Xboxes and Ex-workers?
Gaming and Labor Supply of Young Adults in the U.S.*

Gray Kimbrough
Federal Housing Finance Agency†
gray.kimbrough@gmail.com

June 12, 2018

Abstract

One popular hypothesis holds that the increasing appeal of video games over the last decade has led men to reduce working hours. I examine American Time Use Survey (ATUS) data in detail, documenting the extent of the increase in gaming. I note that increasing gaming time is generally offset by decreasing time spent on other electronics leisure. Moreover, I find that the observed trend is consistent with an alternative explanation, that a shift in social norms rendered playing video games more acceptable at later ages, particularly for non-employed men. The increase in gaming is concentrated among men living with parents, and is not uniform for all ages of young adults. The data further suggest that men exiting the work force do not exhibit significant preferences for gaming leisure.

*This preliminary draft has been prepared for the Time Use Across the Life Course conference at the University of Maryland in June 2018, and is subject to significant revision. Please click here to obtain the most recent version before citing.

†This article was written by Gray Kimbrough in his private capacity. No official support or endorsement by the Federal Housing Finance Agency is intended or should be inferred.

1 Introduction

The popular press has devoted significant attention to the hypothesis of Aguiar et al. (2017) that over approximately the last decade, the increasing appeal of video games as a "leisure luxury" has led men in their twenties to reduce their working hours. Researchers have also cited this work extensively, and some have worked to address its implications for related examinations of adult male labor supply. [1] Abraham and Kearney (2018) place the Aguiar *et al.* analysis in the context of overall declining trends in the proportion of the population working from 1999 to 2016, and note that its conclusions depend critically on key structural assumptions of their model.

Taking these analyses as a starting point, I examine the changing lives of 21-30 year olds over the past decade and a half. Current Population Survey (CPS) data show that the Great Recession hit the employment of young adult men–especially less-educated young adult men–particularly hard. The cyclical downturn occurred in the context of long-term shifts in rates of marriage and living with parents for young adults.

Over the entire period covered by the American Time Use Survey (ATUS), non-working young adult men spend more time gaming and using electronics than their working counterparts. Total electronics leisure time was nearly constant across this period for men of a given employment status; increasing gaming time is generally offset by decreases in time spent watching television and movies. The percentage of electronics leisure time spent gaming did not increase uniformly for young adult men: full-time students and non-employed men markedly increased this percentage over this period, while employed men saw only modest increases. Additionally, the increase in the amount of time spent gaming is concentrated among young adult men living with parents.

Adapting a hypothesis proposed by Abraham and Kearney, I examine whether changing social norms could explain the underlying data. Evidence from the ATUS is consistent with the implications of a shift in social acceptability of greater gaming for young adult men, particularly non-employed men and those in their early 20s. Moreover, an examination of men who recently left employment suggests that they do not prefer to spend significantly more time gaming than currently employed

[1] For example, Coglianese (2018) and Krueger (2017) worked to address the implications of the Aguiar *et al.* hypothesis in their analyses.

men, contrary to the hypothesis that preferences for gaming could be enticing men to leave the labor force.

2 Possible explanations for increased gaming

2.1 Improving video game technology

Aguiar et al. (2017) hypothesize that improvements in video game technology since the mid-2000s might explain increases in time spent playing video games. The authors do not specify which technological improvements would have caused this. While games for personal computers grew in complexity over this time, the major consoles introduced were the Microsoft Xbox 360, Sony PlayStation 3, and Nintendo Wii. The Wii marked a departure from its Nintendo predecessors, but was aimed toward a broader age range than the other two systems. By contrast, the Xbox 360 and PlayStation 3 were heavily targeted toward relatively young men but also represented only incremental improvements over the Xbox and PlayStation 2.

[Table 1 about here.]

Fundamentally, a change in technology is difficult to distinguish from a change in tastes or social norms by examining shifts from spending time with other electronics to video games. However, I posit that improving technology or a general shift in tastes would affect all young adult men, leading to similar shifts from other electronics to gaming for men of different ages as well as those who are employed, non-employed, and full-time students.

Gaming as a leisure luxury yields the additional implication that the underlying improvements in video game technology are driving reductions in the labor supply of young adult men. If this mechanism holds, men who exit employment might be expected to have a significantly higher propensity to play video games than their employed counterparts.

2.2 Shifting social norms

An alternate hypothesis proposed by Abraham and Kearney (2018) is that increasing gaming among young adult men is a result not of improved technology as Aguiar *et al.* suggest, but of changing social norms among these men. I adopt a variation of this: that it is increasingly socially acceptable for non-employed men to spend time gaming somewhat further into their 20s. This hypothesis yields two testable predictions. First, later cohorts would be expected to spend more time gaming at later ages than previous cohorts. Second, gaming would increase for full-time students in parallel with unemployed men and those who have exited the labor force–but crucially this would not hold for employed men. I test both of these predictions.

