# Diversity and defined contribution plans: Loans and hardship withdrawals

Vanguard research

April 2012

Authors
Cynthia A. Pagliaro
Stephen P. Utkus

**Executive summary.** In a sample of seven large defined contribution (DC) plans, blacks and Hispanics were more likely to take a loan or hardship withdrawal than whites or Asians. Yet the fraction of savings "at risk" through loans was only slightly higher for blacks and Hispanics and, in the case of hardship withdrawals, was actually lower for blacks.

**Early access.** In our sample, 17% of active participants accessed plan savings through either loans or hardship withdrawals in the 12-month period ended June 30, 2010. Twelve percent of active participants took one or more loans, 4% took one or more hardship withdrawals, and 1% took both.

**Loans.** Blacks in our sample were 55% more likely to take a loan than whites or Asians during the 12-month period ended June 30, 2010. Hispanics were about one-third more likely to take a loan. However, black and Hispanic participants borrowed only a slightly higher fraction of their retirement account balance, and there was no meaningful difference in 12-month loan default rates among groups. This higher incidence of loans among blacks and Hispanics occurs after controlling for income, account balance, and other demographic differences.

**Number of loans allowed.** The incidence of borrowing and the fraction of retirement savings borrowed were both significantly lower when participants were limited to a single loan. This result occurred across all participants and across all racial and ethnic groups.

**Hardship withdrawals.** Approximately 5% of the participants we studied took hardship withdrawals. Within this group, blacks were almost twice as likely to take a withdrawal as whites. However, they withdrew a smaller fraction of their account balance. Hispanics were about one-third more likely to take hardships as whites, and withdrew a similar fraction of their account balance as whites.

**Implications.** Loans and hardship withdrawals offer participants pre-retirement liquidity from DC plan savings, and are thought to increase plan participation and contribution rates. Our findings suggest that blacks and Hispanics disproportionately make use of these features, although the fraction of account wealth "at risk" among individual black and Hispanic participants is not meaningfully higher. These findings may also reflect other unobservable characteristics, such as differences in financial literacy, trust in financial institutions, or constrained access to credit outside the plan. For sponsors concerned about participants borrowing from retirement savings, one plan design strategy is to consider limiting participants to one loan outstanding and/or other modest borrowing restrictions. This strategy appears to reduce borrowing levels across all participants and all racial and ethnic groups.

## Background

DC plan participants may access their savings prior to retirement age in a variety of ways, including taking loans or withdrawals if they are active employees or cashing out savings when they change jobs. By providing liquidity and pre-retirement access to savings, these plan features make tax-deferred retirement accounts more attractive. Prior research on loans has shown that this feature raises both plan participation and contribution rates. In effect, the ability to borrow acts as an inducement to greater plan saving.[1] At the same time, these types of pre-retirement liquidity features have raised concerns about "leakage," or the spending of DC plan savings for purposes other than financial security in retirement.

In this second paper on workforce diversity and retirement savings, we consider the impact of participant race and ethnicity on the patterns of usage for both loans and hardship withdrawals.[2] In general, loans and hardship features are widely available in DC plans. Among Vanguard-administered plans, for example, three-quarters of plans offered loans and more than eight in ten plans offered hardship withdrawals in 2010.[3] Prior research has suggested that certain minority groups may be at greater risk of jeopardizing retirement savings because of these features.[4] However, it is important to note that participants with a loan outstanding or a hardship withdrawal are arguably better prepared for retirement than similar nonparticipants with no retirement savings.

As in our first paper on workforce diversity and retirement savings, we based this second study on a sample of seven large DC plans that voluntarily chose to provide race and ethnicity data for their participant populations.[5] The seven plans include nearly 250,000 active participants. The total number of loans allowed per participant depends upon the plan. One restricts participants to a single loan while others allow as many as two or three loans at one time. Conforming to IRS hardship definitions, each plan allows participants early withdrawals because of financial hardship.

We recognize that these seven plans do not represent a random statistical sample of the broader U.S. DC system. But we believe that the results of our study do contribute to the emerging body of research on retirement plan behavior and diversity and will lay the foundation for future diversity research based on larger datasets. We also hope that this type of research will encourage other plan sponsors to consider providing such information voluntarily for future research efforts. Though based on a limited sample, it is encouraging that our results are broadly consistent with other household finance research on racial and ethnic differences.

One important caveat about our study is that it occurs in the context of well-designed and generous retirement programs offered by seven large companies. It is intended to examine racial and ethnic differences in that context. It is not intended to address racial and ethnic differences that may exist more broadly beyond the world of workplace retirement plans—whether in personal savings or in household wealth accumulation. Our study only addresses part of the household wealth picture, a worker's current workplace savings plan—albeit a growing and important part of the balance sheet for many Americans.

This paper begins with a brief introduction to loans and withdrawals in DC plans. It then discusses characteristics of the participant sample, and then considers their loan and withdrawal behavior.

## Loan and withdrawal features

Loans are an optional DC plan feature. Participants taking a loan are subject to plan-specific rules, such as limits on the total number of outstanding loans. In addition, plans may restrict the number of loans participants may take over a specific time period (e.g., participants may be limited to only one loan per calendar year). Under IRS rules, participants may not borrow more than half of their vested account balance, with the total amount borrowed not to exceed $50,000.[6]

1 See GAO., 1997, Olivia Mitchell, Stephen Utkus, and Tongzuan Yang, 2005, Alicia Munnell, Annika Sunden, and Catherine Taylor, 2000.

2 In this paper we do not consider nonhardship withdrawals, such as post age 59½ in-service withdrawals, the withdrawal of certain employer contributions, or plan distribution behavior upon separation from service.

3 Vanguard, 2011. See also ICI and EBRI 2011 for industry-wide statistics.

4 Ariel Hewitt, 2009.

5 One plan accounted for about half of the participant sample. We used a variety of robustness checks to ensure that our results were not biased by this one plan, including, in one test, eliminating the plan entirely from the sample.

