

Does Marriage Protect Mental Health? Evidence from the COVID-19 Pandemic

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Abstract

Using weekly variation from April 23 to June 23, we exploit the surge in unemployment over the coronavirus pandemic to identify the effects on mental health outcomes and the role of marital status as a protective factor for households. We find that married respondents are 1-2 percentage points less likely, relative to their unmarried counterparts, to experience mental health problems following declines in work-related income since the start of the pandemic. Our results suggest that the combination of intra-family substitution and the psychological benefits of marriage helps insure against unanticipated fluctuations in job and income loss.

Keywords: Coronavirus, Employment, Family, Marriage, Mental Health, Wages

JEL Codes: D91, I31, J21

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1 Introduction

The coronavirus led to a sharp decline in mental health, which has not only adversely affected individual life satisfaction, but also risks undermining workplace productivity (Bubonya et al., 2017).¹ However, there is preliminary evidence suggesting that social relationships, like marriage, serve as an important protective factor against the increased risk of isolation that resulted from stay-at-home orders (Roth and Wilcox, 2020; Makridis and Wang, 2020). Given that marriage is associated with a wide array of positive outcomes, we provide the first comprehensive assessment about the potentially important role that marriage plays in moderating the adverse effects of labor market disruptions during the coronavirus pandemic. Specifically, we use variation in the unemployment rate to help identify the causal effect of marriage on mental health outcomes.

Unfortunately, empirically identifying the causal effects of marriage is challenging because of selection effects: individuals who get married are systematically different than those who do not get married. In this sense, while much of the existing literature provides a reference point for understanding differences in outcomes between married and unmarried individuals, it is hard to know whether these differences reflect the causal or selection effects of marriage.

Using new panel data from the Census Pulse Survey between April 23 and June 23, we exploit the rapid surge in layoffs during the coronavirus pandemic to examine how marriage serves as a protective factor against employment-related income declines. Our identifying variation comes from comparisons of observationally equivalent workers exposed to different intensities of labor market shocks across states, which could emerge from differences in their industrial composition

¹<https://news.gallup.com/poll/308420/americans-say-covid-hurting-mental-health.aspx>
<https://news.gallup.com/poll/310250/worry-stress-fuel-record-drop-life-satisfaction.aspx>

and the relative share of sectors that are more exposed to national and state quarantine policies. In this way, we use labor market fluctuations during COVID-19 as a plausibly exogenous shock, rather than an outcome in and of itself, to see if married individuals fare better in terms of their mental health than individuals not currently married. We nonetheless recognize that our results could still reflect some forms of selection since we do not trace the same individual repeatedly over the pandemic, but we implement a wide array of diagnostics and controls, which provide some comfort that, even if not fully causal, our coefficients are still qualitatively reliable.

To investigate whether or not marriage has a causal effect on mental health outcomes, we focus on two negative mental health states: anxiety and depression. We find an important moderating role of marital status. In our preferred specifications that control for standard demographic factors, we find that married respondents are 1-2 percentage points less likely, relative to their unmarried counterparts, to report mental health problems following declines in work-related income. We also explore how these relationships vary by demographic groups, showing that the protective effects of marriage on anxiety are concentrated among White, middle-class males. However, when we look at a broader range of mental health outcomes, especially the incidence of depression, we see that the protective effects are also present for females and higher income earners.

2 Background and Theoretical Framework

This paper contributes to a large literature linking marriage to a broad array of social and economic outcomes. Much scholarship has established that marriage is associated with greater income (Ahituv and Lerman, 2007), happiness (Glenn and Weaver, 1981), life expectancy (Lillard and Waite, 1995), overall health (Kiecolt-Glaser and Newton, 2001), and economic mobility (Chetty

et al., 2014). Researchers have also consistently found that marital status is a powerful predictor of mental health (Gove et al., 1983; Horwitz et al., 1996). The mental health benefits of marriage differ in magnitude depending on actual features of the marriage. For instance, Uecker (2012) finds that adults who marry young (under 26) experience lower psychological distress than their single peers, which is concentrated among young adults who are engaged and not cohabiting.

In a meta-analysis comparing the mental health outcomes of custodial grandparents to noncustodial grandparents, Kelley et al. (2020) find that grandparents who are also caregiving have lower mental health. Lamb et al. (2003) is perhaps the closest study to ours, investigating whether psychologically healthier individuals select into marriage. They find no evidence that less depressed persons select into marriage at higher rates, as well as a negative effect of marriage on depression, which is especially strong when the couple did not cohabit before getting married. The literature points us toward marriage as a protective factor of mental health and we follow precedent by focusing only on married individuals, rather than couples who are cohabitating.

Given the empirical evidence that marriage is linked with a wide array of positive economic and social outcomes, we now provide a brief theoretical discussion about the potential effects on mental health and the concept of “mental health savings.” The onset of the COVID-19 pandemic was marked by significant uncertainty: for example, even the volatility index surged nearly as high as the financial crisis in October 2008. In the presence of uncertainty, people look for sources of stability to ground decision-making and deal with anxiety. To the extent marriage provides one such anchor, then married individuals are likely to incur less of a decline in mental health because less in their life is changing, even if they get laid off. Recent work has also highlighted how individuals choosing to get married today are more likely to be motivated by consumption complementarities (Stevenson and Wolfers, 2007) and insurance (Lafortune and Low, 2020).

To mitigate concerns about selection effects (e.g., omitted variables), we exploit variation in the surge in unemployment over the pandemic and examine the potential moderating role of marital status. In this sense, we do not require the typical assumption that selection into marriage is exogenous, conditional on observables: we simply assume that selection into marriage is not correlated with the labor market shocks experienced over the pandemic. By focusing on the role of families, we also contribute to a bigger policy conversation about the determinants of social capital (JEC, 2018) and their effects on stopping the spread and severity of the pandemic (Makridis and Wu, 2021; Barrios et al., 2020; Ding et al., 2020).

Moreover, ever since at least Becker (1981), labor economists have found that families can serve as a vehicle for partial insurance over the business cycle. This benefit may show up in better mental health outcomes for family members who have just lost household income, as compared with individuals weathering similar shocks. For example, Ortigueira and Siassi (2013) show that intra-household substitution serves as an important insurance mechanism for households, especially lower income households. Similarly, Blundell et al. (2016) show that family labor supply allows households to smooth against even fairly permanent labor income shocks. These papers generally highlight the ways that spousal labor supply can create a stream of income when one source declines, although there is also additional evidence that pooling income in the family also leads to better search opportunities too (Guler et al., 2012). Moreover, Eickmeyer et al. (2019) show that marriage (not co-habitation) leads to greater income pooling, which enables them to cushion against idiosyncratic shocks more easily. This is also consistent with the fact that mothers and fathers select into more nurturing versus protective occupations (Pakaluk and Price, 2020).

