Labor Market Hours Constraints, Home Production, and Spousal Labor Supply

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Abstract

We document that U.S. labor market hours constraints are up to 5 times more pervasive than suggested by official measures. If each worker could work his desired number of hours, aggregate hours supplied would rise by 3 percent. Guided by a simple model of household labor supply and home production, we then consider how single and married households adjust to hours constraints. We find that single individuals raise their home production when subject to an upside labor market hours constraint. In married households, the spouse of the constrained worker is more likely to enter the labor market and decrease her home production.

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1 Introduction

Modern business cycle analysis makes a key distinction between employment and hours per worker in explaining variation in total hours worked (Rogerson and Shimer, 2011; Ohanian and Raffo, 2012). Variation in hours per worker across the business cycle is driven in part by hours constraints imposed upon workers. These hours constraints have drawn the attention of policymakers and researchers following record levels of workers involuntarily working part-time during the Great Recession of 2007-09 (Yellen, 2014).

To assess the prevalence of workers facing hours constraints, policymakers rely almost exclusively on the monthly surveys conducted by the Bureau of Labor Statistics, which ask only workers with fewer than 35 hours per week whether they desire to work more hours. Therefore the measure fails to capture labor market slack in workers facing hours constraints but working more than 35 hours per week.

While poor measurement may understate the extent of labor market slack in the U.S. economy, a well-measured figure itself may overstate the welfare impact of work hours constraints if workers adjust along other margins to hours constraints. For example, workers may adjust housework hours. In addition, married households can leverage the labor market insurance offered by their spouse to smooth their own labor market shocks (Kotlikoff and Spivak, 1981; Rosenzweig and Stark, 1989; Hayashi et al., 1996). In particular, if work hours of one spouse of a married couple are constrained, the labor supply of the other spouse may change in response.

In this paper, we estimate the extent of aggregate labor market hours constraints for both part-time and full-time workers, and how they adjust to hours constraints in both single and married households. We conduct our analysis in two parts: first, we introduce new measures of labor market slack and demonstrate that the conventional measure produced by the Bureau of Labo Statistics (BLS) significantly understates labor market slack. Second, we show two novel margins of adjustment for workers facing employer-imposed hours constraints: they adjust by increasing their home production, and for married household, the spouse is more likely to enter the workforce and work longer hours.

A key distinction between our data and the BLS measure is that respondents in our data are asked about labor market hours constraints regardless of how many hours they work. Thus we can observe a broader measure of labor market slack that incorporates full-time workers who desire to work more hours. In particular, we derive our aggregate hours constraints measure from two surveys: the Panel Study of Income Dynamics and the Health and Retirement Study. To validate these two surveys, we first show that the evolution of our measures correlate very closely in levels and changes to the BLS' PTER measure.

When we expand our measure of aggregate hours constraints to include full-time workers, we find substantially higher levels of labor market slack than what the BLS measure indicates. The more restrictive BLS measure understates the fraction of workers facing hours constraints by a factor of three. That is, while on average the BLS counts about 4 percent of workers to be working fewer hours than they would like, our measures show that on average between 10 and 20 percent of workers face upward binding limitations on their working hours. The difference in magnitudes have important implications for the calibration of macroeconomic models of optimal monetary policy.

Next, we leverage the panel dimension of our surveys to study the transition dynamics of work hour constraints and find that their persistence is quite high. Nearly fifty percent of constrained workers remain constrained year-over-year and the likelihood of transitioning out of the constraints is not affected by the duration of the constraints.

We explore the factors that drive workers into the constrained situations. We find that having an additional child in the family is not predictive for becoming constrained (holding earnings constant), consistent with our interpretation of the constraints being driven by external economic forces. Reductions in family income or increases in wage rates are associated with a greater likelihood of being work-hour constrained.

Finally, we study several margins of adjustment by workers facing hours constraints. We first develop a simple model to understand how individual workers and married households might respond to the imposition of hours constraints. Consistent with this simple model, we find that individuals increase their home production in response to hours constraints. For married couples, we find that women are more likely to enter the workforce in response to their husband facing a binding hours constraint.

This paper contributes to our understanding of the extent and consequences of labor market slack. Recent papers on hours constraints experienced by part-time workers (Borowczyk-Martins and Lalé, 2019, 2020; Valletta et al., 2020) have largely left out constrained full-time workers. An exception is analysis by Bell and Blanchflower (2018; 2021), who explore hours constraints among both part- and full-time workers in Europe. Our study goes beyond their analysis in several dimensions. First, we explore both the drivers and adjustment margins of hours constraints. Additioanlly, welook at the U.S. context in which hours constraints have become a more urgent policy priority following the Great Recession of 2007-9. Finally, we are able to examine hours constraints at a longer time horizon, and therefore can observe dynamics across several business cycles.

Our work contribute to the literature estimating labor supply elasticities. Like Rogerson and Wallenius (2019), we look at household labor supply when one member reduces their labor supply. However, we focus on firm-imposed hours constraints whereas Rogerson and Wallenius (2019) look at retirement choices. We also expand upon the adjustment mechanisms to hours constraints highlighted by Chetty et al. (2011) to explain the gap between micro and macro estimates of the labor supply elasticity. In particular, we show that married households respond differently in terms of labor supply to hours constraints.

Most of the existing literature on market work hours constraints has focused primarily on the impact of the constraints on labor market activities and has largely ignored home production. For example, Altonji and Paxson (1988) document evidence that is broadly consistent with the notion that workers demand higher wage compensation for jobs with more restrictive hours. Their subsequent work on market hours constraints, Altonji and Paxson (1992), reveals that the effect of preference changes on work hours is generally much larger for workers who change jobs than for those who do not, consistent with the view that hours constraints effectively limit workers' ability to alter hours without switching jobs. In addition, Paxson and Sicherman (1996) find that hours constraints affect job mobility and dual job holding. They report that workers subject to upside hours constraints are more likely to take a second job at a lower wage, while workers facing downside constraints are less likely to do so but are more likely to switch to a main job with lower required hours. Furthermore, Charles and DeCicca (2007) focus on the extensive margin of market labor supply. They find that downside constrained workers are more likely to retire by some future date compared with their unconstrained counterparts. We expand upon this literature by considering the home production margin of adjustment to hours constarints and considering how married households respond.

