

# Labor Market Volatility and Worker Financial Wellbeing: An Occupational and Gender Perspective

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## ABSTRACT

One emerging but underexplored factor that is likely to contribute to group racial earnings disparity is unstable work schedules. This is often detrimental for hourly workers when volatility is frequent, involuntary, or unanticipated. Using data from 2005-2022 monthly Current Population Survey and its panel design, this study follows a group of hourly workers across a four-month period to assess whether labor market volatility relates to their financial well-being, focusing on low-wage care and service occupations as well as female workers and workers of color. The findings are threefold: In general, during economic expansion periods, nonwhite workers often benefit more in terms of wage growth compared to their white counterparts.

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Second, net of other characteristics, on average, greater volatility is associated with lower earnings, and this is mostly driven by those holding jobs in low-wage service sectors and health care support roles. Last, the earnings consequences of volatility vary significantly by the type of low-wage jobs a worker holds and their gender and race, but this is only true when volatility happens in a job. Specifically, when working within the same employment spell, female workers, particularly those of color and those working in low-wage service and care jobs, earn significantly less when facing greater volatility than their male counterparts or those working in non-service, non-care occupations.

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## Introduction

A consensus is growing that job quality is crucial to many facets of workers' lives and the post-pandemic labor market. In addition, the equity issues therein have put work volatility and wages on the forefront of social science research. Interest in understanding the economic effects of intrayear job churn and particularly work-hour instability has increased over the past decade; both affect not only workers' well-being but also employers' efficiency and the economy more broadly.

Over the past two decades, the United States (U.S.) has undergone drastic changes in labor market structures that have hampered job quality across many low-wage sectors. The deregulation and privatization of industry has also placed downward pressure on not only wages, but also work hours for low-income and middle-class workers.<sup>1</sup> In the early and mid-2010s, the U.S. job growth was more concentrated in lower-wage sectors, including food service, retail trade, and administrative support services. Over two out of five jobs created during this period were in low-wage industries.<sup>2</sup> Due to business shutdowns at the onset of the COVID-19 pandemic, some workers holding jobs in these sectors faced a higher risk of losing their jobs.<sup>3</sup> The workers who maintained their jobs kept communities safe and the economy running. However, many of these jobs entail not only low pay but also unanticipated work scheduling at the employer's discretion.<sup>4</sup> Consequently, hours volatility or employment churn often mark low-wage workers' labor market experience.<sup>5</sup>

Job churning and in-job hours insecurity have been prevalent within the low-wage market.<sup>6</sup> Even in the economic recovery following the Great Recession, low-income workers did not realize positive wage growth until the later part of the 2010s.<sup>7</sup> However, the pandemic further complicated the economic benefits that had slowly flowed to low-wage workers. They were overwhelmingly the backbone of the workforce at the onset of the pandemic—working in food, retail, warehouses, transportation, and health care services—and they were more likely people of color and low-educated women.<sup>8</sup> The stagnant wage growth that black and brown workers experienced during the 2000s coupled with the Great Resignation and labor shortage in low-wage service occupations that emerged during the pandemic recovery signal a need to better understand the relationship between volatile hours and long-term earnings.

Ample research in the past two decades provides evidence that the low economic well-being workers encounter and the racial differences thereof are mostly attributable to occupation

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<sup>1</sup> Hacker 2008

<sup>2</sup> National Employment Law Project (2014).

<sup>3</sup> Hardy, Hokayem, and Roll 2021

<sup>4</sup> Alexander and Haley-Lock 2015; Kalleberg et al. 2000; Lambert 2008

<sup>5</sup> Choper, Schneider, and Harknett 2022

<sup>6</sup> Howell and Kalleberg 2019

<sup>7</sup> Piketty, Saez, and Zucman 2018

<sup>8</sup> Chaganti et al. 2020

segregation, educational attainment, and other individual characteristics.<sup>9</sup> Although these characteristics are pivotal, this research appears to miss an important facet of the labor market story. Recent research on work schedules points to the racial and ethnic inequities in work scheduling before the pandemic.<sup>10</sup> Workers of color and less educated workers were more likely to lose a job during the pandemic.<sup>11</sup> In-job work scheduling changes and month-to-month job-to-job or episodic employment may entail frequent work hours volatility, which can affect workers' economic well-being, especially that of hourly workers and less advantaged workers.

Despite some progress, racial earning disparities persist in the United States.<sup>12</sup> Research on labor market experience does not explain the link between the volatility low-wage workers encounter and their earnings and it leaves open numerous pressing questions, such as what, if anything, can be done to reduce racial and ethnic differences in economic well-being. Racial differences in earnings could be a product of labor market experience (within and between jobs) that various groups of workers encounter, apart from other characteristics, such as occupational segregation, education factors, and total hours. However, researchers have not conducted longitudinal research to quantify this relationship (if there is any) and to unpack how the association varies by workers' race and ethnicity.

The present study uses nationally representative, longitudinally linked data to follow a group of hourly workers over four months to assess whether hours volatility links to workers' subsequent earnings. It further examines whether the earning effects of hours volatility vary by occupations, gender, and race/ethnicity. In addition, we contribute to ongoing research by disentangling within-job hours volatility from between-job hours variability and by determining how each affects workers' earnings. The findings will complement the growing evidence with regard to gender- and race-based workplace discrimination and has implications for policy development that would stabilize work hours and improve worker economic security.

We find that after adjusting for workers' characteristics, there is still a significant relationship between month-to-month hours volatility and workers' earnings. Higher hours volatility, defined as the top tercile of the volatility-index distribution, is linked with lower income earned subsequently. Further analyses reveal that the earnings consequences of volatility vary significantly by occupations. Specifically, even with steady employment, workers in sales, care, or service jobs earn substantially less than their counterparts working in non-service/non-care occupations when experiencing greater volatility. There appears to be gender and racial disparity in earnings according to the measures of experienced volatility. In general, women workers of color have a larger earnings penalty when facing greater volatility even after controlling for average hours worked.

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<sup>9</sup> Goldin and Katz 2010; Mouw and Kalleberg 2010

<sup>10</sup> Storer, Schneider, and Harknett 2020

<sup>11</sup> Hardy, Hokayem, and Roll 2021

<sup>12</sup> Aeppli and Wilmers 2022; Cheng et al. 2019; Semyonov and Lewin-Epstein 2009; Wilson and Rodgers 2016

## Background

### Unstable Work Hours Before and During the Pandemic

Although job growth in the aftermath of the Great Recession was strong by many measures, low-wage industry jobs expanded nearly twice that in some other mid-wage industries.<sup>13</sup> In the economic recovery following the pandemic, food-service work and low-wage health care and education aides are among the job categories that remain mostly vacant.<sup>14</sup> Thus far, the trends observed during the recoveries from both the Great Recession and the pandemic recession corroborate the prior claims that labor market structures and job characteristics have changed over the last few decades. This is not entirely surprising given the well-documented decline in union jobs, financialization, and firm restructuring in the U.S., which transformed the job market and increased the number of workers in the low-wage service and care sectors, making jobs less regular and stable, with fewer nonwage benefits.<sup>15</sup> Social scientists have long described these features as evidence of precarious work.<sup>16</sup>

One other equally important but under-researched facet of precarious work is hours insecurity. When the hours workers are scheduled are unpredictable and sometimes unknown until days, or even hours prior to going to work and changes are frequent or unanticipated, there are often detrimental impacts on workers' lives, which may trigger higher job turnover.<sup>17</sup> Even in the years with economic expansion immediately before the pandemic, job churn, inconsistent work hours, and the resulting income instability were common in the lives of workers holding non-managerial jobs in the retail service and home health care sectors.<sup>18</sup> Irregular work hours are a major source of short-term income instability or substantial income fluctuations.<sup>19</sup>

The income insecurity that these low-wage workers experience may result from in-job hours variability, job-to-job transitions, or both. As the economy plunged during the pandemic, some of these workers in low-wage sectors faced heightened risk of job loss. Hourly workers with minimal employment-related benefits, people of color, women, and immigrants disproportionately held these jobs;<sup>20</sup> indeed, workers holding jobs in frontline industries were significantly more likely to lose a job during the pandemic.<sup>21</sup> The workers remaining at work in food, retail, warehouses, transportation, and health care services continued faced heightened risk of viral exposure.