Finally, our results are related to the literature on intra-household bargaining and female labor

supply.² For example, [Voena \(2015\)](#) finds that the introduction of unilateral divorce laws led to greater asset accumulation and a lower employment rate among females who were already married, which implies that households were able to more credibly threaten to divorce and thereby more likely to resolve conflict. [Eckstein and Lifshitz \(2011\)](#) find that the rise in education level accounts for roughly 33% of the increase in female employment since the 1960s, the rise of female wages accounts for roughly 20%, and the remaining is highly correlated with the cost of child-rearing and other inputs of home production. With regard to mental health outcomes, [Polachek and Wallace \(2015\)](#) find that spouses who perceive the household division of labor as unfair to themselves also report worse mental health compared to those who view it as fair.

3 Data and Measurement

The Household Pulse Survey ("the Pulse") is a 20-minute online survey designed by the U.S. Census Bureau to rapidly assess how the COVID-19 pandemic is impacting households throughout the country. Data collection for Phase 1 began on April 23, 2020, with public files released on a weekly basis starting May 20, 2020.³ Households were selected into a very large sample from the Census Bureau's Master Address File (MAF), accommodating anticipated lower response rates while still producing estimates at the state level as well as for 15 Metropolitan Statistical Areas (MSAs).⁴ Households were contacted primarily through email, and if an interview was completed, that household remained in the sample for up to two additional weekly interviewing periods. The sample we use in our empirical work ranges from the first week of the Pulse, April 23 - May 5,

²See [Doepke and Tertilt \(2016\)](#) for a survey of applications of family models in macroeconomics.

³We refer readers to the full documentation and discussion of the data in [Buffington et al. \(2020\)](#).

⁴The weighting procedure was applied at the state level and contained four parts: 1) adjustment for nonresponse, 2) adjustment to controls weights based on the ACS occupied housing unit estimates, 3) adjustment for the number of adults per household, and 4) adjustment for demographic characteristics.

through the eighth week of the Pulse, June 18 - June 23.⁵

In addition to demographic items, Pulse questions address seven content areas: employment, spending and Economic Impact Payments, food sufficiency and food security, physical and mental wellness, health insurance and health access, housing, and education disruptions. We are interested in a few specific questions. First, we look at a broad question about recent household job loss, specifically: "Have you, or has anyone in your household experienced a loss of employment income since March 13, 2020?" While this includes job loss, it also encompasses any loss of job-related income, from fewer hours to unforeseen expenses. Second, we focus on four primary measures of mental health: (i) frequency of feeling depressed over previous 7 days, (ii) frequency of worry over previous 7 days, (iii) frequency of anxiety over previous 7 days, and (iv) frequency of having little interest in things over previous 7 days. We create binary indicators for whether an individual reports "more than half the days" or "nearly every day," denoting those who report "not at all" or "several days" as a zero. While we have experimented with ordered probit models that retain the categorical values, these allow for a more convenient interpretation and, if anything, would simply lead to more attenuated estimates (i.e., biased towards zero). Section 7 contains a variable dictionary detailing how variables were defined and coded.

Figure 1 investigates the spatial heterogeneity in the share of people reporting having anxiety more than half the days in the past 7 days averaged across all the weeks in our sample. Panel A documents substantial heterogeneity with higher rates of anxiety in the Southwest and areas of the Southeast upwards of 33% and much lower rates in the middle of the country downwards of 28%. We see similar patterns for other outcome variables, which we do not report for brevity, but

⁵Since there is one respondent per household, each household has at most three total responses. This means our panel data is unbalanced, which we account for in our empirical work. The cleaning of our data was standard, e.g., we use observations that have non-missing values for mental health and marriage questions.

the results for depression rates are even larger in the Southeast.

Panel B subsequently documents equally large variation in the change in the share of respondents who are anxious between weeks 1 and 8 of the survey, which corresponds with April 23 to May 5 (week 1) and June 18-23 (week 8). Interestingly, we see that some areas experienced over a 10% decline in the share of respondents saying that they are anxious, concentrated primarily in the middle of the country and select areas of the Northeast, whereas other states have experienced an even greater increase in the share, concentrated in the Southwest and areas of the Southeast.

[INSERT FIGURE 1 HERE]

To investigate the degree of persistence in mental health outcomes, Figure 2 plots the share of individuals reporting high anxiety between April 23 and May 5 with the growth in the share of these individuals between June 18 and 23. Importantly, we see a correlation of -0.56, suggesting that the areas that had worse mental health outcomes in week 1 experienced lower growth in the share of those experiencing mental health outcomes by week 8. This holds regardless of the way that we measure mental health outcomes, including depression, interest, and worry, which exhibit slightly more negative correlations than for anxiety.

[INSERT FIGURE 2 HERE]

To understand the relationship between marital status and mental health, Figure 3 illustrates differences for the four main measures of mental health for married and non-married respondents. Across each outcome, we see that married respondents are substantially more likely to report that they have no days or only some days of mental health problems. Conversely, we also see that they are less likely to report more frequent experiences with mental health problems. It should also be

noted that these counts overstate the prevalence of these mental health outcomes in the married group, since they are overrepresented (57%) in our sample. For example, the percent of married respondents reporting feeling depressed on several days during the past week is 31% while the comparable figure for unmarried respondents is 34%.

[INSERT FIGURE 3 HERE]

Finally, we use data on unemployment claims from [Chetty et al. \(2020\)](#), calculated by taking the total unemployment insurance claims from the Department of Labor per 100 persons in the 2019 labor force. To match the Pulse data in which respondents are asked to reflect on their previous week, we have matched Pulse weeks with that previous week of unemployment rates in the individual's state. For example, Week 1 of the Pulse survey results were taken during April 23rd - May 5th and is matched with state unemployment rates from April 18th.

Table 2 documents descriptive statistics for each of our main variables separately by the week of the Pulse survey, ranging from its start in April 23 to May 5 to our current iteration for June 18 to 23. While the core demographics are, not surprisingly, constant across time, with males slightly less likely to participate in the survey, we find ample variation in our mental health outcomes. For example, the share of respondents reporting feeling depressed (anxious) at least three of the days in the past week grows from 17.3% (31%) in week 1 of the survey to 19.4% (32.4%) in week 8 of the survey with various oscillations in between. Although much of the variation is cross-sectional, we leverage the state-level time series variation that remains to help identify our conditional correlations and avoid comparisons of people living in different states.