2 Comparing Measures of Aggregate Hours Constraints

One important input for measuring aggregate labor market slack is the Bureau of Labor Statistics' (BLS) Part-Time for Economic Reasons (PTER) indicator, included in the BLS' U-6 measure of labor market underutilization. PTER measures the number of employed part-time workers who would like to work full-time but are not able to due to economic circumstances (e.g., unfavorable business conditions or an inability to find full-time work). A major shortcoming of PTER is that it cannot capture labor market slack among *full-time* workers. We use two panel survey datasets with questions regarding workers' labor market hours constraints to extend measures of labor market slack to incorporate full-time workers who wish to work additional hours. The rich set of variables in these panel datasets also allows us to conduct supplementary analyses on the causes and consequences of such labor market hours constraints.

The main data source for our analysis is the Panel Study of Income Dynamics (PSID). We also use the Health and Retirement Study (HRS) data to supplement our analysis to cover more recent years. Both the PSID and the HRS are longitudinal household surveys nationally representative for the United States. In addition to rich employment, income, and demographic data, both surveys collect information on labor market hours constraints and home production. Combining both surveys allows us to cover over 40 years of labor hours constraint dynamics with a rich set of demographic and labor market covariates.

The PSID collected information on labor market hours constraints annually from 1968 to 1986. The HRS, a biennial survey started in 1992, asks about respondents' hours constraints each survey year. One key difference between the surveys is that the HRS only questions individuals age 50 and older while the PSID surveys household members from all age groups.

Table 1 summarizes the hours constraints questions asked on the PSID and the HRS. From 1968 to 1987 the PSID asked household heads the following four questions, referencing the year prior to the survey year:

1. "Would you have liked to work more if you could have found more work?"
2. "Was there more work available on (any of your jobs) so that you could have worked more if you had wanted to?"
3. "Would you have preferred to work less even if you had earned less money?"
4. "Could you have worked less if you had wanted to?"

We count the head as being upside (downside) constrained if the head reported that he/she wanted to, but was not able to, work more (fewer) hours. The HRS asks essentially the same questions in all waves. However, unlike the PSID, the HRS questions refer to the time of the survey. One advantage of the HRS data is that in addition to these qualitative questions, the survey also asks the constrained households what their desired number of market work hours were, a question not asked in the PSID.

2.1 Trends of Working Hours Constraints

The most widely used indicator for tracking involuntary part-time workers is complied by the Bureau of Labor Statistics (BLS) using the Current Population Survey (CPS) data, which is often referred to as the share of working part-time for economic reasons (PTER). To introduce the PSID and the HRS data as useful additional data sources of studying labor market constraints, we show that the similarly defined series these two surveys share similar trends as the BLS PTER series. Specifically, we show that the shares of involuntary part-time workers (those who were upside constrained and working fewer than 35 hours per week) measured in the PSID and HRS resemble the PTER rates estimated using the CPS data. As shown in Figure 1, during the overlapping sample period of 1967 to 1986, the CPS PTER series and the share of involuntary part-time workers in the PSID have similar levels and changes, with a correlation coefficient of 0.84. The CPS PTER series and our HRS-based measure follow a similar pattern during the period of overlap between 1992 and 2012, with a correlation coefficient of 0.79.[1] All three series are highly countercyclical, with more people involuntarily working part-time or unable to work up to the ideal number of hours during recessions.

Next, we turn to our preferred measure of aggregate labor market hours constraints, which includes full-time workers, plotted in Figure 2. We find that the inclusion of hours constrained workers with more than 35 hours per week substantially raises the fraction of hours constrained workers. In particular, the average fraction of the labor force experience hours constraints using our PSID measure is nearly 19 percent, and using the HRS measure is over 12 percent. This compares to an average of 3.7 percent of the labor force working part-time for economic reasons. Therefore, our measure of aggregate labor market hours constraints capture 3 to 5 times more labor market slack than captured by the official BLS indicator. Despite the substantial level differences, the series continue to move in tandem: PTER and our PSID measure have a correlation coefficient of 0.71, while PTER and our HRS measure have a correlation coefficient of 0.87.

The PSID estimates indicate that a large share of prime-age household heads were unable to work up to their desired number of hours in the labor market during the period from late 1960s to the middle of the 1980s. Among the constrained workers, over 60 percent can earn extra income should they be able to work more hours. Moreover, over 70 percent of the constrained worked full time. The significant prevalence of such labor hours constraints suggests that standard metrics of labor market slack, such as share of people involuntarily working part time, miss a large amount of labor market slack.

To understand the magnitude of labor market slack, we leverage a unique survey question from the HRS: "How many hours would you like to work each week?" Taking this answer and subtracting the respondent's actual hours worked, we then impute the additional yearly hours of work desired. We aggregate this measure across individuals to create a time series of national labor market slack (at least among those aged 50 and older), plotted in Figure

[1] Note that this high level of correlation holds despite the HRS only sampling individuals older than 50. This difference in the average age of the sample may explain why the fraction of involuntary part-time workers is lower in the HRS relative to the official BLS part-time for econmic reasons measure.

3. We find a substantial and counter-cyclical amount of additional work hours desired. If each worker was able to work the number of additional hours they desired, aggregate hours of labor supplied would rise by about 3 percent.

Finally, we note that most of the hours constrained workers captured by our measure but missed by the BLS measure are working modest work weeks. Most of the constrained workers not captured by the BLS measure (i.e., those working more than 35 hours per week) work between 35 and 45 hours per week. We show this fact in Figure 4, with the share of constrained workers in the PSID on the left and those from the HRS on the right. We find that those working less than 40 hours but more than 35 hours may still be working part-time, and therefore without full-time benefits. These workers are the second largest group among the constrained in the PSID, as shown by the figure on the left. The largest constrained group overall in the HRS are workers with between 40 and 45 hours per week.

3 Characterizing Working Hours Constraints

We next explore what factors relate to the imposition of labor market hours constraints on workers.

3.1 Occupations and Industries of the Constrained

We next explore workers in which industries and occupations face the highest likelihood of experience an upside hours constraint. We show the fraction of workers reporting an upside hours constraint in Figure 5 by industry (left-hand side graph) and occupation (right-hand side graph).

We find that workers in the construction and manufacturing industries faced the highest odds of experiencing an upside hours constraints, with over 30 percent of construction workers hours constrained. By contrast, white-collar industries like professional services and finance have among the lowest odds of imposing hours constraints.

The four occupations with highest odds of upside constraints are nonfarm laborers, operatives, transportation operators, and farm laborers, each with over or near 25 percent of workers being constrained. The four occupations with lowest odds of upside constraints include sales, professionals, managers, and farmers. Variation across occupations is much larger than we see for industries. The average fraction of workers facing upside hours constraints of the top four occupations was 28.6 percent, more than three times higher than the average of the bottom four occupations (8.9 percent).