6 Plan rules may also restrict to what extent different sources of money (e.g., employer versus employee types of monies) may be borrowed.

Unlike other sources of borrowing, such as bank loans or credit cards, DC plan loans are made from a participant's own assets. Plan loans are not subject to any credit underwriting standards or limits, and so may represent a source of available borrowing for those who lack access to other credit options, have lower credit scores, or who are otherwise credit-constrained.

Participants taking a loan must repay the balance (i.e., replenish the amount borrowed from the account, with interest) with payments made at a minimum on a quarterly basis. Most often, payments are made through payroll deductions. Although loans are repaid through periodic payments over a fixed period (generally five years or less) pursuant to an amortization schedule, the outstanding balance of a loan in many plans is accelerated and payable immediately upon severance of employment. If the participant fails to provide other monies to reimburse the retirement account for the remaining loan balance, the loan is deemed as "defaulted" and the participant incurs a taxable event on the balance due.

Hardship withdrawals are another optional plan feature. While DC plans are not required to permit withdrawals from plan savings for active employees, plans may do so if they provide specific guidelines for determining whether a hardship exists. The IRS provides guidelines for determining an "immediate and heavy" financial need for this purpose and plan sponsors may choose to adopt some or all of these guidelines. The IRS hardship rules include receipt of a foreclosure or eviction notice, burial expenses, or casualty losses. They also include medical expenses, purchase of a primary residence, and payment of college expenses as financial "hardships."[7]

Generally, DC plans will require a participant to first take advantage of any available loan option before the plan permits a hardship or other withdrawal.

Once a participant takes a hardship withdrawal, plans typically restrict participants from making contributions to their employer's retirement savings plan for six months. Plans may also permit hardship withdrawals from both employee and employer contribution sources.[8] However, participants may not withdraw earnings on participant salary deferral contributions and the amount they withdraw may be subject to taxes and penalties.

## The study sample

Our sample consists of seven large DC plans whose sponsors provided race and ethnicity data for their active participant population. These plans include nearly 250,000 active plan participants. The companies operate in a diverse set of industries including natural resources, financial services, health care, transportation, and technology.

Whites (65%) represent the largest racial and ethnic group in the sample, followed by blacks (20%), Hispanics, (10%) and Asians (4%) (**Figure 1**). Other racial and ethnic groups, including Native Americans and Pacific Islanders, make up the remaining 1%.[9] Fifty-eight percent of the sample is male. The median age is 43.9 years; the median job tenure is 9.7 years. Median income is $48,351 and the median account balance is $19,490. Each of the seven plans we studied allows participants to take loans. One of these plans limits the number of loans outstanding to one per participant; three plans allow two loans, and the remaining three plans allow as many as three loans at one time.[10] All plans allow hardship withdrawals based on the IRS guidelines.

All data for this cross-sectional sample is as of June 30, 2010. In addition, new loans and hardships were analyzed during the one-year period beginning on June 30, 2009.

7 See '401(k) Resource Guide—Plan Participants—General Distribution Rules' irs.gov for guidelines.

8 Except employer contributions made to a money purchase plan.

9 Given its small size, results for the "other" group are statistically insignificant and not reported in this study.

10 Among the seven plans, there are various restrictions on the number of outstanding loans allowed and the period of time a participant must wait to take a new loan (one month to one year) after repayment of current loan.

**Figure 1.** Participant characteristics

*Active participants in seven DC plans as of June 30, 2010.*

| | | By racial/ethnic group | | | | |
|---|---|---|---|---|---|---|
| | Total | White | Asian | Black | Hispanic | Other |
| Number of eligible employees | 246,259 | 160,957 | 8,580 | 49,779 | 23,383 | 3,560 |
| Percentage of total sample | 100% | 65% | 4% | 20% | 10% | 1% |
| Percentage male | 58% | 60% | 48% | 51% | 64% | 53% |
| Age (average) | 43.3 | 44.5 | 41.1 | 41.9 | 39.7 | 40.0 |
| Age (median) | 43.9 | 45.5 | 39.6 | 42.4 | 39.2 | 39.1 |
| Tenure (average) | 11.1 | 11.7 | 8.2 | 10.6 | 9.4 | 8.5 |
| Tenure (median) | 9.7 | 10.1 | 6.2 | 9.5 | 7.7 | 6.5 |
| Income (average) | $54,859 | $60,010 | $74,002 | $39,438 | $46,032 | $50,853 |
| Income (median) | $48,351 | $52,240 | $68,068 | $36,610 | $43,000 | $46,124 |
| Account balance (average) | $54,943 | $67,753 | $76,781 | $22,255 | $30,842 | $39,243 |
| Account balance (median) | $19,490 | $29,084 | $40,324 | $6,500 | $9,950 | $14,590 |

Source: Vanguard, 2012.

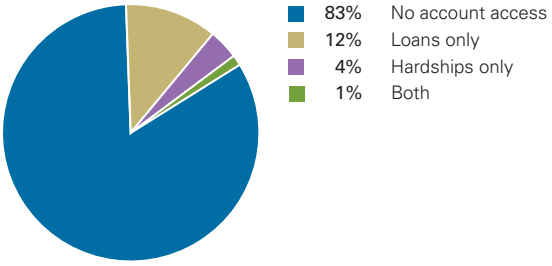
## Access to savings

During this one-year period, 17% of participants in our sample accessed their DC plan savings through loans or hardship withdrawals (**Figure 2**). Of this group, 12% took at least one loan, 4% made at least one hardship withdrawal, and 1% took a combination of these two features. Eighty-three percent of participants chose not to use either feature.