[INSERT TABLE 2 HERE]

4 Empirical Strategy

To understand the relationship between losses in wage income and mental health outcomes as moderated by marital status, we estimate linear regressions of the following form:

$$h_{ist} = \gamma \text{IncomeLoss}_{ist} + \zeta m_{ist} + \xi(\text{IncomeLoss}_{ist} \times m_{ist}) + \beta X_{it} + \phi_s + \lambda_t + \epsilon_{ist} \quad (1)$$

where h_{ist} denotes an indicator for an individual i 's mental health outcome in state s and time t , IncomeLoss_{ist} denotes an indicator for whether the individual experienced any job-related income loss recently, m denotes whether an individual is married, X denotes a vector of individual demographic characteristics (e.g., age, gender, race, education, and number of children), and ϕ and λ denote state and time fixed effects. We report heteroskedasticity-robust standard errors.

Our estimate of the interaction effect, ξ , could reflect at least two different sources of variation. First, there could be psychological benefits associated with greater stability arising from marriage. Even when other dimensions of life, like work, are changing, marital stability anchors an individual and provides alternative sources of satisfaction and joy. Second, there could be income sharing benefits. For example, if the head of household is laid off, the spouse can search for work or continue in work, providing an additional income stream. Because of limits on the data that we have available, we cannot fully isolate one mechanism over another.

Although the inclusion of demographic controls, together with the state and time fixed effects, helps mitigate concerns about omitted variables bias, estimates of Equation 1 may still be subject to bias due to cross-sectional heterogeneity across individuals. For example, if individuals

with lower probabilities of experiencing mental health outcomes are also more productive, then they are also more likely to select into marriage because they will have an easier time finding a spouse. We address this concern by sequentially introducing control variables to gauge the potential importance of unobserved factors.

Our identification comes from comparisons of observationally equivalent individuals that vary in their marital status and exposure to job loss. While job-related income loss is generally subject to significant self-selection concerns, the sampling frame in our study is unique in that the unemployment rate surged from 3.3% to nearly 20% in the span of two months. The rapid surge in layoffs provides us with plausibly exogenous variation in income loss, which we exploit to identify the impact of labor market fluctuations on mental health moderated through the role of marriage. To validate our intuition, we estimate panel regressions of the form:

$$IncomeLoss_{ist} = \psi u_{st} + \beta X_{it} + \phi_s + \lambda_t + \epsilon_{ist} \quad (2)$$

where u_{st} denotes logged unemployment claims in state s and week t . Table 3 shows that there is a robust relationship between state unemployment and the probability that an individual has experienced a decline in their work-related income. For example, column 1 shows that a 1% rise in state unemployment is associated with a 2pp rise in the probability the individual has experienced such a decline in income. Column 2 shows that the gradient actually grows to a 2.3pp once demographic and income controls are incorporated. Column 3 introduces state and week fixed effects, exploiting within-state variation. While it is now statistically significant at only a 10% level (instead of the 1% level), the positive association nonetheless holds, illustrating the variation that we are exploiting to identify how marriage affects mental health outcomes when

respondents are subject to shocks in the labor market.

[INSERT TABLE 3 HERE]

5 Results

Table 4 documents the main results from Equation 1, estimating linear probability models of mental health indicators on marital status, job-related income loss, and their interaction, conditional on controls. Columns 1 and 4 present the raw differences for married and unmarried respondents: married respondents are 7.7pp less likely to feel anxious at least three days in the past week and those experiencing recent job-related income loss are 14.7pp more likely. These cross-sectional differences are similar across each of the outcome variables. Most importantly, however, the interaction effect is also negative: married respondents are 2.1pp less likely to experience anxiety following job-related income losses, consistent with a protective effect.

Moreover, this is economically important: the interaction effect is 14.3% of the magnitude of the direct effect ($= 0.147 - .021$). We also see similar magnitudes for other outcome variables. For example, married respondents are 2.6pp less likely to experience depression following a job-related income loss, which amounts to 22% of the direct effect of job-related income loss on the probability of experiencing a depression. In this sense, while job-related income loss is still associated with a sharp increase in the probability of experiencing mental health problems, marriage nonetheless serves as a protective factor that reduces the adverse effects of income losses.⁶

However, these results do not preclude an interpretation of partial selection—that is, married

⁶We also estimated these equations with “worry” and “loss of interest” as the dependent variable. This yielded nearly identical results, with interaction effects (significant at the 1% level) of -0.015 and -0.014 respectively. For the sake of brevity we omit these results, but they are available upon request.

households are positively selected and those experiencing job-related income loss are negatively selected, so the estimate on the interaction is downward biased. Columns 2 and 5 subsequently introduce a wide array of demographic characteristics, including: age, gender, race, number of children, and education. We control for age using a quadratic and education using fixed effects for less than high school, high school, some college, and college or more. While the direct association between marriage and mental health is downward biased, together with the interaction effect, the inclusion of demographic controls reduces the point estimates marginally. Now, we find that married respondents who experience job loss are 1pp less likely to experience anxiety following job-related income loss. Again, that is roughly 10% of the direct effect of job-related income loss on the probability of experiencing anxiety.

Even with these demographic controls, there is still the potential for unobserved heterogeneity and selection. For example, a large literature suggests that the relationship between marital status and income is reinforced over the life cycle ([Ahituv and Lerman, 2007](#)). Columns 3 and 6 control for income fixed effects to purge differences in income that could be correlated with selection into marriage and the propensity of experiencing a mental health problem. We obtain statistically indistinguishable results when we include these controls. In this sense, our strictest specifications suggest that individuals who are married are 1.7pp less likely to be depressed following declines in wage-related income, relative to their unmarried counterparts (0.9pp for anxiety).

[INSERT TABLE 4 HERE]

We now turn towards heterogeneity in our results. In particular, motivated by evidence that the pandemic has been regressive—for example, that lower income workers are less able to adapt through remote work arrangements ([Mongey et al., 2020](#))—we now allow for differences across

gender, age, race, and income. Table 5 presents these results for high anxiety as the outcome variable. Interestingly, we see that the protective effects of marriage arising from declines in work-related income are concentrated among males, although marital status is associated with twice as large of a direct effect on the decline in the probability of experiencing high anxiety. This is consistent with some prior literature that has found that perceptions of job insecurity are more related with mental health outcomes for males (Blom et al., 2020).⁷ We also see that the protective effects are concentrated among younger individuals and middle-income earners.⁸

When we look at depression as an outcome variable for mental health problems in Table 6, we find some different sources of heterogeneity. For example, marriage is still associated with a stronger protective effect for males (roughly 2.5pp), but now also for females (1.4pp). Moreover, we now see an even stronger protective effect for Whites (2.3pp) and higher income earners (1.9pp) with no statistically significant associations for Blacks, Hispanics, and low income earners. Finally, while younger individuals also exhibit a protective effect (2.2pp), older individuals exhibit an even stronger one (3.2pp).⁹ This is consistent with Tumin and Zheng (2018) that there are heterogeneous effects of marriage on mental health moderated by the length of the marriage. This heterogeneity aligns well with evidence about the deteriorating conditions of White, middle-class males (Case and Deaton, 2017, 2020), although the protective effects are not isolated to them.¹⁰

⁷These results are also related with Pakaluk and Price (2020) who explore differences in occupational choice for mothers and fathers and how those choices propagate to their children.

