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IZA DP No. 12562

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ABSTRACT

The Diversity of Household Assets Holdings in the United States in 2007 and 2009: Measurement and Determinants*

We apply diversity indices, such as the Gini-Simpson index and entropy related indices, to the study of the distribution of individual asset holdings in the United States in 2007 and 2009. We examine the impact of the 2008 recession on asset diversity and the way individual socio-economic characteristics as well as important life events affect this measure. The focus of our analysis is on financial assets. We use a unique panel data set that provides us with comprehensive household level data for 2007 and 2009 in the United States – the Survey of Consumer Finances. We find that asset diversity increases between 2007 and 2009. In addition, it increases with age, education and income and it is lower at the bottom of the wealth distribution. Life changing situations such as getting divorced or losing one's job have a statistically significant negative effect on a change in diversity, while getting married or having deteriorating health have a positive effect. Active money management also affects asset diversity positively.

JEL Classification: D14

Keywords: diversity, financial assets, Great Recession, United States, wealth

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1. Introduction

The Great Recession brought about great losses. People lost their jobs,[1] income, retirement savings and subsequently their homes. Researchers estimated that between 2007 and 2011, 25% of American families lost at least 75% of their wealth and more than half lost at least 25% (Pfeffer et al, 2013). These losses spread across the population, but affected some groups more than others.

Although, a majority of the population lost at least a quarter of their wealth during the Great Recession, close to 50% had much smaller loses. From a welfare point of view, it would be valuable to understand, which mechanisms contributed to a relatively smaller wealth loss in the face of large turbulence in the market. It is reasonable to believe that small wealth losses occurred among households that had very little wealth to begin with, had invested in assets that incurred smaller loses or perhaps used some type of other coping mechanisms that protected them and allowed them to minimize the risk associated with the market.

According to modern portfolio theory, a good way to minimize risk is to diversify one's asset holdings for a given level of expected return. Although, the basic assumptions of this theory have been widely challenged by behavioral economists (Campbell, 2006, Guiso et al., 2012), investing in a variety of assets is still seen as a good way to proceed in order to lower risk.[2] Even though this is the case, household decisions in this area significantly deviate from theory and the literature points to the inefficient construction of many portfolios that leads to negative portfolio returns (Badarinza et al, 2016).

In this paper, we focus on a somewhat different way of dealing with market risk than the one prevalent in modern portfolio theory and test whether it can be considered as a type of coping mechanism selected by households. The central concept we use is that of diversity of individual asset holdings and we borrow this notion from not only the literature linking

[1] According to the official NBER (National Bureau of Economic Research) dates of the recession (December 2007 to June 2009; http://www.nber.org/cycles/), during this period the adjusted unemployment rate increased from 5% to 9.5%.

[2] Risk is measured as the standard deviation of asset price fluctuations. Thus, by investing in assets whose returns are not perfectly correlated, individuals reduce the total variance of their portfolio return.

corporate profitability and growth to diversification, but also from studies dealing with household asset diversification.

A report on wealth gaps in the United States, prepared by the Pew Research Center (2011, page 24), states, "The importance of an asset to household wealth depends on its prevalence and its value. For that reason, homeownership plays a central role for most households—it is a high value asset, and most U.S. households own their homes. The diversity of a portfolio also matters. Although Hispanics and blacks are less likely than whites and Asians to own homes, their wealth is relatively more dependent on home equity. That is because whites and Asians are much more likely to own financial assets and have more diverse portfolios."

Measuring the diversity of household assets is hence an important issue. The goal of the paper is in fact to examine whether, and to what degree, households use diversity of assets as a coping mechanism. In addition, we investigate the determinants of asset diversity between 2007 and 2009. More precisely, we first define the theoretical concept of asset diversity at the individual (household) level. Next, we estimate several specifications of asset diversity indices for households in the United States before and in the immediate aftermath of the Great Recession and compare their performance. Then we estimate the determinants of asset diversity for various demographic groups and check whether during the Great Recession asset holdings diversity changed significantly. We also identify the impact of the crisis on different household types. Our goal is to identify households that are able to weather the recession to some extent and those that are not able to weather it effectively.

We contribute to the literature in several ways. First, we define a measure of the diversity of individual asset holdings that hitherto has rarely been used in this literature. Next, we measure the diversity of individual asset holdings in the United States in 2007 before the Great Recession and in 2009 – after the Great Recession. We find that in all specifications diversity increases. We check the robustness of our results using different levels of asset aggregation and find that the magnitude of the diversity measure increases with the number of assets considered, suggesting that a more in depth analysis warrants a good level of asset disaggregation. Finally, we estimate the impact of various determinants and life events on

asset diversity. We find that diversity increases with age, education and income and that it is lower at the bottom of the wealth distribution. Life changing situations such as getting divorced or losing one's job have a statistically significant negative effect on diversity, while getting married or having deteriorating health has a positive effect. Active money management also affects asset diversity positively.

2. Some background on the importance of the concept of asset diversity: wealth changes during the Great Recession

The Great Recession brought about substantial wealth losses, partly due to changes in asset valuation and partly due to consumption smoothing, which required asset liquidation due to great turbulences occurring in the labor market. The Dow Jones Index lost nearly half of its value between mid-2007 and early 2009, while average housing prices in the largest metropolitan areas fell by nearly 30% during the same time. Wealthy families incurred the largest absolute losses, but the largest relative losses were disproportionally concentrated among lower income households with less education and minority households. Pfeffer et al. (2013) find that the share of those with negative or zero net worth increased from 15.5% in 1983 to 18.6% in 2009. The authors find that although the wealthiest (the top wealth quintile) were most likely to incur the greatest wealth losses (six times more likely as the lowest net worth quintile); they were only one-third as likely to fall into debt. Great wealth losses were also due to changes in employment. For most households, earnings are the biggest component contributing to the household's budget. The households' budget not only includes expenditure, but also savings. Among earners – individuals in the labor market – those with lower education levels as well as minority and low-wage workers typically experienced larger increases in unemployment and reductions in work hours and earnings during recessions than more advantaged workers (Hoynes et al., 2012). A reduction in earnings implies lower savings and consequently, far greater wealth losses for the less-advantaged than for the more advantaged groups, even though they may be smaller in absolute terms.

According to Bricker et al (2015), those in the bottom three quartiles of the wealth distribution experienced the largest relative declines in net worth. Median wealth declined for all income groups except for the top decile. Using the 2007 and 2010 cross-sectional

samples of the Survey of Consumer Finances (SCF) they find that although the change in median wealth for minorities and whites was similar, mean wealth declined more for minorities than for whites.

Wolff et al (2011) using data from a variety of sources around 2009 find that almost all groups experienced substantial wealth losses, but the losses were particularly large among young families, minorities and middle-class households. The largest declines in net worth during the period 2007-2009, according to the longitudinal SCF, were for people below the 30th percentile and most pronounced for those in the bottom 10 percent who were particularly likely to fall into net debt (Kennickell, 2011, 2012).

Other studies using different datasets also find declines in wealth throughout the wealth distribution. For example, Bosworth (2012) finds that there was a negative change in median wealth for all three income terciles (based on 2007 income). In absolute terms, it was slightly smaller for those at the bottom of the distribution compared to those at the top. Shapiro et al. (2013) show that between 2007 and 2009 the losses in wealth for minorities were greater than for whites. Taylor et al (2011) show, using data from the Survey of Income and Program Participation (SIPP), that between 2004 and 2009, the white-to-black ratio of median net worth increased from 11 to 19 and the white-to-Hispanic ratio from 7 to 15.

These studies do not provide additional information on what types of households within those groups were able to "weather" the Great Recession to some extent, which is where our study comes into play.

3. A review of the literature on financial assets prevalence and the determinants of asset allocations

In an important survey of household finance, Campbell (2006) stresses the fact that "households must plan over long but finite horizons; they have important nontraded assets, notably their human capital; they hold illiquid assets, notably housing; they face constraints on their ability to borrow; and they are subject to complex taxation." Campbell (2006) adds that, given the complexity of financial planning as well as the available financial products, it should be clear that households make investment mistakes. This may explain why individuals "make decisions that seem to be based on naïve (or confused) notions of diversification" (Benartzi and Thaler, 2001). One example of behavior is what these

authors call the "1/*N* heuristic". As mentioned by Benartzi and Thaler, such a rule was already recommended in the Talmud since in one of its treatises one can find the following advice of some Rabbi Isaac: "A man should always place his money, a third into land, a third into merchandise, and keep a third at hand". In fact, as stressed by Levy and Duchin (2010) subjects tend "to adopt the naïve investment strategy called the "1*/N* rule," which assigns an equal weight to each security the subjects face". This rule was analyzed by DeMiguel et al. (2009). They suggested two reasons for using such a rule as a benchmark. "First, it is easy to implement because it does not rely either on estimation of the moments of asset returns or on optimization. Second, despite the sophisticated theoretical models developed in the last 50 years and the advances in methods for estimating the parameters of these models, investors continue to use simple allocation rules for allocating their wealth across assets". These authors added that their goal was not to advocate the use of such a simple rule but rather to use it as a benchmark when comparing various portfolio rules. They showed that the naïve (1/N) strategy was more likely to outperform strategies based on optimizing models when the number of assets is large, because it increases the potential for diversification, 'while at the same time increasing the number of parameters to be optimized by an optimizing model" (DeMiguel et al., 2009). The (1/N) rule is also advantageous "when the assets do not have a sufficiently long history to allow for a precise estimation of the moments".

The measures of the diversity of asset holdings proposed in the present paper reach in fact their maximal value under the (1/N) rule. Given what was just mentioned about this simplistic rule, it seems to make sense to use diversity indices to analyze the allocation of the asset holdings of households. This may be particularly important in times of crisis, as households experience job losses, a fall in housing market values and other types of asset losses. Asset diversity may be one of those factors that enabled some households to "weather the storm" better than others.