Summary statistics, which do not control for other factors, suggest that the propensity to access accounts through either loans or hardship withdrawals is highest among blacks and Hispanics. During the year ended June 30, 2010, 27% of blacks and 20% of Hispanics accessed their savings, compared to 14% of Asians

**Figure 2.** Methods of access

Active participants in seven DC plans as of June 30, 2010 who took a loan and/or withdrawal during the prior 12-month period




Source: Vanguard, 2012.

and 13% of whites (**Figure 3**). A higher percentage of blacks accessed their plan accounts through loans (16%) or hardship withdrawals (9%). In total, only 1% of participants took both a loan and hardship withdrawal. However, within this group, blacks were more likely to take advantage of both features.

Since loans and hardships represent two distinct mechanisms for accessing DC plan savings, we chose to examine them separately. In the following sections, we consider loan and hardship withdrawals individually to better identify any important factors that may impact these independent decisions.[11]

## Loans

During the one-year period ended June 30, 2010, 12.9% of participants in our sample took one or more loans (**Figure 4**).[12] Based on summary statistics, which do not control for differences in other factors, the rate of borrowing was highest among blacks (18.6%), followed by Hispanics (15.8%), Asians (12.8%), and whites (10.7%).

In our sample, 55% of participants are in a plan that allows only one loan. But 67% of the borrowing occurs in plans that permit participants to take out two or three loans simultaneously.[13] The percentage

**Figure 3.** Access through loans and hardship withdrawals

*Active participants in seven DC plans as of June 30, 2010 who took a loan and/or withdrawal during prior 12-month period*

| | Total | White | Asian | Black | Hispanic |
|---|---|---|---|---|---|
| Percent of participants who access 401(k) money | 16.6% | 13.0% | 13.6% | 27.4% | 20.1% |
| Loans | 11.6 | 9.9 | 11.8 | 15.5 | 14.5 |
| Hardship withdrawals | 3.8 | 2.3 | 0.8 | 8.8 | 4.3 |
| Both | 1.3 | 0.8 | 1.1 | 3.1 | 1.4 |

Source: Vanguard, 2012.

**Figure 4.** Loan characteristics

*Active participants in seven DC plans as of June 30, 2010, loans taken during prior 12-month period*

| | Total | White | Asian | Black | Hispanic |
|---|---|---|---|---|---|
| Percentage of participants who took loan(s) | 12.9% | 10.7% | 12.8% | 18.6% | 15.8% |
| When plan allows 1 loan | 4.3 | 4.0 | 0.3 | 7.0 | 5.9 |
| When plan allows 2 or 3 loans | 8.5 | 7.2 | 12.5 | 12.0 | 9.9 |
| | | | | | |
| Percentage of participants allowed 1 loan only | 55% | 53% | 4% | 67% | 64% |
| Percentage of participants allowed 2 or 3 loans | 45 | 47 | 96 | 33 | 36 |
| Percentage of loan-takers in plans allowing 1 loan only | 33 | 52 | 2 | 38 | 37 |
| Percentage of loan-takers in plans allowing 2 or 3 loans | 67 | 55 | 98 | 62 | 63 |
| | | | | | |
| Median amount borrowed | $5,035 | $6,500 | $10,000 | $3,200 | $4,579 |
| **Loans taken through June 30, 2010** | | | | | |
| Outstanding loans as a percentage of account balance | 21% | 20% | 23% | 22% | 22% |

Source: Vanguard, 2012.

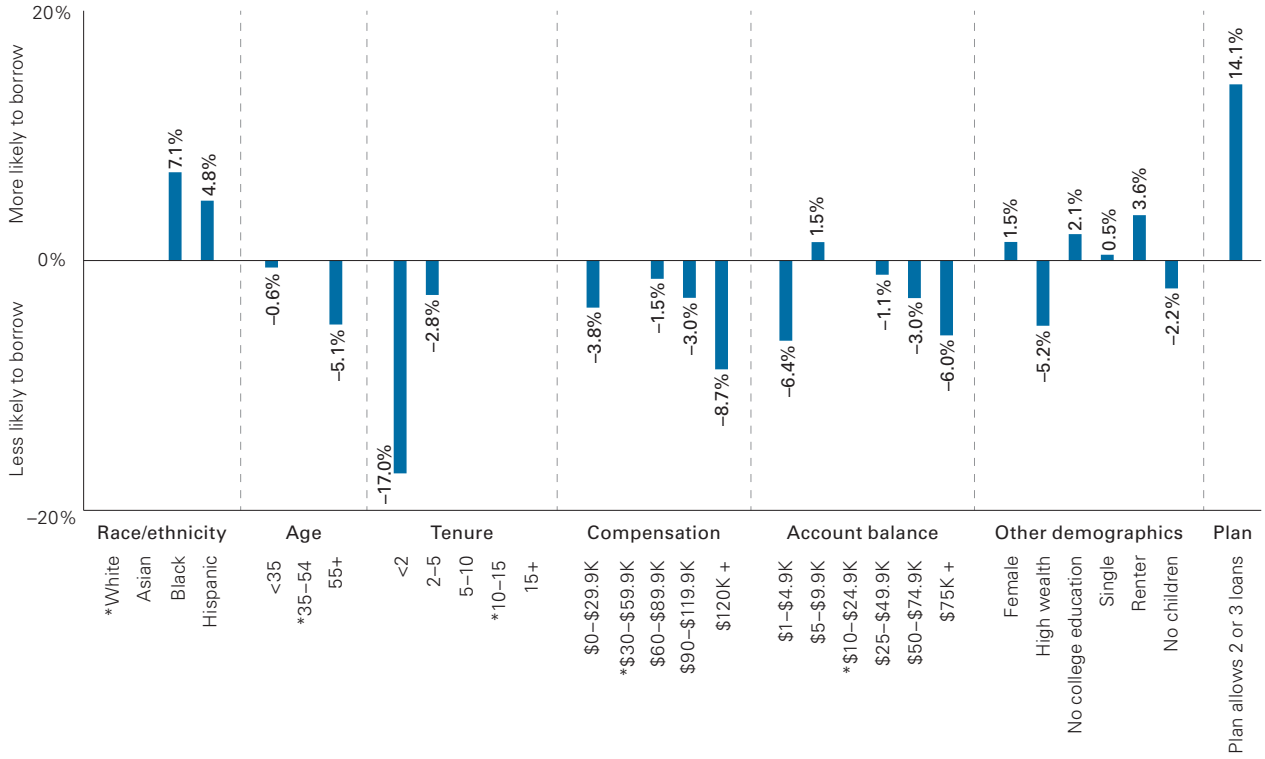
11 Separately we look at "accessing" savings through either loans, hardship withdrawals, or both. The results are very similar to those for loans generally, given that loans dominate a sample combining the two features.

