Informal Bankruptcy: Health Expenditure Shocks and Financial Distress Avoidance

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This article studies the financial decision-making behavior of U.S. families that have difficulties paying for their medical bills and investigate what alternatives they have to avoid filing for formal bankruptcy and what influence their motivation to do so. Using household financial and demographic information from the Health Tracking Household Survey in 2007 and 2010, this article finds that families with younger age members, minority ethnic background, more doctor visits, and without insurance made more diverse and severe choices to finance the payments before resorting to personal bankruptcy. Interestingly, households with better education seek more diverse but easier financing methods, suggesting that financial literacy may play a dual role in undertaking financial planning—strategic default and bankruptcy avoiding.

Keywords: family financial planning, medical bill, personal bankruptcy, strategic default

Medical problems caused 62% of all personal bankruptcies filed in the United States in 2007 according to Himmelstein, Thorne, Warren, and Woolhandler (2009). Seventy-eight percent of these filers had medical insurance at the start of their illness, including 60.3% who had private coverage, not Medicare or Medicaid. There is a large body of empirical papers reporting evidence of rising personal bankruptcies in the United States and examining the personal and economic determinants of filing bankruptcies (e.g., Domowitz & Sartain, 1999; Fay, Hurst, & White, 2002; Dranove & Millenson, 2006) or having difficulty paying off debt. For example, Godwin (1999) examines the predictive factors of household financial distress by examining the over-time association between current family economic characteristics and future debt repayment difficulties; however, the study does not address the endogenous nature of financial difficulties. Prior literature of household financial decision makings is scarce to answer the following questions: How does family financial planning respond to an exogenous financing need cased by unexpected spending arising from medical care? Do consumers make good or poor choices if there are many financing options as in Lusardi (2008)? What demographic groups are particularly vulnerable to complexity as in Agarwal, Driscoll, Gabaix, and Laibson (2009)? Do financial literacy and sophistication play a role in such situations? To study the financial decision-making behavior of families that are faced with exogenous financial distress, I obtain the data from the Health Tracking Household Survey (HTHS), a nationally representative survey conducted by the Center for Studying Health System Change (HSC), and study a sample of randomly selected households that answered survey questions about their financial decisions when they had difficulty paying for medical bills. The HTHS data set has been used extensively in economic research, especially in the field of health and consumer economics.

Personal bankruptcy is an issue that has attracted considerable debate among academics, politicians, and the media in recent years. In part, this has reflected a desire to understand the rationale behind the dramatic rise in personal bankruptcy. There is also a growing recognition that opportunistic households may intentionally take advantage of the legal system and engage in strategic bankruptcy, which could potentially result in rising costs of credit for those who need the most. Given that the prior research only study the state of household finance that is either sound (saving) or distress (bankruptcy) and the impact of strategic default on the entire society, this article seeks to make a contribution by focusing on those families that have difficulties

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paying for their medical bills and investigating what alternatives they had to avoid filing for formal bankruptcy and what influences their motivation to do so. Such an update in the literature is critical to understanding how contributing factors of personal bankruptcy have changed over the past two decades. I provide new evidence on quantitatively understanding how different aspects of employment, medical condition, and education affect household bankruptcy. Specifically, families with younger age members, minority ethnic background, more doctor visits, and without insurance made more diverse and severe choices in financing their mounting medical bills; however, the empirical results suggest that some economic and demographic determinants that previous research has reported significant effect, such as income, gender, employment, and entrepreneurial activities, do not have important influence on household financial decision makings. Interestingly, households with higher education resort to more diverse but easier financing methods, suggesting that financial literacy may play a dual role in undertaking financial planning—strategic default and bankruptcy avoiding.

The present study relates closely to the literature on household finance (Campbell, 2006), in which scholars have gained increasing understanding regarding how households consume, save, invest, and even engage in strategic bankruptcy. However, what influences household financing choices before filing for formal bankruptcy remain relatively less understood. Further understanding is especially important for households with lower incomes and those that face temporary financial difficulties who could potentially benefit the most from adjusting their suboptimal financing decisions. Therefore, the findings from this study provide additional support for the importance of understanding both individual and family characteristics beyond economic factors affecting financial decisions, and, specifically contribute to the research on family financial decision making (Kim, Gutter, & Spangler, 2017).

Most empirical work incorporates financial variables that reflect the traditional life cycle approach to insolvency. In the case of income, many studies find a negative impact on bankruptcy (e.g., Fay et al., 2002; Agarwal, Liu, & Mielnicki, 2003; Fisher, 2005). However, the empirical results are not entirely consistent with some studies including Elul and Subramanian (2002) and Gross and Souleles (2002) finding no significant impact. At the regional level, Barron, Elliehausen, and Staten (2002) examine U.S. county-level data for 1993–1999 and conclude that bankruptcy rates are negatively related to average income. Whereas, in a cross-section study of U.S. counties in 2000, Edmiston (2006) finds that the effect of income is complex, with bankruptcy rates rising with incomes initially (from low incomes), then falling before reaching a peak in the mid-income range and then falling again. Labor wage is, of course, not the sole source of an individual's income, and a number of studies have examined various components of nonlabor income. Fisher (2005), for example, studies the impact of unemployment and welfare benefits and notes that such payments have two effects: ex post, they may encourage risk-taking by providing insurance against risk and hence increase bankruptcy rates; ex ante, they make negative shocks easier to bear by bolstering incomes and make bankruptcy less likely. The study concludes that the net impact of such benefits is to decrease the probability of bankruptcy, implying that the second effect dominates. Conversely, Edmiston (2006) finds that bankruptcy levels are positively related to the proportion of the population receiving public assistance at the U.S. county level. These conflicting results might suggest that the impact of the two effects varies over time and space, and the combined impact is an empirical rather than a theoretical issue.

