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HelloWallet

Debt Savers in Defined Contribution Plans

Size, Causes, and Solutions

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The average 401(k) and other defined contribution (DC) plan participant now defers over 8 percent of their annual income toward retirement savings through their plan and social security taxes, making it one of the largest expenses for households. Yet, the retirement readiness of DC participants remains stubbornly low: the typical worker near retirement only has about 2 years of replacement income saved, or about 15 years short of the median lifespan post-retirement. One explanation for the stubbornly low retirement readiness of workers may be an increase in household debt. With more household income going to pay off debt, households may have less money to save and face higher costs of living in retirement. In this paper, we assess the relationship between DC participant's debt and savings behavior. We find:

The monthly debt obligation of active DC households near retirement (between 50 – 65 years old) increased by 69 percent between 1992 and 2010, now adding up to about $.22 of every $1.00 earned.

Among all DC participants (or participants between 18-65 years old), the debt obligation increased by 9 percent during this time period. The growth in debt obligation leaves less money for savings deferrals into retirement plans and raises the cost of retirement.

Over 60 percent of households that have a DC plan added more debt to their family balance sheet than they contributed to retirement savings between 2010-2011, a group that we refer to as "debt savers."

These data also indicate that 20 percent of DC participants accumulated credit card debt faster than retirement savings in recent years; 20 percent accumulated mortgage debt faster than retirement savings; and the balance accumulated installment (e.g., auto loan), other revolving debt (e.g., home equity), or a combination of debt faster than retirement savings.

Most DC participants that accumulate credit card, auto loan, home equity, mortgage, or other forms of debt faster than retirement savings are over 40 years old, college educated, earn over $50,000, and have insufficient emergency savings.

We also find that 41 percent of debt savers are over the age of 50, and 47 percent are in the highest income quartile. However, no demographic variable is strongly associated with the probability that a DC plan participant will accumulate debt faster than retirement savings.

DC participants that accumulate any type of debt faster than retirement contributions have 50% less of their annual income saved for retirement compared to DC participants more focused on building retirement savings.

In particular, debt savers have about 2 years of replacement income saved, compared to nearly 4 years among non-debt savers.

These data indicate that a large share of DC participants are accumulating debt faster than they are accumulating retirement savings, and that the majority of these participants are over the age of 40 – a time period when participants are expected to be deleveraging and focused on accumulating retirement savings. This growth in debt can come at the expense of being able to afford increased retirement savings deferrals, increases the likelihood that a participant will breach their retirement savings, and raises the cost of retirement. In response to these data, we recommend that DC plan sponsors provide participants with holistic guidance designed to improve their retirement readiness, which can help determine the safest and most successful path for participants to build wealth. We also recommend that sponsors rely on more holistic participant finance data to assess the efficacy of their programs aimed at improving retirement readiness.

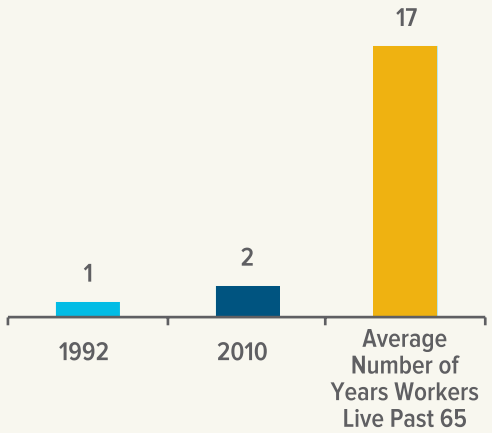
Content

Introduction

Over one-third of U.S. working households now participate in a 401(k) or other defined contribution plan, contributing, on average, 11 percent of their income to retirement savings.[1] Together with over $100 billion in annual employer matches, total new contributions into defined contribution plans now add up to over $300 billion in new deposits every year, making it one of the largest and most widely used retirement savings vehicles.[2] Yet, despite the growth of defined contribution plans and assets, the retirement readiness of workers remains stubbornly low. In 1992, for instance, the median DC participant near retirement had about 1 year of replacement income saved.[3] By 2010, that number had increased to only 2 years of replacement income, despite a surge in 401(k) assets, employer match spending, participation, and aggressive savings deferral initiatives over the past 20 years.[4]

One explanation for the stubbornly low retirement readiness of workers may be the massive surge in household debt in recent decades, which could reduce the amount of money DC participants have to save for retirement and increase their costs of living in retirement. While employers spent over $2.5T into defined contribution plans between 1992 and 2012, for instance, DC participants during that same period added nearly $2.7T in consumer debt.[5] That surge in debt may have a positive effect on retirement readiness if it reflects investments in educations that qualify workers for better paying jobs, or home buying among younger participants, who then hold onto their homes through their careers and build additional wealth through their home equity.[6] On the other hand, the large increase in consumer debt can also erode the retirement readiness of U.S. workers. Increases in monthly debt obligations can leave workers with less money to defer into retirement savings, which would help explain why savings deferral rates in DC programs are insufficient.[7] It also could mean that workers' debt obligations in retirement have increased, which raises the price of retirement and undercuts the effectiveness of DC savings programs and incentives.

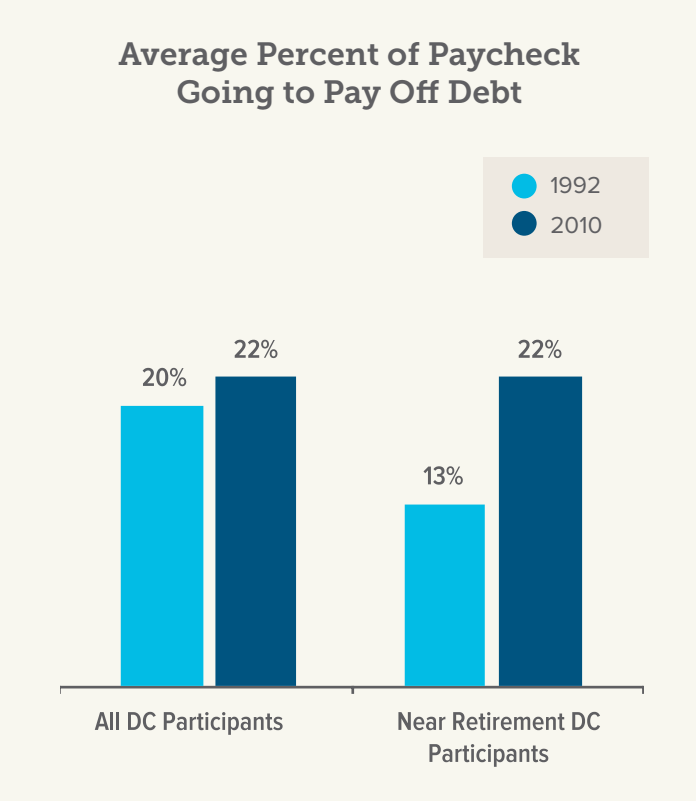
Average Number of Years of Replacement Income Among Near Retirement Households



Source: Federal Reserve Board of Governors and Centers for Disease Control

To better understand the dynamic between savings and debt, this paper first explores household savings and debt trends in the U.S. retirement market. We next consider the underlying characteristics of workers that take on debt faster than they accumulate retirement savings, including a worker's age, income, household size, and educational attainment, all of which are related to household debt consumption patterns. We also consider financial characteristics, deferral rate differences, and the occupation of a worker.

We find that the debt obligation, or the percentage of household income going to pay off debt, increased for all active DC participants by 9 percent between 1992-2010, now adding up to $.22 of every $1 earned. This means that DC participants have less money than they once did to put away for retirement savings, and may face greater strain on short-term spending needs when they do increase their savings contributions. Among all households approaching retirement (or between 50-65 years old), the trend is even more stark: the



Source: Federal Reserve Board of Governors

average debt obligation grew by 69 percent during this time period, now adding up to $.22 of every $1 earned.

