

MEASURING TRENDS IN LEISURE: THE ALLOCATION OF TIME OVER FIVE DECADES*

MARK AGUIAR AND ERIK HURST

In this paper, we use five decades of time-use surveys to document trends in the allocation of time within the United States. We find that a dramatic increase in leisure time lies behind the relatively stable number of market hours worked between 1965 and 2003. Specifically, using a variety of definitions for leisure, we show that leisure for men increased by roughly six to nine hours per week (driven by a decline in market work hours) and for women by roughly four to eight hours per week (driven by a decline in home production work hours). Lastly, we document 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.

I. INTRODUCTION

In this paper, we document trends in the allocation of time within the United States over the last forty years. In particular, we focus our attention on the evolution of leisure time. In commonly used 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, leisure is almost universally defined as time spent away from market work. However, as noted by Becker [1965], households can also allocate time to production outside the formal

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1. In some years, the PSID asks respondents to individually report the amount of time they spent on household chores during a given week. These data are exploited by Roberts and Rupert [1995] to document a decline in total work, which, for the overlapping periods, is consistent with the trends documented in this paper.

market sector. To the extent that nonmarket (home) production is important and changing over time, changes in leisure time will be poorly proxied by changes in time spent away from market work. By linking five decades of detailed time-use surveys, we empirically draw the distinction between leisure and the complement of market work. In doing so, we document a set of facts about how home production and leisure have evolved for men and women of differing educational attainment during the last forty years.

The main empirical finding in this paper is that leisure time—measured in a variety of ways—has increased significantly in the United States between 1965 and 2003. When computing our measures of leisure, we separate out other uses of household time, including time spent in market work, time spent in nonmarket production, time spent obtaining human capital, and time spent in health care. Given that some categories of time use are easier to categorize as leisure than others, we create four distinct measures of leisure. Our measures range from the narrow, which includes activities designed to yield direct utility, such as entertainment, socializing, active recreation, and general relaxation, to the broad, namely, time spent neither in market production nor in nonmarket production. While the magnitudes differ slightly, the conclusions drawn are similar across each of the leisure measures.

Using a narrow definition of leisure (our Leisure Measure 2), we find that leisure increased by 6.2 hours per week for men and by 4.9 hours per week for women between 1965 and 2003, adjusting for changing demographics. Interestingly, the decline in total work (the sum of total market work and total nonmarket work) was nearly identical for both men and women (8.3 and 7.8 hours per week, respectively). These declines in total work are large. To put things in perspective, in 1965 the average man spent sixty-one hours per week and the average women spent fifty-five hours per week in combined market and nonmarket work. The eight-plus hour-per-week decline recorded between 1965 and 2003 therefore represents roughly 14 percent of the total work week in 1965.

The adjustments that allow for greater leisure while satisfying the time budget constraint differ between men and women. Men increased their leisure by allocating less time to the market sector, whereas leisure time for women increased simultaneously with time spent in market labor. The increased leisure for women was made possible by a more than ten-hour-per-week decline in

the time allocated to home production. This decline more than offset their 3.8-hour-per-week increase in time spent in market work during this time period.²

We analyze trends in child care separately from trends in other types of home production. There is an increase of roughly two hours per week in reported time spent on child care in the 2003 survey relative to earlier surveys. In light of the conceptual difficulty in classifying whether time spent with children represents work or leisure, we treat child care as a separate category and then explore the robustness of our conclusions to a variety of different assumptions about how child care should be classified. The alternative classification of child care as work or leisure does not influence the overall trends through 1993, as the reported time spent in child care was essentially flat between 1965 and 1993. Moreover, the two-hour-per-week increase in child care between 1993 and 2003 is modest relative to the large changes in total work and leisure recorded between 1965 and 2003.

We also document a growing cross-sectional dispersion in time allocated to leisure. The gap between the 90th and 10th percentiles of the cross-sectional leisure distribution increased by fourteen hours per week between 1965 and 2003. Other measures tell a similar story of a growing dispersion in the consumption of leisure time. Some of this increase in dispersion we can link to the fact that less educated men and women experienced much greater increases in leisure compared to their more educated counterparts. For example, between 1965 and 2003, men with a high school diploma experienced an increase of 7.3 hours per week in our second narrowest leisure category while men with at least a bachelor's degree experienced no change. The relative growth of leisure favoring less-educated adults is consistent with the finding that low-wage workers have dramatically decreased their market work hours relative to high-wage workers over the last century (see Costa [2000]).

This divergence in leisure we document started during the last half of our sample. The increase in leisure between 1965 and 1985 was similar for respondents of different educational attainment. Post 1985, on the other hand, less-educated adults experienced significantly larger gains in leisure compared to those with a college education or more. The timing of the changing

2. All time trends discussed in this paper, unless otherwise noted, are adjusted for changing demographics. See Section II.A. for details.

inequality in leisure across education groups mirrors the well-documented timing of the changing inequality in wages and consumption (see Katz and Autor [1999] and Attanasio, Battistin, and Ichimura [2004] for wages and consumption, respectively).

We also document a significant dispersion of leisure *within* educational categories. Using the decomposition of Juhn, Murphy, and Pierce [1993], we show that the majority of the increase in the overall cross-sectional dispersion in leisure was due to forces other than observed demographics (including education). That is, while the growing leisure gap between educational groups is substantial, it is more than matched by the growing within-group dispersion.

Our work adds to the existing literature on measuring changes in the allocation of time. Three classic book-length references are Ghez and Becker [1975], Juster and Stafford [1985], and Robinson and Godbey [1999]. The latter is most closely related to our study. It uses the same time-use surveys we use from 1965, 1975, and 1985, as well as some additional time-use information from the early 1990s.³ However, aside from examining trends over longer periods of time, our paper extends the literature by documenting and analyzing the growing dispersion in leisure. Moreover, we consider alternative leisure aggregates. Lastly, instead of reporting unconditional means, we report trends in time use adjusted for changing demographics. This is potentially important given the changes in the age distribution, fertility, family structure, and educational attainment that occurred during this time period. While the literature on the allocation of time is large, particularly in sociology, to the best of our knowledge, no other study combines the length of time series, the attention to cross-sectional dispersion (particularly post-1985), and the focus on different measures of leisure found in the current paper.

3. Juster and Stafford [1985] fully examined unconditional and conditional time use in the United States using the 1965 and 1975 time diaries. In the first edition of their book [1997], Robinson and Godbey extended the analysis of Juster and Stafford by examining the trends in time use across 1965, 1975, and 1985. In their second edition, Robinson and Godbey added a chapter entitled "A 1990s Update: Trends Since 1985." In that chapter, they briefly discuss how unconditional measures of time in the early 1990s compare with unconditional measures of time use from earlier decades. However, their discussion does not include the conditional time-use analysis that is done in this paper. See Schor [1992] for a popular, and controversial, study that draws different conclusions about the trends in leisure between the mid 1960s and the early 1980s.

II. EMPIRICAL TRENDS IN THE ALLOCATION OF TIME

II.A. Data

To document the trends in the allocation of time over the last forty years, we link five major time-use surveys: 1965–1966 America's 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 the 2003 American Time Use Survey.⁴ The data in the Appendix and Table I describe these surveys in detail. All data and programs used to create the results in this paper are available on the authors' websites. In this section, we characterize four major uses of time: market work, nonmarket production, child care, and leisure.

Our primary sample consists of respondents aged twenty-one through sixty-five who are neither students nor retirees.⁵ We drop adults younger than twenty-one and adults older than sixty-five (as well as students and early retirees) to minimize the role of time allocation decisions that have a strong intertemporal component, such as education and retirement. Moreover, the 1965 time-use survey excludes households with heads who are either retired or over the age of sixty-five. We drop these households from subsequent surveys to ensure a consistent sample. Additionally, the 1965, 1975, and 1985 time-use surveys exclude individuals under the age of eighteen or nineteen from their samples.⁶

We report trends over the last forty years holding constant the demographic composition of the sample. Specifically, we divide the sample into demographic cells defined by five age groups (21–29, 30–39, 40–49, 50–59, 60–65), four education categories (less than high school, high school, some college, and college

4. Because of our reliance on time-use surveys, our paper does not address time allocation before 1965, the year of the first large-scale, nationally representative time-diary survey for which micro data are available. Lebergott [1993] is a standard reference for household time use during the early twentieth century.

5. As opposed to measuring changes in the allocation of time *per adult*, as we do, Ramey and Francis [2006] measure changes in the allocation of time *per capita*. Given that the share of children in the population has declined sharply during the last forty years, including children in the per capita measure augments the increase (or mitigates the decrease) for activities that children spend less time doing than adults, such as home production and market work. Conversely, given that children have much more free time than adults, any upward trend in leisure per adult that occurred during the last forty years will be reduced in per capita terms.

6. The inclusion or exclusion of students from our sample makes little difference to our results. See Aguiar and Hurst [2006] for trends in time use using an otherwise identical sample which also includes students.

