-Retired, Non-Students

Variable	1965 Time Use Survey	1967 PSID	1975 Time Use Survey	1975 PSID	1985 Time Use Survey	1985 PSID	1993 Time Use Survey	1993 PSID	2003 Time Use Survey	2000 PSID
Age 21 – 29	0.25	0.21	0.27	0.30	0.27	0.23	0.25	0.18	0.20	0.16
Age 30 – 39	0.23	0.25	0.28	0.24	0.32	0.33	0.31	0.33	0.26	0.27
Age 40 – 49	0.26	0.27	0.20	0.24	0.20	0.20	0.25	0.30	0.28	0.31
Age 50 – 59	0.19	0.19	0.19	0.18	0.16	0.18	0.15	0.15	0.20	0.21
Age 60 – 65	0.07	0.08	0.06	0.05	0.05	0.05	0.04	0.05	0.06	0.05
Education > 12	0.31	0.28	0.30	0.39	0.46	0.49	0.58	0.54	0.55	0.59
Married	0.87	0.89	0.85	0.85	0.69	0.76	N/A	0.71	0.69	0.70
Have Child	0.65	0.65	0.55	0.60	0.42	0.51	0.32	0.46	0.42	0.45
Employed	0.97	0.96	0.93	0.93	0.88	0.90	0.89	0.91	0.88	0.91

Notes:

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

Regression	Coefficient on Year Dummy (Relative to 1965) 1975	1985	1993	2003
Direct Market Work (Figure 2)				
All	-0.63	-1.28	0.01	0.07
	(0.93)	(0.81)	(0.76)	(0.70)
Men	-2.03	-5.03	-5.45	-5.10
	(1.46)	(1.26)	(1.20)	(1.10)
Women	0.54	1.56	4.40	4.59
	(1.17)	(1.02)	(0.93)	(0.88)
Total Non Market Work (Figure 3)				
All	-2.05	-2.17	-4.28	-4.87
	(0.57)	(0.49)	(0.47)	(0.42)
Men	0.60	2.92	2.50	1.74
	(0.76)	(0.67)	(0.63)	(0.57)
Women	-4.03	-6.08	-9.73	-10.37
	(0.81)	(0.70)	(0.65)	(0.61)
Total Work (Figure 4)				
All	-4.00	-4.64	-7.15	-8.23
	(0.92)	(0.79)	(0.75)	(0.69)
Men	-4.12	-5.09	-8.21	-9.03
	(1.46)	(1.26)	(1.20)	(1.10)
Women	-3.66	-4.31	-6.28	-7.30
	(1.16)	(1.00)	(0.92)	(0.86)

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 (Relative to 1965) 1975	1985	1993	2003
All (Figure 5a)				
Leisure Measure 1	2.45	3.62	6.48	5.06
	(0.79)	(0.69)	(0.64)	(0.60)
Leisure Measure 3	4.69	4.53	6.95	6.55
	(0.90)	(0.78)	(0.72)	(0.67)
Leisure Measure 3	4.13	4.53	6.66	7.49
	(0.91)	(0.78)	(0.74)	(0.68)
Males (Figure 5b)				
Leisure Measure 1	1.14	3.41	7.02	6.00
	(1.25)	(1.09)	(1.03)	(0.95)
Leisure Measure 3	3.10	4.19	7.13	6.78
	(1.41)	(1.23)	(1.17)	(1.06)
Leisure Measure 3	3.44	4.69	7.47	8.10
	(1.42)	(1.24)	(1.17)	(1.07)
Females (Figure 5c)				
Leisure Measure 1	3.48	3.87	6.02	4.07
	(1.02)	(0.88)	(0.80)	(0.75)
Leisure Measure 3	5.96	4.83	6.86	6.14
	(1.14)	(0.98)	(0.91)	(0.85)
Leisure Measure 3	4.60	4.40	5.97	6.70
	(1.16)	(1.00)	(0.92)	(0.86)

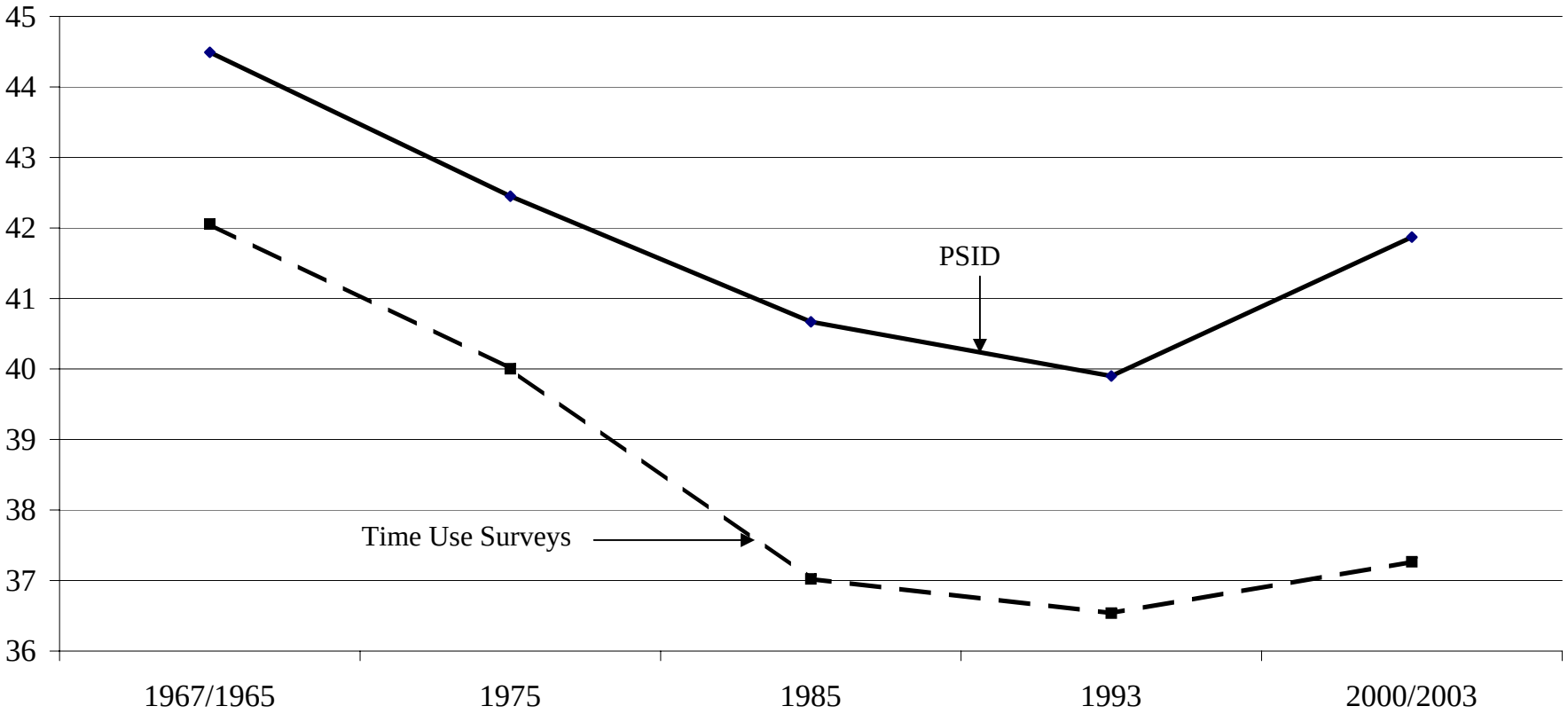
Notes: These are the coefficients and standard errors for the time dummies that are plotted in Figures 2, 3, 4 and 5. See notes to the figures for full sample and methodological descriptions.

