Multiple Job Holding, Local Labor Markets, and the Business Cycle

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Results are preliminary

Abstract: About 6 percent of U.S. workers hold multiple jobs. Multiple job holding can either exacerbate or mitigate employment changes over the business cycle. Theory is ambiguous because of competing labor supply effects and the absence of market clearing during recessions. Previous literature is inconclusive. Using a large Current Population Survey (CPS) data set for 1998-2010 that covers most U.S. urban labor markets, we find clear-cut evidence that multiple job holding across labor markets and over time is cyclical, thus (slightly) exacerbating rather than mitigating the severity of business cycles. Much of the cyclicality in multiple job holding seen across labor markets, however, is not causal, dropping sharply after accounting for MSA fixed effects. Using longitudinal worker data, there is minimal response to unemployment changes within labor markets over time. Our large CPS sample size produces precise estimates, albeit ones close to zero, helping explain conflicting results in prior studies based on far smaller data sets. The net response of multiple job holding to unemployment changes is sufficiently small to warrant characterizing this relationship as acyclic.

Keywords: Multiple jobs, cyclicality, job mismatch
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1. Introduction

Roughly 6 percent of U.S. workers hold multiple jobs. A question not clearly answered in the literature is whether multiple job holding is countercyclical, acting as an automatic stabilizer that helps offset household income losses during a recession, or whether it is cyclical and exacerbates income variability. Neither theory nor evidence provides an unambiguous answer to this question. On the labor supply side, the willingness of workers to hold multiple jobs may be countercyclical if household income effects outweigh substitution effects. During a recession, for example, the desire for a second job may arise from a loss in work hours or other income losses on one's primary job or from a job (income) loss by another household member. Even if labor supply for multiple jobs is countercyclical, aggregate demand and labor demand fall in a recession, resulting in fewer opportunities to hold multiple jobs absent extraordinary wage flexibility. Among the limited evidence that exists on the cyclicality of multiple job holding, authors arrive at conclusions on both sides of this issue.

In this paper, we use a large micro data set for 1998-2010 in order to examine how multiple job holding by individual workers varies across U.S. labor markets (MSAs) with respect to changes in local unemployment rates. To preview our results, our large data set produces precise estimates that are close to zero but that consistently show multiple job holding to be weakly cyclical, thus (slightly) exacerbating rather than mitigating labor market shocks over the business cycle. That said, most of the economy-wide variability in multiple jobs across the business cycle results from differences across labor markets in multiple job holding that are correlated with unemployment (i.e., MSA fixed effects). There exists little variability within labor markets over time in response to changes in unemployment. While multiple job holding no doubt mitigates income shocks for many households, it exacerbates shocks for many others and on balance appears to have little net effect.

In addition to examining how overall multiple job holding varies with respect to local labor market conditions, we address several related questions. Among these is how multiple job holding over the cycle varies for women versus men, how it varies for workers whose primary jobs are salaried versus hourly, and whether responses to business conditions are symmetric or instead differ with respect to increases and decreases in unemployment or for different time periods. We also attempt to address the question of how closely second jobs "match" or complement primary jobs and whether the "quality" of a second job (measured by occupational indices of skill-related job tasks and working conditions) varies over the cycle.

In what follows, we first provide an overview of multiple job holding in the U.S. and briefly discuss prior literature. We then describe our database, created primarily from Current Population Survey (CPS) household data coupled with job descriptors from the Occupational Information Network

(O*NET). This is followed by a description of our empirical methodology and the presentation and interpretation of the evidence.

2. Multiple Job Holding and Unemployment

In our discussion and subsequent analysis of multiple jobs, we largely follow the U.S. Bureau of Labor Statistics (BLS) in how multiple jobs are defined. The BLS defines a multiple job holder as an individual who: (a) holds wage and salary jobs with two or more employers; (b) combines a wage and salary job with self-employment; or (c) combines a wage and salary job with one as an unpaid family worker. In our subsequent empirical work, we include only those multiple job holders whose primary job is a wage and salary job.[1]

The Current Population Survey (CPS) first began regularly collecting information on multiple job holding in 1994 as part of the survey's major redesign. In the BLS's *Monthly Labor Review*, Hipple (2010) provides informative descriptive evidence on multiple job holding, Figure 1 reproduces a figure provided by Hipple showing the rates of national multiple job holding and unemployment for 1994-2010. An obvious characterization of the national multiple job holding series is that it has been largely steady over time, with a slight downward trend, and that it shows no strong pattern with respect to the unemployment rate. If one has sufficiently strong priors that multiple job holding is cyclical, one might see in the figure some increase in during the strong economy during the mid-to-late 1990s, and with even greater effort discern small decreases during the 2001 recession and the Great Recession.

Figure 1: Multiple job holding and unemployment rate (Hipple 2010)

[1] The reason to restrict the sample in this way is that the CPS outgoing rotation group (ORG) files provide earnings information only for wage and salary jobs and do not report any earnings information for second jobs. The CPS does report work hours, occupation, and industry for a second job.

What is visible in the figure is some degree of month-to-month variation in multiple job holding. Hipple (2010), however, shows that seasonal differences in multiple job holding (measured by quarterly averages) are small. Given the possibility of seasonal variation (e.g., during Christmas season and in summers among teachers), empirical analyses of cyclicality should include month fixed effects.

There is a reasonably robust literature exploring the determinants of multiple job holding, but relatively little on how it varies over the cycle.[2] CPS data, much of it from an earlier era, have been used by others to examine the incidence of multiple-job holding (Stinson, 1986, 1990; Paxson and Sicherman, 1994; Kimmel and Powell, 1999). The primary advantage of CPS data is that samples are large and nationally representative. In some earlier CPS supplements, respondents also are asked why they moonlight, although the set of possible responses tell us little about relative wages or hours constraints. In other data sets, such as the SIPP, PSID and National Longitudinal Survey of Youth (NLSY), it is possible to identify wages and characteristics of more than one job, but it is not always possible to discern whether or not these jobs are held simultaneously, i.e. if the person is truly moonlighting or had two jobs at different times or was moving between jobs (Averett 2001).