3.2 Persistence of Working Hours Constraints

To the best of our knowledge, most of the existing work pertinent to the transition dynamics of market work hours constraints uses the CPS data and focuses on involuntary part-time workers. Because the CPS allows only a short panel at 8 months over a period of a year and a half, the analysis is largely limited to short-run dynamics. As a result, relatively little is known regarding the reoccurrence and persistence of such constraints over a worker's life cycle, in particular among those who work full time, which can be an important element to further understanding of the nature and dynamics of these constraints. We present in table 2 some simple statistics of the transition dynamics between years t and $t+1$, and how the dynamics vary by part-time status. Because the upside constraints are much more prevalent and common than the downside constraints, and because measure labor market slack is a key input into monetary policy formulation, our analysis will focus on such constraints.

Panel A shows the transition matrix of three states--upside constrained, unconstrained, and downside constrained—for all PSID household heads in our sample that can be linked between two years. We note that the upside constraints are rather persistent, with slightly fewer than half (48.2 percent) of the constrained workers remaining under such constraints one year later. Downside constraints, by contrast, are less persistent, with about one third of the constrained workers remaining so-constrained one year later. In addition, each year, 11.1 percent and 4.7 percent the unconstrained workers became upside and downside constrained, respectively.

Panel B illustrates how the transitions in and out of the upside constraints vary with the part-time status and presents four 2×2 transition matrices that correspond to working full-time in both years, part-time in both years, changing from full-time to part-time, and from part-time to full-time, respectively. The panel reveals several patterns: first, the upside constraints were fairly persistent across all four groups of workers, with the remaining constrained likelihood between 42 to 56 percent. Second, part-time workers appear to have a higher chance of remaining constrained, but those who switch to working full-time in year $t+1$ had a better chance of escaping the constraints. Third, the unconstrained employees who changed from working full-time to working part-time had the highest chance of becoming constrained (17.7 percent), nearly twice as high as the odds of those who continued working full-time (9.8 percent). On balance, the statistics in panel B are consistent with the notion that many of those switching from full-time to working part-time did so involuntarily.

Panel C takes a different perspective and presents the year $t+1$ status of those who were constrained in year t by their part-time status in year t. Among the constrained full-time workers, about 85 percent stayed working full-time and 15 percent changed to working part-time. The full-time--part-time transition rate among the constrained appears to be higher than this rate for the entire labor force (see, for example, Borowczyk-Martins and Lalé, 2019).[2] Regardless whether changing to working part-time, roughly half of the workers remained constrained the next year. For part-time workers, about 55 percent of those constrained in year-t worked full-time the next year. Interestingly, 56 percent of those working full-time continued to report having working hours constraints, comparing with 42 percent of those remaining working part-time. The difference suggests that changing to working full-time was due to hours constraints. However, working full-time alone, for many workers, did not completely relax the constraints.

Finally, we note that the results presented in table 2 are little changed when we restrict the sample to those who would receive additional pay if they worked extra hours.

3.3 Factors Accounting for Transitions into and out of Constrained Status

We now estimate a econometric model to quantify the extent to which various demographic, labor market, and family income factors are associated with transition into and out of upside hours constraints. We underscore that this is not a structural model that intends to uncover causal relationship. Rather, we are interested in the degree to which such transitions can be accounted for by worker characteristics observed by econometricians. Specifically, we estimate the regression for becoming upside constrained:

$$Y_{i,t-1,t} = \alpha_t + \beta X_i + \gamma Z_{i,t-1,t} + \varepsilon_{i,t} \tag{1}$$

where $Y_{i,t-1,t}$ is an indicator that is equal to one if worker i become upside constrained or escaped an upside constraint in year t, α_t is a year fixed effect, X_i is a vector of time-invariant controls, and $Z_{i,t-1,t}$ is a vector of time varying individual-specific variables. X_i includes demographic characteristics such as rage, age, and education, while $Z_{i,t-1,t}$ includes changes in marital status, changes in family size, changes in labor market variables. We also estimate a version of equation 1 controlling for individual fixed effects. In all regressions we cluster standard errors at the individual level.

We show the results of estimating equation 1 in Table 3. In columns 1 and 2 we show estimates for becoming constrained (conditional on being unconstrained in year $t-1$), first without and then with person fixed effects, and then in columns 3 and 4 the regressions on the likelihood of escaping constrained status (conditional on being constrained in year $t-1$).

Our results reveal that black workers on average are 57 percent more likely to become

[2] Another factor accounting for difference between our statistics and those reported in Borowczyk-Martins and Lalé (2019) is that the latter includes transitions into unemployment, other employment, and out of labor force, whereas our sample includes only those working positive hours in both year t and year $t+1$.

constrained than otherwise comparable non-black workers in a given year, and that the likelihood of becoming constrained substantially diminishes significantly with education levels. Encouragingly for our interpretation of the hours constraints as based on labor demand reasons, we find no significant effect of having children or of health status (proxied for by whether a disability limits one's housework) on becoming constrained or escaping constrained status. We find some evidence that an increase in the household's non-labor income reduces the likelihood of becoming constrained, consistent with a negative income effect on labor supply. While higher wage rates are associated with higher odds of becoming constrained, consistent with a positive substitution effect, the effect is not statistically significant. Younger workers are more likely to become constrained.

We next study the transitions out of upside hours constraints. Workers who remained married had higher odds of escaping hours constraints relative to the workers remained single (the omitted group). Furthermore, workers significantly reduced their hours at the same time they escaped upside hours constraints. More educated workers more easily escape constrained status, consistent with these workers having better bargaining power over working conditions, including hours worked.

Finally, we note the importance of individual fixed effects in explaining entry and exit into upside constrained status. In particular, fixed individual characteristics can explain a quarter of the variation in becoming constrained and nearly 30 percent of the variation in who escapes constrained status. Nevertheless, this leaves a large amount of room for other factors, such as local demand-side changes, to explain the remaining variation.

4 Households Responses to Labor Hours Constraints

4.1 Conceptual Framework

How do workers and their families deal with such labor hours constraints? When worker want to work more hours than they are able to, the standard labor supply model implies that their marginal utility of leisure is not as large as the marginal utility associated with the additional income earned from working the marginal hour. To equalize these margins and achieve a second-best optimal, workers may increase home production or increase labor supply of other household members should it be available.[3]

[3] In addition to these two aspects, constrained workers may also reduce consumption, reduce saving, or increase borrowing. We do not study these responses in this paper.