Appendix Table A3: Coefficients on Year Dummies Displayed in Figures 6a, 6b and 7 (Standard Errors in Parenthesis) UPDATE TOTAL LEISURE NUMBERS

	Coefficient on Year Dummy (Relative to 1965)			
Regression	1975	1985	1993	2003
Men with Education ≤ 12				
Total Market Work	-5.06	-8.28	-11.52	-13.06
	(2.01)	(1.82)	(1.79)	(1.56)
Total Non-Market Work	0.56	3.01	2.88	1.79
	(0.95)	(0.86)	(0.84)	(0.74)
Total Leisure	3.64	4.97	7.81	11.19
	(1.86)	(1.68)	(1.65)	(1.44)
Men with Education > 12				
Total Market Work	-4.21	-6.11	-8.19	-7.18
	(2.77)	(2.23)	(2.08)	(1.98)
Total Non-Market Work	0.70	2.73	2.04	1.63
	(1.35)	(1.10)	(1.03)	(0.98)
Total Leisure	4.43	4.69	6.49	6.41
	(2.49)	(2.01)	(1.88)	(1.80)
Women with Education ≤ 12				
Total Market Work	-0.29	2.16	1.79	1.39
	(1.51)	(1.38)	(1.31)	(1.17)
Total Non-Market Work	-4.08	-6.34	-9.17	-9.86
	(0.99)	(0.91)	(0.86)	(0.77)
Total Leisure	4.39	3.96	6.83	8.13
	(1.38)	(1.26)	(1.19)	(1.07)
Women with Education > 12				
Total Market Work	2.70	3.10	7.44	6.99
	(2.57)	(2.04)	(1.87)	(1.79)
Total Non-Market Work	-4.05	-6.11	-10.85	-11.45
	(1.54)	(1.23)	(1.12)	(1.07)
Total Leisure	1.44	3.42	3.02	4.36
	(2.26)	(1.80)	(1.65)	(1.58)

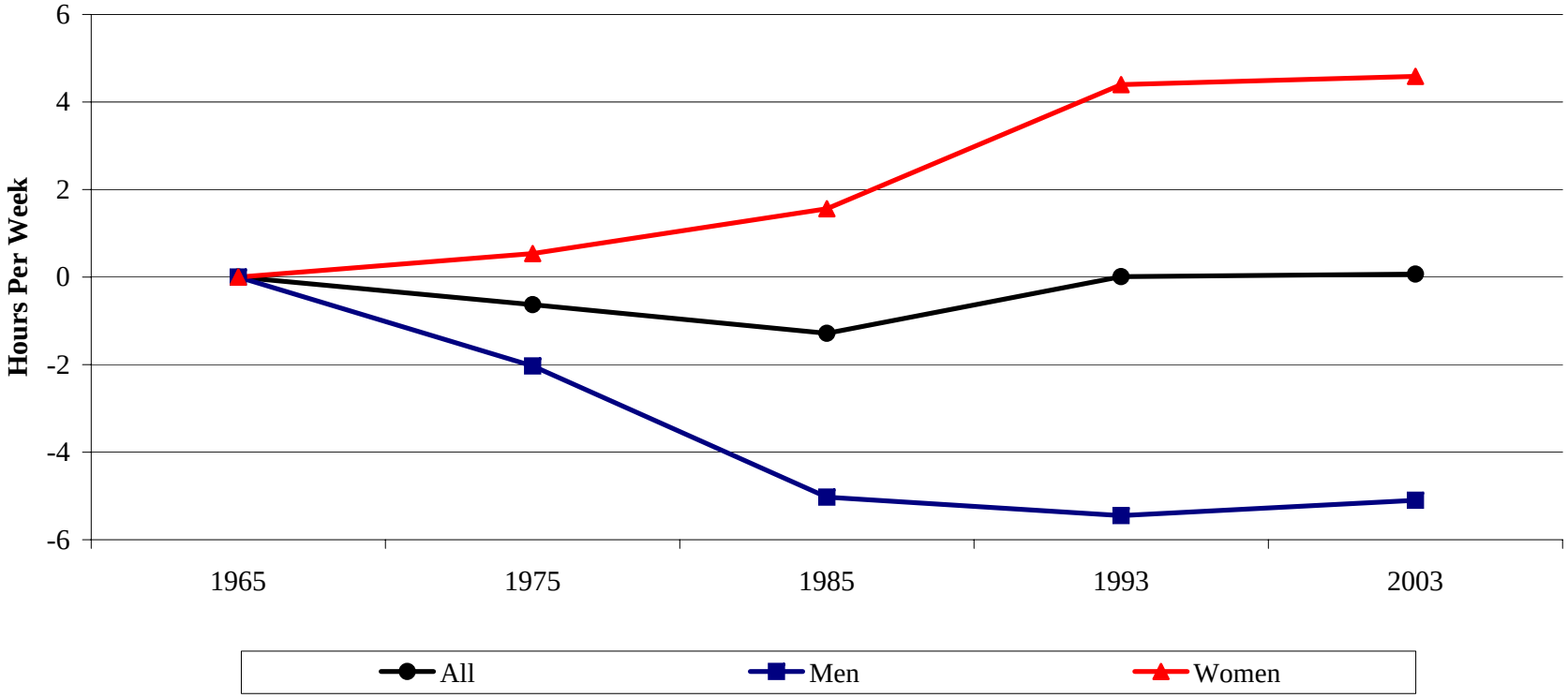
Notes: These are the coefficients and standard errors for the time dummies that are plotted in Figures 6a, 6b and 7. See notes to the figures for full sample and methodological descriptions.