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<sup>13</sup> NELP 2014

<sup>14</sup> Gould and Kassa 2021

<sup>15</sup> DOL 2022; Western and Rosenfeld 2011

<sup>16</sup> Kalleberg 2011

<sup>17</sup> Choper, Schneider, and Harknett 2022

<sup>18</sup> Clawson and Gerstel 2014; Morduch and Schneider 2017

<sup>19</sup> Federal Reserve Board 2014; Morduch and Schneider 2014

<sup>20</sup> Chaganti et al. 2020

<sup>21</sup> Hardy et al. 2021

Many of these jobs, then dubbed “essential,” not only paid less with few benefits but also entailed unanticipated or last-minute changes in hours worked.<sup>22</sup> Scheduling work in the pandemic became even more stressful: workers might be called upon to cover for coworkers unable to work due to health or family caregiving needs. Thus, service workers continuously faced involuntary scheduling changes at the pandemic’s onset.<sup>23</sup> Despite the decrease in overall hours instability in 2022, involuntary hours volatility remained elevated for workers of color, less-educated workers, and those at the bottom of wage distribution, net of other characteristics.<sup>24</sup>

Furthermore, occupational segregation may have exacerbated volatility in the of low-wage markets, in which service and low-wage health care jobs are disproportionately held by women and workers of color. Indeed, the pandemic recession is the first time in U.S. history that women lost nearly two million more jobs than men. Furthermore, hospitality and food service jobs are primarily occupied by women;<sup>25</sup> there is a disproportionate number of black and Hispanic women in home health aide occupations.<sup>26</sup> The evidence suggests that the pandemic amplified horizontal segregation based on gender and race, with the leisure, hospitality, education, and health services sectors undergoing significant job losses.

### **Racial or Gender Differences in Work Volatility and Earnings**

Due to the swift government measures to mitigate pandemic-induced economic consequences, such as UI and generous child benefits, some groups managed to weather the negative consequences of labor market churn. However, others, such as some single individuals without dependents and undocumented immigrants, did not directly benefit from these public policies. Before the pandemic, even with the support of social insurance programs, the majority of U.S. workers relied on earned income as their primary financial resource, though many suffered from income instability and insufficiency.<sup>27</sup>

Volatility in work (caused by changes in jobs, earnings, and/or work hours) and, thereby, earnings is among the most plausible drivers for household income instability. In fact, nearly 70 percent of individuals experiencing unstable incomes did so as a result of either irregular work schedules or periods of unemployment in 2012.<sup>28</sup> Yet, most individuals report that they would prefer a stable, but low, income to a somewhat greater overall income with poor job security or work hours stability.<sup>29</sup> Economic insecurity and instability are not experienced evenly across populations. Frequent instability of work hours (either between jobs or within jobs) contributes to substantial income fluctuations, particularly for lower-income families without sufficient

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<sup>22</sup> Kalleberg et al. 2000; Lambert 2008

<sup>23</sup> Schneider 2021

<sup>24</sup> Cai 2023

<sup>25</sup> Department of Labor 2022

<sup>26</sup> Goubert, Cai, and Appelbaum 2021

<sup>27</sup> Finnigan 2018; Morduch and Schneider 2014

<sup>28</sup> Brown et al. 2014

<sup>29</sup> Hill et al. 2013; Morduch and Schneider 2017

savings. Among those raising children, Hispanic parents are more likely than their white counterparts to encounter earnings shocks, a decline of 20 percent or more in total earnings from one month to the next.<sup>30</sup> Such income fluidity can significantly undermine workers' savings in the long run and hinder upward mobility.<sup>31</sup>

Prior experimental studies have documented racial discrimination in the labor market.<sup>32</sup> Pager (2003), for example, found that Hispanic and Black job applicants have a lower likelihood of receiving a call-back than their white counterparts with comparable qualification, and the penalty is more salient for Black job seekers.<sup>33</sup> Further, for incumbent workers, even those staying with the same firm, workplace discrimination or manager discretion may put certain groups of workers in a more disadvantaged position.<sup>34</sup> Although, empirically, a handful of studies have suggested mixed results,<sup>35</sup> recent work using detailed firm-level data reveals racial bias may indeed exist in today's service-sector jobs with respect to precarious scheduling.<sup>36</sup>

Variations in work hours may also mirror some patterns observed in poverty. Relative to their white counterparts, individuals of color have much higher chances of experiencing episodic poverty over a three-year period, with family income falling below their poverty threshold for two consecutive months—about 5 to 22 percentage points higher.<sup>37</sup> Earnings contribute a large portion of a worker's income stream, especially for the low-wage workers. The disproportionate representation of people of color holding non-managerial service jobs may explain some of the persistent disparities in episodic poverty rates.

Historically, racial disparity in earnings has been largely attributable to human capital, occupation, or other demographic characteristics.<sup>38</sup> Even after considering these factors, black workers earn less than white workers.<sup>39</sup> Although the labor market has made progress in the last decade in narrowing racial differences in earnings, a significant disparity remains in today's job market.

Work-hour instability may be an important factor that can contribute to our understanding of disparities. Given the findings with respect to racial inequality in economic well-being and the state of the labor market, it is plausible that beyond occupational effects and the number of hours worked, there might be a link between work-hour instability and workers' subsequent earnings. Workers may not be able to improve their economic well-being, particularly when instability in hours worked or labor-market flow is frequent.

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<sup>30</sup> Cai and Fremstad 2021

<sup>31</sup> Hill et al. 2017

<sup>32</sup> Pager 2003; Pager and Shepherd 2008

<sup>33</sup> Quillian et al. 2017

<sup>34</sup> Lambert and Henly 2012; Wood 2018

<sup>35</sup> Ruetschlin and Asante-Muhammad 2015; Swanberg, Watson, and Eastman 2014; Finnigan and Hunter 2018

<sup>36</sup> Storer, Schneider, and Harknett 2020

<sup>37</sup> Warren and Tettenhorst 2022

<sup>38</sup> Goldin and Katz 2010; Mouw and Kalleberg 2010

<sup>39</sup> Wilson and Rodgers 2016

Two potential mechanisms may explain why volatility might be linked to lower earnings. Work-hour volatility may entail spikes, dips, or both within a short period. It is reasonable to expect that modest instability might not be harmful for one's economic well-being. However, constant fluctuations in the number of hours worked could be a source of economic insecurity, especially for those paid by the hour. In fact, instability and insecurity in work schedules are associated with workers' financial insecurity and material hardship.<sup>40</sup> Further, even if workers gain hours, the length of time they can maintain those hours is unknown.

On the other hand, today's private employers may impose last-minute cancellations or on-call jobs to minimize their administrative costs. Prior research reveals that nearly half of retail workers between the ages of 26 and 32 reported a difference of about 10 hours between weeks.<sup>41</sup> This was further confirmed in a more recent study.<sup>42</sup> Workers with unfavorable scheduling are increasingly experiencing higher job turnover.<sup>43</sup> Workers might not have a new job ready when they are let go and job changes may introduce temporary work hours shocks or workers may have new jobs where hours volatility persists. A recent study using quarterly data finds that one out of two low- or moderate-income households experience job instability over the course of one year, and approximately 15 percent experience job loss without subsequent job gains during the same year.<sup>44</sup> Thus, it is plausible that intermittent employment may lead to lower levels of economic well-being.

### **Measuring Unstable Work Hours**

While researchers have increasingly realized the importance of hour instability for workers' economic well-being, fewer studies have investigated economic outcomes resulting from short-term hour instability or employment churn, partly due to limited suitable national-level survey data. Even with longitudinal datasets, such as NLSY and PSID, respondents are usually surveyed annually or biannually. This makes such data less appropriate for studying such topics. The SHIFT project has started to recruit respondents for a group of targeted low-wage service-sector workers, who are mostly impacted by hour insecurity and have less power in the labor market, more frequently within a shorter period. Nationally representative data sets fielded by the Census Bureau include the CPS data, which have a rotation panel that follows workers across four consecutive months and collects information on hours worked in each month within that four-month time window. Additionally, the SIPP data are based on detailed labor-market information and benefit receipt every four months or monthly over the course of a year (depending on the panel selected).