The literature on multiple job holding and cyclicality is limited and not conclusive. Most relevant to our paper is Catalina and Kimmel (2009), who use U.S. data from the NLSY79. They conclude that male multiple job holding is largely acyclical, while female multiple job holding appeared countercyclical during the 1980s and early 1990s, but had turned procylical by 2000-2002. They use state employment growth as their measure of the business cycle. The authors provide a thorough summary of previous work.

3. Why Do Workers Hold Multiple Jobs?

Our emphasis is on how multiple job holding varies with the business cycle. It is helpful, however, to briefly discuss reasons for holding dual or multiple jobs and what type of workers may be most likely to do so. Such a discussion helps inform our understanding of how multiple jobs vary with macroeconomic conditions.

Most explanations for taking multiple jobs can be grouped into one of two categories, either because of an "hours constraint" or in order to obtain a preferred "job portfolio." An hours constraint on a worker's principal (say, highest wage) job can readily explain why a worker might increase utility by taking a second job, even at a lower wage. Alternatively, a worker not facing an hours constraint on the first job may take a higher paying second job that does have constrained hours; say, a temporary job or limited hours per week. Roughly 45 percent of U.S. wage and salary workers are salaried rather than paid

[2] Studies examining various dimensions of multiple job holding include Shishko and Rostkers (1976), Krishnan (1990), Paxson and Sicherman (1996), Averett (2001), Conway and Kimmel (2009), Renna and Oaxaca (2006), Pouliakas et al. (2009), and Hamersma and Heinrich (2010). Partridge (2002) uses state level data to examine how multiple job holding varies across states and time, concluding that state differences are maintained over time.

by the hour. Although salaried jobs generally do not have any explicit hours constraint, they do have an "earnings constraint" that can work in much the same way, leading some salaried workers to take a second job in order to increase their earnings.[3]

A "job portfolio" framework provides several explanations for multiple job holding. A worker may simply prefer diversity in job tasks, being happier dividing time in two different jobs or occupations.[4] In this spirit, Renna and Oaxaca (2006) develop a job portfolio model based on a personal preference for job differentiation. Alternatively, workers may choose to work a second job as a form of insurance (i.e., diversifying one's human capital) due to a high level of employment or income uncertainty in a first job. Or workers wanting to switch occupations or employers due to a poor match may use a second job as a source of on-the job training that will facilitate a utility-enhancing move. Finally, a worker may choose to work at a second job for financial or family circumstances that are temporary, at the same time expecting that the current primary job offers the best long-run job match.

Given the varied reasons for which individuals hold multiple jobs, predicting how or why we might see differences in multiple job holding among demographic groups is problematic. Hipple (2010) reports multiple job holding rates among employed workers for 1994 through 2009. Although rates for men and women were equivalent in 1994 (at 5.9 percent), over time rates have decreased for men relative to women. In 2009, the overall rate of 5.2 percent reflected rates of 5.6 and 4.8 percent among women and men, respectively. The rate in 2009 for whites (5.4) was higher than seen for black (4.8), Asian (3.2), or Hispanic (3.3) workers. Marriage increases dual job holding for men and decreases it for women. And multiple jobs are substantially less prevalent among foreign-born workers, more so for non-citizens than naturalized citizens.

Multiple job holding increases with education. The incidence with respect to age is an inverted-U, much like the age profiles for wages and hours worked on primary jobs. Primary job occupations with particularly high rates of dual job incidence among men are firefighters, emergency medical technicians and paramedics, and teachers; and among women dental hygienists, psychologists, teachers, and therapists. Some of these occupations (e.g., teachers) are salaried but earnings constrained, with hours that are either sufficiently predictable or flexible as to allow a second job. Those holding multiple jobs worked an average 46.8 total hours per week in 2009 as compared to 35.8 for single-job holders. As compared to

[3] We have not seen the earnings constraint argument regarding salaried jobs previously made in the literature. A college professor who occasionally consults might fit into either of these last two categories. The consulting job may pay an hourly or daily rate far in excess of one's primary hourly earnings, but the job's hours (longevity) is temporary (i.e., an hours constraint on the second job). Alternatively, the salaried professor faces an earnings constraint on the primary job and may choose to consult or take on paid work at a rate below one's implicit wage, say, a low-paying consulting job or reviewing a textbook. Teaching summer school has a similar logic, although it is not classified as a multiple job if the teaching is performed for the primary employer (college).

[4] The title of a paper by Böheim and Taylor (2004) arguably says it all: "And in the Evening She's a Singer with the Band – Second Jobs, Plight or Pleasure?"

men, women who moonlight were about twice as likely as men to hold multiple part-time jobs. In surveys asking why individuals hold multiple jobs (last asked in the May 2004 CPS), economic reasons are predominant, although roughly 1 in 5 cites enjoyment of the second job.

4. How Should Multiple Job Holding Vary over the Business Cycle?

Even if more workers prefer to hold multiple jobs during downturns, it does not follow that multiple job holding will increase – creation of jobs requires employer demand as well as labor supply. To the extent that business cycles and economic conditions are defined by measures of economic activity, say by employment measures based on the number of jobs (from establishment surveys), then it follows more or less arithmetically that dual job holding will be cyclical, whatever the preferences of workers. Using alternative business cycle measures, say the unemployment rate (as in our study) or employment measured by household surveys in which one counts employed persons and not jobs (i.e., a dual job holder counts as one worker rather than as two jobs), then multiple job holding is not automatically cyclical. That said, it would be surprising (to us) if multiple job holding were not at least weakly cyclical.