Figure 1: Comparison of Time Spent in Market Work Between PSID and Time Use Data Sets



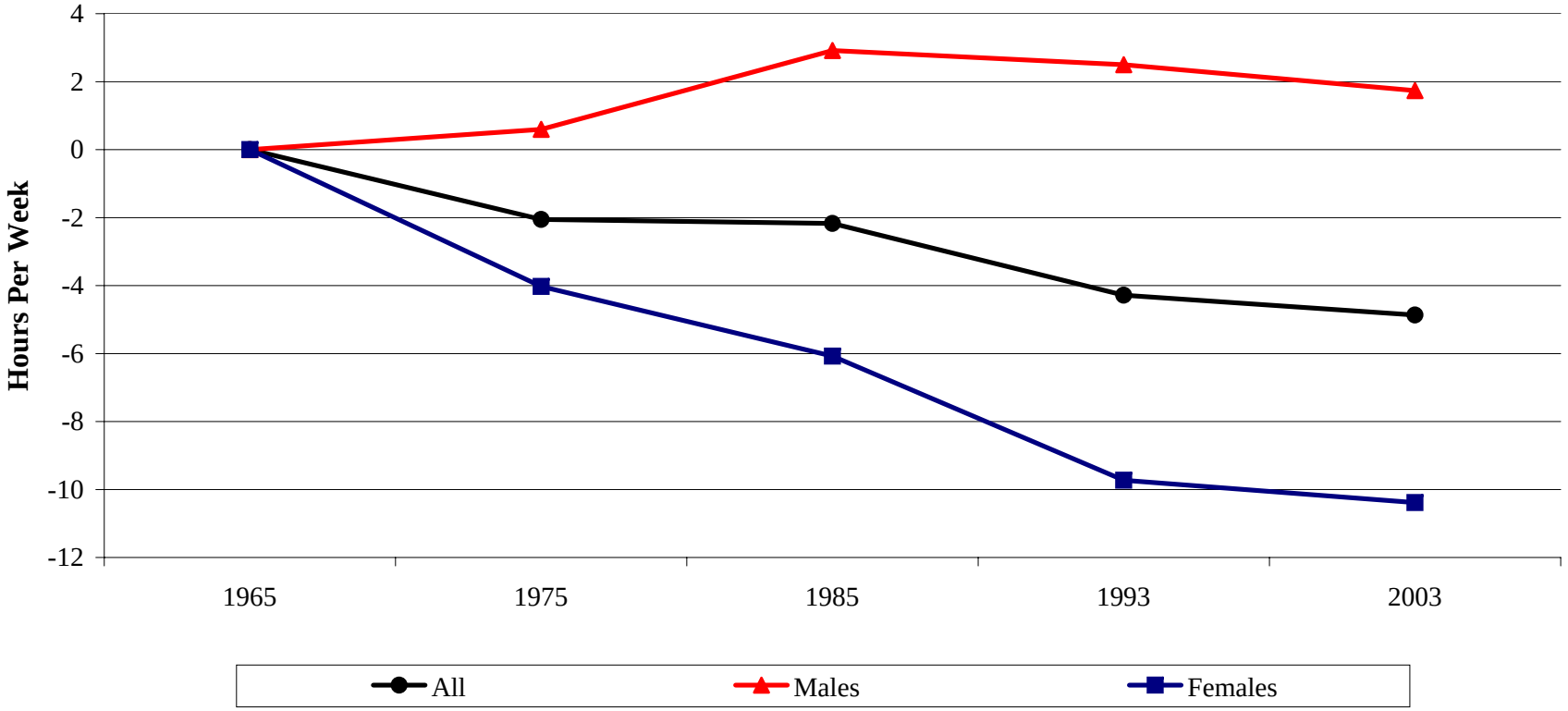
Notes: Figure compares time spent in market work for males in the Panel Study of Income Dynamics (PSID) and the five time use data samples. Time spent in market work is defined as time spent working for pay on main job and all other jobs. All samples are restricted to include only males between the ages of 21 and 65 who are non-retired and non-full time students. The time use samples are adjusted to make the age, education and family structure characteristics comparable to the PSID. To compare to the time use data sets, we only report work hours in the PSID for the years 1967, 1975, 195, 1993, and 2000. The PSID data is only availabe back to 1967 (via the first wave of the PSID which was conducted in 1968). The most recent PSID data available for work hours is from 2000. For the full trend in male market work hours in the PSID between 1967 and 2000, see appendix figure A1.

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



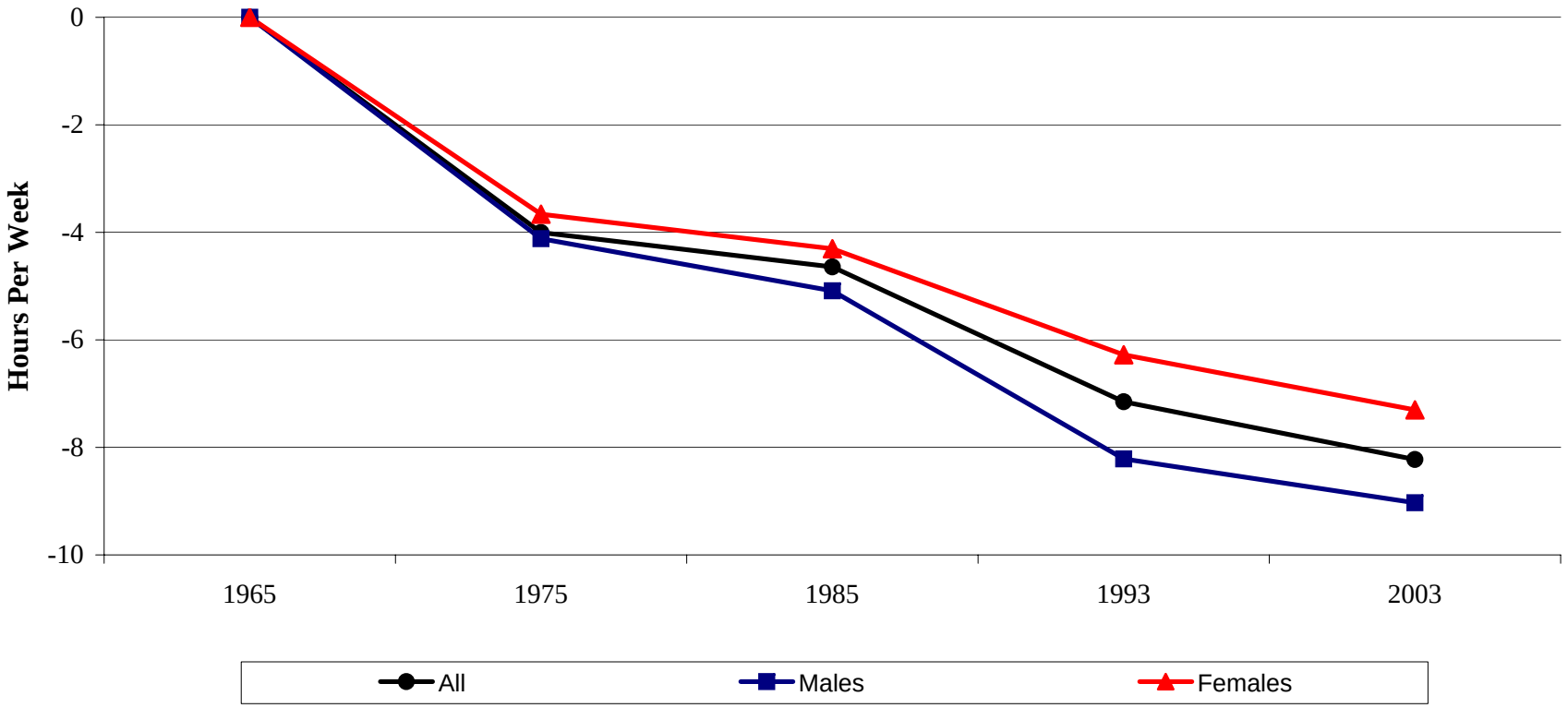
Notes: See Table 2 for definition of direct market work. Sample includes all individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. This graph plots the coefficients on year dummies from a regression of time spent in direct market work on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls. The pooled sample had 25,221 individuals. To get the conditional trends in direct 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).