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<sup>40</sup> Golden 2015; Schneider and Harknett 2019

<sup>41</sup> Lambert et al. 2014

<sup>42</sup> Schneider and Harknett 2019

<sup>43</sup> Choper et al. 2022)

<sup>44</sup> Cai et al. 2023



Hour volatility could stem from either job-to-job transitions or in-job hours, both of which may influence the variability of hours worked from month to month and, consequently, financial security. Prior studies on work-hour instability have mostly measured employment changes based on between-job instability (job loss or gain), nonstandard work schedule (full and part time), day and night shifts, and frequent job changes.<sup>45</sup> However, relying solely on measures such as nonstandard work schedules or job transitions may not sufficiently capture unanticipated aspects of hours instability; in other words, it may not portray the nuances of the magnitude of such instability.

Looking specifically at within-job hours instability, some prior research has used dichotomous variables in surveys that asked directly whether respondents had experienced job shocks or whether their hours worked had varied since the previous survey.<sup>46</sup> Additionally, the difference between the maximum and minimum numbers of hours workers reported having worked each week is another measure the researchers have been using to understand within-job instability.<sup>47</sup>

Although this type of measure captures respondents' perceptions of hour variability they might have experienced, it tends to underestimate the actual volatility an individual might encounter in the labor market. It may not be the most effective way to understand short-term variation if a worker works some number of hours between the reported maximum and minimum range and that information does not get utilized; researchers cannot quantify the magnitude of such variation over time. In addition, reported varying hours tend to be positively correlated with more desirable flexibility according to the respondents' own choice,<sup>48</sup> signaling that this type of dummy variable might not be the best approach for understanding the unfavorable volatility that some workers experience due to involuntary variations in hours. Beyond the direct survey questions asking about respondent households' employment or hour status, another line of research has drawn upon longitudinal data to quantify the actual variability in number of hours a worker might work over time. To date, only one study has examined short-term work instability using this approach.<sup>49</sup>

In the spirit of this recent work, the present study contributes to the ongoing research by capturing month-to-month hour variability to understand how the magnitude of volatility shapes workers' earnings. Further, we also conceptualize variability by calculating the frequency of month-to-month hour reduction a worker experiences across a four-month time window. Furthermore, the findings will provide evidence to supplement previous literature on labor market discrimination by unpacking within-job racial bias. We move beyond how hours volatility is perceived to understand the income implications of how it is experienced.

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<sup>45</sup> Morduch and Schneider 2017; Wolf et al. 2014

<sup>46</sup> Finnigan and Hale 2018; Lambert et al. 2014

<sup>47</sup> Schneider and Harknett 2019

<sup>48</sup> Lambert et al. 2014

<sup>49</sup> LaBriola and Schneider 2020

## Data and Methods

The study employs the panel subsample of the Current Population Survey (CPS). The CPS is a nationally representative survey that is widely used in labor economics. It is employed, for example, to compute the official monthly unemployment rate from the Bureau of Labor Statistics. The data is accessed through IPUMS.<sup>50</sup> The CPS interviews the same (subset) individuals over four consecutive months and they are again re-interviewed for another four months after an eight-month gap—a 4 in, 8 out, 4 in monthly design. This study focuses on the four-month periods (regardless of whether it is first entry or re-entry to the survey). We limit the sample to non-elderly hourly workers (ages 19 and older) who reported being employed at the start of the interview over a four-month period between 2005 and 2022. The sample excludes workers who miss work or work part-time due to taking a vacation/holiday, going to school, or experiencing chronic health problems, as we are mainly interested in capturing an involuntary non-health-related aspects of work-hours instability. Following prior research, we also do not include workers who only have proxy labor-market status instead of their own report. Pursuant to this restriction, the sample includes 267,013 unique observations.

*Key predictor:* The study measures volatility in hours worked using the standard deviation of the arc percent change of hours across four months. It is operationalized in the form:  $v_i =$

$\sqrt{\text{var}\left[\frac{HR_{sit} - HR_{sit-1}}{Y}\right]}$  where  $v_i$  is the average volatility index for worker  $i$  in a given four-month time window.  $HR_{sit}$  and  $HR_{sit-1}$  denote weekly hours worked for all jobs worker  $i$  reported at month  $t$  and  $t-1$ , respectively. The denominator,  $Y$ , uses a midpoint approach in order to reduce the impact of large changes in total hours worked between waves. As a sensitivity check, we also use the coefficient of variation approach, by dividing the standard deviation of a worker's hours by their average hours across the four-month period (results available upon request). The approaches are used in prior studies on income volatility.<sup>51</sup> Further, instability is treated as a categorical variable for the regression analyses; to better understand how the intensity or extent of instability workers experience matters for their financial well-being, we use tercile of the volatility index distribution to define low, moderate, and high instability.

*Outcome variable:* Our primary outcome of interest is workers' reported weekly earnings at the last month observed. Earnings are adjusted for inflation and presented in 2020 dollars and are log-transformed.

*Covariates:* Low-wage occupations and the intersection of gender and race are two key covariates of interest. Specifically, six categories of occupation type are created: (1) healthcare support, (2) food preparation and serving, (3) other care and service jobs, (4) sales and related, (5) manufacturing- or production-related jobs, and (6) all other occupations. The last two groups mainly serve for comparison, given that the intensity of volatility may have different

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<sup>50</sup> Flood et al., 2020

<sup>51</sup> Gennetian et al. 2015; Ziliak, Hardy, and Bollinger 2011

implications for workers holding different jobs (the detailed groupings based on CPS 2010 occupation classification and available upon request). Regarding the intersection of gender and race, eight demographic groups are created according to a worker's race, ethnicity, and gender. Other sociodemographic variables considered in this study that may affect one's earnings include workers' ages (19-24, 25-35, 36-54, and 55 or above), marital status, parenthood status, and education level (comprising four categories: less than high school, high school diploma, some college, and college and above), job-related factors, such as the average number of hours worked, whether a job is covered by a union, industry, and region of residence. To separate the observed volatility that happens within a job from that associated with labor market transition, we create an indicator denoting whether workers ever change jobs within the four-month period.

## Methods

The analysis begins with a series of descriptive charts showing patterns of volatility and earnings over time for hourly workers as a whole and those working in specific low-wage jobs (as described above). To address the question – whether there is a relationship between hours' volatility and workers' subsequent financial well-being – we ran models using ordinary least square estimation to predict workers' earnings during the fourth reference month for the key predictor – volatility level. In addition to estimating this model using the full sample, we also separately estimate models for major occupation categories: (1) healthcare support and other service jobs, (2) food serving and sales related jobs, and (3) other jobs. There are two specifications. First, we include workers' demographic and job-related characteristics. We then further include state of residence and time fixed effects in the model. The model to be estimated is:

$$Y_{it4} = \beta_0 + \beta_1 VolatilityLevel_i + \beta X_i + \beta Z_i + \gamma_s + \mu_t + \epsilon_{ist4} \quad (1)$$

where  $Y_{it4}$  is earnings reported by worker  $i$  in state  $j$  at time  $t4$ .  $\beta_1 VolatilityLevel_i$  denotes low-, moderate-, or high-instability of worker  $i$ .  $X_i$  is a list of covariates representing worker  $i$ 's other sociodemographic background, including race and ethnicity, sex, age, marital status, education level, parenthood status.  $Z_i$  is a vector of control representing worker  $i$ 's job-related characteristics, including average hours worked, union coverage, whether a worker maintains the same job, occupation, and industry.  $\gamma_s$  consists of state indicators.  $\mu_t$  denotes month and year fixed effects. In our second question, we add interaction terms to test whether and how earnings consequences of volatility vary by a worker's occupation.

$$Y_{it4} = \beta_0 + \beta_1 VolatilityLevel_i + \beta_2 OCC_i + \delta(VolatilityLevel_i * OCC_i) + \beta X_i + \beta Z_i + \gamma_s + \mu_t + \epsilon_{ist4} \quad (2)$$

where  $\delta$  represents a set of coefficients of interest. We run models separately for those who maintained the same jobs and those who changed jobs to better understand if there are differences between within-job work hours variability and volatility associated with labor market flow. Last, the study examines how the aforementioned relationship between volatility and

earnings differs by race and gender. To this end, we substitute the previous occupational interaction term with ( $VolatilityLevel_i * GenderRace_i$ ). Using our preferred specifications with states, time-fixed effects, and a full set of covariates, we re-estimate the linear models to assess if any racial/ethnic and gender groups exhibit lower or higher earnings.

