Gender Differences in Consumer Debt Stress: Impacts on Job Performance, Family Life and Health

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Abstract
During periods of economic instability, women may suffer uniquely from economic stress compared to men. We examine stress effects from financial debts by gender with monthly national-level household data starting in 2006, going through the Great Recession in the U.S and into the recovery period. We find that women on average in the sample exhibit approximately 30% overall greater debt stress scores than men. Underlying factors for both genders are examined, including impacts on job performance, family life and health. Sources of disadvantage for women and implied policy needs are explored. Our findings and their consequences are examined relative to economic circumstances for women that have been documented as a result of the pandemic-induced recession.

Keywords Consumer debt stress · Gender · Job performance · Family life · Health · Recession

Introduction
As the role of women increased in the market economy in the U.S. throughout the second half of the twentieth century, their use of debt instruments increased also. Increasingly, research and informal information from financial and family counselors have shown that debt has become a significant disruptive factor in the lives of many consumers. In this paper, we use original data from a nationwide survey of more than 25,000 U.S. households, the Consumer Finance Monthly (CFM), taken from January 2006 through June 2013, to examine debt stress by gender throughout the seven-year period which included the dramatic upheaval of the Great Recession, recovery and beyond. These data thus capture a time of significant economic challenge for women, and although they are from the recession preceding the pandemic, they bear similarities to women’s situation in the pandemic recession and will be useful for understanding both the immediate and prolonged impact of Covid on their financial lives (Friedline et al., 2020). Here, in addition to looking at overall stress from debt, we also take a particular focus in investigating separately specific functional areas that underly stress. These include an analysis by gender of the negative impact of debt separately on job performance, family life, and health.

We find that throughout the period of the Great Recession, women consistently exhibited greater overall stress from debt than comparable men. As the economic recovery from the recession proceeded, the overall debt stress impact improved for men in the sample but deteriorated for women. In specific functional areas, the negative impact of debt was found to be higher for women than men in job performance and family life, a finding that may be echoed in the documented increased unpaid care work for out-of-school children widely experienced by women in the pandemic to the detriment of their market work (Kashen et al., 2020). A significant factor in our findings from the Great Recession is related to marital status, with married women being more stressed from debt due to income issues than other gender/marital status groups. Some ethnic/racial differences within gender were found, with Latina women exhibiting overall more debt stress than comparable White non-Latina women. This may be connected to Latinos’ greater likelihood of being unbanked and thus not having access to some

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types of credit (Apaam et al., 2018; Richman et al., 2015). African American females report a greater negative impact on their health from debt than comparable White, non-Latina females. This last result underscores an important way that health disparities among African American women are connected to other day-to-day problems in that population which have continued and been amplified by the Covid pandemic (Carratala & Maxwell, 2020; Rushovich et al., 2021).

Thus the experience of the Great Recession and recovery may provide insights that may help set policy for the current pandemic-induced upheaval (Dynn, 2020). The female patterns of greater debt stress, especially in turbulent times, suggest a need for policy attention to aspects of women’s access to credit, possible unequal collections practices to which they may be subjected, and other issues which are discussed below.

**Literature on Consumer Debt Stress and Changes in Measurement Type**

Interest in the behavioral implications of household debt cuts across a broad swath of social sciences. This has been less studied in economics, although below we show that consumer debt has many behavioral economic impacts and can shed light on gender-related disadvantages in credit markets. The earliest efforts to address debt stress did not tie those stress conditions to debt in a direct survey instrument. Typically, they use subjective attitudinal measures of wellbeing to connect to various objective conditions of debt such as amount of debt, debt to income, delinquency, etc. These studies include works by Lea et al. (1993), Lea et al. (1995) Brown et al. (2005), and Bridges and Disney (2010). Similarly, Berger et al. (2016) used data from the National Survey of Families and Households to examine debt and depressive symptoms from short-term debt. Most of this work established a link between indebtedness and psychological wellbeing.

Survey instruments were eventually developed to directly assess psychological stress coming specifically from debt, with some of the first efforts in this direction being initiated by Paul Lavrakas. This resulted in studies of a variety of psychological stress and economic issues using these measures with the earliest being found in Lavrakas et al. (2000) and in Drentea & Lavrakas (2000). Other issues studied with these measures include anxiety and health where debt is found to contribute to greater anxiety and a variety of health issues (Drentea, 2000; Lavrakas & Tompson, 2009). A negative effect on consumer confidence has been found by Ekici & Ozbeklik (2013). Haurin et al. (2019) used the direct survey stress instrument to study the effects of debt from reverse versus standard mortgages. This type of direct survey instrument can be used in other types of research.

Specific gender findings on debt include work by George et al. (2018) who used data from the Survey of Consumer Finances examining gender differences in the attitudes toward using debt for different types of purchases. Research on stress from specific types of debt also using data from the Consumer Finance Monthly has found non-collateralized debt to be associated with higher stress and the collections procedure more stressful for women (Dunn & Mirzaie, 2016). Previous research by Thorne (2010) has found more stress for women in deciding to handle bankruptcy filings.

Another strand of literature has looked at gender differences in financial literacy and planning. This includes studies by Loibl and Hira (2006), Lusardi and Mitchell (2008), Fonseca et al. (2012), and Bucher-Koenen et al. (2017). All generally find women lagging behind men in most areas addressed. Finally, there has recently been renewed interest in the financial stresses of women due to a common disadvantage they suffered from caring for children at home during the pandemic. Research relevant to this will be discussed.

**The Data and Measurement of Debt Stress Used Here**

The Consumer Finance Monthly (CFM) survey is a publicly available product from the Center for Human Resource Research at the Ohio State University. It is a national-level, monthly household telephone survey that uses random digit dialing techniques. It is not panel but represents a time series of cross-sectional observations, with the same questions being asked of a different randomly selected sample of subjects each month. Its data are weighted using information from the Current Population Survey to reflect national socioeconomic characteristics. The survey asks a wide range of questions pertaining to household finances and demographics, providing a comprehensive look at critical aspects of household financial condition on a monthly basis. Here we used a part of those data for the years 2006 through June 2013 for which a total of 19,410 completed survey cases were obtained.

We began by examining general debt stress by gender with an overall debt stress score computed from four questions in the survey. These questions are specified in Appendix 1. Their internal consistency and reliability and the methods used to aggregate them have been discussed previously.
Below we address separately each of three functional areas underlying overall debt stress—stress on job performance, family life, and health. Questions which were used for these specific functional areas are presented in the relevant sections below.

The Historic Path of the Overall Consumer Debt Stress Scores by Gender

In Fig. 1 below, we present a graph of the Consumer Debt Stress Index for the sample across time for both genders. This index is based on the period January 2006 so that it has a value of 100 in that period. Subsequent movements can then be tracked relative to that base value. (See Appendix 1 for detail on the construction of the index.)

