Moonlighting over the Business Cycle*

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Abstract

Using data from the 1979 National Longitudinal Survey of Youth, we examine the cyclicality of moonlighting by gender. We estimate a random effects Tobit model of moonlighting among working men and women and find that, while male moonlighting behavior does not fluctuate significantly with the business cycle, female moonlighting does. The cyclicality of female moonlighting has, nonetheless, varied over the course of the past 35 years. Female moonlighting seemed to behave counter-cyclically during much of the 1980s and early 1990s, confirming the popular media belief that moonlighting is more likely to occur during periods of economic distress. Yet, this counter-cyclical behavior disappears during the 1993-99 period to become pro-cyclical by the early twentieth century. The recent pro-cyclicality of female moonlighting supports the idea that female workers respond to a need for "just-in-time" employment following the economic upturn of the mid to late 1990s.

I. Introduction

During economic downturns, employment levels fall, unemployment rates increase and real wages drop. As such, real wages are considered somewhat pro-cyclical. Yet, very little is known about the cyclicality of multiple-job holding. From a graphical analysis of national time series moonlighting data during the 1960s and 1970s, Stinson (1987) finds evidence of large increases in moonlighting during expansionary periods. Likewise, Partridge's (2002) findings support the possibility of pro-cyclical multiple job holding. Yet, the popular media and employment think tanks discuss moonlighting as a by-product of financial pressures.[1] Furthermore, the idea that individuals may hold multiple jobs during an economic downturn in order to supplement family income is consistent with the so-called 'added worker effect' in the labor economics literature.

Why should we care about the cyclicality of multiple job holding in the economy? There are numerous reasons. First, moonlighting has played, and can be expected to continue to play, a visible role in the U.S. workforce. The moonlighting rate was 5.2 percent as of 1970, with 7.0 percent of male workers and 2.2 percent of female workers holding multiple jobs. This moonlighting rate remained practically unchanged over the course of the next 30 years. Yet, its gender incidence did fluctuate. In particular, the female moonlighting rate grew over the past several decades from the above listed 2.2 percent in 1970, to 3.8 percent in 1980 and to 5.9 percent in 1991, and exceeded the male rate for the first time in 1995 (6.5 percent versus 6.3 percent). In May 2007, the moonlighting rate was still similar to the moonlighting rate in 1970 (i.e. 5.3 percent), although now females are much more likely to moonlight than men, with rates of 4.9 percent versus 5.7 percent.[2] Considered over the course of an entire year (versus at a point

[1] See for example, *The State of Working America*, 2002-2003.
[2] These data were compiled from the Current Population Survey (CPS) by the Bureau of Labor Statistics.

in time), an even larger percentage of workers hold second jobs. In this regard, Paxson and Sicherman (1996) note that approximately 20 percent of male workers and 12.2 percent of female workers hold second jobs in any given year (see p. 357).[3] As these numbers make clear, moonlighting is a substantively important labor market phenomenon; however, it is much understudied. In fact, our review of the literature to follow will show that only a handful of research papers have studied this phenomenon. Thus, our primary motivation for writing the paper is to shed light on a poorly understood, yet numerically important, feature of the labor market.

A second reason for examining the cyclicality of multiple job holding is the potential importance of moonlighting in facilitating labor supply adjustments during temporary economic downturns or upturns.[4] Through a description of moonlighters, our analysis will shed light on how workers respond to fluctuations in job opportunities across the business cycle. Macro-economists and labor micro-economists have long studied employment cyclicality in an attempt to improve the explanations of the changing composition of the labor force over business cycles, e.g. the added and discouraged worker effects.[5]

Thirdly, as one part of the broader picture of economic cyclicality, our study fits nicely into the ongoing debate concerning the cyclicality of real wages.[6] Considerable research effort has been devoted to understanding the nature of real wage fluctuations across business cycles, yet these studies are muddied by a glossing lack of distinction between workers' average real wages across all jobs and their wages in the primary job alone. Understanding the role that

[3] These figures may be somewhat overstated as some job changers may be mistakenly categorized as moonlighters (see p. 359).
[4] Conway and Kimmel (1998) argue that, if labor supply elasticity estimates were adjusted to reflect this additional labor supply adjustment, labor supply elasticities would be increased, although the magnitude of this increase would be small. In other words, labor supply is more elastic than current empirical estimates suggest.
[5] For an explanation of these two effects and recent evidence, see Mincer (1966) and Spletzer (1997), respectively.
[6] Examples of research on this topic include Devereux (2001), Hart (2006), and Keane et al (1988).

moonlighting may play in employment cyclicality may inform the debate concerning the measurement of real wages when studying real wage cyclicality.

A final and policy relevant motivation for this research refers to the structure of employment taxes affecting secondary jobs. As explained by Anderson and Meyer (2003), unemployment insurance (UI) payroll taxes are highly regressive, in large part because benefits are structured in the same way.[7] However, due to the UI payroll tax's low taxable wage base, moonlighters working few hours in the second job are still subject to the full UI tax despite likely lacking eligibility for benefits in the event of a layoff. Considering the important role that multiple job holding can play in the economy by responding to firms' "just-in-time" labor needs, a better understanding of the cyclical nature of moonlighting can help inform the debate on how to best structure the UI tax.[8]

Given the magnitude of moonlighting and the policy implications that its cyclicality may have for the functioning of the labor market, we examine the responsiveness of male and female multiple job holding to business cycles. We first review the existing descriptive evidence regarding this question. Subsequently, we describe our data and methodology, concluding with a discussion of our findings.