Several unique features of the HTHS data set facilitate the current study. First, the survey includes important information on household medical conditions, which enables me to study the link between the level of physical distress and the level of financial distress. The survey also has detailed information on household demographics, such as age, race, gender, and number of family members. I can therefore distinguish how adverse events (illness) and demographic background separately contribute to financial decision makings. In addition, detailed labor market information, such as income, employment status, and entrepreneurial opportunities, provides additional control for earning capacity and expectation of future income, which may influence the tendency to seek diverse forms of financing.

It is worth noting that despite the advantages of this new data set, it suffers limitations in that I end up studying a rather small group of households facing a large amount of medical bills, who could be clustered in some particular geographical areas and not representing the households nationwide. Although state economic situations and

bankruptcy laws clearly influence households' behavior, I believe that focusing upon those not yet filing for bankruptcy should distinguish this research from prior literature that mainly studies the determinants of formal bankruptcy. Nonetheless, I advise readers to exercise caution when interpreting such results.

Related Literature

An extensive body of research has focused on the state of household finance that is either sound (saving) or distress (bankruptcy). Bernheim and Garrett (2003), Hilgert, Hogarth, and Beverly (2003), and Lusardi (2008) among other investigated various economic and demographic factors of household financial decision makings in saving. Bernheim and Garrett (2003) explored cross-sectional relations between employer-based financial education and personal asset accumulation and provided evidence that financial literacy stimulates saving, both in general and for retirement. Hilgert et al. (2003) studied personal financial management activities: cash-flow management, credit management, saving, and investment, and reveal a positive correlation between knowledge and behavior. In an attempt to address the question whether low literacy and lack of information affect the ability to save and secure a comfortable retirement, Lusardi (2008) found that very few individuals with low levels of literacy rely on the help of experts or financial advisors to make saving and investment decisions. There is also a small but growing literature concerning the credit supply to individuals who have filed for personal bankruptcy (Cohen-Cole, Duygan-Bump, & Montoriol-Garriga, 2013) and "post-bankruptcy" borrowing behavior and financial health (Han & Li, 2011).

To a large extent, this article is concerned with how families choose financing methods and what their determinants are when households are close to financial distress. Nevertheless, literature on personal strategic default is also relevant. Indeed, the earlier studies propose different reasons that U.S. households file for bankruptcy, and these reasons hold the key to the fairness and effectiveness of bankruptcy laws and to evaluating different reform agendas. One popular view is that households file for bankruptcy based on the benefits and costs of filing. Using the Panel Study of Income Dynamics from 1984 to 1995, Fay et al. (2002) provided empirical evidence that households are more likely to file for bankruptcy when they will benefit from doing so. Consistent with this strategic filing view, Gross and Souleles (2002) reported that personal bankruptcy filings surged during 1995–1997, and households are more likely to file when social norms lower the costs of bankruptcies. The alternate view of personal bankruptcy filing is that adverse events such as divorce, illness, and layoffs simply caused household financial distress as argued by Himmelstein, Warren, Thorne, and Woolhandler (2005) and Jacoby, Sullivan, and Warren (2001). The authors surveyed personal bankruptcy filers in 2001 and report that about one-half of the filing households cited medical conditions as the cause of filing for bankruptcy. In a later study, Himmelstein et al. (2009) survey a random sample of 2,314 bankruptcy filer in 2007 and interview 1,032 of them. They estimate that 62% of all bankruptcies in 2007 were due to medical shocks. Similarly, Domowitz and Sartain (1999) studied a sample of households that filed for bankruptcy in bankruptcy courts from five districts in 1980 and find that medical conditions and credit card debt are the two most important factors that contributed to bankruptcy filings in the early 1980s. However, later studies (Conwell & Cohen, 2005; Heriot, 2005; Dranove & Millenson, 2006) argued that causality between medical conditions and personal bankruptcy has to be interpreted with caution. To address this concern of causal effect, Gross and Notowidigdo (2011) employed a quasi-experiment study using Medicaid expansions as an exogenous shock and suggest that out-of-pocket medical costs roughly account for 26% of personal bankruptcies among low-income households.

In an effort to disentangle two competing bankruptcy motivations—strategic default and exogenous adverse event—Zhu (2011) used the personal bankruptcy filings in Delaware and found that household expenditures on durable consumption goods, such as houses and automobiles, contribute significantly to personal bankruptcy filings, whereas medical conditions, along with other adverse events, such as divorce and unemployment, have marginal effects. These results suggest that consumption patterns make households financially overstretched and more susceptible to adverse events. Taking a different approach, Livshits, MacGee, and Tertilt (2010) estimated a structural model of household financial decisions and suggested that uncertainty or shock-based stories cannot account for the rise in personal bankruptcies between 1980 and 2000. Instead, the authors concluded that credit market innovations that reduced the cost of borrowing and bankruptcy was the essential reason.