3 Data

This analysis uses hierarchical ATUS data extracts from IPUMS Time Use covering all currently available years, 2003-2016 (Hofferth et al., 2017).[2] Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) samples are drawn from IPUMS-CPS (Flood et al., 2017).

The ATUS is a national time use survey administered by the Bureau of Labor Statistics (BLS). which collects extensive information on how Americans spend their time, as well as a range of household and worker characteristics. One respondent (age 15 or older) per household is chosen from a subset of households which have recently completed the CPS. Begun in 2003, data are now available for years 2003 through 2016, with about 14,000 respondents per year. Response rates vary from 46.8% in 2016 to 57.8% in 2003. Respondent probability weights are used to account for nonresponse and oversampling of some groups, producing nationally representative estimates.

An ATUS respondent provides information to an interviewer on how she spent her day; activities are then coded using a hierarchical coding scheme. The ATUS does not have a code exclusively used for time spent playing video games, but activity code 120307 corresponds to "playing games." In practice, the vast majority of time assigned to this activity for young adults appears to be

[2] Aguiar *et al.* exclude 2003 data since significant changes were made to some coding guidance between the 2003 and 2004 waves of the survey. I do not find evidence of significant differences in the measurement of electronics leisure between 2003 and later years, and include 2003 data in this analysis.

spent playing video games. Additional electronics time is measured using activity codes 120303 and 120304 (television and movie watching) as well as 120308 (non-gaming computer use for leisure).

The CPS ASEC, typically fielded in March of each year, collects a range of economic and demographic data. Unlike other CPS samples, the ASEC sample includes active-duty military members of some households, which I exclude from this analysis. As with the ATUS, respondent probability weights are used throughout to generate nationally representative estimates.

4 Recent changes in the lives of young adults

Young adults' lives have changed in a variety of significant ways since 2000. The percentage of 21-30 year olds living with parents increased dramatically after 2000, after slowly rising through much of the 1980s and 1990s,. By 2016, young adult men were nearly 10% more likely to live with parents than in 2001, and this rate increased nearly as much for women. As shown in Figure 1, both women and men were more than 15% more likely to live with parents in 2016 as they were in parts of the 1970s.

[Figure 1 about here.]

Previous researchers have addressed portions of this increase. For example, Ruggles (2007) examined the reverse relationship–parents living with their children–and found this arrangement increasingly common through 2000. Matsudaira (2016) notes that young adults increasingly lived with parents through 2011, estimating that much of this increase is explained by changing economic conditions. Crucially, this trend continued after 2011, even as economic conditions improved.

Greater rates of living with parents would be expected if fewer adults were marrying at this age. Indeed, over this time period young adult marriage rates continued their steady decline. Among 21-30 year olds, both men and women were more than 40% less likely to have ever married in 2016 than in 1970. However, contrasting with the propensity to live with parents, young adult marital rates have dropped almost completely consistently over the past five decades.

As Matsudaira (2016) suggests, changing economic conditions may explain the accelerating increase in young adults living with parents as their marital rates continue a steady decline. As shown

in Figure 2, the percentage of young adult men without college degrees who were employed fell more than eight percentage points from the peak in 2008 to its lowest point in 2010. Unlike women, these men remained significantly below pre-Great Recession employment levels in 2017.

[Figure 2 about here.]

By contrast, the Great Recession does not appear to have shifted rates of labor force participation. Labor force participation rates decreased slightly over this period for young adult men and women, but the most dramatic reduction was seen among men without college degrees. These shifts are illustrated in Figure 3. Unlike the dramatic cyclical changes in the percentage of young adults (especially those without college degrees), the decreases in labor force participation do not appear to be strongly related to the health of the economy. Particularly for less-educated young adult men, the trend of decreasing participation appears to have persisted across the business cycle.

[Figure 3 about here.]

The significant drop in the young adult male employment-to-population ratio, particularly among less-educated men, has motivated researchers to seek out explanations for the observed shifts. I turn in the next section to a detailed examination of the ATUS data on young adults' use of electronics.

5 Overview of young adult electronics time use

Consistent with Aguiar et al. (2017), young adult men spent increasing amounts of time gaming over this period. Table 2 illustrates this, with data from two years pooled to address the relatively small sample sizes when examining 21-30 year olds in the ATUS. The percentage of men or women reporting some electronics leisure–including television, movies or streaming video, computer use for leisure, and video games–was roughly constant over this period. The percentage reporting gaming on a given day increased steadily. Similarly, the average weekly hours spent using electronics for leisure remained roughly constant or slightly lower by 2015 and 2016. Meanwhile, both women and

men increased their average time spent gaming over this period, though the increases were larger for men. The average amount of time spent gaming in a week for men increased from 2.4 hours in 2003 and 2004 to 3.5 hours in 2015 and 2016. However, the stylized fact of increasing young adult male gaming comes with several important caveats.