⁸We re-ran these models using an alternative definition where younger individuals are below age 40. We find a coefficient estimate of -0.025 on the interaction effect for these younger individuals and -0.015 for the older individuals. Both are significant at the 1% level and the confidence intervals do not overlap. We now include a footnote pointing out this alternative classification.

⁹Although we focused on more precise definitions of “young” and “old,” we also estimated these models using an alternative definition where younger individuals are below age 40 (and older those above). We find a coefficient estimate of -0.025 on the interaction effect for these younger individuals and -0.015 for the older individuals. Both are significant at the 1% level and the confidence intervals do not overlap.

¹⁰We have also explored the effects when using “worried” and “losing interest” as outcome variables. The results are broadly the same and available upon request.

[INSERT TABLES 5 and 6 HERE]

Before continuing, we recognize that these protective effects do not completely offset the effects of income loss more generally. In particular, losing a job has important ramifications, including with links to mortality (Sullivan and von Wachter, 2009), particularly during a crisis. Our interaction effects tend to offset for roughly a fifth of the overall decline in mental health. Of course, there are other activities and investments that could further offset these declines, like having a diversified financial portfolio and other job options, but these are beyond the scope of the paper.

Why do we not see the presence of protective effects among Blacks or Hispanics?¹¹ While we potentially lack statistical variation in the data since Blacks and Hispanics constitute smaller shares of our sample, but were more likely to experience adverse effects from the pandemic (Mongey et al., 2020), a better explanation may stem from the steep decline in marriage rates and family stability among the African American community (Ellwood and Crane, 1990; Laughlin, 2014). For example, Cross (2018) finds substantial differences in living arrangements for children, with 57% of Black children having lived with extended family members, compared with 35% of Hispanic children and 20% of White children. There is also evidence of differences in marital abuse and marital quality that differ across race even after controlling for income (Lockhart, 1987; Bulanda and Brown, 2007). Moreover, since relational intimacy in a marriage is tied with mental health, specifically depression (Yan and Schoppe-Sullivan, 2020), then differences in the incidence of abuse will propagate into mental health outcomes. Finally, prior research has also pointed out the limitations of traditional measures of family structure, particularly among Blacks (Mouzon, 2013).

¹¹We recognize that these differential effects by race could reflect other time-varying, unobserved factors that correspond with declining employment outcomes in states, particularly following the death of George Floyd. While we cannot rule out these effects, we estimate robustness by restricting our sample before June 2020, finding similar results as before. The interaction effect for Whites is -0.019 (significant at the 1% level), while the interaction effect for Blacks and Hispanics is insignificant and very small (0.006 and -0.003 respectively).

6 Discussion and Limitations

The COVID-19 pandemic and related policies have predictably had significant effects on mental health. For instance, [Mulligan \(2021\)](#) documents an increase in deaths of despair for men aged 15-55. Furthermore, [Agostinelli et al. \(2020\)](#) show that school closures cost high school students from poor neighborhoods a learning loss of 0.4 standard deviations while children in wealthier neighborhoods are virtually unaffected. Our results also build upon a larger literature on the effects of job insecurity and marriage on mental health by focusing on a period of unique uncertainty ([Tumin and Zheng, 2018](#); [Blom et al., 2020](#)).

We subsequently explore the moderating effects of marital status on mental health arising from declines in work-related income. Not surprisingly, married respondents are much less likely to report mental health problems in not only the raw data, but also in our conditional correlations. For example, they are 8.6 percentage points (pp) and 7.7pp less likely to report depression and anxiety at least three of the days in the past week when examining the raw data, but the correlations only decline to 2.8pp and 2.4pp when we introduce demographic controls (e.g., age and education) and semi-parametric interactions between education and income. Declines in work-related income are associated with roughly an 8-10pp increase in the probability of reporting mental health problems, which is significant given that the share of individuals reporting high anxiety is roughly 30% and the share reporting depression is roughly 20%.

Our paper nonetheless has some limitations. Primarily, the differences we observed among married versus non-married individuals in response to labor market shocks could reflect a correlation with unobserved characteristics that are also related with mental health. For example, if

selection effects are present beyond our existing controls, and if employers lay off less productive workers first, then that could bias our estimates. We also are unable to assess how these shocks to the head of household and his/her spouse propagate to their children since we do not have measures of childhood development. Future research should explore ways to isolate more exogenous sources of variation to obtain fully causal parameter estimates and trace out the effects on the children’s human capital investments and mental health.

7 Conclusion

Mental health outcomes deteriorated over the ongoing COVID-19 pandemic. Motivated by a large literature about the beneficial effects of marriage on income (Ahituv and Lerman, 2007), happiness (Glenn and Weaver, 1981), life expectancy (Lillard and Waite, 1995), overall health (Kiecolt-Glaser and Newton, 2001), and economic mobility (Chetty et al., 2014), we investigate whether marriage also serves as a protective factor against declines in work-related income.

Using individual-level data from the Census Bureau’s recent Pulse survey, we show that married respondents are not only less likely to experience mental health problems, but also less likely to experience these problems following declines in work-related income. Our identification strategy exploits the fact that individuals in different states were exposed to more severe contractions in their local labor markets as states introduced varying intensities of stay-at-home orders and nonessential business closure policies, thereby increasing the probability that some people would experience layoffs or declines in income. We also document heterogeneity across gender, race, age, and income, showing that the greatest effects are concentrated among Whites, males, younger, and middle to upper income workers.

Our paper provides the first comprehensive assessment of the effects of labor market disruptions on mental health outcomes over the pandemic moderated by the role of marriage. However, many questions remain. For example, given evidence of heightened marital abuse, how much do differences in marital quality account for some of our heterogeneous effects? Similarly, given the mental health “savings” that stem from marriage, how will children growing up in families with strong marriages versus a single-parent fare in the years ahead? Moreover, what is the role of public policy in encouraging human flourishing amid a pandemic? Only time will tell over some of these questions, but we hope to have provided meaningful evidence as we begin to recover from the crisis and posed new questions that encourages further inquiry in the literature.