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



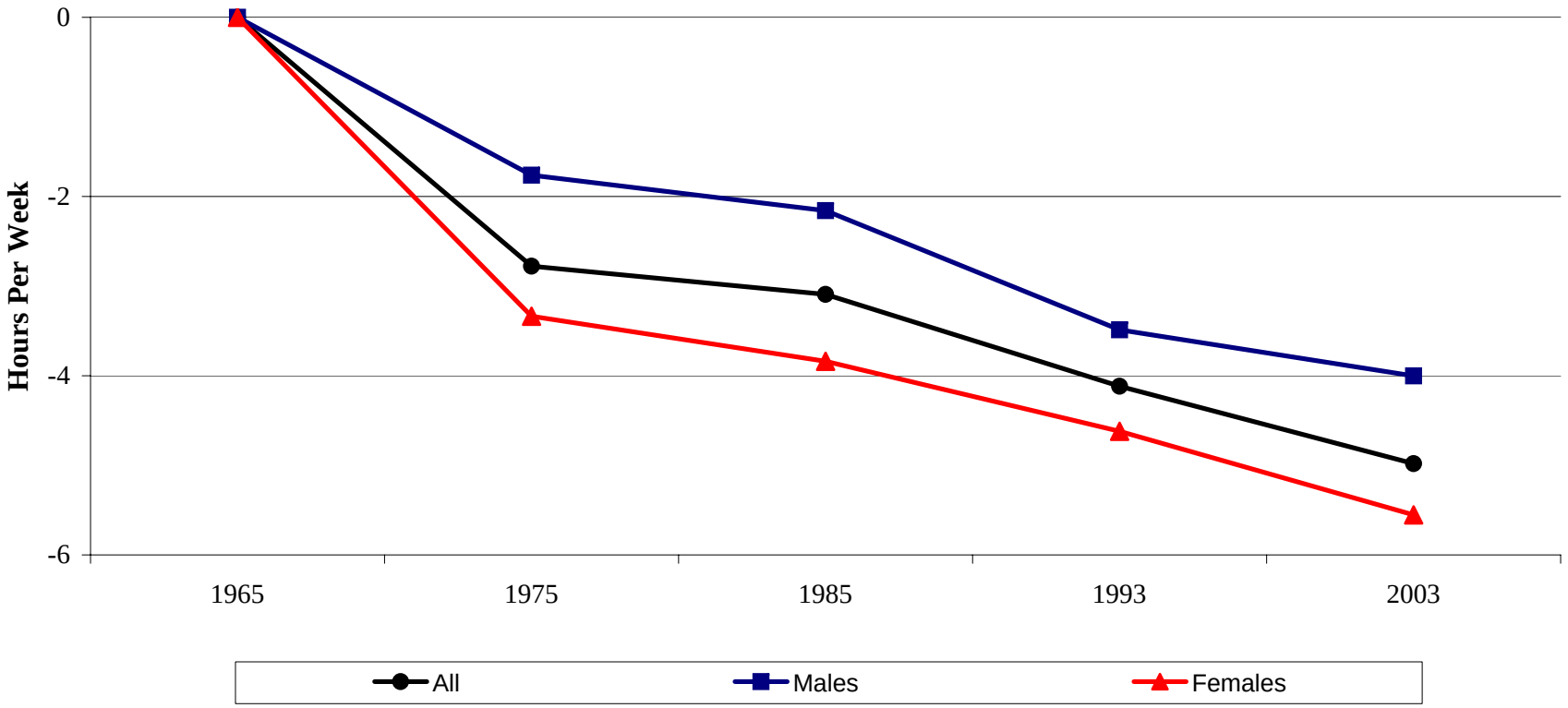
Notes: See Table 2 for the definition of "Total Non-Market Work". Sample includes all individuals by sex from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. This graph plots the coefficients on year dummies from a regression of time spent in total non-market work on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls. The pooled sample had 25,221 individuals. To get the conditional trends in total non market work by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively).