Looking at the path of overall consumer debt stress, we see that it remained fairly low for both genders in the early years of the survey. It began to increase for both men and women with the collapse of the subprime mortgage market in 2007 and peaked at the height of the Great Recession in 2009. As the economy began to recover, debt stress fluctuated for both genders on a similar downward trajectory. However, a key feature of this plot is that the stress level for females is above that of males in all but two months over the entire period of 88 months, and the gap widens as the recovery solidified in the final stages of our data.

The employment factor continued to be a problem for both genders during the recovery. However, according to a Pew study (Kochhar, 2011), while men lost jobs at a higher rate during the Great Recession, they also regained them at a higher rate. Pew researchers using BLS data found that from the end of the recession in June 2009 through May 2011, men gained 768,000 jobs and their unemployment rate went down by 1.1 percentage points to 9.5%. On the other hand, women lost 218,000 jobs during the same period, thus raising their unemployment rate by 0.2 percentage points to 8.5%. Hence despite the lower unemployment rate for women, the rate of job recovery was slower for them, and this undoubtedly contributed to their greater levels of debt stress. While the data used here predate the pandemic recession, they may provide some guideposts as to what outcomes of the pandemic economic downturn might be. Thus, the findings from the Great Recession of 2007–2009 raise additional alarms for women given that to date in the pandemic upheavals, women are experiencing higher rates of unemployment than men and greater withdrawal from the labor force as a result of school and daycare closures (see Bureau of Labor Statistics, Current Population Survey, 2021). In September 2020, it was reported that four times as many women as men dropped out of the labor force (Kashen et al., 2020). The burden of more non-market work on women, which was well documented to interfere with their employment before the pandemic, if anything will become more of a problem going forward.
Another factor in the higher debt stress of women is connected to the kinds of debt they incur. Earlier research has found that non-collateralized debt is the most stress-inducing, with the top three in descending order being payday loan, credit card debt, and student loan debt (Dunn & Mirzaie, 2016). In two of these three debt categories, women in our sample were found to hold significantly more of the debt per dollar of income than men. Women held 74% more student debt per dollar of income and 14% more credit card debt per dollar of income than men, with both differences significant at the 1% level. We should also note that women in our sample also held 1% more payday loan debt per dollar of income than men, although the difference did not reach the 10% significance level. Nevertheless, this trend, may be a problem for women given that the presence of a payday loans increases the likelihood of personal bankruptcy by a factor of two (Skiba & Tobacman, 2019).

It is important here to consider possible differences in institutional access to credit between the genders. The Equal Credit Opportunity Act of 1974 in the US prohibits the use of gender information in the loan process. This makes the credit history of women difficult to study. However, researchers who have used proprietary data have similarly found that women have greater revolving credit utilization rates and that they also have greater difficulties repaying their debt, which may be the result of their economic circumstances, labor market experiences, and related factors (Li, 2018). Experian reports that in 2019 the average FICO scores of women and men were almost identical—704 and 705 respectively (McGurran, 2020). However, Li examined Vantage credit scores from Transunion over the period 2007 to 2017 controlling for demographic characteristics and found that women have somewhat lower credit scores than comparable men, especially in the older age categories. This would, of course, lead to a credit disadvantage for women in virtually all loan markets. Indeed, examining mortgage behavior by gender, Goodman et al. (2016) find that women pay more for mortgages due to their weaker credit characteristics and also due to having a higher percentage of subprime mortgage debt despite the fact that when credit characteristics are controlled for, female-only borrowers in their sample defaulted less than their male counterparts. These findings suggest a need to rethink how creditworthiness is determined by lending institutions, as current mechanisms may not be accurately predicting the true risk of female borrowers. We should note, however, that earlier work on determining group related bias using 2003 Transunion and Social Security Administration data found evidence of disparate impact only by age and not race or gender (Avery et al., 2010). Hence time-related changes need to be considered, especially considering events such as the Great Recession. Where these kind of credit disadvantages, exist, they would work to increase the stress that women feel from their debts relative to men’s stress.

Finally, one could speculate that the observed gender difference in debt stress may result from the fact that women express their feelings and emotions more freely than men. It is of course difficult to pin down deeper psychological motivation among different respondents in survey setting without deeper psychological probing which is not available in this data set. There is previous research which attempts to adjust for these factors and concludes that the differences in distress expressed by women are indeed genuine (Mirowsky & Ross, 1995). These findings are supported by Simon and Nath (2004). Literatures in other economic settings have also found attitudinal gender differences. In particular, women have been found to show more risk aversion than men (Croson & Gneezy, 2009; Eckel & Grossman, 2008). However, more recent survey research finds that the financial risk aversion gender factor changes with real changes in education and cultural environment (Hibbert et al., 2013; Liu & Zuo, 2019). Similarly, research has shown that women have greater price perceptions than men, but that difference is likely to be the product of concrete differences in shopping habits (Bryan & Venkatu, 2001). Clearly more research is needed in this area. However, these studies generally support the notion that any tendency for women to be expressed differently on surveys is coming from something that actually exists in their environment or experience at the time of questioning and is not merely an artifact of greater emotional expressiveness.

**Determinants of Debt Stress by Gender**

**The Econometric Model and Results**

Here a tobit model has been fit separately for males and females. The dependent variable in this model is the individual debt stress scores reflecting each subject’s level of stress from debt. As explained in Appendix 1, these scores are derived by aggregating a subject’s responses to the four debt stress questions on a 5-point scale ranging from zero (no stress) to four (the highest level of stress). A two-sided tobit model is used since the values of our debt stress scores by definition are constrained to be between zero and four, thus yielding a regression which is censored on two sides. This model is given in Eq. 1 below.

\[
\text{Debt Stress Score} = \alpha + \beta_1 \text{LogIncome} + \beta_2 \text{LogDebt} + \beta_3 \text{MaritalStatus} + \beta_4 \text{MaritalStatus} \times \text{LogIncome} + \beta_5 \text{MaritalStatus} \times \text{LogDebt} + \beta_6 \text{LogAssets} + \beta_7 \text{AvailableCreditCardLine} - \text{to} - \text{Income} + \beta_8 \text{ChildrenPresent} + \beta_9 \text{Age} + \beta_{10} \text{Education} + \sum \beta_{11j} (\text{Ethnic / Race})_j + S_i \beta_{12i} \text{Year}_i + \epsilon
\]

(1)

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4 Preliminary investigations with gender dummy interactions were qualitatively similar.
Here the debt variable refers to total household debt from all sources, and income is total household income from all sources, both in log form. We also control access to liquidity, which we enter as the amount of unused credit card credit line for a household in ratio to household income; the log of household assets; and relevant socioeconomic and demographic variables including racial/ethnic background, age, education, marital status and presence of children. Our preliminary investigations showed significant gender differences in debt stress by marital status, and we have hence included interaction terms for both (1) debt and marital status and (2) income and marital status in our model. To control for the macroeconomic environment, in addition to income we added year fixed effects for the different years of the survey.