Appendix

Table 1: Variable Dictionary

| Name | Type | Source | Description |
|-----------|---------|------------------------|---|
| Age | Ordinal | Household Pulse Survey | Calculated using the respondent's birth year. Ranges from 18 - 88. |
| Anxious | Binary | Household Pulse Survey | Calculated from the respondent's answer to the question: "Over the last 7 days, how often have you been bothered by the following problems... feeling nervous, anxious, or on edge?" 1 if "more than half the days" or "nearly every day"; 0 if "not at all" or "several days." |
| Depressed | Binary | Household Pulse Survey | Calculated from the respondent's answer to the question: "Over the last 7 days, how often have you been bothered by the following problems... feeling down, depressed, or hopeless?" 1 if "more than half the days" or "nearly every day"; 0 if "not at all" or "several days." |
| Education | Ordinal | Household Pulse Survey | 1 if less than high school; 2 if some high school; 3 if high school graduate or equivalent; 4 if some college; 5 if Associate's degree; 6 if Bachelor's degree; 7 if Graduate degree. |

Continued on next page

Table 1 – continued from previous page

| Name | Type | Source | Description |
|-----------------|---------|------------------------|---|
| Gender | Binary | Household Pulse Survey | 1 if female; 0 if male. |
| Income | Ordinal | Household Pulse Survey | 1 if less than \$25,000; 2 if \$25,000 - 34,999; 3 if \$35,000 - 49,999; 4 if \$50,000 - 74,999; 5 if \$75,000 - 99,999; 6 if \$100,000 - 149,999; 7 if \$150,000 - 199,999; 8 if \$200,000 and above. |
| Income Loss | Binary | Household Pulse Survey | Calculated from the respondent's answer to the question: "Have you, or has anyone in your household experienced a loss of employment income since March 13, 2020?" 1 if yes; 0 if no. |
| Kids | Ordinal | Household Pulse Survey | Calculated from the respondent's answer to the question: "How many people under 18 years-old currently live in your household?" Ranges from 0 - 5. |
| Losing Interest | Binary | Household Pulse Survey | Calculated from the respondent's answer to the question: "Over the last 7 days, how often have you been bothered by the following problems... having little interest or pleasure in doing things?" 1 if "more than half the days" or "nearly every day"; 0 if "not at all" or "several days." |
| Married | Binary | Household Pulse Survey | 0 if widowed, divorced, separated, or never married; 1 if now married. |

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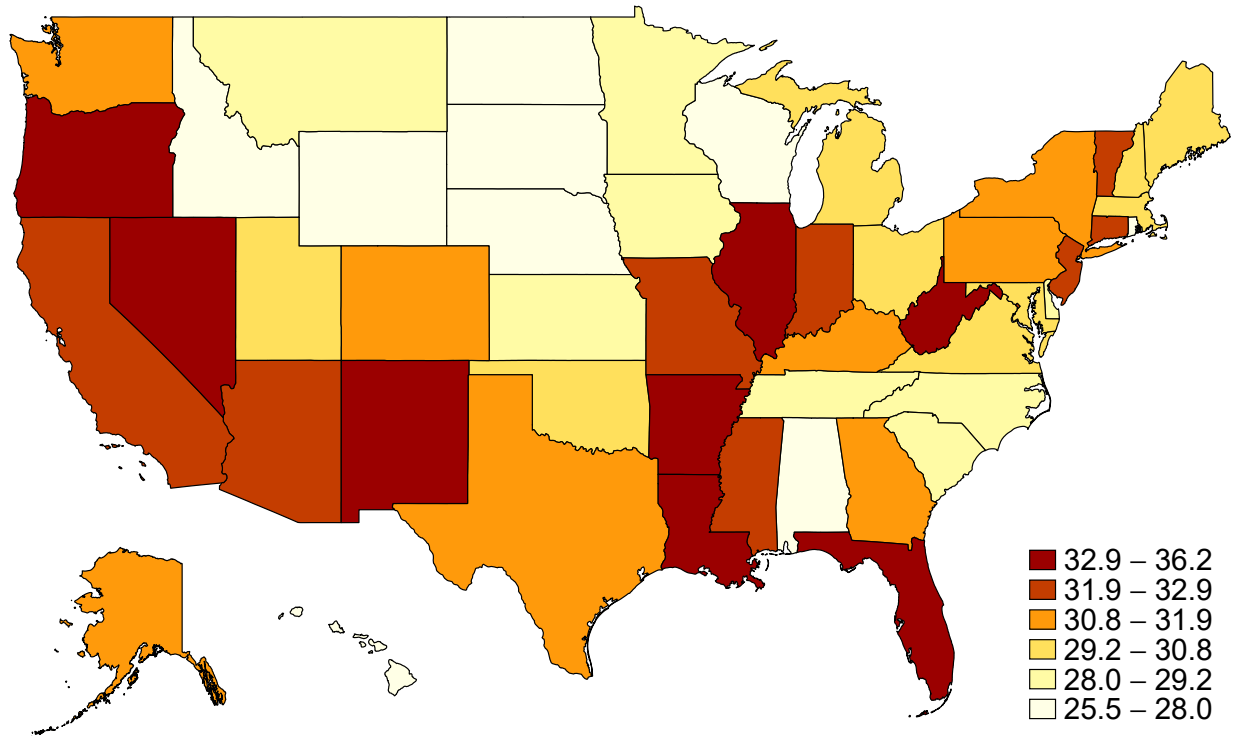
Table 1 – continued from previous page

| Name | Type | Source | Description |
|--------------|---------------|------------------------|---|
| Race | Categorical | Household Pulse Survey | 1 if White; 2 if Black; 3 if Asian; 4 if any other race or combination. |
| Unemployment | Logged Claims | Chetty et al. (2020) | Calculated by taking the total unemployment insurance claims from the Department of Labor per 100 persons in the 2019 labor force. |
| Worried | Binary | Household Pulse Survey | Calculated from the respondent's answer to the question: "Over the last 7 days, how often have you been bothered by the following problems... not being able to stop or control worrying?" 1 if "more than half the days" or "nearly every day"; 0 if "not at all" or "several days." |