Fueling this growth in debt obligations among all DC participants, we find that a majority of DC participants between 2010-2011 (the most recent panel data period available for research) accumulated debt faster than they were building retirement savings, a group that we refer to as "debt savers." About 20 percent of these households accumulated more credit card debt between 2010-2011 than retirement savings; 16 percent accumulated more auto loan debt and other installment loan debt; 20 percent accumulated more mortgage debt than retirement savings; and the balance accumulated more debt in one or more of these categories compared to retirement savings.[8]

We recommend in response to these findings that DC plan sponsors and the policy community devote more attention to the holistic financial needs and obligations of participants. These data indicate that automation policies on their own cannot improve retirement readiness if participants are on the other side of the ledger accumulating credit card or home equity debt faster than savings; or mismanaging debt, such as by buying homes on which they are not realistically going to make a return. In some cases, participants need to get their spending under control before these policies will benefit them. In other cases, participants likely need to further increase their DC savings deferrals rather than buying alternative forms of debt that will leave them financially worse off, even when that debt is being used to buy housing, since the market returns in 401(k) and other investment products can outpace housing returns.[9]

To do this, we recommend that sponsors and policymakers support holistic financial guidance solutions that are focused on all of the determinants of a participant's retirement readiness, including the other side of a ledger, which seems to be a powerful anchor dragging down the retirement security of workers. With data and a holistic approach, sponsors and policymakers can begin to see more of a return from the already very large investment employers and their employees are making toward their retirement security.

Methodology

This analysis was motivated by the transaction-level, anonymous data that HelloWallet has about DC plan participant's savings behavior and their financial consumption. We found that large shares of DC participants accumulate debt faster than they accumulate retirement savings, affecting both their short-term and long-term financial prospects. To explore whether these data could be generalizable to the broader DC population, we relied on numerous national surveys administered by the U.S. Government.

The primary data source for this analysis is the Survey of Income and Program Participation (SIPP),

which is administrated by the U.S. Census Bureau. It is a panel survey, which means that it tracks hundreds of household variables over numerous time periods for the same households. Since recent economic growth is associated with household debt accumulation, we consider two different time periods in the analysis. The first is a panel of 51,379 households surveyed repeatedly between 2004 and 2008, which was generally a period of growth for the U.S. economy. Financial service questions used in this analysis were covered between 2006-2007, which is what we designate as the first time period in this analysis. The second is a panel of 52,031 households surveyed between 2008-2012, which was a recessionary or low growth period for the U.S. economy. Financial service questions used in this analysis were covered between 2010-2011, which is what we designate as the second time period in this analysis. These two sample periods provide a useful vehicle for assessing the role of the U.S. economy in the relationships that we assess in this paper between a DC participant's savings and debt accumulation behavior.

The Federal Reserve's Survey of Consumer Finances (SCF) is a secondary resource we use throughout this assessment. It is administered to a random sample of U.S. households every three years. Federal policymakers use these data to make public policy decisions related to consumer finance. We use these data in the paper to assess multi-year trends in the consumer finance markets. These data are supplemented with numerous additional federal data resources, which we cite throughout the paper.

Our primary unit of analysis is either DC participants or the households that they live in. We only consider DC participants if they are actively in the workforce, although expanding the universe to all DC participants does not substantively change the analysis. Many of these households that are not active in the workforce are retired or unemployed, and are outside of the scope of the employers that we seek to help with this analysis.

Variables used in this analysis are provided by either the Federal Reserve or the U.S. Census Bureau. One exception is the measurement of "debt savers," which is a new term and measure that we introduce in this paper. We define this as participants that are accumulating debt faster than they are accumulating retirement savings. Some of these households are trying to use debt to make investments in houses or educations that they hope will create long-term wealth. However, as we will report in this paper, households tend to reload debts throughout their lifecycle, which can mitigate or eliminate altogether any wealth effect created from the investments made with debt. In addition, the long-term return of these alternative investments is the subject of some debate, as we will discuss. There are also many participants, as we will report that are accumulating revolving debt, or credit card, home-equity, and other short-term reloadable debt, at a faster rate than retirement savings, which is a signal that there is an imbalance between their short-term economic needs or lifestyle and their income.

The Census Bureau survey that we use as the primary source of measurement for the debt-saver analysis has data about overall household debt, as well as balance data over time on credit card, mortgage, installment, and "other" debt.

The bulk of the analysis uses Pearson correlation coefficients to assess bivariate relationships and probabilities. We explored multivariate regression models, but there was very high mulitcollinearity between the demographic variables, which biased the regression coefficients. Structural equation models may be an appropriate substitute for additional research into the relationships assessed in this paper. However, the correlation coefficients indicate that there is a weak association between the probability of being a debt saver – both overall as well as by debt type – and all of the demographic variables in this analysis.

The Relationship Between Retirement Savings And Debt

In this section we consider the relationship between consumer debt and DC savings behavior. By way of context, active DC participants in 2010 owed about $4.2 trillion in debt compared to liquid assets worth about $9.2 trillion in DC savings plans.[10] The bulk of consumer debt is held in mortgages, which accounts for about 75 percent of all consumer debt.[11] Student loan debt is the next largest share, followed by auto loans, home equity and credit card debt.[12] However, that debt is not distributed evenly across the DC participant population.[13] For instance, about 90 percent of U.S. households with a DC participant carry a credit card in their wallets; but only about 66 percent have an outstanding mortgage.[14] This means that there are many more DC participants that have credit card debt at any given period compared to installment debt, such as a mortgage.

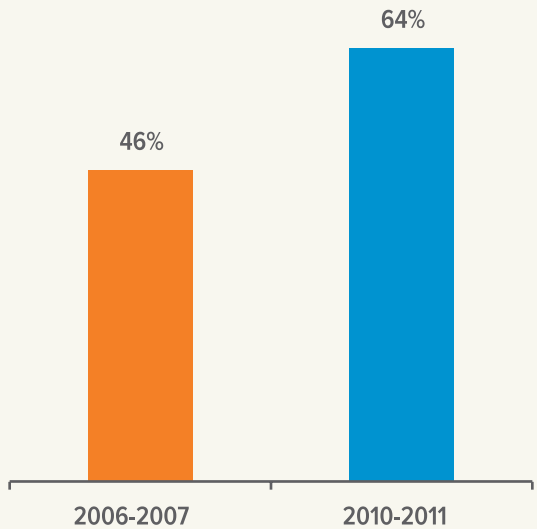
We first consider how the $2.7 trillion of debt taken on by DC participants influences the amount of disposable income that participants have to invest in their retirement savings. To assess that impact, we consider the debt-to-income ratio of DC participants, or the share of paychecks that are used to pay interest and principal to lenders on outstanding debt. We use the 1992 and 2010 Federal Reserve Survey of Consumer Finance for this analysis.

We find that DC participants allocated more of their paychecks for debt payments in 2010 compared to 1992, particularly older DC participants that are near retirement. In particular, the mean DC participant paid about $.22 of every $1 earned to creditors, an increase of about 11 percent between 1992-2010. This trend was even starker among participants near retirement. In particular, participants near retirement in 1992 paid about $.13 of every earned dollar to a creditor; by 2010 it had increased to $.22 – an increase of 69 percent. This increase was driven by both a 10% expansion in the share of near-retirees with mortgage debt and an increase in the amount of debt owed by these participants.