The finding emphasizing that consumption patterns contribute to the increase in personal bankruptcy filing is not totally new. The permanent income hypothesis by Friedman (1957) predicted that households borrow from future earnings to smooth out their consumption and improve their well-being. The question is whether households can make the right decision on such intertemporal factors and how the different options of financing may alter their borrowing and consuming behavior to start with. It is important to recognize that, as pointed out by Gropp, Scholz, and White (1997), irresponsible borrowing and default may drive up the cost of credit, and in turn, this make credit less accessible to other households. While the theory accounts for the risk of default, the vast majority of households may not factor the risks into their daily financial planning and, moreover, some opportunistic households may intentionally engage in strategic bankruptcy to take advantage of the legal system, which could potentially result in rising cost of credit for those who need the most.

METHODOLOGY

Data

The main objectives of this article were to study household financing choices before resorting to bankruptcy and assess the economic, demographic, and personal factors that determine the likelihood of choosing these financing options. I obtained data on household financial and demographic information in 2007 and 2010 from the HTHS, which is a successor of the Community Tracking Study Household Survey. This U.S. household-representative, cross-sectional survey of civilian and non-institutionalized individuals contains information on health insurance coverage, access to care, perceptions of care delivery and quality of care, use of health services, health status, consumer engagement, use of health care information, and demographic information. The survey was conducted by the HSC via random-digit-dialing telephone surveys. The reason to include both surveys in 2007 and 2010 is to increase the sample size and hence the statistical power of the analysis.

In this study, I only consider the household with its head not yet filing bankruptcy. Specifically, the Section C (Resource use during the last 12 months) of the survey asks a question: "Because of problems paying medical bills during the past 12 months, (have you/has your family) filed for bankruptcy?" Based on the answers to this survey question, I eliminated those households neither receiving medical bills nor experiencing personal bankruptcy, and the final sample includes 2,087 households in the 2007 and 2010 surveys.

Variables

There are five main dependent variables representing financing options: bankrupt, borrow, cutspend, tapsaving, and cut necessity. Bankrupt is a dummy variable with a value of one for a family, considering (but not yet) filing for bankruptcy due to problems paying medical bills in the past year and zero otherwise. BORROW is a dummy variable with a value of one for a household having had to borrow money due to problems paying medical bills during the past 12 months and zero otherwise. Cut spend is a dummy variable with a value of one for a family having put off major purchases, such as a new home or car due to problems paying medical bills during last year and zero otherwise. Tap saving is a dummy variable with a value of one for a household having had to take money out of savings due to problems paying medical bills during the past 12 months and 0 otherwise. Unfortunately, the user guide of the data set does not distinguish between money drawn from a bank savings account and money drawn from a retirement account. Cut necessity is a dummy variable with a value of one for a family, having cut paying for other necessities (e.g., include housing, utilities, food, and clothing) due to problems paying medical bills in the last year month and 0 otherwise.

To control for household characteristics, I collected information about family wealth, family size, marriage status, ethnicity, age, gender, education, insurance coverage, doctor visits, surgery history, geographic location, and whether owing a business. The main measure of family wealth in this article is household income. Family wealth may be negatively related to financial distress, as better household financial strength makes debt payments more sustainable; on the other hand, higher incomes along with better employment or entrepreneurial opportunities might also encourage borrowing and cause greater exposure to economic shocks, thereby having a positive impact on financial distress. Because family income might not be a perfect measure of household wealth and the survey didn't ask a specific question about wealth, I also consider whether the head of the household owns a business or farm and the number of hours he worked per week at main job.

A second potentially important factor is occupational status. The main measure of occupational status of a household in this study is the number of hours that the head of a household works in a week. This might impact on household financial distress and financing decision making due to, for example, variations in the risk of unemployment or the competence of individuals in dealing with financial matters across occupational situations. A full-time job might be expected to mitigate the tendency to file personal bankruptcy, whereas an unemployment status would be expected to have a negative impact on household financial condition.

Because this article studies household financing decision makings when a family is in financial distress due to paying for medical bills, family health information become a very relevant and important factor for this study. I use two variables to proxy for health situation: (a) total number of visits to medical doctors; and (b) whether the head of household had any type of surgical or nonsurgical procedure, excluding routine blood work, X-rays, or mammograms in the past 12 months. Grafova (2015) explicitly examined the relationship between various chronic conditions (e.g., diabetes, cancer, lung disease, and a heart condition) and personal wealth and suggested that financial status decline is associated with health shocks. I also have information about whether a household has insurance coverage, which could mitigate the negative impact of bad health condition on household financial situation. The insurance dummy variable is set to one if the family is covered by employment-sponsored, private purchased, or military insurance, Medicare, Medicaid, or other public coverage, and zero if not insured. In addition, family location information such as whether living in a large metropolitan area with more than 200K population (based on 1992 MSA/PMSA boundaries and population) and one of the four U.S. regions (Northeast, Mideast, South, and West) are included in the regression analysis. In the regression specification, the indicator variables of living in Mideast, South and West regions are included in all specification, and the Northeast region is served as the control group.