Not unexpectedly, we found that both men and women feel significantly reduced stress when incomes, assets and available credit are higher. Both genders feel significantly increased stress when debt levels are higher. These are in line with previous research both from surveys in 2018 and in pandemic era focus groups in December 2020 (Hasler et al. 2021). However, there were significant gender differences connected to both debt levels per se and to income when income is interacted with marital status.

First, women were more stressed by the level of debt than men. Next, by interacting income levels with marital status, we found that for any level of debt, the magnitude of the stress coming from the income level was statistically greater for married women than for any of the populations.

| Table 1 Factors in consumer debt stress by gender, tobit fits |
|-------------------------------------------------------------|
| **Variable** | **Females: coefficient (S.E.)** | **Males: coefficient (S.E.)** | **Difference female – male (S.E.)** |
| Intercept | 3.70 (0.40)*** | 3.53 (0.44)*** | 0.17 (0.59) |
| Log income | –0.20 (0.04)*** | –0.15 (0.04)*** | –0.04 (0.060) |
| Log debt | 0.19 (0.01)*** | 0.17 (0.01)*** | 0.020 (0.010)* |
| Marital status (married = 1) | 1.22 (0.49)* | 0.24 (0.51) | 0.98 (0.71) |
| Marital × Log income | –0.12 (0.05)* | –0.01 (0.05) | –0.11 (0.069) |
| Marital × Log debt | 0.002 (0.01) | –0.01 (0.01) | 0.015 (0.013) |
| Log assets | –0.16 (0.01)*** | –0.19 (0.02)*** | 0.03 (0.022) |
| Available credit card line/income | –0.11 (0.03)*** | –0.07 (0.03)** | –0.04 (0.042) |
| Children present | 0.09 (0.05)* | 0.14 (0.05)** | –0.05 (0.071) |
| Age | –0.01 (0.001)*** | –0.01 (0.002)*** | 0 (0) |
| Education (years) | –0.0002 (0.0018) | –0.004 (0.002)* | 0.0033 (0.0027) |
| African American | –0.06 (0.07) | 0.05 (0.09) | –0.11 (0.071) |
| Latino | 0.18 (0.09)* | 0.21 (0.09)* | –0.03 (0.13) |
| Other ethnic/racial groups | –0.09 (0.09) | 0.06 (0.08) | –0.15 (0.12) |

n = 9723

†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001

**Results**

We saw in Fig. 1 that while both men and women show the same general pattern of debt stress across time, the level of debt stress for women throughout the period of our study was persistently higher than that of men. In Table 1, we now look deeper at these gender differences in our Tobit model which controls for key socioeconomic variables.

Not unexpectedly, we found that both men and women feel significantly reduced stress when incomes, assets and available credit are higher. Both genders feel significantly increased stress when debt levels are higher. These are in line with previous research both from surveys in 2018 and in pandemic era focus groups in December 2020 (Hasler et al. 2021). However, there were significant gender differences connected to both debt levels per se and to income when income is interacted with marital status.

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| Table 2 Marital status effects of debt and income based on Table 1 |
|---------------------------------------------------------------|
| **Women** | **Men** | **Difference** |
| Effect of debt on debt stress: coefficients (SE) by gender and marital status |
| Unmarried | 0.19 (0.01) | 0.17 (0.01) | 0.020 (0.010)* |
| Married | 0.19 (0.01) | 0.16 (0.01) | 0.035 (0.009)*** |
| Difference | 0.002 (0.009) | –0.013 (0.009) | 0.015 (0.013) |
| Effect of income on debt stress: coefficients (SE) by gender and marital status |
| Unmarried | –0.20 (0.04) | –0.15 (0.04) | –0.04 (0.06) |
| Married | –0.32 (0.03) | –0.16 (0.03) | –0.16 (0.05)** |
| Difference | –0.12 (0.05)* | –0.01 (0.05) | –0.11 (0.07) |

n=9723

*p < 0.05, **p < 0.01, ***p < 0.001
of married and unmarried men and unmarried women. See Table 2.

The more precarious position of married women with regard to stress in general compared to single women and all men has been highlighted in previous research, where it is commonly tied to women’s greater household and family responsibilities (Cerrato & Cifre, 2018; Schaeffer, 2019; American Psychological Association, 2010). These factors would be expected to play some role in the stress over debt as well. Surveys show that while women tend to make most day-to-day household purchase decisions, a significant proportion of males handle all decision making with regard to big ticket items like automobiles, which are typically financed on credit and add significantly to household debt (Silverstein & Sayre, 2009). Yet women can be held responsible legally for these debts incurred by a partner (Macdonald, 2020). In a divorce, which occurred in 40–50% of marriages in the US during the time of our survey (see American Psychological Association, 2022), women suffered disproportionate losses in household income, increases in poverty, and greater chances of debt default compared to men (Leopold, 2018; Lyons & Fisher, 2006). All of these factors could understandably cause additional anxiety and debt stress for married women. Figure 2 below which plots the Debt Stress Index across time for married and unmarried women illustrates the greater stress for married women.

As seen in Table 1, some demographic variables affect debt stress similarly for women and men, such as presence of children in the household and age of the respondent. Stress increases with the presence of children and decreases with age. The fact that younger respondents show more debt stress is consistent with other work by Jiang and Dunn (2013) which finds younger cohorts taking on debt at higher rates and paying off at slower rates, and also work by Shand (2013) showing high levels of stress for the young over student debt. African-American and other racial/ethnic categories (predominantly Asian) are not significantly different than Whites. However, Latinos of both genders show greater debt stress than the reference group of White females and White males respectively. This greater level of stress is roughly of the same magnitude for both Latino males and females. Increasing education decreases debt stress for men slightly but not for women; and the difference between the genders did not reach the 10% significance level.

We have examined our model for endogeneity of log debt, which could potentially arise either from reverse causality or from the presence of unobserved characteristics affecting both stress and debt. We used an instrumental variable which is the response to the questions asking respondents if they use credit cards to pay bills. Using credit cards to pay bills raises the debt of a respondent but should only affect stress through the influence on debt. Wald tests for endogeneity of log debt (and its interaction with marital status) resulted in $\chi^2(2) = 2.25$ ($p = 0.325$) for females and $\chi^2(2) = 1.95$ ($p = 0.377$) for males, thus not rejecting the null hypothesis of exogeneity.

**Underlying Determinants of Debt Stress: The Impact by Gender in Three Functional Areas**

To understand the factors underlying debt stress in more depth, we have analyzed additional questions from the CFM survey which are connected to specific avenues of stress. These are (1) job performance, (2) family life, and (3)
health. The survey questions used here cover stress from all consumer debt sources including mortgages, credit cards, home equity loans, car loans, student loans, payday loans, etc. Our dependent variable for this investigation used the five-category response for each subject ranging from zero for “no stress” to 4 for “extreme problem” for each of the specific stress areas.