[Table 2 about here.]

First, gaming remains a relatively infrequent activity, as shown in Table 2. The ATUS only collects a time diary for a single day per respondent, so it is generally not possible to distinguish per-person and population-wide frequency. For example, the 12% figure in 2003 and 2004 might be due to 84% of young adult men gaming one day per week, or 12% of men gaming every day.[3] However, it is clear that on a given day, the majority of young adults–regardless of gender–do not report playing video games. While gaming remained a relatively rare activity in 2015 and 2016, the percentage of both men and women gaming on a given day had increased since the beginning of this period. Gaming incidence increased to about 1.5 times its starting rate over this period for men and women; 17.5% of young adult men report gaming on a diary day in 2015 and 2016 relative to 12.0% in 2003-2004, and for women this rate increased from 5.5% to 8.1%.

Second, young adult men increased their gaming more than women or older men, but did not increase the total amount of time spent using electronics for leisure. On an aggregate basis, these men traded off some time spent watching television and movies for time spent gaming. For both men and women, average time spent using electronics for leisure increased in 2009 and 2010, while returning to a slightly lower level by 2015 and 2016. Gaming as a proportion of the time young adult men spend on electronic leisure has increased since 2003-2004, but still represents a small fraction of this leisure time.

[Figure 4 about here.]

Disaggregating by employment and student status increases noise in the estimated means, but does not reject this basic story. In Figure 4, I present the average weekly hours spent on the different types of electronics leisure, separated by employment and student status. I use a three-year

[3] This limitation is discussed in further detail by Frazis and Stewart (2012).

moving average to smooth some of the variation in the series. The amount of time spent on electronics leisure by employed men and women (excluding students) remained consistent across this time period. Television time was down slightly over this time period for both men and women in this category. Average gaming time for student and non-employed men increased after the Great Recession, reaching a new plateau for each of these categories around 2010.

[Figure 5 about here.]

Finally, increasing gaming time is concentrated among young adult men living with their parents, as shown in Figure 5. Both groups averaged about two hours of gaming per week in 2004-2006, but in 2014-2016 men living with their parents averaged over five hours per week, while men not living with their parents averaged under three hours of gaming per week. This stark difference is not evident among young adult women.

Living with parents could simply provide the resources to enable young adult men to spend more time gaming than they otherwise would. Alternatively, changing social norms might have reduced the stigma of both living with parents and spending more time gaming. Regardless, particularly since young adults increasingly lived with parents over this period

6 Testing predictions

The hypothesis of the increasing social acceptability for certain young adult men to play video games yields a set of predictions which I test using ATUS data.

6.1 Delayed dropoff in gaming for later cohorts

First, I would expect that shifting norms would mean that average gaming time for men would remain somewhat high for longer into the 20s. This is in contrast to the assumption that all ages would adjust their behavior similarly. To test this, I construct synthetic cohorts by aggregating diaries of men born (1) from 1982 to 1985, (2) from 1986 to 1989, and (3) from 1990 to 1993. I then calculate the average amount of time spent gaming (in hours per week) at each age for each synthetic cohort.

[Figure 6 about here.]

The results, shown in Figure 6, demonstrate that men in post-1985 cohorts appear to be gaming more into their early 20s. For example, 23 year olds in post-1985 cohorts spend similar amounts of time gaming, on average, as 21 year olds in the 1982-1985 cohort. By the time men reach age 25, these cohort differences have shrunk. This pattern is consistent with it becoming increasingly socially acceptable for men in their early 20s to play video games. However, aggregating all men ages 21-30 obscures that this age-specific effect underlies observed aggregate differences in gaming.

6.2 Uniformity of increases in gaming

Figure 7 presents the percentage of young adult men's electronics leisure time devoted to gaming, disaggregated by employment and student status. At the beginning of this period, each group devoted between 10 and 15% of its electronics leisure to gaming. Employed men increased this percentage steadily but only modestly across the period. By contrast, non-employed men and full-time students saw increases in the percentage of gaming time across the Great Recession, reaching new heights around 2010 and maintaining similarly higher levels at the end of this period. This pattern is consistent with the prediction that changing social norms might lead to greater shifts for non-employed men.

[Figure 7 about here.]

