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Displacement and Debt: The Role of Debt in Returning to Work in the Period Following the Great Recession

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ABSTRACT

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The onset of the housing and subsequent financial crisis in 2008 marked the steepest economic downturn in the United. States, since the Great Depression in the late 1920s and 1930s. This most recent financial crisis has been characterized by massive layoffs and displacement. Given the depth of the recent 'great' recession and its links to the finance and housing industries, both economists and policy analysts have speculated that the sticky jobless situation for many would-be workers is also related to their level of individual and/ or household debt. In contrast to a growing literature that links financial market conditions on employers' hiring capabilities, we focus on the question how household indebtedness renders households' incentives to search for and take up a new job after displacement? Using information on households' labor market and financial behavior from the Survey of Income and Program Participation (SIPP), our findings indicate that households that experience a higher debt burden are faster in getting a new job. Although it is difficult to make a cause and effect connection, our findings are pointing to a systematic relationship between household indebtedness and labor market behavior. The impetus of debt of dislocated workers to move back into employment perhaps by accepting lower wages builds a faster economic recovery; however, it may exacerbate trends toward greater income inequality.

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Introduction

Nearly seven years have passed since the end of what economists are calling "The Great Recession". However, the structural component of joblessness in the United States lingers. The share of total unemployment that is considered long term (27 weeks or longer) rose to record levels during the recent "great recession", reaching an unprecedented 45 percent of the unemployment in the United States and has fallen very slowly and is still above pre-recession levels. Figure 1 shows that about 25 percent of the U.S. unemployed in 2016 were long-term, having remained jobless for 27 weeks or longer. Recent studies have debated the reasons behind the rapid rise and stickiness in the number of long-term unemployed. For example, Valletta and Kuang (2012) argue that the depth of the job losses and weakness of the economic recovery were very important in explaining the slow labor market recovery. Still as the economy is picking up, long-term unemployment has not return to its pre-recession level, lingering at historically high levels.

Given the depth of the recent 'great' recession and its links to the finance and housing industries, both economists and policy analysts have speculated that the sticky jobless situation for many would-be workers is also related to their level of individual and/or household debt. A unique and key characteristic of the recent recession was the magnitude of the housing crisis. Housing values plummeted, foreclosures increased and the level of personal and household debt skyrocketed (Hurd and Rohwedder, 2010). Clearly, the debt of over-extended households is an important issue behind digging our way out of the most recent economic downturn. However, there has been limited empirical

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work addressing it.

Figure 1 – Long-term unemployed as a percent of total unemployed
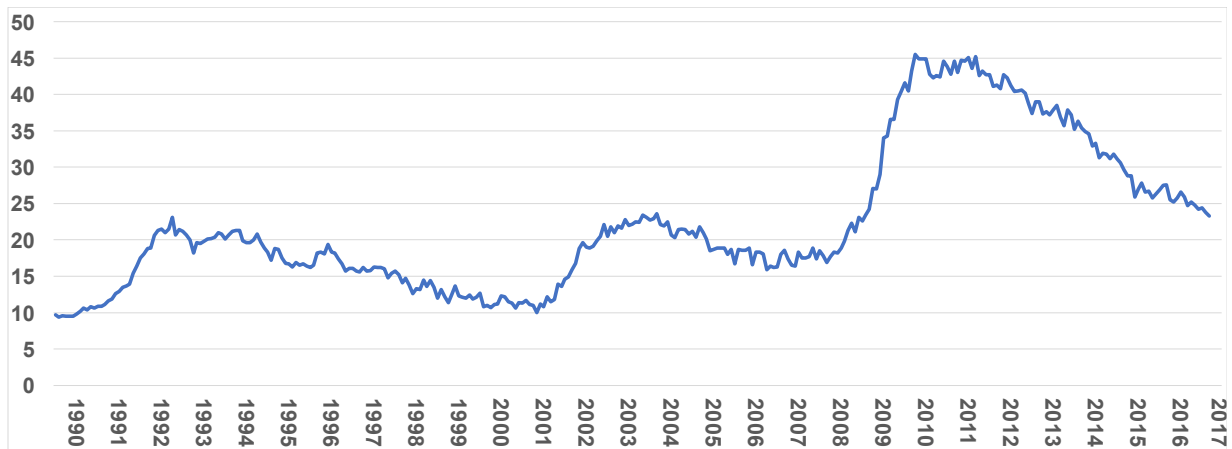
A substantial literature has analyzed the role of tightening credit conditions on firms' ability and willingness to hire new employees in the recent recession (Bentolila et al., 2013; Haltenhof, Lee and Stebunovs, 2014; Hall, 2014; Mian and Sufi, 2015; and Giroud and Mueller, 2015). However, little is known about the relationship of household debt and labor market outcomes. For example, Mian and Sufi (2014) concluded that the cause of the recent recession was a run up of household debt (not the damage to banks), as consumption eventually declined the most in counties where net worth fell most and jobs were slashed in big companies as sales slumped. From a policy perspective, this raises the question of whether and through which channels mounting household debt is related to the stickiness in unemployment. In contrast to this growing literature, we focus on the question how household indebtedness renders households' incentives to search for and take up a new job after displacement?