In order to incorporate most of the population in our study, our focus in the paper is on financial assets.[3] The literature finds that although almost all households hold transaction

[3] Almost 95% of the population holds some type of financial asset (see Table A.2). The components of financial assets are introduced in Section 3.

accounts, those with higher income, higher financial wealth and higher education are more likely to invest in other type of financial assets, such as risky assets. These households are also more likely to invest in a wider range of assets and pay lower fees, thus having higher expected returns and being able to move quicker up the accumulation ladder. It appears nevertheless that both low and high wealth individuals participate less in risky assets than theory predicts. Among low-wealth households, this is due to relatively high fixed costs of risky investments, but it is more difficult to explain why this is so for wealthy households. Wealth is endogenous to investment decisions, but even in the case of exogenous wealth shocks (such as lottery winnings) close to 40% of individuals with large lottery winnings (over 300 000 USD) have been shown not to begin participating in the equity market in Sweden (Briggs et al. 2015). The overreaching conclusion is that since households portfolios are often inefficiently constructed, they offset the benefits of their investments to some extent.

When it comes to household finance, there is wide agreement in the empirical literature that the socioeconomic and demographic characteristics of households have a significant influence on portfolio decisions. The composition of the household, as well as the gender, marital status of the reference person, age, education, labor market situation (employment status, type of contract), inheritance received, as well as own resources, such as their net wealth, and the quintile of the income distribution to which they belong, (see Guiso et al, 2002, for a cross-national review of the literature) are all determinants, that have been shown to have a significant effect on households' portfolio composition or investment behavior.

A more insightful discussion on household portfolio allocation also requires taking into account the institutional context of the country and the background risk the household is facing. For example, Cardak and Wilkins (2009) consider the case of Australia and examine the effect of different sources of background risk (plus the effect of credit and liquidity constraints) on risky asset shares. They find a positive effect of homeownership and mortgage expenditures and a negative effect of labor risk on the holdings of risky asset shares. In the case of home-ownership, it could be the case that households leverage off home-ownership to diversify their portfolios and as a result increase their risky financial

asset holdings. Only among employed households do they find a negative effect of poor health status and a positive age gradient for risky asset holdings. They do not find however any impact of business background risk. Their study also finds that households that are more risk-averse have a lower risky asset ratio, while those with a longer planning horizon are more likely to have a larger risky asset ratio.

In our case, we can expect an overall increase in background risk caused by the Great Recession to affect asset diversity. We would expect a more risk-averse person to react more strongly to a change in background risk compared to a more risk-loving household, in terms of their portfolio.

4. Data sources and methods

4.1 Data

The data source used in this paper is the Survey of Consumer Finances (SCF). It is a tri-annual cross-sectional survey performed by the Federal Reserve Board (FRB) since 1983. The FRB opted for a panel component in 2007 and 2009 to monitor the impact of the Great Recession on household finance. The survey data include information on families' balance sheets, pensions, income, and demographic characteristics. The 2007 wave provided detailed information on all aspects of household finances collected at the level of individual items in most cases. The 2009 SCF follow-up interview focused on a smaller set of variables that were most useful for understanding the nature of the changes experienced by families during the financial crisis. To maximize the comparability of data between the original and follow-up interviews, the 2009 questionnaire maintained the ordering and systematic framing of concepts from the 2007 questionnaire as much as possible. The 2009 data were collected from July 2009 to January 2010.[4]

The survey consists of a core representative sample combined with a high-income supplement. The high- income supplement is selected as a list sample derived from tax data from the Internal Revenue Service (IRS). In the 2007 SCF, the standard multi-stage area-

[4] Details on the collection and construction of the 2007-2009 panel are found in Bricker et al. (2015).

probability sample contributed 2,915 cases, while the high-income supplement contributed another 1,507 cases.

The SCF collects detailed information at the household (primary economic unit) level on components of assets (financial and non-financial) and liabilities. In this paper, our focus is on financial assets,[5] which according to their risk categories, we classify into safe, fairly safe and risky. **Safe** assets include (1) transaction accounts (such as bank deposits and money market accounts) and (2) Certificates of Deposit (CDs). **Fairly safe** assets include (3) savings bonds, (4) cash value of whole life insurance; (5) other managed accounts (trusts, annuities and managed investment accounts). **Risky** financial assets include (6) stocks, (7) mutual funds, (8) bonds, (9) pension accounts (IRAs, thrift accounts and accumulated current or future pension accounts), as well as (10) other financial accounts (loans to others, future proceeds, royalties, non-public stock).

When discussing assets, we will either be focusing on the three categories: safe, fairly safe and risky financial assets or on the ten underlying assets as listed above. For calculating the diversity indices, we use shares of these assets in total financial assets.

4.2 Variables

The diversity of financial assets regressions include a set of controls commonly used in the household finance literature[6]. These variables are: either age or the age group to which the household head belongs to (less than 30, 30-40, 40-50, 50-60 and 70 and over); her/her level of education (less than high school, high school, some university and university), his/his marital status (married or not); the number of her/his children; the income class to which the household head belongs to (less than 25 000 USD, between 25 000 and 50 000 USD, between 50 000 and 100 000USD and over 100 000 USD); race (Black, Hispanic, White and Other); labor market status (employed, self-employed, retired and out of the labor force, unemployed); occupation (managerial, sales or other); the industry of employment (whether the household head worked in the construction industry or not); and risk preferences (unwilling to take any financial risk, willing to take above average risk for

[5] Financial assets are owned by over 94% of households. Details of ownership are in Table A.2.
[6] Their summary statistics are given in Appendix Table A.1

above average return, willing to take large risk for a large return, willing to take average risk for an average return).

Typically, net wealth is an endogenous variable by construction, but the position of a household in the wealth distribution is very important in explaining the structure of the portfolio. It is thus an important factor to control for when investigating asset diversification.[7] We address this by including wealth quintiles in the regressions.

The panel component of the data allows us to analyze the determinants of changes in diversity due to events that took place over the 2007-2009 periods. We control for events such as getting divorced or married, having children, losing one's job or health deterioration. The first two factors are calculated based on whether there was a change in marital status of the household head, either from married to divorced, or from "not married" to married, respectively. Having children was based on whether the household had a change in the number of children from 0 to 1; losing one's job was determined by whether the household head become unemployed; finally, the change in health status was determined by whether self-reported health in 2009 was worse than in 2007.

4.3 Assets diversity as a coping mechanism

Many people lost their jobs and experienced wealth losses during the Great Recession, but some have coped with this better than others have. One of the coping mechanisms in the face of job loss is reliance on savings to smooth consumption. Relying on the most liquid of assets like checking and savings accounts is the easiest way for a household to ensure temporary consumption smoothing and alleviate potential credit constraints. Checking and saving accounts are the most popular forms of financial assets, yet, as can be seen in Tables A.2-A.5, they are still not available to about 20% of households in the bottom wealth quantile even though the average level is less than 2000 USD for that group.

Another way of coping, when one has limited resources, is to sell off less liquid assets. Less liquid forms of savings, though still easily liquefiable, are for example, mutual funds,

[7] When addressing wealth endogeneity, the literature sometimes drops this control or the specific type of asset modelled is excluded from the aggregate measure and the remaining "aggregate wealth" distribution is used.

stocks or bonds. On average, about 20 to 30% of households have these types of assets. In the bottom half of the wealth distribution, the numbers are much lower and the actual levels for 60% of the population are below 2000 USD (see Table A.3 and Table A.5, for details). The overall ownership rate decreased during the Great Recession and the value of these funds decreased as well.

In this paper, we focus on assets and diversity as a potential coping mechanism among households. This method requires having in possession financial assets. It takes into account, both liquid and less liquid asset components. The diversity measure takes into account the number of financial assets owned and their shares.

An important point to make is that the position of households across the wealth distribution will have a large impact on diversity. For example, we expect information costs to differ among people according to their wealth position. Wealthier individuals are better informed regarding investment opportunities and thus, have the capacity to invest in more products and have higher asset diversity. They also have a higher level of financial literacy and specific financial education (Van Rooij et al. 2001), so that they are better equipped to buy numerous sophisticated financial assets.

Less well-informed investors (with lower wealth) may invest in more complicated, structured products that usually have higher mark-up rates. Thus, an increase in wealth could result in moving away from these products, thus affecting asset diversity (the direction would be ambiguous) (Celerier and Vallee, 2014).

Another more mechanical limit on asset diversity at the bottom of the distribution would be the lack of wealth itself. Individuals at the bottom of the distribution have very low wealth levels (a substantial share of these households has zero wealth).

Aside from asset diversity, other coping mechanisms could take place, which are beyond the scope of this paper, such as reaching into the equity of one's home to smooth consumption, for example. This is a risky avenue, though, as housing prices fall, individuals could see themselves with negative home equity once loans taken out with housing as collateral start exceeding the value of the house and put their economic well-being in jeopardy.

4.4 Empirical Strategy

In Section 5, we elaborate on the concept of diversity of asset holdings at the individual/household level. We define several measures and discuss their properties. We then compare the measures in 2007 and 2009 at different levels of aggregation. In the estimation, we focus on identifying the determinants of asset diversity and discussing how changes in life events could have affected asset diversity.

When focusing on the determinants of individual asset diversity, we pool the data for 2007 and 2009 and, estimate the following equation:

$$d_{it} = \beta X_i + \alpha Z_{it} + \gamma D_t + \varepsilon_{it} \quad (1)$$

where d_{it} is a vector giving the value of the diversity measure for individual *i* at time *t;* X_i is a matrix with time-invariant variables for individual *i*; Z_{it} is a matrix of variables for individual *i*, as specified in section 3.2, at time *t*, β and α are vectors of the coefficients of the time-invariant and time-specific variables, respectively; D_t is an indicator variable equal to 1 in 2009 and 0 otherwise; γ is the coefficient of this variable and ε_{it} the error term. This specification allows us to focus on the driving forces of diversity and to see whether the results for the U.S. differ from those found in the literature.