TABLE I
DESCRIPTION OF TIME-USE SURVEYS

Survey	Survey coverage	Sample coverage	Panel	Total sample size	Analysis sample size	Number of time-use categories
Americans' Use of Time	Fall 1965 and Spring 1966	Individuals aged 19-65. One person in family must have been employed during previous 12 months. Two samples: one that was nationally representative and one which oversampled individuals in Jackson, Michigan. Conducted by the Survey Research Center at the University of Michigan.	No	2,001 individuals	1,854 individuals	95
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 by the Survey Research Center at the University of Michigan.	Yes	2,406 individuals	1,673 individuals	87
Americans' Use of Time	January 1985 - December 1985	Nationally representative with respect to adults over the age of 18 living in homes with at least one telephone. Conducted by the Survey Research Center at the University of Maryland.	No	4,939 individuals	3,168 individuals	88
National Human Activity Pattern Survey	Fall 1992 - Summer 1994	Nationally representative with respect to households with telephones. Conducted by the Survey Research Center at the University of Maryland. Sponsored by the U.S. Environmental Protection Agency.	No	9,383 individuals	5,347 individuals	91
American Time Use Survey	January 2003 - December 2003	Nationally representative. Participants are drawn from the existing sample of the Current Population Survey (CPS). Survey is conducted approximately three months after the individual's last CPS survey. Conducted by the U.S. Bureau of Labor Statistics.	No	20,720 individuals	15,091 individuals	406

Analysis sample refers to the number of observations from each survey that we use in our main empirical analysis. We restrict the sample to include only nonretired, nonstudent individuals between the ages of twenty-one and sixty-five (inclusive). We also restrict the sample to include only those individuals who had time diaries that summed to a complete day (i.e., 1440 minutes). Lastly, we exclude individuals who did not report age, education, or the presence of a child. All surveys include sample weights, except for the 1965 survey, for which we weight respondents equally. All weights are adjusted to ensure each day of the week is uniformly represented. See Appendix for additional details.

degree or more), two sex categories, and whether or not there is a child present in the household. We do not create separate cells distinguishing child status for respondents aged sixty to sixty-five due to the small number that have children present in the home. This division yields seventy-two demographic cells. Note that due to the limited demographics in the 1993 survey, we cannot create consistent cells for the full sample based on marital status, the number of children in the household, or the age of the children. However, we discuss later the robustness of our results when we exclude the 1993 survey and create cells in the remaining years that also differentiate respondents by marital status, the number of children, and the age of the children. Previewing these results, conditioning on these additional controls has a minimal effect on the trends documented in Tables II and III.

To calculate the constant weights used for our demographic adjustments, we pool together all of our time use data sets and compute the percentage of the population that resides in each demographic cell. These weights are denoted by the 72×1 vector W .⁷ Following Katz and Murphy [1992], we use these fixed weights to calculate weighted means for each activity in each year. Specifically, if Y_{jt} is the 72×1 vector of cell means for activity j in year t , we calculate the demographically adjusted average time spent in activity j in year t as $W'Y_{jt}$. Means for subsamples based on sex and education are calculated in a similar manner with the weights scaled to sum to one. Unless otherwise stated, all magnitudes reported in the paper are for constant demographic weights.⁸ However, in Section II.G we address how much of the unconditional trends in time use can be explained by changing demographics.

The demographic adjustment is necessary given the significant demographic changes in the United States over the last forty years. Since 1965, the average American has aged, become more

7. When pooling the surveys together to compute the percent of the population in each of our cells, we used the weights provided by the surveys to ensure the data is representative of the total population. Furthermore, we adjusted these weights so that each day of the week and each survey are equally represented in the overall sample. Given the smaller sample sizes in the early time-use surveys, we do not create our demographic cells so that they are day-of-week specific, leaving open the possibility that days of the week are not uniformly distributed within individual demographic cells. However, in a robustness exercise, we have differentiated respondents by demographics as well as by whether their diary was completed on a weekend or a weekday. These results, reported in the robustness Appendix available on our websites, were nearly identical to those reported below.

8. See Aguiar and Hurst [2006] for time trends of key activities without adjustment for demographics.

TABLE II
HOURS PER WEEK SPENT IN MARKET AND NONMARKET WORK OVER TIME
FOR FULL SAMPLE, MEN, AND WOMEN

Time-use category (hours per week)	Average hours per week spent in market and nonmarket work over time					Difference: 2003–1965
	1965	1975	1985	1993	2003	
Panel 1: Full sample						
Core market work	29.63	28.79	27.74	29.93	28.63	–1.00
Total market work	35.98	33.79	32.67	33.22	31.71	–4.27
Core nonmarket work	13.02	11.34	10.82	8.75	8.66	–4.35
Obtaining goods and services/ shopping	6.18	5.40	5.84	5.20	5.19	–0.99
Total nonmarket work	22.09	20.15	21.00	18.40	18.31	–3.78
Child care: primary	2.82	2.37	2.73	2.30	3.72	0.90
Child care: educational	0.35	0.41	0.38	0.25	0.72	0.38
Child care: recreational	0.51	0.33	0.53	0.56	1.06	0.55
Child care: total	3.67	3.11	3.64	3.11	5.50	1.83
Total market work + total nonmarket work	58.07	53.94	53.67	51.61	50.02	–8.05
Total market work + nonmarket work + child care	61.74	57.05	57.31	54.73	55.53	–6.21
Underlying sample size	1854	1673	3168	5347	15091	
Panel 2: Men						
Core market work	42.09	39.80	36.86	38.52	35.54	–6.55
Total market work	51.58	46.53	43.35	42.74	39.53	–12.05
Core nonmarket work	1.96	2.01	3.82	2.90	3.40	1.44
Obtaining goods and services/ shopping	4.85	4.44	4.59	3.83	4.34	–0.51
Total nonmarket work	9.67	10.85	13.96	12.44	13.43	3.75
Child care: primary	0.77	1.06	1.04	0.90	1.89	1.12
Child care: educational	0.12	0.15	0.17	0.17	0.43	0.31
Child care: recreational	0.54	0.19	0.44	0.39	0.92	0.38
Child care: total	1.44	1.40	1.66	1.47	3.24	1.80
Total market work + total nonmarket work	61.25	57.38	57.32	55.18	52.96	–8.29
Total market work + nonmarket work + child care	62.69	58.78	58.97	56.65	56.20	–6.49
Sample size	833	756	1412	2483	6699	
Panel 3: Women						
Core market work	18.83	19.24	19.84	22.49	22.65	3.82
Total market work	22.45	22.74	23.41	24.97	24.93	2.48
Core nonmarket work	22.61	19.43	16.89	13.83	13.23	–9.38
Obtaining goods and services/ shopping	7.33	6.23	6.92	6.38	5.93	–1.40
Total nonmarket work	32.86	28.21	27.10	23.56	22.55	–10.31
Child care: primary	4.59	3.51	4.20	3.52	5.30	0.71
Child care: educational	0.54	0.64	0.56	0.32	0.98	0.44
Child care: recreational	0.48	0.45	0.60	0.70	1.18	0.71
Child care: total	5.60	4.60	5.36	4.54	7.46	1.86
Total market work + total nonmarket work	55.31	50.95	50.51	48.52	47.48	–7.83
Total market work + nonmarket work + child care	60.91	55.55	55.87	53.06	54.94	–5.97
Sample size	1,021	917	1,756	2,864	8,392	

All means are calculated using fixed demographic weights, as described in the text. See Table IX and text for category definitions. The sample restrictions are described in the footnote to Table I.

TABLE III
HOURS PER WEEK SPENT IN LEISURE FOR FULL SAMPLE, MEN, AND WOMEN

Time-use category (hours per week)	Average hours per week spent in leisure					Difference: 2003–1965
	1965	1975	1985	1993	2003	
Panel 1: Full sample						
Leisure Measure 1	30.77	33.24	34.78	37.47	35.33	4.56
Leisure Measure 2	102.23	106.62	107.82	110.04	107.73	5.50
Leisure Measure 3	105.90	109.74	111.46	113.16	113.23	7.33
Leisure Measure 4	109.93	114.06	114.33	116.39	117.98	8.05
Panel 2: Men						
Leisure Measure 1	31.80	33.36	35.15	37.65	37.40	5.60
Leisure Measure 2	101.68	105.33	106.81	108.50	107.88	6.20
Leisure Measure 3	103.12	106.73	108.47	109.97	111.13	8.01
Leisure Measure 4	106.75	110.62	110.68	112.82	115.04	8.29
Panel 3: Women						
Leisure Measure 1	29.89	33.14	34.46	37.32	33.54	3.65
Leisure Measure 2	102.70	107.75	108.69	111.38	107.59	4.89
Leisure Measure 3	108.31	112.35	114.05	115.92	115.06	6.75
Leisure Measure 4	112.69	117.05	117.49	119.48	120.52	7.83

All means are calculated using fixed demographic weights, as described in the text. Leisure Measure 1 refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, in 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 (excluding own medical care). Leisure Measure 3 includes Leisure Measure 2 plus time spent in child care. Leisure Measure 4 is defined as any time not allocated to market or nonmarket work. See Table IX and text for additional detail. The relevant sample sizes are as reported in Table II. The sample restrictions are described in the footnote to Table I.

educated, become more likely to be single, and had fewer children. All of these changes may affect how an individual chooses to allocate his or her time. By fixing the demographic weights, we are reporting how time spent in a given activity has changed during the last forty years, adjusted for these demographic changes.