There exists substantial research indicating that those unemployed are 'maxing

out' credit limits on credit cards, tapping into unconventional refinancing schemes (e.g. family support), and/or seeking shelter under the umbrella of government funded programs to sustain themselves while jobless (Sullivan, 2008; Bethune, 2014; and Herkenhoff, 2014). Findings of recent research suggest that the debt level of households might have a direct impact on unemployment duration insofar that highly indebted households will demand higher reservation wages (the wage people would accept to return to work) to sustain their life style (Donaldson, Piacentino and Thakor, 2015). In particular, being able to draw on additional credit, households can search longer 'for better-paying, but harder-to-find jobs,' which would theoretically lead to a lengthening of an individuals' unemployment spell. Moreover, media reports indicate that several households are 'burning' savings while waiting for a better job to come (Basten, Fagereng, and Telle, 2012; Lammers, 2009; Lentz and Tranaes, 2005). For example, Lentz and Tranaes (2005) show that job search effort is negatively related to wealth because it is used to smooth consumption as the jobless spell progresses. The main findings support the notion that savings influence unemployment duration indirectly through the reservation wage. This wage shrinks and job search effort intensifies as the length of joblessness increases. Higher savings and higher reservation wages go hand-in-hand and can lead to a longer period of unemployment.

This channel might be of minor importance in the U.S. context. For instance, Sullivan's findings suggest that the median 25 to 64-year-old worker only has enough financial assets to cover three weeks of preparation earnings (Sullivan, 2008). In addition, falling asset prices such as stock prices and homes during the recent recession resulted in an erosion of households' net asset positions. However, if

households do not have access to credit as a form of informal unemployment insurance and cannot draw on substantial savings, we would expect a shortening of the unemployment spell. This is likely the case for the recent U.S. downturn. In addition, the proposed mechanisms provide little information on the relationship between accumulated/existing household debt levels and incentives of households to search for and take up a new job. Several scholars have argued that private household indebtedness increases the search intensity of the unemployed and reduces reservation wages; hence, shortening the duration of unemployment (see, discussion in Lammers, 2009).

The central aim of this paper is to analyze the relationship between accumulated debt (i.e. the debt stock) and unemployment duration. In particular, we are interested in answering the question whether a threshold level of debt exists, at which a jobless worker will accept just about any job. Our aim is to deliver new theoretical and empirical insights on the relationship between private household debt and labor market behavior. From a policy perspective, we hope to motivate further research that aims at better understanding the role household indebtedness plays on labor market outcomes through examining its impact on households' incentives to return to work after displacement.

In order to do such an analysis, we needed to bring together labor market status and financial data for the same individuals. The Survey of Income and Program Participation (SIPP) asks respondents questions pertaining to their labor market behavior as well as their level of debt. Hence, we know for example if a person is

unemployed as well as his or her annual debt level.   Furthermore, from a policy perspective, job losers are perhaps the most important jobless group to focus on, especially those whose job loss is permanent and they have almost no likelihood of returning to it.   Many of them typically end up as long-term unemployed.   Permanent job losers are often referred to as "displaced or dislocated workers".   Our focus will be on this group using data available in the time span between 2008 and 2012 from the SIPP 2008 panel. The level of debt could have a role to play in labor market decision-making. Also, whether the debt is unsecured (credit card) or secured (mortgage) could matter.

Using standard proportional hazard and logit models, our findings indicate that households that experience a higher debt burden are faster in getting a new job. These results are robust to different model assumptions and robustness tests. That is, our findings point to a systematic relationship between household indebtedness and labor market behavior.

<u>Related Literature and Theoretical Considerations</u>

Since the onset of the financial crisis a myriad number of papers have tried to address the relationship between the financial meltdown and labor market outcomes. A large share of the literature has evolved to explain U.S. displacement patterns and subsequent behavior of displaced workers in returning to work in order to explain the sluggish recovery of the U.S. labor market. Farber's (2011) study of U.S. displacement from the 1970s onward using data from the BLS Displaced Worker Survey (DWS) confirms the stickiness of joblessness, showing the re-employment rate for displaced

workers over the past four decades was the lowest ever in 2011 with the vulnerability of the lowest educated rising. Similarly, several authors have found evidence that employers are reluctant to hire the long-term unemployed, thinking their skills have deteriorated or there is something else wrong with them. Moscarini and Fujita (2013), using SIPP data, found that the displaced with the least amount of job experience had the most difficult time finding a new job. Focusing on low-income workers, Andersson et al. (2014) found that poor job accessibility significantly increased the duration of joblessness among lower-paid displaced workers. Blacks, females, and older workers are more sensitive to job accessibility than other subpopulations.

A key shortcoming of most of these studies is that they take an isolated look at displacement and ignore the significance of household indebtedness, which is likely to have a strong influence on household incentives to take up a new job. From a theoretical point of view, returning to work is a two-way street. There first has to be an available job, and secondly, a willingness on the part of the job seeker to accept it. The first aspect concerning job arrival rates has been extensively studied in the U.S. context. During the recent recession firms have been reportedly suffering from a tightening of credit lines and worsening credit conditions, which in turn has led to an increase in displacement and also to a drop in hiring (Bentolila et al., 2013; Haltenhof, Lee and Stebunovs, 2014; Hall, 2014; Mian and Sufi, 2015; Giroud and Mueller, 2015). In fact, several other contributions address the role of financial frictions on unemployment, especially from a firms' hiring perspective (Wasmer and Weil, 2004; Monacelli et al. 2011; Petrosky-Nadeau and Wasmer, 2013; and Petrosky- Nadeau, 2014). Although these approaches were able to link household indebtedness to drops in consumption,

which negatively impact firms hiring behavior and thus are highly potent in explaining 'sluggish' job arrival rates in the course of the economic decline, they ignore the direct effects of household indebtedness on households' incentives to re-enter into employment.