## Results

Table 1 summarizes the key outcomes of interest as well as the demographic and economic characteristics of hourly workers, covering both the entire sample and the subsamples of varying instability levels. Nearly one fourth of the sample experienced at least one substantial hours cut, defined as 20 percent reduction in work hours. The majority, 76 percent, of workers in the highest volatility quartile encounter such an event. Further, their month-to-month instability index is more than triple the sample average. Reported earned income at month four does not vary much from the average for those from the bottom half of volatility distribution. However, compared with the average, those in the 3<sup>rd</sup> quartile have slightly higher subsequent earnings, while workers with the greatest volatility have lower earned income at month four. Nine out of ten workers did not change jobs across the time window examined. Roughly 15 percent of the sampled workers had a union job. Workers with the most volatile hours had lower education attainment and were more often service job holders. Other basic demographic characteristics reveal that nearly three out of four workers were in their prime years (ages 25 to 54), and older workers comprise around 20 percent of the sample. On average, the analytic sample consists of over 60 percent white workers. Black and Hispanic workers make up 16 and 14 percent of the sample, respectively. Another 9 percent reported as Asian American or Pacific Islander (AAPI) or other race.

[Table 1 About Here]

We then proceed by showing the pattern, across time, in volatility and earnings among all wage workers (see Figure 1). Our analyses revealed that an estimated 67 percent of wage workers experienced volatility nationwide. Descriptively, we observe a negative association between hours volatility and a worker's economic well-being, except for the pandemic year. The panels of Figure 2 report trends in work hours volatility and earnings by race-ethnicity. Though volatility spiked during the pandemic for all wage workers, the spike was more acute for people of color, most notable among Hispanic workers and those identifying as Asian American or other racial-ethnic group. This is a bit different than the longer-term trend showing Black and Hispanic workers with the greatest variability. Wages, which were already highest among white and Asian workers, grew for all groups, but relatively slowly among Hispanic workers in the recent two years.

[Figures 1 and 2 About Here]

The panels of Figure 3 show patterns of volatility and earnings for major occupation categories. All groups of workers experienced wage increase in the prosperous period before the COVID-19

pandemic. These continued through the pandemic as most of the workers in care or services jobs were often essential to meeting individuals and families' basic needs. The patterns of earnings and volatility were generally similar for all groups of workers, but ones working in production-related occupations and non-care/non-service jobs appear to have much higher earnings.

[Figure 3 About Here]

### **Greater Volatility Links to Lower Economic Well-Being**

Table 2 reports results from regressions of earnings on the key predictors of interest, both without and with a full set of job-related characteristics and with state and time fixed effects (the first two columns). The study also differentiates the sample into hourly workers working in low-wage healthcare or service-related occupations, food serving or sales-related occupations, and other jobs, as the last three columns show. Results suggest a clear relationship between work-hour volatility and a worker's financial well-being. Net of other characteristics, higher volatility is associated with lower earnings, and the relationship is mainly driven by those who work in care or service occupations. For example, for those who holding healthcare support jobs, compared to their peers with stable hours throughout, experiencing high instability was associated with a 16 percent decrease in earnings (see Model 3 in Table 2). This earnings reduction is even larger for those working in food serving or sales-related jobs, with the top tercile in volatility being associated with a 17 percent decrease in earnings, whereas for hourly workers in other non-service/non-care occupations, facing high instability was linked to a 7 percent decrease in earnings.

[Table 2 About Here]

Regarding potential heterogeneity across occupations, Table 3 presents results for job stayers and job switchers separately. Note that for those who change jobs (whether it is in the same occupation category), the occupation denotes their first reported job at the time of the interview. It is interesting to observe that the earnings difference of volatility experience, indeed, varies significantly by worker's occupation, but this is only true when instability occurs in the same job. This may suggest that those who change jobs experience volatility, whether by choice or constraint. Specifically, for hourly workers in non-care/non-service occupations, high instability in work hours correlated to about 9 percent earnings reduction. For those in sales, care, or service jobs, the same volatility was associated with a larger earnings penalty whereas for ones working in manufacturing- or production-related jobs, the earnings penalty was much smaller, nearly zero. The regressions in Table 3 also point to consistent racial-ethnic disparities, with Black and Hispanic workers realizing the lowest wages within a job.

[Table 3 About Here]

Table 4 reports how gender and race differences in earnings vary by volatility experience. There is significant racial and gender disparity in earnings when volatility happens within a job. For

white male workers, high instability in work hours correlated to about 6 percent earnings reduction. For female workers (regardless of their race or ethnicity), the same volatility was associated with a much higher earnings penalty, and this is more salient for black workers. However, for those who switched jobs, we do not find any significant gender or race differences in the association of earnings to volatility. Again, it may be that job changes are associated with voluntary or involuntary changes in hours triggering the shock. Given the observed occupational, gender, and racial-ethnic differences in the effect of within-job hours volatility, we illustrate findings from these models in Figure 4.

[Table 4 and Figure 4 About Here]

### **Robustness**

We conduct a variety of robustness check. First, we replicate analysis using an alternative measure—the coefficient of variation method—to capture hour volatility. The relationship between hours instability and earnings operates in the same direction, and the point estimates are nearly identical. Specifically, women workers are consistently found to earn less than their white male counterparts when facing within-job greater variability in work hours, and the effect is more pronounced for black workers. Further, to reduce concerns regarding temporal ordering between predictors and outcome examined, we utilize a worker’s initial three-month data to compute the work hours instability index and retest whether volatility in hours is predictive of their earned income in the fourth month. We find that the relationship between instability and subsequent earnings operate in the same direction, but with slightly lower point estimates than previously reported. Finally, slightly less than one third of workers do not have any form of instability in work hours, thus, we also run the analysis by restricting the sample to workers with instability experience. This yields similar findings with larger magnitude observed (all results available upon request).

### **Discussion and Conclusion**

Over the past few decades, the compositional shift in the U.S. workforce toward more service sector jobs often made work less stable. Both the adoption of on-call scheduling practices in many retail and services jobs and the involuntary employment instability influence workers’ non-work lives, but more importantly, they might impact their financial well-being. Studies on unpredictable scheduling and job churn have revealed significant different experiences various types of workers face with people of color experiencing a higher likelihood of encountering layoffs and scheduling instability on the job. Research on earnings or the wage gap according to a worker’s race has generally revealed the difference of an occupation or class divide. No study has documented the consequences of frequent involuntary hours instability for workers’ economic well-being, as measured through their earnings, or how the relationship differs by racial groups and across time.

To complement this knowledge, we draw insights from both lines of research and take advantage of the rotation panel design from the CPS, one of the few data sets that provide information on workers' hours worked on a monthly basis. We analyze the associations between month-to-month variability in work hours and workers' financial well-being, separating the effects stemming from in-job schedule changes from those having variable hours because of job switching. The study pays particular attention to various groups of workers according to their occupations, gender, and race or ethnicity.

This analysis provides new knowledge to our understanding on work schedule uncertainty and its implications for workers' economic security in several ways. First, in the U.S. workforce, inconsistent work hours has become a common phenomenon for hourly workers. About four out of six wage workers experience involuntary month-to-month hours instability. Over one-third of them have had their hours cut by at least 20 percent from one month to the next. Second, we find that work hours fluctuation, when it is large in magnitude and involuntary, may reduce subsequent earned income, even after we account for a worker's individual and job characteristics, including average hours worked. This finding is more salient for those holding sales, care, or service jobs.

Third, although we find evidence of occupational and gender/race disparity in earnings as a result of hours volatility, this result is only significant when the instability happens in a job. Specifically, when staying in the same job, compared to white male workers, black workers have been found to have a substantially lower level of earnings when facing greater month-to-month hours instability, followed by Hispanic and AAPI female workers. That is, the implications of work hours volatility seem to be greater for those remain in the same employment spell, at least in terms of earnings.