Neither the CPS nor other surveys asks employed workers if they are seeking a second job. Hence, we cannot directly observe or reliably estimate the labor supply for multiple jobs absent a strong assumption about market clearing. And it makes little sense to assume that markets clear if one is studying employment over the business cycle. Theory does allow us to assume that both income and substitution effects have an impact on the labor supply for multiple jobs, and that their relative contributions may vary with the business cycle. During a recession, income effects should lead to increased desire for second jobs due to earnings losses on the primary job (more likely due to reductions or constraints in hours rather than wage reductions). Perhaps more important, search for a second job may result from a job or substantial earnings loss by another household member. Substitution effects work in the opposite direction, with a weak economy lowering wage offers in second jobs. Using the same logic, during an expansionary period, income effects (i.e., higher earnings on a primary job and from other household members) should reduce the desire for a second job. But the substitution effect (i.e., more lucrative dual job wage offers) acts to increase multiple job labor supply.

Our intuition is that income effects might well dominate and that the labor supply of multiple jobs is likely to be countercyclical. Countercyclical labor supply for second jobs, however, need not result in increased multiple job holding during a recession since such jobs are not readily available. Regardless of whether dual job labor supply is countercyclical or cyclical, the *observed* variation in multiple job holding is likely to be cyclical due to the binding constraint of labor demand.

More opaque is how multiple job responsiveness to the business cycle differs between women and men and for those in hourly versus salaried jobs. Women have higher multiple job holding rates than do men, but these differences are trivial. Men's unemployment tends to be more cyclical than for women,

so one might expect employed married women to have a somewhat less cyclical (or countercyclical) multiple job holding response than do married men. That is, during a recession with large male job losses, we would expect negative income effects (and more husbands' time at home) to increase married women's willingness to take a second job, despite their being difficult to find. We have no priors for differences between unmarried men and women.

More interesting may be differences between those in hourly versus salaried jobs. Weekly earnings in hourly jobs are likely to more cyclical than are earnings in salaried jobs. Whereas earnings in salaried jobs varies little week-to-week, earnings in hourly jobs varies due to changes in hours worked and in the marginal wage for overtime hours (1.5W versus W). Hence, hourly workers will have stronger income effects and might exhibit less cyclical or more countercyclical dual job labor supply. However, if labor demand is more cyclical for jobs that hourly workers typically take as second jobs, compared to such jobs for salaried workers, those holding hourly primary jobs could well exhibit more rather than less cyclicality than do salaried primary job holders.

5. Occupational Mismatch between Primary and Secondary Jobs and Changes over the Business Cycle

The CPS, which provides the principal source of information about multiple jobs, provides measures of hours worked, detailed industry, and detailed occupation for those with a primary wage and salary job and a second job. Earnings information is provided for the primary job but not a second job. Thus, there is little literature comparing the quality of the first and second jobs. We cannot directly overcome the absence of wage data for the second job.[5] As we describe in the data section below, we are able to construct an index of occupational skills requirements and job tasks and an index of physical working conditions. The skill index is highly correlated with wages. Use of these indices allows us to compare the "closeness" of skill and job task requirements and of working conditions on the first and second jobs. This allows us to say something about how close are occupational matches between the first and second jobs and whether, on average, second jobs involve an upgrading or downgrading from the primary job. Moreover, we can study how the degree of mismatch varies over the business cycle.

As discussed previously, the motives for taking a second job vary, so defining "mismatch" in a precise way is not possible.[6] Whether job mismatch tends to narrow or widen during a recession is likely

[5] Averett (2001) uses a May 1991 CPS supplement that provides information on wages (among other things) on secondary as well as primary jobs. She provides analysis for women, and among those holding dual jobs, finds virtually identical mean wages for their primary and secondary jobs ($9.93 and $9.97, respectively). We will show later in the paper that the value of an occupational skill index (highly correlated with wages) is lower in second than in primary jobs, suggesting that this relationship may have changed over time.

[6] "Mismatch" may be desired for a person working in a second job for personal enjoyment or in order to acquire training for a new career.

to depend on whether economic shocks more greatly impact workers' primary or second job opportunities.

6. Data

Our goal in this paper is to identify how multiple job holding responds to the business cycle and local labor market conditions. To examine this we use monthly Current Population Survey (CPS) Monthly Outgoing Rotation Group (MORG) data from January 1998 through December 2010. Each month the CPS—conducted by the U.S. Census Bureau—interviews about 60,000 households, collecting a variety of information about labor market behavior, demographics, and family characteristics. Households are in the survey for a total of eight months: they are interviewed for four consecutive months (rotation groups 1-4), then out of the survey the next eight months, and then reenter the survey the following four months (rotation groups 5-8). We use the outgoing rotation group files (groups 4 and 8), the quarter sample each month that provides information on earnings and hours worked during the survey week, along with additional information on multiple jobs (see below).

Workers in the CPS-MORG files are in the survey only once within a calendar year, but then appear in the survey the same month in the following year, assuming they remain in the same residence. Thus, it is possible to create one-year panels with two observations on the same worker, one year apart, for up to half of the respondents in any given year's survey. We provide analysis in this initial draft using the full CPS-MORG files for 1998-2010. We subsequently will present analysis using CPS panels of worker-year pairs for the years 1998/99 through 2009/2010.[7] The panels will provide a robustness check on our principal cross-section results, examining how one-year changes in the unemployment rate within labor markets affect worker-specific transitions into and out of multiple jobs.