Our focus is on worker behavior that we address through looking at displaced workers' ability to find and willingness to accept a job offer.   According to our view, there are several mechanisms at play that link the supply of labor to financial markets and financial frictions. Labor supply theory states that wanting to work depends on an individual's utility function. Debt likely enters into the utility function such that work is necessary to repay debt and is thus preferred over leisure. The rational for this theoretical prediction is that debt enters as negative wealth into households' decision making on "what I actually do today will effect what I can do tomorrow" and incentivizes households to take up a new job. Several studies have investigated the relationship between the length of unemployment spells and household wealth with the most notable being Herkenhoff and Phillips (2015); Keys (2010); and Sullivan (2008).

Building off of a stylized intertemporal household optimization framework, authors show that households can 'burn' savings and draw on additional financial resources until they find an acceptable employment opportunity. (Sullivan, 2008: Phillips, 2015) The main findings of this literature support the notion that wealth and available savings influence duration indirectly through the reservation wage. Higher savings and higher reservation wages go hand-in-hand and can lead to a longer period of unemployment. In addition, if households can use their accumulated wealth as

collateral for enhanced lending, wealth can have a second-round effect. For instance, Sullivan (2008) reports that households increase borrowing by roughly 11 to 13 cents per dollar of lost earnings, which is primarily sourced through unsecured debt and concentrated among wealthy households. Similarly, Herkenhoff and Phillips (2015) using two separate large administrative datasets found that higher pre-displacement wealth led to an increase in credit limits equal to 10 percent of prior annual earnings, which in turn led to an average lengthening of the unemployment spell between 2 to 7 days for displaced mortgagors. For this reason, it is hardly surprising that most authors' find a positive relationship between household wealth and unemployment duration; that is, wealth lengthens the unemployment spell. However, these findings are not uncontested and are subject to substantial debate.

In the recent U.S. context, mortgage equity and home ownership play an important role. Work by Oswald (1996) and Beer (2008) suggested that home ownership limited the willingness to move for a job outside of the current locality. Consistent with this finding were the results of Taslin and Yaman (2012) showing longer jobless spells for homeowners. Herkenhoff and Ohanian (2012) showed that some mortgage holder's use it as a quasi UI fund by delaying mortgage payments, which also appeared to lengthen unemployment duration. In a study that has relevance for our examination of financial issues and joblessness, Herkenhoff and Ohanian (2011) examined mortgage modification programs (mostly government sponsored) that changed the present value of the loan and concluded that reducing mortgage payments changed homeowners' incentive to move to better job markets and thus hindered their finding jobs. This of course assumes movers would have more success than non-

movers in finding a job.

Data from the Displaced Worker Survey (DWS) are available to analyze the job market outcome for displaced workers who moved. The DWS question was "Did the person move to another location after the job loss to take or look for another job?" A tabulation from selected years of the responses supports the notion that moving helps (see, Table 1). The number and percent of the displaced that moved and whether they were reemployed compared to non-movers follows:

Table 1   Displacement vs. Personal Mobility

Year	Number displaced movers	Percent of displaced	Percent movers re-employed	Percent nonmovers re-employed
2012	942,000	7.3	71.5	55.7
2010	986,000	6.4	65.8	47.6
2008	574,000	7.0	76.8	65.8
2006	671,000	8.2	77.5	67.8

At the time of the survey, movers were more likely than non-movers to be re-employed. However, very few displaced workers moved, less than 10 percent in the years the question was asked.

Following the collapse of the housing market, where the value of people's homes severely declined, with many homeowners owing more on their mortgage loans than the value of their house. It is only possible to sell your home for a loss. Obviously, most people are unwilling to do that. This in turn hinders geographical mobility to search and accept a new job in a different location. Brown and Matsa's (2016) findings suggest that housing market distress impedes household mobility. Indeed, SIPP data allow for the

determination of whether homeowners have negative equity whereby their mortgage loan is greater than the value of their home.   Displaced workers in this situation experienced longer jobless spells, lending some credence to the notice that having an under-water loan discourages mobility.   Table 2 illustrates that displaced workers with a mortgage were more likely re-employed than those without mortgages; however, those with negative equity (under-water mortgages) were less likely to be re-employed. This implies that the composition of debt, as well its magnitude, may be important to job search behavior.

Table 2.   Displaced workers re-employed by mortgage status and level of debt, 2009-2012 (SIPP 2008 panel)

Mortgage status	Total displaced	Percent re-employed
Total	13,337,674	63.0
With mortgage	5,087,401	64.2
Positive equity	3,926,094	65.3
Negative equity	1,073,030	58.8
No mortgage	1,872,168	54.7

By contrast - following job search theory - debt, serving as a source of income, may be helpful, as it gives the unemployed more time to search, resulting in better job matches but lengthening the duration of joblessness.   Using the 2009 RAND American Life Panel, Hurd and Rohwedder (2010) found that 18 percent of unemployed households self-report using unsecured credit to replace lost income. Following this empirical observation, Herkenhoff (2014) developed a theoretical framework, in which greater access to unsecured credit among the unemployed decreases the consumption decline upon job loss, and thus increases reservation wages. In particular, being able to draw on additional credit, households can search longer 'for better-paying, but harder-to-find jobs,'

which would theoretically lead to a lengthening of an individuals' unemployment spell. In line with these findings recent studies indicate that highly indebted households will demand higher reservation wages to sustain their life style and thus try to stay out of the job market longer (Donaldson, Piacentino and Thakor, 2015). From this perspective, credit can be regarded as a private form of unemployment insurance that allows households to smooth consumption after displacement. This wage shrinks and job search effort intensifies as the length of joblessness increases. Thus, there are counteracting financial forces that both raise and lower the duration of unemployment, which must be sorted out empirically.