II.B. Trends in Market Work

Trends in market work over the last half century have been well documented (see, for example, McGrattan and Rogerson [2004]). The major difference between our results and those using traditional household surveys, such as the CPS and PSID, is that our research focuses on changes in the allocation of household time across market work, nonmarket work, and leisure, while the existing research tends to focus exclusively on changes in market hours. As we show in this paper, the conclusions about changing

leisure drawn solely from time spent working in the market sector are misleading.

We define market work in two ways. “Core” market work includes all time spent working in the market sector on main jobs, second jobs, and overtime, including any time spent working at home.⁹ This market work measure is analogous to the market work measures in the Census, the PSID, or the Survey of Consumer Finances (SCF). The broader category “total” market work is core market work plus time spent commuting to/from work and time spent on ancillary work activities (for example, time spent at work on breaks or eating a meal).

The time trend in core market work and total market work for all individuals, men, and women are shown in Panels 1, 2, and 3 of Table II, respectively. Average hours per week of core market work for nonretired, working-age adults were essentially constant between 1965 and 2003 (Panel 1). However, as is well known, this relatively stable average masks the fact that market work hours for men have fallen and market work hours for women have increased. Specifically, core market work hours for males fell by 6.6 hours per week between 1965 and 2003 (Panel 2) and increased by 3.8 hours per week for women (Panel 3). The increase in core market work hours for women occurred continuously between 1965 and 1993 before stabilizing in the last decade. These trends in male and female labor force participation and work hours have been well documented in the literature.¹⁰

The decline in market work for men is relatively larger using our broader measure of “total market work.” Specifically, total market work declined by 12.1 hours per week, as opposed to 6.6 hours per week for core market work. The difference stems primarily from a decline in breaks at work, perhaps reflecting the decline over this period in unionized manufacturing jobs in which breaks are clearly delineated.¹¹ For women, the increase in total

9. A discussion of all the time-use categories we use in this paper is found in Appendix Table IX.

10. For example, using Census data, McGrattan and Rogerson [2004] document an unconditional decline of 3.6 hours per week for men and an increase of 7.9 hours per week for women between 1960 and 2000. These values are similar to the change in unconditional means found in time use data sets. See Table II of Aguiar and Hurst [2006]. However, this paper shows that these changes are mitigated after adjusting for changing demographics.

11. The treatment of meals and breaks at work across the various time-use surveys is discussed in detail in our robustness appendix, available online at the authors' website.

market work was slightly smaller than the increase in core market work (2.5 versus 3.8 hours per week).

II.C. Trends in Nonmarket Work

Unlike the trends in time spent in market work, the trends in time spent in “nonmarket” work between 1965 and 2003 have been relatively unexplored.¹² We define three categories of time spent on nonmarket production. Throughout the remainder of the paper, time spent on an activity includes any time spent on transportation associated with that activity.

First, we define time spent on “core” nonmarket work. This includes any time spent on meal preparation and cleanup, doing laundry, ironing, dusting, vacuuming, indoor household cleaning, and indoor design and maintenance (including painting and decorating). Second, we analyze time spent “obtaining goods and services.” This category includes time spent acquiring any good or service (excluding medical care, education, and restaurant meals). Examples include grocery shopping, shopping for other household items, comparison shopping, coupon clipping, going to the bank, going to a barber, going to the post office, and buying goods online. The last category we analyze is “total nonmarket work,” which includes time spent in core nonmarket work and time spent obtaining goods and services plus time spent on other home production such as home maintenance, outdoor cleaning, vehicle repair, gardening, and pet care. This latter category is designed to be a complete measure of nonmarket work excluding child care. Later, we separately discuss and analyze trends in child care.

As reported in Table II, Panel 1, while core *market* work hours for the full sample have been relatively constant over the last forty years, time spent in *nonmarket* work has fallen sharply. Specifically, time spent in core nonmarket work has fallen by 4.4 hours per week, time spent obtaining goods and services has fallen by 1.0 hour per week, and total nonmarket work has fallen by 3.8 hours per week. As with market work hours, the average trends mask differences across sexes. Male total nonmarket work hours have actually increased by 3.8 hours per week, whereas

12. Recent work that utilizes micro data on nonmarket production include Rupert, Rogerson, and Wright [1995, 2000], Roberts and Rupert [1995], Robinson and Godbey [1999], Bianchi et al. [2000], Gottschalk and Mayer [2002], and Knowles [2005].

female total nonmarket work hours have fallen by 10.3 hours per week.

Disaggregating the changes in time spent on nonmarket work into its three components, we find that for women, time spent on core nonmarket work decreased by 9.4 hours per week, and time spent obtaining goods and services decreased by 1.4 hours per week. Women slightly increased time spent on other nonmarket work by 0.5 hours per week. For men, time spent on core nonmarket work increased by 1.4 hours per week, and time spent on other nonmarket work increased by 2.8 hours per week. Men, however, experienced a decline in time spent obtaining goods and services of 0.5 hours per week.

II.D. Trends in Child Care

Child care poses both conceptual as well as measurement challenges. It has been argued that child care differs from housework in terms of the utility generated. For example, when asked to assess the satisfaction they receive from the various activities they perform, individuals consistently rank time spent playing with their children and reading to their children as being among the most enjoyable [Robinson and Godbey 1999]. Additionally, individuals consistently report that general child care is more enjoyable than activities such as housework, grocery shopping, yard work, cleaning the house, doing dishes, and doing laundry.¹³ Such survey evidence suggests that it may be appropriate to examine trends in child care separately from trends in other categories of nonmarket production.

Also, from the standpoint of empirical implementation, there is some ambiguity about whether child care is treated consistently across all surveys. Robinson and Godbey [1999] raise several concerns about the comparability of 1993 child care measures to the measures of child care in the other surveys. Egerton, Fisher, and Gershuny [2006] also caution against making comparisons between the 1993 and 2003 time-use surveys. In the absence of a firm consensus on this point, we adopt a conservative approach that analyzes child care separately from other components of nonmarket production.

We define *primary* child care as any time spent on the basic needs of children, including breast-feeding, rocking a child to sleep, general feeding, changing diapers, providing medical care

13. See Table 25 of Robinson and Godbey [1999].

(either directly or indirectly), and grooming. Note that time spent preparing a child's meal is included in general meal preparation, a component of nonmarket production. We define *educational* child care as any time spent developing children's cognitive skills, including reading to children, teaching children, helping children with homework, and attending meetings at a child's school. We define *recreational* child care as playing games with children, playing outdoors with children, attending a child's sporting event or dance recital, going to the zoo with children, and taking walks with children. *Total* child care is defined as the sum of these three measures.

In Table II, we show the evolution of hours per week spent in all four of these child care measures. Despite a slight decline in time allocated to child care between 1965 and 1993, there was a 2.4-hours-per-week increase in reported time spent on total child care across all individuals between 1993 and 2003. Note that this number pools together households with and without children. Conditional on having a child, the increase in child care between 1993 and 2003 was over five hours per week.

The pattern occurred for both sexes. For all women (men), total child care increased by nearly three (1.8) hours per week between 1993 and 2003 after remaining roughly constant between 1965 and 1993. Additionally, this recent increase in time spent in total child care is reflected in all subcomponents. Specifically, women increased their time spent on primary child care by 1.8 hours per week, on educational child care by 0.7 hours per week, and on recreational child care by 0.5 hours per week. Lastly, after being relatively flat between 1965 and 1993, similar increases in time spent in child care occurred across all demographic groups between 1993 and 2003 (results not shown). The demographic groups included highly educated and less-educated men and women, married and single men and women with children, and working and nonemployed men and women. For example, women with children and a high school education or less experienced an increase in the time spent in total child care of 6.4 hours per week between 1993 and 2003. The increase for women with children who had at least some college education was also 6.4 hours per week.

While the increase in child care between 1993 and 2003 may have resulted from an actual change in household behavior, it may also be the result of differences in the measurement across the surveys. Given the potential measurement problem with child

care across surveys along with the conceptual problem of whether the marginal hour of time spent with children is work or leisure, we have chosen to examine child care as a separate category.¹⁴ In doing so, we discuss the robustness of our main results to the inclusion of child care as a component of total work and then, separately, to the inclusion of child care as a component of leisure. However, it is important to note that time spent in child care was essentially flat between 1965 and 1993. As a result, it does not matter how child care is classified for trends between 1965 and 1993. Additionally, given that child care increased similarly for all broad demographic groups between 1993 and 2003, the treatment of child care has essentially no effect on the conclusions about the changing dispersion of leisure discussed in Section III.

II.E. Trends in Total Work

We combine total market work with total nonmarket work to compute a measure of “total work.” To start, our measure of total work excludes time spent in child care. Table II documents the changes in total work between 1965 and 2003. For the full sample, total work has fallen by 8.1 hours per week. A striking result is that the decline in total market work is nearly identical for men and women. Between 1965 and 2003, men and women decreased their total work hours by 8.3 and 7.8 hours per week, respectively. The similarity is surprising, given the increase in the relative wage of women over this period and the simultaneous increase in the market work hours of women. This places a strong restriction on theories explaining the increase in female labor force participation.

If one adds total child care to our benchmark total work measure, the full sample records a decline of 6.2 hours per week. Men and women experienced declines of 6.5 and 6.0 hours per week, respectively. As discussed earlier, all of the differences in the trends due to the inclusion of child care occurred between 1993 and 2003.