II. Background on the Cyclicality of Moonlighting

There is often the presumption that moonlighting is counter-cyclical. In this vein, the Employment Policy Institute (1999) asserted that: "The benefits of persistent low unemployment are reflected in many labor market indicators. Multiple job holding, for instance, has fallen over the last year…". Nonetheless, from a theoretical standpoint, moonlighting rates can be pro-

[7] The authors find that workers in the lowest earnings decile assign 3 percent of their earnings to UI payroll taxes, whereas for their counterparts in the highest earnings decile, only 0.5 percent of their earnings go to paying for such taxes.

[8] On the topic of UI and moonlighting, see Vroman and Nightingale (1996).

cyclical or counter-cyclical. Focusing on economic downturns, from a demand side, moonlighting opportunities may be limited during a recession as the total number of jobs falls. On the other hand, from a supply side, workers may choose to moonlight in an effort to stabilize family income during an economic downturn when unemployment rates are higher and real wages lower.

Partridge (2002) examines moonlighting during the period 1994 and 1998 using state-level data. While his focus is on the nature of second job holding during a period of strong economic growth, his paper offers insight into the potential cyclical pattern of moonlighting. If moonlighters face a relatively high likelihood of being laid off during periods of high unemployment, or if moonlighting rises during periods of rapid economic growth and labor shortages, then moonlighting might be pro-cyclical (pg. 426).

Conway and Kimmel (1998) propose a model that leads to a more rigorous prediction regarding the cyclicality of moonlighting. According to their theoretical framework, hours on the primary job and hours on the secondary job (along with leisure hours) enter the utility function separately. Their model explicitly allows for two distinct reasons for moonlighting: primary job constraints (e.g. underemployment) and job heterogeneity (i.e. the second job might provide non-wage remuneration or affect utility differentially from the primary job). From their model, it follows that an increase in non-wage income leads to a decline in moonlighting. As such, moonlighting might be counter-cyclical. Via the estimation of a fixed effects logit model of the likelihood of holding multiple jobs, Heineck and Schwarze (2004) find support for this notion.[9] However, Conway and Kimmel (1998) estimate a positive second job labor supply

[9] Heineck and Schwarze (2004) compare secondary job holding in Germany and the United Kingdom. This cross-country comparison allows them to draw some conclusions regarding the role that institutions might play in moonlighting outcomes. They conclude that, while institutions matter, they are not a substantial factor in explaining moonlighting rates.

elasticity for men, suggesting that moonlighting might move cyclically with the business cycle since wages have been found to be slightly pro-cyclical.[10]

Renna's (2006) cross-country comparative research on moonlighting and overtime work provides interesting insight into our question regarding the cyclicality of moonlighting. Renna finds that the incidence of moonlighting increases in the face of increased primary job constraints imposed by declining standard hours of work. In other words, as workers have found it more difficult to accommodate desires for extra work hours on their primary jobs, they are more likely to take second jobs. This implies that for workers seeking to increase their total work hours, moonlighting could serve as an alternative to overtime work. Thus, his finding that overtime work is pro-cyclical suggests that moonlighting may also be pro-cyclical as both employment options are responses to the similar desire for increased work hours.

Two other possible motivations for moonlighting may be individuals' responses to negative financial shocks and to primary job insecurity. Boheim and Taylor (2004) examine these moonlighting reasons, both closely related to business cycle fluctuations, and find mixed evidence of multiple job holding in response to financial shocks and weak support for the job insecurity motivation.

Yet, other studies in the literature refer to expectations about future income as another motive for moonlighting. In this vein, Bell, Hartwright and Hart (1997a, 1997b) investigate the possibility that workers might take second jobs as a hedge against future unemployment. That is, as expectations regarding a future economic downturn rise, moonlighting rates might increase.

[10] Renna and Oaxaca (2006) focus on moonlighting workers who report no primary job hours constraints and whose multiple-job holding choice reflects a "personal preference for job differentiation" (pg. 1). Their job portfolio model confirms Conway and Kimmel (1998) finding of a stronger wage elasticity of labor supply on the second job.

However, their study, which uses British data from 1991 to 1998, fails to yield support for this hypothesis.[11]

In sum, there are sufficient reasons and evidence to suggest that moonlighting rates may respond in some systematic fashion to cyclical labor market fluctuations, but no clear indication of whether multiple job holding is pro- or counter-cyclical. As such, we also lack a definite prediction regarding gender differences in moonlighting cyclicality. Given that men and women exhibit different labor market trajectories and different degrees of employment cyclicality, their moonlighting choices and cyclicality may vary.[12] Indeed, historically, women were more likely to moonlight for financial reasons (e.g. Kimmel and Powell 1999), due to primary job constraints (Averett 2001), or to meet family responsibilities (Allen 1998) than men. These gender differences in moonlighting may have diminished over time as female moonlighting rates have come to mirror those of men (and exceed male rates in recent years). Yet, moonlighting women are still much more likely to work in a full-time primary job and a part-time secondary job, while moonlighting men are more likely to hold two full-time jobs.

Why should we expect the cyclicality of moonlighting to differ between men and women? One could cite various reasons. First, gender differences in moonlighting cyclicality could be due to differences in the demographics of male and female moonlighters. For instance, male moonlighters are more likely to be married or have children, while the opposite is true for women. Secondly, gender differences in moonlighting cyclicality could stem from occupational segregation by sex and/or from industry seasonality. In this vein, Goodman (2001) examines the

[11] British moonlighting differs from U.S. moonlighting in three important ways: Brits have a higher moonlighting rate, display greater moonlighting persistence over time and their average secondary job wages are much higher than their average primary job wages.