In each of the three sections below, we present graphs showing the percentage of male and female respondents who expressed stress from debt in each of the three separate functional areas in the period from January 2006 through June 2013. This includes stress on job performance (Fig. 3), stress on family life (Fig. 4), and stress on health (data beginning only in 2008 Fig. 5). The debt stress in each case in these graphs is measured as a response being in one of the top three impact categories on our 5-point scale, indicating that it is a medium, large, or extreme problem in their lives. We have fit ordered probit regressions for the three functional stress categories separately for men and women using the monthly data and controlling for other relevant influences. As independent control variables, we include the same demographic and financial variables used in our tobit fit above.

We have examined our model for endogeneity of log debt again using as an instrumental variable the response to the question asking if respondents use credit cards to pay bills. The Wald test for endogeneity of log debt (and its interaction with marital status) was not significant for males in any case and was significant only in the case of family life for females: $\chi^2(2) = 8.98$ ($p = 0.011$). In this case, the model was estimated using the instrumental variable for log debt and its interaction with marital status.

In Appendix 4 we present additional estimates from a more general model of the discrete responses. The test for the “parallel lines” property of the ordered probit model failed at conventional significance levels, as is often the case.\(^8\) Most of the discrepancy from the parallel lines assumption arises in the index function for the lowest level response, suggesting a zero-inflated ordered probit model. The first part of such a model is binary probit determining whether the respondent is stressed or not in the relevant category, while the second part is ordered probit for the level of stress in those who are stressed; both parts are estimated simultaneously by maximum likelihood. These results are useful in that they provide an insight into the degree of stress in these categories for those who register stress apart from the basic result of being stressed or not. We do not discuss these additional results in detail here since the conclusions specifically regarding stress by gender are qualitatively similar to those presented in the following three subsections. However, while an expanded investigation is beyond the scope of the present paper, we include these results based on the zero inflated model as we feel they could bear closer attention in future research.

**Impact of Debt on Job Performance**

Figure 3 below shows the percentage of males and females in the sample reporting in the three top negative impact categories for the effect of debt on their job performance for the following survey question:

How much of a problem, if any, has your debt caused for your job performance? Is it (a) an extreme problem, (b) a large problem, (c) a medium problem, (d) a small problem, or (e) no problem at all?

Considering both genders, there was roughly a doubling of the high negative impact responses in the sample from the 6–7 percentage point range before the subprime mortgage market collapse to about the 11–13 percentage point range in 2009. This indicates how debt worries can significantly impact economic activity through worker performance in

\(^8\) The test of the parallel lines condition was suggested by a referee. We did not pursue the generalized ordered probit model in view of its more complex interpretation, as well as the problem of negative predicted probabilities for potential outcomes in a significant number of cases.
critical times. The peak in the impact on job performance for both genders came at the height of the recession in 2009, and never returned to levels pre-dating the 2007 subprime mortgage collapse for either gender by 2013 despite some improvement. Females, however, showed a greater level of disruption on job productivity than men consistently through this period.

Previous studies of job problems have also found a connection between debt and absenteeism, accidents, drinking problems and lowered productivity coming both from mental stress and time at the job spent dealing with personal financial issues (Kim et al., 2006). A survey by the Society for Human Resource Management reports that financial stresses have resulted in tardiness and the inability to focus at work (Spark, 2018). Studies from the Center for Retirement Research at Boston College found that financially stressed employees miss almost twice as many days (3.5) each year compared to their unstressed counterparts (Center for Retirement Research at Boston College, 2016). In a 2016 survey, American HR managers reported that they estimate 66% of their employees were struggling with debt; and it had affected the ability to concentrate in 60% of employees (Miller, 2016). There have also been reported job disruptions from collection agents calling at places of employment.9

In addition to these problems, recent research has also shown that work effort on a job tends to increase when macroeconomic conditions deteriorate as workers strive for greater productivity in order to avoid layoff (Senney & Dunn, 2019; Burder et al., 2016; Lazear et al., 2016). This documented pressure to increase productivity during an economic downturn would naturally amplify the disruptive factors from debt, thus contributing to the spike in negative impact on job performance seen in Fig. 3.

Turning to our ordered probit fits of the individual debt stress score from the 5-point scale for the job performance question on our same independent variables, in Table 3 we see again that marital status played a similar role in gender differences.10 The male and female coefficients were significantly different for marital status and also for the interaction of marital status with income—in both cases with the impact being greater for women. This is in line with the observed greater difficulty of these minority groups in the job market relative to White males throughout this period (Cunningham, 2018).

We also see racial/ethnic differences in our results for impact on job performance. Among African-Americans, as well as the “other” category (comprised of mostly Asians), males showed significantly more impact of debt stress on job performance than White males. This is in line with the observed greater difficulty of these minority groups in the job market relative to White males throughout this period (Cunningham, 2018).
Impact of Debt on Family Life

Figure 4 below presents a graph showing the percentage of females and males who reported that their family life has been affected in a strongly negative way by debt, responding in the top three negative categories to the following question:

How much of a problem, if any, has your debt caused for your family life? Is it (a) an extreme problem, (b) a large problem, (b) a medium problem, (d) a small problem, or (e) no problem at all?

Throughout the period of the survey, the percentage of females showing strong negative debt impact on their family life was greater than the percentage for males, although both genders showed a similar pattern of change over the survey period, starting before the subprime mortgage collapse and running through the ensuing Great Recession and recovery. The peak in this type of stress in the CFM survey came at the height of the recession in 2009, then eased off as the economy began to recover but never returned to levels pre-dating the 2007 subprime mortgage collapse for either gender. This pattern regarding the peak at the height of the recession was similar for the job performance area as well. In addition, as the economy moved further into recovery, females began to show a resurging trend in the impact of debt stress on their family life while males showed some easing by the end of the survey period in 2013. For job performance, as seen in Fig. 3, the debt stress for men fell more steeply in the recovery than it did for women. Employment issues discussed earlier which showed women regaining jobs at a slower rate than men during the recovery have probably contributed to this disparity seen in both the job and family life area. These findings suggest that policy makers may have to focus close attention on the areas of female employment and labor market barriers as we move out of the pandemic recession. There is also a long history of women carrying a disproportionately larger share of household duties which is seen in time use survey data from around the world (Ferrant et al., 2014). The pandemic is likely to have exacerbated the burden of this situation, including stresses from financial debts.

In general, our findings on the family distress brought on by debt reinforce the findings of previous researchers who have shown family discord increases with financial problems and are predictive of lower relationship quality. Dew et al. (2012) have shown that disagreements about financial issues have become the number one predictor of divorce among married couples. Britt et al. (2017) have shown how a couple’s conflicts can be related to perceptions of their partner’s financial habits.