12 This statistic includes participants who took a loan during the period, whether or not it was also preceded by a hardship withdrawal.

13 Asians appear to take very few loans when only one loan is allowed in their plans. However, this finding is not significant because a very small percentage of Asians are in plans that restrict borrowing to a single loan.

**Figure 5.** Propensity to take a loan

*Factors associated with the propensity to take a loan*




*Reference category.

Note: All variables are statistically significant at the 95% level. For categorical variables, effects are measured against a reference of: white, 35–54 years of age; 10–15 years of job tenure; $30K–$59.9K for income; $10K–24.9K for balance; nonretirement-plan wealth < $75,000, married, male, college-educated; homeowner with children; plan that allows one loan.

Source: Vanguard, 2012.

of participants taking a loan was lower in plans that allowed only one outstanding loan (4.3%) compared to plans that allow two or three loans (8.5%). Regardless of how many loans were permitted by a plan, the decision to take a loan was higher among blacks and Hispanics than among whites. The median amount borrowed during the one-year period was $5,035. Asians borrowed the highest amount during the period ($10,000), while blacks borrowed the lowest amount ($3,200). For all participants sampled, the average outstanding loan balance as a fraction of the account balance was 21%.

We used a logistic regression model, which we describe in Appendix I, to control for other demographic factors and to estimate the independent effect of race and ethnicity on the decision to take a loan from a DC plan account. Blacks and Hispanics were more likely to take a loan than whites, our designated reference group (**Figure 5**). There was no significant difference between whites and Asians in borrowing behavior. When compared to white and Asian participants, the probability of a black participant borrowing from DC plan savings is 7.1 percentage points higher—a relative increase of 55%.[14] For Hispanics, the probability of taking a DC plan loan is 4.8 percentage points higher than the reference category—a relative increase of 37%, compared to whites and Asians.

In terms of other demographic patterns, middle-aged participants in our sample are more likely to take loans than younger or older workers.[15] Loan-taking is also

14 The relative increase is calculated as follows: (7.1% plus mean of 12.9%) divided by 12.9%.

15 This finding is consistent with results from Beshears et al. regarding DC plan loans.

related to tenure. Those with less than five years of tenure are less likely to take loans than longer-tenured participants. Not surprisingly, then, participants with shorter tenures and lower account balances are less likely to borrow—no doubt because borrowing is conditional on having accumulated an account balance.

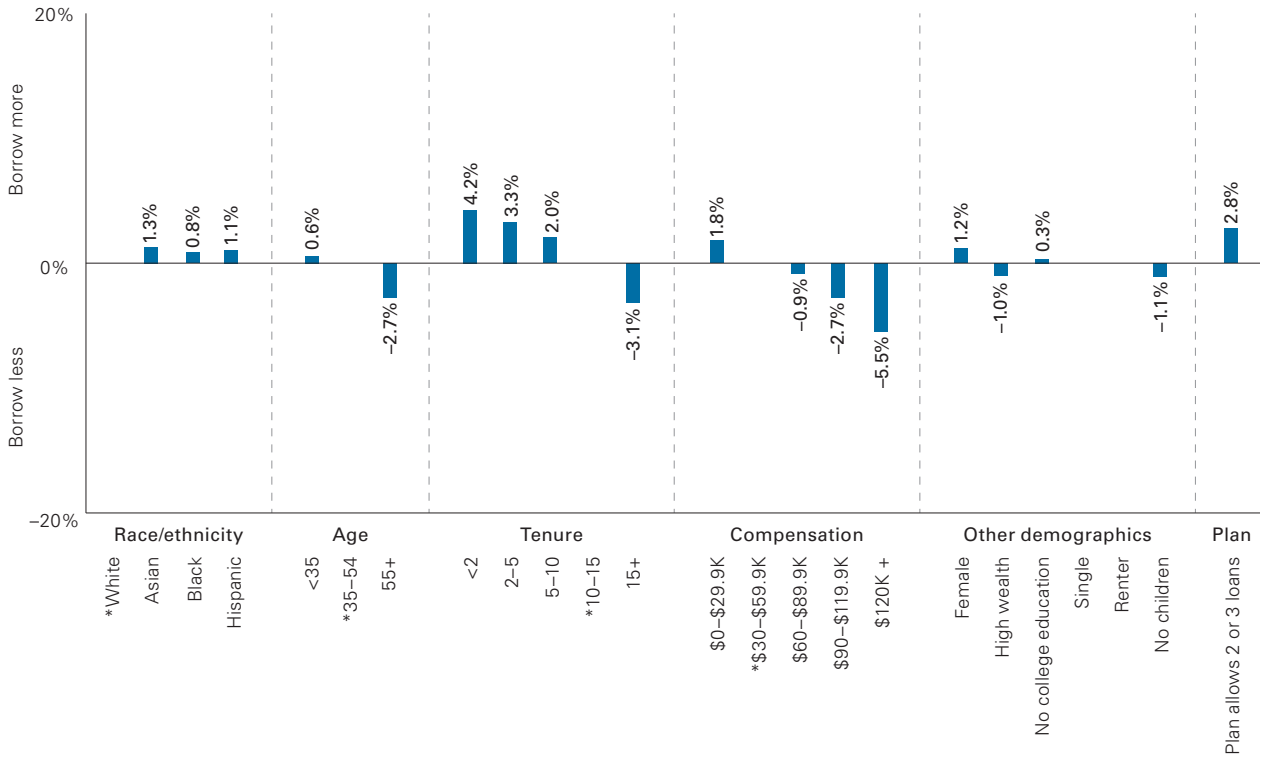
Our findings also suggest that limited access to liquidity may be a key factor in whether participants borrow from their retirement plans. Women who generally have less access to liquidity are slightly more likely to borrow than men. Higher-income, higher-balance and higher-nonretirement wealth participants are less likely to borrow, presumably in part because they have access to other forms of credit or have liquid assets outside the retirement plan for spending needs. Non-college-educated participants are slightly more likely to take a loan, as are renters and participants with children.