In general, black workers have larger earnings penalty when facing greater volatility. These results also complement the expanding literature on racial bias or discrimination in the labor market and how it shapes workers' economic well-being.<sup>52</sup> The descriptive finding that workers identifying as Hispanic and AAPI see greater variability in hours worked, both during the pandemic and its recovery, may confirm that low-wage service sectors employing overwhelmingly workers of color underwent drastic layoffs and erratic work hours. Indeed, our data show that Hispanic workers are overrepresented in sectors that are more likely to be influenced by seasonality, such as agriculture and construction; they are also more likely to hold jobs in personal services. Similarly, AAPI workers disproportionately work in retail or service-related industries. Also, the fact that AAPI workers are more likely to run small businesses may put them in a more precarious situation during the pandemic period due to high cost of the lockdown and the subsequent sharp decline in demand.

The findings regarding gender and race-based earnings differences as a function of within-job hours volatility may have direct policy implications that may help promote workplace equity. For

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<sup>52</sup> Neumark 2018; Pager, Bonikowski, and Western 2009

example, the finding that black workers earn significantly less as a result of greater hour instability may provide supporting evidence that workplace specific discrimination may exist. Unlike wages, work hours are still largely unregulated in the U.S. private sector job market, which may further marginalize disadvantaged workers with less bargaining power and those residing in regions where worker organizing and work protection is relatively weak. To combat such a phenomenon and improve job quality across places, it is critical to consider laws such as the Fair Workweek Ordinance, in which employers are mandated to give workers notice of any changes in hours at least two weeks in advance, provide predictable pay for any employer-driven changes to workers' original schedules, and release available hours to current employees before hiring, among several other provisions. Currently, only a handful of municipalities and one state have implemented similar laws. Although a few earlier studies, through qualitative interviews and empirical analysis, suggest the law's positive effects on workers' health and parenting outcomes,<sup>53</sup> more research is needed to understand more thoroughly its effectiveness in stabilizing hours worked and boosting workers' economic well-being.

Several limitations of the study are worth mentioning. First, because the analysis relies on the data's longitudinal design, some groups of respondents may be more likely to drop out of the survey and may not be linked across the four-month window. The analysis could understate the magnitude of the negative relationship between hours instability and earned income. It is also worth noting that work hours volatility may not necessarily be a characteristic of a poor-quality job because it could solely entail an increase in hours, leading to a better earnings situation. However, the negative relationship that emerged in the study suggests that regardless of directional shift, when hours variability is frequent and involuntary, workers fare no better in terms of their economic well-being. More research is needed to understand this association.

Second, although the current analysis controls for a worker's job-related characteristics, the observed relationship between hours instability and a worker's subsequent earnings – in particular, the racial difference emerging among job stayers – could emerge due to some other workplace factors. However, the current data do not provide fine-grained information about workers' employers, their direct managers, or their job tenure at a workplace, which might influence the wages workers receive at work. The findings warrant future research to understand why significant earning differences might exist for workers with different racial and ethnic backgrounds, the extent to which these differences are shaped by employer-specific characteristics, such as direct supervisors, working in urban vs. rural areas. Although one may anticipate a relatively high prevalence of unfavorable instability in the low-wage service industry according to previous research, it is also worth conducting sectoral analysis to quantify specific wage impacts of irregular work hours to fully build on evidence that supports full-stream workforce development.

Last, even after we adjusted for a rich array of covariates, a significant relationship between hours instability and racial earnings difference remained. This finding may signify some form of

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<sup>53</sup> Ananat et al. 2022; Loustaunau, et al. 2020; Schneider and Harknett 2019



race-based workplace discrimination. Because one of the critical determinants of living standards for workers, particularly those paid hourly, is earned income, racial differences in work remain one of the most enduring aspects of income inequality. Unpredictable scheduling issues or job flows and the racial disparity thereof are relatively less developed as a dimension of precarious work. Future research could consider applying a propensity score matching approach to examine economic outcomes for workers with similar backgrounds and the same level of volatility experience. Researchers may also consider conducting field experiments to understand more clearly forms of systematic of discrimination that might continue to influence low-wage and hourly workers' labor market experience.

With that in mind, this study adds to the effort to address the salient insufficiency of data on short-term work instability and research intended to help understand how involuntary or unanticipated hour volatility influences workers' economic well-being. The results expand our understanding of the growing spread of work-hour volatility and add a new layer of considering racial and ethnic equity in terms of workers' wages. Although closing the racial earnings gap thoroughly remains arduous, the negative relationship between unanticipated work-hour volatility and workers' earnings unveils one more plausible policy solution to advance equity at the workplace.

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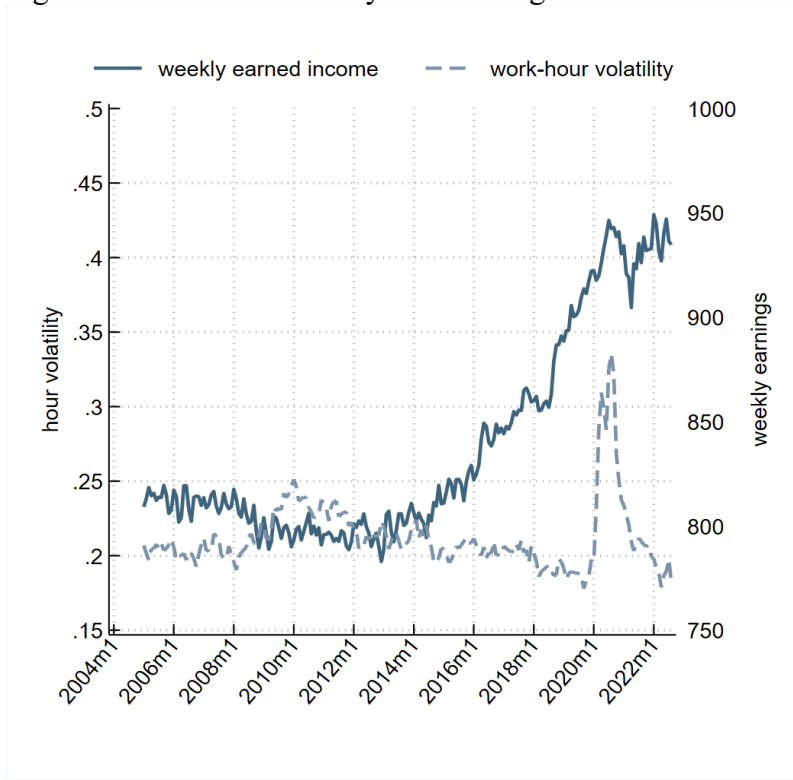
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Figure 1. Trends in Volatility and Earnings Over Time