The results in Table II provide a dramatically different picture for the evolution of time allocation than one usually infers from standard household surveys that measure only time spent in market work. Specifically, the dramatic increase in the market

14. Trends in child care have been examined by other researchers. For example, see Bianchi [2000], who finds that, relative to earlier periods, mothers' time with children was stable into the 1990s, and Sayer et al. [2004], who find that, relative to earlier periods, time spent on child care increased into the 1990s.

work hours of women masks a decline in total work hours. Women have experienced a decline of over ten hours per week in the time they spend on home production—an amount that is nearly three times as large as their increase in time spent in market work. In other words, for women, changes in market work reveal little about changes in total work.

Another important consideration raised by the trends in total work hours is whether the economy is on a balanced growth path. Taken as a whole, the strong downward trend in total work (market plus nonmarket work) suggests that the economy may not be on a balanced growth path, although this does not rule out the possibility that the economy may asymptote to such a path. The relatively stable figure for market work hours per adult over the last forty years (in the presence of steady increases in real incomes) is often used to justify utility functions in which the income and substitution effects of wage changes cancel.¹⁵ If non-market work yields a disutility similar to that of market work, the downward trend in the sum of these variables suggests that this assumption may be inappropriate.

II.F. Trends in Leisure

In this subsection, we proceed by exploring four alternative definitions of leisure. The reason we explore different measures of leisure is that the classification of leisure activities can be somewhat subjective. As we show, our various measures tell a fairly consistent story regarding the past forty years, making much of the ambiguity of what actually constitutes leisure empirically unimportant.

The means of our four leisure measures are reported in Table III. Our narrowest measure of leisure, Leisure Measure 1, sums together all time spent on “entertainment/social activities/relaxing” and “active recreation” described in Appendix Table IX. These categories include any activity that is pursued solely for direct enjoyment, such as television watching, leisure reading, going to parties, relaxing, going to bars, playing sports, surfing the web, and visiting friends. We include gardening and time spent with pets in our leisure measures. This is the only set of

15. The standard reference is King, Plosser, and Rebelo [1988], who derive the necessary restrictions on preferences to yield stationary work hours. See also Basu and Kimball [2002] and Galí [2005].

TABLE IV
BLINDER-OAXACA DECOMPOSITION OF MEAN UNCONDITIONAL CHANGES IN TIME USE

Time use category (years)	Unconditional change (hours per week)	Change due to different demographics	Change due to different cell means
	$W_{2003} Y_{2003} - W_{1965} Y_{1965}$	$(W_{2003} - W_{1965}) Y_{2003}$	$W_{1965} (Y_{2003} - Y_{1965})$
Panel 1: Decomposition evaluated at 1965 demographic weights and 2003 cell means			
Total market work	-0.78	4.03	-4.81
Total nonmarket work	-5.56	-1.12	-4.44
Total child care	0.88	-1.11	1.99
Leisure Measure 2	4.21	-2.04	6.25
Panel 2: Decomposition evaluated at 2003 demographic weights and 1965 cell means			
	$W_{2003} Y_{2003} - W_{1965} Y_{1965}$	$(W_{2003} - W_{1965}) Y_{1965}$	$W_{2003} (Y_{2003} - Y_{1965})$
Total market work	-0.78	2.59	-3.37
Total nonmarket work	-5.56	-2.31	-3.25
Total child care	0.88	-1.08	1.96
Leisure Measure 2	4.21	0.11	4.10

This table reports two alternative Blinder-Oaxaca decompositions of trends in the allocation of time to market work, nonmarket work, child care, and leisure. The first column represents the overall unconditional change between 1965 and 2003 for each activity. The second and third columns decompose the total change into components due to different weights on demographic cell means (W_t , $t = 1965, 2003$) and to different cell means (Y_t , $t = 1965, 2003$), respectively. Panel 1 evaluates the effect of the change in demographic weights using the cell means of 2003, while Panel 2 evaluates the change in weights at the cell means of 1965. Correspondingly, Panel 1 evaluates the change in cell means at the demographic weights of 1965, and Panel 2 evaluates the change in cell means at the demographic weights of 2003.

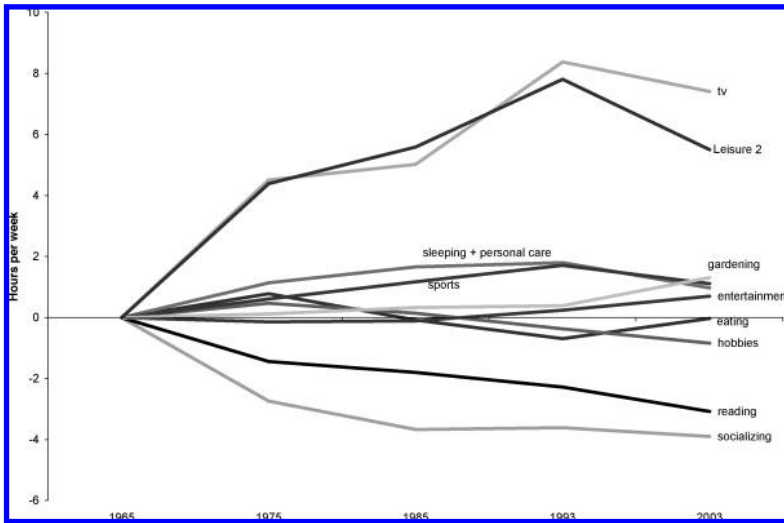


FIGURE I
Breakdown of Leisure by Activity, Deviations from 1965

This figure plots the evolution of the subcomponents of Leisure 2 for the full sample, represented as differences from each subcomponent's mean in 1965. All means are calculated using fixed demographic weights, as described in the text.

activities that is classified as both leisure and home production.¹⁶ Pet care provides direct utility but is also something one can purchase on the market. Conceptually, gardening is more likely to be considered a hobby, while cutting grass and raking leaves is more likely to be seen as work (of course, this is subject to debate). However, the data do not let us draw the distinction between gardening and yard work consistently throughout the sample. In the pre-2003 surveys, yard work is included in outdoor home maintenance, while gardening is a separate activity. Unfortunately, in 2003, yard work is not differentiated from gardening. However, as can be seen in Figure I (described later), this activity is a small component of total leisure and plays little role in generating the overall trends.

As seen in Table III, Leisure Measure 1 increased by 4.6 hours per week for the full sample, by 5.6 hours per week for men, and 3.7 hours per week for women. Leisure 1 increased fairly

16. As Leisure Measure 4 is the residual of market and nonmarket work, gardening and pet care are not included in this measure of leisure. They are included in Leisure Measures 1 through 3.

consistently for men between 1965 and 2003. However, for women, Leisure 1 increased monotonically between 1965 and 1993 and then declined between 1993 and 2003. The entire decline between 1993 and 2003 can be explained by the increase in child care in this interval. However, regardless of such measurement issues, our basic measure of leisure increased dramatically for both men and women between 1965 and 2003.¹⁷

Biddle and Hamermesh [1990] argue that certain time activities may enhance production in the market and nonmarket sectors. For example, they provide a model in which 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. Similar conceptual points apply broadly to time spent eating and on personal care. In this spirit, we define Leisure Measure 2 as activities that provide direct utility but may also be viewed as intermediate inputs. Specifically, Leisure Measure 2 includes Leisure Measure 1 as well as time spent sleeping, eating, and on personal care. While we exclude own medical care, we include such activities as grooming, having sex, sleeping or napping, and eating at home or in restaurants.

Leisure Measure 2 increased by 5.5 hours per week between 1965 and 2003. In other words, in addition to the increase in Leisure Measure 1, time spent sleeping, eating, and on personal care increased by an additional one hour per week between 1965 and 2003. Over this period, Leisure Measure 2 increased by 6.2 hours per week for men and by 4.9 hours per week for women.

Our third leisure category, Leisure Measure 3, includes Leisure Measure 2 plus time spent in child care. The inclusion of child care has very little effect on trends between 1965 and 1993, but it does make a difference regarding the change over the last decade. Leisure 3 increased by 7.3 hours per week for the full sample, by 8.0 hours per week for men, and 6.8 hours per week for women.

As noted earlier, Leisure Measure 4 is the residual of total work. The difference between Leisure Measures 3 and 4 includes

17. We note that between 1993 and 2003, Leisure Measure 1 was roughly constant and Leisure Measure 2 increased by approximately one hour per week for women without children.

time spent in education, civic and religious activities (going to church, volunteering, social clubs, etc.), caring for other adults, and own medical care. Between 1965 and 2003, civic activities fell by thirty minutes per week, education (omitting students) fell by eighteen minutes per week, own medical care increased by thirty-eight minutes per week, and care for other adults increased by one hour per week (with all of the latter increase taking place between 1993 and 2003).

In Figure 1, we explore the trends in the individual components of Leisure 2 for the full sample. The line labeled "Leisure 2" reflects the corresponding row in Panel 1 of Table III. More than 100 percent of the increase in leisure can be accounted for by the increase in the time spent watching television, which totals 7.4 hours per week for the full sample, 6.7 hours per week for men, and 8.0 hours per week for women. This increase in television is offset by a 3.9-hour-per-week decline in socializing (going to parties, bars, etc.) and a 3.1-hour-per-week decline in reading (books, magazines, letters, etc.). The sharp decline in socializing reinforces the evidence of Putnam [2000], which documents a decline in social interactions using a variety of data sources. Small changes were recorded for categories such as gardening/pet-care, hobbies, and other entertainment (plays, movies, radio, records, computers, etc.).