Perhaps most importantly, the number of loans allowed by the plan had the largest effect on whether a participant borrowed savings during the past year. In plans that offered participants the ability to take two or three loans, the probability of a participant taking a loan increases by 14.1 percentage points—a relative increase of 110% relative to the average borrowing rate of 12.9%.

Another way to assess the effect of DC plan loans is to consider the aggregate amount borrowed relative to the participant's account balance. In this case, we examine total loans outstanding as of June 30, 2010, regardless of when the loan was taken. As noted above, for all participants, the average outstanding loan balance as a fraction of account balance was 21%. (**Figure 4, on page 6**) This figure varies only slightly among various races and ethnic groups.

**Figure 6.** Fraction of account balance borrowed

*Factors associated with the fraction of account balance borrowed*




*Reference category.

Note: All variables are statistically significant at the 95% level. For categorical variables, effects are measured against a reference of: white, 35–54 years of age; 10–15 years of job tenure; $30K–$59.9K for income; $10K–24.9K for balance; nonretirement-plan wealth < $75,000, married, male, college-educated; homeowner with children; plan that allows one loan.

Source: Vanguard, 2012.

**Figure 7. Loan defaults**

*Percentage of loan defaults that occurred June 30, 2010 to June 30, 2011 for loans outstanding as of June 30, 2010.*

| | All | White | Asian | Black | Hispanic |
|---|---|---|---|---|---|
| Total defaults | 5.8% | 5.4% | 6.3% | 6.0% | 6.8% |

Source: Vanguard, 2012.

**Figure 8. Hardship withdrawal characteristics**

*Active participants in seven DC plans as of June 30, 2010 who took a hardship withdrawal during prior 12-month period*

| | Total | White | Black | Hispanic |
|---|---|---|---|---|
| Percent of participants who took a hardship withdrawal | 5.2% | 3.1% | 11.9% | 5.7% |
| Percent of participants taking 1 hardship withdrawal | 4.5 | 2.6 | 10.1 | 5.0 |
| Percent of participants taking 2 or more hardship withdrawals | 0.7 | 2.4 | 1.7 | 0.6 |
| Median hardship withdrawal amount | $2,870 | $4,096 | $2,007 | $3,144 |
| Hardship withdrawals as a percentage of account balance | 35% | 36% | 33% | 37% |

Source: Vanguard, 2012.

After controlling for other demographic differences, the marginal impact of race and ethnicity on the total amount borrowed as a fraction of account balance[16] is essentially the same for all races and ethnic groups (**Figure 6**). The difference is around one percentage point, which, compared to the mean fraction borrowing of 21%, represents an increase of around 5%. In other words, while blacks and Hispanics are much more likely to take loans, the fraction borrowed is only slightly higher than that for whites.

In terms of plan design, we observe that the number of loans allowed not only increases the incidence of loans taken but also increases the fraction of the account borrowed, by 2.8 percentage points. On a relative basis, allowing participants to take two or three loans increases the percentage of loans taken by 13% and represents a much larger impact than differences in race or ethnicity.

One important risk of loans is the increased risk of default that comes with a job change. In a separate study of a broad Vanguard recordkeeping population, only around 10% of DC plan loans end in default.[17] However, it is possible that loan defaults disproportionately affect certain groups. We examined default behavior for the one year following June 30, 2010, for our sample of seven plans. During this period, the average default rate for participants in our sample was 5.8% (**Figure 7**). Before controlling for other factors, there does appear to be some difference in default rates among various racial and ethnic groups. However, after controlling for other factors, these differences disappear (**Appendix II**). This result suggests that, at least in our sample for a one-year period in which we observed default rates, there were no meaningful differences among various groups.