[12] Hotchkiss and Robertson (2006) show that female labor force participation exhibits a much stronger pro-cyclicality than that of males, which they explain is due to the females' higher reservation wage. In fact, controlling for education, men are half as responsive to labor market conditions so that, even if they become unemployed during an economic downturn, they are half as likely to leave the labor force.

cyclicality of service jobs and notes that service jobs do not suffer much during recessions (although their growth does wane). To the extent that women are more likely to work in the service sector, they may exhibit less cyclicality in their moonlighting behavior than men. However, Hotchkiss and Robertson (2006) show that lesser educated workers, many of whom are employed in the service industry, are more responsive to business cycle fluctuations. Finally, Stinson (1990) shows that men moonlight for long periods of time and women are more likely to moonlight on a temporary basis to meet financial needs. This feature may have some implications for gender differences in moonlighting cyclicality as well.

Much of the above-described gender differences in moonlighting, because they are explained by observable demographic differences, will be eliminated when standard regression procedures are implemented. Thus, the question arises: Once observable factors are controlled in a regression framework, would we expect any remaining gender differences in moonlighting? First, to the extent that we cannot measure precisely an individual's reservation wage, we might expect such gender differences to persist. But, what if regression methodologies are utilized that adjust, in some sense, for unobservable differences across individuals? Then, we might expect some portion of expected gender differences in moonlighting patterns to disappear.

III. Data and Descriptive Statistics

We use data drawn from the Geo-coded 1979 National Longitudinal Survey of Youth File (NLSY79 Geo-coded file).[13] This is a nationally representative sample of 12,686 civilian young men and women aged 14-21 as of December 31, 1978. This cohort was initially interviewed annually from 1979 through 1994. Starting in 1994, the interviews were conducted biennially through the year 2002.

[13] The NLSY-GeoCoded file data as well as documentation are available at: http://www.bls.gov/nls/nlsgeo97.htm . The geo-coded file was obtained under contract agreement #03-77.

We have chosen the NLSY79 survey because its questionnaire is best suited for analyzing our research question.[14] Specifically, the survey instrument permits individuals to report up to 6 distinct jobs held within each calendar year, and includes job details, such as job start and end dates. This permits us to construct precise measures of multiple job holding. Other data sets, such as the PSID, may result in an over-statement of moonlighting, as it is difficult to distinguish multiple job holders from job changers. The one drawback with the NLSY79 is that the data are representative of a specific age cohort. However, focusing on this prime-aged sub-sample allows us to derive useful information regarding moonlighting cyclicality and partially alleviates heterogeneity concerns.

We work with separate unbalanced panels of men and women from the 20 rounds of the NLSY79.[15] In 2002, a total of 8,033 civilian and military respondents were interviewed. We restrict our sample to person-year observations for which information is available regarding employment, earnings, race, gender, age, education, marital status, fertility, work limitations due to health related reasons and other location-specific variables. We use the week-by-week longitudinal work records on each respondent from January 1978 to the year 2002 to construct variables indicative of the respondent's sector of employment, occupation, tenure, weekly hours worked, and hourly rate of pay at the primary job.[16] Similarly, we create a dummy variable indicative of whether the respondent moonlighted, which we define as holding more than one job simultaneously for longer than one week.[17]

[14] Park and Shin (2005) and Tremblay (1990) use these data to examine the cyclicality of the real wages by gender.
[15] Robust standard errors are computed to correct for the heteroscedasticity that may affect our estimates.
[16] We deflate hourly wages using the CPI for all urban consumers, not seasonally adjusted, with base period 1982-1984 was retrieved from http://www.bls.gov/cpi/home.htm
[17] In this manner, we avoid counting as moonlighting job transitions during which the old and new jobs overlap briefly.

Preliminary employment and moonlighting rates for men and women over the last two decades are shown in Table 1. We compare employment and moonlighting rates for three time periods centered around 1980, 1990, and 2000.[18] In part due to the aging nature of the NLSY79 cohort, employment and moonlighting rates increased between the 1980 and the 1990 time period, and then declined between the two time periods centered around 1990 and the year 2000. In particular, while moonlighting rates averaged 7 percent for both men and women over the period under consideration, moonlighting rates showed some fluctuations, peaking around 1990 for both men and women. Note that this now prime-aged sample exhibits a moonlighting rate somewhat above the national average of 5.3 percent for all workers.

Tables 2A and 2B inform on some of the personal characteristics of single and multiple job holders for the same periods displayed in Table 1. An increasingly larger fraction of multiple job holders are Black, with the percentage of moonlighters in our NLSY79 sample who are Black rising from 14 percent in the time period centered around 1980 to 32 percent around 2000. Additionally, moonlighters appear to be more highly educated than non-moonlighters, although the education gap narrows over time. Looking at family characteristics, married men and women are less likely to hold more than one job, although the difference is quite small, and male single job holders seem to have more children than their moonlighting counterparts in earlier decades. Finally, a higher fraction of moonlighters reside in urban areas relative to single job holders.