Table 4 below presents the ordered probit fits of the individual debt stress score from the 5-point scale for the family life question on our same independent variables. Looking at this table, we see in general that the family life for both women and men has been negatively impacted by the general economic circumstances such as income, debt, assets, and available credit line. The presence of children increased stress for both, and the young of both genders felt more stressed in their family life than older consumers. Married women again felt more stress, and the interaction terms suggest that this was again related to their income situation. Our results in the area of debt stress impact on family life are

Table 4  The impact of debt on family life ordered probit fit

| Variable                  | Females: coefficient (S.E.) | Males: coefficient (S.E.) | Difference female – male (S.E.) |
|---------------------------|-----------------------------|---------------------------|---------------------------------|
| Intercept                 | 2.25 (0.41)***              | 2.73 (0.045)**            | − 0.47 (0.61)                   |
| Log income                | − 0.19 (0.044)***           | − 0.19 (0.046)**          | − 0.0044 (0.064)                |
| Log debt                  | 0.16 (0.014)***             | 0.12 (0.0079)**           | 0.039 (0.016)*                  |
| Marital                   | 1.14 (0.52)*                | 0.046 (0.52)              | 1.09 (0.74)                     |
| Marital × Log income      | − 0.11 (0.057)†             | 0.0082 (0.0509)           | − 0.12 (0.077)                  |
| Marital × Log debt        | 0.0028 (0.019)              | − 0.0017 (0.0101)         | 0.0045 (0.022)                  |
| Log assets                | − 0.14 (0.014)***           | − 0.16 (0.016)**          | 0.019 (0.021)                   |
| Available credit card line/Income | − 0.16 (0.029)***          | − 0.10 (0.026)**          | − 0.60 (0.039)                  |
| Children present          | 0.13 (0.044)**              | 0.15 (0.045)**            | − 0.017 (0.063)                 |
| Age                       | − 0.0033 (0.0019)†          | − 0.0086 (0.0017)**       | 0.0053 (0.0026)*                |
| Education (years)         | − 0.017 (0.0072)*           | − 0.0028 (0.0020)         | − 0.014 (0.0074)†               |
| African American          | 0.017 (0.068)               | 0.034 (0.085)             | − 0.018 (0.11)                  |
| Latino                    | 0.075 (0.080)               | 0.15 (0.087)†             | − 0.078 (0.12)                  |
| Other ethnic/racial       | 0.029 (0.083)               | 0.12 (0.073)              | − 0.089 (0.11)                  |

n = 9882

†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001
thus similar to those found for job performance. No racial/ethnic differences reached the 5% significance level.

**Impact of Debt on Health**

The final factor underlying general debt stress for which there are data in our study is the impact on health. It is examined with the following survey question:

“How much has your debt affected your health? (a) Very much affected, (b) quite affected, (c) somewhat affected, (d) not much affected, or (e) not at all affected?”

In the health area, previous studies looking at the general impact of financial strain include the following. Currie and Tekin (2015) found that mortgage foreclosures are associated with increased hospital visits for a broad array of mental and physical health conditions. Lavrakas and Tompson (2009) found that stress from debt is related to such health conditions as ulcers, heart attacks, and severe depression. Drentea (2000) has related debt stress to anxiety. Nelson et al. (2008) associated credit card debt with unhealthy conditions for college students, including binge drinking, overweight, and substance abuse. Lyons and Yilmazer (2005) used the *Survey of Consumer Finances* to examine health and financial strain for different income groups; and Kim and Lyons (2009) used the 2002 and 2004 *Health and Retirement Survey* to connect financial strain including household solvency, liquidity, and investment asset accumulation to increased health problems. Clayton et al. (2015) have examined debt and health outcomes across 17 European countries and found that long-term unsecured debt and mortgage debt were associated with poorer health outcome.

The question on health impact that we used from the CFM was introduced into the survey in 2008. Thus, we have a shorter time observation on this factor. As Fig. 5 below shows, contrary to the other two functional stress categories discussed above, the level of negative impact of debt on health based on the percentage in the top three stress categories was consistently greater for men than women, although the trends for men and women were similar over time.

Considering *t* tests for the ordered probit coefficients in Table 5, we found that the specific factors underlying the negative debt impact on health are not significantly different between the genders. In particular, we note that financial variables of debts, assets, and remaining access to credit affected both men and women significantly in a similar way; and there appeared to be little significant difference in the way that the two genders were impacted in health by changes in the other socioeconomic factors in our fits. Hence the high debt stress expressed by men over health is coming from differences in levels of the explanatory variables for the two genders, e.g., men carry more debt than women (see Appendix 3 for means of variables by gender). Our findings

| Table 5 The impact of debt stress on health, ordered probit fit |
|---------------------------------------------------------------|
| **Variable** | Females: coefficient (S.E.) | Males: coefficient (S.E.) | Difference female − male (S.E.) |
|---------------|-----------------------------|---------------------------|---------------------------------|
| Intercept | −1.31 (0.42)** | −1.35 (0.48)** | 0.046 (0.64) |
| Log income | 0.064 (0.042) | 0.050 (0.048) | 0.014 (0.064) |
| Log debt | 0.080 (0.0062)***** | 0.084 (0.0074)** *** | −0.0037 (0.0010) |
| Marital status | 0.91 (0.51)** | −0.30 (0.56) | 1.22 (0.76) |
| Marital × Log income | 0.091 (0.050)** | 0.029 (0.053) | 0.062 (0.073) |
| Marital × Log debt | −0.0090 (0.0083) | −0.0003 (0.0090) | −0.0087 (0.012) |
| Log assets | 0.027 (0.015)** | 0.053 (0.017)** | −0.025 (0.023) |
| Available credit card line/Income | 0.079 (0.025)** | 0.053 (0.027)** | 0.026 (0.037) |
| Children present | −0.045 (0.051) | −0.070 (0.054) | 0.025 (0.075) |
| Age | −0.0020 (0.0019) | 0.00022 (0.0020) | −0.0022 (0.0027) |
| Education (years) | 0.0028 (0.0017)** | −0.00073 (0.0018) | 0.0035 (0.0025) |
| African American | 0.20 (0.077)** | 0.095 (0.11) | 0.11 (0.13) |
| Latino | 0.056 (0.095) | 0.10 (0.11) | −0.048 (0.14) |
| Other ethnic/racial | −0.021 (0.094) | −0.069 (0.085) | 0.048 (0.13) |

n = 6706

† *p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001
suggest that stress specifically from debt should be added to the long-acknowledged greater health and longevity issues facing men including general stress (Harvard Health, 2019).

It should also be pointed out that the absolute levels of stress from debt in the health area were much higher for both genders than stress levels in the previous two functional areas discussed here. Health stress also showed less fluctuation over the recovery periods after rising in 2009. Rising costs of health insurance, which affect a very large swarth of households, may partially explain this. Also, as noted in our earlier discussion in this section, stress from debt has been found to be associated with dramatic and obvious events such as heart attacks and hospital visits after a mortgage foreclose. The highly visible nature of health events impacted by debt could be another factor in the larger level of concern expressed in this this area.

It is noteworthy that marital status impacted health from debt stress for women in the opposite way that we found for the other two functional areas above. In the health area, there was a small improvement for women when they were married. This is in line with findings in the medical literature showing that trends towards single-person households have a general negative impact on health (Lim & Lee, 2019; Mather et al., 2019).