Subsequently, using the panel component of the data, we check whether, as a result of a change in background risk, people modified their investment strategy, i.e. whether they decided to rebalance their portfolio or not. We do this by checking, which lifetime changes, over the 2007 -2009 period, had the biggest impact on asset diversity. More precisely, we estimate the following equation:

$$d_{it+1} = \beta' X_i + \alpha' Z_{it+1} + \gamma + \delta events + \varepsilon_{it+1} \quad (2)$$

In (2), $d_{i,t+1}$ is a vector referring to the value of the individual diversity index for assets at time $t+1$, X_i and Z_{it} are as described above, β, α and γ are coefficients and ε_{it+1} is the error term for this new equation. In the regression, we focus on a set of variables labeled *events* that refer to changes in an individual's life that took place between 2007 and 2009.

These include such events as getting divorced or married, having children, losing one's job or having deteriorating health from one period to the next; δ is the coefficient vector of the additional explanatory variables. All these events may have led to precautionary savings and behavior geared at avoiding risk (Cardak & Wilkins, 2009). We also introduce a variable that captures whether people actively responded to events during the two years of the recession period. This variable is defined based on the following question: "Over this time, have you (and your family) made decisions to change the ways you arrange your money or investments?" Thus a "yes", would indicate that households changed their investment behavior, while a "no" would rather indicate that the changes in the portfolio were largely the result of what happened in the market. Our focus is on investigating how this variable differs for families that experienced the changes highlighted above and whether this variable had an effect on portfolio diversity. Thus, we can see whether households change their allocation because of changes in their circumstances, a changing risk tolerance, or lifecycle factors.

5. Measuring the diversity of assets holdings

5.1. On the notion of diversity

There is by now quite a vast literature in economics on the measurement of diversity and diversification. The focus is often on the link between enterprise diversification, whether it refers to the number of industries in which the enterprise operates or the number of countries in which it sells its product, and profitability and growth (e.g. Berry, 1971; Grant et al., 1988). Grant et al. (1988) made a useful distinction between diversity, which refers to the spread of an enterprise's activities at a point in time, and diversification, a concept that measures the increase in diversity over time. Most of the studies of corporate diversity consider the latter as the complement to one of a measure of the concentration of a company's activities. Concentration is generally measured via the so-called Hirschman-Herfindahl index (Hirschman, 1945; Herfindahl, 1950). Thus, Rosenbluth (1955), Stigler (1964; 1968), Adelman (1969), Berry (1971), Gorecki (1974), Utton (1977) and Grant et al. (1988) used this index. Here, we redefine this idea to the diversity of assets.

The literature on asset diversity on the other hand, is quite scarce. Only a few studies discuss the diversity measures in the context of asset allocation. Worthington (2009), for example, applies asset concentration measures (calling them diversification measures) to Australian data. Using the Hirschman-Herfindahl concentration index, a Shannon entropy index and an index of market asset share, he finds very low levels of asset diversity and contrary to the predictions of portfolio theory, that more risk-averse households have more concentrated portfolios. This is also the case for, lone-parents and households with more children. Larger and older households, as well as those composed of couples and children have more diversified portfolios. Households that have a larger part of their income coming from wages and salaries, business interests, investments, private pensions and transfers have more diversified portfolios as well. An important finding of his paper is that demographic and socioeconomic factors that have a significant impact on diversity do not have the same impact on the proportion of assets held in risky assets. This suggests that holding substantial amounts of financial assets may offset the efforts of households seeking risk-minimization through diversified asset allocations.

Another study that looks at naïve diversification (1/n) versus more sophisticated diversification combined with risk aversion is Barasinska et al. (2012). They find that investors with a combination of higher risk aversion and less wealth generally have lower asset diversity. These investors want to avoid risk but, ironically, are exposed to excess unsystematic risk due to lower wealth holdings which results in under-diversification.[8] They find that the propensity to diversify decreases when risk aversion rises.

In what follows, we elaborate on the measures used in this paper.

5.2. Applying the concept of diversity to individual asset holdings

In this section, we will derive a general measure of diversity used in the paper and introduce the Gini-Simpson diversity index.

Let V refer to the total assets in the population while V_{jk} refers to the value of asset k held by household j. We then define s_{jk} as $s_{jk} = \left(V_{jk}/V\right)$ and it refers to the share of asset k

[8] This is in contradiction to the predictions of classical portfolio theory.

held by individual j in the total assets of the population. Similarly, we define $s_{j.}$ as $s_{j.} = \sum_{k=1}^{K} s_{jk}$ where K refers to the total number of categories of assets. Therefore $s_{j.}$ represents the share of individual j (all assets combined) in the total assets of the population.

The Hirschman-Herfindahl index HH_j of the concentration of the asset holdings of individual j is then expressed as

$$HH_j = \sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)^2 \quad (3)$$

where K refers to the total number of assets. It measures the extent to which asset shares concern only a few assets. The less assets types one has, the higher the value of the index will be. Note that HH_j is equal to 1 if individual j concentrates his/her asset holdings on one asset h (so that $s_{jh} = s_{j.}$ and $s_{jk} = 0\ \forall k \neq h$). When all the assets have the same weight so that $\left(\frac{s_{jk}}{s_{j.}}\right) = \left(\frac{1}{K}\right)$, the index HH_j will be equal to $K\left(\frac{1}{K^2}\right) = \left(\frac{1}{K}\right)$, so that the inverse of the Hirschman-Herfindahl index of asset holdings of individual j is equal to the number of equal size assets that would generate the value of this index[9] and can be considered as a measure of the diversity of asset holdings.

Note also that the larger the number of assets of relatively equal shares, the more the value of the index approaches to zero. In particular, HH_j will tend towards zero when the number of categories K is very high ($K \to \infty$) and all categories have the same weight ($\left(s_{jk}/s_{j.}\right) = (1/K)\ \forall k$). In other words, the index will increase, as the number of assets falls and as the disparity in shares increases.

The Herfindahl-Hirschman index HH_j defined in (3) may be generalized to obtain a measure of the concentration of the asset holdings of individual j (C_j). Equation (3) may be also written as

$$HH_j = \left[\sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)\left(\frac{s_{jk}}{s_{j.}}\right)^{2-1}\right]^{\frac{1}{2-1}} \quad (4)$$

[9] Adelman (1969), in a note on the measurement of industrial concentration, derived also this result, though in a different way. Stigler (1968) also mentioned that the inverse of the Herfindahl index of the concentration of firms gives the number of equivalent firms.

Replacing 2 in the exponents in (4) with a more general parameter *r,* with $r \geq 2$, we derive the concentration index C_j as

$$C_j = \left[\sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)\left(\frac{s_{jk}}{s_{j.}}\right)^{(r-1)}\right]^{\left(\frac{1}{r-1}\right)} = \left[\sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)^{r}\right]^{\left(\frac{1}{r-1}\right)} \quad (5)$$

Equation (5) shows clearly that C_j is a weighted generalized mean of order $(r-1)$. Note that the higher *r*, the greater the weight given to higher shares, since $r \geq 2$.

Assume now that the individual divides his/her assets equally between a certain number $(P_j;\ P_j \leq K)$ of assets. The index C_j will then be expressed as

$$C_j = \left[P_j \left(\frac{1}{P_j}\right)^{r}\right]^{\left(\frac{1}{r-1}\right)} = \left[\left(\frac{1}{P_j}\right)^{r-1}\right]^{\left(\frac{1}{r-1}\right)} = \left(\frac{1}{P_j}\right) => \ P_j = \left(\frac{1}{C_j}\right) \quad (6)$$

so that the inverse of the concentration index C_j is equal to the number P_j of equal size assets that would generate this value of the index. P_j can clearly be considered as a measure of the diversity of the asset holdings of individual *j*.

The overall measure of diversity $P_{total,ind}$ at the individual level is then defined as the sum of individual diversity indices P_j, weighted by the share of individual *j* assets in the total assets of the population.

$$P_{total,ind} = \sum_{j=1}^{n} s_{j.} P_j = \sum_{j=1}^{n} s_{j.} \left\{1 / \left[\sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)^{r}\right]^{\left(\frac{1}{r-1}\right)}\right\} \quad (7)$$

and this is the measure used in Table 2 for different values of *r*.[10]

Note also that since the Hirschman-Herfindahl index varies between 0 and 1, an alternative to the index of the diversity of asset holdings(P_j), is the complement to one of the index

[10] In the particular case, where $r = 1$ in equations (4) and (5), the individual diversity measure may be shown to correspond to the concept of entropy. It is then expressed as $P_{j,entropy} = e^{-\sum_{k=1}^{K}\left(\frac{s_{jk}}{s_{j.}}\right) ln\left(\frac{s_{jk}}{s_{j.}}\right)}$ Hackbart and Anderson (1975), as well as Attaran and Zwick (1987), for example, used this kind of entropy related measure to analyze economic or industrial diversification.

HH_j, which is the so-called Gini-Simpson GS_j diversity index (see, Gini, 1912; Simpson, 1949), which we use for our estimation results. It is expressed as

$$GS_j = 1 - \left[\sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)^2\right] \tag{8}$$

The overall level of individual diversity would then be the weighted average of the individual diversity indices GS_j and written as

$$DIV_{GS,\ total\ ind} = \sum_{j=1}^{n} s_{j.} GS_j = 1 - \sum_{j=1}^{n} s_{j.} \sum_{k=1}^{K} \left(\frac{s_{jk}}{s_{j.}}\right)^2 = 1 - \sum_{j=1}^{n} s_{j.} HH_j \tag{9}$$

Properties of diversity indices

Desirable properties of concentration indices have been formulated, for example, by Hall and Tideman (1967), Hannah and Kay (1977) and Chakravarty and Eichhorn (1991). From this list of properties, it is easy to derive the desirable properties of a diversity index.

Symmetry: A diversity index should be invariant to permutation of its arguments. In other words assets are distinguished only by their size and by no other characteristics. *Homogeneity*: A diversity index should be homogeneous of degree zero, so that its value will depend only on the shares of the various assets.