IV. Methodology

Our purpose is to examine the cyclicality of male and female moonlighting during the 1980s and 1990s, up to the year 2002. Underlying our empirical analyses is a standard

[18] We use five-year averages. For the year 1980, we use data from 1979 to 1983 (the survey started in 1979, hence data for 1978 were unavailable). For 1990, we average data from 1988 to 1992 and, for the year 2000, averages from the 1998-2002 period are computed. In this last period, we include three years instead of five because the NLSY79 survey switched from an annual to a biennial survey around that date.

individual utility-maximizing model,[19] according to which working men and women decide whether to moonlight and, if so, the number of hours they will work in more than one job. Note, however, that a non-negligible number of working men and women do not moonlight. Therefore, the distribution that applies to the sample data is a mixture of discrete and continuous distributions, rendering the use of OLS inappropriate. Consequently, a Tobit model would seem more appropriate as it would take into account the censored nature of the distribution of working men and women's moonlighting hours by modeling the likelihood of moonlighting and the hours moonlighted as a function of the same covariates.

A potential disadvantage of the Tobit model is that a change in any regressor will have the same overall effect (that is the same sign) on both the probability of moonlighting and on the number of hours moonlighted. Hence, a two-part model could improve on the estimation by allowing for the possibility that variables affecting the decision to moonlight may impact the hours moonlighted differently. Nonetheless, recognizing: i) the difficulty of conceiving appropriate identifiers that affect the decision to moonlight without influencing the hours moonlighted, and ii) the sensitivity of the findings to the choice of identifiers inherent in the estimation of two-part selection models, we view the estimation via a Tobit model as preferable.[20]

As such, we estimate the following random effects Tobit model.[21] The random effects specification allows us to adjust standard errors for the group-wise heteroskedasticity arising from the fact that the growth rate of non-farm employment only varies across states, while the

[19] Conway and Kimmel (1998) provide a detailed derivation of this theoretical framework.
[20] A second potential disadvantage of the Tobit and two-part selection models is their reliance on normality and homoscedasticity in the latent variables. However, as noted by Wooldridge (2008), neither conditional normality nor heteroskedasticity affect the unbiasedness or consistency of the OLS estimates and, as a result, for reasonable deviations from these assumptions, the Tobit model still provides good estimates.
[21] It should be noted that a fixed-effects Tobit model is not estimated as we lack a sufficient statistic to condition the fixed effects out of the likelihood function.

remaining variables in our model vary across individuals (Moulton 1986), while also taking into account some of the individual heterogeneity shaping male and female moonlighting rates. Thus, we model the likelihood and the number of hours moonlighted by men and women as follows:

(1) $y_{it}^{*} = \alpha_i + X_{it}^{'}\beta + \varepsilon_{it}$ where: $y_{it} = \max\left(0, y_{it}^{*}\right)$ and $\varepsilon_{it} \mid X_{it}, \alpha_i \sim N\left(0, \sigma_e^2\right)$.

The vector X_{it} controls for a variety of personal, family, regional, time-related factors and specific primary job characteristics known to affect male and female employment patterns. In particular, among the personal and family characteristics, we include two dummies for race (Black, Other Race), a continuous measure of age, the highest grade completed by the respondent, a dummy variable for marital status (Married), and two measures of parental status (a dummy variable for the presence of young children in the household plus a continuous count of the total number of children in the household). One might expect that individuals with greater demands on their non-market time (i.e., higher reservations wages) might, in addition to the standard conclusion of being less likely to seek paid employment), also be less likely to moonlight. As we described earlier, we expect that these demographic controls will eliminate some of the observed gender differences in moonlighting.

We also include a variety of primary job characteristics possibly affecting the moonlighting decision and the hours moonlighted, such as the real primary job hourly wage, tenure, occupation and whether the job is in the private or public sector. Likewise, we incorporate a number of regional and time-related factors in our regression analysis. For instance, to control the fact that wealthier states might exhibit systematically different moonlighting patterns than less wealthy states, we include the state's per capita income. Additionally, we include a dummy variable for residence in an urban area, and three regional

dummies to address other macroeconomic differences in job markets. Regarding time, we include a continuous time trend measure plus three time period dummies for the periods of time: 1979-1985, 1986-1992, and 1993-1999, with the period 2000-2004 as the excluded period.[22] We structure our four time periods in this way so as to reflect distinct economic circumstances. The first and second periods wrap around a recession and, thus, include the build-up to the recession, the recession itself, and the recovery. The third period is unique as it reflects a 7 year period of substantial economic growth. Finally, the fourth period is the shortest of the four and captures a slight economic downturn following the rapid economic growth of the mid to late 1990s. We would expect period differences in moonlighting; therefore, structuring our periods in this way will maximize our efforts to reveal these differences.

Finally, our business cycle measure is the state's growth rate in non-farm employment. The bulk of the literature examining the cyclicality of real wages relies on national unemployment rate measures, insufficient for our needs due to the existence of regional disparities in industrial composition and moonlighting rates (see, for example, Partridge 2002). Additionally, state unemployment rates may be subject to greater measurement error due to the smaller sample sizes from which the data are drawn. Finally, reliance on a static measure of economic activity at the state level may be problematic because states vary in their equilibrium unemployment rates (Blanchard and Katz, 1992). Thus, we rely on the more accurately measured non-farm employment and construct its growth rate. Additionally, to better capture potential differences in moonlighting cyclicality over the time period under examination, we interact the time period dummies with the growth rate in non-farm employment.

[22] We opted not to include year dummies because, to the extent that our data come from a single cohort of individuals, the population is not likely to have a different distribution over time and, as such, the year dummies would likely be picking up much of the cyclical variation that is the focus of our research.

V. Moonlighting over the Business Cycle

Results from our random effects Tobit models are displayed in Tables 3A and 3B. Male and female Blacks moonlight more than whites. Married men, men with greater family responsibilities, and men and women residing in states with higher per capita incomes moonlight less than single men, men with fewer children, or men and women residing in poorer states, respectively. In contrast, more educated men and women seem more likely to moonlight, perhaps due in part to their access to part-time consulting opportunities.