Empirical Analysis

Our empirical section incorporates several layers of analysis. Besides, providing preliminary descriptive statistics on the structure of displacement patterns and household indebtedness, we follow prior research and analyze the impact of household debt on the duration of the unemployment spell. To mitigate the influence of competing mechanisms, we focus on displaced workers in the time span between 2008 and 2012. The selected time span is important because it exactly captures the financial crisis in the United States. During this time – especially at the outset - firms were more likely to close down or go out of business; employees were more likely to lose 'unexpectedly' their job, which reduces concerns about anticipation effects.

Concentrating on displaced workers is important for several reasons. First, given rapidly rising displacement rates at the outset of the financial crisis, getting people back to work has been a policy priority during the economic recovery in the United States. Moreover, displaced workers have historically been a difficult group to re-employ. As

such, their duration of unemployment is typically longer and when re-employed their wages have shrunk (see, Fallack, 1996). Second, from an econometric standpoint, looking at displaced workers allows us to minimize selection bias (most people do not choose to leave an employer) and left censoring problems (the date of displacement is unknown) that would arise if we were looking at the unemployed population at large. From a household balance sheet perspective, the selection of our population and the time span are important because households are less likely to be able to insure against job loss via mobilizing savings and tapping into other financial resources as the financial crisis coincides with falling house and asset prices. The unexpected nature of the financial crisis also likely mitigates concerns about anticipation effects that might drive households' financial decision making.

Our definition of labor force displacement is similar to that used in the biennial survey of displaced workers administered by the U.S. Bureau of Labor Statistics (BLS). All individuals, age 16 and older, that we determined to be unemployed in the "core" component of SIPP are also asked to for the main reason for their unemployment. The reasons available for response are: (1) On Layoff; (2) Retirement or old age; (3) Childcare problems; (4) Other family/personal obligations; (5) Own Illness; (6) Own Injury; (7) School/Training; **(8) Discharged/Fired; (9) Employer Bankrupt; (10) Employer sold business;** (11) Job was temporary and ended; (12) Quit to take another job; **(13) Slack work or business conditions;** (14) Unsatisfactory work arrangements (hours, pay, etc.); (15) Quit for some other reason. Reasons 8-10 and 13 (bolded) may be considered as reasons that imply that a worker has been displaced. For the time period considered in this research, January 2009 through December 2012, the average annual number of

displaced workers per our definition was 3.33 million people. The BLS estimate for January 1, 2011 to December 31, 2013 was 3.18 million per year.   Our definition includes teenagers, while the BLS estimate includes only adults 20 years and over, the most likely explanation for the difference.

Descriptive Statistics

A useful analytical starting point is to examine our sample of displaced workers to see who they are and how they have fared in the labor market subsequent to their job loss. Table 3 reveals slight differences between displaced workers from other jobless workers. For example, in comparison to other unemployed workers, the displaced were more likely older, male, non-white and less educated. Interestingly, for all the unemployed, those with higher levels of debt were the most educated.

Table 3. Profile of displaced and non-displaced workers and level of debt

Characteristic	Displaced (percent)	Debt greater than $50,000		Non-displaced (percent)	Debt greater than $50,000
Total	100.0 (13,338)			100.0 (36,154)	
Age					
16-24 years	25.3	23.1		30.6	27.9
25-54 years	64.9	67.4		60.1	63.0
55 years and over	9.8	9.6		9.4	9.1
Gender					
Male	53.6	54.0		49.7	51.0
Female	46.4	46.1		50.3	49.0
Race					
White	78.8	84.2		80.4	83.9
Non-white	21.2	15.8		19.6	16.1
Education					
Less than high school	22.0	18.4		15.9	12.7
High school	26.5	21.4		21.4	16.3
More than high school	51.5	60.2		62.7	71.0

Numbers in thousands

Among displaced workers, there did not appear to be any significant differences along any single personal characteristic between those, who had more than $50.000 debt. This gives some confidence that personal characteristics, other than education, play a significant role in explaining differences in indebtedness.

A key policy-laden variable to analyze is the duration of unemployment, comparing displaced workers with other unemployed workers. Median duration of unemployment for our sample of displaced workers was about 30 months, slightly longer than other jobless workers.   Table 4 shows that displaced workers were less likely to be re-employed and more likely to drop out of the labor force than other unemployed workers.

Table 4. Displaced and non-displaced unemployed workers by subsequent labor force status[a]				
Unemployment status	Total	Unemployed	Re-employed	Out of the labor force
Displaced	100.0	10.9	55.9	33.2
Non-displaced	100.0	8.9	64.3	26.8

[a]Labor force status observed in the 48th month (last month) of our sample period.

According to our estimate of displacement, more than 13 million Americans lost their job since 2008. At the same time, median household debt was around $73,000 and home owners faced falling house prices, so that their mortgages were higher than the value of the house (termed an under-water mortgage) and were seeing their retirement savings melting. Table 5 gives us an indication of household debt levels before and after displacement covering the years 2009 to 2012. However, trends in household indebtedness are not entirely clear.   For those displaced in 2009, debt rose in 2010 and then declined but for those displaced in 2010, debt fell the following year.   It was the same trend for secured and unsecured debt.   Interestingly, the trend for debt prior to displacement seems clear.   Both secured and unsecured debt rose prior to displacement, supporting earlier arguments that households may anticipate that hard times are coming.