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



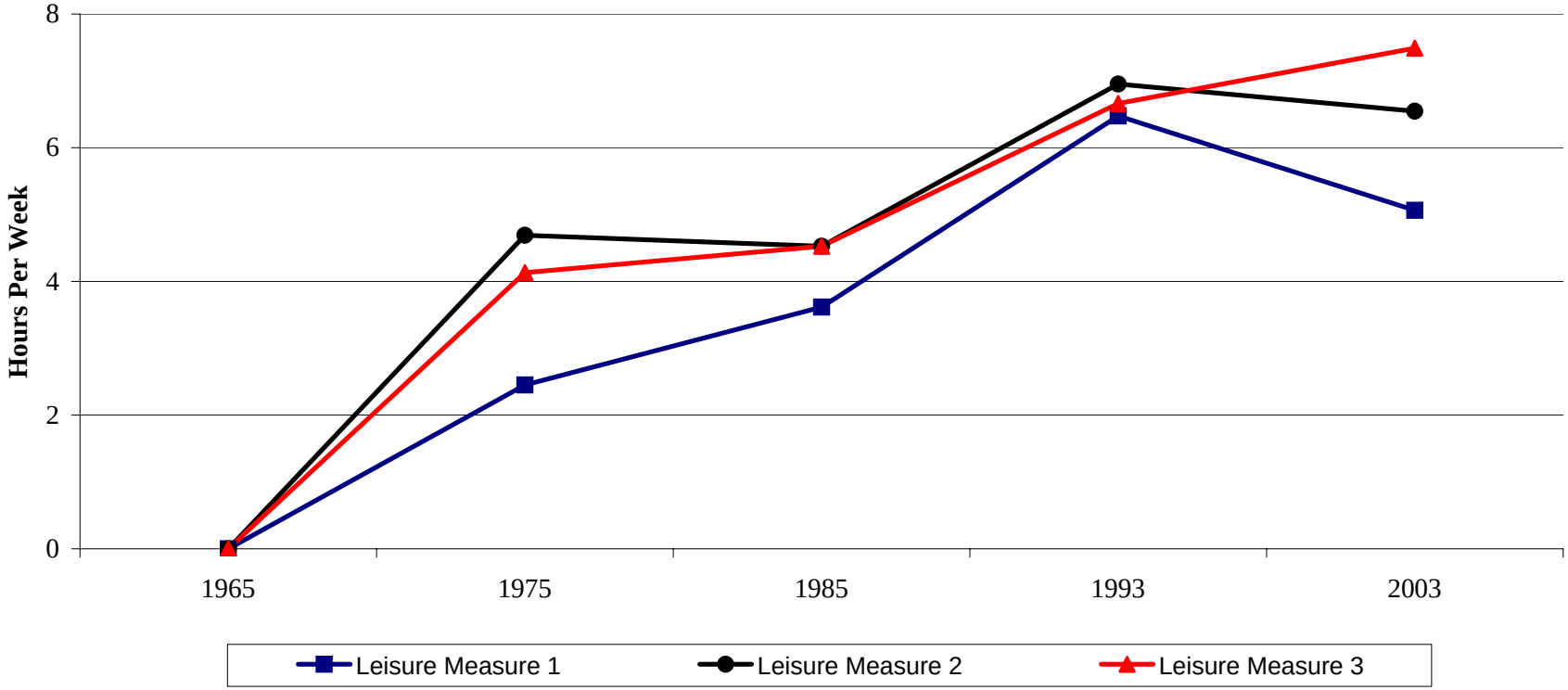
Notes: "Total Work" is the sum of total market work and total non-market work. Sample includes all individuals by sex from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. This graph plots the coefficients on year dummies from a regression of time spent in total work on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls. The pooled sample had 25,221 individuals. To get the conditional trends in total work by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively).

Figure 4 (Alternate): Time Spent in "Total Work - Excluding "Work Related Activities""
By Sex Conditional on Demographics - Change in Hours Per Week Relative to 1965



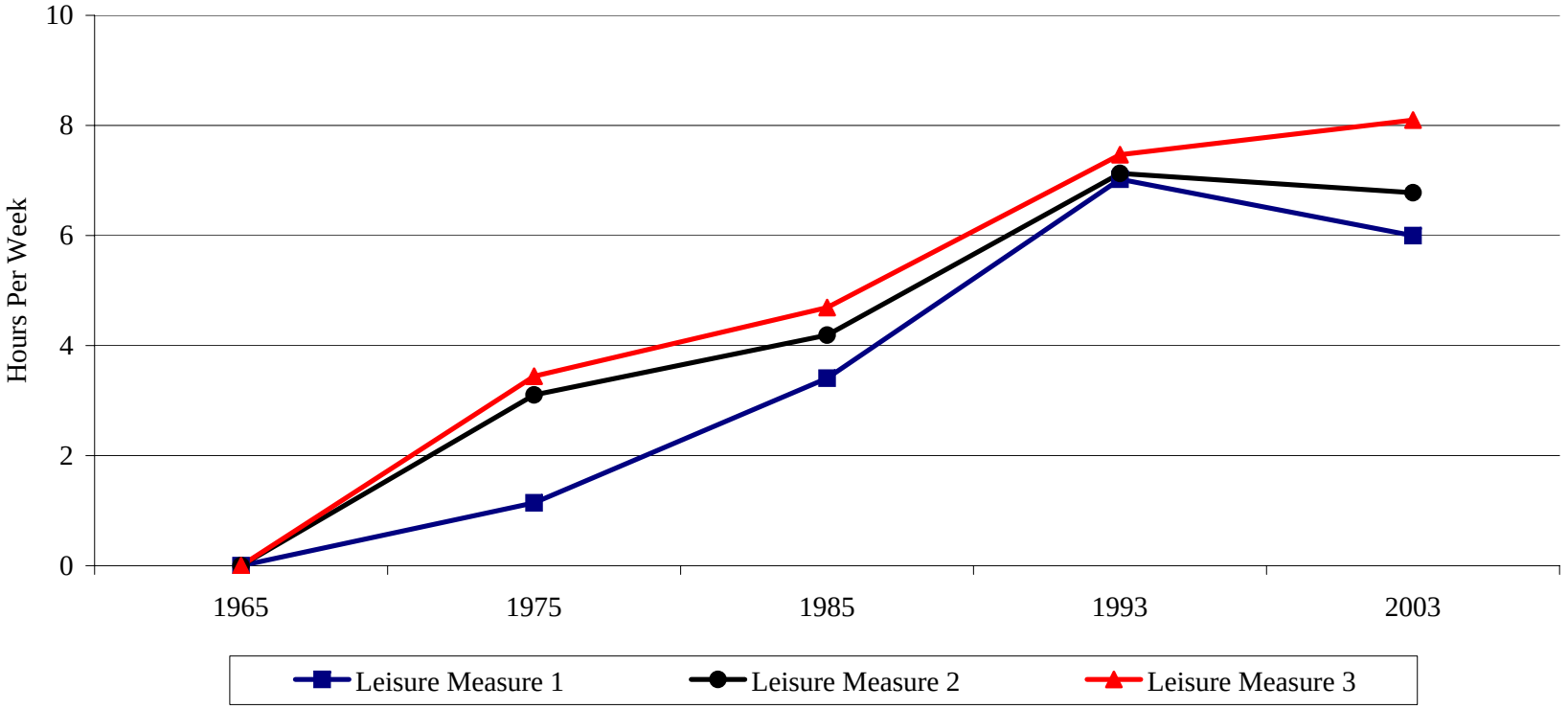
Notes: "Total Work" is the sum of total market work and total non-market work. Sample includes all individuals by sex from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student. This graph plots the coefficients on year dummies from a regression of time spent in total work on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls. The pooled sample had 25,221 individuals. To get the conditional trends in total work by sex, we re-estimated the regression separately restricting the sample to include only men or women (13,814 and 11,407 observations, respectively).