Replication Principle: If individual *i* has *H* assets, where the share of each asset *h* (*h* = 1 to *H*) is s_{ih}, while individual *q* holds mH assets where the share of each asset *h* (*h* = 1 to *mH*) is $s_{qh} = (s_{ih}/m)$, the diversity d_q of the asset holdings of individual *q* will tend towards its maximal value as $m \rightarrow \infty$.

Upper bound: If all the assets have the same share, the diversity index will reach its maximal value.

Asset transfer principle: If a sum δ is transferred from asset *k* to asset *l*, where the shares s_k and s_l of these assets are such that $s_k > s_l$, the diversity of asset holdings will increase.

Zero asset holding independence: The diversity of asset holdings will not vary if an asset category a_r is added or subtracted from the list of assets, as long as the individual did not invest any money in this asset a_r. This assumption shows the difference between a diversity

and an equality index, because it is well known that if an individual with zero income is added to a society, income equality is assumed to decrease (income inequality is assumed to increase).

It is easy to verify that the index P_j defined previously, has the properties of symmetry, homogeneity of degree zero, asset transfer principle and zero asset holding independence. It has also an upper bound, which will be equal to the number of assets. As far as the replication principle is concerned, we observe that the diversity d_q of the asset holdings of individual q will be such that $d_q = md_i$, where d_i is the diversity of the asset holdings of individual i. Finally, it is easy to check that the upper bound of the index P_j will be equal to the number of assets.

Similarly, we can verify that the Gini-Simpson index has the properties of symmetry, homogeneity of degree zero, asset transfer principle and zero asset holding independence. As far as the replication principle is concerned, note that the Gini-Simpson index will tend towards 1, as the number of assets tends towards infinity. Similarly, when all the asset holdings are of equal size, the Gini-Simpson index will tends towards 1 as the number of assets tends towards infinity.

In our empirical investigation, when we computed the diversity of individual asset holdings at various levels of aggregation in the United States in 2007 and 2009, (in Table 2, for example) we used several indices to check the robustness of the results. Since they all pointed in the same direction, we focus on the Gini-Simpson index when looking at the determinants of diversity. Regression results based on alternative diversity indices are available in previous versions of the paper and are mentioned in the Appendix.

5. Looking at the diversity of asset holdings in 2007 and 2009

Before comparing the diversity indices defined in the previous section, we compare the distribution of assets in the two survey years.

5.1 Distribution of Assets in 2007-2009

Table 1 focuses on the distribution of the three main assets defined as: safe, fairly safe and risky financial assets and a more detailed look considers the 10 underlying categories of assets.

Table 1: Share of the various assets in 2007 and 2009 (n=3857 observations)

Type of Asset	2007	2009
All the Assets	**100%**	**100%**
Safe Assets	**8.6%**	**13.9%**
Transaction accounts (liquid assets)	7.4%	11.6%
Certificates of Deposits (CDs)	1.2%	2.2%
Fairly Safe Financial Assets	**8.6%**	**13.2%**
Savings Bonds	0.07%	0.1%
Cash Value of Life Insurance	1.3%	2.1%
Other Managed Accounts	7.1%	11.0%
Risky Assets	**82.8%**	**72.9%**
Mutual Funds	24.4%	15.0%
Stocks	36.8%	31.5%
Other Bonds	11.8%	15.6%
Quasi Liquid Pension Accounts	7.5%	7.3%
Other Financial Assets	2.3%	3.5%

Source: SCF 2007-2009

Table 1 indicates that the majority of financial assets among households are held in the form of risky assets. The rest is distributed among safe and "fairly safe" in more or less the same proportion. From 2007 to 2009, the share of assets held in risky assets decreased by about 10 percentage points. This could be due to a decline in either valuation or ownership. Table A.2, which presents ownership rates indicates that there was no significant change in ownership rates of safe, fairly safe and risky assets, which leads us to believe that valuation played a key role.

Looking at the share of various assets in more detail, by focusing on the 10 underlying assets, we observe that the increase in the share of safe assets was due to an increase in the share of assets held in transaction accounts (ownership rates did not change) and a slight increase in the share of assets held as CDs.

In terms of "fairly safe" assets, we also observe an increase in the share of assets held in life insurance and other managed accounts. There are no significant changes in ownership rates here (see, Table A.2). The share of assets held in risky assets decreased from 2007 to 2009. This refers to stocks and mutual funds, mostly. The share increased in other type of bonds and other financial assets. The ownership Table also indicates that over time there is a statistically significant drop in ownership rates in mutual funds, but not stocks. Ownership of other bonds and other financial assets also exhibits a statistically significant increase.

So overall, we do see some changes in the composition of the portfolio between 2007 and 2009. There is a drop in the share and ownership of mutual funds and in the share of stocks and an increase in the shares and ownership of other bonds and other financial assets.

5.2 Diversity of Assets in 2007-2009

In what follows (in Table 2), we measure diversity using the indices defined in section 4 and equation (7) for different values of r.[11] We compute these weighted individual diversity indices, first, separately for the safe, fairly safe and risky assets, then, by including all assets, either at the aggregated level (three types of assets) or when taking into account ten different financial assets. It then appears that diversity increased between 2007 and 2009, within assets (safe, fairly safe and risky), for all ten asset categories, as well as at the aggregated level (three categories).

[11] The correlation between the different diversity indices is shown in Tables A.7-A.9.

Table 2: Various measures of the diversity of individual asset holdings in 2007 and 2009

Type of Assets Covered and Year	Gini-Simpson Diversity Index	Index $P_{total,ind}$ in eq. (7) with $r \to 1$ ($r = 0.999$)	Index $P_{total,ind}$ in eq. (7) with $r = 2$	Index $P_{total,ind}$ in eq. (7) with $r = 10$
No. of observations	**3857**	**3857**	**3857**	**3857**
Safe Assets				
2007	0.05795 (0.05792, 0.05798)	1.11972 (1.11964, 1.11978)	1.09492 (1.09486, 1.09497)	1.07056 (1.07052, 1.0706)
2009	0.08757 (0.08752, 0.08759)	1.18044 (1.18034, 1.18049)	1.14646 (1.14639, 1.14651)	1.11114 (1.11109, 1.11118)
Fairly Safe Assets				
2007	0.058211 (0.058208, 0.058221)	1.12498 (1.12492, 1.12508)	1.09334 (1.09333, 1.09335)	1.06485 (1.06482, 1.0649)
2009	0.068831 (0.068830, 0.068840)	1.14463 (1.14458, 1.14472)	1.107605 (1.107603, 1 .107620)	1.07451 (1.0745, 1.07458)
Risky Assets				
2007	0.36935 (0.36928, 0.36938)	2.01145 (2.01118, 2.01165)	1.783271(1.783125 1.7833841)	1.5558 (1.5556, 1.5560)
2009	0.39842 (0.39834, 0.39845)	2.1615 (2.1611, 2.1617)	1.90656 (1.90640 1.90669)	1.6399 (1.6396, 1.6400)
All the Assets (Ten Categories)				
2007	0.46301 (0.46294, 0.46304)	2.5620 (2.5617, 2.5622)	2.16153 (2.16128 2.16169)	1.7927 (1.7925, 1.7928)
2009	0.49690 (0.49683, 0.49692)	2.7350 (2.7347, 2.7352)	2.29438 (2.29412 2.29452)	1.8775 (1.8773, 1.8776)
Aggregated Assets (Three Categories)				
2007	0.18791 (0.18786, 0.18795)	1.4420 (1.4419 1.4421)	1.31739 (1.31729 1.3175)	1.2239 (1.2238, 1.22406)
2009	0.23594 (0.23588, 0.23598)	1.5374 (1.5373 1.5375)	1.39968 (1.39958 1.39979)	1.2806 (1.2805, 1.2807)

Note: The number in each cell gives the value of diversity index for the corresponding type of index and year. Confidence intervals (5%-95%) based on the jackknife resampling approach are given in parentheses. They allow us to check whether changes over time or differences between types of assets are statistically significant. For example, for risky assets, the Gini Simpson index in 2007 was equal to 0.36935 and is below the lower bound of the confidence interval of this index in 2009, while the corresponding Gini-Simpson index in 2009 is equal to 0.39842 and this value is above the upper bound of the confidence interval of the Gini-

Simpson index in 2007. We may therefore conclude that there was a significant increase in the Gini –Simpson index of risky assets between 2007 and 2009.

We also take a descriptive look at the changing levels of asset diversity over 2007 and 2009 for a chosen set of specific socio-economic groups. Table 3 shows changes in diversity across wealth and income quintiles as well as race. These raw results support our hypothesis about an increasing level of asset diversity as we move up the wealth (and income) distribution. There have been no significant changes over the period apart from the top wealth (and second income) quintile, where we observe a statistically significant increase in diversity.

Table 3. Changes in asset diversity levels for selected socio-demographic categories (Gini-Simpson index).

	2007		2009		Diff		
	GS	se	GS	se			t-stat
Wealth: Q1	0.11	0.01	0.12	0.01	0.01		1.03
Wealth: Q2	0.20	0.01	0.20	0.01	0.00		-0.07
Wealth: Q3	0.26	0.01	0.27	0.01	0.00		0.36
Wealth: Q4	0.34	0.01	0.34	0.01	0.00		0.22
Wealth: Q5	0.43	0.01	0.45	0.01	0.02	***	2.65
Income: Q1	0.08	0.01	0.10	0.01	0.01		0.64
Income: Q2	0.13	0.01	0.16	0.01	0.03	*	1.91
Income: Q3	0.22	0.01	0.24	0.01	0.01		1.14
Income: Q4	0.31	0.01	0.31	0.01	0.00		-0.24
Income: Q5	0.41	0.01	0.41	0.01	0.00		-0.40
RISK1	0.27	0.02	0.26	0.02	-0.01		-0.22
RISK2	0.33	0.01	0.34	0.01	0.01		0.80
RISK3	0.33	0.01	0.34	0.01	0.01		1.13
RISK4	0.18	0.01	0.19	0.01	0.01		0.71
White	0.29	0.00	0.31	0.00	0.01	*	1.67
Black	0.19	0.01	0.17	0.01	-0.01		-0.89
Hispanic	0.14	0.01	0.15	0.01	0.01		0.81
Other	0.30	0.02	0.31	0.02	0.01		0.49
Change in investment	0.28	0.01	0.30	0.01	0.01	*	1.87
No change	0.25	0.01	0.25	0.01	0.00		0.24
Sample:							
Main (employed)	0.26	0.01	0.27	0.01	0.01		0.99
Business Owners	0.30	0.01	0.31	0.01	0.02		1.46

Older households	0.32	0.01	0.32	0.01	0.00	-0.02
Other	0.16	0.01	0.16	0.01	-0.01	-0.31

Source: SCF 2007-2009

Note: *GS* refers to the Gini-Simpson Index; *se* to the standard error; *Diff* to the difference between the Gini Simpson index in 2007 and 2009. Q1-Q5, consecutive quantiles; RISK1 Willing to take large financial risk is expecting large returns; RISK2 Willing to take above average financial risks expecting to earn above average returns; RISK3 Take average financial risks expecting to earn average returns; RISK4 Unwilling to take any financial risks.