Next, we consider how this growing debt obligation among DC participants compares to their retirement savings. For this analysis, we can use the Census Bureau panel data to assess how these debt trends are associated with DC plan savings. We consider both study time-periods for this analysis, since consumers were aggressively leveraging-up during the 2006-2007 time period, but were deleveraging through most of the 2010-2011 study period.[15]

We find that a large percentage of DC participants accumulate debt faster than they accumulate retirement savings, regardless of the underlying health of the U.S. economy. In particular, between 2006-2007, 46 percent of DC participants accumulated debt faster than retirement savings – a segment that we refer to as “debt savers.” By the 2010-2011 period, that share had increased to 64

Proportion of DC Participants Accumulating Debt Faster Than Retirement Savings



Source: United States Department of Commerce, Census Bureau

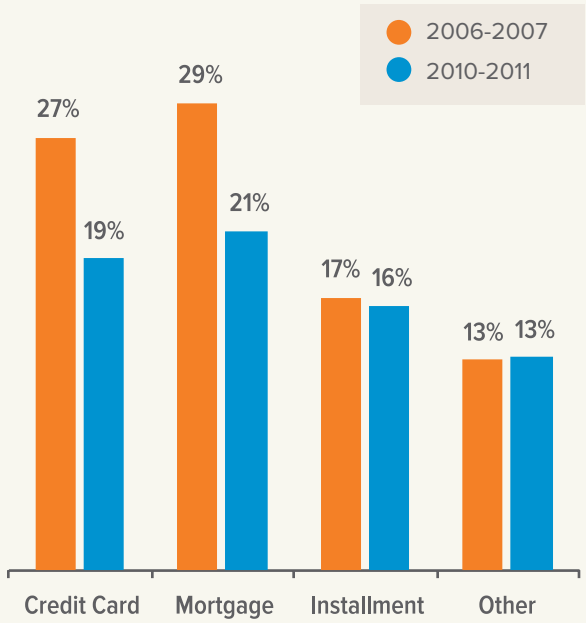
percent of DC participants, even though there was a broad deleveraging occurring to this period as consumer debt retracted across most line types. Less understood is that deferrals into retirement also retracted during this period because of fear over the stock market, which drove up the overall percentage of participants that were accumulating debt faster than retirement savings.

To assess the consumer finance implications of this trend, we considered the type of debt that DC participants accumulated during this period. We find that about 20 percent of DC participants accumulated credit card debt faster than retirement savings in recent years; 20 percent accumulated mortgage debt faster than retirement savings; and the balance accumulated installment (e.g., auto loan), other revolving debt (e.g., home equity), or a combination of debt faster than retirement savings.

While an increase in debt obligations that arise from accumulating debt reduce the amount of money for other things in a person's life, including retirement savings deferrals, the wealth effect of these data is difficult to define with the extant data. For DC participants that are growing credit card debt faster than their retirement savings, for instance, there are numerous potential long-term implications. Some participants may be better off, because the use of credit cards allowed them to avoid a more serious outcome, like a foreclosure or bankruptcy. For others, these data signal a difficulty spending less than they earn, which will erode their retirement security and readiness over time as their debt accumulates.

Even among DC participants that are building mortgage debt faster than DC savings wealth effects are difficult to assess. Although mortgages buy an asset that can appreciate, the long-term real return on housing has only kept pace with inflation.[16] Home value research also only considers home value, which is an overly aggressive measure of home value over time. Home maintenance costs, appliance repairs and replacement costs, and interior decorating to keep up with fads are all costs faced by homeowners that can erode any long-term investment return from housing.

Proportion of DC Participants Accumulating Debt Faster Than Retirement Savings, by Debt Type



Source: These data show the share of participants that increased the amount of displayed

Complicating matters further, the average homeowner is selling their home within 9 years of buying it, which can stunt wealth accumulation from housing and create large additional transactional costs associated with buying, selling, and moving.[17] In addition, over 80 percent of mortgage payments will be going to pay future interest costs during the first 9 years of homeownership, which means that, once transaction and move-in costs are covered, homeowners can struggle to build additional equity in their homes.[18] Given these data, it is not clear that even DC participants that decide to use debt to buy homes are making good financial decisions that will benefit them over the long term. They may very well be better off renting, and using those savings to increase their retirement savings deferrals.

Although the data do not allow us to reliably forecast out the long-term wealth implications of these types of debt for DC participants, we can observe changes in net wealth during the two years that these households were interviewed by the Census Bureau. In the earlier study period, the typical DC participant that did not add debt faster than retirement savings built about two times more net wealth between 2006 and 2007. In the later time period, between 2010-2011, the difference was even starker: the median DC participant that did not add debt faster than retirement savings built about seven times more net wealth during that two year time period compared to debt savers. Importantly, net wealth is a function of numerous variables, including market returns, account performance, and home price changes, among many other variables. However, the two different time periods represent vastly different economic conditions, which suggests that the differences in net wealth associated with debt accumulation differences among DC participants are independent of markets.

We also find that DC participants that accumulate any type of debt faster than retirement have 50% less of their annual income saved for retirement compared to DC participants more focused on building retirement savings. In particular, debt-savers have about two years of replacement income saved, compared to four years among non-debt savers.

In summary, the data suggest that DC participants were not immune from the broad increase in consumer debt over the past 20 years. Most DC participants now accumulate debt faster than retirement savings, which is associated with a sharp slowdown in their ability to accumulate wealth in the short-term. In the next section, we consider the characteristics of DC participants that are associated with this debt trend.

Who Accumulates More Debt Than Savings?

In this section, we assess the demographic, financial, and occupational characteristics that are associated with the propensity of a DC participant to be a debt saver. We find that the majority of debt savers are over 40 years old, college educated, earn over $50,000, and have insufficient emergency savings.

Escalation Policies

We first consider the relationship between deferral rate increases over time and the propensity of a DC participant to be a debt saver. Given the stubborn lack of retirement readiness among most workers, quite a bit of attention in recent years has been given to encourage plan sponsors to enact automatic escalation policies, since this can lead to increased deferral rates.[19] This led to a broad group of DC participants to increase their deferral rates, although they were not necessarily aware that their savings deferrals were increasing.

Retirement programs with escalation policies may have a neutral, positive, or negative association with a decision by a participant to take on more debt than retirement savings. One might see no relationship between these variables if consumers are rational and automatically live within their means by slowing down their spending once their employers escalate their deferral rates.[20] Similarly, the decision to take on more debt than retirement savings may be independent of the amount of income that is being automatically deferred into retirement savings, which would suggest a weak relationship. On the other hand, one would expect a positive relationship if employees struggle with managing their money and do not slow down their spending after their deferral rates are increased,

which would be evidenced by increased debt burdens and a growing number of debt savers. Similarly, increasing deferral rates may indicate growing financial capability among participants, who also feel able to afford other investments, like houses or educations. Finally, there may be a negative relationship between deferral rate increases and the rate of indebtedness increases, if employees become progressively more focused on their financial health as their savings deferral rates increase and reduce their debt profile as a result.

To assess the relationship between escalation policies and participant indebtedness, we look at the sample of households that increased their retirement savings deferral rates in two different time periods – between 2006 and 2007, and between 2010 and 2011 – and their propensity to be debt savers during those time periods. These two time periods represented starkly different economies – the former was during a period of steady GDP growth and relatively moderate unemployment, the latter was during a recession with historically high unemployment rates.

We find the relationship between escalation decisions and the propensity of a participant to be a debt saver grew much stronger between study periods, both overall as well as across specific types of debt. In particular, in the 2006-2007 study period, about 40 percent of participants that escalated their retirement savings contributions during these two years were debt savers, compared to about 44 percent of participants that did not escalate. However, in the later time period, nearly 60 percent of participants that escalated their retirement savings contributions were debt savers, compared to just 35 percent of non-debt savers. This indicates that participants that increased their

Proportion of DC Participants Accumulating Debt Faster Than Retirement Savings, by Debt Type

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
Escalated Retirement Contributions					
2006-2007	40%	22%	26%	14%	11%
2010-2011	60%	18%	20%	16%	12%
Did Not Escalate Retirement Contributions					
2006-2007	44%	19%	28%	15%	11%
2010-2011	35%	17%	21%	15%	12%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

retirement savings deferrals between the panel periods had a much higher likelihood of accumulating more debt than savings than participants that left their deferrals unchanged or reduced the amounts.