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



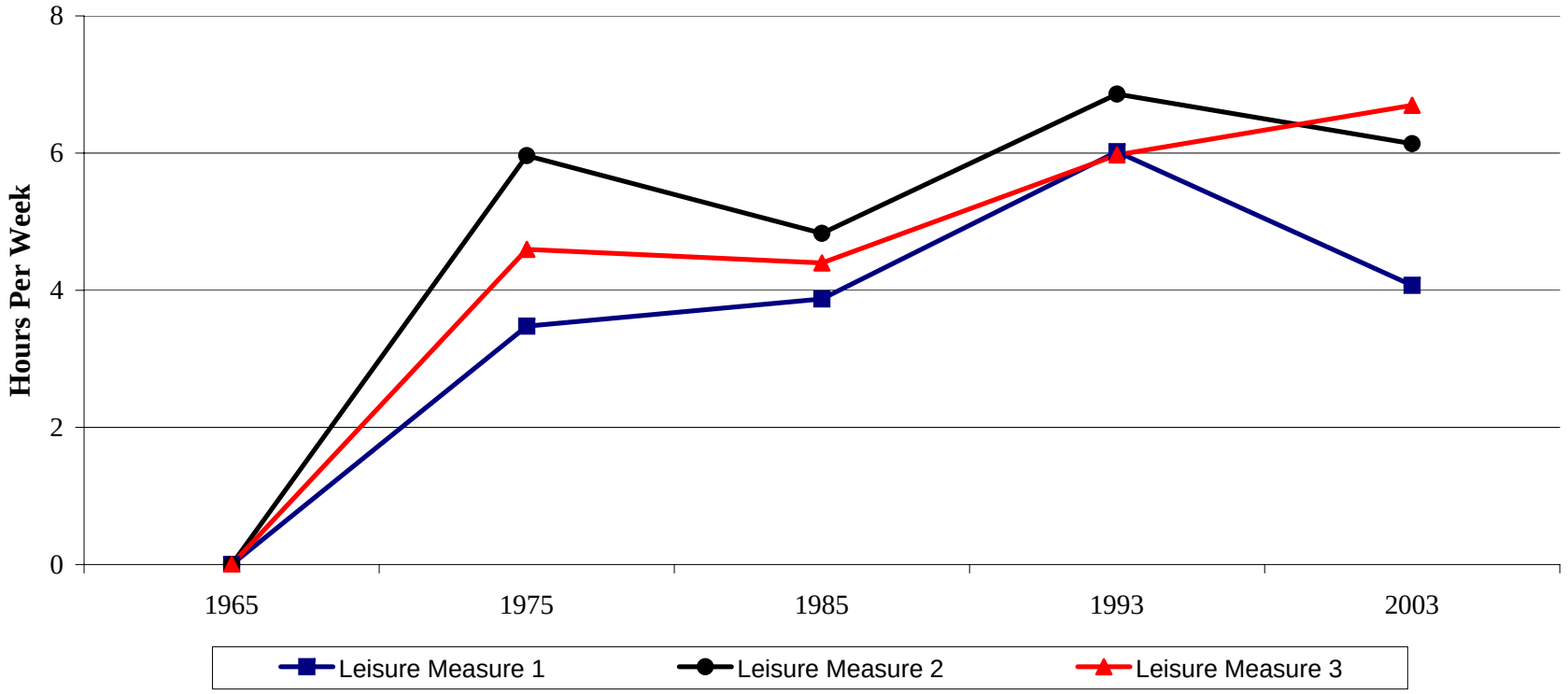
Notes: "Leisure Measure 1" refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, political and religious activities, pet care, and gardening. "Leisure Measure 2" refers to the time individuals spent in leisure measure 1 plus time spent sleeping, eating, and in personal activities. "Leisure Measure 3" includes leisure measure 2 plus time spent in child care. . Sample includes individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student (25,221 individuals). This graph plots the coefficients on year dummies from regressions of time spent in one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.

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



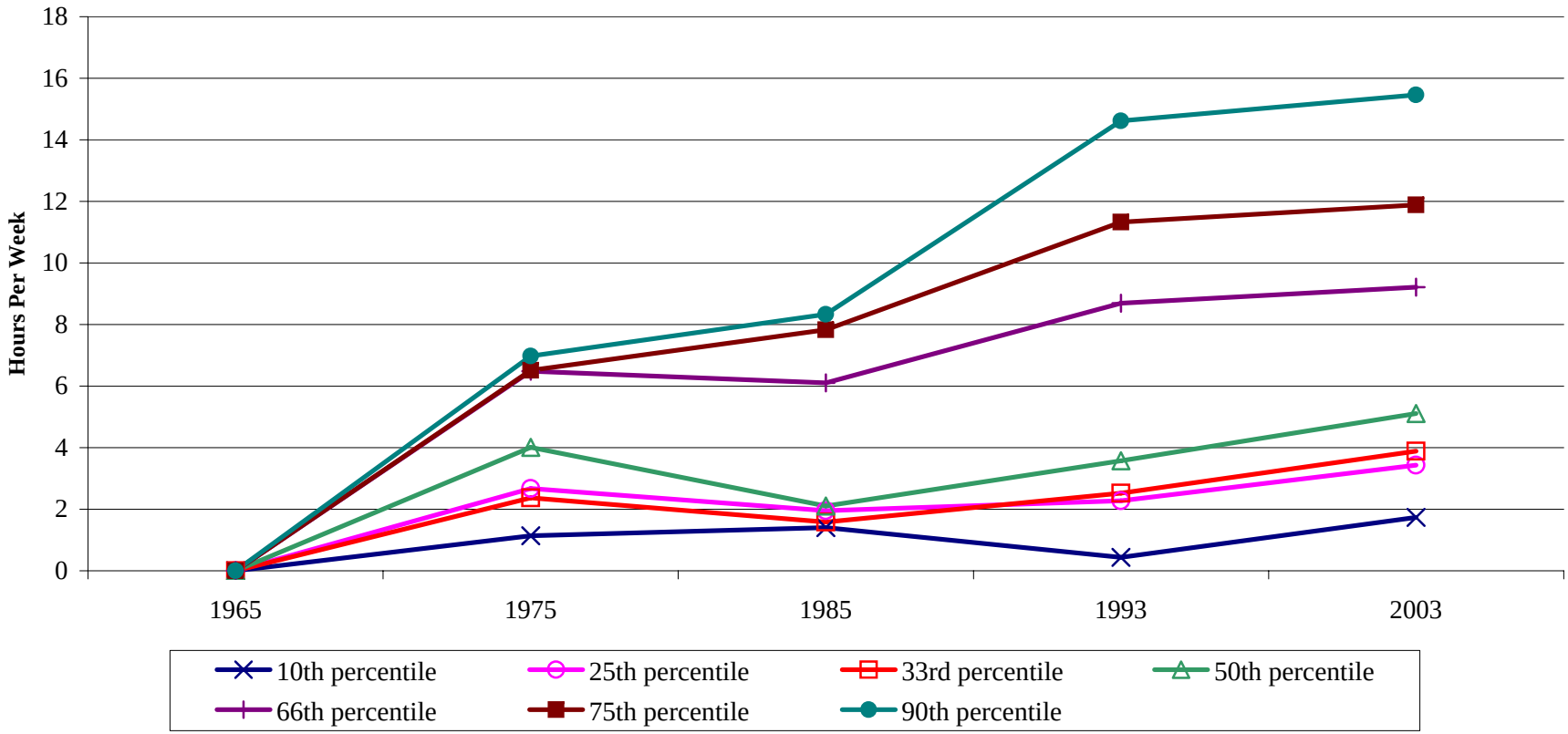
Notes: "Leisure Measure 1" refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, political and religious activities, pet care, and gardening. "Leisure Measure 2" refers to the time individuals spent in leisure measure 1 plus time spent sleeping, eating, and in personal activities. "Leisure Measure 3" includes leisure measure 2 plus time spent in child care. Sample includes male individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student (11,407 individuals). This graph plots the coefficients on year dummies from regressions of time spent in one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.