6. Looking at individual diversity and its determinants.

Next, we focus our attention on the determinants of individual diversity, in order to understand what factors lead to greater or smaller asset diversity. When investigating the determinants of asset diversity, we pool the data for 2007 and 2009 and assume that the effect of covariates does not change over time. We also include a dummy variable for the year. We perform this for all diversity indices. Table 4 presents the results for the Gini-Simpson index, while Table A.6 in the Appendix gives the results for other diversity indices.

Explanatory factors

In trying to explain the variation in asset diversity, we focus on several explanatory factors including demographic characteristics, where we focus on age, education, children, marital status and race; monetary variables, where we focus on income and wealth; variables related to the labor market, such as labor market status and industry, as well as the willingness to take risk.

Among our *demographic variables,* we expect diversity to increase with age, along with wealth and financial literacy. Education is a good indicator of financial literacy and most likely will affect asset diversity. We observe that diversity increases with age and the increase is highest for the age group 70 years of age and older (see Table 4). As predicted, diversity also increases with the educational level of the individual and being married has a statistical significant positive effect on the measure of diversity, possibly due to greater financial sophistication among married couples. Having children has a statistically significant negative effect on the diversity of assets, albeit very small. This result could be related to increased expenses related to raising children. These demographic results are robust to the inclusion of income and wealth. The inclusion of income has a stronger effect

than that of education and that of being married. The inclusion of wealth has a strong effect on the impact of age on diversity. The oldest group is usually the wealthiest one.

In terms of our *race* variables, as is often the case, minority households, are at a disadvantage in terms of their economic well-being. As far as the diversity of financial asset holdings is concerned, we observe that both black and Hispanic headed households have statistically significantly lower asset diversity than white households. For Asian households, this is not statistically significant. The effects hold when we control for income or wealth.

As indicated before, wealthier households have a greater capacity to diversify, given their means and ability to deal with fixed costs related to owning more risky assets. Thus, we expect *monetary variables* to have a positive relationship with asset diversity. Results indicate that diversity increases with income, except for the highest income category (having over 100 000 USD), where it slightly declines. Being in the lowest two quintiles of wealth coincides with a decrease in diversity compared to the middle wealth quintiles and this is robust to the inclusion of income. In accordance, with our expectations, being in a higher wealth quantile has a positive effect on asset diversity.

Table 4: The determinants of individual diversity (Gini-Simpson index), using the pooled data for the years 2007 and 2009.

	(1)	(2)	(3)	(4)	(5)	(6)
Age 30-40	0.02*	-0.01	0.02	-0.01	-0.02*	-0.04***
	(1.91)	(-1.30)	(1.55)	(-1.26)	(-1.65)	(-3.49)
Age 40-50	0.06***	0.01	0.05***	0.01	0.00	-0.05***
	(5.74)	(0.98)	(4.66)	(0.58)	(-0.25)	(-4.75)
Age 50-60	0.07***	0.01	0.06***	0.01	-0.01	-0.07***
	(6.64)	(0.87)	(5.34)	(0.58)	(-0.61)	(-6.88)
Age 60-70	0.12***	0.07***	0.11***	0.07***	0.05***	-0.03***
	(10.90)	(6.60)	(9.38)	(6.42)	(4.19)	(-2.71)
Age 70+	0.16***	0.11***	0.13***	0.10***	0.08***	-0.01
	(13.37)	(9.48)	(11.40)	(9.23)	(6.14)	(-0.91)
High school	0.12***	0.08***	0.10***	0.06***	0.06***	0.04***
	(12.26)	(8.41)	(10.38)	(6.38)	(6.39)	(4.76)
Some University studies	0.19***	0.12***	0.17***	0.09***	0.09***	0.06***
	(17.80)	(11.10)	(15.79)	(8.31)	(8.20)	(6.18)
University degree	0.28***	0.16***	0.25***	0.13***	0.12***	0.08***
	(30.12)	(16.77)	(26.55)	(12.65)	(11.38)	(7.98)

Married	0.09***	0.02***	0.08***	0.02***	0.02***	0.00
	(16.65)	(3.74)	(14.88)	(3.06)	(2.92)	(0.75)
Kids	-0.00*	-0.00*	0.00	0.00	0.00	0.00
	(-1.69)	(-1.79)	(-0.65)	(-0.60)	(-0.78)	(-1.45)
Black			-0.10***	-0.06***	-0.05***	-0.03***
			(-10.81)	(-6.78)	(-6.29)	(-3.04)
Hispanic			-0.10***	-0.07***	-0.06***	-0.05***
			(-8.85)	(-6.42)	(-6.15)	(-5.24)
Other race			-0.02*	-0.01	-0.01	-0.01
			(-1.78)	(-0.64)	(-0.76)	(-0.76)
Employee					0.01	0.01
					(0.58)	(0.99)
Self-employed					0.05***	0.02*
					(3.27)	(1.75)
Not working					0.05***	0.03***
					(3.61)	(2.73)
Managerial					0.03***	0.02***
					(3.57)	(2.85)
Sales					0.00	0.00
					(0.49)	(0.12)
Construction					0.00	-0.01
					(-0.55)	(-1.14)
Unwilling to take risk				-0.08***	-0.08***	-0.06***
				(-12.54)	(-12.26)	(-9.42)
Willing to take large risk for large return				-0.03**	-0.03***	-0.04***
				(-2.46)	(-3.02)	(-3.33)
Willing to take above av. risk for above av. return				0.00	0.00	-0.01
				(-0.15)	(-0.72)	(-1.27)
10K<=INCOME<25K		-0.03**		-0.03**	-0.02	-0.01
		(-2.25)		(-2.02)	(-1.53)	(-0.87)
25K<=INCOME<50K		0.06***		0.05***	0.06***	0.05***
		(4.52)		(3.97)	(4.88)	(3.84)
25K<=INCOME<50K		0.13***		0.10***	0.11***	0.08***
		(9.97)		(8.21)	(9.04)	(5.99)
INCOME>100K		0.22***		0.18***	0.18***	0.10***
		(17.42)		(14.37)	(14.00)	(7.94)
Wealth Q1						-0.11***
						(-11.81)
Wealth Q2						-0.04***
						(-3.96)
Wealth Q4						0.05***
						(5.67)
Wealth Q5						0.12***
						(13.61)

Year 2009	0.01**	0.01***	0.01**	0.01***	0.01***	0.01***
	(2.25)	(3.29)	(2.36)	(3.95)	(3.82)	(5.56)
Constant	-0.05**	-0.02	0.01	0.06**	0.04	0.11***
	(-1.98)	(-0.64)	(0.25)	(2.49)	(1.48)	(3.93)
R-squared	0.23	0.3	0.24	0.32	0.33	0.37
N. of cases	7714	7714	7714	7714	7714	7714

Notes: For each explanatory variable, the first line gives the value of the regression coefficient, the second the t-value. Significance: * at 10%; ** at 5%; *** at 1%
The excluded categories are age group less than 30; education less than high school; race is white; not in the labor force; other occupations; willingness to take average risk for average expected return; income less than 10 000 USD and the third wealth quintile.

When linking *labor market factors* to asset diversity, we focus on the labor market status of the individual and include information on the industry in which he/she works. The labor market status is indicative of the risks faced by the household, and the current life-stage (this will be elaborated in more details in the subsequent section 7). The industry is indicative of the toll the Great Recession took, in particular on the construction sector (see Sierminska and Takhtamanova, 2016, for a discussion). The reference category is not being in the labor market. Our results indicate that being self-employed or retired (this category also includes disabled and others not working) has a positive and significant association with asset diversity, compared to those out of the labor force. When it comes to occupations, the same is true for those in managerial occupations compared to others. Asset diversity is highly dependent on the type of prestigious or lucrative positions associated with higher wealth and financial literacy (retired, self-employed, managers). The *risk preference* set of variables can be interpreted in two ways. On the one hand, individuals unwilling to take risk may not have high asset diversity, due to their fear of taking risk. On the other hand, in order to minimize risk, more asset diversity is desirable. Our estimation shows that in fact those unwilling to take risk have lower asset diversity than those willing to take average risk for average expected return (also see Table 4), but so do those that are willing to take large risks for a large return. This could suggest that their risk taking is bringing them losses.

In short, our findings indicate that older, wealthier, better-educated households, either retired or self-employed, have higher asset diversity.

7. Looking at the impact of various events that took place between 2007 and 2009 on individual diversity

In this section, in order to augment our understanding of individual asset diversity, we look at the impact of various events that took place between 2007 and 2009 on this measure. To this end, we regress the individual diversity index in 2009 (as outlined in equation (2)) on the same set of covariates as before, and include additional variables reflecting important household events. This includes such events as changes in marital status (got divorced or got married); having children over the course of the two years; having stopped working; and having deteriorating health. In addition, we introduce a variable that indicates whether the household made any changes in the way it managed money or investments over the course of the two years. Table 5 presents the results of such regressions for the Gini-Simpson index.