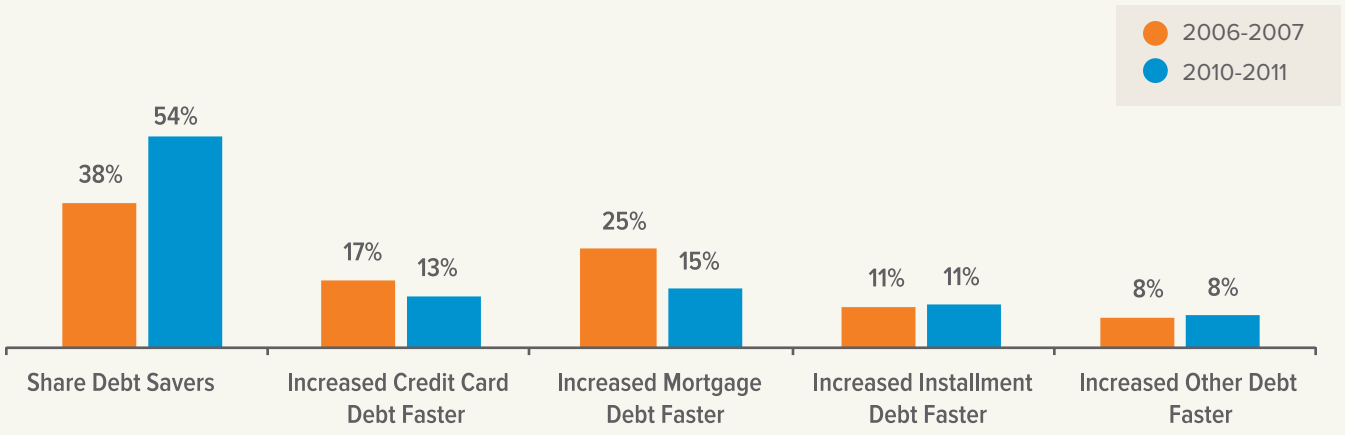
This association may be a reflection of the fact that participants may not be able to afford automatic savings increases or may simply keep on spending at their pre-escalation rates, accumulating debt at increasingly higher rates to cover their financial obligations or spending habits. It also could mean that workers that increase their savings are also in a financial position to take on more debt. These data certainly do not suggest that the escalation in savings deferrals caused an increase in debt. More research and a richer data set are needed to make this critical distinction in the data.

Emergency Savings

We next consider the relationship between the sufficiency of emergency savings and the propensity of DC participants to accumulate debt faster than retirement savings. One would expect a negative relationship between these variables if the lack of emergency savings drives participants to accumulate debt, since they have no savings to fall back on when they encounter unexpected expenses or have already spent through their emergency savings and then turn to debt to cover emergency expenses. On the other hand, one would expect a positive relationship if emergency savings signals broader financial capability and an ability to take on greater quantities of debt, such as mortgage debt.

To assess this relationship, we measure emergency savings as three or more months of a household's annual income. There is not yet agreement among financial planners about a definition for sufficient emergency savings. Some measure it as the median duration that people are out of work when they lose their jobs, which has been around 17 months in recent years.[21] Others use a measure that accounts for more common economic shocks, like an unexpected medical or car expense, which can range between 2-4 months of annual income. We experimented with numerous time horizons

The Share of Debt Savers with Insufficient Emergency Savings, by Debt Type



Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

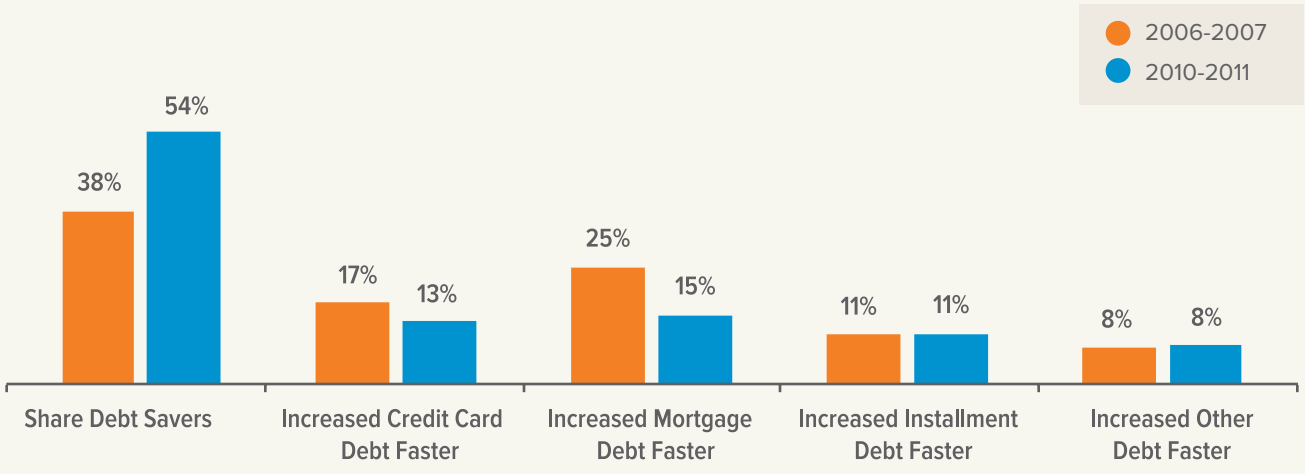
and found the same directional relationship between emergency savings and the propensity to be a debt saver regardless of the measure. We settled on a definition of three months, since the bulk of the economic shocks that we observe in our consumer data fall into this range. Extending the measure to a longer period only strengthens the relationship we report below.

We find that participants with insufficient emergency savings in liquid accounts are more likely to accumulate debt faster than retirement savings compared to workers with sufficient emergency savings. In particular, we find that among the participants that are accumulating debt faster than savings, 84 percent between 2006-2007 and 89 percent between 2010-2011 had insufficient emergency savings. By contrast, only 16 percent of debt savers had sufficient emergency savings in the 2006-2007 study period; in the later period, that number had fallen to 11 percent. This trend held regardless of what type of debt participants were accumulating faster than retirement savings.

However, these data do not indicate that having emergency savings will insulate a participant from becoming a debt saver. In the 2006-2007 study period, 38 percent of DC participants with sufficient emergency savings were debt savers; by the later period, that number had increased to 54 percent. This trend also held regardless of the particular type of debt under consideration.

These findings indicate that a high percentage of debt savers have insufficient emergency savings, and that participants with insufficient emergency savings have a higher likelihood in recent years of being a debt saver compared to participants with three or more months of their annual income in a liquid savings account. With less money in savings, some of these workers are turning to debt to cover the imbalance between their income and spending, which is potentially exacerbated by the fact that a share of their income is being automatically deducted to cover long-term spending needs. There are others, however, that are buying assets with debt, like houses and cars,

The Share of DC Participants with Sufficient Emergency Savings That Were Debt Savers



Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

even though they lack basic savings to cover unexpected expenses. This can create instability in their retirement savings over the long-term, increasing the likelihood that they will take out a loan or, worse, cash-out their balance altogether.[22]

Household Income

We next consider the relationship between household income and the probability that a participant is a debt saver, or adding debt at a faster rate than retirement savings. There is a literature that indicates higher-income households have greater access to student loans and mortgages, the two largest sources of consumer debt, since higher income households can qualify for more debt, their credit profile is considered less risky, and consumption tends to rise with their income.[23] Given that literature, one might expect for participant income to be positively associated with the probability that a participant is a debt saver, since they have more opportunities to borrow and can access progressively larger volumes of debt compared to lower income participants.