Primary job characteristics play an important role in the decision to moonlight, particularly among women. For instance, both men and women appear more likely to hold a second job, the longer their tenures in their primary jobs. Perhaps workers with longer job tenures are more reluctant to change jobs entirely when new opportunities arise, resulting in higher multiple-job holding. Additionally, men and women working in higher skilled occupations seem less likely to moonlight than their counterparts in service related jobs (the category of reference). It is also worth noting that, while male moonlighting does not seem to be shaped by primary job wages, female moonlighting is responsive to wage changes. A $10 increase in women's primary job wages would reduce their moonlighting likelihood by 1 percentage point and hours moonlighted by approximately 0.2 hours. This is consistent with the finding of Kimmel and Connelly (1998). In addition to wages, women working in the public sector are about 6 percentage points more likely to moonlight and, once they moonlight, work 2 more hours in their secondary jobs than their counterparts in the private sector.

Of particular interest are the differences in moonlighting over the various periods of time. Male and female moonlighting was more prominent during each of three time periods spanning between 1979 and 1999 relative to the 2000-02 period used as reference. Specifically, during the

1979-85 period, men and women were about 12 and 21 percentage points more likely to moonlight, respectively.[23] If they held multiple jobs, moonlighting men and women worked an average of 4 and 8 more hours per week than their counterparts during the more recent reference period of 2000-02. These estimates dropped between 1986-92 to 10 percentage points and 3 hours among men, and to 15 percentage points and 5 hours among women. Finally, between 1993 and 1999, men and women were only 7 and 6 percentage points more likely to moonlight than their counterparts in 2000-02. Additionally, their hours moonlighted dropped to just 2 more hours per week.

What can we say about the cyclicality of moonlighting? Period-specific moonlighting cyclicality results for men and women are presented in Table 4. There is no evidence of any moonlighting cyclicality for men. However, female moonlighting is counter-cyclical during the 1980s and early 1990s, then turns pro-cyclical by the beginning of the twentieth century. Specifically, a two percent increase in the growth rate of non-farm employment (the average in our sample is close to 2 percent – see Appendix Table A) would lower the probability of moonlighting among women by approximately 0.8 percentage points in 1979-85 and by 1.4 percentage points during 1986-92. However, the same increase in the growth rate of non-farm employment would increase the likelihood of moonlighting and the weekly hours moonlighted by women by approximately 3 percentage points and 58 minutes, respectively, during the reference time period of 2000-02. These results help explain the apparently contradictory views of moonlighting as a byproduct of economic distress stressed by advocacy groups with the view of moonlighting as the response of "just-in-time" labor to an increasing labor demand following periods of economic growth.

[23] These estimates (as well as the ones corresponding to the number of hours moonlighted) are computed adding up the marginal effects corresponding to the time period dummy and its interaction term evaluated at the mean growth rate of non-farm employment in Table A.

VI. Summary and Conclusions

We examine male and female moonlighting cyclicality over the 1980s, 1990s and early twentieth century. We find that, despite diminishing over time, both men and women were more likely to moonlight and moonlighted longer hours during the 1980s and 1990s than during the 2000-2002 period. Additionally, while male moonlighting does not seem to respond to business cycles, female moonlighting does. Specifically, consistent with the popular media, female moonlighting appeared counter-cyclical during the 1980s and early 1990s. These are time periods that wrapped up around a recession and, as such, our finding suggests that moonlighting during those times may have been a byproduct of economic distress. This finding is also consistent with the lower incidence of moonlighting in higher per capita income states. Yet, this counter-cyclical behavior disappears during the 1993-99 period –a period of rapid economic growth– to become pro-cyclical by the early twentieth century. The recent pro-cyclicality of female moonlighting, which follows the economics growth of the 1993-99 period, supports the idea that female workers respond to a need for "just-in-time" employment characteristic of economic upturns. While the analyses differ in their focus and usage of state level data, the recent pro-cyclicality of female moonlighting supports the findings by Partridge (2002) and Renna (2006). Partridge (2002) argues that short-run moonlighting appears to be pro-cyclical and states that "moonlighting appears to be a regional labor market shock absorber" (see p. 438). Similarly, Renna (2006) finds that, like overtime work, moonlighting is pro-cyclical and is used by workers as a means to increase their work hours.

Overall, the analysis provides us with a better understanding of the variability and business cyclicality of male and female moonlighting over the past decades, which can prove useful in anticipating the adjustment of men and women to fluctuations in job opportunities over

the business cycle. Additionally, our findings are relevant for the literature on real wage cyclicality. To the extent that the incidence of moonlighting is pro-cyclical during recent years and primary job wages exceed secondary job wages,[24] average hourly real wages across all jobs should be more pro-cyclical than primary job wages due to the incidence of secondary jobs. Further research examining real wage cyclicality separately by gender across all jobs held concurrently may help assess the role of moonlighting cyclicality in explaining overall real wage cyclicality. Finally, a better understanding of the cyclicality of male and female moonlighting can prove useful in informing the debate on how to structure UI taxes.

[24] Kimmel and Conway (2001) compare primary and secondary job wages across age and education categories, primary and secondary job occupations, as well as family income status, and consistently find that on average, primary job wages exceed secondary job wages. Relevant to this question is the recent work by Hart (2006), who examines the real wage cyclicality of full versus part time workers.