4.1.1 Model for Individual

Consider a stylistic, simple model of one individual optimizing market and housework labor supplies. She chooses working L hours in the labor market, earning a unit of goods per hour, and H hours on housework. Assuming her consumption is produced by combining housework and goods purchased with wages earned in the labor market with a Cobb-Douglas technology $C = L^{\alpha}H^{(1-\alpha)}$. Her utility function is defined as $U = log(C) + log(1 - L - H)$, where $1 - L - H$ indicates her leisure time net of market and housework. The optimality condition $\frac{dU}{dL} = \frac{dU}{dL} = 0$ implies the well known result $\frac{L^*}{N^*} = \frac{\alpha}{1-\alpha}$. Solving for optimal market and housework hours, we have $L^* = \frac{\alpha}{2}$ and $H^* = \frac{1-\alpha}{2}$. The optimization has an interior solution if $\underline{L} \leq L^* \leq \overline{L}$, where $\underline{L}$ and $\overline{L}$ are the lower and upper bounds of labor market hours, respectively. If the individual has a binding market hour constraint, $\overline{L} < L^*$. At $\overline{L}$, $\frac{dU}{dL} > 0$, i.e., the marginal value of leisure is too high relative to the marginal value of consumption. Accordingly, she will increase H above H^*. Specifically, $\widehat{H}^* = \frac{(1-\alpha)(1-\overline{L})}{2-\alpha}$, where the optimal housework hours under binding market hour constraints decreases with $\overline{L}$.

Prediction 1. A single individual facing an upside labor hours constraint will (i) reduce her working hours and (ii) increase her home production.

Prediction 2. A single individual facing a downside labor hours constraint will (i) increase her working hours and (ii) decrease his home production.

4.1.2 Model for Couple

Now consider a model for a couple with spouse A and spouse B. The optimization program becomes

$$\max_{L_A, L_B, H_A, H_B} log(C) + log(1 - L_A - H_A) + log(1 - L_B - H_B),$$

where $C = (L_A + mL_B)^{\alpha}(H_A^{\beta}H_B^{1-\beta})^{1-\alpha}$.

The couple consumes C, which is a bundle of purchased goods and housework input. Note that m denotes the relative market labor productivity (wages) between spouses. The technology of producing C reflects the assumption that the spouses' market labor income is perfect substitutes but their housework input is not. In addition, the couple values about each individual's leisure equally. The first order conditions are

$$\frac{\alpha}{L_1 + mL_2} = \frac{1}{1 - L_1 - H_1} = \frac{(1-\alpha)\beta}{H_1}, \quad \text{and}$$

$$\frac{\alpha m}{L_1 + mL_2} = \frac{1}{1 - L_2 - H_2} = \frac{(1-\alpha)(1-\beta)}{H_2},$$

which imply

$$\frac{1}{m} = \frac{1 - L_2 - H_2}{1 - L_1 - H_1} = \frac{\beta H_2}{(1-\beta)H_1}. \tag{2}$$

Assuming spouse B has a lower market wage ($m < 1$) and a higher equilibrium share of housework ($\beta < \frac{1}{2}$), we have $L_1 > L_2$ and $H_1 < H_2$. Note that, for sufficiently small m, equation (1) implies $L_2 = 0$ because of nonnegative market labor hours. The time allocation is consistent with the patterns observed for the majority couples in our sample, where the household heads earned a higher wage and worked more hours than the spouses in the labor market. Some spouses worked zero hours in the labor market. In addition, most heads worked positive but fewer hours than spouses on housework.

Prediction 3. A married individual facing an upside labor hours constraint will (i) reduce his working hours, (ii) increase his home production. The upside constrained worker's spouse will (i) increase her home production, (ii) be more likely to enter the labor force, (iii) work more hours.

Prediction 4. A married individual facing a downside labor hours constraint will (i) increase his working hours, (ii) decrease his home production. The downside constrained worker's spouse will (i) decrease her home production, (ii) be less likely to enter the labor force, (iii) work fewer hours.

4.2 Sample

We make several sample restrictions in order to focus on the mechanisms featured in our model. To rule out interactions between worker's desired work hours and Medicare eligibility, we drop workers older than 65. Because hours constraints faced by self-employed workers are more likely to reflect individual-specific time varying factors, we drop the self-employed. We further restrict the sample to households whose heads were either working or temporarily laid off. Finally, we also restrict our sample to individuals who can earn more with additional hours of work. This drops salaried workers, for example, who do not earn overtime. This last restriction removes workers who wish to increase their hourly wage by reduce their hours but holding their salary fixed (Johnson, 2011).

Table 4 presents summary statistics of key relevant variables in our PSID sample, pooled across years. All statistics are estimated using the PSID sample weights and all dollar-denominated variables are converted to 1986 dollars. Further, the PSID survey treats the male in a married household as the head of household.

Our estimates indicate that a significant share of workers are bound by market work hours constraints. Specifically, the upside constraints of labor market hours are binding nearly five times more frequently than the downside constraints. Nearly 29 percent of our sample observations (household $\times$ year) reported that the household heads were not able to increase work hours when they wanted to (column 1). However, fewer than 7 percent of the sample were not able to decrease hours when they wanted to (column 2).

We find that the downside constrained household heads are similar to the unconstrained. On the other hand, the upside constrained household heads were significantly different from the downside constrained and unconstrained heads. In particular, the upside constrained heads tended to be younger, more likely to be nonwhite, having lower educational attainments. The HRS sample upside constrained were also more likely to be widowed or divorced. In addition, the downside constrained households earned a substantially lower family income, and their heads worked fewer hours comparing with the unconstrained workers. In contrast, the downside constrained workers reassuringly reported higher average hours worked. Furthermore, we note that the mean hours worked of the upside constrained were around 37 hours per week, suggesting that the upside constraints were not only applicable to part-time workers. Indeed, in the PSID sample we find that 28 percent of the upside-constrained worked part-time, comparing with 17 percent among the unconstrained.

Finally, we look at the housework hour and food-out ratio variables. Because married and unmarried households have different home production preferences, the estimates are presented separately. Indeed, in the PSID data across constraint status, married households tended to have higher housework hours and lower food-out ratios. Our estimates indicate that, in both the PSID and the HRS data, the upside constrained households had greater housework hours and lower food-out ratios, a contrast that holds among both married and unmarried households. The downside constrained households had similar or slightly lower housework hours and slightly higher food-out ratios.

We use both a direct and an indirect measure of time spent on home production. The direct measure is the annual hours of housework, and the indirect measure is the ratio between expenditures on eating out and total food expenditures (henceforth the food-out ratio). Fixing the ratio of prices between eating out and at home, a lower food-out ratio implies more eating and cooking at home, hence a higher level of housework. While both the PSID and the HRS collected housework hours information, the HRS (a biennial survey) data was collected one year off from the reference year of labor hour constraints.[4] As a result, unlike the PSID, the HRS labor hours constraints and housework hours data do not refer to the same period. We therefore leverage only the PSID to analyze homework responses to hours constraints, and both the PSID and HRS for the food-out analysis.[5]

Both the PSID and HRS track the same households over time, allowing us to compute the share of household heads that had ever been constrained during the sample period. For the PSID sample, we find that 63 percent of our sample households were upside constrained at least once, whereas only 18 percent were ever downside constrained. For the HRS sample, 24 percent of household heads have ever been upside constrained and 15 percent ever downside constrained.