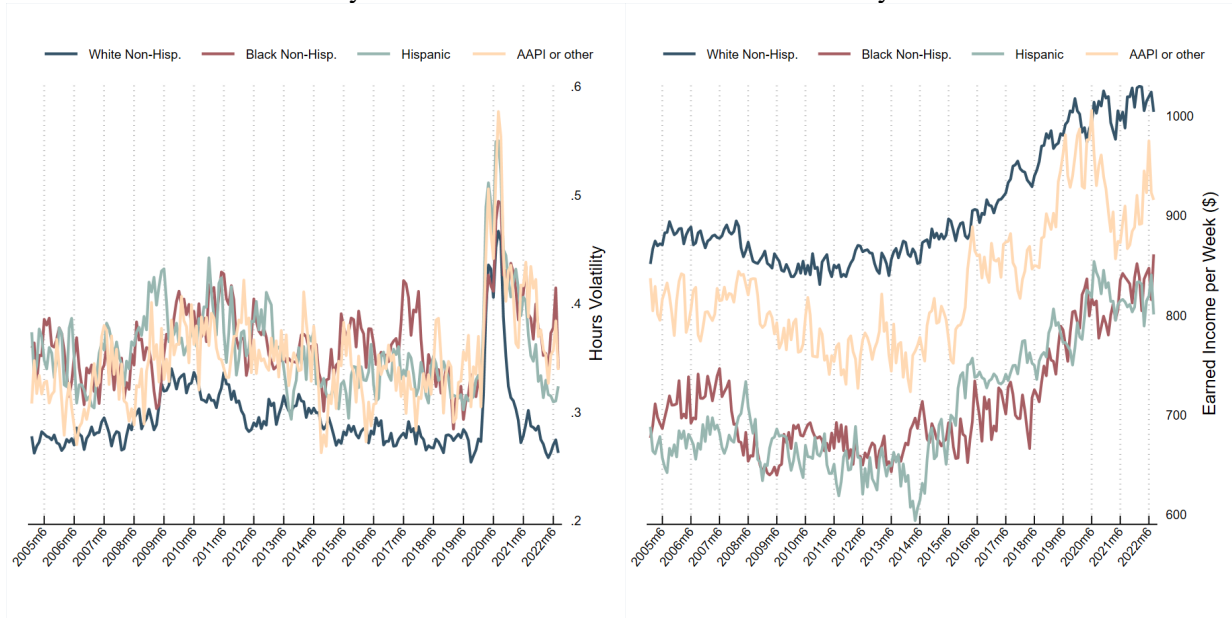


Source: Data based on the monthly Current Population Survey 2005-2022

Figure 2. Trends in Volatility and Earnings, by Race/Ethnicity

Panel A – work hour volatility

Panel B – weekly earned income



Source: Data based on the monthly Current Population Survey 2005-2022

Figure 3. Trends in Volatility and Earnings, by Occupations

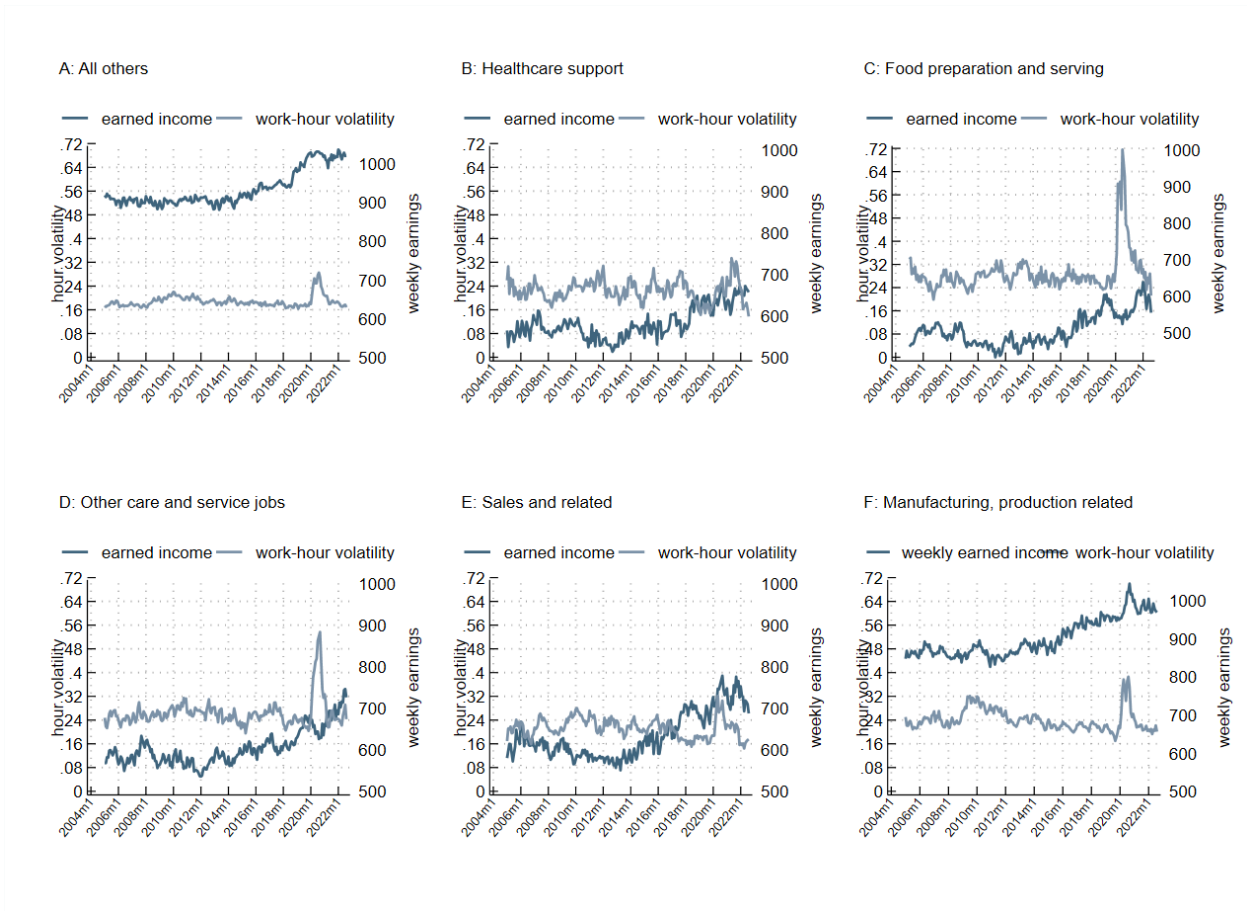




Table 1. Summary Statistics by Volatility Quartile

	All	Lowest quartile	2 <sup>nd</sup> quartile	3 <sup>rd</sup> quartile	Highest quartile
Hour volatility	0.21 (0.4)	0.00 (0.0)	0.05 (0.02)	0.14 (0.04)	0.68 (0.61)
Substantial hours cut	0.24	0.00	0.00	0.21	0.76
# of large hours cut	0.27 (0.4)	0.00 (0.0)	0.00 (0.08)	0.22 (0.43)	0.85 (0.55)
Stay with the same job	0.90	0.94	0.96	0.95	0.74
Earnings per week	839.70 (516.0)	831.47 (470.7)	856.39 (490.3)	892.17 (538.4)	788.30 (561.6)
Average hours worked	40.01 (9.67)	38.96 (7.05)	41.73 (6.92)	42.94 (8.5)	37.38 (13.6)
Job covered by union	0.15	0.14	0.13	0.16	0.16
<b>Worker Characteristics</b>					
Female	0.50	0.52	0.52	0.47	0.50
Age: 19-24	0.07	0.06	0.07	0.08	0.09
Age: 25-35	0.27	0.26	0.26	0.27	0.28
Age: 36-54	0.45	0.46	0.45	0.45	0.44
Age: 55 or over	0.21	0.22	0.21	0.20	0.19
White	0.61	0.57	0.67	0.64	0.60
Black	0.16	0.18	0.13	0.14	0.17
Hispanic	0.14	0.15	0.12	0.13	0.14
Others	0.09	0.10	0.08	0.08	0.09
Less than high school	0.09	0.09	0.08	0.09	0.11
High school diploma	0.34	0.36	0.33	0.33	0.33
Some college	0.36	0.34	0.38	0.37	0.35
College or above	0.21	0.21	0.22	0.21	0.21
Unmarried	0.55	0.53	0.55	0.56	0.58
Have children present	0.34	0.34	0.32	0.33	0.35
<b>Broad Occupation Categories</b>					
Professional and related	0.25	0.26	0.26	0.25	0.22
Services and related	0.20	0.19	0.18	0.20	0.25
Sales and related	0.08	0.07	0.09	0.08	0.08
Office and admin support	0.17	0.21	0.19	0.15	0.12
Observations	267,013	86,310	48,018	65,789	66,896

Source: Authors' calculation from the monthly Current Population Survey 2005-2022. Note: Mean (SD) or proportion presented. Work-hour volatility is calculated as the standard deviation of the arc percent change of household's total work hours. A substantial hours-cut is defined as a decrease in work hours by at least 20 percent from one month to the next. Earnings constant in 2020 dollars.