However, most of the customer market expansion in consumer credit markets over the last 20 years has been in low-income markets, where the share of households carrying debt obligations has soared.[24] In addition, more lower income households report that they fall behind on bills and far fewer shop around for credit offers compared to their higher income counterparts, which may indicate that they struggle to manage their money and are more likely to become debt savers as a result.[25] Given this literature, one may expect a negative relationship if participants becoming increasingly unable to meet the fixed costs of living as their income falls, which drives them to take on more debt, eventually overcoming the amount they are depositing into their DC accounts. Similarly, higher income households have greater access to financial advisors and guidance, which make them comparably more able to manage their money effectively than lower and middle-income households that lack as much access to these resources.

To assess this relationship, we measure household income as the sum of all gross income earned by a household during the study periods. In addition to wages, this includes numerous other sources of income, including bonuses, dividend income, rental income, gift income, and income from property sales. This income is all reported before taxes are deducted. We also look at four income quartiles for the analysis, which are based on an assessment of U.S. working household income in the study years. For instance, the bottom quartile includes households that earned less than 75 percent of all other working households in the U.S. during the study period.

During the earlier study period, we find that the propensity to be a debt saver modestly increases with income, although, the probability is relatively high across all income groups. In particular, about 40 percent of lower income workers were debt savers in the 2004-2006 study period, compared to about 44 percent of high-income workers. But, each income group is about as likely as other income groups to be debt savers. In addition, the propensity is high across income groups – between 40-46 percent of DC participants in the earlier study period.

The only form of debt to deviate from this trend was mortgage debt. In particular, only 18 percent of low-income workers accumulated mortgage debt faster than retirement savings during this period, compared to about 32 percent of higher income workers, indicating a much stronger relationship between participant income and debt compared to other forms of debt. These same trends were evident in the later study period as well, although all economic groups were much more likely to be debt savers.

It is important to point out, however, that high-middle and high-income workers represent the majority of DC participants, which is why so many

debt savers earn higher incomes. In particular, almost 78 percent of debt savers live in households than earn more than the median US household. About 44 percent of debt savers, in fact, earn more than $91,000.

These findings indicate that a high percentage of debt savers earn high incomes, but there is a relatively flat probability across income groups to become debt savers, aside from the mortgage debt category. The underlying causes of becoming a debt saver likely vary across income groups, however. Lower-income workers are likely struggling to keep up with bills, and turn to credit card, home-equity, and alternative sources of debt to supplement their low-incomes. On the other hand, high-income workers are buying property, and using increasing shares of debt to cover those purchases. Whatever the reason, the data indicate that large shares of DC participants in any income groups are debt savers, accumulating debt faster than they are accumulating DC savings.

The Share of DC Participants That Are Debt Savers, by Household Income

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
Low Income					
2006-2007	40%	25%	18%	19%	17%
2010-2011	63%	20%	11%	13%	10%
Low-Middle Income					
2006-2007	46%	29%	26%	20%	16%
2010-2011	65%	21%	18%	16%	14%
High-Middle Income					
2006-2007	44%	28%	30%	18%	13%
2010-2011	67%	21%	24%	20%	15%
High Income					
2006-2007	44%	24%	32%	14%	11%
2010-2011	62%	17%	23%	15%	12%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

Debt Savers Distribution, by Household Income

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
2006-2007					
Low Income	4%	8%	5%	9%	11%
Low-Middle Income	17%	23%	19%	25%	26%
High-Middle Income	32%	34%	33%	33%	31%
High Income	47%	36%	43%	33%	32%
2010-2011					
Low Income	4%	8%	5%	9%	11%
Low-Middle Income	17%	23%	19%	25%	26%
High-Middle Income	32%	34%	33%	33%	31%
High Income	47%	36%	43%	33%	32%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

Worker Age

We next consider the relationship between worker age and the propensity to be a debt saver. Accumulation of debt is driven by a range of factors, including progressively higher credit limits that workers graduate into as they build their credit records, home-purchases, and auto-loan purchases. Since the bulk of these large expenses initially occur in the earlier years of a worker's career, some literature has found workers tend to accumulate debt during their late 20s and into their later 30s, but then begin a long de-accumulation process through the rest of their life.[26] But, this literature does not capture the recent surge in consumer debt and the increasing propensity of older households to draw down their home equity, which may have distorted extant trends.[27]

Given this literature, there may be numerous directional relationships between age and the propensity to be a debt saver. One would expect a negative relationship between the worker's age and the probability that they will be a debt saver if debt accumulation surges during the initial credit accumulation years of a worker's career, but

declines steadily as they pay off debt. On the other hand, there may be a positive relationship between age and the probability that a participant is a debt saver. As income grows with age, workers may seek to consume increasingly larger and more expensive homes. Similarly, long imbalances between income and spending may accumulate and compound over time, which could be exacerbated by the trend of young adults increasingly living at home with their parents, creating new, additional costs for older workers.[28]

To assess the relationship between age and the debt saver probability, we consider the age of the working head of the household, which we find is directionally similar to all of the DC participants in a household. We find that the propensity to be a debt saver modestly decreases with age, although the probability is relatively evenly high across all age groups, just as we found in our analysis of household income. In particular, about 52 percent of younger workers were debt savers in the 2006-2007 study period, compared to about 45 percent of older workers.

The Share of DC Participants That Are Debt Savers, by Participant Age

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
Age 18-29					
2006-2007	52%	30%	26%	27%	23%
2010-2011	67%	24%	18%	23%	21%
Age 18-29					
2006-2007	47%	29%	32%	16%	13%
2010-2011	64%	20%	18%	18%	14%
Age 18-29					
2006-2007	45%	27%	31%	16%	12%
2010-2011	65%	17%	25%	17%	14%
Age 18-29					
2006-2007	41%	23%	27%	15%	11%
2010-2011	64%	19%	21%	13%	10%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

However, the overall propensity among different age groups to become debt savers sharply increased between the earlier and later study periods. In particular, the share of younger workers that were debt savers increased from 52 percent in the 2006-2007 study period to 67 percent by the 2010-2011 study period. The effects were even more dramatic among older populations. In particular, the share of workers between the ages of 40-49 that were debt savers increased from 45 percent to 65 percent between the 2006-2007 and 2010-2011 study periods. Similarly, the share of debt savers between 50-59 increased from 41 percent to 64 percent of all DC participants in that age group between the two study periods.

These data reflect the broad economic insecurity that developed for all age groups between these two sample periods.

Just as we found in the income analysis, however, it is important to point out that older workers do represent the majority of debt savers in the DC population, given their larger representation in DC plans. In particular, about 64 percent of all debt savers are over the age of 40; just 13 percent are in their 20s.

These findings indicate that a high percentage of debt savers are older workers, but there is a relatively flat probability across age groups to

Debt Savers Distribution, by Participant Age

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
			2006-2007		
18-29	13%	13%	11%	19%	21%
30-39	21%	29%	30%	26%	27%
40-49	24%	31%	32%	29%	27%
50-59	20%	20%	21%	21%	20%
			2010-2011		
18-29	13%	15%	11%	17%	19%
30-39	19%	25%	21%	26%	25%
40-49	23%	26%	36%	31%	32%
50-59	21%	25%	26%	20%	19%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

become debt savers. Regardless of the age group, mortgage debt represents the majority of new debt taken on during the study periods. The intention of the worker may be to use housing as an alternative retirement savings vehicle, where equity can accumulate over time.[29] Unfortunately, the long-term return on housing has only matched inflation, making it a potentially weak investment vehicle.[30] Just as importantly, homeowners now move, on average, every 9 years, which may not be enough time to make up transaction costs.[31] Similarly, no study that we are aware of takes into account the additional costs of homeownership over renting, which includes maintenance costs, remodeling costs, utility costs, and, for some, longer commuting times and associated transportation costs. This high level of uncertainty underscores the importance of access to financial guidance, which can help workers make more informed choices between retirement savings and other investment choices.