6.3 Gaming behavior of those on employment margins

One way to examine whether video games serve as an enticement for men to leave employment is to compare the gaming behavior of men who recently left employment to other non-employed men. Using the ATUS, it is possible to identify a subset of men who recently exited employment by comparing employment status at the time of the ATUS interview to that recorded at the time of the CPS interview, two to five months earlier. Figure 8 presents point estimates and confidence intervals of average weekly hours spent gaming for men by employment status and whether they recently transitioned out of employment. I pool data from 2010 to 2016 to attempt to address the

issue of small sample sizes of 21-30 year old men meeting these criteria. For unemployed men and men out of the labor force, differences between those who recently transitioned out of employment and those who did not are statistically significant at the 5% significance level.

[Figure 8 about here.]

The point estimates of gaming time for men who recently left employment are consistently slightly higher than those for employed men. However, these differences are neither statistically significant nor large; employed men in this sample average 2.8 hours of gaming per week, while recently employed men in the other three categories average between 3.5 and 4.3 hours of gaming per week. Non-employed men who did not report a recent transition out of employment spend, on average, a significantly larger amount of time gaming.

These results are consistent with the explanation that men are leaving employment for reasons other than a desire to spend more time gaming.

7 Conclusions

I find that evidence from the ATUS suggests that young adult men have increased their average amount of time spent gaming over the past decade and a half. This is generally offset by declines in time spent on other electronics leisure, especially television and movies. The increase in gaming is concentrated among men living with parents, and appears to be associated with later cohorts gaming more through their early 20s. Non-employed men and students appear to have shifted electronics time to gaming more dramatically than employed men. Taken together, this evidence is consistent with the explanation that norms have shifted so that it is more socially acceptable for slightly older and non-employed men to spend more of their time gaming. By contrast, this evidence does not appear to support the hypothesis of video games, as a leisure luxury, driving down the labor supply of young adult men.

Additionally, evidence from a set of young adult men who recently transitioned out of employment is inconsistent with the hypothesis that men left jobs to play significantly more video games. While non-employed men who recently left jobs play slightly more video games, on average, than

employed men, they play significantly less than non-employed men who did not recently transition out of employment.

As Abraham and Kearney (2018) note, the connection between living with parents and shifting time use could be a crucial one. Moreover, as shown in Figure 1, the increase in living with parents since 2000 is both common to men and women and marks a significant acceleration in the pre-2000 trend, reversing huge post-World War II decreases in intergenerational living that coincided with the Great Compression (Goldin and Margo, 1992). The causes and effects of such dramatic shifts in the lives of young adults warrant additional examination.

References

Abraham, K. G. and Kearney, M. S. (2018). Explaining the decline in the U.S. employment-to-population ratio: A review of the evidence. Working Paper 24333, National Bureau of Economic Research.

Aguiar, M., Bils, M., Charles, K. K., and Hurst, E. (2017). Leisure luxuries and the labor supply of young men. Working Paper 23552, National Bureau of Economic Research.

Coglianese, J. (2018). The rise of in-and-outs: Declining labor force participation of prime age men. Working paper.

Flood, S., King, M., Ruggles, S., and Warren., J. R. (2017). Integrated Public Use Microdata Series, Current Population Survey: Version 5.0. [dataset]. College Park, MD: University of Maryland and Minneapolis, MN: University of Minnesota, 2017.

Frazis, H. and Stewart, J. (2012). How to think about time-use data: What inferences can we make about long- and short-run time use from time diaries? *Annals of Economics and Statistics*, (105-106):231–245.

Goldin, C. and Margo, R. A. (1992). The great compression: The wage structure in the United States at mid-century. *The Quarterly Journal of Economics*, 107(1):1–34.

Hofferth, S. L., Flood, S. M., and Sobek, M. (2017). American Time Use Survey Data Extract Builder: Version 2.6 [dataset]. College Park, MD: University of Maryland and Minneapolis, MN: University of Minnesota.

Krueger, A. (2017). Where have all the workers gone? An inquiry into the decline of the U.S. labor force participation rate. Working paper, Brookings Papers on Economic Activity.