Table 2. Linear Models Predicting Earnings

	All	All	Healthcare support, other care/service jobs	Food serving and sales related jobs	Other jobs
Volatility, 2 <sup>nd</sup> tercile	-0.03*** (0.00)	-0.03*** (0.00)	-0.07*** (0.01)	-0.07*** (0.01)	-0.02*** (0.00)
Volatility, 3 <sup>rd</sup> tercile	-0.10*** (0.00)	-0.10*** (0.00)	-0.16*** (0.01)	-0.17*** (0.01)	-0.07*** (0.00)
Black	-0.09*** (0.00)	-0.10*** (0.00)	-0.06*** (0.01)	-0.06*** (0.01)	-0.12*** (0.00)
Hispanic	-0.05*** (0.00)	-0.09*** (0.00)	-0.04*** (0.01)	-0.06*** (0.01)	-0.12*** (0.00)
Asian or others	-0.02*** (0.00)	-0.06*** (0.00)	-0.05*** (0.01)	-0.04*** (0.01)	-0.07*** (0.00)
Female	-0.16*** (0.00)	-0.16*** (0.00)	-0.12*** (0.01)	-0.14*** (0.01)	-0.15*** (0.00)
Age: 25-35	0.14*** (0.00)	0.14*** (0.00)	0.11*** (0.01)	0.11*** (0.01)	0.16*** (0.00)
Age: 36-54	0.23*** (0.00)	0.22*** (0.00)	0.13*** (0.01)	0.16*** (0.01)	0.26*** (0.00)
Age: 55 or over	0.22*** (0.00)	0.21*** (0.00)	0.12*** (0.01)	0.14*** (0.01)	0.24*** (0.00)
Have children present	0.01*** (0.00)	0.02*** (0.00)	0.01 (0.01)	0.01 (0.01)	0.02*** (0.00)
Unmarried	-0.04*** (0.00)	-0.04*** (0.00)	-0.04*** (0.01)	-0.04*** (0.01)	-0.04*** (0.00)
High school diploma	0.14*** (0.00)	0.14*** (0.00)	0.11*** (0.01)	0.09*** (0.01)	0.16*** (0.00)
Some college	0.19*** (0.00)	0.18*** (0.00)	0.18*** (0.01)	0.12*** (0.01)	0.23*** (0.00)
College or above	0.35*** (0.00)	0.33*** (0.00)	0.37*** (0.01)	0.22*** (0.01)	0.44*** (0.01)
Average hours worked	0.02*** (0.00)	0.02*** (0.00)	0.02*** (0.00)	0.03*** (0.00)	0.02*** (0.00)
Job covered by union	0.19*** (0.00)	0.17*** (0.00)	0.13*** (0.01)	0.15*** (0.01)	0.17*** (0.00)
Work with the same job	-0.08*** (0.00)	-0.08*** (0.00)	-0.06*** (0.01)	-0.10*** (0.01)	-0.06*** (0.00)
Occupation controls	x	x	-	-	-
Industry controls	x	x	x	x	x
Year and month fixed effects		x	x	x	x
State fixed effects		x	x	x	x
Constant	5.69*** (0.01)	5.61*** (0.01)	5.45*** (0.04)	5.36*** (0.09)	5.31*** (0.02)
Observations	267,013	267,013	33,972	36,359	196,682
R-squared	0.38	0.39	0.32	0.35	0.29

Robust standard errors in parentheses \*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, † p&lt;0.10

Table 3. Linear Models Predicting Earnings (interaction models – volatility and occupation)

	Within job	Within job	Between job	Between job
Volatility, 2 <sup>nd</sup> tercile	-0.02*** (0.00)	-0.02*** (0.00)	-0.14*** (0.02)	-0.14*** (0.02)
Volatility, 3 <sup>rd</sup> tercile	-0.10*** (0.00)	-0.09*** (0.00)	-0.16*** (0.01)	-0.16*** (0.01)
Healthcare support jobs	-0.20*** (0.01)	-0.24*** (0.01)	-0.22*** (0.04)	-0.25*** (0.04)
Food preparation and serving	-0.32*** (0.01)	-0.22*** (0.01)	-0.34*** (0.04)	-0.20*** (0.04)
Other care and service jobs	-0.24*** (0.01)	-0.25*** (0.01)	-0.34*** (0.03)	-0.32*** (0.03)
Sales and related jobs	-0.21*** (0.01)	-0.11*** (0.01)	-0.33*** (0.03)	-0.18*** (0.03)
Manufacturing, production related	-0.02*** (0.00)	-0.06*** (0.00)	0.06** (0.02)	-0.04† (0.02)
Volatility 2 <sup>nd</sup> tercile x Healthcare support jobs	-0.02* (0.01)	-0.02* (0.01)	-0.03 (0.06)	-0.01 (0.06)
Volatility 2 <sup>nd</sup> tercile x Food preparation and serving	-0.05*** (0.01)	-0.03** (0.01)	-0.04 (0.05)	-0.02 (0.05)
Volatility 2 <sup>nd</sup> tercile x Other care and service jobs	-0.06*** (0.01)	-0.06*** (0.01)	0.03 (0.04)	0.04 (0.04)
Volatility 2 <sup>nd</sup> tercile x Sales and related jobs	-0.04*** (0.01)	-0.04*** (0.01)	0.09* (0.04)	0.08* (0.04)
Volatility 2 <sup>nd</sup> tercile x Manufacturing, production related	0.01* (0.01)	0.02** (0.01)	-0.09* (0.03)	-0.06† (0.03)
Volatility 3 <sup>rd</sup> tercile x Healthcare support jobs	-0.05*** (0.01)	-0.05*** (0.01)	0.05 (0.05)	0.05 (0.05)
Volatility 3 <sup>rd</sup> tercile x Food preparation and serving	-0.04*** (0.01)	-0.03** (0.01)	-0.02 (0.04)	-0.02 (0.04)
Volatility 3 <sup>rd</sup> tercile x Other care and service jobs	-0.08*** (0.01)	-0.08*** (0.01)	0.05 (0.03)	0.05 (0.03)
Volatility 3 <sup>rd</sup> tercile x Sales and related jobs	-0.12*** (0.01)	-0.11*** (0.01)	0.01 (0.03)	0.01 (0.03)
Volatility 3 <sup>rd</sup> tercile x Manufacturing, production related	0.09*** (0.01)	0.09*** (0.01)	0.09*** (0.03)	0.08** (0.02)
Black	-0.10*** (0.00)	-0.11*** (0.00)	-0.07*** (0.01)	-0.08*** (0.01)
Hispanic	-0.07*** (0.00)	-0.10*** (0.00)	-0.03** (0.01)	-0.08*** (0.01)
Asian or others	-0.03*** (0.00)	-0.06*** (0.00)	-0.01 (0.01)	-0.04*** (0.01)
Female	-0.15*** (0.00)	-0.15*** (0.00)	-0.17*** (0.01)	-0.16*** (0.01)
Age: 25-35	0.15*** (0.00)	0.14*** (0.00)	0.14*** (0.01)	0.13*** (0.01)
Age: 36-54	0.25*** (0.00)	0.23*** (0.00)	0.22*** (0.01)	0.20*** (0.01)
Age: 55 or over	0.24*** (0.00)	0.21*** (0.00)	0.19*** (0.01)	0.15*** (0.01)

Have children present	0.02*** (0.00)	0.02*** (0.00)	0.01 (0.01)	0.00 (0.01)
Unmarried	-0.05*** (0.00)	-0.04*** (0.00)	-0.05*** (0.01)	-0.04*** (0.01)
High school diploma	0.15*** (0.00)	0.14*** (0.00)	0.14*** (0.01)	0.13*** (0.01)
Some college	0.24*** (0.00)	0.21*** (0.00)	0.19*** (0.01)	0.17*** (0.01)
College or above	0.46*** (0.00)	0.41*** (0.00)	0.36*** (0.02)	0.32*** (0.02)
Average hours worked	0.02*** (0.00)	0.02*** (0.00)	0.02*** (0.00)	0.02*** (0.00)
Job covered by union	0.20*** (0.00)	0.15*** (0.00)	0.33*** (0.01)	0.28*** (0.01)
Industry controls		x		x
Year and month fixed effects		x		x
State fixed effects		x		x
Constant	5.42*** (0.01)	5.21*** (0.01)	5.71*** (0.02)	5.64*** (0.05)
Observations	240,164	240,164	26,849	26,849
R-squared	0.34	0.36	0.33	0.36