Worker Education

We next consider the role that the education of workers plays in driving the probability that they will be a debt saver, or take on debt faster than they accumulate retirement savings. The literature is unified across any form of major debt: higher educated workers tend to accumulate more debt than lower educated workers. In the mortgage market, for instance, higher educated workers are much more likely than less educated workers to own homes, increasing their mortgage debt burden.[32] These same workers also tend to accumulate more student loan debt, since they are, by definition, in school longer than less educated workers and have more opportunities to borrow for their education.[33] Similarly, higher educated workers tend to qualify for credit cards at an earlier age and for a larger equity line compared to less educated workers because they are qualified as a comparably lower credit risk.[34]

Given this literature, one would expect there to be a positive relationship between a worker's educational attainment and their probability of being a debt saver. On the other hand, higher educated workers may be more able than less educated workers to effectively manage their money. There is some literature that indicates, for instance, that financial literacy increases with educational attainment.[35] This may make higher educated workers relatively less likely to take on debt that does not increase wealth over time. It also may mean that they are more focused on deferring compensation than debt accumulation.

To assess the relationship between a worker's educational attainment and their probability of being a debt saver, we consider the educational attainment of the head of the household with at least one worker participating in a defined contribution plan. These workers represent the bulk of the DC participants in the sample; their educational level is also highly correlated with their spouses, which include a large share of the other DC participants in the sample.

We find that the overall probability of being a debt saver is nearly constant across different educational levels. In particular, about 48 percent of workers with less than a high school degree during the 2004-2006 study period were debt savers, compared to about 44 percent of workers with at least a college degree. Like we have seen in previous sections, the number of debt savers sharply increased between study pweriods, as the economy deteriorated. By the 2010-2011 study period, for instance, over 63 percent of workers
with a college degree were debt savers, a 43 percent increase between study periods. Similarly, more than 69 percent of workers with a high school degree were debt savers by the later study period, compared to 43 percent a few years earlier during a more robust economic period. These data indicate that education does not seem to have a strong independent effect on the likelihood that

The Share of DC Participants That Are Debt Savers, by Participant Age

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
Less Than HS					
2006-2007	48%	26%	29%	21%	15%
2010-2011	64%	23%	18%	13%	8%
HS or GED					
2006-2007	48%	26%	29%	21%	15%
2010-2011	64%	23%	18%	13%	8%
Some College					
2006-2007	47%	32%	31%	18%	13%
2010-2011	67%	22%	20%	19%	14%
At Least College Degree					
2006-2007	47%	32%	31%	18%	13%
2010-2011	67%	22%	20%	19%	14%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

a worker will be a debt saver – the majority of workers, regardless of their educational attainment, will accumulate debt faster than retirement savings.

As in the previous demographic assessments, however, it is important to point out that while the probability to be a debt saver is relatively flat across educational levels, the vast majority of debt savers are college educated. In the 2010-2011 study period, for instance, we find that 63 percent of debt savers were college educated and another 15 percent had at least some college. This reflects the fact that the majority of DC participants have at least some college education. With a relatively equal probability of being a debt saver across educational groups, the distribution of debt savers will align closely with the underlying distribution of the DC population.

These data indicate that although extant literature has found that higher educated workers tend to accumulate more debt than lower educated

workers, there is a relatively equal probably probability among different educational groups in their propensity to be a debt saver. Although the underlying debt varies across educational groups, all educational groups are affected by the economy's performance. We saw a large increase in the share of debt savers across all educational groups between the moderate-growth period of 2006-2007 and the recessionary period of 2010-2011. During this later time period, workers substantially deleveraged, reversing a multi-decade trend of rapid consumer debt accumulation. But, the pace of that deleveraging did not outpace the rate at which they were saving for retirement.

Credit Revolvers

We next consider the relationship between a DC participant's management of their credit card and their propensity to be a debt saver. The credit industry considers a borrower that carries debt from month to month, or a revolver, to have a higher risk profile compared to a borrower that pays off their balance on a monthly basis. The reasoning is that revolvers may be spending more than they make in income, which is signaled by the fact that they cannot afford or do not choose to pay off their monthly balance. This same logic may say something meaningful about the propensity

Debt Savers Distribution, by Participant Educational Attainment

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
2006-2007					
Less than HS	3%	2%	2%	3%	3%
HS or GED	18%	19%	16%	18%	17%
Some College	19%	22%	20%	20%	19%
At Least College	59%	56%	61%	58%	61%
2010-2011					
Less than HS	3%	3%	2%	2%	1%
HS or GED	20%	18%	17%	16%	15%
Some College	15%	16%	13%	16%	15%
At Least College	63%	63%	68%	67%	69%

Note: These data show the share of DC participants that increased different types of debt faster than retirement savings during each study period.

Source: United States Department of Commerce, Census Bureau

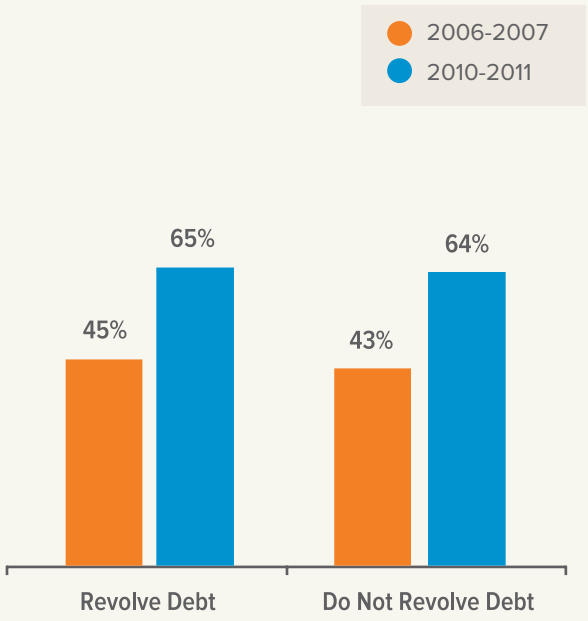
of a DC participant to be a debt saver. One would expect revolvers to have a higher likelihood of being debt savers, for instance, if this signaled the fact that they are relatively less able to manage their money effectively.

To assess the relationship between debt saving and credit revolving, we consider households to be credit revolvers if they carried a credit card balance between the two year panel study period, either in 2006-2007 or in 2010-2011. We consider all credit cards in this analysis, but we were not able to not include home equity, another important form of revolving debt for U.S. consumers. The Census data used in the analysis did not individually measure home equity, making it impossible to assess this form of debt. According to Federal Reserve data on household debt, this indicates we're considering about half of the revolving debt markets in both study periods.

We find that there is very little relationship between a DC participant's debt saver probability and their use of credit card debt. In particular, in the 2006-2007 time period, about 45 percent of revolvers were debt savers, compared to about 43 percent of non-revolvers. Like in the preceding analyses, this distribution substantially increased by the 2010-2011 period, but the underlining proportions across revolvers and non-revolvers was unchanged. On the other hand, we do find that there are many more revolving debt savers than non-revolving debt savers. In the later study period, for instance, 55 percent of the debt savers were credit revolvers, while the remaining share were non-revolvers. This reflects the underlying distribution of revolvers in the US population, which includes about half of the US household population.

These data indicate that there is a no association between a DC participant's likelihood to be a debt saver and their propensity to carry credit card debt from month to month. Although credit revolvers may have more difficulty spending less than they make in income, they have essentially the same probability of non-revolvers to be debt savers.

Debt Saver Distribution, by Whether The Participant Revolves Credit



Source: United States Department of Commerce, Census Bureau

Occupation

We next consider the relationship between the industry that a DC participant works in and their propensity to be a debt saver. There is no literature that indicates whether one industry or another should be expected to have more debt savers than another. However, industries do vary widely in the wages and benefits they administer, which may indirectly be associated with the likelihood that they accumulate debt faster than retirement savings. Lower wage industries, for instance, may include a systematically larger share of workers focused on making ends meet from month to month,

which may affect their relative distribution of debt savers. Similarly, higher wage industries, like technology, may include more home and boat buyers than other industries, which would affect the share of debt savers in that industry.