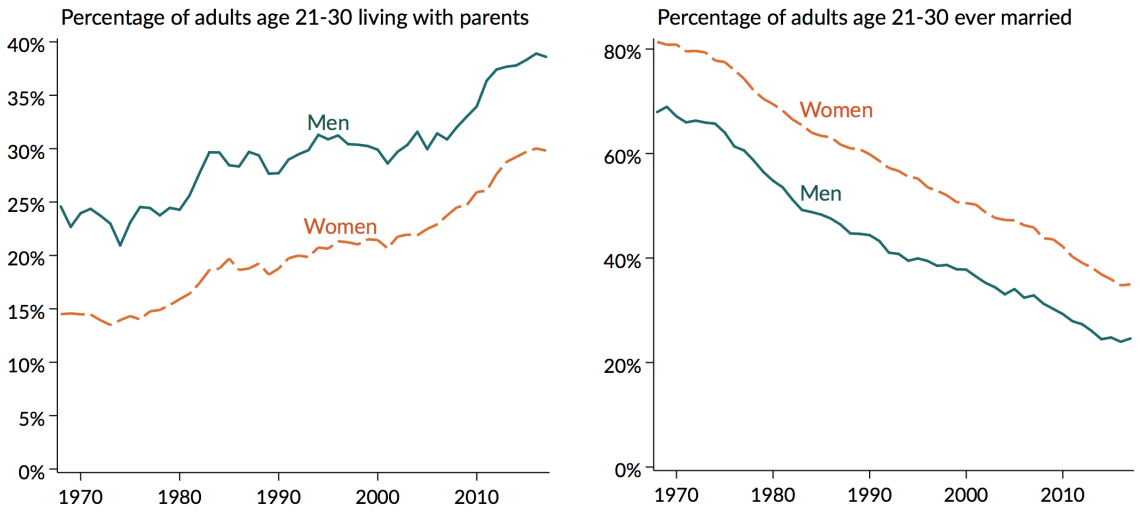
Matsudaira, J. D. (2016). Economic conditions and the living arrangements of young adults: 1960 to 2011. *Journal of Population Economics*, 29(1):167–195.

Ruggles, S. (2007). The decline of intergenerational coresidence in the United States, 1850 to 2000. *American Sociological Review*, 72:964–989.

List of Figures

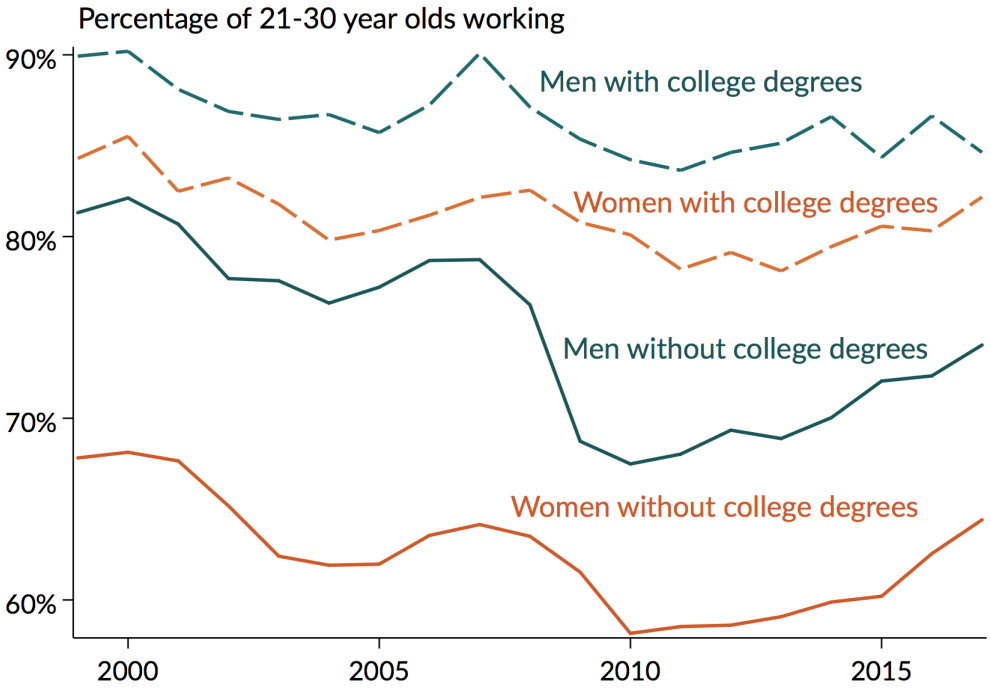
1 Two significant changes in the lives of young adults 14
2 Young adult employment as a percentage of the population 15
3 Labor force participation of young adults 16
4 Time spent playing games, watching TV, and using a computer for other leisure, ages 21-30 17
5 Increased gaming is concentrated among men living with their parents 18
6 Men born after 1985 play video games longer into their 20s 19
7 Gaming as a percentage of total electronics leisure time 20
8 Men 21-30 who recently left jobs spend less time gaming 21