## Hardship withdrawals

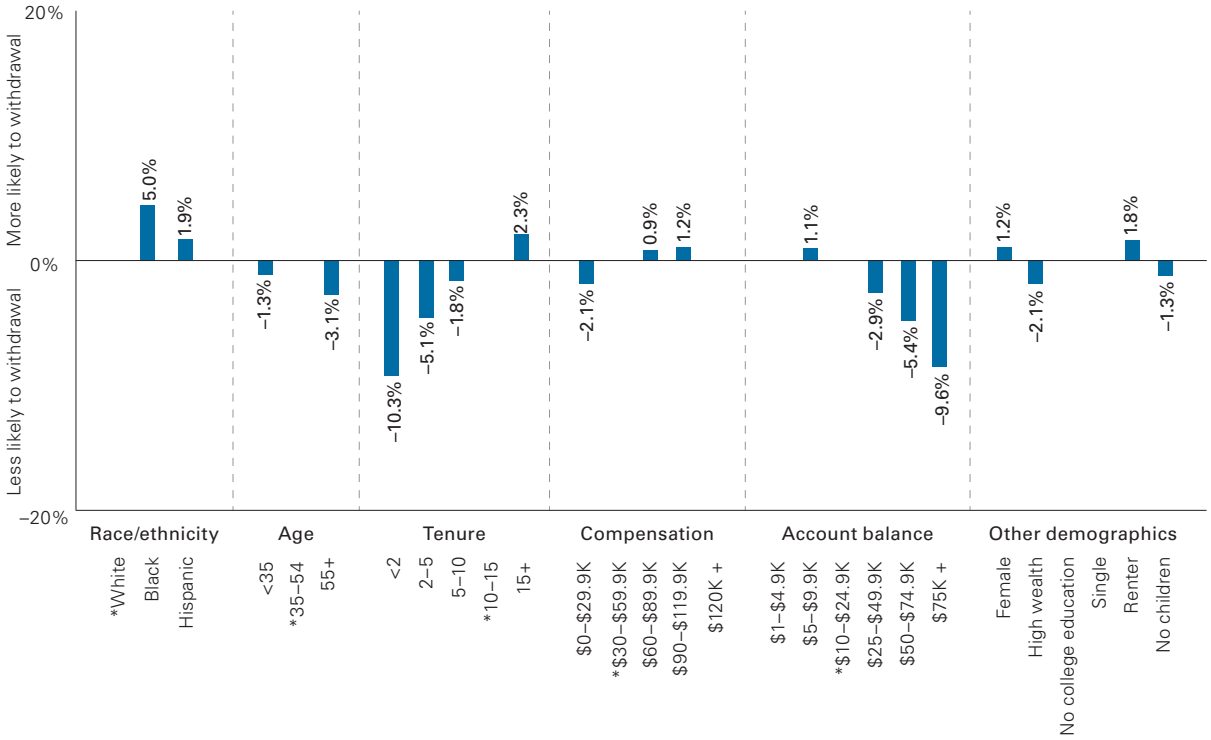
Unlike loans, which are repaid via payroll deduction, hardship withdrawals are not repaid and so represent a known reduction in a participant's retirement assets. In our sample, 5.2% of participants took a hardship withdrawal over the one-year period ended June 30, 2010 (**Figure 8**). This figure includes participants who took only a hardship withdrawal and the small percentage who took both a hardship withdrawal and a loan.

16 The statistic on loans as a fraction of account balance is calculated as follows: The outstanding loan balance is divided by the sum of the account balance and loan balance.

17 See Lu /Mitchell/Utkus, 2010.

**Figure 9.** Propensity to take a hardship withdrawal

*Factors associated with the propensity to take a hardship withdrawal*




*Reference category.

Note: All variables are statistically significant at the 95% level. For categorical variables, effects are measured against a reference of: white, 35–54 years of age; 10–15 years of job tenure; $30K–$59.9K for income; $10K–24.9K for balance; nonretirement-plan wealth < $75,000, married, male, college-educated; homeowner with children.
Source: Vanguard, 2012.

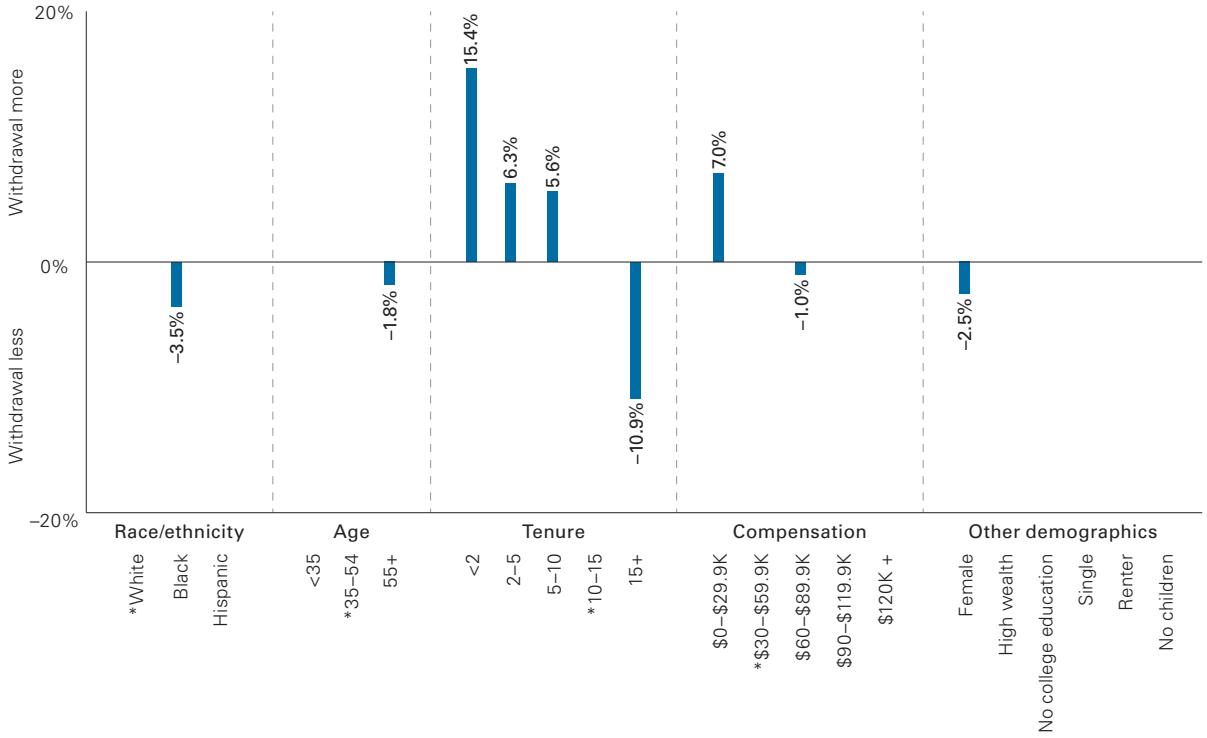
Without controlling for other demographic factors, the withdrawal rate was highest among blacks (11.9%) compared to Hispanics (5.7%) and whites (3.1%).[18] For the entire participant population sampled, 4.5% took one withdrawal and 0.7% took two or more. The median hardship withdrawal amount was $2,870. Whites had the highest median withdrawal amount, $4,096, while blacks had the smallest, $2,007. On average, all participants withdrew slightly more than one-third of their available account balances for a hardship. The rate was highest among whites and Hispanics and lowest among blacks.