We find that there is a high distribution of workers across all industries that are debt savers, similar to the preceding analyses. However, the food service and transportation industries contain the highest share of debt savers compared to any other industry in recent years. This held true regardless of what form of debt we considered. In particular, in the 2010-2011 study period, over 75 percent of DC participants in the food service industry were accumulating debt faster than retirement savings. Similarly, during that same period, almost 70 percent of DC participants in the transportation industry were debt savers. On the other side of the range, professional services industry workers had the lowest percentage of debt savers, at 60 percent in the later time period. The more telling data point in this analysis, however, is that the propensity to be a debt saver across different industries varies between study periods. During the strong economy of the 2004-2006 study period, for instance, workers in the entertainment and arts industry had the highest debt saver probability, while manufacturing had the lowest share of debt savers.

These data suggest that the distribution of debt savers within an industry is highly responsive to the underlying economic environment. In times of economic distress, lower wage industries, like the food service and transportation industries, spur workers to accumulate debt faster than retirement savings, focusing on immediate financial needs instead of their longer term retirement needs. In a healthier economic environment, debt savers seem to reflect a greater propensity to buy homes and other property, which drives up their debt profile relative to retirement savings.

Debt Savers Distribution, by Participant Educational Attainment

	Share Debt Savers	Increased Credit Card Debt Faster	Increased Mortgage Debt Faster	Increased Installment Debt Faster	Increased Other Debt Faster
2006-2007					
Construction	43%	29%	29%	16%	10%
Manufacturing	39%	19%	25%	15%	11%
Wholesale	47%	27%	33%	20%	15%
Retail	46%	29%	27%	17%	14%
Transportation	48%	23%	27%	17%	13%
Prof. Services	45%	25%	29%	15%	12%
Govt & Military	42%	30%	31%	14%	10%
Food Service & Restaurant	43%	34%	24%	31%	28%
Education, Health, Social Services	45%	27%	30%	18%	15%
Entertainment and Arts	55%	31%	37%	18%	14%
Repair and Personal Services	46%	35%	18%	30%	13%
2010-2011					
Construction	65%	19%	25%	18%	15%
Manufacturing	62%	16%	23%	15%	12%
Wholesale	65%	24%	22%	16%	15%
Retail	65%	22%	20%	15%	13%
Transportation	70%	20%	19%	11%	9%
Prof. Services	60%	16%	19%	16%	13%
Govt & Military	67%	22%	26%	18%	13%
Food Service & Restaurant	76%	30%	23%	21%	16%
Education, Health, Social Services	64%	20%	20%	17%	14%
Entertainment and Arts	63%	18%	22%	10%	7%
Repair and Personal Services	68%	26%	17%	18%	13%

Source: United States Department of Commerce, Census Bureau

Recommendations

In response to these findings, we propose two recommendations to plan sponsors and policymakers. First, this paper makes a clear case for more consumer data to be part of the conversation in the retirement plan market. At a minimum, this paper indicates that retirement programs cannot know if they are improving the retirement security of their workers without also considering data about the parallel decisions their participants are making about debt. Some participants take on credit card and other revolving debt at a faster rate than retirement savings, which can erode the efficacy of retirement investments by employers; others buy homes, which can lead to wealth increases over time, but also can erode wealth for others. Still other participants have already accumulated large volumes of debt prior to their participation in an employer-sponsored DC plan, which can erode their ability to save for retirement and take advantage of company matches. Without this visibility into the decisions their participants are making about debt, and their finances more generally, it is difficult to understand what participants most need to improve their retirement security. Some policies can also have counterproductive effects, which can vary widely across industries.

Second, it is clear that sponsors and the policymakers that guide these plans need to focus more attention on the holistic financial decisions that impact the retirement security of workers. This paper found that the average debt burden of retirement plan participants has increased by a wide margin over the past 20 years, and now the majority of participants are accumulating debt faster than DC savings. At the very least, this large increase in debt burden erodes the amount of money available for participants to save for their retirement. But, more seriously, it highlights how debt can hamstring the efficacy of match-spending by employers. Many participants are taking advantage of employer-sponsored retirement plans, but on the other side of the ledger are taking on very expensive short-term debt that far outpaces any investment return they can reasonably expect from their DC plan. Some of this debt can even be more expensive than the return a worker generates from an employer match, particularly among low-wage workers that rely on alternative forms of credit. An even larger share of participants are buying homes, when they should instead be considering increasing their DC savings deferrals, which can offer stronger long-term investment returns. Providing holistic guidance to participants can help them make better decisions about their savings and debt, and improve their retirement security.

With data and a holistic approach, sponsors and policymakers can begin to see more of a return from the already very large investment employers and their employees are making in retirement security. Retirement readiness is a function of numerous assets and liabilities, and the day-to-day decisions participants make about both sets of financial products. Data will help sponsors and participants make better decisions about the needs of participants and guidance will ensure that those needs are addressed in an efficacious and responsible manner.

Endnotes

1. The Federal Reserve Board of Governors, Survey of Consumer Finances (2010) indicates that the average 401(k) participant deferred 5 percent of their gross income to their DC plan. Workers pay another 6.2 percent of their paychecks (under $113,700) to the Social Security program, which is more than the average income of DC participants (employers contribute an additional 6.2 percent).

2. U.S. Bureau of Labor Statistics. Annual inflows into the Social Security are larger, adding up to about $800 million annually in recent years. Also see: Steve Utkus. 2013. "How America Saves 2013: A report on Vanguard 2012 defined contribution plan data." Malvern, PA: Vanguard.

3. Federal Reserve Board of Governors, Survey of Consumer Finances (1992)

4. U.S. Bureau of Labor Statistics; Federal Reserve Board of Governors, Survey of Consumer Finances (2010). There are many excellent resources that document these phenomena. One recent book is Courtney C. Coile and Phillip B. Levine. 2010. *Reconsidering Retirement: How Losses and Layoffs Affect Older Workers.* Washington, DC: The Brookings Institution. For a helpful review of recent policy development and participant experiences, see Alicia H. Munnell. 2011. "401(k) Plans in 2010: An Update from the SCF." Boston, MA: Center for Retirement Research at Boston College or John Beshears, James J. Choi, David Laibson, Brigitte C. Madrian, and Brian Weller. 2010. "Public Policy and Saving for Retirement: The 'Autosave' Features of the Pension Protection Act." In John Siegfried, editor, *Better Living Through Economics: How Economic Research Improves Our Lives*, Cambridge, MA: Harvard University Press, pp. 274-290. For an excellent academic assessment, please see Andrew A. Samwick and Jonathan Skinner,"How Will 401(k) Pension Plans Affect Retirement Income?" *The American Economic Review* Vol. 94, No. 1 (Mar., 2004), pp. 329-343.

5. The Federal Reserve Board of Governors; for all households, please see: Meta Brown, Andrew Haughwout, Donghoon Lee, and Wilbert van der Klaauw. 2013. "The Financial Crisis at the Kitchen Table: Trends in Household Debt and Credit." New York Federal Reserve Board Vol. 19, No. 2, pp 1-10.

6. This was once a commonly held belief, but it is now more controversial. For one assessment of the wealth benefits of homeownership, please see Lisa A. Keister and Stephanie Moller. 2000. "Wealth Inequality in the United States." *Annual Review of Sociology* Vol. 26, pp. 63-81 or, for a literature review of the work that supported the view that homeownership generally produces wealth, see Christopher E. Herbert and Eric S. Belsky. 2008. "The Homeownership Experience of Low-Income and Minority Households: A Review and Synthesis of the Literature" *Cityscape*, Vol. 10, No. 2, pp. 5-59. For a more recent assessment, see Robert A. Schiller. 2008. *Subprime Solution: How Today's Global Financial Crisis Happened and What to Do About It.* Princeton, New Jersey: Princeton University Press. For another excellent resource that looks at the relationship between housing wealth and consumption, see: Karl E. Case, John M. Quigley, and Robert Schiller. 2005. "Comparing Wealth Effects: The Stock Market vs. the Housing Market," Advances in Macroeconomics Vol. 5, No. 1: 1–34.