Figure 1: Two significant changes in the lives of young adults



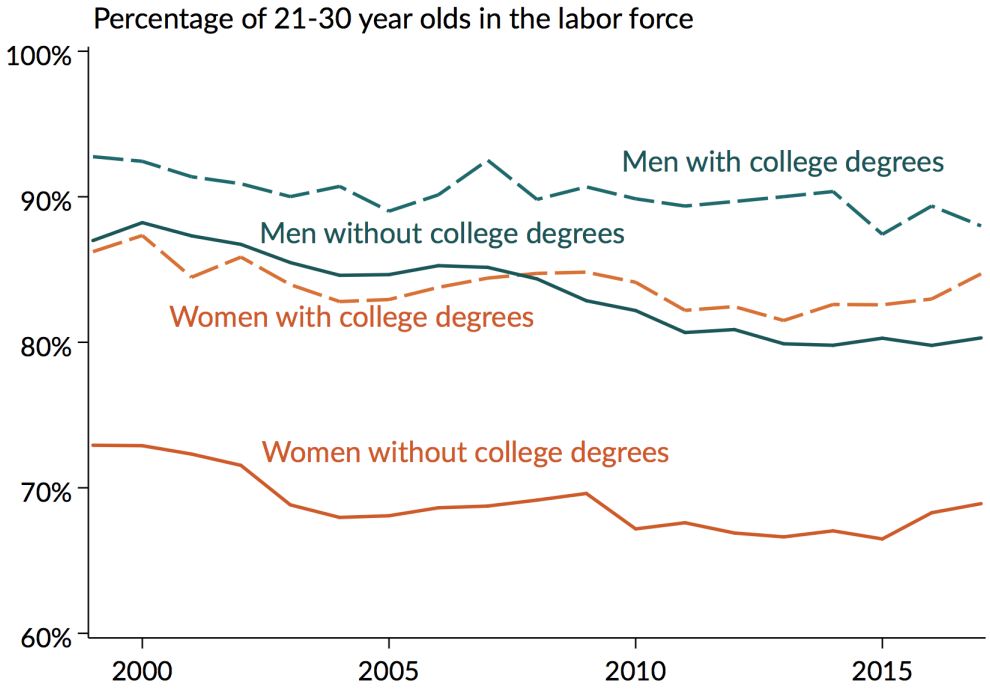
Source: 1968-2017 CPS ASEC samples from IPUMS-CPS. Excludes armed forces.

Figure 2: Young adult employment as a percentage of the population



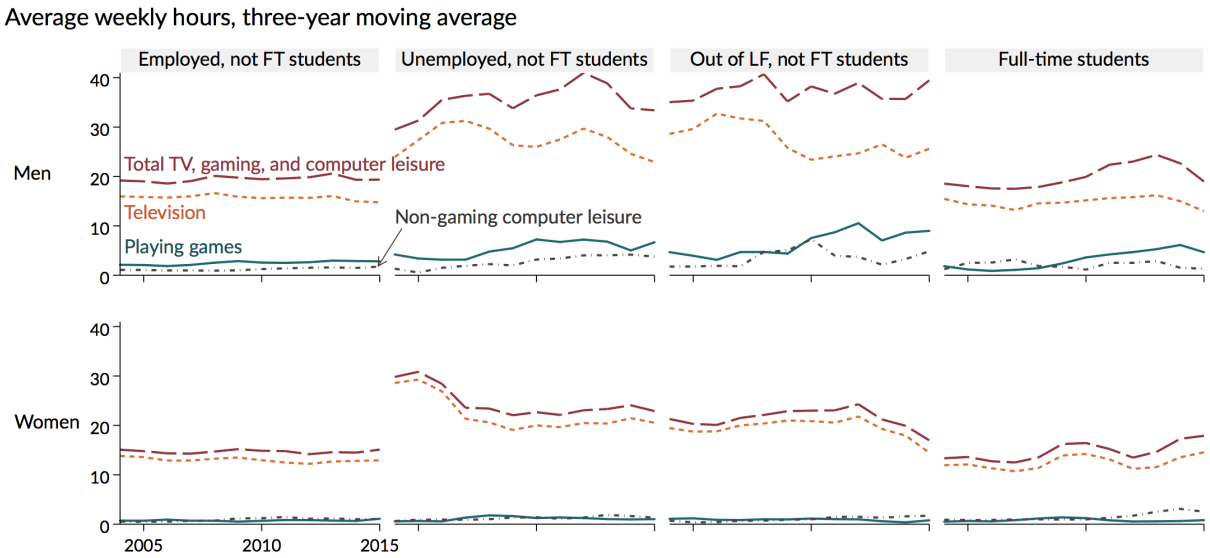
Source: 1968-2017 ASEC samples from IPUMS-CPS. Excludes armed forces.