Table 5.   Changing debt level for displaced workers, 2009-2012

Debt class All household debt	Ever displaced	Year displaced			
		2009	2010	2011	2012
2009	$87,373	$88,101	$86,413	$77,005	$98,645
2010	$92,909	$105,145	$74,123	$77,625	$106,090
2011	$75,930	$72,435	$65,807	$74,463	$100,149

.

Secured debt	Ever displaced	Year displaced			
		2009	2010	2011	2012
2009	$72,492	$74,482	$68,898	$65,297	$80,707
2010	$76,598	$86,685	$59,436	$63,710	$90,107
2011	$63,780	$61,625	$50,958	$61,334	$89,540

Unsecured debt	Ever displaced	Year displaced			
		2009	2010	2011	2012
2009	$14,881	$13,618	$17,514	$11,708	$17,938
2010	$16,310	$18,460	$14,687	$13,915	$15,983
2011	$12,150	$10,810	$14,849	$13,130	$10,608

An intriguing finding from a preliminary analysis of our data suggests that displaced workers with higher debt, both unsecured (credit card) and secured (mortgage or not), had shorter duration of jobless spells. A key goal of this study is to dig deeper into this finding to determine some of the underlying forces encouraging unemployed debtors to try to move quickly back into employment.

Table 6 shows that displaced workers with higher debt were more likely to be re-employed, about 69 percent of displaced workers with $125,000 or more debt were re-employed compared to 61 percent of those with 0-$25,000 debt. The pattern holds whether the debt was secured or unsecured. A very likely reason for this result is that from a household balance sheet perspective, households had to simultaneously cope

Table 6.   Displaced workers subsequent labor status by type and level of debt

Total Debt

	Total number displaced/1.	Displaced, re-employed/1.	Percent
Total	13,337,700	8,398,100	63.0
$0 - $50,000	8,291,800	5,050,600	60.9
$50,001 - $125,000	2,157,200	1,347,000	62.4
$125,00+	2,888,700	2,000,500	69.3

Secured debt

	Total number displaced/1.	Displaced, re-employed/1.	Percent
Total	13,337,700	8,398,100	63.0
$0 - $25,000	8,078,300	4,991,700	61.8
$25,001-$100,000	2,326,900	1,392,000	59.8
$100,000+	2,932,400	2,014,400	68.7

Unsecured debt

	Total number displaced/1.	Displaced, re-employed/1.	Percent
Total	13,337,700	8,398,100	63.0
$0 - $10,000	10,011,600	6,192,700	61.9
$10,001 - $20,000	1,215,300	740,600	60.9
$20,000+	2,110,700	1,464,800	69.4

/1.   Values rounded to the nearest 100s

with a collapse of the asset side of their balance sheet, while the liability side stayed at a

constant level, putting households under immense economic pressure to work.

Baseline Model

Duration models have been evolving in econometrics since the late 1970s.

They are termed hazard models and are from a class of survival models, whereby they

relate the time that passes before something occurs that may be related to that quantity of time.   In our case, for example, is the duration of unemployment related to debt buildup?   The goal is to predict the probability at each time for each observation.   We want to predict the probability of finding a job. However, economist have recognized that it is important to account for unobserved heterogeneity (or omitted variables) in models for duration data. That is, in our sample there may be unmeasurable reasons for some people to have accumulated more debt than other people. Thus, the sample could be biased.   Failure to account for this causes the estimated probability to decrease more with the duration than if our observations were truly randomly selected. A final concern with panel data is censoring, or the exact ending date of an event is unknown.   That is, for some of our observations, it is not known how long they remained jobless. Fortunately each of these issues has a rich history of how to deal with them econometrically, which will be discussed then implemented to gain an understanding of how debt may influence the length of a jobless spell.

Cox (1972) was among the first users of hazard rate models to predict and construct "length-of-life" tables. In economics his model has become a standard approach to analyze individual longitudinal observations or possible movements out of unemployment to another labor market status. It is termed a Multiplicative Proportional Hazard (MPH) model for exit rates from unemployment using micro (TIME) data. Heckman and Singer (1984) provide an early survey for this approach, and Machin and Manning (1999) updated the survey with an emphasis on long-term unemployment and negative duration dependence in Europe.   More recently, van den Berg and van der Klaauw (2001) have estimated the MPH model using both micro data and aggregate data

on unemployment duration distributions. As our baseline, we estimate a Cox proportional hazard model in the form of:

$$\log(h_{it}) = \beta_1 DEBT_{it} + \beta_2 X_{it} + \varepsilon_{it} \tag{1}$$

where h captures the hazard rate, DEBT is the amount of outstanding debt of individual i at time t, and ε_{it} is a vector capturing characteristics of the individual influencing the probability to leave unemployment and taking up a new employment, and   is a parameter that varies across individuals but is unobservable and also may influence outflow. We control for marital status, age, and regional fixed effects. We include region fixed effects to account for different policy responses and economic conditions during the economic decline phase across different U.S. regions that are available in SIPP.

This raises the question how we can empirically isolate the effect of indebtedness on unemployment duration, so that the behavior is strictly driven by household indebtedness and not any other mediating variable which is correlated with household debt and may not be really measurable.   To ensure (or at least minimize) that such factors are not biasing our results we add a behavioral variable. This variable is based on SIPP module that asked individuals on whether recipients of the 2008 tax rebate used this transfer mostly to pay off debt. We include it in our regression as a measure of debt concern and as a measure of liquidity constraint among households. In fact, a substantial literature on tax incentives/rebates finds that liquidity constrained households are more likely to spend their additional tax transfers/rebates on paying off debt (Sahm, 2009; Shapiro, 2009; and Johnson, 2006).