We also explore the extent to which constrained HRS respondents were working beyond or below their desired hours. Upside constrained workers put in 462 more hours than they desired to work, a 24 percent increase relative to their actual hours worked. Among the downside constrained household heads, the hours they worked were on average 658 hours higher than their desired hours, accounting for 30 percent of their actual hours worked.

While the PSID also collected information regarding wives' market work hours constraints, we do not use these data in our analysis for several reasons. First, questions on wives' labor hours constraints were asked only between 1971 and 1976, a much shorter period compared with that for household heads' hours constraints. This was also a period of relatively low women labor force participation. As a result, the number of wives experiencing upside hours constraints in a given year was, on average, only about one quarter of that for household heads. Second, unlike household heads, the indicator for salaried workers became available only after 1976 for wives. Therefore, we do not know whether the constrained wives were salaried or hourly-paid workers. Finally, there was a fair bit of overlapping between the constraint status of the heads and the wives. For about one third of the constrained wives, their husbands also experience upside hours constraints.

[4] For example, the 1994 survey collected data on respondents' 1994 labor hours constraints and their 1993 home work hours.

[5] The PSID did not ask food-out expenditure separately in 1968 and skipped the entire food expenditure question in 1973. See Li et al. (2010) for more details about the food expenditure variables in the PSID data. The HRS did not collect food data in 1998.

4.3 Estimation

To test the four predictions of our simple model, we next turn to estimating the effect of hours constraints using microdata from the PSID.[6] We estimate the regression

$$Y_{it} = \alpha_t + \alpha_i + \beta_u UC_{it} + \beta_d DC_{it} + \gamma X_{it} + \epsilon_{it}, \tag{3}$$

for dependent variable Y_{it}, where UC_{it} and DC_{it} are dummy variables for whether household head i faced an upside or downside labor hours constraint in year t; X_{it} is a vector of control variables; α_t and α_i are year and household level fixed effects; and ϵ_{it} is an idiosyncratic error term.

Consistent with our model predictions, we look at the effect of hours constraints separately for single and married households. For single households, Y_{it} is either the number of hours worked in the labor market or the number of hours spent on home production. For married households, we expand the set of dependent variables to capture spousal adjustment to one's own labor hours constraints, including spouse's labor force participation, labor market hours, and home production hours.

We cluster standard errors at the individual-level to account for autocorrelation in standard errors over time. Our set of controls X_{it} is the number of children in the household, the number of adults in the household, the household's family income decile, and a dummy for whether the household head works part-time.

Our specification deals with a range of plausible confounding variables. Our year fixed effects absorb changes in the national macroeconomic environment. The household fixed effects control for the head's comparative advantage in market versus home work, as well as his human capital and demographics which might affect labor market performance. Nevertheless, because our estimation utilizes simple OLS regressions, we cannot completely rule out time-varying household-specific confounders.

4.3.1 Single Households

We first study how single workers respond to labor hours constraints. We show the results of estimating equation 3 in columns 1 and 2 of table 5. Column 1 shows that hours constraints indeed impact workers' hours worked. An upside hours constraint reduces workers' hours on average by nearly 80 hours per year, or by nearly 4%. Similarly, a downside constraints increases workers' hours by nearly 70 hours per year, about a 3% increase.

Turning to the effect of hours constraints on home production, we find a positive impact

[6] We do not use the HRS because the survey asks respondents their current hours constraints at the time of survey but only collects home production data for the previous year.

of upside hours constraints on home production, with home production rising by over 9% relative to the mean. We similarly that downside constraints reduce home production by over 3%, though this effect is not statistically significant.

4.3.2 Married Households

Turning to married households, these households had three ways to respond to heads' labor hours constraints as indicated by the model outlined above. Consider an upside hour constraint: first, the head could increase his own housework hours; second, the spouse could increase her housework hours; and third, the spouse could increase her labor supply. We test these channels using equation (3). The results are presented in columns 3–7 of Table 5.

Again, we see that the hours constraints have a notable impact on hours worked (column 3), where an upside constraint reduces hours worked per year by 130 hours, and a downside constraint by 80 hours. In contrast to single households, we find no statistically significant effect on head's home production when the head is married (column 4). This effect is small in magnitude but is consistent with our findings for singles in terms of the coefficient sign.

Therefore, adjustment to hours constraints in married households typically occurs with the wife. In particular, we find a modest effect on wife's labor market hours (column 5) where an upside constraint on the husband raises wife's working hours and a downside constraint on the husband reduces wife's working hours. We also find a small negative effect of husband's hours constraint on wife's home production time, and a sizable and statistically significantly positive effect of a husband's downside hours constraint on wife's home production time (column 6). Finally, we find a large and positive effect of a husband's upside constraint on the propensity for the wife to enter the labor force (column 7). The sign of each of our coefficients is consistent with our model predictions.

To summarize, we find that single workers appeared to increase housework hours significantly when they were not able to work as many hours as desired in the labor market. For married households, the adjustments on husband's housework were more muted. In contrast, wives tended to increase their own labor supply under such constraints, either by entering the labor force or by working longer hours.

4.4 Food-out Ratios

We supplement the analysis of home production time with an alternative measure of home production: the ratio of food consumption expenditures spent on eating out versus eating at home. This ratio can be constructed in both the PSID and HRS data, contemporaneous to the labor hours constraints data. In this analysis, we can take advantage of the HRS in addition to the PSID survey. While the HRS survey took place in more recent years, it has the drawback of being less representative of the population. In particular, the youngest household heads in the HRS were 50 years old. However, we find that food-out ratios were similar in the PSID subsample of households older than 50.

Our model predicts that upside hours constraints should raise housework, and therefore reduce the food-out ratio. Similarly, a downside hours constraint should raise the food-out ratio. Our results, reported in Table 6, are broadly similar with these predictions. When coefficients are estimated precisely (i.e., with statistical significance), we find that upside constraints reduce the food out ration by 1 to 3 percentage points (columns 2 and 3), and that downside constrains increase the food-out ratio by 1 to 5 percentage points (columns 1 and 2).