Figure 3: Labor force participation of young adults



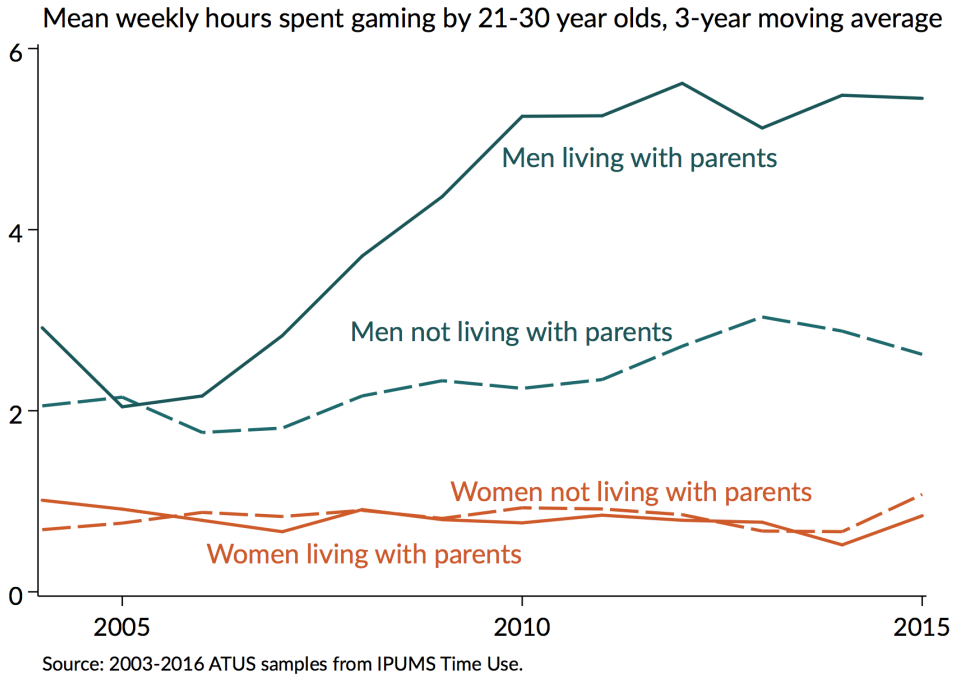
Source: 1968-2017 ASEC samples from IPUMS-CPS. Excludes armed forces.

Figure 4: Time spent playing games, watching TV, and using a computer for other leisure, ages 21-30



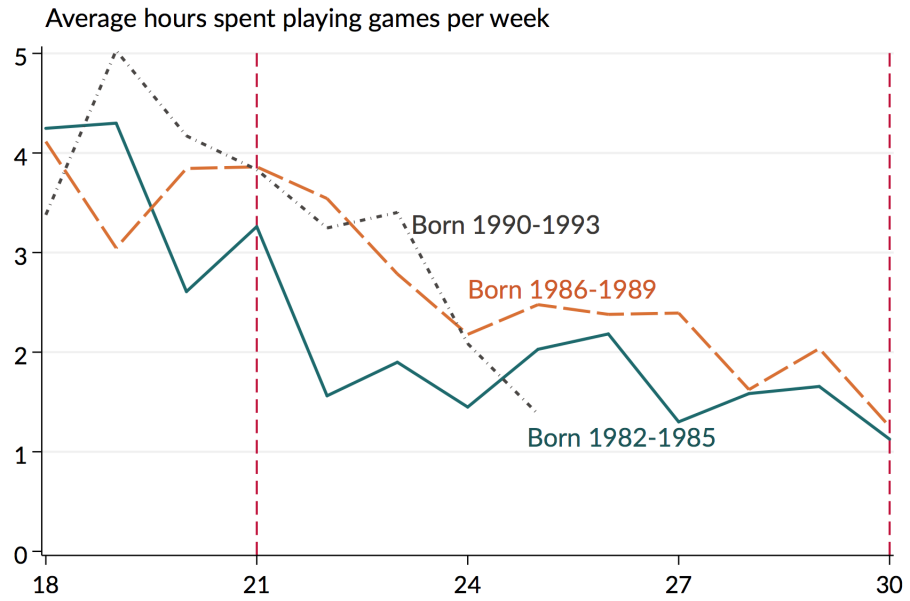
Source: 2003-2016 American Time Use Survey samples from IPUMS Time Use.