The empirical models incorporated variables representing demographic factors suggested by prior research: age, gender, ethnicity, family size, and education. In particular, age appears to be potentially of major significance on the basis of previous empirical evidence (e.g., the age effects on borrowing in the study by Agarwal et al., 2009, on labor earnings in the study by Gourinchas & Parker, 2002 and Murphy & Welch, 1990, on stock investment decisions in study by Korniotis & Kumar, 2011, and on financial decision mistakes in the study by Stango & Zinman, 2009). Recent data show that the risk of bankruptcy varies considerably across age groups with peak levels occurring in the 30–39 years age group and much lower levels in the over 60s. Consequently, the measure of age for the head of household is included as explanatory variables. Finally, risk-taking activity might affect levels of financial distress and financing decisions. The main variable of risk preference is whether a household owns a business or a farm. Owning a business or a farm can be a good proxy for measuring the level of entrepreneurial activity of a household. It should be noted that the impact of education on financing decision makings can be mixed. On one hand, better educated family might be more likely to resort to various methods of financing to avoid bankruptcy; however, it might be more risk-taking and likely to engage in strategic bankruptcy. The effect of education on bankruptcy behavior is well studied in the literature such as Lopes (2008). The consensus is that default rate decreases with education level and often households with less education are more likely to borrow more. Of course, such behavior can also be driven by income level: less education can be correlated with lower income; therefore, for less educated individuals, the spending level is already very low, and not much savings are available. The education variable is calculated based on a survey question in the Section A (Demographics and screening) of the survey, which asks all persons aged 18 years or older or under 18 years and are either the head of the household or spouse of the head of the household: "What is the highest grade or year of school completed?" The detailed definition of dependent and independent variable can be found in Table 1.

To measure the severity or intensity of the financing options, I order the following five choices and construct a new variable Method with values from 1 to 5: (1) cut necessity (cut paying for other necessities); (2) tap saving (had to take money out of savings); (3) cut spend (put off major purchases, such as a new home or car); (4) borrow (had to borrow money); (5) bankrupt (considering filing bankruptcy). In this research I am also interested in the intensity or diversity of household financing: how many different financing a household is considering when it is facing financial pressure (i.e., a medical bill is due). To measure the intensity of household financing decisions, I construct another

TABLE 1. Variable Definitions

Variable Name	Type	Definition
Bankrupt	Dummy	1 if thinking about filing for bankruptcy due to problems paying medical bills during the past 12 months, and 0 otherwise.
Borrow	Dummy	1 if you and your family have had to borrow money due to problems paying medical bills during the past 12 months, and 0 otherwise.
Cut spend	Dummy	1 if you and your family have put off major purchases, such as a new home or car due to problems paying medical bills during the past 12 months, and 0 otherwise.
Tap saving	Dummy	1 if you and your family have had to take money out of savings due to problems paying medical bills during the past 12 months, and 0 otherwise.
Cut necessity	Dummy	1 if you and your family have cut paying for other necessities due to problems paying medical bills during the past 12 months, and 0 otherwise.
Income	Scale	Log income of family's total income from all sources, before taxes and other deductions.
White	Dummy	1 for white, and 0 for other ethnic groups.
Family size	Scale	Total number of persons within each family.
Metro	Dummy	1 if a household living in a large metropolitan area with 200K population based on 1992 MSA/PMSA boundaries and population, and 0, if living in small metropolitan or rural areas with less than 200K population.
Married	Dummy	1 for married family and 0 otherwise.
Age	Scale	Age of the head of the household.
Male	Dummy	1 for male head of household and 0 for female.
Education	Scale	The number of years of education completed.
Insurance	Dummy	1 if covered by employment-sponsored, private purchased or military insurance, Medicare, Medicaid, or other public coverage, and 0 if not insured.
Doctor visits	Scale	Number of time visiting doctor in the past 12 months.
Surgery	Dummy	1 if the household had any type of surgical or nonsurgical procedure, excluding routine blood work, X-rays, or mammograms, and 0 otherwise.
Own business	Dummy	1 if the household has a business or farm, and 0 otherwise.
Work hours	Scale	Number of hours per week worked at main job.
Mideast	Dummy	1 if living in U.S. Mideast region, and 0 if living in Northeast, South, or West.
South	Dummy	1 if living in U.S. south region, and 0 if living in Northeast, Mideast, or South.
West	Dummy	1 if living in U.S. west region, and 0 if living in Northeast, Midwest, or South.
Year 2010	Dummy	1 for 2010 survey, and 0 for 2007 survey.

categorical variable *intensity*, which is a sum of the five dummy variables: bankrupt, borrow, cut spend, tap saving, and cut necessity. The value of this variable ranges from 0 to 5, for example, if a household decides to use all five methods, the value will be 5, whereas a family not considering any financing method, it will be 0.

Data Analysis

It should be noted that households can make multiple choices to help pay their medical bills, and therefore, the research questions addressed in this empirical study include both the individual choice of financing method and the financing intensity, which is measured as the sum of all financing choices. In the first regression analysis, I use ordered probit regression to estimate the association between financing intensity and household characteristics. The dependent variable is a categorical variable (intensity) measuring household financing intensity. It is a sum of five dummy variables of financial decision choices: whether a household is (a) considering bankruptcy (bankrupt); (b) borrowing

money (borrow); (c) postponing spending on car and house (cut spend); (4) tapping into saving account (tap saving); and (5) cutting necessities (cut necessity). The main predictor variables are family income, family size, marriage status, ethnicity, age, gender, education, and insurance coverage. Other model covariates include doctor visits, surgery history, geographic location, and whether owing a business. Similar to the first regression, the second analysis examines the relationship between the financing method choice and the predictor variables. The dependent variable is a categorical variable (Method) measuring household financing method. The value is 5 if a household is considering bankruptcy, 4 if borrowing money being, 3 if postponing spending on car and house being, 2 if cutting necessities, and 1 if tapping into saving account.