Among racial/ethnic groups, African American women had significantly more negative impact from debt stress on their health than White women. This is particularly noteworthy in the pandemic and is in line with a recent study by the Commonwealth Fund that found approximately half of African American survey respondents reported experiencing an economic challenge because of the coronavirus pandemic compared to the 21% of White respondents (Getachew et al., 2020).

**Summary and Conclusions**

This research has empirically examined levels of consumer debt stress and its change across time with particular emphasis on differences by gender. It has used original data from a large sample of U.S. households before, during, and after the Great Recession into the recovery period. It thus brings into sharp focus the struggles with debt encountered by women as a result of economic downturns, and it is relevant for the pandemic-induced downturn which has impacted women in a unique way.

This research finds that overall, women are significantly more stressed by debt than comparable men. The disadvantaged situation of women regarding income is a central factor in this. Although men in our sample carried 11% more debt than women, the men had 27% more income, which gave them a significantly greater cushion in dealing with the stresses of debt. Marital status also played a role. We find that married women are more stressed than single women or men of any marital status holding constant the presence of children, although debt stress increases in the presence of children for both genders.

The generally greater stress of women due to greater household responsibilities has been well documented in the literature, and probably interacts with differential purchasing patterns to enhance the debt stress of women. While women make the majority of day-to-day household purchases, a significant portion of men report being responsible for large, typically credit-based purchases such as automobiles. Nevertheless, women can be held legally responsible for these debts by a partner. There is a literature suggesting that females have disadvantage in divorce, which may also be a factor in our findings of the greater stress for married women (Leopold, 2018; Lyons & Fisher, 2006).

Three key functional areas where stress due to debt impacts our subjects have been examined: job performance, family life, and health. Women are found to show more stress due to certain economic circumstances on both their job performance and family life than men. With regard to impact on health, we find that both genders have been affected by the socioeconomic circumstances of their debt in a similar way. However, the absolute level of debt stress on health impact is greater for men due to differences in the levels of explanatory variables, in particular the fact that men carry more debt than women. We should note that debt stress over health affected a much larger share of respondents of both genders compared to either of the other two function areas examined. Our finding here may reflect rising costs of health insurance which affects a very large market of households. Within racial/ethnic groups, African American women are found to have their health more seriously impacted by debt stress than White non-Latina women, and this highlights another critical way that economic circumstances are contributing to the health disadvantages of that group. Latinos of both genders were found to have more overall debt stress than the comparable White non-Latinos.
There are many areas where policy might be brought to bear on the greater debt stress for women found in this study, as was the case in general after the Great Recession. The continuing income gap between men and women in similar jobs is a major factor in our debt stress findings, and this issue needs renewed vigilance. Reasonable access to credit for women could be addressed in policy actions aimed at banking reform. This should also include women’s greater use of higher stress debt instruments; the ways that credit characteristics are used in credit scoring for women; the impact of more aggressive collections practices on women; and the traditional unbanked status of women in the Latino community (Richman et al., 2015). As the economy emerges from the pandemic-induced recession, debt and its stresses for women might well be a special focus for policy makers.

Appendix 1: Overall Debt Stress and the Construction of the Overall Debt Stress Score and Debt Stress Index

The wording of the questions to evaluate overall debt stress is presented below. The answers were recorded on a 5-point scale as indicated.

1. Overall, how often do you worry about the total amount you (and your spouse/partner) owe in overall debt? Would you say you worry (a) all of the time; (b) most of the time; (c) some of the time; (d) hardly ever; or (e) not at all?

2. How much stress does the total debt you (and your spouse/partner) are carrying cause to you? It is (a) a great deal of stress; (b) quite a bit; (c) some stress; (d) not very much; or (e) no stress at all?

3. Now, thinking ahead over the next five years, how much of a problem, if any, will the total debt you (and your spouse/partner) have taken on be for you? Will it be (a) an extreme problem; (b) a large problem; (c) medium problem; (d) small problem; or (e) no problem at all?

4. How concerned are you that you (and your spouse/partner) will never be able to pay off these debts? Are you (a) very much concerned; (b) quite concerned; (c) somewhat concerned; (d) not very concerned; or (e) not at all concerned?

The responses to the four questions are aggregated into a respondent debt stress score which then forms the dependent variable in our econometric analysis. This is done by assigning numbers based on a 5-point scale from zero (meaning no debt stress) to four (the highest level of debt stress) to each response. We then average these values across the four stress item categories $X_{ij}$ to obtain the score for the respondent $i$ used in the fit of Eq. 1 as follows.

$$DebtStressScore_i = \frac{1}{4} (X_{i,1} + X_{i,2} + X_{i,3} + X_{i,4})$$

Turning the Overall Debt Stress Scores into the Debt Stress Index

To compute the Debt Stress Index shown in Figs. 1 and 2, we average the debt stress scores across the $n$ individuals in the sample in a given month. These monthly average scores are rescaled so that the Debt Stress Index takes the value 100 in the base period, January 2006 (the initial period of available data). The computation of the index for a given month can thus be represented as follows:

$$DebtStressIndex = \frac{100}{0.946} \times \frac{1}{n} \sum_{i=1}^{n} DebtStressScore_i$$

where $DebtStressScore_i$ for respondent $i$ is calculated as shown above. The divisor 0.946 is the raw average score in the base period. In the time-series plots shown in Figs. 1 and 2, to reduce sampling variation, we have used a three-month rolling average of the index. Again, our regression analysis of debt stress presented in Eq. 1 and Table 1 uses the individual scores denoted $DebtStressScore_i$.

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11 The Great Recession resulted in new policies which were designed to help consumers better understand and manage their debts, for example, the Credit Card Act of 2009.

12 See Dunn & Mirzaie, 2016 for a fuller discussion of women and collections practices.

13 Further detail on an analysis of the components can be found in Lavrakas & Tompson (2009) and Dunn & Mirzaie (2016).
### Appendix 2: Variable Definitions

| Variable                          | Variable definition                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------|
| Log debt                         | Total debt from all sources                                                        |
| Log(income)                      | Total household income                                                               |
| Log(assets)                      | Total assets (physical & financial)                                                 |
| Available credit card line/income| (Total credit limit – total balance)/total income                                     |
| Gender                           | Male = 1; Female = 0                                                                  |
| Marital status                   | Married (including spouse/partner) = 1; Non-married (including widowed/divorced) = 0 |
| Children present                 | Presence of children < 18 years = 1; no children = 0                                 |
| Education years                  | Respondent’s years of schooling                                                      |
| Age                              | Age of respondent in years                                                           |
| African American                 | 1 if respondent is African American; 0 otherwise                                      |
| Latino                           | 1 if respondent is Latino; 0 Otherwise                                              |
| Other ethnic/racial groups       | 1 if respondent is other; 0 otherwise                                               |

*Financial variables refer to respondent and spouse/partner where applicable. Income is annual.