Figure 5: Increased gaming is concentrated among men living with their parents



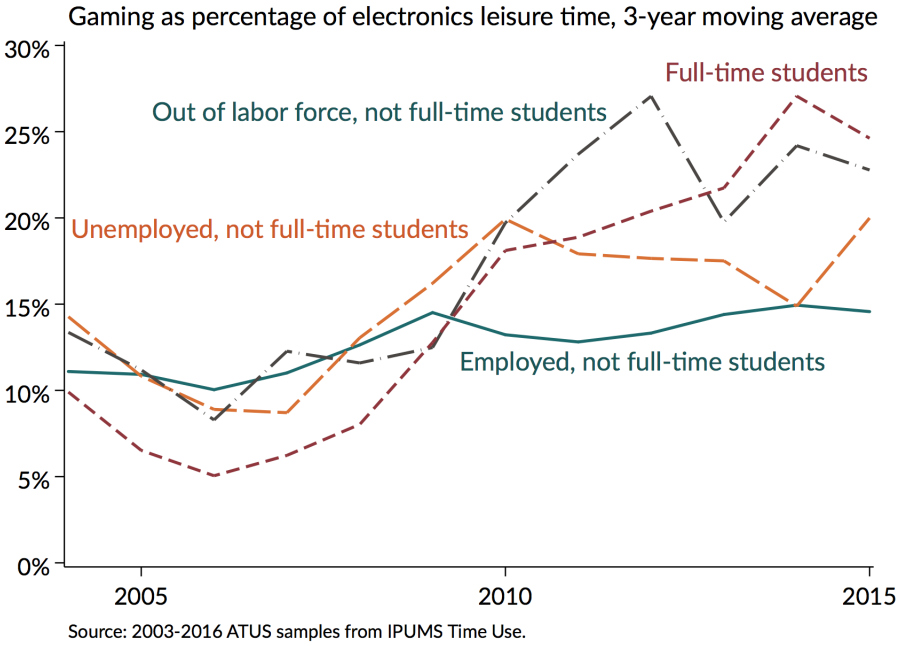
Source: 2003-2016 ATUS samples from IPUMS Time Use.

Figure 6: Men born after 1985 play video games longer into their 20s



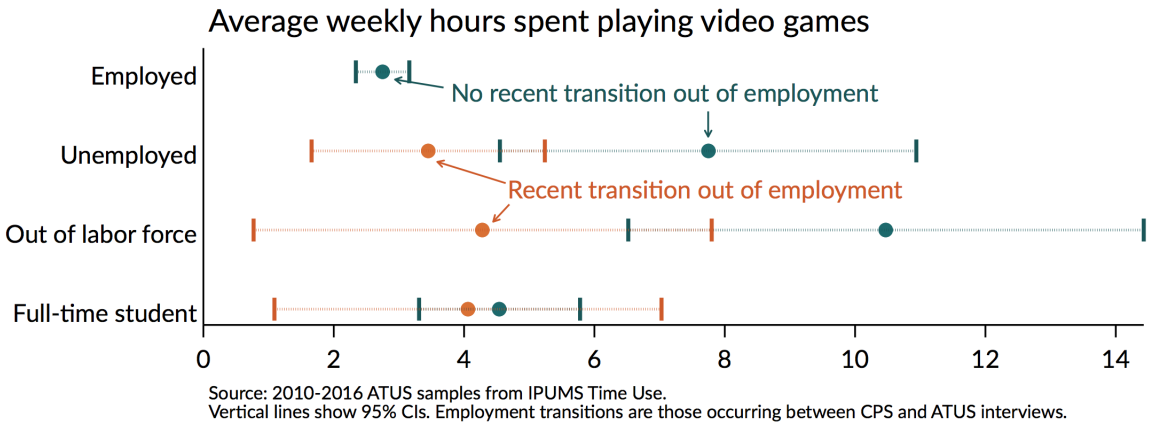
Limited to men age 18-30, excluding full-time students under 25. Vertical lines show bounds of Aguiar et al. sample.
Source: 2003-2016 ATUS samples from IPUMS Time Use.

Figure 7: Gaming as a percentage of total electronics leisure time



Source: 2003-2016 ATUS samples from IPUMS Time Use.

Figure 8: Men 21-30 who recently left jobs spend less time gaming



Source: 2010-2016 ATUS samples from IPUMS Time Use.
Vertical lines show 95% CIs. Employment transitions are those occurring between CPS and ATUS interviews.

List of Tables

1 Prominent video game systems 23
2 Characteristics of young adults in the ATUS 24

Table 1: Prominent video game systems

System	Year introduced in the US
Atari 2600	1977
Nintendo Entertainment System (NES)	1985
Sega Genesis	1989
Game Boy	1989
Super NES	1991
Sony PlayStation	1995
Nintendo 64	1996
Sony PlayStation 2	2000
Nintendo DS	2004
Microsoft Xbox 360	2005
Sony PlayStation 3	2006
Nintendo Wii	2006
Nintendo 3DS	2011
Sony Playstation 4	2013
Nintendo Switch	2017

Table 2: Characteristics of young adults in the ATUS

	Men 21-30			Women 21-30		
	2003-2004	2009-2010	2015-2016	2003-2004	2009-2010	2015-2016
Percent gaming on diary day	12.0%	15.1%	17.5%	5.5%	6.6%	8.1%
Percent using electronics for leisure	83.4%	83.0%	80.2%	79.9%	81.0%	77.6%
Weekly hours spent gaming	2.4	3.2	3.5	0.6	0.8	1.2
Weekly hours spent using electronics for leisure	20.8	21.9	20.6	16.6	17.2	16.3