Questions about multiple jobs were introduced into the CPS beginning in January 1994. Since then, all employed respondents have been asked the following question: "Last week, did you have more than one job (or business), including part-time, evening, or weekend work?" If they answer "yes," they are then asked how many jobs (or businesses) they had altogether and how many hours they worked each week at all their jobs. The primary job is defined as one at which the greatest number of hours were worked. Additional questions on the class of the job (private for-profit, private not-for-profit, federal, state, or local), detailed industry occupation of the second job, and usual weekly hours worked on the second job are asked of the quarter ORG sample. For workers holding more than two jobs, the

[7] It is not possible to match across years if the household changed residence or if individuals moved out of a household. Because we restrict our sample to those working in a primary wage and salary job in consecutive years, coupled with household changes, match rates are well below 100 percent.

information on class, industry, occupation, and hours is collected only for their primary job and the job at which they worked the second-greatest number of hours.[8]

Our estimation sample includes 1,407,636 non-student wage and salary workers (on their primary job), ages 18-65, for 1998 through 2010, located in about 250 MSAs throughout the U.S. (this accounts for roughly 70 percent of the U.S. workforce).[9] In this sample, the (unweighted) multiple job holding rate is 5.56 percent, with 1,329,428 single-job holders and 78,208 multiple job holders (few of these hold more than two jobs). Workers self-employed in their primary job but with a wage and salary second job are counted by BLS as multiple job holders, but we exclude them from our sample given that earnings (and other) information is not provided for their self-employment job. This large national sample of workers over thirteen years provides us with substantial statistical power and the ability to examine differences both across labor markets and over time.

Although our unit of analysis is the individual worker, emphasis is given to cross-MSA variability in business conditions (the unemployment rate) across labor markets and over time, plus within-MSA variability in unemployment over time. The latter analysis is achieved by including MSA fixed effects in our estimating equations. Not surprisingly, we find that much of the cyclical response seen for multiple job holding reflects differences across labor markets, while there is minimal cyclical response within labor markets over time. In the analysis in this version, we use MSA unemployment, averaged over three months (to reduce measurement error), as our measure of the business cycle. In work not shown, the use of a lagged unemployment measure produced results similar to those shown.

For the analysis of occupational mismatch, we combine our CPS worker sample with data from the Occupational Information Network (O*NET), produced by the U.S. Department of Labor's Employment and Training Administration. This database is a comprehensive system for collecting, organizing, and describing data on job characteristics within occupations. We use O*NET 12.0, released in June 2007, and created a data set with O*NET occupational job descriptors.[10] The O*NET indices were created based on SOC occupation codes used in the CPS beginning in 2003. These indices were matched to occupation codes used in the CPS prior to 2003 where relatively clean occupation matches could be made (workers from 35 mostly small occupations were omitted for the years 1998-2002).

In this paper, we construct indices of skill-related job tasks and, separately, physical working conditions from the O*NET database using factor analysis. Combining O*NET with the CPS allows us to account more directly for occupational skill requirements, job tasks, and working conditions for both the

[8] In addition to information from CPS documentation, Hipple (2010) provides a clear description of how the BLS defines and measures multiple job holding using the CPS.

[9] There exist 242 and 264 MSAs identified in the CPS prior to and following mid-2004. We included 279 MSAs in our analysis, with some MSAs included in the earlier period not included in the latter period, and vice-versa.

[10] The O*NET dataset was developed by, used, and described in Hirsch and Schumacher (2012).

primary jobs and the second jobs. Due to the imperfect measurement of workers' skill based on schooling, experience and other variables in CPS, we include the job task skill index as a proxy for worker skill. Because the skill index is a strong correlate of wages, and wages are not reported in the CPS for workers' second job, comparison of the skill index for the primary and secondary jobs provides information on likely differences in wages between primary and secondary jobs.

Following Hirsch and Schumacher (2012), we include 206 O*NET job descriptors in our database. Using factor analysis, we construct indices of occupational skills/tasks (*SK*) and physical working conditions (*WC*). *SK* indices provide linear combinations of the 168 skill attributes and *WC* indices provide linear combinations of 38 working condition attributes. We examine the first skill factor and first working condition factor. Based on its factor loadings, we title skill/task *SK* ''cognitive skills.'' *SK* accounts for 41 percent of the total covariance among the 168 skill/task attributes across 501 Census occupations. *SK* heavily loads such O*NET measures as critical thinking, judgment and decision making, monitoring, written expression, speaking, writing, active listening, written comprehension, active learning, negotiation, and persuasion. *WC* accounts for 56 percent of the total covariance among the physical working conditions and heavily loads extreme working conditions (e.g., temperature, lighting, contaminants, hazards) and strength requirements. The factor analysis is weighted by occupational employment based on a large CPS sample of all wages and salary workers. By construction, the factors have a mean of zero and standard deviation of 1.0.[11]

7. Descriptive Evidence

Descriptive evidence on our merged CPS-O*NET database is provided in Table 1. Usual weekly hours on the primary job is somewhat lower for multiple versus single job holders (37.2 versus 39.8 hours). Usual hours per week on a second job is 14.2 hours, so dual job holders work more hours on average than do single job holders. Average hourly earnings in the primary job is highly similar for multiple job and single job holders, $21.78 and $21.87, respectively, in 2010 dollars. Multiple job holders tend to be more educated, having a higher proportion of B.A. and graduate degrees than do single job holders. The proportion of employees who are hourly rather than salaried workers is similar for multiple and single job holders (58 and 56 percent, respectively).

The descriptive data provide limited insight into the questions being asked in this paper. Mean MSA unemployment rates for the single and multiple job samples are similar (5.5 and 5.3 percent), although slightly lower among the latter sample. This small difference suggests that multiple job holding may be cyclical, but tells us nothing about how sensitive are changes in job holding relative to changes in unemployment.

[11] Informative descriptions of factor analysis are provided in Gorsuch (1983) and Ingram and Neumann (2006).

Comparing the means of the occupational skills and working conditions indices (*SK* and *WC*) shows that on the primary job's occupation, multiple job holders display a higher value of occupational skill (0.21 versus 0.085) and slightly less demanding working conditions (-0.17 versus -0.07) than do single job holders.[12] Restricting the sample to dual job holders, one sees that these workers' second jobs involved a noticeably lower level of skill (-0.11 versus 0.21 or a 0.3 s.d. difference) and largely similar (but slightly less onerous) working conditions (-0.12 versus -0.17; 0.05 difference). We calculate that only 8 percent of multiple job holders work in the same detailed occupation in their primary and second jobs. In wage analysis not shown, the coefficient on the *SK* skill index in a dense Mincerian log wage equation is about 0.20. Using that estimate, the 0.32 average in the skill index between multiple job holders' primary and secondary jobs (.21 versus -.11) suggests a roughly 6 percent wage advantage (0.2 times 0.32) in the primary job. Subsequent analysis will examine how these skill and working condition differences vary with the business cycle.