The third set of regression analysis studies the relation between individual financing method and household characteristics. There are five different dependent (dummy) variables in five separate probit regression specifications. The value of first dummy variable is set to 1 if the household is considering bankruptcy, and 0 otherwise. The value of the second dummy variable is set to 1 if the family is borrowing money to finance medical bills, and 0 otherwise. The value of the third dummy variable is set to 1 if the family is postponing spending on car and house when faced with financial difficulties. The value of the fourth dummy variable is set to 1 if tapping into saving account, and the value of the fifth dummy variable is set to 1 if cutting necessities.

RESULTS

The summary statistics for all variables are shown in Table 2, and Pearson's correlations are reported in Table 3. An examination of the correlation matrix indicates that correlations between independent variables are generally smaller than 0.5 except one case of family size and married (0.52). This low correlation among the covariates helps prevent the problem of multicollinearity that causes high standard errors and low significance levels when both variables are included in the same regression. Further diagnostics indicate no obvious evidence of serious multicollinearity among the covariates.

Table 4 specification (1) provides the results of the empirical estimates for the associations between financing intensity and household characteristics. Financing intensity is a measure of variety in financing choices. By definition,

TABLE 2. Summary Statistics

Variable	*M*	*SD*	Min	Max
Bankrupt	0.17	0.38	0	1
Borrow	0.47	0.50	0	1
Cut spend	0.52	0.50	0	1
Tap saving	0.64	0.48	0	1
Cut necessity	0.64	0.48	0	1
Income	9.36	3.31	0	11.9
White	0.75	0.43	0	1
Family size	2.25	1.28	1	8
Metro	0.70	0.46	0	1
Married	0.60	0.49	0	1
Age	54	16	18	91
Male	0.46	0.50	0	1
Education	13.80	2.77	6	19
Insurance	0.90	0.30	0	1
Doctor visits	4.19	4.61	0	20
Surgery	0.26	0.44	0	1
Own business	0.13	0.34	0	1
Work hours	22	22	0	65
Mideast	0.25	0.44	0	1
South	0.35	0.48	0	1
West	0.20	0.40	0	1
Year 2010	0.48	0.50	0	1

Note. *SD* = standard deviation.

intensity is the sum of five financial decision choices: (a) cut paying for other necessities; (b) had to take money out of savings; (c) put off major purchases, such as a new home or car; (d) had to borrow money; and (e) thought about filing bankruptcy. For example, intensity is 5 if a household resorted to all five choices, and 0 if none. Among all covariates, five variables have significant coefficients in the ordered probit model: White, age, education, insurance and doctor visits. Families with better education, minority ethnic background, and more doctor visits made more diverse choices in financing their medical bill, whereas those in older age cohorts and with insurance coverage tend to focus on fewer choices of financing methods.

It should be recognized that the result does not provide further information regarding what exact financing method a household mainly focused on. To address this concern, I construct a new dependent variable Method and re-do the same regressions and report the results in Table 4 specification (2). Method is a categorical variable which is constructed by combining the yes responses to five survey

TABLE 3. Correlation Matrix

	Income	White	Family size	Metro	Married	Age	Male	Education	Insurance	Doctor visits	Surgery	Ownbusiness
White	0.11											
Family size	0.08	0.08										
Metro	0.06	−0.09	−0.02									
Married	0.14	0.14	0.52	−0.08								
Age	0.01	0.09	−0.28	−0.01	−0.02							
Male	−0.06	−0.10	−0.24	0.08	−0.40	−0.02						
Education	0.06	0.12	−0.01	0.15	0.00	0.10	0.06					
Insurance	0.14	0.05	0.19	0.08	0.17	0.18	−0.05	0.17				
Doctor visits	0.05	0.02	−0.08	0.06	−0.09	0.12	0.14	0.10	0.23			
Surgery	0.01	0.11	−0.06	−0.02	−0.05	0.10	0.08	0.13	0.11	0.41		
Own business	0.01	0.12	−0.04	−0.10	0.07	0.14	−0.18	0.13	−0.04	−0.09	-0.02	
Work hours	0.12	0.12	0.20	−0.07	0.19	−0.04	−0.25	0.06	0.20	−0.01	0.00	0.12