References

Allen, W.D. 1998. "The Moonlighting Decision of Unmarried Men and Women: Family and Labor Market Influences" *Atlantic Economic Journal*, 26(2): 190-205.

Anderson, Patricia M. and Bruce D. Meyer. 2003. "Unemployment Insurance Tax Burdens and Benefits: Funding Family Leave and Reforming the Payroll Tax" NBER Working Paper No. 10043 (October), 30 pgs.

Averett, Susan L. 2001. "Moonlighting: Multiple Motives and Gender Differences" *Applied Economics*, 33: 1391-1410.

Bell, David N.F., Robert A. Hart, and Robert E. Wright. 1997a. "Double Job Holding in Great Britain," unpublished manuscript October (think they sent it to *Journal of the Royal Statistical Society*, Series A).

Bell, David N.F., Robert A. Hart, and Robert E. Wright. 1997b. "Multiple-Job Holding as a 'Hedge" Against Unemployment," CEPR research programme on UK Labour Market: Microeconomics Imperfections and Institutional Features; 19 pgs.

Blanchard, Olivier Jean and Lawrence F. Katz. 1992. "Regional Evolutions," *Brookings Papers on Economic Activity*," Vol. 1, pp. 1-75.

Boheim, Renee and Mark Taylor. 2004. "And in the Evening She's a Singer with Band – Second Jobs, Plight or Pleasure?" IZA Discussion Paper No. 1081, March.

Conway, Karen and Jean Kimmel. 1998. "Male Labor Supply Estimates and the Decision to Moonlight" *Labour Economics* 5(2): 135-166.

Devereux, Paul J. 2001. "The Cyclicality of Real Wages Within Employer-Employee Matches" *Industrial and Labor Relations Review*, 54(4): 835-850.

Goodman, Wiliam C. 2001. "Employment in Service Industries Affected by Recessions and Expansions" *Monthly Labor Review*, pp. 3-11.

Hart, Robert A. 2006. "Real Wage Cyclicality of Female Stayers and Movers in Part-Time and Full-Time Jobs" IZA Discussion Paper No. 2364 (October), 36 pgs.

Heineck, Guido and Johannes Schwarze. 2004. "Fly Me to the Moon: The Determinants of Secondary Job holding in Germany and the U.K." IZA Discussion Paper No. 1358 (October), 35 pgs.

Hotchkiss, Julie L. and John C. Robertson. 2006. "Asymmetric Labor Force Participation Decisions over the Business Cycle" unpublished manuscript (May), 24 pgs.

Keane, Michael, Robert Moffitt and David Runkle. 1988. "Real Wages over the Business Cycle: Estimating the Impact of Heterogeneity with Micro Data," *Journal of Political Economy* Vol. 96 (December), pp. 1232-66.

Kimmel, Jean and Karen Conway. 2001. "Who Moonlights and Why? Evidence from the SIPP" *Industrial Relations* 40(1): 89-120.

Kimmel, Jean, and Lisa Powell. 1999. "Moonlighting Trends and Related Policy Issues in Canada and the United States" *Canadian Public Policy* 25(2): 207-231.

Mincer, Jacob. 1966. "Labor Force Participation and Unemployment: A Review of Recent Evidence," in Robert A. Gordon and Margaret S. Gordon, eds., *Prosperity and Unemployment*, (New York: John Wiley and Sons), pp. 73-12.

Moulton, B. R. 1986. "Random Group Effects and the Precision of Regression Estimates," *Journal of Econometrics*, 32 (August): 385-397.

Park, Seonyoung, and Donggyun Shin. 2005. "Explaining Pro-cyclical Male-Female Wage Gaps" *Economics Letters* 88(2): 231-235.

Partridge, Mark. 2002. "Moonlighting in a High Growth Economy: Evidence from U.S. State-Level Data" *Growth and Change* 33(4): 424-452.

Renna, Francesco. 2006. "Overtime and Moonlighting: a Cross-Country Analysis," *Journal of Labor Research* Vol. 27, No. 4 (Fall), pp. 575-591.

Renna, Francesco and Ronald L. Oaxaca. 2006. "The Economics of Dual Job Holding: A Job Portfolio Model of Labor Supply" IZA Discussion Paper No. 1915 (January), 24 pgs.

Spletzer, James R. 1997. "Reexamining the Added Worker Effect," *Economic Inquiry* Vol. 35 (April), pp. 417-27.

Stinson, John F. (Jr.). 1990. "Multiple job holding up sharply in the eighties," *Monthly Labor Review* 113(7): 3-10.

Stinson, John F. (Jr.) 1987. "Moonlighting: a key to differences in measuring employment growth" *Monthly Labor Review* 110(2): 30-31.

Tremblay, Carol Hilton. 1990. "Wage Patterns of Women over the Business Cycle." *Quarterly Review of Economics and Business* 30(1): 90-101.

Vroman, Wayne and Demetra Smith Nightingale. 1996. "Multiple Job Holding and Unemployment Insurance," Urban Institute: unpublished report.

Wooldridge, Jeffrey M. 2008. *Econometric Analysis of Cross Section and Panel Data*, 2nd Edition, MIT: Cambridge, MA.

Table 1
Working and Moonlighting Rates by Gender

Variables	1980		1990		2000	
	Working	Moonlighting	Working	Moonlighting	Working	Moonlighting
Men	0.72	0.05	0.81	0.08	0.82	0.07
Women	0.79	0.05	0.91	0.09	0.91	0.07

Notes: Authors' tabulations using the NLSY79.