8. Empirical Estimation: Models

To examine the response of multiple jobs holding over the business cycle, linear probability models of multiple job holding are specified (probit estimates at the sample means are highly similar). That is, we estimate

$$y_{ikt} = x_{ikt}\beta + LM_{kt}\theta + \gamma\, U_{kt} + \varepsilon\,, \qquad (1)$$

where y_{ikt} represents the probability of individual i in labor market k in time period t holding multiple jobs, conditional on being employed as a wage and salary worker. Our measure of the business cycle is the monthly unemployment rate U (averaged over three months) in metropolitan area k during month t.[13] An estimate of $\gamma < 0$ would indicate that multiple job holding is cyclical, $\gamma = 0$ acyclical, and $\gamma > 0$ countercyclical.

The vector x_{ikt} includes demographic and human capital controls. These include indicator variables for education (5 dummies for 6 categories), age (3), gender, marital status (2), children in household (2), citizenship, union member, public employment, hours on primary job (4), industry (8) and occupation (15) in the primary job, and month and year dummies. The vector LM_{kt} represents labor market (MSA) characteristics other than the unemployment rate. Specifically, we will first show a

[12] The factor index values were compiled by Hirsch and Schumacher (2012) for all wage and salary workers for somewhat different years and, by construction, take on mean values of zero with a standard deviation of one. The principal difference in our sample is that it excludes those living outside a metropolitan area or in very small MSAs not identified in the CPS (about 30 percent of the workforce). The small positive means for SK and small negative means for WC indicate that our urban sample of workers tends to work in slightly more skilled and less onerous occupations than does the larger labor force including non-urban workers.

[13] The three-month average is to reduce measurement error. In results not shown, we use lagged values of U and obtain highly similar results. Alternative measures of business conditions will be used in subsequent work.

specification without any *LM* controls, then add regional dummies, then metropolitan area size dummies, and finally MSA fixed effects (which absorb the region and size dummies). Standard errors are clustered by MSA. The purpose of increasingly detailed *LM* location dummies is to move from estimates of γ based largely on cross-sectional differences in multiple job outcomes to estimates of *LM* based primarily on temporal changes in multiple job behavior within labor markets.

The demand side of labor market suggests that multiple job holding will fall during downturns as employers provide fewer jobs, while the supply side of the market suggests that the desire for multiple jobs increases during downturns as employees respond to lower household income (possibly from reduced spousal earnings) and increased financial risk. Although pro-cyclical forces are likely to dominate, net effects may be weak.

Further ambiguity arises from possible asymmetry in the responsiveness of multiple job holding to economic expansions and contractions. To test for asymmetric responsiveness, we estimate a model that permits unemployment level coefficients to differ depending on whether the unemployment rate has increased or decreased. We examine whether the response to the change term differs for increases and decreases. The estimated model is

$$y_{ikt} = x_{ikt}\beta + LM_{kt}\theta + \gamma^{U}\, UP{\cdot}U_{kt} + \gamma^{D}\, DOWN{\cdot}U_{kt} + \varepsilon\,, \qquad (2)$$

where *UP* and *DOWN* are indicator variables whether unemployment increased or decreased over the previous three months (*UP* is coded 1 when there is no change) and γ^{U} and γ^{D} represents the responsiveness of multiple job holding to unemployment during periods of contraction and expansion (increasing and decreasing *U*), respectively.

The cross-sectional model with MSA fixed effects provides one method for examining how within-MSA multiple job holding varies with MSA-specific changes in unemployment. An alternative approach is to estimate a longitudinal model, which has the added advantage of accounting for individual worker heterogeneity. Here we regress individual changes in dual job status over one year among workers remaining in the same physical household residence. That is, we estimate the following specification:

$$\Delta y_{ikt} = \Delta x_{ikt}\beta' + \gamma'\,\Delta U_{kt} + \Delta\varepsilon\,, \qquad (3)$$

where Δ is the change operator (time period *t* now represents one-year changes), and γ' provides an estimate of multiple job change cyclicality, after accounting for individual heterogeneity. In the panel model all labor market and most individual worker controls fall out since few worker attributes change. The dependent value takes on values of -1 (multiple job leavers), 0 (single and multiple job stayers), and +1 (multiple job joiners). This model can be estimated as shown above, and also with *U* in levels included as well as Δ*U*. Standard errors are clustered by MSA. In the model above, the reference group includes all "stayers" – both those who hold single jobs and hold multiple jobs in both years, and the treatment group

includes both sets of "switchers" – those moving from single to multiple and those moving from multiple to single jobs.

To investigate how occupational skill difference ("mismatch") between primary and secondary jobs change with respect to the business cycle, we estimate regressions of a similar form as seen previously. Estimation here, however, is over the much smaller sample of multiple job holders. The dependent variables, $\Delta skill$ and $\Delta working\ conditions$ are equal to the differences in *SK* and *WC* , the O*NET indices of occupational skill requirements and working conditions, between workers' primary job occupation and secondary job occupation. (i.e., the Δ operator here is not longitudinal, but a difference operator between jobs at a point in time).

$$\Delta skill = x_{ikt}\beta + LM_{kt}\theta + \gamma_{SK} U_{kt} + \varepsilon , \quad (3)$$

$$\Delta working\ conditions = x_{ikt}\beta + LM_{kt}\theta + \gamma_{WC} U_{kt} + \varepsilon , \quad (4)$$

In equation (3), a positive (negative) γ_{SK} implies that the skill advantage seen for primary jobs will widen (narrow) as unemployment increases (decreases). In (4), a positive (negative) γ_{WC} implies that working conditions in the primary relative to the secondary job will worsen (improve) as unemployment rises. (higher *WC* values imply more demanding working conditions).