The results for the demographic variables and labor market and monetary factors are quite similar to those reported for the previous specification given in equation (1) and discussed in the previous section.[1] Let us therefore focus on reporting the results for the changes in life events, risk preferences and changes in investment patterns.

In terms of the *demographic* changes that took place between 2007 and 2009, we find that being married does not have a statistically significant effect on asset diversity, but a change in marital status does. Even though getting married does have an effect on a couple's finances, the coefficient is not statistically significant in our specification, although it is negative in all specifications. Getting divorced, on the other hand, decreased the diversity of one's financial asset holdings, a result that is likely related to the additional loss of assets following a divorce, resulting in a decreased ability to diversify assets. Having children has a negative and significant effect on asset diversity, but having a child during this period does not. Another life event that we consider is having declining health, which has a significant positive impact on asset diversity. This may be a result of several factors. Individuals with deteriorating health may be preparing themselves for higher health care costs and thus, be liquidating some of their non-financial assets and investing in financial assets. This indicator may also be indicative of very old age, where one of the spouses

[1] The results are available upon request from the authors.

passed away and there are additional funds available. We will test this in the next section when we partition the sample according to their exposure to different types of risk.

The variable describing *labor market* change does not seem to have an impact on asset diversity. Thus, a loss of one's job during the Great Recession does not seem to have an effect on asset diversity. Finally, for those that have declared an *active change* in their investment strategy over the two-year period, we observe a significant positive effect on asset diversity.

Thus, overall we find that the diversity measure depends on education, whether children are present, on race and on the labor market situation. Having experienced a life-changing situation during this time may have an effect on asset diversity. This is particularly true for those getting divorced, having deteriorating health, but not necessarily for those getting married, or those that lost their jobs. Having children is a significant determinant of the diversity index, but not necessarily, whether one had a child during this period. If the household is actively engaged in making changes in the way it manages and invests money over this two-year period, this has definitely a positive effect on asset diversity.[2]

Table 5: The determinants of individual diversity (Gini-Simpson index) in 2009, taking into account life events during 2007 and 2009.

	(1)	(2)	(3)	(4)	(5)
Got divorced		-0.06***	-0.06***	-0.04***	-0.04***
		(-4.30)	(-4.00)	(-3.01)	(-3.22)
Got married		-0.03	-0.03	-0.04	-0.03
		(-1.26)	(-1.31)	(-1.56)	(-1.39)
Stopped working		0.02	0.03	0.01	0.02
		(1.17)	(1.28)	(0.67)	(0.90)
Health became worse		0.07**	0.06**	0.07**	0.07**
		(2.42)	(2.10)	(2.56)	(2.54)
Had children		-0.01	-0.01	-0.01	-0.02
		(-0.84)	(-0.82)	(-0.94)	(-1.18)
Active change in investing			0.03***	0.03***	0.03***
			(4.56)	(4.88)	(5.02)
Unwilling to take risk	-0.09***	-0.09***	-0.08***	-0.06***	
	(-9.57)	(-8.97)	(-8.58)	(-6.91)	

[2] Table 3 indicates that asset diversity increased for those that are actively engaged in changing their investment patterns.

Willing to take large risk for large expected return	-0.05*** (-3.06)	-0.05*** (-2.86)	-0.05*** (-3.37)	-0.05*** (-3.50)	
Willing to take above av. risk for above av. return	-0.01 (-1.03)	-0.01 (-1.14)	-0.01 (-1.64)	-0.02** (-1.98)	
Demographic controls	Yes	Yes	Yes	Yes	Yes
Income controls	Yes	Yes	Yes	Yes	Yes
Wealth controls	No	No	No	Yes	Yes
R-squared	0.32	0.32	0.34	0.38	0.37
N. of cases	3857	3857	3857	3857	3857

Source: SCF 2007, 2009;
Note:* p<0.1, ** p<0.05, *** p<0.01. Standard errors in parentheses.

Active changes in investment and money management

In this section, we further study the impact of changing investment patterns due to life circumstances by examining how the change in investment strategies differs in its effect for families that experienced the above-mentioned changes in life-events and whether it had any effect on the change in asset diversity.

To help isolate the different background risks that households are facing, we split the sample accordingly. We identify three groups, first those that are in their working years, where the employed head (or the one in the labor force) is between 25 to 61 years old; those that are close to retirement or retired (head over 62 years old and not a business owner) and business owners (many are located at the top of the distribution). Kennickell and Lusardi in their 2005 study argue that the populations mentioned previously face different kinds of risk. Employed people are more likely to face unemployment risk (income), while for the older population health and longevity risk, as well as other risks (e.g. consumption risk) play a more substantial role. Business owners face yet a different set of risks and they do not only build wealth to create a buffer that insures against shocks. Business owners are different in a few other respects. They may self-select into self-employment because of their risk tolerance or their perceptions of risk. They are also less likely to have pensions or retire at the typical retirement age.

Table 6 presents the coefficients of the regression variables for the three samples: employed, business owners and older households.[3] The results confirm that the samples

[3] We have excluded the remaining part of the sample, which amounts to 343 observations.

face different types of risk. Table 3 indicates that asset diversity for these three samples also differs. The highest is for the older sample (.32 in 2007 and 2009), followed by business owners (.30 and .31 in 2007 and 2009, respectively) and the employed sample (.27 in 2007 and 2009). There are no significant changes observed between 2007 and 2009.

The results also indicate that the change of the investment strategy variable has a significant impact on asset diversity in all three groups, except for older households, suggesting that this group is less likely to react to market changes. If households change their strategies, this has a positive effect on the outcome variable. The willingness to take risk has a similar impact for all three samples as seen before.

In terms of life events, we find divorce to have the understandable negative effect for the main sample of employed individuals, and in one specification for older households. It does not seem to have an impact on asset diversity of business owners. This may be because business owners need to save individually for their pension and retirement, and this is not affected by divorce significantly. Getting married on the other hand, does have a negative effect on the asset diversity of business owners (and employed households), perhaps suggesting some type of consolidation of assets. For older households getting married has a positive effect on asset diversity. Deteriorating health has a positive effect on asset diversity for business owners, which could imply that they actively change their portfolio to finance health care or to prepare their bequest.

In the next specification, we introduce interactions between life events and the change in the investment strategy variable. The negative effect of divorce remains for the employed, but not that of getting married. In addition, we find that if a person lost his/her job and actively managed his/her investment, this would result in a positive impact on asset diversity. There are no statistically significant effects for the older sample, once the interaction terms are included. The negative effect of getting married remains for business owners, and we find that for business owners having a child and actively managing one's portfolio would result in lower diversity, most likely due to financial adjustments that are necessary when a child is born.

Thus, we find that although overall an active change in investing has a positive effect on asset diversity, this is not the case for older households (most likely due to an already high level of asset diversity). In terms of life events, divorce and health are significant factors in this scenario, although not for business owners. Deteriorating health also has a significant impact on asset diversity, particularly among business owners. For those that become unemployed and actively manage their portfolio, this can have a positive impact on asset diversity. These findings indicate that certain life events, as well as, playing an active role in money management, may affect asset diversity.

Table 6: The determinants of individual diversity (Gini-Simpson index) in 2009 based on life events during 2007 and 2009 for three sub-samples.

	Employed		Business Owners		Older Households	
	(1)	(2)	(1)	(2)	(1)	(2)
Got divorced	-0.04*	-0.05*	-0,03	-0,02	-0.06*	-0,05
	(-1.93)	(-1.70)	(-0.96)	(-0.63)	(-1.66)	(-0.98)
Got married	-0.06**	-0,02	-0.14*	-0.20*	0.16**	0,12
	(-2.20)	(-0.51)	(-1.70)	(-1.71)	(2,36)	(1,12)
Stopped working	0,01	-0,03	0,01	0,01	0,03	-0,09
	(0,32)	(-0.94)	(0,29)	(0,12)	(0,58)	(-0.93)
Health became worse	0,05	0,04	0.11*	0.11*	0,05	0,05
	(1,22)	(1,15)	(1,89)	(1,90)	(0,41)	(0,39)
Had children	-0,02	-0,03	-0,05	-0,01	-0,02	-0,04
	(-0.77)	(-0.84)	(-1.36)	(-0.21)	(-0.42)	(-0.74)
Got divorced *change_invest		0,02		-0,03		-0,01
		(0,49)		(-0.54)		(-0.21)
Got married* change_invest		-0,07		0,12		0,07
		(-1.28)		(0,70)		(0,55)
Stopped working*change_invest		0.09*		0,01		0,17
		(1,68)		(0,16)		(1,46)
Had children*change_invest		0,02		-0.15*		0,05
		(0,39)		(-1.86)		(0,60)
change_invest	0.03***	0.03***	0.04***	0.05***	0,01	0,01
	(3,41)	(2,81)	(2,98)	(3,12)	(0,74)	(0,38)
Unwilling to take risk	-0.04***	-0.04***	-0.11***	-0.11***	-0.07**	-0.07**
	(-3.19)	(-3.13)	(-5.95)	(-6.00)	(-2.46)	(-2.39)
Willing to take large risk	-0.05**	-0.06**	-0.07**	-0.07**	-0.06**	-0.06**
for large expected return	(-2.28)	(-2.37)	(-2.20)	(-2.18)	(-2.18)	(-2.18)
Willing to take above av.	-0,01	-0,01	-0,03	-0,03	-0,02	-0,02
risk for above av. return	(-0.99)	(-0.97)	(-1.41)	(-1.42)	(-1.12)	(-1.10)

Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Income and Wealth controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0,30	0,30	0,38	0,39	0,35	0,35
N. of cases	1817	1817	1028	1028	669	669

Source: SCF 2007, 2009
Note: * p<0.1, ** p<0.05, *** p<0.01

8. Conclusions

In this paper, we define several indices of diversity of individual financial asset holdings, discuss their properties and identify their determinants.