Robust standard errors in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, † p<0.10

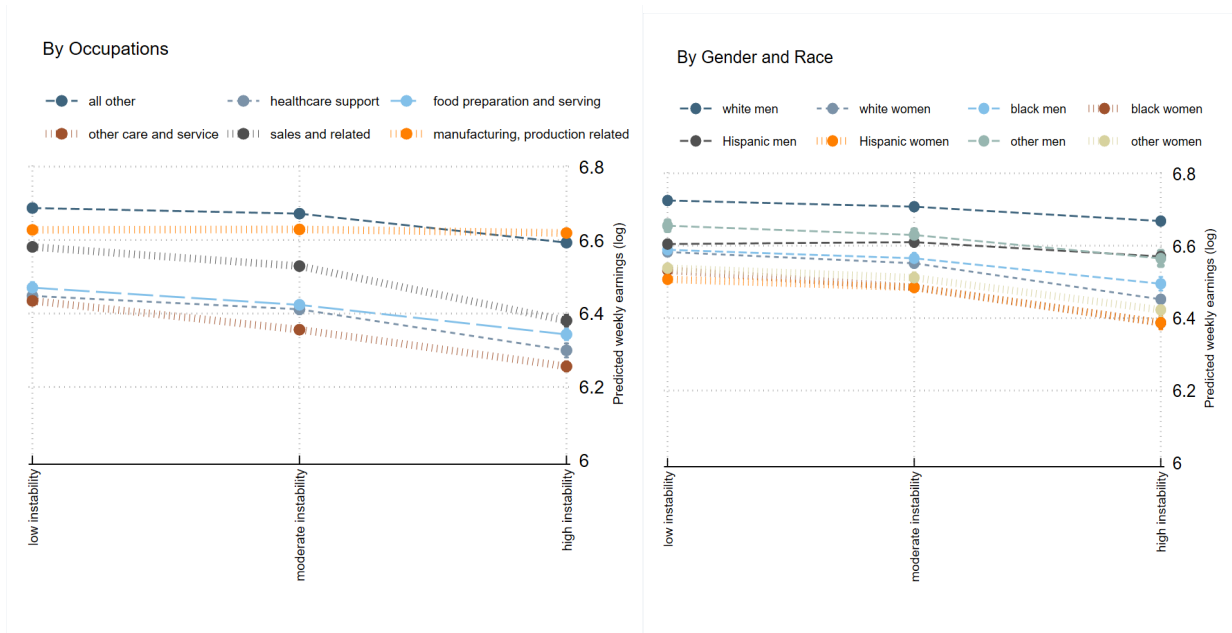
Table 4. Linear Models Predicting Earnings (interaction models – volatility and race/gender)

	Within Job	Within Job	Between Job	Between Job
Volatility, 2 <sup>nd</sup> tercile	-0.02*** (0.00)	-0.02*** (0.00)	-0.15*** (0.02)	-0.15*** (0.02)
Volatility, 3 <sup>rd</sup> tercile	-0.06*** (0.00)	-0.06*** (0.00)	-0.11*** (0.02)	-0.12*** (0.02)
white women	-0.15*** (0.00)	-0.14*** (0.00)	-0.19*** (0.02)	-0.19*** (0.02)
black men	-0.13*** (0.01)	-0.14*** (0.01)	-0.14*** (0.03)	-0.16*** (0.03)
black women	-0.19*** (0.01)	-0.19*** (0.01)	-0.19*** (0.03)	-0.19*** (0.03)
Hispanic men	-0.08*** (0.01)	-0.12*** (0.01)	-0.08* (0.03)	-0.13*** (0.03)
Hispanic women	-0.18*** (0.01)	-0.22*** (0.01)	-0.16*** (0.04)	-0.20*** (0.04)
other men	-0.03*** (0.01)	-0.07*** (0.01)	-0.05 (0.04)	-0.10** (0.04)
other women	-0.15*** (0.01)	-0.19*** (0.01)	-0.12*** (0.03)	-0.17*** (0.03)
Volatility 2 <sup>nd</sup> tercile x white women	-0.01** (0.01)	-0.01** (0.01)	0.04 (0.03)	0.05† (0.03)
Volatility 2 <sup>nd</sup> tercile x black men	-0.01 (0.01)	-0.01 (0.01)	0.02 (0.05)	0.03 (0.05)
Volatility 2 <sup>nd</sup> tercile x black women	-0.03*** (0.01)	-0.03*** (0.01)	0.01 (0.05)	0.01 (0.05)
Volatility 2 <sup>nd</sup> tercile x Hispanic men	0.02† (0.01)	0.02* (0.01)	0.00 (0.04)	0.02 (0.04)
Volatility 2 <sup>nd</sup> tercile x Hispanic women	-0.01 (0.01)	-0.01 (0.01)	-0.05 (0.05)	-0.04 (0.05)
Volatility 2 <sup>nd</sup> tercile x other men	-0.02 (0.01)	-0.01 (0.01)	-0.01 (0.05)	0.00 (0.05)
Volatility 2 <sup>nd</sup> tercile x other women	-0.02 (0.01)	-0.01 (0.01)	-0.01 (0.05)	-0.00 (0.05)
Volatility 3 <sup>rd</sup> tercile x white women	-0.07*** (0.01)	-0.07*** (0.01)	-0.02 (0.02)	-0.02 (0.02)
Volatility 3 <sup>rd</sup> tercile x black men	-0.04** (0.01)	-0.04** (0.01)	0.01 (0.04)	0.01 (0.04)
Volatility 3 <sup>rd</sup> tercile x black women	-0.09*** (0.01)	-0.09*** (0.01)	0.00 (0.04)	0.00 (0.04)
Volatility 3 <sup>rd</sup> tercile x Hispanic men	0.02 (0.01)	0.02* (0.01)	0.02 (0.04)	0.03 (0.04)
Volatility 3 <sup>rd</sup> tercile x Hispanic women	-0.06*** (0.01)	-0.06*** (0.01)	-0.01 (0.04)	-0.01 (0.04)
Volatility 3 <sup>rd</sup> tercile x other men	-0.04** (0.01)	-0.03** (0.01)	-0.00 (0.04)	0.01 (0.04)
Volatility 3 <sup>rd</sup> tercile x other women	-0.06*** (0.01)	-0.06*** (0.01)	-0.04 (0.04)	-0.03 (0.04)
Average hours worked	0.02***	0.02***	0.02***	0.02***

	(0.00)	(0.00)	(0.00)	(0.00)
Job covered by union	0.19***	0.17***	0.32***	0.29***
	(0.00)	(0.00)	(0.01)	(0.01)
Age: 25-35	0.14***	0.14***	0.12***	0.12***
	(0.00)	(0.00)	(0.01)	(0.01)
Age: 36-54	0.23***	0.23***	0.20***	0.19***
	(0.00)	(0.00)	(0.01)	(0.01)
Age: 55 or over	0.23***	0.22***	0.17***	0.15***
	(0.00)	(0.00)	(0.01)	(0.01)
Have children present	0.01***	0.01***	-0.01	-0.00
	(0.00)	(0.00)	(0.01)	(0.01)
Unmarried	-0.04***	-0.04***	-0.05***	-0.04***
	(0.00)	(0.00)	(0.01)	(0.01)
High school diploma	0.14***	0.14***	0.13***	0.12***
	(0.00)	(0.00)	(0.01)	(0.01)
Some college	0.18***	0.18***	0.15***	0.14***
	(0.00)	(0.00)	(0.01)	(0.01)
College or above	0.35***	0.33***	0.26***	0.24***
	(0.00)	(0.00)	(0.02)	(0.02)
Occupation controls	x	x	x	x
Industry controls	x	x	x	x
Year and month fixed effects		x		x
State fixed effects		x		x
Constant	5.57***	5.48***	6.11***	6.01***
	(0.01)	(0.02)	(0.04)	(0.05)
Observations	240,164	240,164	26,849	26,849
R-squared	0.39	0.40	0.38	0.39

Robust standard errors in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, †p<0.10

Figure 4. Differences in the Relationship Between Volatility Levels and Earnings, by Occupations, Gender, and Race



Note: Full models are included in Tables 3 and 4 (Models 2).