5 Conclusion

We have shown that the standard measurements (e.g., BLS' PTER) tend to underestimate aggregate labor market hours constraints. Our results suggest that a more comprehensive measure of hours constraints that looks beyond just part-time workers is necessary for obtaining a complete picture of labor market slack.

We also show that household respond to hours constraints in a few ways. First, individuals increase their time spent on home production in response to an upside hours constraint. Second, for married couples, the spouse is more likely to join the labor force in response to the hours constraint imposed on her husband. Taken together, these results have important implications for calibration of macroeconomic models and, especially, for crafting optimal monetary and economic policy aimed at full employment.

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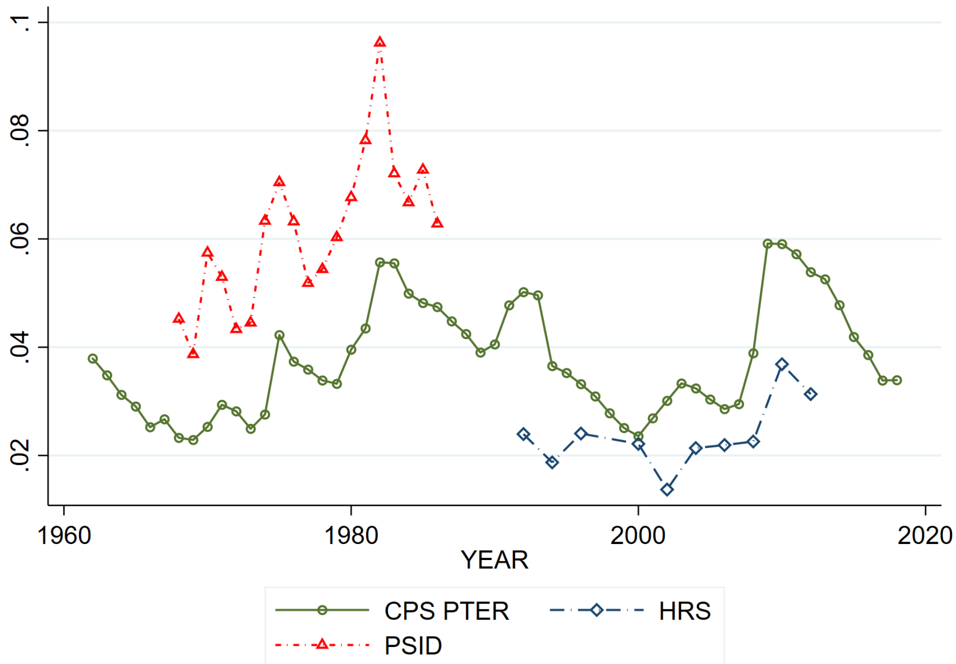
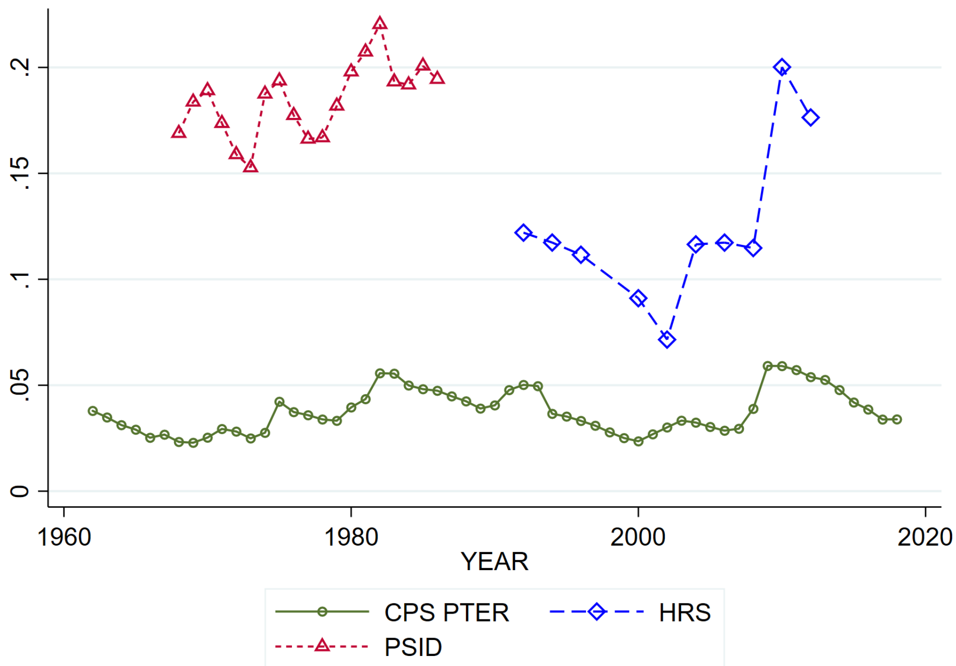
Figure 1: Validating Involuntary Part-Time Measures



Notes: The figure shows the time series of the official Bureau of Labor Statistics Part-Time for Economic Reasons (PTER) measure (solid green line), our PSID-based measure of hours constraints among part-time workers (dash-dot red line), and our HRS-based measure of hours constraints among part-time workers (dash-dot blue line).

Figure 2: Official Measure of Hours Constraints vs. Our Measures



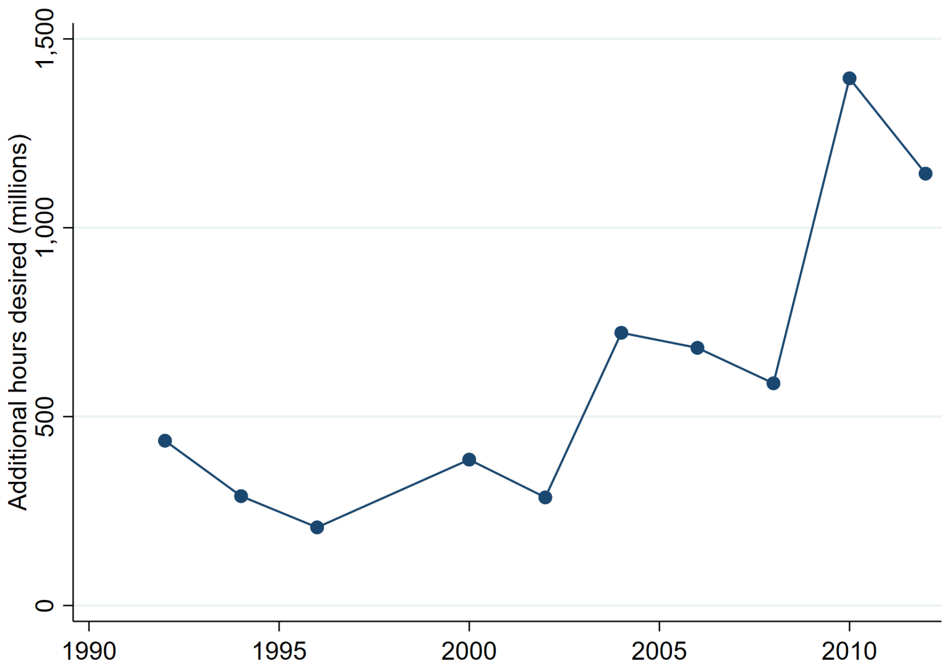
Notes: The figure shows the time series of the official Bureau of Labor Statistics Part-Time for Economic Reasons (PTER) measure (solid green line), our PSID-based measure of hours constraints among all workers (dashed red line), and our HRS-based measure of hours constraints among all workers (dashed blue line).