9. Empirical Estimation: Results

Our initial focus is on estimates of γ, which measure the response of multiple job holding to differences in local labor market unemployment rates across markets and over time. In Table 2, we present LPM estimates using a base equation in which human capital and demographic characteristics are included, along with each worker's wage on the primary job, plus fixed effects for hours, industry, occupation, year, and month (probit marginal effects evaluated at means of the *X's* are highly similar to OLS estimates). We do not include any location variables in our base equation, but will subsequently add MSA fixed effects. In all results shown, standard errors are clustered on MSA to account for error correlation among workers within the same labor market.

Virtually all estimates of γ are negative, indicating that multiple job holding is cyclical, expanding as unemployment decreases and receding as it increases. Even if labor supply for multiple jobs is countercyclical due to dominant income effects, employer demands (job openings) are insufficient to satisfy workers' desire for second jobs. That said, the magnitude of γ is modest, even absent location controls. In our base equation for the full sample, the estimated γ is -0.254 and highly significant, indicating that each 1 percentage point increase in local area unemployment (an increase in *U* of .01) is associated with a .0025 lower multiple job holding rate (i.e., a quarter of 1 percent). Relative to the mean multiple job rate of 5.6 percent in our sample, an unemployment rate one percentage point higher in one

labor market versus another is associated with a multiple job holding rate reduced by 5 percent (i.e., -.0025/.056 = -0.045).

When we add MSA fixed effects (which absorb region and city size effects), estimates of γ fall sharply and are close to zero (although sometimes close to statistical significance). For the full sample, the estimate of γ with MSA fixed effects is -0.024, about a tenth as large as the estimate from our base specification and not significant at standard levels. The point estimate implies that a 1 percentage point increase in unemployment (an increase of .01 in U) is associated with a near-zero reduction in multiple job holding (a .00024 reduction in the .056 dual job rate across this sample). In short, within U.S. labor markets, the response of multiple job holding to within-market changes in unemployment is largely acyclic.

In addition to the full sample results, we explore variation in multiple job responsiveness to the unemployment rate across different groups of workers (that is, we estimate a different γ by group), as shown in Table 2. Given that nearly all the estimates including MSA fixed effects are close to zero (although some are close to statistical significance), our discussion focuses more on the differences in results absent MSA fixed effects. We view these comparisons as informative or at least suggestive, although readers might reasonably disagree.

We might expect differences between men and women due to household specialization. If so, these differences should show up more strongly for married than for single workers.[14] Comparing all men versus all women, the difference in γ is small, -0.271 among men versus -0.237 for women. Adding MSA fixed effects, estimates of γ fall sharply and are close to zero, -0.054 for men and -.0002 for women. However, if we compare married men and women, we find a more substantial difference due to substantial differences between married versus single women (there is little difference between single and married men). For the base equation, γ for married women is -0.156 as compared to -.0.337 for single women. Adding MSA fixed effects, we obtain a marginally significant γ for married women of 0.0791 (the only positive coefficient estimate in Table 2). That is, married women are the one group that we find exhibiting countercyclical multiple job response, presumably resulting from income effects produced by changes in husbands' earnings over the business cycle. During recessions, we should expect to see some married working women switch into multiple jobs in response to losses in husbands' earnings. These results are consistent with our earlier conjecture that married women would exhibit less cyclical or even countercyclical multiple job responsiveness relative to married men or single women. That said, given the absence of market clearing in a recession, it is not possible to distinguish between the net income and

[14] In Table 2, married is defined to include those married with spouse present. The "single" group includes those never married, plus those separated, widowed, or divorced.

substitution effects of labor supply from the demand effects that vary with business conditions. All we can do is observe the net outcome.

We find particularly interesting differences in γ among hourly versus salaried workers, a question not examined in previous literature. Hourly workers display a somewhat more cyclical pattern than do salaried workers, -0.30 versus -0.19. To the extent that hourly workers have more variable earnings due to variation in regular and overtime hours, they should have strong income effects and their behavior would be less cyclical (more countercyclical). That we observe the opposite outcome, with hourly workers having more rather than less cyclical multiple job holding, the implication is that multiple job outcomes are driven mainly by labor demand, with second job opportunities for workers in hourly primary jobs being highly cyclical. That said, these differences are small and the MSA fixed effects estimates for these two groups are nearly identical, -0.024 and -0.020 for hourly and salaried workers respectively (all these estimates may be affected by gender differences since women are more likely to be hourly workers).

A important question to address is whether and how the relationship between multiple job holding and local labor market unemployment changed during the Great Recession, a period in which the rate of nationwide multiple job holding changed little, but in which there was substantial variation across labor markets in unemployment. The findings are reasonably clear-cut. Whereas we found a value of γ = -0.254 over the entire 1998-2010 for our base equation, restricting the sample to 2008-2010 (the recession began officially in December 2007), we obtain a nearly identical γ of -0.249 during the Great Recession. The MSA fixed effects estimates for the entire time period was γ of -0.024; the equivalent estimate during the Great Recession is virtually zero or acyclic (i.e., γ = -0.001). Although the level of primary and secondary job holding declined in the Great Recession, the aggregate multiple job holding *rate* changed little and differences across labor markets in response to unemployment were, if anything, less cyclical and effectively acyclic. In short, multiple job holding, on net, did little to either mitigate or exacerbate the severity of employment losses during the Great Recession.

Note that discussion in this section relied on parameter estimates from specifications with and without MSA fixed effects. With labor market fixed effects, nearly all estimates of γ are close to zero and inconsequential. Our initial analysis without MSA fixed effects finds nontrivial differences in multiple job holding rates across labor markets, with a modest amount of these differences accounted for by differences in unemployment rates. But to the extent that such estimates reflect unmeasured MSA-specific factors (fixed effects) correlated with unemployment levels and that affect multiple job holding, it is reasonable to conclude that γ is effectively zero and that multiple job holding is largely acyclic.