Our regression results, however, do control for other variables and suggest that blacks were much more likely to take withdrawals than whites (**Figure 9**). The black hardship withdrawal rate is about double that of whites. Hispanics were somewhat more likely to take hardship withdrawals, with a withdrawal rate about one-third higher than that of whites. The other demographic characteristics linked to borrowing also apply to hardship withdrawals. The participants most likely to take hardship withdrawals are middle-aged, longer tenured with mid-range incomes. They are slightly more likely to be women with lower nonretirement wealth.

18 Because the number of Asians who took hardship withdrawals was extremely small, Asians are excluded from this section of the study.

**Figure 10.** Fraction of account withdrawn

*Factors associated with the fraction of account balance withdrawn due to hardship*




*Reference category.

Note: All variables are statistically significant at the 95% level except for (*). For categorical variables, effects are measured against a reference of: white, 35–54 years of age; 10–15 years of job tenure; $30K–$59.9K for income; $10K–24.9K for balance; nonretirement-plan wealth < $75,000, married, male, college-educated; homeowner with children; plan that allows one loan.

Source: Vanguard, 2012.

Measuring the impact of withdrawals from the fraction of account balance withdrawn yields a somewhat different result (**Figure 10**). While blacks are far more likely to take hardship withdrawals, they actually withdraw around 3.5 percentage points less of their portfolio than whites and Hispanics. Relative to the average amount withdrawn, that is 10% lower than whites.

## Implications

Based on our sample of seven large DC plans, blacks are much more likely than whites or Asians to take a loan or hardship withdrawal from their retirement account. Hispanics behave similarly but do so at a lower rate than blacks. In other words, in the aggregate there are disproportionately more blacks and Hispanics utilizing these mechanisms for pre-retirement access to saving. At the same time, the fraction of retirement wealth "at risk" through loans for blacks and Hispanics is only slightly higher than for whites and Asians—and for blacks taking hardship withdrawals, it is actually lower. In other words, at the participant level, blacks and Hispanics do not appear to be materially more "at risk" than whites and Asians from loans and hardship withdrawals.

What may account for the higher incidence of loans or withdrawals among blacks and Hispanics? One possible explanation has to do with financial literacy—understanding the variety of credit sources available in the marketplace and understanding the risks of accessing retirement savings through loans or withdrawals. Another factor may be related to trust in financial institutions. For example, certain groups may be more willing to borrow from their own savings than rely on institutions outside of the plan. Another possible explanation is that certain groups may face constrained access to credit outside their retirement plan—either due to lower creditworthiness or to the lack of equivalent access to private borrowing options. With our data set, we are unable to determine the role these factors might play in influencing participant behavior.

What we do observe at the participant level is that higher pre-retirement access to savings does not seem to pose an undue risk to retirement savings by race and ethnic group. Participants, regardless of race, borrow or withdraw relatively similar fractions of savings—even though more blacks and Hispanics are likely to access their savings than whites and Asians.

Our other findings on loan behavior are broadly consistent with a standard life-cycle model of borrowing and accumulation, with a twist. In general, consistent with such a model, younger households are more likely to borrow than older households. However, the propensity to borrow in a DC plan is initially a function of tenure—shorter-tenured participants are less likely to borrow. We also observe a "hump shaped" age pattern in borrowing, with middle-age participants most likely to borrow. Other measures, such as renting, presence of children, and low nonretirement savings, are all suggestive of a lack of liquid assets in the household, and are related to a greater reliance on DC plan loans.

One powerful finding from our research is the impact of plan design on borrowing. Both the incidence of borrowing and the fraction of retirement wealth borrowed are significantly lower when participants are limited to one loan. For sponsors concerned with the potential impact of borrowing on retirement security, one simple design strategy is to reduce the number of loans participants can take. This rule reduces borrowing across all groups. Although we did not evaluate other plan rules in our research, it's also reasonable to believe that other modest restrictions on borrowing, such as a one loan per calendar year rule, might have similar results.

## Appendix I

Our statistical models are cross-sectional and follow the general form below. For the *i*th participant in the *j*th plan, we examined the relationship between different outcome variables, $Outcome_{i,j}$, with employee race and ethnicity, $Race/Ethnicity_{i,j}$, while controlling for other demographic and plan-specific characteristics:

$$Outcome_{i,j,} = f(Race/Ethnicity_{i,j,}) + g(Demographics_{i,j}) + h(Plan\ specs_{ij}) + \varepsilon_{i,j} + v_j$$

A logistic model was used to study the following binary (1/0) outcome variables: the propensity to access 401(k) savings, the propensity to take a loan, the propensity to default on a loan, and the propensity to take a hardship withdrawal. Ordinary Least Squares (OLS) models were used for percentage of account balances removed by both loans and hardship withdrawals.

All models included four race/ethnicity categories coded as dummy variables: white, black, Hispanic, and Asian. The demographic controls included age, gender, tenure, income, nonretirement household wealth, and level of educational attainment. In addition, we included marital status, homeownership, and presence of children in the household. Missing values were included in the analysis to ensure they did not bias the results.