Table 1: Variable Definitions and Years Available

Definition	PSID	HRS
Head Upside Constrained — Wanted to work more hours but was not able to (UC)	1968–1986	All waves
Head Downside Constrained — Wanted to work fewer hours but was not able to (DC)	1968–1986	All waves
Ideal number of market hours	No waves	All waves
Hours spent on housework by head and wife (HWHead, HWWife)	1969–1986	No waves (see note)
Ratio between food consumed out and total food expenditure (Food-out ratio)	1970–1986, except 1973	All waves except 1998

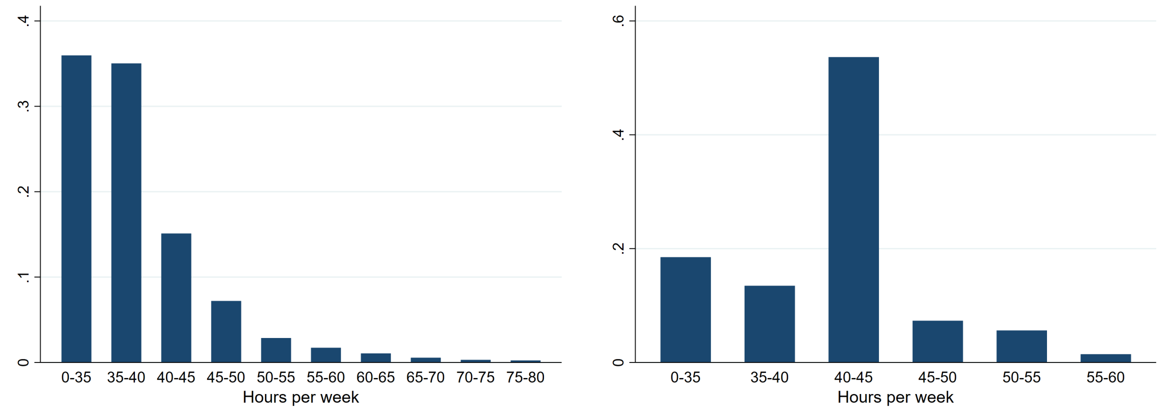
Notes: The HRS data have 11 waves, taken every other year from 1992 to 2012. While the HRS collects data on time use is collected for the off-survey year, no such counterpart exists for the survey year, making analysis of the effect of hours constraints (collected during the survey year) on home production challenging.

Figure 3: Difference between Desired and Actual Hours Worked



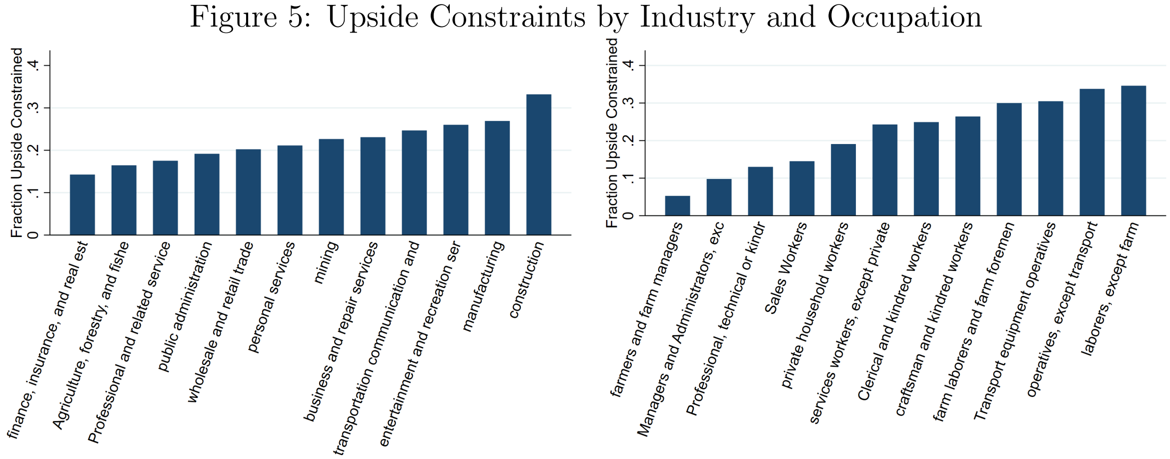
Notes: The figure shows the aggregate number of hours workers are willing and able to work but cannot due to hours constraints. The series is constructed from the HRS, which surveys individuals older than 50 years old, and is therefore a lower bound for labor market slack across all age groups. To construct this measure, we take respondents' answer to the question, "How many hours would you like to work each week?" and subtract off actual weekly hours worked. We then annualize this number and sum across all individuals for each survey years, using the sample weights.

Figure 4: Share of Hour Constrained by Hours Bin



Notes: The figure depicts the fraction of all upside constrained workers across hour bins. The figure on the left shows this distribution for the PSID, while the figure on the right shows the distribution for the HRS data. The first bin contains all part time workers (those working 35 hours or less), and bins thereafter increment by 5 hours. The sample is pooled across all included years for each survey (1968 to 1986 for the PSID on the left, and 1992 to 2012 for the HRS on the right). Calculated using survey weights.

Figure 5: Upside Constraints by Industry and Occupation



Notes: The figure depicts the fraction of workers by industry reporting upside hours constraints, computed using the PSID pooled across years. Calculated using PSID survey weights.