Table 2A
Male Single versus Dual Job Holders
(Only Includes Workers)

Variables	1980		1990		2000	
	One Job	Moonlighting	One Job	Moonlighting	One Job	Moonlighting
Percent White	0.73	0.81	0.69	0.71	0.63	0.64
Percent Black	0.21	0.15	0.24	0.25	0.30	0.30
Highest Grade Completed	11.86	12.82	13.02	13.64	13.31	13.73
Married	0.21	0.14	0.56	0.46	0.58	0.54
# Children	0.24	0.09	1.22	0.99	1.55	1.67
Urban	0.79	0.82	0.79	0.81	0.76	0.77

Notes: Authors' tabulations using the NLSY79.

Table 2B
Female Single versus Dual Job Holders
(Only Includes Workers)

Variables	1980		1990		2000	
	One Job	Moonlighting	One Job	Moonlighting	One Job	Moonlighting
Percent White	0.71	0.81	0.69	0.70	0.67	0.64
Percent Black	0.24	0.14	0.25	0.25	0.27	0.32
Highest Grade Completed	11.49	12.05	12.66	13.12	13.07	13.27
Married	0.12	0.11	0.50	0.49	0.61	0.57
# Children	0.10	0.10	0.79	0.85	1.27	1.18
Urban	0.78	0.82	0.79	0.80	0.74	0.76

Notes: Authors' tabulations using the NLSY79.

Table 3A
Random Effects Tobit Model of Male Moonlighting

Variables	Coefficient	S.E.	M.E. on Prob (Y>0)	M.E. on E(Y|Y>0)
Personal and Family Characteristics				
Black	2.355***	0.927	0.030	0.867
Other Race	1.828	1.776	0.023	0.675
Age	0.083	0.154	0.001	0.030
Highest Grade	1.307***	0.177	0.017	0.475
Married	-3.012***	0.784	-0.038	-1.088
Young Children	-4.602***	0.973	-0.058	-1.635
No. of Children	0.753*	0.428	0.010	0.274
Health Limitations	0.264	1.511	0.003	0.096
Past Non-labor Income	-3.05E-06	8.57E-06	-3.88E-08	-1.11E-06
Primary Job Characteristics				
Real Hourly Wage	-0.005	0.025	-6.00E-05	-0.002
Public Sector Job	1.107	0.929	0.014	0.405
Professional, Technical, Clerical	-2.132***	0.787	-0.027	-0.777
Craftsmen, Operatives, Laborers	-1.838	1.200	-0.023	-0.659
Tenure	0.278***	0.012	0.004	0.101
Tenure Squared	-5.21E-05***	2.46E-06	-6.60E-07	-1.89E-05
Regional and Time Related Factors				
Urban	1.179	0.940	0.015	0.429
Northeast	-29.059*	15.682	-0.342	-8.949
South	-12.886	11.897	-0.162	-4.556
West	12.973	17.457	0.162	5.095
Time Period 1979-85	**10.968*** **	**3.788**	**0.138**	**4.142**
Time Period 1986-92	**8.720*** **	**2.506**	**0.110**	**3.232**
Time Period 1993-99	**8.520*** **	**2.528**	**0.107**	**3.264**
Growth Non-farm Employment	**0.476**	**0.699**	**0.006**	**0.173**
Period 79-85*Growth NFE	**-0.780**	**0.740**	**-0.010**	**-0.284**
Period 86-92*Growth NFE	**-0.366**	**0.757**	**-0.005**	**-0.133**
Period 93-99*Growth NFE	**-1.584**	**0.981**	**-0.020**	**-0.576**
State PC Income	-0.001***	3.02E-04	-1.34E-05	-3.85E-04
Regression Fit Statistics	Observations		11391	
	Groups		3907	
	Wald Chi2 (78)		944.22	
	Log Likelihood		-32470.957	

Notes: All regressions include a constant term, state dummies and a time trend. Sales and services are used as reference categories for the primary job occupation. *** Signifies statistically different from zero at the 1% level, **at the 5% level and *at the 10% level.

Table 3B
Random Effects Tobit Model of Female Moonlighting

Variables	Coefficient	S.E.	M.E. on Prob (Y>0)	M.E. on E(Y|Y>0)
Personal and Family Characteristics				
Black	3.419***	1.043	0.035	1.167
Other Race	-1.518	1.875	-0.015	-0.505
Age	-0.040	0.177	-4.10E-04	-0.013
Highest Grade	1.123***	0.192	0.011	0.378
Married	-0.777	1.018	-0.008	-0.261
Young Children	-0.470	1.236	-0.005	-0.158
No. of Children	0.495	0.540	0.005	0.166
Health Limitations	0.125	2.150	0.001	0.042
Past Non-labor Income	5.22E-06	1.04E-05	5.33E-08	1.76E-06
Primary Job Characteristics				
Real Hourly Wage	-0.054**	0.027	-0.001	-0.018
Public Sector Job	5.809***	1.159	0.060	2.022
Professional, Technical, Clerical	-2.707***	1.072	-0.028	-0.903
Craftsmen, Operatives, Laborers	-6.116***	0.992	-0.062	-2.050
Tenure	0.325***	0.013	0.003	0.109
Tenure Squared	-6.01E-05***	2.48E-06	-6.14E-07	-2.02E-05
Regional and Time Related Factors				
Urban	-0.495	1.041	-0.005	-0.166
Northeast	-14.457	14.246	-0.144	-4.529
South	12.848	14.969	0.131	4.446
West	15.476	20.581	0.158	5.592
Time Period 1979-85	**25.013*** **	**4.388**	**0.253**	**9.027**
Time Period 1986-92	**19.311*** **	**2.950**	**0.196**	**6.733**
Time Period 1993-99	**9.738*** **	**2.944**	**0.100**	**3.440**
Growth Non-farm Employment	**1.435***	**0.820**	**0.015**	**0.483**
Period 79-85*Growth NFE	**-2.090****	**0.865**	**-0.021**	**-0.703**
Period 86-92*Growth NFE	**-2.184*** **	**0.884**	**-0.022**	**-0.734**
Period 93-99*Growth NFE	**-1.820***	**1.101**	**-0.019**	**-0.612**
State PC Income	-0.002***	3.50E-04	-1.85E-05	-0.001
Regression Fit Statistics	Observations		137448	
	Groups		4424	
	Wald Chi2 (78)		1114.97	
	Log Likelihood		-36825.782	