### Appendix 3: Means of Variables and Percentage Difference by Gender

| Variables                    | Female          | Male            | Difference in means | t-statistic |
|------------------------------|-----------------|-----------------|---------------------|-------------|
|                              | Mean  | S.D  | n   | Mean  | S.D | n | female – male |
| Overall debt stress          | 1.18  | 1.14 | 10,915 | 0.90  | 0.99 | 8495 | 0.28 | 17.97*** |
| Debt stress job              | 0.39  | 0.89 | 11,099 | 0.35  | 0.82 | 8634 | 0.041 | 3.36*** |
| Debt stress family           | 0.90  | 1.20 | 11,191 | 0.67  | 1.04 | 8676 | 0.23 | 14.51*** |
| Debt stress health           | 2.27  | 1.71 | 8200  | 2.48  | 1.68 | 6258 | – 0.21 | 7.25*** |
| Income                       | 65,896 | 82,788 | 9617 | 83,462 | 123,726 | 7720 | – 17,566 | 10.70*** |
| Debt                         | 64,799 | 103,214 | 10,833 | 71,691 | 116,904 | 8462 | – 6891 | 4.28*** |
| Marital status               | 0.57  | 0.49 | 12,076 | 0.61  | 0.48 | 9298 | – 0.043 | 6.38*** |
| Assets                       | 374,068 | 768,792 | 9551 | 562,640 | 1,090,913 | 7713 | – 188,572 | 12.83*** |
| Available credit card line/income | 0.32  | 0.67 | 7306  | 0.35  | 0.66 | 6354 | – 0.038 | 3.32*** |
| Children present             | 0.43  | 0.50 | 12,126 | 0.35  | 0.48 | 9328 | 0.086 | 12.94*** |
| Education years              | 16.0  | 11.1 | 12,067 | 16.3  | 11.1 | 9290 | – 0.32 | 2.07* |
| Age                          | 50.4  | 16.3 | 12,076 | 50.7  | 16.0 | 9298 | – 0.24 | 1.08 |
| White                        | 0.79  | 0.40 | 12,126 | 0.83  | 0.38 | 9328 | – 0.037 | 6.87*** |
| African American             | 0.10  | 0.30 | 12,126 | 0.05  | 0.22 | 9328 | 0.045 | 12.55*** |
| Latino                       | 0.06  | 0.23 | 12,126 | 0.05  | 0.22 | 9328 | 0.0066 | 2.15* |
| Other ethnic/racial groups   | 0.05  | 0.22 | 12,126 | 0.07  | 0.25 | 9328 | – 0.014 | 4.50*** |

*p < 0.05, **p < 0.01, ***p < 0.001
**Appendix 4: Determinants of Debt Stress in Three Functional Areas: Additional Estimates Using the Zero-Inflated Ordered Probit Model**

The following Tables 3A, 4A, 5A refer to determinants of debt stress in the three functional areas considered in the main text: job performance, family life, and health, but here based on a zero-inflated probit model. In each table the first set of coefficients are from a binary probit determining whether an individual is stressed in the relevant area, while the second set of coefficients are from an ordered probit determining the level of stress in those individuals who are stressed. As noted earlier, these results identify the degree of stress apart from the basic result of being stressed or not, and should bear further attention in future research.

### Table 3A: Impact of debt on job performance, zero-inflated ordered probit fit

| Variable                          | Females: coefficient (S.E.) | Males: coefficient (S.E.) | Difference female − male (S.E.) |
|-----------------------------------|----------------------------|---------------------------|-------------------------------|
| **Binary probit (stress/no stress)** |                            |                           |                               |
| Log income                        | −0.042 (0.10)†             | 0.55 (0.31)†              | −0.60 (0.33)†                 |
| Log debt                          | 0.050 (0.017)**            | 0.042 (0.038)             | 0.0086 (0.042)                |
| Marital status                    | 0.40                       | 4.28 (4.59)               | −3.89 (4.78)                 |
| Marital × Log Income              | −0.042 (0.14)†             | −0.40 (0.46)              | 0.35 (0.48)                  |
| Marital × Log debt                | 0.033 (0.031)              | 0.0092 (0.044)            | 0.024 (0.054)                |
| Log assets                        | 0.079 (0.040)*             | 0.15 (0.087)*             | −0.073 (0.10)                |
| Available credit card line/income | −0.086 (0.076)             | −0.038 (0.10)†            | −0.048 (0.13)                |
| Children present                  | 0.27 (0.14)*               | 0.72 (0.64)               | −0.45 (0.66)                 |
| Age                               | −0.035 (0.0078)**          | −0.035 (0.019)†           | −0.00034 (0.020)             |
| Education                         | 0.0031 (0.021)             | −0.030 (0.050)            | 0.033 (0.054)                |
| African American                  | 0.32 (0.25)                | −0.036 (0.38)             | 0.35 (0.43)                  |
| Latino                            | 0.37 (0.25)                | −0.52 (0.42)              | 0.89 (0.49)†                 |
| Other ethnic/racial               | 0.088 (0.23)               | 0.11 (0.36)               | −0.024                       |
| **Ordered probit (level of stress)** |                            |                           |                               |
| Log income                        | −0.052 (0.091)             | −0.39 (0.095)**           | 0.34 (0.13)**                |
| Log debt                          | 0.080 (0.019)**            | 0.090 (0.019)**           | −0.010 (0.27)                |
| Marital Status                    | 0.93 (1.09)                | −2.68 (1.04)**            | 3.61 (1.51)*                 |
| Marital × Log Income              | −0.11 (0.11)               | 0.25 (0.098)**            | −0.37 (0.15)*                |
| Marital × Log debt                | 0.016 (0.30)               | −0.0047 (0.21)            | 0.021 (0.037)                |
| Log assets                        | −0.24 (0.034)**            | −0.22 (0.043)**           | −0.015 (0.055)               |
| Available credit card line/income | −0.11 (0.067)†             | −0.086 (0.052)†           | −0.028 (0.084)               |
| Children present                  | −0.042 (0.095)             | −0.048 (0.081)            | 0.0059 (0.12)*               |
| Age                               | 0.024 (0.0042)**           | 0.0023 (0.0052)           | 0.021 (0.0067)**             |
| Education                         | −0.035 (0.017)*            | 0.0028 (0.015)            | −0.038 (0.023)†              |
| African American                  | −0.11 (0.16)               | 0.33 (0.14)*              | −0.44 (0.21)*                |
| Latino                            | −0.039 (0.15)              | 0.28 (0.16)†              | −0.31 (0.22)                 |
| Other ethnic/racial               | 0.030 (0.18)               | 0.30 (0.18)*              | −0.27 (0.22)                 |

n = 9839

†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001
Table 4A  Impact of debt on family life, zero-inflated ordered probit fit