In short, leisure has increased by between 4.6 hours per week (Leisure Measure 1) and 8.1 hours per week (Leisure Measure 4) for the average nonretired adult since 1965. These magnitudes are economically large. In 1965, the average individual spent thirty hours per week in core market work (roughly four hours per day). The gain in total leisure between 1965 and 2003 is therefore equal to an increase of between 15 percent (Leisure Measure 1) and 27 percent (Leisure Measure 4) of the average core market work week in 1965. Or, if one assumes a forty-hour work week, the increase in leisure is equivalent to 5.9 to 10.5 additional weeks of vacation per year.

The trends documented earlier are computed for fixed demographic composition, defined by age, sex, education, and the presence of children in the household. We can refine our demographic categories by omitting the 1993 survey, which has the least demographic detail. We have explored the robustness of our conclusions to conditioning on marital status, the number of children, and the age of the youngest child, in addition to age, education,

and sex. The results for men were similar to those reported in Tables II and III. The additional demographic controls play a somewhat larger role for women. For example, the additional controls reduced the increase in Leisure 2 for women (men) by roughly one hour (twenty-three minutes) per week. The details are reported in the robustness appendix posted on the authors' websites.

There are two reasons to believe that the increase in leisure that we have documented may be biased downwards. First, we are measuring changes in leisure only for nonretired individuals. The fact that individuals are living longer and are retiring earlier coupled with the fact that retired individuals enjoy more leisure than nonretired households [Hamermesh 2006], implies that the increase in *lifetime* leisure is much larger than we document.

Second, there has been a claim that the nature of time spent at work has changed over the last decade. While at work, individuals may engage in more leisure-type activities like corresponding through personal email or surfing the web. The time diaries do not separate out the type of tasks individuals perform while at work, so it is hard to test this claim formally within our data. If this shift in the nature of time spent at work has occurred, it accentuates the increase in leisure we document.

II.G. The Role of Demographics in Mean Trends

Throughout, we have presented changes in time use between 1965 and 2003 conditional on demographics. We have yet to discuss how much of the unconditional change in time use can be explained by changing demographics. To explore this, we conduct a Blinder-Oaxaca style decomposition of the unconditional mean change in time use into the portion that can be explained by changing demographics and the portion that can be explained by changes within demographic groups.

Formally, the unconditional average amount of time spent in activity j in 1965 can be computed as $\bar{Y}_{j1965} = W_{1965}Y_{j1965}$, where Y_{j1965} is the vector of mean times reported for activity j in the 1965 survey by each demographic group, and W_{1965} is the associated vector of demographic weights from the 1965 survey. Similarly, $\bar{Y}_{j2003} = W_{2003}Y_{j2003}$ represents the sample average

reported for 2003. The change in the unconditional mean between 1965 and 2003 can be decomposed as:¹⁸

$$\begin{aligned}\bar{Y}_{j2003} - \bar{Y}_{j1965} &= W_{2003}Y_{j2003} - W_{1965}Y_{j1965} = (W_{2003} - W_{1965})Y_{j2003} \\ &\quad + W_{1965}(Y_{j2003} - Y_{j1965}).\end{aligned}$$

The term $(W_{2003} - W_{1965})Y_{j2003}$ represents the contribution to the total change due to evolving demographic weights and a fixed cross-demographic distribution of time allocation, while $W_{1965}(Y_{j2003} - Y_{j1965})$ represents the contribution due to changes of time allocation within demographic cells at constant weights. An alternative would be to use the following decomposition: $(W_{2003} - W_{1965})Y_{j1965} + W_{2003}(Y_{j2003} - Y_{j1965})$. The two decompositions are reported in Table IV, Panels 1 and 2, respectively.

The first column of Table IV shows the unconditional change in time use for total market work, total nonmarket work, total child care, and Leisure 2. The second column reports the change that is due to changing demographics. The third column reports the change that is due to changes within demographic cells. Shifts in demographics add 2.6 to 4.0 hours per week to the overall change in market work. This in part reflects the fact that older and more-educated individuals work more hours in the market and that these segments are increasing their relative weights. This is offset by a decline in market work within each demographic group, leaving the overall unconditional change at minus 0.8 hours per week. The other time categories indicate only a modest role of changing demographics in explaining the overall trends in unconditional means. Much of the trend is due to within-demographic-cell changes rather than evolving demographics. This result will be echoed in the analysis of leisure dispersion in the next section. Note as well that the change in Leisure 2 due to changing demographic weights is larger in Panel 1. This reflects that leisure differences between demographic groups are larger in 2003 than in 1965, a point also developed in the next section.

18. Blinder-Oaxaca decompositions are typically reported using regression notation. Our demographic cell averages correspond to the coefficients in a regression of Y_j on demographic-cell dummies for each survey year. The weights are the mean dummy variables within each survey.

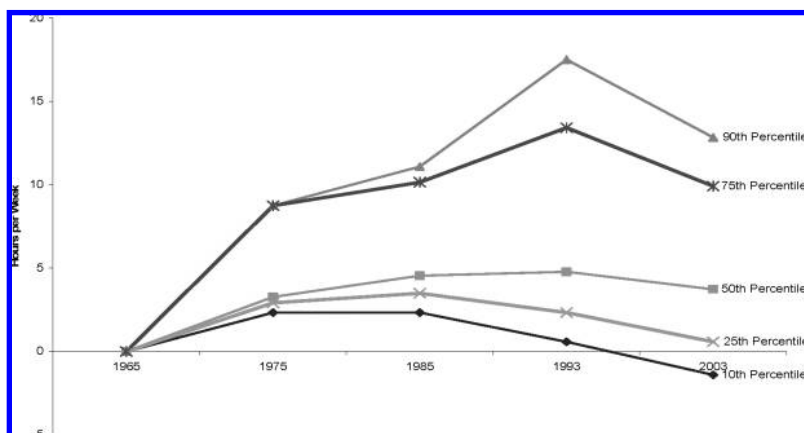


FIGURE II

Key Percentiles of Leisure 2 Distribution, Deviations from 1965

This figure plots the evolution of key percentiles of the cross-sectional distribution of Leisure 2 for the full sample, represented as differences from each percentile point's value in 1965. The percentile points represent the unconditional sample distribution in each year, unadjusted for demographic changes.

III. LEISURE INEQUALITY

The previous section documented a mean decline in total work for both men and women over the last forty years. In this section, we consider how other moments of the leisure distribution evolved with the aim of documenting the evolution of leisure inequality. We show that the inequality in leisure increased both between and within educational categories.

The evolution of several key percentiles of the Leisure 2 distribution is depicted in Figure II. Specifically, for each year, we calculate the 10th, 25th, 50th, 75th, and 90th percentiles of Leisure 2, unconditional on demographics.¹⁹ The figure depicts a general fanning out of the leisure distribution over the last forty years. Notice further that all of the percentile points of the leisure distribution, except the 10th, recorded increases between 1965

19. Later we examine how much of the change in the distribution of leisure can be explained by changing demographics. For an analysis of the changing distribution of Leisure 3, conditional on demographics, see Figure 5 of Aguiar and Hurst [2006].

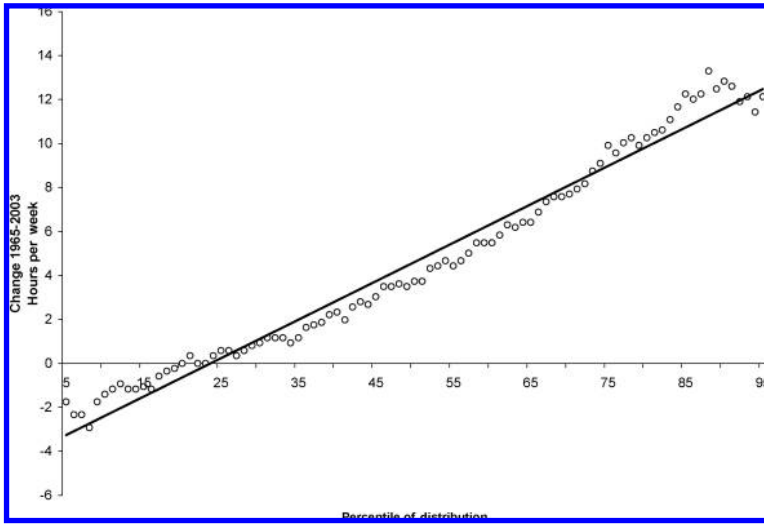


FIGURE III
Change by Percentile Point for Leisure 2, 1965–2003

This figure plots the change at each percentile point of the Leisure 2 distribution between 1965 and 2003. The percentile points represent the unconditional full-sample distribution in each year, unadjusted for demographic changes.

and 2003. In other words, besides fanning out, the leisure distribution also shifted upwards.