In addition, we include different measures of household debt in order to capture relative indebtedness of the household. We separate the effects of secured versus non-secured debt to see whether a crunch of the household balance sheet through an under-water mortgage leads to a quicker return into the labor market. In order to make sure that this effect is driving individuals back into the labor market. We also crosscheck our results by looking at the actual debt burden a household experiences. The debt burden is a dummy variable (0, 1) which indicates an individual's position within the distribution of average annual household debt, as defined by quintile. If an individual had an average annual household debt that placed it in the middle, 4th or top quintile of the household debt distribution, then their value of the variable was set equal to 1, or 0 otherwise. For example, if someone's average annual household debt was greater than $35,000 they would find themselves in the top of the distribution of household debt. In addition, we included the debt to wealth ratio at the beginning of the unemployment spell. The reason for checking for this variable is that households with higher annual income prior to displacement might be able to draw on more 'generous' credit lines and thus stay out of the labor market longer. For instance, Herkenhoff and Phillips (2015) find that credit limits are decisive in determining the length of unemployment.

A pre-recession study and a recession study both found that wealth can dampen job search effort. Lentz and Tranaes (2005) showed that job search effort is negatively related to wealth because it is used to smooth consumption as the spell progresses. Lammers (2009) used a job search model to relate savings (perhaps the opposite of debt) and unemployment duration. The main finding was that savings influenced duration indirectly through the reservation wage. This wage shrinks and job search effort

intensifies as the length of joblessness increases.   Higher savings and higher reservation wages go hand-in-hand and can lead to a longer period of unemployment. An interesting study in Norway showed a tendency for workers to build up savings in anticipation of a tough job market ahead, followed by a depletion of savings during unemployment (Basten, Fagereng, and Telle, 2012).   Savings or overall wealth, as their opposite debt, can influence job search behavior and hence the duration of unemployment. Besides a debt-to-wealth variable (total household debt divided by total household wealth), a variable measuring a wealth advantage was included.   An individual had a "wealth advantaged' if she was located in the top three of five wealth groups. Indeed, wealth did appear to lengthen unemployment duration.

Our analysis begins with a logit approach to predict the likelihood of re-employment for our sample of displaced workers in order to have a point of comparison when more sophisticated econometric approaches are applied.   The basic approach is Cox model with a gamma distribution; it has several attributes.   It adds a random variable that accounts for the omitted heterogeneity, plus accounts for censoring, something traditional linear regression models do not do. Since the pattern of the length of jobless spells is not known for those beyond the censored point, an assumption of this pattern must be made. A convenient and commonly used distribution is the gamma distribution, which is also used here.

The results for the logit and Cox models are both presented as each has a different functional form.   Seven regressions are run for each where the measure of debt and liquidity constraints are varied.   The logit results (Table 7) illustrate that debt appears to matter to the length of a jobless spell for displaced workers.   Those characterized as

having a high debt burden are more likely to move from unemployment to employment than those experiencing a low debt burden. That is, this difference is statistically significant. Likewise, the probability of moving from unemployment to employment was positively related to total household debt and to total secured debt. The level of unsecured debt was not a significant factor.

Table 7 Regression results for logit model (dependent variable is probability of employment)							
Variable	Logit odds ratios						
Intercept	-0.111	-0.030	-0.039	-0.087	-0.272	-0.001	0.132
Age							
16-24 years	1.208	1.199	1.190	1.178	1.196	1.314	1.079
25-34 years	1.487*	1.453*	1.471*	1.424*	1.509**	2.145*	1.427*
35-44 years	1.407**	1.412*	1.409*	1.388	1.429*	2.114	1.382
45-54 years	1.359	1.361	1.362	1.355	1.373	1.999	1.339
Married	0.853	0.882	0.850	0.877	0.816	1.134	0.901
Region							
Northeast	1.041	1.054	1.038	1.051	1.055	1.544	1.066
South	1.149	1.162	1.148	1.153	1.166	1.523	1.176
West	0.674**	0.684***	0.677**	0.685**	0.683**	0.926**	0.679**
Behavioral – received tax rebate and used mainly to pay down debt							0.76**
Debt							
Experienced debt burden	1.268**						
Experience wealth advantage		1.047					
Total household debt			1.041**				
Unsecured debt				1.013			
Secured debt					1.035**		
Debt to wealth ratio						1.000	
Likelihood ratio	21.85	17.83	22.96	18.29	24.22	18.37	22.84
Note: Each regression included variable "jobless spell started in month 4 or multiple of 4 (dummy)" which was not statistically significant							

The Cox model results (Table 8) broadly support these findings. So, the evidence appears to show for unemployed displaced workers that level of debt and finding a job are positively related.   In a conversely manner, one could say that this finding somewhat

supports the literature showing higher wealth leads to longer unemployment duration.