Notes: All regressions include a constant term, state dummies and a time trend. Sales and services are used as reference categories for the primary job occupation. *** Signifies statistically different from zero at the 1% level, **at the 5% level and *at the 10% level.

Table 4: Tobit Estimates of Moonlighting Cyclicality among Working Men and Women

Group	Computation	Men		Women	
		Probability	Hours(min.)	Probability	Hours(min.)
Cyclicality in 1979-85	$me_{grnfe} + me_{grnfe*period\ 1979-85}$	-0.004	-0.111 (-7 m.)	-0.004**	-0.22 (13 m.)
Cyclicality in 1986-92	$me_{grnfe} + me_{grnfe*period\ 1986-92}$	0.001	0.04 (2 m.)	-0.007**	-0.251 (15 m.)
Cyclicality in 1993-99	$me_{grnfe} + me_{grnfe*period\ 1993-99}$	-0.14	-0.403 (-24 m.)	-0.006	-0.129 (8 m.)
Cyclicality in 2000-02	me_{grnfe}	0.006	0.173 (10 m.)	0.015*	0.0483* (29 m.)

Notes: *** Signifies statistically different from zero at the 1% level, **signifies statistically different from zero at the 5% level and *signifies statistically different from zero at the 10% level. For the first three time periods in the table, the significance levels correspond to those from a joint significance Chi-square (2) test.

Appendix

Table A: Means and Standard Deviations

Variables	Women				Men			
	One Job		Moonlighting		One Job		Moonlighting	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
White	0.69	0.46	0.71	0.45	0.69	0.46	0.72	0.45
Black	0.25	0.43	0.24	0.43	0.25	0.44	0.23	0.42
Other Race	0.05	0.22	0.05	0.21	0.05	0.23	0.04	0.20
Age	27.49	6.58	28.42	6.46	27.35	6.54	28.63	6.73
Highest Grade	12.80	2.18	13.02	2.33	12.41	2.37	13.52	2.18
Married	0.46	0.50	0.41	0.49	0.40	0.49	0.39	0.49
Separated	0.05	0.21	0.03	0.17	0.03	0.18	0.04	0.20
Divorced	0.09	0.29	0.07	0.26	0.06	0.24	0.11	0.32
Widowed	0.00	0.07	0.00	0.03	0.00	0.04	0.01	0.08
Never Married	0.40	0.49	0.48	0.50	0.51	0.50	0.45	0.50
Young Children	0.32	0.47	0.24	0.43	0.24	0.43	0.22	0.41
No. of Children	0.94	1.12	0.67	1.07	0.63	1.04	0.84	1.14
Health Limitations	0.05	0.22	0.03	0.18	0.03	0.18	0.05	0.22
Previous Year Non-labor Income	17190.75	40122.81	13476.70	40006.20	13009.20	37993.54	16995.04	38280.87
Urban	0.80	0.41	0.80	0.41	0.79	0.41	0.81	0.40
Northeast	0.17	0.38	0.19	0.39	0.18	0.38	0.20	0.40
North Central	0.23	0.42	0.27	0.45	0.24	0.42	0.26	0.44
South	0.40	0.49	0.33	0.47	0.38	0.48	0.36	0.48
West	0.19	0.39	0.20	0.40	0.20	0.40	0.18	0.38
Time Period 1979-85	0.38	0.48	0.30	0.46	0.38	0.49	0.31	0.46
Time Period 1986-92	0.37	0.48	0.39	0.49	0.36	0.48	0.37	0.48
Time Period 1993-99	0.18	0.38	0.22	0.41	0.18	0.38	0.22	0.41
Time Period 2000-02	0.08	0.27	0.10	0.30	0.08	0.27	0.11	0.31
State PC Income	17759.55	6326.97	18900.42	6209.25	17795.71	6300.73	18902.96	6395.50
Growth Non-farm Employment	1.90	2.02	1.89	1.95	1.90	2.04	1.86	1.94
Real Hourly Wage	5.98	10.88	7.92	13.72	11.57	280.72	6.82	13.94
Public Sector Job	0.14	0.34	0.15	0.36	0.08	0.27	0.18	0.38
Professional, Technical, Clerical	0.54	0.50	0.35	0.48	0.25	0.43	0.60	0.49
Craftsmen, Operatives, Laborers	0.13	0.34	0.40	0.49	0.53	0.50	0.11	0.31
Sales and Services	0.30	0.46	0.22	0.41	0.19	0.40	0.26	0.44
Tenure	33.38	34.74	56.57	83.19	33.93	62.79	55.27	65.89
Hours in Non-primary Job	-	-	30.49	25.32	-	-	25.67	22.08