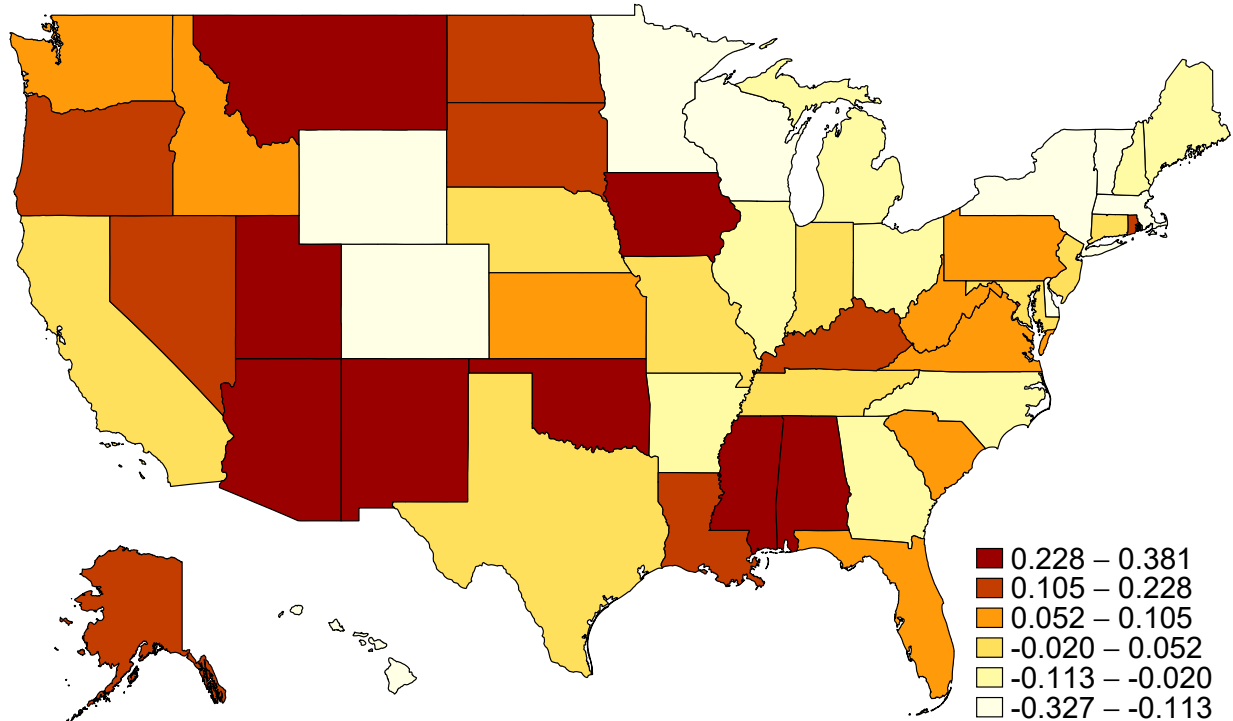
Tables and Figures

Figure 1: Spatial Heterogeneity in High Anxiety Across States

Panel A: Average Anxiety (Percent)

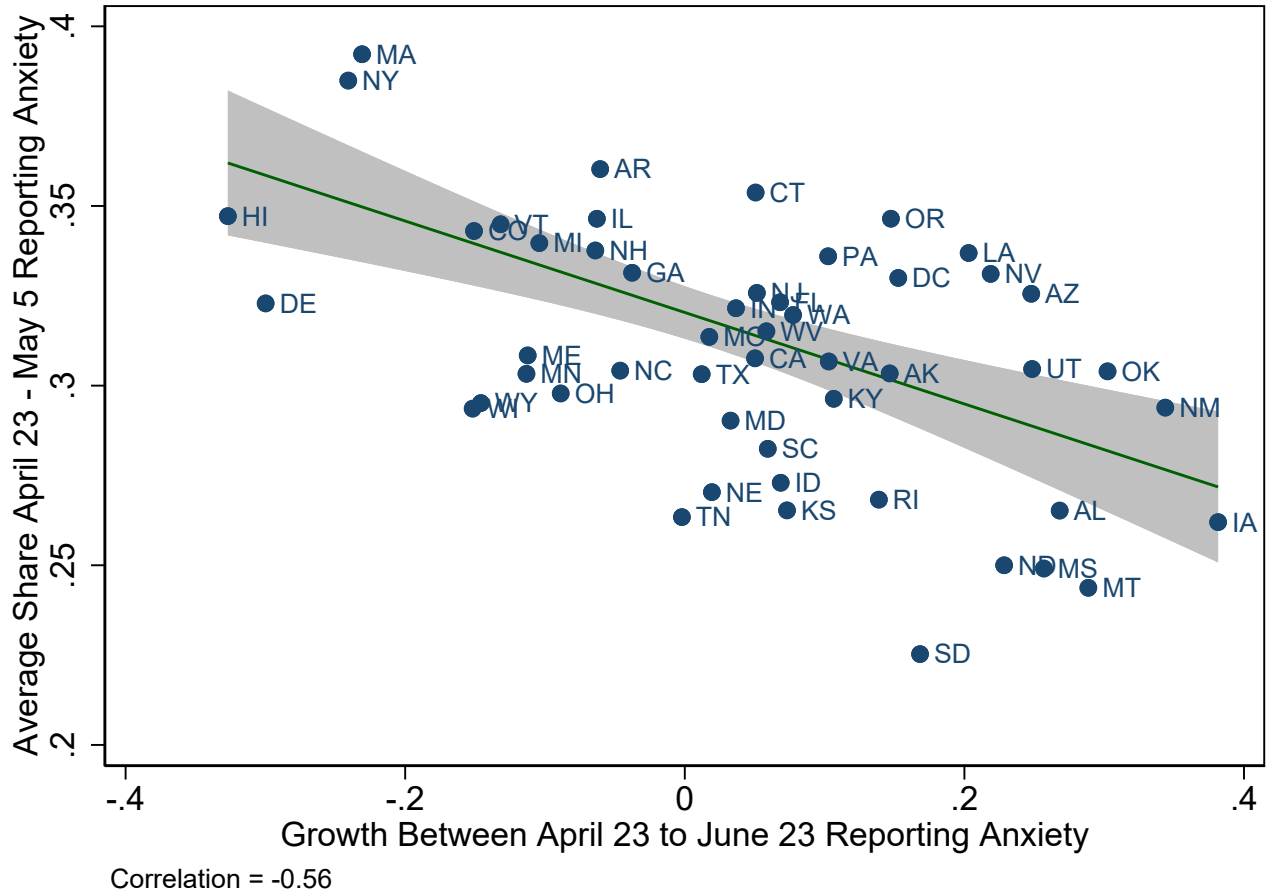


Panel B: Growth in Anxiety (Percentage Points)