Figure III plots the hour-per-week change in Leisure 2 for each percentile between 1965 and 2003. That is, for each percentile point, we subtract the hours per week of leisure in 1965 for a given percentile point from that percentile point's hours per week of leisure in 2003. The fact that Leisure 2 is bounded below by zero and above by the constraint of twenty-four hours in a day implies that changes in the extreme percentiles tend toward zero. As a result, the figure only depicts percentiles 5 through 95. Note that the percentiles refer to the sample distributions and the differences are not adjusted for demographics. The figure shows that the change in leisure time essentially increased linearly with the percentile of the leisure distribution. That is, the patterns depicted in Figure II are replicated throughout the entire leisure distribution.

To gain additional insight into the increasing dispersion, we examine the extent to which leisure has become more unequal between education groups. Table V reports the demographically

TABLE V
MEANS OF TIME-USE CATEGORIES BY EDUCATIONAL ATTAINMENT

Year/Category	Means of time use							
	Men				Women			
	<12 ^a	12	13–15	16+	<12	12	13–15	16+
Panel 1: Total market work								
1965	51.10	52.91	52.44	49.37	17.87	22.91	21.65	26.63
1985	43.79	42.84	46.13	41.65	18.22	23.60	25.61	25.93
2003	33.08	39.22	39.81	44.96	15.44	24.94	28.17	30.89
Change 1965–2003	–18.02	–13.69	–12.63	–4.41	–2.43	2.03	6.52	4.26
Panel 2: Total nonmarket work								
1965	9.49	9.11	9.71	10.61	36.28	33.42	32.01	29.33
1985	13.76	13.39	14.04	14.89	28.89	27.54	26.84	24.79
2003	12.92	13.59	13.26	13.73	26.18	22.61	20.56	20.82
Change 1965–2003	3.43	4.48	3.55	3.12	–10.10	–10.81	–11.45	–8.51
Panel 3: Leisure 2								
1965	104.12	101.66	99.21	101.64	105.70	101.82	102.47	101.77
1985	106.94	107.53	105.03	107.02	113.16	108.66	107.09	105.99
2003	116.34	108.94	105.42	101.44	113.58	108.13	105.20	103.10
Change 1965–2003	12.22	7.28	6.21	–0.20	7.88	6.31	2.73	1.33

This table reports the hours per week spent in different activities by education and sex category for 1965, 1985, and 2003. All means are calculated using fixed demographic weights, as described in the text. See Table I for sample restrictions and Table IX for definitions of activity categories.

a <12, 12, 13–15, and 16+ indicate years of schooling.

adjusted time spent in market work, total nonmarket work, and Leisure 2 for men and women, broken down by educational attainment during 1965, 1985, and 2003. Our education categories are less than a high school diploma (<12), a high school diploma or GED equivalent (12), some college (13–15), and a college degree or more (16+). In 1965, men spent roughly fifty hours per week in market work, with little variation across educational categories. Moreover, in 1965, the time spent in leisure was similar as well. For example, men with less than a high school degree spent 104 hours per week in Leisure Measure 2 while college-educated men spent 102 hours per week.

For women, the college educated spent more hours in market work in 1965 (twenty-seven hours per week) relative to high school graduates (twenty-three hours per week) and high school dropouts (eighteen hours week). This pattern was reversed for nonmarket work, with college educated women performing seven hours less nonmarket work per week than high school dropouts. In terms of leisure, college educated women enjoyed the same

leisure as high school graduates and four hours less leisure per week than high school dropouts, a pattern similar to that for men.

However, the rough equality in leisure time observed in 1965 disappeared over the subsequent four decades. Specifically, men with a college degree experienced no change in Leisure 2 between 1965 and 2003. Male high school dropouts, on the other hand, experienced an increase of 12.2 hours per week, and male high school graduates experienced an increase of 7.3 hours per week. The corresponding increase for female college graduates is 1.3 hours per week versus 7.9 hours per week for high school dropouts and 6.3 hours per week for high school graduates.

Table V indicates that this divergence in leisure time for both men and women is due primarily to differences in market work. Less-educated and highly educated males increased total non-market work hours by similar amounts between 1965 and 2003. Conversely, total market work hours fell by a much greater amount between 1965 and 2003 for less-educated males (−18.0 for less than high school, −13.7 for high school, and −4.4 for college graduates). The net result is that leisure increased relatively more for less-educated men than was the case for their more highly educated counterparts due to a shift out of market work.

For women, high school dropouts experienced a decline of 10.1 hours per week in total nonmarket work versus 8.5 hours for college educated women. However, during this time period, total market work hours increased much more for highly educated females than for less educated females. Specifically, college graduates increased their total market work hours by 4.3 hours per week while high school graduates increased market work by 2.0 hours per week and those with less than a high school degree decreased market work by 2.4 hours per week.

We should note that the divergence in leisure times across education groups occurred primarily post 1985. Table VI illustrates this point by showing the difference in the change in Leisure 2 between individuals with a college education or more and the other three educational groups over the first half and then the latter half of our sample. Table VI pools together men and women. Between 1965 and 1985, respondents with less than a high school degree, a high school degree, and some college, experienced gains in leisure relative to college educated individuals of 0.5, 1.6, and 0.4 hours per week, respectively. These differences indicate that leisure gains were shared fairly evenly

TABLE VI
DIFFERENCES IN LEISURE MEASURE 2 BETWEEN 1965 AND 2003
BY EDUCATIONAL ATTAINMENT

Educational comparison	1985–1965	2003–1985
Less than high school – college or more	0.49	8.86
High school graduates – college or more	1.60	4.58
Some college – college or more	0.36	3.41

This table reports the change in Leisure Measure 2 between 1965 and 1985 (column (1)) and 1985 and 2003 (column (2)) for all adults with less than high school (row 1), high school (row 2), and some college (row 3), minus the corresponding change over the respective time period for adults with a college education. All differences are calculated using fixed demographic weights, as described in the text.

across education groups in the first half of our sample. However, between 1985 and 2003, the relative gains in leisure over college educated individuals were 8.9, 4.6, and 3.4 hours per week, respectively, for individuals with less than a high school degree, a high school degree, or some college. This growing gap in leisure mirrors the well documented change in wages and consumption between education groups starting in the early 1980s (see Katz and Autor [1999] and Attanasio, Battistin, and Ichimura [2004] for wages and consumption, respectively). Specifically, the 1980s and 1990s were decades in which higher educated individuals experienced increases in wages and consumption relative to their less educated counterparts.²⁰ If leisure time has value, our results suggest that welfare calculations about the growing inequality based solely on changing incomes or changing expenditures may be incomplete.

One concern with the results regarding educational status is that the marginal high school graduate in 1965 differs from that in 2003. In particular, 73 percent of our sample in 1965 had a high school education or less, while the corresponding figure for 2003 is 42 percent. However, the percentiles presented in Figure II indicate that the growing inequality occurs throughout the distribution. Moreover, as a robustness exercise we have also split the sample in two at approximately the 70th percentile by education in 1965, 1985, and 2003. The dividing line corresponds to a high school degree in 1965 and some college in 1985 and 2003. We found that within the bottom 70 percentiles of the education

20. These results are consistent with those documented by Juhn, Murphy, and Topel [2002], who found that, starting in the early 1980s, low-wage men experienced declining hours of market work relative to high-wage men.

TABLE VII
CHANGES IN LEISURE 2 1965–2003, COMPONENT BREAKDOWN BY EDUCATION

Category	Change in Leisure 2 between 1965 and 2003			
	<12	12	12–15	16+
TV	9.31	7.79	6.93	5.48
Sleeping and personal care	3.15	1.43	0.67	–1.44
All other leisure measures	2.57	2.04	1.40	0.72
Gardening and pet care	1.10	1.52	1.01	1.38
Sports/sporting events	0.89	0.68	1.18	1.97
Eating	–1.58	–0.04	0.03	1.29
Reading	–2.74	–3.16	–2.84	–3.46
Socializing	–2.79	–3.52	–4.05	–5.39
All Leisure 2	9.91	6.74	4.33	0.56

This table reports the change in several subcategories of Leisure 2 between 1965 and 2003, broken down by educational attainment. All differences are calculated using fixed demographic weights, as described in the text.

a <12, 12, 12–15, and 16+ indicate years of schooling.

distribution, leisure increased by 7.7 and 5.8 hours per week for men and women, respectively. The corresponding increases in leisure for individuals within the top 30 percentiles were 1.0 and 1.2 hours per week, respectively.²¹ Again, most of the divergence was in the latter half of the sample. This confirms that the separation between educational categories is not simply a result of the changing composition of high school graduates.