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



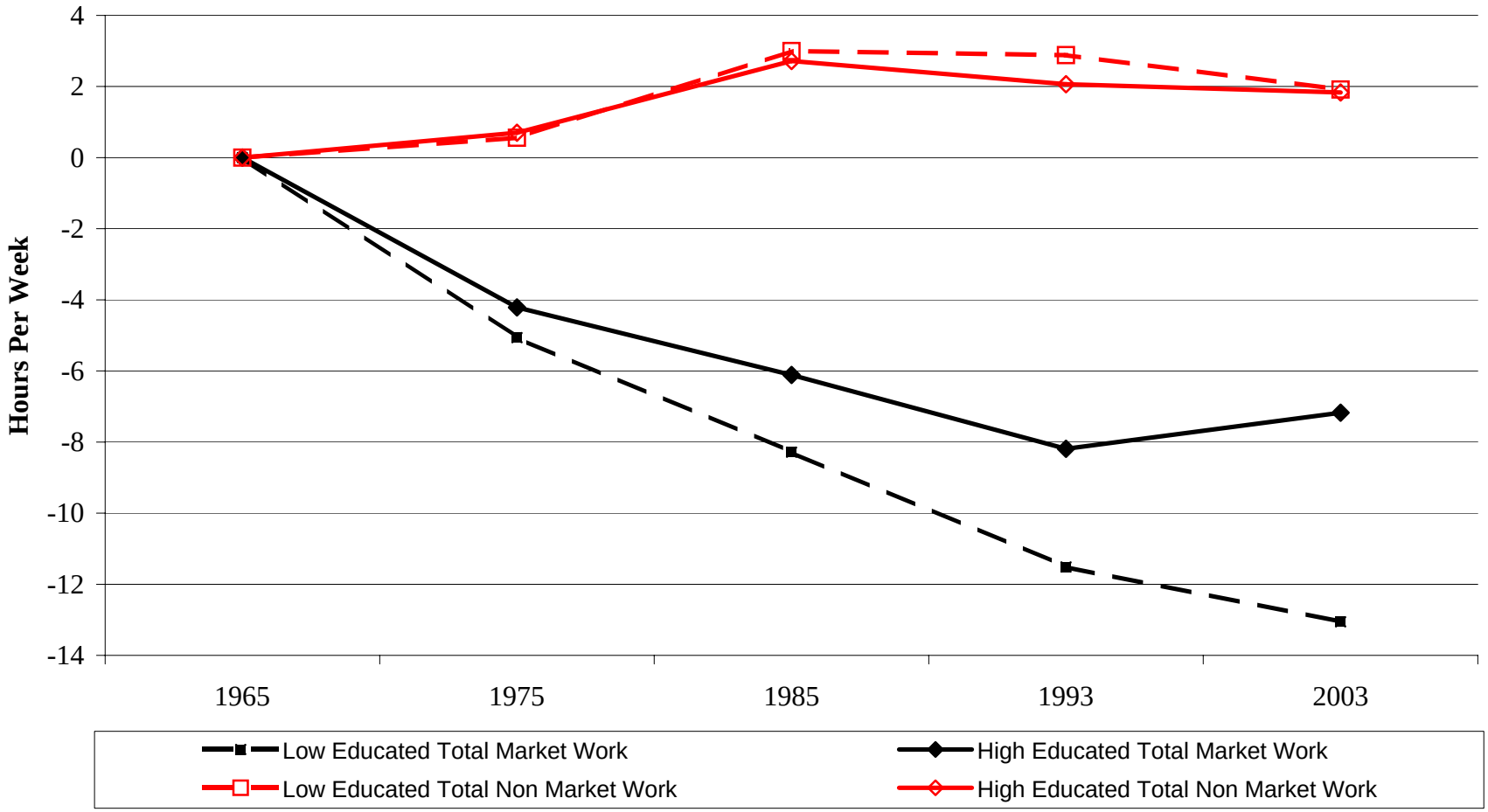
Notes: "Leisure Measure 1" refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, political and religious activities, pet care, and gardening. "Leisure Measure 2" refers to the time individuals spent in leisure measure 1 plus time spent sleeping, eating, and in personal activities. "Leisure Measure 3" includes leisure measure 2 plus time spent in child care. Sample includes female individuals from the pooled time use survey between the ages of 21 and 65 who report not being retired and not being a full time student (13,814 individuals). This graph plots the coefficients on year dummies from regressions of time spent in one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.