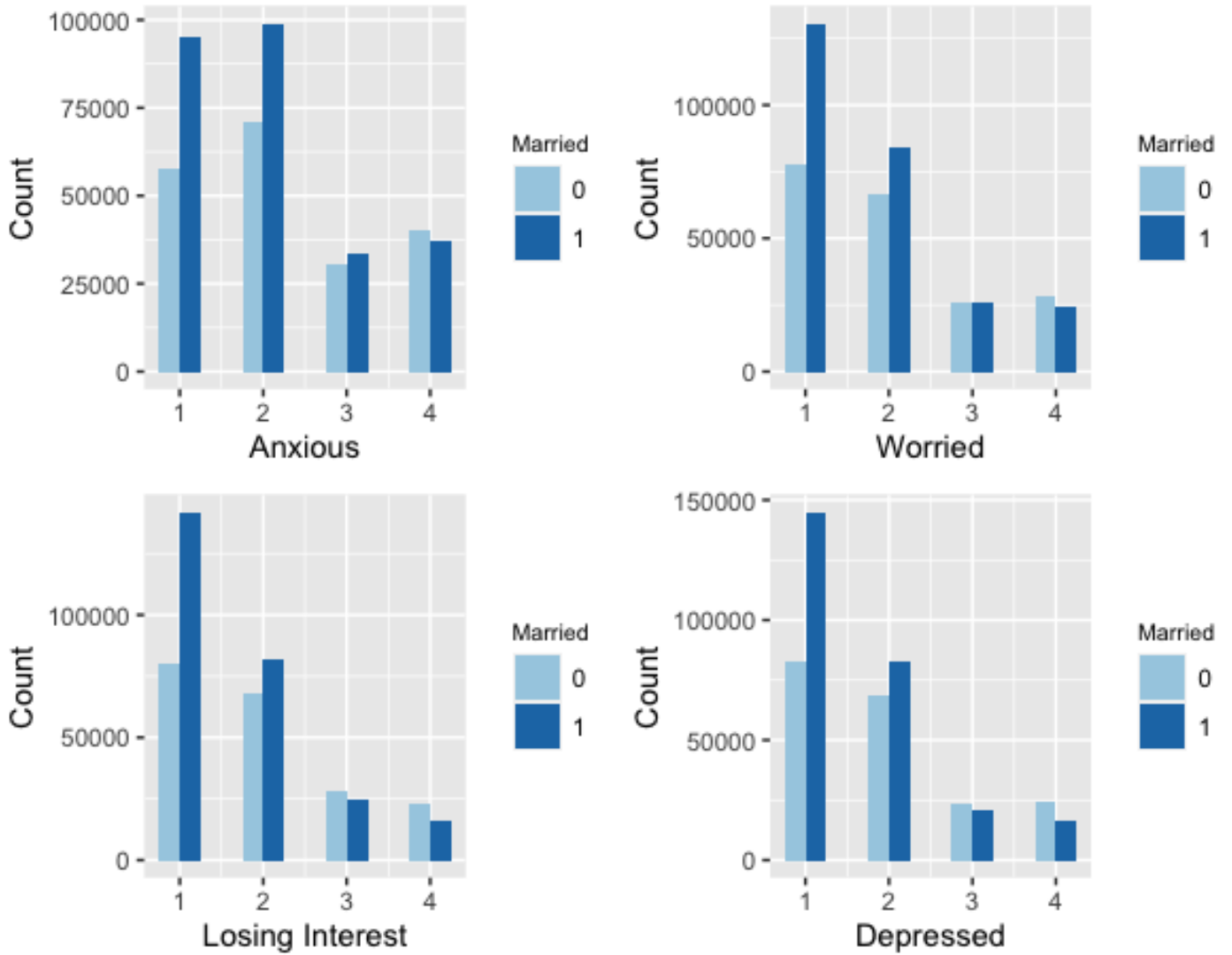
Source: Census Pulse. The figures plot the average share and the growth rate (between April 23-May 5 and June 18-23) in the share at a state-level for those reporting high anxiety at least three days in the past week of the survey. Anxiety can take one of four values in the survey: “nearly every day,” “more than half the days,” “several days,” and “not at all.” We denote an individual as anxious if they feel that way more than half the days, which allows us to obtain the percent that feel that way in a state.

Figure 2: Examining the Persistence in State Mental Health Outcomes



Source: Census Pulse. The figures plot the state share for those reporting high anxiety at least three days in the past week for April 23 to May 5 with the change in the share between the April 23-May 5 and June 18-23 average. Observations are weighted by state employment as of 2018.

Figure 3: Mental Health Outcomes for Married and Unmarried Respondents



Source: Census Pulse. The figure plots the share of married and unmarried respondents pooled across the sample waves based on the weekly frequency (1 = “not at all,” 2 = “several days,” 3 = “more than half the days,” and 4 = “nearly every day”) that they report being anxious, worried, losing interest, and feeling depressed.

Table 2: Summary Statistics: Averages by Week

| | <i>Week:</i> | | | | | | | |
|-------------------|--------------|--------|--------|--------|--------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Male | 0.38 | 0.39 | 0.40 | 0.41 | 0.40 | 0.40 | 0.39 | 0.39 |
| Married | 0.57 | 0.57 | 0.57 | 0.58 | 0.57 | 0.57 | 0.57 | 0.57 |
| Age | 47.8 | 48.8 | 48.2 | 49.0 | 48.7 | 49.0 | 49.3 | 48.2 |
| Kids | 0.82 | 0.76 | 0.78 | 0.74 | 0.74 | 0.73 | 0.72 | 0.77 |
| Hours with Kids | 13.6 | 13.2 | 12.8 | 11.8 | 10.3 | 7.75 | 7.76 | 5.76 |
| White | 0.81 | 0.83 | 0.82 | 0.83 | 0.82 | 0.82 | 0.82 | 0.81 |
| Black | 0.09 | 0.08 | 0.09 | 0.08 | 0.09 | 0.08 | 0.09 | 0.09 |
| Hispanic | 0.09 | 0.08 | 0.09 | 0.08 | 0.09 | 0.09 | 0.09 | 0.10 |
| College or More | 0.52 | 0.55 | 0.55 | 0.56 | 0.56 | 0.56 | 0.56 | 0.55 |
| Work Loss | 0.42 | 0.43 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.43 |
| Unemployment Rate | 12.4% | 14.3% | 13.8% | 14.4% | 12.6% | 12.2% | 12.0% | 11.5% |
| Anxious | 0.310 | 0.298 | 0.300 | 0.286 | 0.297 | 0.305 | 0.319 | 0.324 |
| Worried | 0.221 | 0.221 | 0.217 | 0.211 | 0.221 | 0.226 | 0.239 | 0.242 |
| Losing Interest | 0.194 | 0.201 | 0.198 | 0.194 | 0.197 | 0.195 | 0.201 | 0.206 |
| Depressed | 0.173 | 0.180 | 0.179 | 0.177 | 0.185 | 0.184 | 0.187 | 0.194 |
| Respondents | 50,465 | 27,993 | 85,133 | 63,607 | 66,007 | 52,199 | 47,311 | 71,323 |

Notes—Sources: Census Pulse Survey and the Opportunity Insights Economic Tracker from [Chetty et al. \(2020\)](#). The table reports the mean of a series of descriptive variables across eight weeks of the Census Pulse Survey. The values of the demographic binary variables (male, married, white, black, hispanic, college or more, and work loss) indicate the share of total respondents that week with that characteristic. Specifically, "College or More" refers to those with a BA or higher, and "Work Loss" refers to respondents who said their household has experienced a loss of income since March 13, 2020. The state unemployment rates are originally from the Department of Labor and are lagged to match respondents' reflections on their previous week. The four mental health variables – anxious, worried, losing interest, and depressed – are indicators of whether or not the individual experienced that negative mental state for "more than half the days" and "nearly every day" (1), or for "several days" and "not at all" (0).