Table 2: Transition Matrix of Constraint Status

Panel A Overall Transition Matrix (%)

	Year t+1		
Year t	Upside constrained	Unconstrained	Downside constrained
Upside constrained	48.2	49.2	2.6
Unconstrained	11.1	84.2	4.7
Downside constrained	7.6	62.3	30.1

Panel B Upside Constraint Transitions by Part-Time Status (%)

	Full-time only		Part-time only	
	Constrained	Unconstrained	Constrained	Unconstrained
Constrained	52.9	47.2	55.9	44.1
Unconstrained	9.8	90.2	12.9	87.1
	Full-time to part-time		Part-time to full-time	
	Constrained	Unconstrained	Constrained	Unconstrained
Constrained	49.3	50.7	42.4	57.6
Unconstrained	17.7	82.3	11.5	88.5

Panel C Subsequent-Year Status of the Upside Constrained (%)

	Year t+1			
	Full-time		Part-time	
Year t	Constrained	Unconstrained	Constrained	Unconstrained
Full-time	40.3	45.2	7.1	7.3
Part-time	31.5	24.8	18.5	25.2

All statistics are computed using the PSID weights.

Table 3: Determinants of Upside Hours Constraints

	Become Upside Constrained		Escaped Upside Constraint	
	(1) Became UC	(2) Became UC	(3) Escaped UC	(4) Escaped UC
Became married	-0.00909	-0.00962	-0.0487	-0.0491
	(0.0139)	(0.0151)	(0.0362)	(0.0517)
Stay married	0.00296	-0.00858	-0.0439***	-0.0463
	(0.00491)	(0.0105)	(0.0140)	(0.0327)
Got divorced	0.0165	-0.0137	-0.00309	0.0272
	(0.0154)	(0.0154)	(0.0398)	(0.0531)
Chg. num. of children	0.00544	0.000780	0.0000286	0.0127
	(0.00402)	(0.00397)	(0.00956)	(0.0106)
Chg. nonlabor income	-0.000000171*	-0.000000112	0.00000112	0.00000120
	(9.38e-08)	(8.13e-08)	(0.00000105)	(0.00000145)
Chg. log head wage	0.000954	0.000945	-0.00633	-0.00134
	(0.00229)	(0.00220)	(0.00651)	(0.00662)
Became homeowner	0.0158*	0.00488	0.0000829	0.00216
	(0.00873)	(0.00847)	(0.0223)	(0.0256)
Disability limits housework	-0.000645		0.0152	
	(0.00655)		(0.0199)	
Chg. log head hours	-0.00318	-0.00292	-0.00269	-0.0141**
	(0.00222)	(0.00263)	(0.00510)	(0.00712)
Changed job	0.0269***	0.0113**	0.0803***	0.0104
	(0.00520)	(0.00541)	(0.0125)	(0.0163)
Head age	-0.00293***		-0.0173***	
	(0.000979)		(0.00322)	
Head age squared	0.00000310		0.000245***	
	(0.0000105)		(0.0000382)	
Head black	0.0569***		-0.0227	
	(0.00821)		(0.0155)	
High school grad	-0.0332***		0.00201	
	(0.00666)		(0.0162)	
Some post-secondary education	-0.0570***		0.0608***	
	(0.00578)		(0.0160)	
College or higher degree	-0.107***		0.106***	
	(0.00587)		(0.0279)	
Observations	48886	47669	17718	15879
R^2	0.031	0.281	0.025	0.310
Dep. var. mean	0.103	0.103	0.527	0.527
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Person FE	N	Y	N	Y

Notes: The table presents coefficient estimates from equation 1 using data from the Panel Study of Income Dynamics. Estimates are weighted, with standard errors clustered at the household-head level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Summary Statistics

varname	UC	DC	NC
Extensive Margin			
Share of HH heads	0.290	0.0700	0.650
Demographics			
Head age	37.10	41.30	40
White (%)	0.780	0.860	0.830
High school dropout (%)	0.390	0.280	0.330
High school grad (%)	0.260	0.230	0.230
Some college (%)	0.310	0.390	0.350
College Grad.+ (%)	0.0500	0.100	0.0900
Married (%)	0.740	0.710	0.710
Num. children in HH	1.400	0.940	1.140
Income and Employment			
Total family income	25,851	33,881	30,700
Total head labor income	18,521	25,029	22,517
Head avg. weekly hours	37	41.80	40.50
Have more than 1 job	0.170	0.140	0.190
Salaried	0.120	0.220	0.180
Unionized	0.450	0.450	0.430
Housework and Leisure			
Food-out ratio	15.90	20.80	18.10
Head housework hours (weekly)	9.920	9.360	9.380
Wife housework hours (weekly)	26.90	28.50	27
N (person-years)	11,936	1,909	21,727

Notes: Summary statistics for PSID computed using sample weights.

Table 5: Effect of Hours Constraints

	Single		Married				
	(1) Head work hours	(2) Head HW hours	(3) Head work hours	(4) Head HW hours	(5) Wife work hours	(6) Wife HW hours	(7) Wife working
Upside constrained	-76.63***	36.20**	-129.8***	6.596	20.01	-13.99	0.0179*
	(17.13)	(16.33)	(8.670)	(7.704)	(15.23)	(17.90)	(0.00920)
Downside constrained	68.40***	-12.85	79.99***	-4.043	-26.98	87.73***	-0.0212
	(21.54)	(28.03)	(14.04)	(12.99)	(25.75)	(28.46)	(0.0170)
Observations	6497	6497	21409	21409	21409	21409	21409
R^2	0.738	0.595	0.644	0.475	0.662	0.585	0.605
Dep. var. mean	1920.9	586.9	2125.7	293.9	831.8	1481.4	0.605
Person FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y

Notes: The table presents coefficient estimates from equation 3 using data from the Panel Study of Income Dynamics. Columns 1 and 2 subset to single-headed households, while columns 3–7 subset to married households. Control variables are the number of children in the household, number of adults, whether the head works part-time, and the family income (net of head labor income) decile. Estimates are weighted, with standard errors clustered at the household-head level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Effect of Hours Constraints on Food-out Ratio

	PSID		HRS	
	(1) Single	(2) Married	(3) Single	(4) Married
Upside constrained	1.217	-1.033***	-2.619***	-0.0124
	(0.882)	(0.279)	(0.785)	(0.652)
Downside constrained	4.537***	1.130**	-1.658	0.544
	(1.412)	(0.487)	(1.093)	(0.665)
Observations	6128	19981	5228	8584
R^2	0.610	0.555	0.724	0.731
Dep. var. mean	25.19	15.22	27.19	27.62
Person FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

Notes: The table presents coefficient estimates using data from the Panel Study of Income Dynamics (columns 1 and 2) and from the Health and Retirement Study (columns 3 and 4). The dependent variable is the percent (from 0 to 100) of food consumption expenditures made on food produced outside the home. Control variables for columns 1 and 2 are the number of children in the household, number of adults, whether the head works part-time, and the family income (net of head labor income) decile. For columns 3 and 4 controls are the same except we control for family size instead of the number of children and adults separately. Estimates are weighted, with standard errors clustered at the household-head level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.