Since household decisions in the area of investment deviate considerably from the predictions of theory, measuring asset diversity could help in assessing the vulnerability of portfolios. Our asset diversity indices can complement other measures used in household finance, by capturing the fact that people are holding few assets and have lower asset diversity or conversely, are holding numerous assets and have higher asset diversity. Integrating these indices in future research, could help determine to what extent asset diversity helps "weather the economic storm" for households.

In this paper, we focus on financial asset to measure diversity. We show that even though the share of financial assets held in risky assets decreased and the share held in safe and fairly safe assets increased between 2007 and 2009 due to changes in the valuation of assets and changes in ownership, asset diversity increased in all specifications over this time. We show this for safe, fairly safe and risky assets. The larger the number of assets, the larger the magnitude of the diversity measure.

The diversity of financial asset holdings increases with age, the educational level of the individual and income. Having children has a negative effect on diversity, which is in-line with stylized facts coming from the household portfolio literature, as single households without children are more likely to own risky assets, given that they are less risk averse than families with children. Diversity at the bottom of the wealth distribution is lower than at the top, and this is explained by a positive relationship between asset ownership and net wealth. In the top quintile of the distribution, diversity decreases.

A change in diversity is statistically significantly related to education, the presence of children, race, and the labor market situation. Life changing situations such as getting divorced, or losing one's job have a statistically significant negative effect on changes in diversity, while getting married or having deteriorating health have a positive effect.

We show that playing an active role in money management during the time of crisis has a significant impact on asset diversity. Households that actively reacted to the events in 2007 and 2009 by making changes in their investments increased the diversity of their financial assets. This was not the case for older households, most likely due to an already high level of asset diversity. In addition, important life events, such as, divorce or getting married significantly impacted asset diversity. Deteriorating health also has a significant impact on asset diversity, particularly for business owners that need to manage their own health insurance. Becoming unemployed and actively managing portfolios can have a positive impact on asset diversity. These findings indicate that certain life events, as well as playing an active role in money management, may affect asset diversity.

In terms of policy implications, our findings indicate that households with higher risk aversion and low wealth have lower asset diversity. This should remind wealth management practitioners and regulators to emphasize the importance of balancing portfolios with different asset classes in order to reduce the economic vulnerability of households and increase their financial wealth holdings. Future research will explore the role of asset diversity in ensuring economic well-being among households and whether *ceteris paribus*, low asset diversity or rather high asset diversity households had better outcomes when it comes to dealing with the Great Financial Crisis.

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APPENDIX

Table A.1 Changes in socio-demographic variables between 2007 and 2009.

	2007	2009	difference
Age	51.65	53.72	-2.07***
education	14.07	14.08	-0.01
less than high school	0.09	0.09	0
high school	0.26	0.25	0
some college	0.16	0.16	0
college	0.49	0.49	0
married	0.69	0.63	0.05***
children (0/1)	0.88	0.84	0.03
Labor force status:			
employee	0.52	0.46	0.06***
self-employed	0.24	0.25	0
not working	0.2	0.23	-0.03***
out of labor force	0.04	0.06	-0.02***
Occupation			
Managerial	0.41	0.41	0
Sales	0.19	0.16	0.02***
Other occupation	0.16	0.14	0.03***
Construction	0.19	0.16	0.03***
Willing to take large risk for large expected return	0.05	0.05	0.01
Willing to take above av. risk for above av. return	0.22	0.16	0.06***
Willing to take average risk for average return	0.42	0.44	-0.02
Unwilling to take risk	0.3	0.36	-0.06***
Health of household head	1.9	1.89	0.01
Health of household spouse	1.2	1.2	0.01

Source: SCF 2007, 2009
Note: * p<0.1, ** p<0.05, *** p<0.01; Not working includes retired/disabled or students/homemaker/misc not working and 65 and older. Out of labor force refers to those not working under 65 and out of the labor force.

Table A.2. Changes in ownership rates of financial assets between 2007 and 2009.

	2007	2009	Difference
Safe Assets:	94.6	94.5	0.001
Transaction Accounts	94.6	94.4	0.002
CDs	18.7	20.3	-0.017*
Fairly Safe Financial Assets:	43.5	43	0.004
Savings Bonds	16.1	15.5	0.006
Cach value of life insurance	30.1	30.3	-0.002
Other managed accounts	9.7	9.7	0.000
Risky Assets:	74.5	74.3	0.003
Mutual Funds	23	21.1	0.018*
Stocks	32.1	31.7	0.004
Other bonds	8.1	11.4	-0.033***
Quasi Liquid Pension Accounts	65.4	65.3	0.001
Other Financial Assets	13.2	15.4	-0.022***

Source: SCF 2007-2009.
Note: * p<0.1, ** p<0.05, *** p<0.01 for the differences in ownership 2007-2009

Table A.3. Changes in ownership rates of financial assets between 2007 and 2009, by wealth quintile (n=3857).

	2007					2009					Diff (2009=2007)				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Financial Assets	78	95	99	100	100	83	95	99	100	100	5,0 ***	0,0	0,0	0,0 *	0,0
Transaction Accounts	74	91	98	99	100	78	92	97	99	100	4,0 ***	1,0	-1,0 *	0,0 **	0,0
CDs	2	6	13	22	29	2	6	14	28	33	0,0	0,0	1,0	6,0 ***	4,0 ***
Mutual Funds	1	2	6	16	45	1	3	8	13	44	0,0	1,0 ***	2,0 **	-3,0 ***	-1,0
Stocks	4	8	12	23	59	4	10	15	24	60	0,0	2,0 ***	3,0 ***	1,0	1,0
Other Bonds	0	0	0	1	18	0	1	1	2	27	0,0 ***	1,0 ***	1,0 **	1,0 ***	9,0 ***
Quai Liquid Pension Accounts	20	44	60	74	86	24	47	65	78	86	4,0 ***	3,0 **	5,0 ***	4,0 ***	0,0
Saving Bonds	5	9	16	22	20	5	8	15	26	20	0,0	-1,0	-1,0	4,0 ***	0,0
Cash Value of Life Insurance	8	15	22	34	43	9	15	27	36	44	1,0	0,0	5,0 ***	2,0	1,0
Other Managed Accounts	0	1	3	8	18	1	1	4	8	19	1,0	0,0	1,0	0,0	1,0 *
Other Financial Assets	7	10	9	8	19	8	13	10	10	23	1,0 **	3,0 ***	1,0	2,0 **	4,0 ***

Source: SCF 2007-2009.
Note: The table shows the share of households owning a particular asset by wealth quintile and whether the changes over 2007 and 2009 are statistically significantly different over time. *Diff* - the change between 2009 and 2007.
* p<0.1, ** p<0.05, *** p<0.01

Table A.4 Changes in portfolio shares between 2007 and 2009, by wealth quintile (n=3857).

	2007						2009						Diff					
	All	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5
Financial Assets	100	100	100	100	100	100	100	100	100	100	100	100						
Transaction Accounts	7.4	36.1	27.4	19.2	13.8	7.3	11.7	20.4	21.6	18.1	13.9	11.6	-4.3	15.7	5.8	1.1	-0.1	-4.3
CDs	1.2	0.6	3.4	5.5	5.4	1.2	2.2	2.2	3.6	5.9	7.2	2.2	-1	-1.6	-0.2	-0.4	-1.8	-1
Mutual Funds	24.6	0.8	1.5	2.6	6.2	24.7	14.9	5.7	2.4	2.9	4.5	15	9.7	-4.9	-0.9	-0.3	1.7	9.7
Stocks	36.8	4	4.7	3.8	4.8	37	31.5	14	4.7	3.7	4.7	31.7	5.3	-10	0	0.1	0.1	5.3
Other Bonds	11.8	0.1	0	0.1	0.2	11.9	15.6	0	0	0.2	0.2	15.7	-3.8	0.1	0	-0.1	0	-3.8
Quai Liquid Pension Accounts	7.5	42.7	50.8	56.4	55.8	7.2	7.3	36.4	51.5	57.2	58.4	6.9	0.2	6.3	-0.7	-0.8	-2.6	0.3
Saving Bonds	0.1	1.3	0.8	1.1	1	0.1	0.1	0.4	0.6	0.6	0.8	0.1	0	0.9	0.2	0.5	0.2	0
Cash Value of Life Insurance	1.3	7.2	6.1	6	5.9	1.3	2.1	2.9	5.6	6	4.6	2.1	-0.8	4.3	0.5	0	1.3	-0.8
Other Managed Accounts	7	0.6	0.9	2.2	4.9	7	11.1	3.7	2.6	2.5	3.7	11.1	-4.1	-3.1	-1.7	-0.3	1.2	-4.1
Other Financial Assets	2.3	6.7	4.3	3.3	2	2.3	3.5	14.2	7.3	3	2.1	3.5	-1.2	-7.5	-3	0.3	-0.1	-1.2

Source: SCF 2007-2009.
Note:The table shows the asset shares out of total financial assets by wealth quintile. *Diff* - the change between 2009 and 2007.
* p<0.1, ** p<0.05, *** p<0.01

Table A.5 Changes in portfolio values between 2007 and 2009, by quintile in USD (mean (top panel) and median (bottom panel)) (n=3857).