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



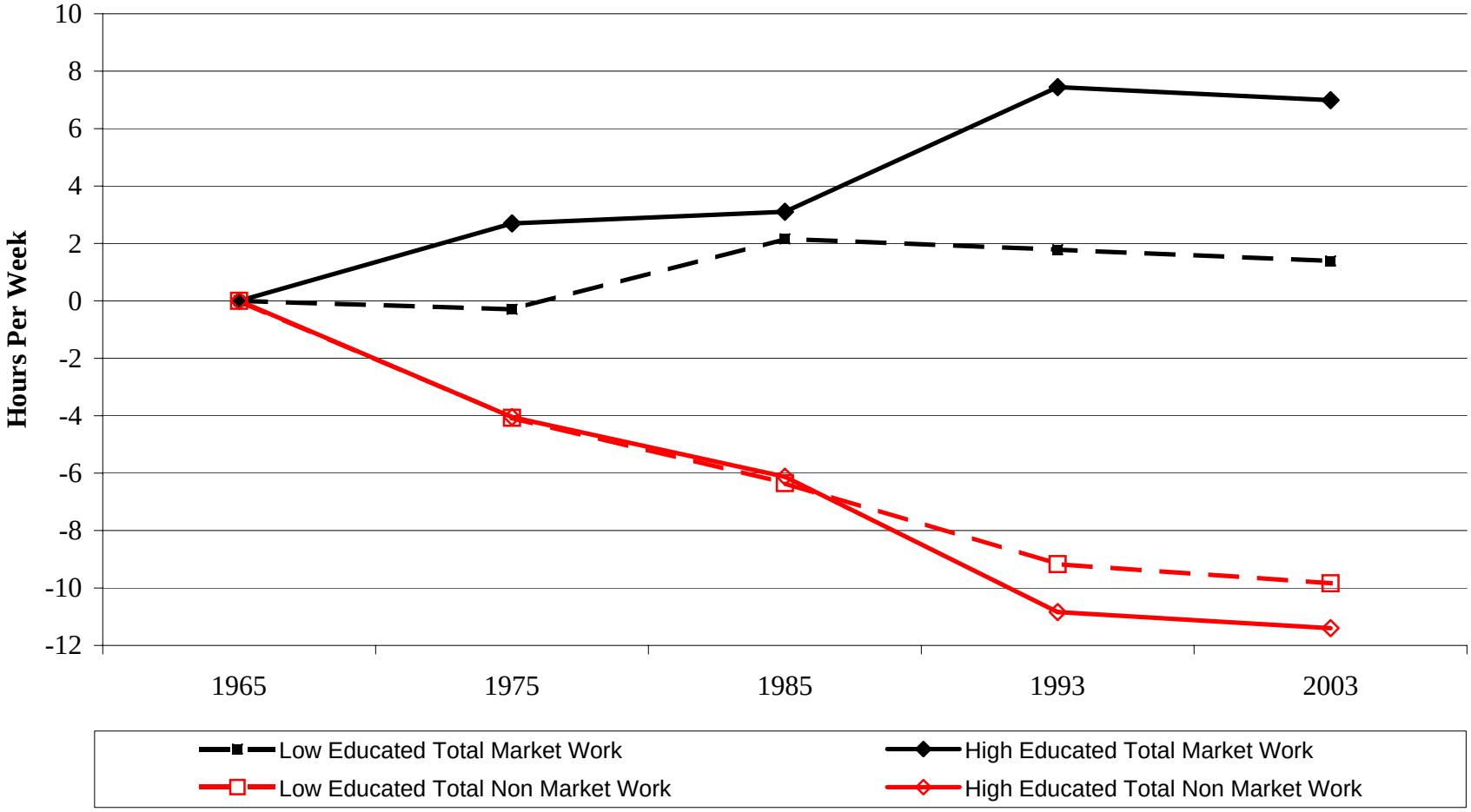
Notes: "Leisure Measure 3"is defined in the footnotes to figures 5a-5c. To contruct this plot, we ran a regression of leisure time on age, education, sex, family composition, and day of week controls on our pooled time use data set. We then take the residuals of this regression by year and compute the 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



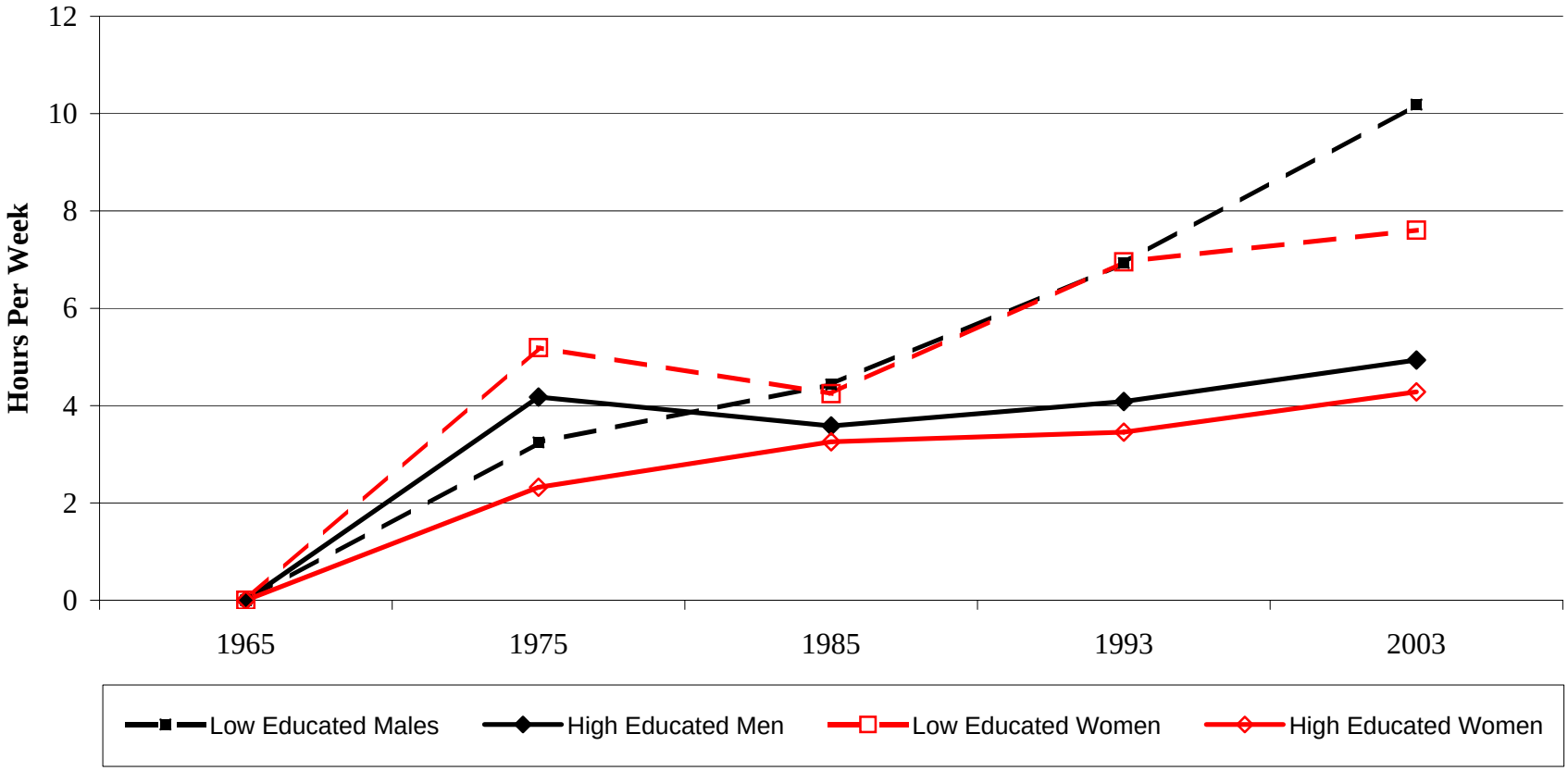
Notes: This graph plots the coefficients on year dummies from regressions of time spent in one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.

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 one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.

Figure 8: Time Spent in Leisure Measure 3 By Sex and Educational Attainment Conditional on Demographics



Notes: "Leisure Measure 3"is defined in the footnotes to figures 5a-5c This graph plots the coefficients on year dummies from regressions of time spent in one of the three leisure measures on year dummies (with 1965 being the omitted year), day of the week dummies, age controls, sex controls, education controls, and family composition controls.