Table 8 Regression results for Cox model with (dependent variable is probability of employment)							
Variable	Cox odds ratio (exponentiation yields hazard ratio)						
Intercept	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age							
16-24 years	0.489***	0.504***	0.485***	0.489***	0.488***	0.493***	0.470***
25-34 years	0.216***	0.236***	0.213***	0.212***	0.216***	0.215***.	0.215***
35-44 years	0.149***	0.165***	0.148***	0.150***-	0.150***	0.151**	0.154***
45-54 years	-0.011	-0.002	-0.011	-0.010	-0.010	-0.010	-0.010
Married	0.054**	0.060**	0.050*	0.059**	0.051*	0.062**	0.060**
Region							
Northeast	-0.049	-0.054	-0.049	-.045	-.047	-0.042	-0.046
South	0.014	0.013	0.014	0.015	0.016	0.017	0.015
West	-0.079**	-0.078**	-0.079**	-0.077**	-0.077**	-0.076**	-0.082**
Behavioral – received tax rebate and used mainly to pay down debt							0.078***
Debt							
Experienced debt burden	0.40						
Experience wealth advantage		0.059**					
Total household debt			0.009**				
Unsecured debt				0.003			
Secured debt					0.006*		
Debt to wealth ratio						-0.00002	
Likelihood ratio	192.7	195.1	195.5	191.2	194.0	190.9	197.4
Note: Each regression included variable "jobless spell started in month 4 or multiple of 4 (dummy)" which was not statistically significant							

As expected age (Farber, 2011) and marital status (Kletzer, 2001) are important predictors of the length of a jobless spell. Relative to older workers, younger workers were more likely re-employed during our survey period. Married workers were also more likely re-employed compared to those not married. Although it is important to control for local or regional economic conditions when examining likely job prospects, only dislocated workers living in the West relative to the Midwest appeared to have a harder time finding a post-displacement job.

Our behavioral variable, used tax rebate to repay debt, was statistically significant in all equations showing a negative relationship with probability of finding employment. This means displaced workers actively lowering their debt probably had longer jobless spells.   This is a difficult result to interpret.   One interpretation supports the earlier findings in that their behavior illustrates that they are not disparate for a job, as they are using extra money to pay down debt.   Another interpretation is that they represent a responsible or savvy behavioral financial group and controlling for it allows us to see if debt is important to labor market behavior. It is and seems to push displaced workers back to work.   Per the Likelihood Ratio, the weakest models are those without a debt variable.

<u>Robustness and modeling approaches</u>

In a second step, we account for two important features. First, it has been well established that unemployment spells follow a certain time path or duration dependence. Duration dependence has two roots. Several studies, such as those by Ham and Rea (1987), Berkovitch (1990), and Kroft, Lange and Notowidigdo (2013), found that the longer one is jobless, the harder it becomes to find a job.   An erosion of skills in conjunction with skeptical employers is often given as reasons for this phenomenon. An early study in Canada found the probability of returning to employment declines as the jobless spell lengthens (Ham and Rea, 1987).   Berkovitch (1990) concluded that there was a stigma associated with long-term jobless spells.   Lending support to this hypothesis, Kroft, Lange and Notowidigdo (2013) found employers overlooked or did not consider the long-term unemployed unless the jobless rate was so high to offer a reason for their long joblessness.   In particular, for displaced workers, this effect is important.

This has come to be known as "true duration dependence." In order to account for this dynamic effect – it might violate our proportional hazard assumption. Weibull models have shown to deal adequately with duration dependence (Jenkins, 1995). Our model is re-estimated with a Weibull model specification (results not shown) and indicate no difference from the Cox model,

An additional major concern for our analysis is unobserved heterogeneity among the unemployed. In this case, the unemployed are assumed to differ in their exit rates from the time they become unemployed. It is intuitive that some people are less mobile than others. As such, they are less likely to leave the population; making it appear that long duration itself is related to even longer duration. Machin and Manning (1998) investigated this issue in great detail, concluding that papers that have tried to disentangle true duration dependence from unobserved heterogeneity have to make specific assumptions about functional form. Unfortunately, some assumptions like the effect being proportional are not tied to a specific economic theory; most studies use it out of convenience (Machin and Manning, 1998). A second issue with exit rates is that not everyone has found a job by the end of the survey. A common "fix" in the literature to deal with these two issues is to apply a gamma distribution. These results are presented in tables 9-12. Although the models include age, marital status and region, the results for these variables are not reported as they are essentially unchanged from previous models. The debt-to-wealth variable is dropped because it was not statistically significant in any model. The key finding that higher debt appears to encourage a return to work for dislocated workers holds. There is a positive relationship between extent of debt and likelihood of being employed, which holds for secured debt but not for unsecured debt,

which is just below the 90 percent significant level.

Table 9 Regression results for Cox model with gamma distribution (dependent variable is probability of employment)							
Variable	Coefficients						
	(1)	(2)	(3)	(4)	(5)	(6)	
Intercept	1.25***	1.28***	1.30***	1.26***	1.27***	1.22***	
Behavioral – received tax rebate and used mainly to pay down debt						0.038	
Debt							
Experienced debt burden	-0.0452**						
Experience wealth advantage		0.089***					
Total household debt			-0.01***				
Unsecured debt				-0.005			
Secured debt					-0.005**		
Likelihood ratio	28522.0	28511.2	28519.1	28523.5	28522.4	28523.6	
Note: Each regression included variable "jobless spell started in month 4 or multiple of 4 (dummy)" which was not statistically significant. Age, marital status and region included in regression but results not shown as they are similar to Cox regression.							

A fundamental concern in our analysis still remains: it relates to the level of household indebtedness. Debt is not strictly exogenous. For instance, households might borrow more at the beginning of the unemployment spell, which might correspond to an increase in unsecured debt (Sullivan, 2008). It might also be the case, that debt is capturing certain behavioral patterns that are associated with the duration of unemployment. For instance, the results of our descriptive results indicate that education plays an important role in explaining variations in debt (see Table 6). This observation is hardly surprising, as most college education is debt financed. At the same time, a higher level of educational attainment is likely to reduce the length of the unemployment spell. Also, debtors may not be a random sample. There may be some unmeasurable characteristic (beyond education level) that is a good predictor of level of debt.