TABLE 4. Pooled Regressions of Household Financing Intensity

Dependent Variable:	(1) Intensity	(2) Method
Income	0.00121 (0.131)	−0.0353*** (−3.512)
White	−0.0940* (−1.920)	−0.198*** (−3.779)
Family size	−0.00357 (−0.173)	0.0254 (1.140)
Metro	−0.00395 (−0.0821)	−0.0272 (−0.532)
Married	−0.0398 (−0.703)	−0.0815 (−1.353)
Age	−0.00500*** (−2.723)	−0.00875*** (−4.463)
Male	−0.0824* (−1.698)	−0.0949* (−1.831)
Education	0.0201** (2.165)	−0.0267*** (−2.687)
Insurance	−0.137** (−2.367)	−0.266*** (−4.272)
Doctor visits	0.0204*** (4.465)	0.0175*** (3.633)
Surgery	0.0577 (1.135)	−0.0486 (−0.908)
Own business	−0.112 (−1.553)	−0.112 (−1.475)
Work hours	0.00139 (1.208)	−0.00100 (−0.822)
Mideast	0.174** (2.488)	0.0985 (1.311)
South	0.182*** (2.741)	0.0421 (0.591)
West	0.174** (2.258)	0.139* (1.677)
Year 2010	0.0316 (0.718)	0.0228 (0.488)
N	2,087	2,087
Pseudo R^2	0.01	0.03
LR test (χ^2)	61.53	129.24

Note. All specifications use ordered probit model, and *z*-statistics are shown in the parentheses with ***, **, and *, indicating its statistical significance level of 1%, 5%, and 10%, respectively.

questions: because of problems paying medical bills during the past 12 months (have you/has your family): (a) cut paying for other necessities; (b) had to take money out of savings; (c) put off major purchases, such as a new home

or car; (d) had to borrow money; (e) thought about filing bankruptcy? The assignment of the values from 1 to 5 is based upon the empirical ranking of the financing decisions made by households in the entire sample with 5 for the most severe financing method (bankrupt) and 1 for the easiest method (cut spending on necessities). The coefficient estimates in specification (2) suggest that families with lower income, minority ethnic background, younger age, and lower education chose more severe methods when they were facing financial distress in paying medical bills. Those with female head of household, in better health condition, and health insurance coverage chose more easy financing methods.

Whereas the above findings using categorical variables were suggestive, there is a possibility that the ordering of the financing method in the ordered probit regression may bias the result. I hence breakdown the dependent variable to five dummy variables (bankrupt, borrow, cut spend, tap saving, and cut necessity) and run the standard probit regressions separately. Here, the dependent variable is an indicator variable for each method of financing: considering bankruptcy in specification (1), borrowing money in specification (2), postponing spending on car and house in specification (3), tapping into saving account in specification (4), and cutting necessities in specification (5).

Although many variables were not significant predictive factors in the ordered profit model, the probit regression results in Table 5 suggest that some of them actually matter for specific financing methods. Lower income families without medical insurance coverage are more likely to file bankruptcy. Younger families with minority ethnic background are more likely to borrow money. Female heads of households with better education tend to put off major purchases, such as a new home or car. Families living in large metropolitan areas and with full-time job and better education are more likely to take money out of savings. Finally, households without owning a business or farm tend to cut paying for other necessities. In contrast to the other independent variables, health condition as proxied by doctor visits (number of visits to medical doctors) has a positive and significant coefficient in four of the five specifications, highlighting the importance of taking into fact that these households in the sample are facing a financial distress due to paying a large amount in medical bills, although it is worth stressing that surgery (if had any type of surgical or nonsurgical procedure) does not have any significant impact on household financing decision makings.

ROBUSTNESS

It should be noted that the economic interpretation of statistical significance in correlations between household financing choices and personal characteristics deserves caution because the empirical results reported in the previous section could be driven by endogeneity concerns. Specifically, there might be significant omitted variable(s) correlated with both financial decisions and household characteristics driving our results spuriously. One possible omitted variable is the long-term health condition of the households. People coping with the chronic illness of household members are more likely to be poor, old, particularly living alone, in the minor ethnic groups, and having difficulty paying medical bills; however, the variables that are used to measure the health condition (times of doctor visits and whether the household members had surgery in the last 12 months) do not necessarily reflect the chronic illness condition of the households. To specifically address this endogeneity, I need to separate the households in "exogenous" need of medical treatment (such as due to accident and illness) from those in "endogenous" need of medical treatment (such as routine check-up and birth of child).

In this robustness study, I break down the sample to two subsamples. The first subsample includes households experiencing difficulty paying medical bills due to accident and illness. The second subsample includes households having medical expenses for routine check-up, medical test, surgical procedure, birth of child, and other reasons. To analyze the difference between these two samples, specifically whether families with a younger head of household, minority ethnic background, more doctor visits, and without insurance made more diverse and severe choices in financing, as shown in the previous section, and how education influences households' financial decisions, I employ ordered probit regressions with financing intensity and financing method as the independent variable and report the results in Table 6. The dependent (categorical) variable measuring household financing intensity is a sum of five dummy variables: whether a household is (a) considering bankruptcy; (b) borrowing money; (c) postponing