7. Alicia H. Munnell, Anthony Webb, and Francesca Golub-Sass. 2007. "Is there Really a Retirement Savings Crisis? An NRRI Analysis," Center for Retirement Research, Boston College, Number 7-11; Alicia H. Munnell, Anthony Webb, and Luke Delorme, 2006 "Retirement at Risk: A New National Retirement Risk Index," Center for Retirement Research at Boston College, Boston: MA.

8. Since the data are confined to a two-year study period, the long-term effect of escalation and debt decisions cannot be reliably forecasted. However, there are several indirect indicators that indicate this growing debt accumulation over time is eroding the efficacy of 401(k) plans and escalation policies, and may very well make them counter-productive in some cases. First, about 40 percent of debt savers are accumulating credit card and installment debt (e.g., auto loans, student loans) at the fastest rate. These debts can show an imbalance between income and spending, with costs to the participant that far outpace the economic return that they can generate through their 401(k). Second, as the paper discusses in more detail, the 20 percent of debt savers that are accumulating mortgage debt at the fastest rate may not make money on that housing investments. Even when homes appreciate in value, the long-term return does not outpace inflation and there are numerous costs that swell above the costs of renting, including home maintenance, remodeling costs, utilities, and transportation. All of these arguments are reviewed in more detail in the paper. The bottom line is that these data indicate, at a minimum, participants are assuming liability costs at a faster rate than their 401(k), and these costs are unlikely to outpace the returns they earn in their retirement plans. This points to the need to give participants more personalized financial guidance, so they can make better decisions about how to allocate their paychecks and benefits.

9. Karl E. Case, John M. Quigley, and Robert Schiller. 2005. "Comparing Wealth Effects: The Stock Market vs. the Housing Market," Advances in Macroeconomics Vol. 5, No. 1: 1–34.

10. Federal Reserve Board of Governors.

11. U.S. consumer debt segments are closely associated with debt segments in the DC population.

12. Meta Brown, Andrew Haughwout, Donghoon Lee, and Wilbert van der Klaauw. 2013. "The Financial Crisis at the Kitchen Table: Trends in Household Debt and Credit." *New York Federal Reserve Board* Vol. 19, No. 2, pp 1-10.

13. Matt Fellowes and Mia Mabanta. 2007. "Borrowing to Get Ahead, and Behind: The Credit Boom and Bust in Lower-Income Markets." Washington, DC: The Brookings Institution.

14. Jesse Bricker, Arthur B. Kennickell, Kevin B. Moore, and John Sabelhaus. 2012. "Changes in U.S. Family Finances from 2007 to 2010: Evidence from the Survey of Consumer Finances"

Federal Reserve Bulletin, vol. 98, no 2, pp. 1-80.

15. Meta Brown, Andrew Haughwout, Donghoon Lee, and Wilbert van der Klaauw. 2013. "The Financial Crisis at the Kitchen Table: Trends in Household Debt and Credit." *New York Federal Reserve Board* Vol. 19, No. 2, pp 1-10.

16. Robert A. Schiller. 2008. *Subprime Solution: How Today's Global Financial Crisis Happened and What to Do about It.* Princeton, New Jersey: Princeton University Press. Karl E. Case, John M. Quigley, and Robert Schiller. 2005. "Comparing Wealth Effects: The Stock Market vs. the Housing Market," Advances in Macroeconomics Vol. 5, No. 1: 1–34.

17. National Association of Realtors

18. To calculate this yourself, first sum the total value of your mortgage payments over this time period and than subtract the remaining loan balance at the end of the time period, which is = $L[(1 + c)^n - (1 + c)^p]/[(1 + c)^n - 1]$, where L = starting loan balance, c = monthly interest rate, L = Loan amount, n = Month when the balance is paid in full. The difference is the amount of principal you have paid down.

19. There are countless resources here. For one impartial analysis, see GAO. 2007. "Automatic Enrollment Shows Promise for Some Workers, but Proposals to Broaden Retirement Savings for Other Workers Could Face Challenges" Washington, DC: GAO-10-31.

20. For the best summary we have ever found of the traditional economic expectations for consumer behavior and the data that challenge it, see John Y. Campbell. "Household Finance, Presidential Address to the American Finance Association. *Journal of Finance*. 2006;LXI(4):1553-1604.

21. United States Department of Labor, Bureau of Labor Statistics, Major Economic Indicators.

22. Matt Fellowes and Katy Willemin. 2013. "The Retirement Breach in Defined Contribution Plans: Sizes, Causes, and Solutions." Washington, DC: HelloWallet.

23. Matt Fellowes. 2006. "Credit Scores, Reports, and Getting Ahead in America." Washington, DC: The Brookings Institution.

24. Matt Fellowes and Mia Mabanta. 2007. "Borrowing to Get Ahead, and Behind: The Credit Boom and Bust in Lower-Income Markets." Washington, DC: The Brookings Institution.

25. Matt Fellowes. 2006. *From Poverty, Opportunity: Putting the Market to Work for Lower Income Families.* Washington, DC: The Brookings Institution.

26. Tufan Ekici and Lucia F. Dunn. 2010. "Credit Card Debt and Consumption: Evidence from Household-Level Data." *Applied Economics*. Volume 42, No. 4, 2010, pg. 455-462; Lewis M. Segal and Daniel G. Sullivan. 1998. "Trends in homeownership: Race, demographics, and income." *Economic Perspectives*, Federal Reserve Bank of Chicago.

27. Meta Brown, Andrew Haughwout, Donghoon Lee, and Wilbert van der Klaauw. 2013. "The Financial Crisis at the Kitchen Table: Trends in Household Debt and Credit." *New York Federal Reserve Board* Vol. 19, No. 2, pp 1-10; 1992 and 2010 Survey of Consumer Finances, Federal Reserve Board of Governors.

28. Richard Fry. 2013. "A Rising Share of Young Adults Live in Their Parents' Home." Philadelphia, PA: Pew Research Center.

29. In fact, about 8 percent of 401(k) participants that take out loans or cash-out their 401(k)s balances report doing so to buy housing. See: Matt Fellowes and Katy Willemin. 2013. "The Retirement Breach in Defined Contribution Plans: Sizes, Causes, and Solutions." Washington, DC: HelloWallet.

30. Robert Schiller. 2005. "Comparing Wealth Effects: The Stock Market vs. the Housing Market," *Advances in Macroeconomics* Vol. 5, No. 1: 1–34.

31. National Association of Realtors. According to their data, between 2002-2008, average home tenure was 6 years, compared to about 9 years in 2012.

32. Lewis M. Segal and Daniel G. Sullivan. 1998. "Trends in homeownership: Race, demographics, and income." *Economic Perspectives*, Federal Reserve Bank of Chicago.

33. Sandy Baum & Patricia Steele. 2010. Who Borrows Most? Bachelor's Degree Recipients with High Levels of Student Debt." Trends in Higher Education Series. Washington, DC: The College Board.

34. Jinkook Lee and Kyoung-Nan Kwon. 2002. "Consumers' Use of Credit Cards: Store Credit Card Usage as an Alternative Payment and Financing Medium." *Journal of Consumer Affairs.* Volume 36, Issue 2, pages 239–262.

35. Annamaria Lusardi and Olivia S. Mitchell. 2009. "Financial Literacy: Evidence and Implications for Financial Education." Charlotte, NC: TIAA Institute.

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