To address possible correlation of error terms arising from participants within a given plan, the regression controls for plan-level heteroskedasticity, $v_j$. Because only one plan offered one loan, we ran multiple robustness checks to ensure that the results were not biased by other plan-specific characteristics. The relative impact of race and ethnicity were similar across models with and without the one-loan plan.

Seven DC plans were used as the sample for this paper. The sample differs slightly from our prior paper on automatic enrollment and workplace diversity. In particular, one plan in that original sample that accounted for 5% of participants was removed because it did not offer a loan feature. It was replaced by another plan that had a comparable number of participants and offered a loan feature but did not provide an automatic plan option.

Complete regression results, including coefficients, standard errors, and predicted marginal effects, are available from the authors.

## Appendix II

Figure 11 displays the binary logistic regression results for loan defaults. The effects of race/ethnicity are insignificant.

**Figure 11.** Access through loans and hardship withdrawals

*Summary of binary logistic results: Default on loan(s)*

| Variable | Estimate | StdErr | Significance | Marginal effect |
|---|---|---|---|---|
| Intercept | –2.77 | 0.13 | <.0001 | |
| **Race/ethnicity** | | | | |
| Asian | 0.12 | 0.10 | **0.24*** | 12% |
| Black | –0.11 | 0.11 | **0.31*** | –10 |
| Hispanic | 0.12 | 0.09 | **0.19*** | 11 |
| **Gender** | | | | |
| Female | 0.04 | 0.06 | 0.50 | 4% |
| **Age** | | | | |
| Less than 35 | 0.08 | 0.07 | 0.25 | 8% |
| 55+ | 0.59 | 0.13 | <.0001 | 56 |
| **Tenure** | | | | |
| Less than 2 | 0.52 | 0.18 | 0.00 | 49% |
| 2-5 | 0.42 | 0.07 | <.0001 | 40 |
| 5-10 | –0.28 | 0.11 | 0.01 | –26 |
| 15+ | –0.56 | 0.11 | <.0001 | –53 |
| **Nonretirement-plan wealth** | | | | |
| $75K or more | –0.10 | 0.06 | 0.11 | –9% |
| **Compensation** | | | | |
| $0–$29,9K | 0.39 | 0.03 | <.0001 | 37% |
| $60–$89,9K | –0.05 | 0.10 | 0.63 | –5 |
| $90–$119,9K | –0.08 | 0.13 | 0.52 | –8 |
| $120K + | –0.01 | 0.19 | 0.98 | –1 |
| **Account balance** | | | | |
| $1–$5K | 0.26 | 0.07 | 0.00 | 25% |
| 5–$10K | 0.15 | 0.04 | <.0001 | 14 |
| $25–$49,9K | –0.19 | 0.07 | 0.01 | –18 |
| $50–$74,9K | –0.32 | 0.09 | 0.00 | –30 |
| $75K + | –0.48 | 0.10 | <.0001 | –45 |
| **Other demographic variables** | | | | |
| No college | 0.08 | 0.10 | 0.44 | 7% |
| Single | –0.02 | 0.04 | 0.56 | –2 |
| Renter | –0.08 | 0.05 | 0.11 | –7 |
| No children | –0.02 | 0.06 | 0.80 | –1 |

* Statistically insignificant at 90%, 95%, and 99% significance level.
Source: Vanguard, 2012.

## References


Aon, 2011. *Leakage of Participants' DC assets: How Loans, Withdrawals and Cash outs are Eroding Retirement Income.* aon.com.

Ariel/Hewitt, 2009. *401(k) Plans in Living Color: A Study of 401(k) Savings Disparities Across Racial and Ethnic Groups.* aon.com.

Beshears, John, James J. Choi, David Laibson, and Brigitte C. Madrian. 2011. *The Availability and Utilization of 401(k) Loans. NBER Working Paper 17118. June 2011.* nber.org.

EBRI, 2010. *401(k) Plan Asset Allocation, Accounts Balances, and Loan Activity in 2009.* ebri.org.

GAO, 1997. *401(k) Pension Plans—Loan Provisions Enhance Participation But May Affect Income Security for Some.* gao.gov.

ICI, 2011. *Defined Contribution Plan Participants' Activities, First Half 2011.* ici.org.

Lu, Timothy, Olivia S. Mitchell. 2010. *Borrowing From Yourself: The Determinants of 401(k) Loan Patterns.* MRRC Working Paper WP 2010-221. 2010 mrrc.isr.umich.edu.

Lu, Timothy, Olivia S. Mitchell, and Stephen P. Utkus, 2010. *An Empirical Analysis of 401(k) Loan Defaults. PRC Working Paper WP2010-40. 2010.* pensionresearchcouncil.org.

Mitchell, Olivia S., Stephen P. Utkus, and Tongxuan (Stella) Yang. 2005. *Turning Workers into Savers? Incentives, Liquidity and Choice in 401(k) Plan Design.* NBER Working Paper 11725. October 2005. nber.org.

Munnell, Alicia H., Annika Sunden, and Catherine Taylor. 2000. *What Determines 401(k) Participation and Contributions?* Boston College CRR Working Paper No. 2000-12. December, 2000. crr.bc.edu/.

Utkus, Stephen P., Jean A. Young. 2010. *Financial Literacy and 401(k) Loans.* PRC Working Paper WP2010-28. pensionresearchcouncil.org.

Young, Jean A. and Stephen P. Utkus, 2011. *How America Saves 2011—A report on Vanguard 2010 defined contribution plan data.* institutional.vanguard.com.

P.O. Box 2600
Valley Forge, PA 19482-2600

**Connect with Vanguard®** > vanguard.com
> global.vanguard.com (non-U.S. investors)

Vanguard research >
Vanguard Center for Retirement Research
Vanguard Investment Counseling & Research
Vanguard Investment Strategy Group

E-mail > research@vanguard.com

All investing is subject to risk.



CRRDDCLW 042012