TABLE 5. Pooled Probit Regressions of Household Financing Choice

Dependent Variable	Bankrupt	Borrow	Cut Spend	Tap Saving	Cut Necessity
Income	−0.0331***	−0.0142	−0.000984	0.0481***	−0.000340
	(−2.685)	(−1.251)	(−0.0872)	(4.139)	(−0.0297)
White	−0.0776	−0.279***	0.0492	0.0312	−0.0823
	(−1.121)	(−4.681)	(0.829)	(0.505)	(−1.337)
Family size	0.0393	−0.0160	−0.0145	0.00981	−0.0123
	(1.377)	(−0.634)	(−0.578)	(0.373)	(−0.477)
Metro	0.0352	−0.0193	−0.0681	0.144**	−0.0972
	(0.507)	(−0.326)	(−1.162)	(2.359)	(−1.606)
Married	−0.125	−0.0558	−0.0356	0.126*	−0.101
	(−1.543)	(−0.804)	(−0.518)	(1.757)	(−1.414)
Age	−0.00445*	−0.0128***	−0.000787	0.00179	−0.00247
	(−1.675)	(−5.660)	(−0.353)	(0.773)	(−1.081)
Male	−0.127*	−0.0495	−0.149**	−0.0697	0.0646
	(−1.819)	(−0.834)	(−2.521)	(−1.126)	(1.069)
Education	−0.0232*	−0.0156	0.0271**	0.0994***	−0.0141
	(−1.734)	(−1.379)	(2.402)	(8.244)	(−1.225)
Insurance	−0.273***	−0.131*	−0.125*	0.0481	−0.0481
	(−3.451)	(−1.855)	(−1.782)	(0.664)	(−0.665)
Doctor visits	0.0175***	0.0177***	0.0115**	0.00703	0.0206***
	(2.760)	(3.177)	(2.077)	(1.204)	(3.529)
Surgery	0.0223	−0.00529	0.0842	0.145**	−0.0346
	(0.304)	(−0.0849)	(1.361)	(2.218)	(−0.542)
Own business	−0.122	−0.146	0.0102	0.139	−0.242***
	(−1.125)	(−1.641)	(0.116)	(1.445)	(−2.744)
Work hours	0.000781	−0.00171	0.00251*	0.00471***	−0.000865
	(0.476)	(−1.220)	(1.797)	(3.198)	(−0.603)
Mideast	0.116	0.0790	0.157*	0.0157	0.243***
	(1.148)	(0.917)	(1.847)	(0.177)	(2.805)
South	−0.0135	0.153*	0.142*	0.0265	0.257***
	(−0.139)	(1.890)	(1.769)	(0.316)	(3.157)
West	0.167	0.125	0.00527	0.152	0.197**
	(1.516)	(1.323)	(0.0564)	(1.523)	(2.068)
Year 2010	0.121*	−0.0867	−0.0000872	0.0216	0.114**
	(1.899)	(−1.608)	(−0.00163)	(0.385)	(2.080)
Constant	0.0879	1.260***	−0.0958	−1.855***	0.524**
	(0.303)	(4.952)	(−0.381)	(−6.991)	(2.029)
N	2,087	2,087	2,087	2,087	2,087
Pseudo R^2	0.03	0.04	0.02	0.07	0.03
LR test (χ^2)	56.04	108.05	35.49	188.50	68.07

All specifications use probit regression model, and *z*-statistics are shown in the parentheses with ***, **, and *, indicating its statistical significance level of 1%, 5%, and 10%, respectively.

TABLE 6. Robustness Checks

Reason for Medical Expenses	Accident and Illness		Routine Check-Up, Medical Test, Surgical Procedure, Child Birth, and Others	
Dependent Variable	**Intensity**	**Method**	**Intensity**	**Method**
Income	0.0102	−0.00240	−0.00238	−0.0379
	(0.555)	(−0.129)	(−0.104)	(−1.629)
White	−0.201*	−0.0724	−0.0663	−0.0795
	(−1.856)	(−0.664)	(−0.623)	(−0.748)
Family size	−0.0680	−0.0551	0.0549	0.0499
	(−1.469)	(−1.180)	(1.186)	(1.074)
Metro	0.0435	0.0299	−0.0101	0.00974
	(0.384)	(0.261)	(−0.0971)	(0.0936)
Married	0.00492	0.00198	−0.123	−0.190
	(0.0379)	(0.0151)	(−0.989)	(−1.531)
Age	−0.0108***	−0.0125***	−0.00324	−0.00849**
	(−2.745)	(−3.217)	(−0.836)	(−2.183)
Male	0.0549	0.00493	−0.0521	−0.00351
	(0.518)	(0.0459)	(−0.486)	(−0.0327)
Education	0.0243	−0.0171	0.0625***	0.0292
	(1.268)	(−0.883)	(2.957)	(1.403)
Insurance	0.0411	−0.150	−0.138	−0.163
	(0.340)	(−1.222)	(−1.057)	(−1.236)
Doctor visits	0.0197*	0.0187*	0.0109	0.0177
	(1.841)	(1.755)	(0.997)	(1.617)
Surgery	−0.00110	−0.0635	0.159	0.152
	(−0.00889)	(−0.511)	(1.448)	(1.382)
Own business	0.0711	0.0457	−0.252	−0.0528
	(0.375)	(0.241)	(−1.594)	(−0.334)
Work hours	0.0000572	−0.00109	0.000560	0.000655
	(0.0229)	(−0.432)	(0.218)	(0.255)
Mideast	0.175	0.148	0.433***	0.427***
	(1.113)	(0.947)	(2.795)	(2.764)
South	−0.0380	0.00205	0.527***	0.521***
	(−0.253)	(0.0138)	(3.659)	(3.642)
West	0.199	0.365**	0.477***	0.376**
	(1.226)	(2.229)	(2.951)	(2.331)
Year 2010	0.0298	0.0417	−0.0494	−0.0727
	(0.298)	(0.413)	(−0.513)	(−0.757)
N	448	448	492	492
Pseudo R^2	0.02	0.02	0.02	0.03
LR test (χ^2)	24.26	25.53	33.26	39.68

All regressions use ordered probit model, and *z*-statistics are shown in the parentheses with ***, **, and *, indicating its statistical significance level of 1%, 5%, and 10%, respectively.

spending on car and house; (d) tapping into saving account; and (5) cutting necessities. The dependent (categorical) variable measuring household financing method has value 5 if a household is considering bankruptcy, 4 if borrowing money being, 3 if postponing spending on car and house being, 2 if cutting necessities, and 1 if tapping into saving account.