Education is added to the model and the results are reported in tables 10-11.

Table 10. Regression results for Cox model, gamma distribution (dependent variable is probability of employment)

Variable	coefficients						
	(1)	(2)	(3)	(4)	(5)	(6)	
Intercept	1.03***	1.03***	1.25***	0.93***	0.92***	1.21***	
Age (relative to 65+)							
16-24 years			-0.408***			-0.40***	
25-34 years			-0.155***			-0.16***	
35-44 years			-0.113***			-0.11***	
45-54 years			0.032			0.029	
Married			-0.068***			-0.06***	
Education (relative to lower education)							
High school graduates plus those with some college				0.160***	0.162***	0.065***	
College graduates				0.130***	0.128***	-0.025	
Region (relative to Midwest)							
Northeast		0.044	0.045		0.043	0.051	
South		0.032	-0.020		-0.033	-0.020	
West		0.054*	0.058**		0.058**	0.061**	
Debt							
Experienced debt burden	-0.048***	-0.050***	-0.045***	-0.059***	-0.057***	-0.039*	
Likelihood ratio	28723.1	15430.0	15285.1	28688.2	28678.5	28510.5	
Note: Each regression included variable "jobless spell started in month 4 or multiple of 4 (dummy)" which was not statistically significant							

Table 10 includes six regressions in somewhat of a stepwise fashion by including additional variables in each regression. To better compare results, only our key measure of debt is included. Debt remains a strong predictor of employment likelihood across all specifications. Education level has the expected relationship with duration of unemployment (or likelihood of returning to work).   Dislocated workers with a higher level of education experienced a higher likelihood of moving into a job. The last regression with all the independent variables – equation 6 in table 10 – brings out the importance of age and education relative to debt in predicting a return to work. All of them are statistically

significant but the significance of debt dips a little.   Moreover, table 11 includes all the

debt measures and confirms earlier findings,

Table 11 Regression results for Cox model, gamma distribution (dependent variable is probability of employment)							
Variable	coefficients						
	(1)	(2)	(3)	(4)	(5)	(6)	
Intercept	1.21***	1.23***	1.26***	1.23***	1.22***	1.19***	
Education (relative to lower education)							
High school graduates plus those with some college	0.065***	0.067***	0.070***	0.067***	0.065***	0.059***	
College graduates	-0.025	-0.012	-0.012	-0.028	-0.026	-0.037	
Behavioral – received tax rebate and used mainly to pay down debt						0.030	
Debt							
Experienced debt burden	-0.0387*						
Experience wealth advantage		0.082***					
Total household debt			-0.008***				
Unsecured debt				-0.005			
Secured debt					-0.004*		
Likelihood ratio	28510.5	28501.1	28507.4	28511.1	28510.6	28511.8	
Note: Each regression included variable "jobless spell started in month 4 or multiple of 4 (dummy)" which was not statistically significant. Age, marital status and region included in regression but results not shown as they are similar to Cox regression.							

Policy and Discussion

The onset of the housing and subsequent financial crisis in 2008 marked the

steepest economic downturn in the United States, since the Great Depression in the late

1920s and 1930s. This most recent financial crisis has been characterized by massive

layoffs and displacement. Given the depth of the recent 'great' recession and its links to

the finance and housing industries, both economists and policy analysts have speculated

that the sticky jobless situation for many would-be workers is also related to their level of

individual and/or household debt. In contrast to a growing literature that links financial

market conditions on employers' hiring capabilities, we focus on the question how household indebtedness renders households' incentives to search for and take up a new job after displacement?

One can argue that our results show that debt may shorten unemployment spells as job seekers worry about their accumulated debt and perhaps lower the wage at which they would accept in a new job. The Survey of Income and Program Participation (SIPP) data on individual work histories and household debt and our initial regression results appear to lean towards the shortening duration hypothesis. From a policy perspective, our research findings support the notion that household indebtedness plays an important mediating effect on labor market outcomes through impacting households' incentives to return to work after displacement.

An important conclusion of the apparent relationship between higher debt and shorter jobless spells is that internal devaluations (i.e. reductions in wages during a financial crisis) would be more feasible in countries where (a) the labor market is more flexible and (b) the household sector is more indebted. In this respect, household debt incentives households to accept lower wages and return quicker into the labor market, thus building the basis for a faster economic recovery. This is an especially important insight for policy making in the Eurozone and other crisis-ridden economies.

In addition, this finding supports the notion that the costs of economic crisis are born by the population at large through falling and/or stagnating wage levels in combination with an asset price deflation that reduces overall household wealth. From a public policy perspective, our findings are alarming. In fact, they imply that shrinking

household balance sheets drive the increase in perceived inequality, which is most pronounced for low and middle income households. Theoretically, our findings also imply that it will be harder for households at lower incomes to rebuild their balance sheets if shorter durations go hand in hand with lower re-employment wages, likely aggravating socio-economic inequality and subsequent social tensions in the United States.

It does not appear, although the evidence is weak, that jobless workers view credit card debt as a replacement for unemployment insurance (UI) benefits. To some extent higher unsecured debt and thus credit card debt appears to encourage re-employment while higher/longer UI benefits do not. An in-depth analysis of these behavioral aspects of credit card debt as a form of UI warrants important future public policy insights. We leave this analysis to future research. Nevertheless, our empirical findings point to the importance of household indebtedness in influencing individuals' labor market behavior in the US and call for further analysis.

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