| Variable                     | Females: coefficient (S.E.) | Males: coefficient (S.E.) | Difference female − male (S.E.) |
|------------------------------|-----------------------------|---------------------------|--------------------------------|
| **Binary probit (stress/no stress)** |                             |                           |                                |
| Log income                   | − 0.20 (0.072)**            | − 0.0056 (0.094)          | − 0.19 (0.12)                  |
| Log debt                     | 0.11 (0.011)*****           | 0.12 (0.012)              | − 0.11 (0.017)                 |
| Marital status               | − 0.86 (0.99)               | − 1.89 (1.27)             | 1.02 (1.61)                    |
| Marital × Log Income         | 0.084 (0.10)                | 0.22 (0.13)               | − 0.14 (0.17)                  |
| Marital × Log debt           | 0.020 (0.019)               | − 0.012 (0.020)           | 0.032 (0.27)                   |
| Log assets                   | 0.018 (0.029)               | − 0.079 (0.040)*          | 0.10 (0.050)                   |
| Available credit card line/income | − 0.0077 (0.059)          | 0.010 (0.055)             | − 0.018 (0.81)                 |
| Children present             | 0.45 (0.11)*****            | 0.15 (0.11)*              | 0.30 (0.15)                    |
| Age                          | − 0.033 (0.0050)*****       | − 0.014 (0.0041)          | − 0.019 (0.0064)               |
| Education                    | 0.0039 (0.016)              | − 0.0038 (0.016)          | 0.0078 (0.022)                 |
| African American             | 0.0078 (0.13)               | 0.044 (0.17)              | − 0.036 (0.21)                 |
| Latino                       | 0.16 (0.19)*                | − 0.054 (0.17)            | 0.21 (0.25)                    |
| Other ethnic/racial          | 0.11 (0.20)                 | − 0.15 (0.14)             | 0.26 (0.25)                    |
| **Ordered probit (level of stress)** |                             |                           |                                |
| Log income                   | − 0.11 (0.063)†             | − 0.34 (0.089)*           | 0.23 (0.11)                    |
| Log debt                     | 0.086 (0.014)*****          | 0.053 (0.018)             | 0.033 (0.023)                  |
| Marital status               | 1.45 (0.73)*                | − 0.22 (1.04)             | 1.67 (1.27)                    |
| Marital × Log Income         | − 0.16 (0.073)**            | − 0.027 (0.10)            | − 0.13 (0.13)                  |
| Marital × Log debt           | 0.023 (0.019)               | 0.039 (0.023)             | − 0.02 (0.30)                  |
| Log assets                   | − 0.22 (0.022)*****         | − 0.19 (0.033)            | − 0.03 (0.040)                 |
| Available credit card line/income | − 0.22 (0.041)*****       | − 0.16 (0.044)            | − 0.06 (0.60)                  |
| Children present             | 0.018 (0.064)               | 0.12 (0.077)              | − 0.10 (0.10)                  |
| Age                          | 0.017 (0.0027)*****         | − 0.00094 (0.0035)        | 0.018 (0.0045)                 |
| Education                    | − 0.022 (0.011)†            | − 0.010 (0.013)           | − 0.01 (0.017)                 |
| African American             | − 0.018 (0.11)              | 0.026 (0.15)              | − 0.043 (0.18)                 |
| Latino                       | 0.03 (0.11)                 | 0.27 (0.15)               | − 0.23 (0.19)                  |
| Other ethnic/racial          | − 0.074 (0.12)              | 0.32 (0.15)*              | − 0.39 (0.19)                  |

n = 9882

†p < 0.10,*p < 0.05,**p < 0.01,***p < 0.001
Table 5A Impact of debt on health, zero-inflated ordered probit fit

| Variable                          | Females: coefficient (S.E.) | Males: coefficient (S.E.) | Difference female − male (S.E.) |
|-----------------------------------|-----------------------------|---------------------------|-------------------------------|
| Binary probit (stress/no stress) |                             |                           |                               |
| Log income                        | − 0.15 (0.11)               | − 0.048 (0.12)            | − 0.10 (0.17)                 |
| Log debt                          | 0.12 (0.016)***             | 0.094 (0.023)             | 0.024 (0.028)                 |
| Marital Status                    | 0.87 (1.57)                 | − 0.54 (1.71)             | 1.40 (2.32)                   |
| Marital × Log Income              | − 0.096 (0.16)              | 0.11 (0.18)               | − 0.21 (0.24)                 |
| Marital × Log debt                | 0.034 (0.025)               | − 0.059 (0.036)           | 0.092 (0.044)                 |
| Log assets                        | 0.012 (0.039)               | − 0.019 (0.12)            | 0.031 (0.13)                  |
| Available credit card line/income| − 0.24 (0.091)**            | − 0.069 (0.062)           | − 0.17 (0.11)                 |
| Children present                  | 0.040 (0.15)                | 0.17 (0.29)               | − 0.12 (0.32)                 |
| Age                               | − 0.033 (0.0079)***         | − 0.01 (0.011)            | − 0.023 (0.013)               |
| Education                         | 0.015 (0.023)               | − 0.0022 (0.073)          | 0.017 (0.077)                 |
| African American                  | 0.13 (0.19)                 | 0.074 (0.36)              | 0.053 (0.41)                  |
| Latino                            | 0.57 (0.27)*                | 0.14 (0.61)               | 0.43 (0.67)                   |
| Other ethnic/racial               | − 0.044 (0.26)              | − 0.47 (0.50)             | 0.42 (0.56)                   |
| Ordered probit (level of stress)  |                             |                           |                               |
| Log income                        | − 0.16 (0.085)†             | − 0.20 (0.11)             | 0.046 (0.14)                  |
| Log debt                          | 0.059 (0.018)***            | 0.043 (0.034)             | 0.016 (0.038)                 |
| Marital status                    | 1.079 (1.01)                | − 0.33 (1.22)             | 1.41 (1.59)                   |
| Marital × Log Income              | − 0.10 (0.10)               | − 0.023 (0.12)            | − 0.079 (0.16)                |
| Marital × Log debt                | − 0.0018 (0.024)            | 0.056 (0.029)             | − 0.058 (0.038)               |
| Log assets                        | − 0.18 (0.029)***           | − 0.22 (0.051)            | 0.034 (0.059)                 |
| Available credit card line/income| − 0.11 (0.082)              | − 0.029 (0.055)           | − 0.084 (0.10)                |
| Children present                  | 0.065 (0.080)               | 0.036 (0.22)              | 0.0289 (0.23)                 |
| Age                               | 0.014 (0.003)***            | − 0.0011 (0.0070)         | 0.015 (0.0080)                |
| Education                         | − 0.037 (0.014)**           | − 0.044 (0.041)           | 0.0075 (0.043)                |
| African American                  | − 0.078 (0.13)              | 0.15 (0.26)               | − 0.23 (0.29)                 |
| Latino                            | − 0.086 (0.13)              | 0.027 (0.34)              | − 0.11 (0.36)                 |
| Other ethnic/racial               | 0.0063 (0.17)               | 0.65 (0.24)*              | − 0.64 (0.29)                 |

n = 6706

†p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001

Declarations

Conflict of interest No financial or non-financial conflicts of interest; no funding.

Research Involving Human Participants and/or Animals Human survey participants.

Informed Consent Informed consent for participation in this survey was obtained in accordance with requirements of the Ohio State University Institutional Review Board.

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