In the subsample that households have medical expenses due to accident and illness, age of the household head, race, and health status are still statistically significantly associated with financing intensity and method; however, there is no insurance effect and education effect that was found in the previous section.

The other endogeneity concern is that having medical insurance is an endogenous decision by households. Families with higher incomes and better education are more likely to carry more comprehensive coverage; consequently, their financing choice can be less diverse and severe. On the other hand, families with lower incomes and education can make more diverse and severe choices in financing their mounting medical bills. In order to address this endogenous issue, I follow Cantor, Monheit, DeLia, and Lloyd (2012) and McWilliams, Zaslavsky, Meara, and Ayanian (2004) arguing that health care reforms to expand coverage, such as the Medicare buy-in program and the young adult coverage under the Patient Protection and Affordable Care Act (PPACA), may produce health benefits and reduce financial burdens. Medicare buy-in benefits were created by Congress to help low-income Medicare beneficiaries pay their share of Medicare premiums, and in some instances, deductibles and co-payments. The PPACA permits young adults up to 26 years old to obtain health insurance as dependents through their parents' family plan coverage. If the 2010 health care reform law has provided better medical coverage for the uninsured young adults, the financing choices made by families will be more modest overall. In fact, the coefficient estimate of the year 2010 dummy variable in Table 5 is significant at 5% level only for the *cut necessity* specification but not the other specifications including bankrupt, borrow, cut spend, and tap saving. This suggests that the overall likelihood that families reduce buying necessities, which is a much less severe financing method comparing to filing bankruptcy, borrowing money, cutting big spending, and tapping into saving, is higher in 2010 than in 2007.

CONCLUSION

Despite a large body of research on personal bankruptcy, prior literature of household financial decision makings when the need of financing is exogenous and imminent is scarce, and little research has been done into aspects of household financing options. This article is to take a step further to study how family financial planning responds to the rise in medical care spending and what alternative financing choices have been taken before households resorting to formal bankruptcy. It assesses the economic, demographic, and personal factors that determine the likelihood of choosing each type of options.

Specifically in this article, I study a sample of randomly selected households that answered survey questions about their nonbankruptcy financing solutions when they had difficult paying for medical bills. The evidence shows that families with younger age members, minority ethnic background, more doctor visits, and without insurance made more diverse and severe choices in financing their mounting medical bills. Interestingly, households with higher education resort to more diverse but easier financing methods, suggesting that financial literacy may play a dual role in undertaking financial planning: strategic default and bankruptcy avoiding. Prior studies suggest that low-income consumers often focus on short-term financial horizons and often do not budget appropriately for living expenses; therefore, it is very likely that uninformed consumers and those without long-term financial planning are uncertain about future financial obligations. Given the potential challenges of meeting medical bill payment obligations, families will need personalized advice, based on their level of income and financial literacy, rather than generic education to have more accurate estimates of a family's ability to meet monthly expenses in the future.

The identification of exogenous adverse events of being sick and their consequences of having difficulty paying medical bills could be troublesome because even people with similar illness or similar severity of illness could still pay their bills if they have other options. This suggests that future research might be directed toward detailed case studies of individual households to closely examine the "unknown" factors underlying household financial decision makings. This would also facilitate a

more qualitative approach that might be able to assess those factors for which data or adequate quantitative measures are unavailable. Such a research agenda might also focus on an analysis of major contagious adverse events underpinning regional variations in household financial distress. This approach would complement the present study that primarily relies upon econometric estimation techniques.

Finally, there are a couple of practical implications for financial counselors and planners. First, financial counselors or planners must attempt to understand and acknowledge the unique family health condition and medical needs before offering advice or suggestions. Collecting data such as treatment plans, expenditures, and timing of hospital bill payments is important to understand the dynamics of household financial decision making in financing their mounting medical care costs. Second, financial counselors or planners need to take into the account that health insurance coverage, ethnic background, and medical history play a critical role, influencing family financial decisions. Furthermore, because individuals' preferences for health insurance often depend on the health insurance plans offered by their employers (Bundorf, 2002), employers should be actively involved in family financial planning, including the purchase of additional health coverage, retirement benefits, or comprehensive education on financial planning because the costs are low and the benefits are high (Garman, 1997). Third, financial counselors or planners need to understand the importance of all financing methods that are available to the family, as well as the unique combination of these financing methods in family financial planning. Fourth, counselors or planners may also need to develop strategies to assist families experiencing health problems or having significant medical histories. Once these families understand the potential adverse implications of treatment needs and associated costs, as well as available options to address these issues, they may develop financial goals and strategies in an informed manner.

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