10. Asymmetric Multiple Job Holding Over the Business Cycle

The results to this point show that multiple job holding is mildly pro cyclical, but that within labor markets (i.e., with MSA fixed effects) it is largely acyclic. An interesting question to ask is whether multiple job holding responds symmetrically to increases and decreases in unemployment. To examine this question, we simply estimate separate coefficients on unemployment for periods of contraction and expansion, with unemployment interacted with *UP* and *DOWN* indicator variables based on whether unemployment increased or decreased in the previous three months (equation 2). As seen in Table 3, coefficients are nearly identical using our base equation, being -0.30 during contractions and -0.29 during expansions. With MSA fixed effects added, both estimates are effectively zero (-0.007 and -0.016) and far from statistical significance. In short, we find no evidence to suggest asymmetry in multiple job holding responses during contractions and expansions.

11. Longitudinal Evidence on Multiple Job Holding

As a check on our cross-section results, we estimate multiple-job regressions using short one-year panels of workers who do not change residence over the year and are surveyed in the CPS the same month in consecutive years. The principal advantage of panel evidence is that it accounts for worker-specific heterogeneity that may be correlated with multiple job holding and unemployment (i.e., person-specific fixed effects net out in the differencing). Rather than comparing a group of multiple job holders with a group of single job holders, conditioning on measured attributes, we are comparing each worker to themself one year apart, with some workers having switched between single and multiple job holding.

Our estimation sample is for the worker/year pairs 1998/99 through 2009/10. Estimating the longitudinal equation (3) shown previously, we obtain an estimate (not shown in a table) of γ' (the coefficient on ΔU) of -.0945 (.0251). The sample size is 488,293. This coefficient is about 1/3 the magnitude of the cross-sectional estimate of γ absent MSA fixed effects but, interestingly, about three times the magnitude of the cross-sectional estimate including MSA fixed effects. Controlling for the unemployment level U as well, the coefficient on ΔU declines (in absolute value) to -.079 (the coefficient on U is also negative, but small and insignificant). In short, the longitudinal analysis shows that multiple job holding is cyclical within labor markets over time, but the size of this effect is very small, with each 1 percentage point increase in unemployment associated with a .001 decrease in multiple job holding relative to an overall multiple job holding rate of 5.6 percent. Although this result is statistically significant, the relevant conclusion to draw is that multiple job holding within labor markets is largely acyclical over time. This longitudinal evidence reinforces our previous conclusion based on the cross

sectional analysis with MSA fixed effects.[15]

12. The Business Cycle and Occupational Mismatch between Primary and Secondary Jobs

Our final analysis examines how job quality differences between primary and secondary jobs vary with the business cycle. As previously observed in Table 1, on average, workers' secondary jobs have a lower O*NET occupational skill index (*SK*) value and a higher (more demanding) physical working conditions (*WC*) value, signaling lower job quality on secondary than on primary jobs. Given that the skill index is highly correlated with pay, while working conditions are not, these results suggest that on average second jobs pay less than first jobs (our guesstimate is about 6 percent less). Not examined in previous literature is whether job quality differences vary over the business cycle. Based on the sample of multiple job holders, we estimate regressions in which the dependent variable is the difference in either *SK* or in *WC* between the first and second jobs. Our focus is on how the difference in job quality varies with the business cycle.

As seen in in Table 4, results are reasonably clear-cut, but inconsequential in magnitude. The gap in occupational job quality between the primary and secondary job narrows slightly during recessions and widens in expansions. The coefficient on the unemployment rate is -1.906 (and significant at the .01 level) for the ΔSK base equation. It remains significant (at the .05 level) but declines to -0.449 when MSA fixed effects are added. Although statistically significant, these magnitudes are small. The raw mean gap in occupational *SK* between first and second jobs is 0.3 (see Table 1), a large second job deficit that represents a nearly 1/3 standard deviation difference. However, coefficient effects of -1.906 or -0.449 multiplied by a .01 (one point) change in unemployment increase are trivial relative to the standard deviation in *SK* (by construction 1.0) or compared to the 0.3 mean difference in *SK1* and *SK2*.

Turning to the ΔWC equations, we obtain a statistically significant (at the .01 level) coefficient on the unemployment rate of 0.816 for the base equation. The mean difference in *WC* for the primary minus the secondary job (Table 1) is a small -0.04 points, indicating slightly less demanding working conditions in the primary job. The positive coefficient on the unemployment rate implies that as unemployment increases, the small advantage of less demanding working conditions in the primary relative to the second job narrows slightly, but the magnitudes of these gaps are trivial compared to the standard deviation in *WC* across the workforce (i.e., close to 1.0). Adding MSA fixed effects, the coefficient is effectively zero, at -.373. The former is statistically significant at the .01 level, while the latter is insignificant.

[15] In the next version of the paper, we will separately estimate panel coefficients from multiple job joiners and leavers. That is, each worker is in one of four states, d_{00}, d_{01}, d_{10}, or d_{11}, where the subscripts 0 and 1 designate whether one is a dual job holder in years 0 and 1, respectively. The dependent variable will take on values of -1 for multiple job leavers d_{10}, +1 for joiners d_{01}, and 0 for single job and multiple job stayers d_{00} and d_{11}. Estimates of γ will be identified off each group's sensitivity to changes in within labor-market unemployment.

In short, there are modest occupational job quality differences between dual workers' first and second jobs, with the primary job having *SK* and *WC* index values indicating moderately higher skills and slightly less demanding working conditions. These modest gaps in job quality are largely invariant to differences in unemployment differences across labor markets or within markets over time.

13. Conclusion

Multiple job holding has the potential to exacerbate or mitigate employment changes over the business cycle, depending on whether it is cyclical or countercyclical. Theory is helpful, but inconclusive. Changes in business conditions produce substitution and income effects in labor supply for multiple jobs that typically cut in opposite directions. Moreover, whatever the preferred labor supply responses for multiple jobs over the business cycle, such preferences are demand constrained by the availability of potential second jobs. Even if labor supply is countercyclical due to dominant income effects, the availability of second jobs is almost certain to be cyclical absent highly flexible wages. Thus, empirical evidence is needed to address the question of how multiple job holding varies over the cycle, yet research on this topic is inconclusive. Our Current Population Survey (CPS) data set, which contains large samples of workers and provides information on multiple job holding over many years, makes it possible to obtain relatively precise estimates of these net effects.