Table 3: The Relationship Between State Unemployment and Individual Income Declines

| | Household Income Loss | | |
|-----------------------------|-----------------------|---------------------|-------------------|
| | (1) | (2) | (3) |
| Unemployment Claims (log) | 0.020*** (0.001) | 0.023*** (0.001) | 0.010* (0.006) |
| Demographic/Income Controls | | yes | yes |
| State/Week FE | | | yes |
| Observations | 463,659 | 463,659 | 463,659 |
| Adjusted R ² | 0.002 | 0.036 | 0.053 |

Notes—Sources: Census Pulse Survey and the Opportunity Insights Economic Tracker from [Chetty et al. \(2020\)](#). The table reports the coefficients associated with regressions of an indicator for whether the respondent’s household has experienced work-related income loss since March 13, 2020 on logged total unemployment claims by state. Individual controls include: age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

Table 4: The Moderating Effects of Marriage for Income Losses on Mental Health

| | <i>Dependent variable:</i> | | | | | |
|-------------------------|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Is Anxious | | | Is Depressed | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Married | -0.077*** (0.002) | -0.061*** (0.002) | -0.024*** (0.002) | -0.086*** (0.002) | -0.068*** (0.002) | -0.028*** (0.002) |
| Work Loss | 0.147*** (0.002) | 0.126*** (0.002) | 0.115*** (0.002) | 0.116*** (0.002) | 0.098*** (0.002) | 0.086*** (0.002) |
| Married * Work Loss | -0.021*** (0.003) | -0.010*** (0.003) | -0.009*** (0.003) | -0.026*** (0.003) | -0.019*** (0.003) | -0.017*** (0.003) |
| Demographic Controls | | yes | yes | | yes | yes |
| Income Controls | | | yes | | | yes |
| State/Time FE | | | yes | | | yes |
| Observations | 463,659 | 463,659 | 463,659 | 463,659 | 463,659 | 463,659 |
| Average Share | 0.30 | 0.30 | 0.30 | 0.18 | 0.18 | 0.18 |
| Adjusted R ² | 0.030 | 0.054 | 0.064 | 0.033 | 0.048 | 0.062 |

Notes.—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been anxious or depressed at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. Individual controls include: age, gender, number of children, education, income, and race. When controls for income*education are included, our independent variable of interest, married*work loss, remains significant across all specifications and only changes to -0.008 (0.003) for anxiety. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

Table 5: Heterogeneity in the Moderating Effects of Marriage on Anxiety

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|-------------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| | Men | Women | White | Black | Hispanic | Young | Old | Low Income | Middle Income | High Income |
| Married | -0.014*** (0.003) | -0.032*** (0.003) | -0.022*** (0.002) | -0.011 (0.007) | -0.040*** (0.007) | -0.031*** (0.003) | -0.031** (0.013) | -0.030*** (0.008) | -0.020*** (0.005) | -0.035*** (0.005) |
| Work Loss | 0.129*** (0.004) | 0.107*** (0.003) | 0.121*** (0.003) | 0.092*** (0.006) | 0.103*** (0.007) | 0.119*** (0.004) | 0.127*** (0.016) | 0.104*** (0.006) | 0.125*** (0.005) | 0.120*** (0.009) |
| Married * Work Loss | -0.020*** (0.005) | -0.003 (0.004) | -0.016*** (0.003) | 0.011 (0.010) | 0.004 (0.009) | -0.010** (0.005) | -0.025 (0.020) | -0.002 (0.011) | -0.015** (0.007) | -0.014 (0.010) |
| Observations | 183,701 | 279,958 | 379,282 | 39,557 | 41,678 | 203,411 | 9,210 | 44,353 | 66,618 | 58,567 |
| Adjusted R ² | 0.059 | 0.053 | 0.068 | 0.034 | 0.037 | 0.042 | 0.046 | 0.038 | 0.053 | 0.048 |

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been anxious at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020 on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). "Middle income" refers to household income from \$35,000-99,000. "High income" refers to households with an income above \$100,000. "Young" refers to individuals under the age of 45, and "old" refers to individuals between the ages of 45 and 65. Individual controls include: age, gender, number of children, education, income, and race. State and week FE are included for each column, as well as full controls (adjusted to the subset of data): age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

Table 6: Heterogeneity in the Moderating Effects of Marriage on Depression

| | Is Depressed | | | | | | | | | |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | Men | Women | White | Black | Hispanic | Young | Old | Low Income | Middle Income | High Income |
| Married | -0.028*** (0.003) | -0.029*** (0.002) | -0.028*** (0.002) | -0.020*** (0.006) | -0.034*** (0.006) | -0.034*** (0.003) | -0.027** (0.011) | -0.040*** (0.007) | -0.034*** (0.004) | -0.036*** (0.004) |
| Work Loss | 0.100*** (0.004) | 0.080*** (0.003) | 0.089*** (0.002) | 0.066*** (0.006) | 0.089*** (0.006) | 0.094*** (0.003) | 0.086*** (0.014) | 0.083*** (0.005) | 0.091*** (0.005) | 0.081*** (0.008) |
| Married * Work Loss | -0.025*** (0.004) | -0.014*** (0.003) | -0.023*** (0.003) | 0.008 (0.008) | -0.007 (0.008) | -0.022*** (0.004) | -0.032* (0.017) | 0.002 (0.010) | -0.010 (0.006) | -0.019** (0.008) |
| Observations | 183,701 | 279,958 | 379,282 | 39,557 | 41,678 | 203,411 | 9,210 | 44,353 | 66,618 | 58,567 |
| Adjusted R ² | 0.065 | 0.056 | 0.064 | 0.043 | 0.040 | 0.059 | 0.064 | 0.026 | 0.034 | 0.026 |

Notes—Source: Census Pulse Survey. The table reports the coefficients associated with regressions of an indicator for whether the respondent has been depressed at least three of the seven past days on an indicator for being married, an indicator for household loss of income since March 13, 2020 on an indicator for being married, an indicator for household loss of income since March 13, 2020, and their interaction, conditional on individual controls and state and week-of-the-year fixed effects. "Low income" refers to any household with income below \$34,999 (before taxes). "Middle income" refers to household income from \$35,000-99,000. "High income" refers to households with an income above \$100,000. "Young" refers to individuals under the age of 45, and "old" refers to individuals between the ages of 45 and 65. Individual controls include: age, gender, number of children, education, income, and race. State and week FE are included for each column, as well as full controls (adjusted to the subset of data): age, gender, number of children, education, income, and race. Standard errors are heteroskedasticity-robust and observations are weighted by the sample weights.

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