In Table VII we explore whether there are differences between educational groups in terms of which leisure activities experienced the largest changes. Specifically, Table VII reports the 1965–2003 change in the major subcomponents of Leisure 2 broken down by educational attainment. The table indicates that all education groups increased television watching substantially. Those with less than a high school degree increased their television watching by 9.3 hours per week. The corresponding number for high school graduates was 7.8 hours per week. Perhaps surprisingly, given the small overall increase in Leisure 2, college graduates increased their television watching by 5.5 hours per week. This increase in time spent watching television for highly educated individuals was offset by a decline in the time spent socializing and reading of 5.4 and 3.5 hours per week, respec-

21. See the robustness appendix, available on the authors' web sites, for full details of how the sample was split.

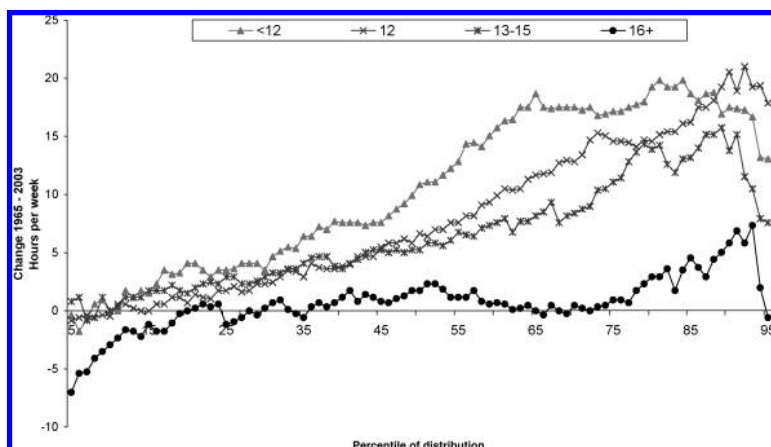


FIGURE IV
Change by Percentile Point for Leisure 2 by Educational Attainment
1965–2003

This figure plots the change at each percentile point of the Leisure 2 distribution between 1965 and 2003, broken down by educational attainment. The percentile points represent the unconditional distribution of the respective subsample in each year, unadjusted for demographic changes.

tively. The net result was only a 0.6 hour per week increase in Leisure 2 for college graduates between 1965 and 2003. The other educational categories also experienced significant declines in the time spent reading and socializing, although these declines were smaller than those for college graduates and smaller than the corresponding categories' increase in time spent watching television. The most educated respondents also recorded declines of 1.4 hours per week in sleeping and personal care, compared to an increase of 3.2 hours per week for this category among high school dropouts. Conversely, highly educated individuals increased the time they spent eating while less-educated individuals experienced a decline in time spent on this activity.

Aside from a growing inequality between educational groups, Figure IV shows that there has also been a growing inequality within educational groups. Figure IV replicates Figure III but breaks the sample down by educational attainment. Specifically, we compare the change in leisure by percentile for the sample of respondents within each of our four educational groups. The figure indicates that the positive correlation between changes in leisure time and the initial level of leisure time occurs within each

educational category. The figure also indicates that the pattern is more pronounced for those with less education.

To further explore what is driving the growing dispersion in leisure, we perform a decomposition using the methodology of Juhn, Murphy, and Pierce [1993], henceforth JMP, which examined the changing wage distribution. In particular, let Y_{it} denote the amount of time allocated to Leisure 2 in survey year t for respondent i . The cross-sectional variation can be jointly explained by demographics, X , and a residual term, u_{it} :

$$(1) \quad Y_{it} = X_{it}\beta_t + u_{it}.$$

Our X controls include dummy variables for the corresponding interactions between age, sex, education, and fertility. In particular, we include seventy-two dummy variables that correspond to the seventy-two demographic cells discussed in Section II used to compute our demographically adjusted weights.²² The elements of β_t therefore represent demographic cell means.²³ We run this regression separately using data from each year of our sample.

To briefly review the methodology of JMP, changes in the distribution of Y_{it} can be attributed to changes in demographic composition (X_{it}), changes in cell-means (β_t), or changes in the residual variation. If we let θ_{it} represent individual i 's percentile in the residual distribution, and F_t the residual distribution function at time t , then $u_{it} = F_t^{-1}(\theta_{it}|X_{it})$. We define $\bar{\beta}$ to be the mean of Leisure 2 by demographic cell for the entire sample. That is, $\bar{\beta}$ is the vector of coefficients on the dummy variables from a regression that pools together all years of the sample. Similarly, $\bar{F}(\cdot|X_{it})$ is the cumulative distribution function for the residuals pooled across all years. Then, by definition,

$$(2) \quad Y_{it} = X_{it}\bar{\beta} + \bar{F}^{-1}(\theta_{it}|X_{it}) + X_{it}(\beta_t - \bar{\beta}) + (F_t^{-1}(\theta_{it}|X_{it}) - \bar{F}^{-1}(\theta_{it}|X_{it})).$$

Let $Y_{it}^1 \equiv X_{it}\bar{\beta} + \bar{F}^{-1}(\theta_{it}|X_{it})$. Note that this is the prediction

22. The conclusions are unchanged if we exclude the 1993 survey so as to include a richer set of controls in our X vector (such as marital status, the number of children, and the age of children).

23. The coefficient vector from a regression like (3.1) in a standard JMP decomposition is often referred to as "prices" given that the typical application is a wage regression and the coefficients therefore represent the price of particular attributes represented by X . However, in our context of leisure time, "cell-means" is a more appropriate term for the coefficients on the dummy variables.

TABLE VIII
 JUHN-MURPHY-PIERCE DECOMPOSITION OF THE CHANGE
 IN THE LEISURE 2 DISTRIBUTION

Distribution percentile comparison	Total change	Decomposition		Unobservables
		Demographic quantities	Cell means	
Panel 1: 1965–2003				
90–10	14.23	−0.76	2.70	12.29
90–50	9.10	−0.19	0.67	8.63
50–10	5.13	−0.57	2.03	3.67
Panel 2: 1965–1985				
90–10	8.75	−1.14	0.57	9.32
90–50	6.53	−0.32	−0.41	7.27
50–10	2.22	−0.82	0.99	2.05
Panel 3: 1985–2003				
90–10	5.48	0.38	2.13	2.97
90–50	2.57	0.13	1.08	1.36
50–10	2.92	0.25	1.05	1.62

This table reports the change in the cross-sectional distribution of Leisure 2 between 1965 and 2003 (Panel 1), between 1965 and 1985 (Panel 2), and between 1985 and 2003 (Panel 3). The cross-sectional distribution is measured by the 90–10 percentile difference (row 1 in each panel), the 90–50 percentile difference (row 2), and the 50–10 percentile difference (row 3). The changes in these percentile comparisons, not adjusting for any demographics, are shown in column (1). The portion of the unadjusted change attributed to changing demographic quantities is reported in column (2). The portion of the unadjusted change attributed to changing demographic cell means is reported in column (3). The last column is the remaining change attributed to unobservables. The details of the methodology are described in the text.

of Leisure 2 for a respondent with characteristics X_{it} and a relative residual θ_{it} using the average cell means $\bar{\beta}$ and the average residual distribution, \bar{F} . Changes in the moments of this series over time are driven by changes in observed demographics, X_{it} . The series $Y_{it}^2 \equiv X_{it}\beta_t + \bar{F}^{-1}(\theta_{it}|X_{it}) = Y_{it}^1 + X_{it}(\beta_t - \bar{\beta})$ contains the additional variation due to changes in the cell means over time. Finally, the series $F_t^{-1}(\theta_{it}|X_{it}) - \bar{F}^{-1}(\theta_{it}|X_{it})$ represents changes in the distribution of unobservables.

Table VIII reports how much of the change in the cross-sectional distribution of Leisure 2 is attributable to each of these components. Panel 1 reports the forty-year changes between 1965 and 2003 while Panels 2 and 3 look at the first and last twenty-year subsamples, respectively. Each panel reports the decomposition of the change over time in the difference between the 90th and 10th percentiles, the 90th and 50th percentiles, and the 50th and 10th percentiles. The first column reports the total change. Taking the first row, the 90–10 differential increased by 14.2

hours per week between 1965 and 2003. Demographics, as captured by Y_{it}^1 defined earlier, predict a change of -0.8 hours per week, as reported in the second column. The fact that changes to demographic quantities explains little of the change in leisure inequality is reminiscent of the Blinder-Oaxaca decompositions of changes in means presented in Table IV. The third column reports the change in the 90–10 differential for Y_{it}^2 once we subtract the second column's change in Y_{it}^1 . This term represents the additional contribution to dispersion due to changes in cell means and totals 2.7 hours per week. The remainder, 12.3 hours per week, is attributed to unobservables and represents the bulk of the total change. A similar pattern is repeated for the other measures of cross-sectional dispersion. The one subperiod for which the change in between-group means plays a substantial role is the period 1985–2003. As discussed earlier this is the subperiod during which educational differences in leisure became prominent. For this period, roughly 40 percent of the increased dispersion represented in each of the three measures can be attributed to changing demographic-group means.

IV. DISCUSSION AND CONCLUSION

In this paper, we have documented that the amount of leisure enjoyed by the average American has increased substantially over the last forty years. This increase is observable across a number of subsamples. In particular, women have increased their market labor force participation while at the same time enjoying more leisure. Moreover, the increase in leisure time occurred during a period in which average market work hours were relatively constant.

Our results also document a dramatic increase in the dispersion of leisure. Much of this dispersion occurred within demographic groups, but some can be attributed to differences across educational groups. In particular, we find that less-educated adults have increased their relative consumption of leisure, particularly in the last twenty years. This corresponds to a period in which wages and consumption expenditures increased faster for highly educated adults. This divergence suggests a different relationship between income and leisure in the cross-section compared to the time-series. In the first part of the paper, we documented a large increase in leisure over the last forty years, potentially suggesting that higher income implies greater leisure.

However, the recent divergence in leisure between educational groups suggests that, cross-sectionally, lower incomes imply more leisure. These trends are coupled with the fact that the early time-use surveys (particularly the ones from 1965 and 1985) suggest that leisure is invariant to education in the cross section. The larger increase in leisure for less-educated adults is an empirical implication that any quantitative model should match.