Virtually all the evidence we find indicates that to the extent that multiple job holding responds to unemployment, that response is on net cyclical rather than countercyclical, thus slightly exacerbating rather than mitigating the severity of the business cycle. We find that much of the business cycle difference in multiple job holding seen across labor markets is not causal, however, dropping sharply after accounting for MSA fixed effects. As seen in our longitudinal analysis, there is minimal response to unemployment changes within labor markets over time. Our large CPS sample size produces relatively precise estimates, albeit ones close to zero. It is not surprising that prior studies, based on evidence from far smaller data sets, have produced ambiguous results, some studies concluding multiple job holding is procyclical and others countercyclical.

Because there is little variation in multiple job holding within markets over time; it follows that national employment figures are affected little by business cycle changes in multiple job holding. Individual households vary their job holding over time in ways that benefit them financially and enhance well-being. Some of that variation is cyclical and some countercyclical. But in the aggregate, multiple job holding is largely acyclic and plays a (perhaps surprisingly) small role in labor market dynamics over the business cycle.

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Table 1: Sample Means for Single and Multiple Job Workers

Variable name	Single job workers	Multiple job workers
MSA Unemployment Rate	0.055	0.053
Weekly hours, primary job	39.8	37.2
Weekly hours, second job	-	14.2
Hourly real earnings, primary job (2010$)	21.87	21.78
Proportion hourly workers in primary job	0.555	0.580
Primary job skill index, *SK*1	0.085	0.207
Secondary job skill index, *SK2*		-0.106
Primary job working conditions index, *WC1*	-0.067	-0.167
Secondary job working conditions index, *WC2*		-0.115
Household kids ages 0-5	0.265	0.233
Female	0.486	0.508
White	0.818	0.839
Black	0.113	0.100
Married, spouse present	0.569	0.534
Never married	0.264	0.275
U.S. citizen	0.905	0.947
Age < 25	0.101	0.102
Age 25-34	0.247	0.249
Age 35-54	0.517	0.533
Age 55+	0.135	0.122
High school degree	0.294	0.219
Some college, no degree	0.185	0.207
Associates degree	0.094	0.114
BA degree	0.222	0.261
Graduate or professional degree	0.111	0.158
Private sector, primary job	0.841	0.774
Union member	0.139	0.166
Sample size	1,329,428	78,208

Principal data sources are the Current Population Survey Monthly Outgoing Rotation Group (CPS-MORG) earnings files. 1998-2010, and occupation skill and working condition descriptors from O*NET. Total Sample size is 1,407,636 with a multiple job holding rate of 5.56 percent.

Table 2: Unemployment Effects on Multiple Job Holding, by Worker Group

	Base Specification	R^2	Base + MSA FE	R^2	N
All workers, all years	-0.254	0.015	-0.0238	0.017	1,407,636
	(0.0338)		(0.0282)		
Men	-0.271	0.016	-0.0536	0.018	717,776
	(0.0352)		(0.0313)		
Women	-0.237	0.017	-0.00021	0.018	689,860
	(0.0385)		(0.0399)		
Married men	-0.278	0.017	-0.0427	0.020	428,616
	(0.0445)		(0.0379)		
Single men	-0.255	0.015	-0.0717	0.016	289,160
	(0.0366)		(0.0428)		
Married women	-0.156	0.016	0.0791	0.018	367,417
	(0.0406)		(0.0421)		
Single women	-0.337	0.014	-0.0965	0.016	322,443
	(0.0522)		(0.0581)		
Hourly workers	-0.296	0.017	-0.0244	0.017	784,028
	(0.0363)		(0.0307)		
Salaried workers	-0.193	0.016	-0.0204	0.016	623,608
	(0.0383)		(0.0371)		
All workers, 2008-2010	-0.249	0.015	-0.00126	0.020	346,904
	(0.0372)		(0.0417)		

The table shows coefficients on the local labor market monthly unemployment rate, ranging from 0 to 1. Robust standard errors, clustered on MSA, are shown in parentheses. The base specification used unless stated otherwise. *All coefficients significant at .01 level except those starred (i.e., regressions with MSA fixed effects). Data are CPS. In addition to the monthly MSA unemployment rate, the base regression includes indicator variables for education (5 dummies for 6 categories), age (3), gender, marital status (2), children in household (2), citizenship, union member, public employment, hours on primary job (4), industry (8), occupation (15), month and year dummies. The "base" specification includes regional (8) and MSA size dummies (5), while the "base+MSA FE" specification includes MSA fixed effects.

Table 3: Asymmetric Response of Multiple Job Holding with Respect to Unemployment

	Base Spec.	Base+MSA FE
Unemployment Increasing	-0.304	-0.00658
	(0.0363)	(0.0147)
Unemployment Decreasing	-0.288	-0.0159
	(0.0361)	(0.0152)
R-squared	0.018	0.017
Observations	1,407,636	1,407,636

See noted in Tabled 1 and 2**.**

Table 4: Unemployment Effect on Primary-Secondary Job Differences in Skills and Working Conditions

	Base Specification	Base+MSA FE
Dependent variable: Skill Index difference	-1.906	-0.449
	(0.345)	(0.479)
R^2	0.133	0.140
Dependent variable: Working Conditions diff	0.816	-0.373
	(0.312)	(0.438)
R^2	0.194	0.200
Observations	71,494	71,494

See notes in Tables 1 and 2**.** Shown are coefficients on unemployment, where the dependent variables are skill differences and working condition differences in the primary and secondary jobs, *SK1–SK2* and *WC1–WC2*, respectively.