Our evidence on leisure dispersion has a parallel in the longer run trends in market labor supply. Costa [2000] documents that low-wage workers reduced their market work hours relative to high-wage workers between the 1890s and 1991. In particular, at the turn of the twentieth century, low-wage workers worked longer hours than high-wage workers. This differential disappeared by the early 1970s, and during the last thirty years high-wage workers supplied relatively more market hours. Similarly, we find small differences in leisure across educational categories in 1965 and a sharp relative increase in leisure favoring less educated adults over the subsequent forty years.

We acknowledge that any definition that distinguishes “leisure” from “work” is a matter of judgment. Some work activities may generate direct utility, whether at a formal job or while cooking and shopping. Similarly, such leisure activities as reading a book or watching TV may add to one’s human capital or be directly job related and therefore be considered market substitutes. Our response to this ambiguity has been to present a wide range of evidence. The decline in home production and the time-series and cross-sectional patterns in leisure are generally robust to these variations. Regardless of one’s preferred definition of leisure, the fact remains that large changes have occurred in the allocation of time over the last forty years. Many of these changes concern activities away from the market, making conclusions drawn solely from observations on market work hours potentially misleading.

The present study focuses exclusively on the United States. There are studies that compare the United States and Europe at a point in time (for example, see Freeman and Schettkat [2005] and Ragan [2006]). However, to our knowledge, there are no other research papers using data from other countries that perform a time-series analysis similar to the one above. One country that has conducted a consistent time-use survey during the last forty years is Norway. According to published Norwegian statistics, between 1971 and 2000, Norwegian men and women increased

their "leisure" by roughly seven and eight hours per week, respectively.²⁴ These findings are similar to the results we documented for the United States. How changes in the time spent in leisure experienced in the United States compares to changes in the time spent in leisure in a broad group of other industrialized countries remains an important area for future research.

APPENDIX

We use the following time-use surveys: 1965–1966 Americans' 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 of our data, codebooks, and programs used to create the time-use categories for this paper are available on our data webpage (http://troi.cc.rochester.edu/~maguiar/timeuse_data/datapage.html). The programs include a detailed description of how we took the raw data from each of the time-use surveys and created consistent measures for each of the time-use categories across the different surveys. The website also includes an online appendix that contains several additional robustness exercises that supplement those reported in the text.

All surveys used a twenty-four-hour recall of the previous day's activities to record time diary information. All surveys save 1975 collect diaries for only one individual per household. The 1975 survey collects diaries for both spouses of married households. Later, we briefly summarize the other salient features of these surveys.

The 1965–1966 Americans' Use of Time was conducted by the Survey Research Center at the University of Michigan. The survey sampled one individual per household in 2,001 households in which at least one adult person between the ages of nineteen and sixty-five was employed in a nonfarm occupation during the previous year. This survey does not contain sampling weights, so we weight each respondent equally (before adjusting for the day of week of each diary). 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 twenty-four-hour period between November 15 and December 15,

24. See statistics published by Statistics Norway found at http://www.ssb.no/english/subjects/00/02/20/tidsbruk_en.

1965, or between March 7 and April 29, 1966. In our analysis, we included the Jackson, Michigan, sample. However, we redid our main analysis excluding the Jackson sample, and the results are robust to this exclusion. We also explored whether the weeks for which diaries were collected in 1965 are representative of the entire year. We find that the major trends are robust to this potential "seasonal" effect. The details of this robustness exercise are reported in the online appendix.

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 multiple adult individuals in a household (as opposed to a single individual per household). The sample included 2,406 adults from 1,519 households. The 1975–1976 survey collected up to four diaries for each respondent over the course of a year. However, the attrition rate for the subsequent rounds was high, and we therefore restrict the sample to the first round conducted in the fall of 1975.

The 1985 Americans' Use of Time survey was conducted by the Survey Research Center at the University of Maryland. The sample of 4,939 individuals was nationally representative with respect to adults over the age of eighteen living in homes with at least one telephone. 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 United States Environmental Protection Agency. The sample was designed to be nationally representative with respect to households with telephones. The sample included 9,386 individuals, of whom 7,514 were individuals over the age of eighteen. The survey randomly selected a representative sample for each three-month quarter starting in October of 1992 and continuing through September of 1994. For simplicity, we refer to the 1992–1994 survey as the 1993 survey (given that the median respondent was sampled in late 1993). This survey contained the least detailed demographics of all the time-use surveys we analyzed. Specifically, the survey reports the respondent's age, sex, level of educational attainment, race, labor force status (working, student, retired, etc.), and parental status.

Unfortunately, the survey does not report the respondent's marital status or the number of children present in the household.

The 2003 American Time Use Survey (ATUS) was conducted by the U.S. Bureau of Labor Statistics (BLS). Participants in ATUS, which includes children over the age of fifteen, are drawn from the existing sample of the Current Population Survey (CPS). The individual is sampled approximately three months after completion of the final CPS survey. At the time of the ATUS survey, the BLS updated the respondents' employment and demographic information. Roughly 1,700 individuals completed the survey each month, yielding an annual sample of over 20,000 individuals.

We restrict our sample to include only those household members between the ages of twenty-one and sixty-five and who are not retired or students and who had a complete twenty-four-hour time diary. Additionally, all individuals in our sample must have had nonmissing values for age, education, sex, and the presence of a child. This latter restriction was relevant for only eleven individuals in 1965, two individuals in 1975, thirty-five individuals in 1985, and twenty-four individuals in 1993. The restriction that all individuals had to have a complete time diary was also innocuous. Only forty-three individuals in 1965, one individual in 1975, and three individuals in 1985 had a time diary in which total time across all activities summed to a number other than twenty-four hours. In total, our sample included 27,133 individuals. In Table I, the sample sizes, given our sample restrictions, are shown for each time-use survey. In the appendix of Aguiar and Hurst [2006], we document that the demographic composition of the time use surveys are similar to that of the Panel Study of Income Dynamics (PSID), once similar sample restrictions are made.

One challenge in comparing the time use data sets with each other is the fact that the surveys report time use at differing levels of aggregation. This is particularly true for the 2003 survey compared to the earlier surveys (which used a similar activity lexicon). Table I shows the number of different time use subcategories that are reported in the raw data of each of the surveys. For example, each survey prior to 2003 includes roughly ninety different subcategories of individual time use. The 2003 survey includes over 400 different subcategories of individual time use.

To create consistent measures of time use over time across the surveys, we worked with the raw data at the level of subcategories. In order to render our analysis tractable (and to mitigate

TABLE IX
TIME-USE CLASSIFICATIONS

Time use classification	Examples of activities included
Core market work	Work for pay, main job (including time spent working at home); work for pay, other jobs
Total market work	Core market work plus other work-related activities such as commuting to/from work; meals/breaks at work; searching for a job; applying for unemployment benefits
Core nonmarket work	Food preparation; food presentation; kitchen/food cleanup; washing/drying clothes; ironing; dusting; vacuuming; indoor cleaning; indoor painting; etc.
Shopping/obtaining goods and services	Grocery shopping; shopping for other goods; comparison shopping; clipping coupons; going to bank; going to post office; meeting with lawyer; going to veterinarian; etc. (excluding any time spent acquiring medical care)
Total nonmarket work	Core nonmarket work plus shopping/obtaining goods and services plus all other home production including: vehicle repair; outdoor repair; outdoor painting; yard work; pet care; gardening; etc.
Education	Taking classes for degree; personal interest courses; homework for coursework; research for coursework; etc.
Sleeping	Sleeping; naps
Personal care	Grooming; bathing; sex; going to the bathroom; etc. (excluding any time spent on own medical care)
Own medical care	Visiting doctor's/dentist's office (including time waiting); dressing wounds; taking insulin; etc.
Eating	Eating meals at home; eating meals away from home; etc.
Primary child care	Breast-feeding; rocking a child to sleep; general feeding; changing diapers; providing medical care to child; grooming child; etc.
Educational child care	Reading to children; teaching children; helping children with homework; attending meetings at a child's school; etc.
Recreational child care	Playing games with children; playing outdoors with children; attending a child's sporting event or dance recital; going to the zoo with children, taking walks with children; etc.
Sports/exercise	Playing sports; attending sporting events; exercise
TV	Watching television
Entertainment (not TV)	Going to movies and theater; listening to music; computer use for leisure
Socializing	Attending/hosting social events; playing games; telephone calls
Reading	Reading books, magazines; personal mail; personal email
Gardening/pet care	Caring for lawn, garden, houseplants, and pets
Hobbies	Arts and crafts; collecting; playing musical instrument
Religious/civic activities	Religious practice/participation; fraternal organizations; volunteer work; union meetings; AA meetings; etc.

classification issues across the surveys), we aggregated an individual's time allocation into twenty-one categories described in Table IX. Travel time associated with each activity is embedded in the total time spent on the activity.

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 converted the minute-per-day reports to hours per week by multiplying the response by seven and dividing by sixty. When presenting the means from the time-use data within each demographic cell, we weighted 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. We adjusted weights so that each day of the week and each survey are equally represented.

DEPARTMENT OF ECONOMICS, UNIVERSITY OF ROCHESTER
GRADUATE SCHOOL OF BUSINESS, UNIVERSITY OF CHICAGO, AND NATIONAL BUREAU
OF ECONOMIC RESEARCH

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