	2007						2009						Diff					
Mean	All	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5
Financial Assets	5,015,565	3,238	13,115	45,845	133,054	11,625,577	4,012,210	7,603	17,844	52,724	141,986	10,070,096	-1,003,355 ***	4,365 ***	4,729 ***	6,879 ***	8,932 ***	-1,555,481 **
Transaction Accounts	369,481	1,168	3,598	8,784	18,328	850,645	467,650	1,550	3,846	9,522	19,760	1,170,443	98,169 *	382 ***	248	738 *	1,432 *	319,798 **
CDs	60,818	19	451	2,516	7,155	138,397	89,595	171	648	3,094	10,218	221,614	28,777 ***	152 ***	197 ***	578 **	3,063 ***	83,217 ***
Mutual Funds	1,235,009	26	196	1,177	8,202	2,875,355	599,774	434	426	1,523	6,372	1,513,999	-635,235 ***	408 ***	230 **	346 *	-1,830 **	-1,361,356 ***
Stocks	1,844,536	129	621	1,759	6,420	4,296,273	1,262,428	1,066	845	1,945	6,634	3,189,504	-582,108 ***	937 **	224	186	214	-1,106,769 ***
Other Bonds	591,660	3	0	44	297	1,378,923	626,011	0	9	92	340	1,583,346	34,351	-3 ***	9 ***	48	43 ***	204,423
Quasi Liquid Pension Accts	376,836	1,382	6,667	25,837	74,245	842,518	294,270	2,770	9,197	30,167	82,962	699,732	-82,566 ***	1,388 ***	2,530 ***	4,330 ***	8,717	-142,786 ***
Saving Bonds	3,338	41	109	496	1,336	7,124	5,544	27	111	299	1,067	13,488	2,206 ***	-14 **	2	-197 **	-269	6,364 ***
Cash Value of Life Ins.	67,293	234	795	2,736	7,854	152,998	83,943	221	992	3,188	6,461	208,451	16,650 *	-13	197 **	452	-1,393 **	55,453 **
Other Managed Accounts	352,392	18	114	1,003	6,505	818,811	443,796	283	470	1,298	5,192	1,119,999	91,404	265 **	356 ***	295	-1,313 *	301,188 **
Other Financial Assets	114,202	216	563	1,494	2,713	264,534	139,198	1,080	1,300	1,596	2,980	349,520	24,996	864 *	737 **	102	267	84,986 **

Median	2007	Q1	Q2	Q3	Q4	Q5	2009	Q1	Q2	Q3	Q4	Q5	All	Q1	Q2	Q3	Q4	Q5
Financial Assets	93,100	590	6,214	32,104	115,469	1,214,756	86,340	800	8,680	40,000	132,000	1,160,500	-6,760	210	2,466	7,896	16,531	-54,256
Transaction Accounts	8,595	217	1,243	3,625	8,492	69,385	8,000	300	1,580	4,000	10,470	95,000	-595	83	337	375	1,978	25,615
CDs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutual Funds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stocks	0	0	0	0	0	25,890	0	0	0	0	0	25,000	0	0	0	0	0	-890
Other Bonds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quasi Liquid Pension Accts	22,783	0	0	8,285	46,602	279,611	22,000	0	0	13,000	59,000	270,000	-783	0	0	4,715	12,398	-9,611
Saving Bonds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash Value of Life Ins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Managed Accounts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Financial Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: SCF 2007-2009.
Note: The table shows asset values in USD by wealth quintile. *Diff* - the change between 2009 and 2007.

Table A.6 The determinants of individual diversity (index P_(total,ind) in eq. (7), with the parameter r) (merged data for the years 2007-2009).

	r=2						r=10					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Age 30-40	0.07*	-0.04	-0.04	-0.07*	-0.06	-0.12***	0.03	-0.04	-0.04	-0.05*	-0.05*	-0.08***
	(-1.80)	(-0.94)	(-1.05)	(-1.80)	(-1.51)	(-2.97)	(-1.05)	(-1.23)	(-1.32)	(-1.82)	(-1.72)	(-2.76)
Age 40-50	0.22***	0.06	0.04	-0.10***	0,00	-0.15***	0.13***	0.02	0.01	-0.07***	-0.02	-0.10***
	(-5.69)	(-1.53)	(-0.97)	(-2.70)	(-0.00)	(-3.87)	(-4.38)	(-0.77)	(-0.32)	(-2.62)	(-0.56)	(-3.60)
Age 50-60	0.28***	0.08**	0.06	-0.17***	0,00	-0.21***	0.15***	0.02	0.01	-0.13***	-0.03	-0.16***
	(-7.23)	(-2.15)	(-1.50)	(-4.39)	(-0.07)	(-5.44)	(-5.21)	(-0.71)	(-0.19)	(-4.64)	(-1.11)	(-5.56)
Age 60-70	0.45***	0.28***	0.25***	-0.06	0.16***	-0.10**	0.26***	0.16***	0.14***	-0.05*	0.08**	-0.08**
	(-11.14)	(-7.27)	(-6.40)	(-1.40)	(-3.84)	(-2.30)	(-9.01)	(-5.52)	(-4.81)	(-1.75)	(-2.51)	(-2.55)
Age 70+	0.59***	0.43***	0.39***	0.04	0.28***	-0.01	0.36***	0.26***	0.23***	0.01	0.16***	-0.02
	(-14.31)	(-10.75)	(-9.53)	(-0.94)	(-6.06)	(-0.21)	(-11.89)	(-8.63)	(-7.63)	(-0.40)	(-4.60)	(-0.59)
High school	0.38***	0.26***	0.22***	0.23***	0.22***	0.16***	0.22***	0.14***	0.12***	0.12***	0.12***	0.08***
	(-11.01)	(-7.57)	(-6.46)	(-6.97)	(-6.47)	(-4.81)	(-8.51)	(-5.63)	(-4.74)	(-4.97)	(-4.75)	(-3.34)
Some Uni	0.62***	0.39***	0.36***	0.35***	0.35***	0.26***	0.36***	0.22***	0.20***	0.20***	0.20***	0.14***
	(-16.41)	(-10.42)	(-9.39)	(-9.83)	(-9.21)	(-6.94)	(-13.22)	(-8.09)	(-7.26)	(-7.37)	(-7.13)	(-5.15)
University	0.90***	0.54***	0.50***	0.47***	0.45***	0.31***	0.56***	0.33***	0.30***	0.27***	0.27***	0.18***
	(-27.61)	(-15.6)	(-14.05)	(-13.93)	(-12.50)	(-8.64)	(-23.13)	(-12.68)	(-11.43)	(-10.94)	(-10.15)	(-6.76)
Married	0.30***	0.08***	0.07***	0.09***	0.06***	0.02	0.18***	0.04**	0.03*	0.04***	0.03*	0,00
	(-15.29)	(-3.84)	(-3.26)	(-4.77)	(-3.01)	(-0.96)	(-12.22)	(-2.43)	(-1.96)	(-3.04)	(-1.67)	(-0.06)
Kids	-0.01	-0.01*	-0.01	-0.02**	-0.01	-0.01*	-0.01	-0.01	0,00	-0.01**	-0.01	-0.01
	(-1.45)	(-1.65)	(-0.89)	(-2.39)	(-1.12)	(-1.75)	(-1.13)	(-1.35)	(-0.74)	(-2.09)	(-0.99)	(-1.60)
Black			-0.25***		-0.23***	-0.13***			-0.15***		-0.14***	-0.08***
			(-8.08)		(-7.46)	(-4.37)			(-6.50)		(-5.93)	(-3.40)
Hispanic			-0.23***		-0.22***	-0.17***			-0.14***		-0.13***	-0.10***
			(-6.24)		(-5.89)	(-4.87)			(-4.96)		(-4.61)	(-3.76)
Other race			-0.04		-0.04	-0.03			-0.03		-0.03	-0.03
			(-0.81)		(-0.89)	(-0.73)			(-0.99)		(-1.02)	(-0.84)
Employee					0.01	0.04					0	0.02
					(-0.27)	(-0.77)					(-0.08)	(-0.50)
Self-employed					0.20***	0.12**					0.14***	0.09**
					(-3.87)	(-2.38)					(-3.54)	(-2.31)
Not working					0.18***	0.15***					0.10***	0.08**
					(-3.86)	(-3.15)					(-2.91)	(-2.34)
Managerial					0.12***	0.09***					0.07***	0.05**
					(-3.88)	(-3.00)					(-2.82)	(-1.97)
Sales					0.02	0.01					0,00	-0.01
					(-0.52)	(-0.17)					(-0.03)	(-0.40)
Construction					-0.02	-0.03					-0.02	-0.03
					(-0.65)	(-1.27)					(-1.04)	(-1.54)

10K<=INCOME<25K		-0.05	-0.05		-0.02	0.02		-0.06*	-0.06*		-0.04	-0.01
		(-1.13)	(-1.13)		(-0.45)	(-0.41)		(-1.80)	(-1.81)		(-1.14)	(-0.27)
25K<=INCOME<50K		0.23***	0.22***		0.27***	0.23***		0.10***	0.10***		0.14***	0.12***
		(-5.14)	(-4.90)		(-6.11)	(-5.30)		(-3.20)	(-2.98)		(-4.17)	(-3.66)
25K<=INCOME<50K		0.39***	0.36***		0.42***	0.29***		0.20***	0.19***		0.23***	0.15***
		(-8.75)	(-8.14)		(-9.28)	(-6.43)		(-6.14)	(-5.63)		(-6.78)	(-4.57)
INCOME>100K		0.73***	0.69***		0.68***	0.40***		0.44***	0.41***		0.41***	0.23***
		(-16.13)	(-15.20)		(-14.75)	(-8.48)		(-13.08)	(-12.30)		(-11.98)	(-6.61)
Wealth Q1				-0.44***		-0.34***				-0.23***		-0.17***
				(-13.14)		(-9.83)				(-9.36)		(-6.81)
Wealth Q2				-0.14***		-0.09***				-0.08***		-0.05*
				(-4.30)		(-2.68)				(-3.26)		(-1.92)
Wealth Q4				0.21***		0.16***				0.14***		0.11***
				-6.43		(-5.01)				"(-5.99)		(-4.77)
Wealth Q5				0.60***		0.45***				0.41***		0.31***
				-20.61		(-14.08)				(-19.15)		(-13.06)
year	0.03***	0.03***	0.03***	0.05***	0.03***	0.05***	0.02***	0.02***	0.02***	0.03***	0.02***	0.03***
	(-2.96)	(-3.93)	(-3.96)	(-5.82)	(-3.86)	(-5.68)	(-2.93)	(-3.74)	(-3.76)	(-5.31)	(-3.62)	(-5.11)
Constant	1.03***	0.65***	0.76***	1.04***	0.67***	0.79***	1.08***	0.87***	0.93***	1.06***	0.89***	0.93***
	(-11.76)	(-6.99)	(-8.07)	(-12.21)	(-6.59)	(-7.73)	(-16.69)	(-12.54)	(-13.37)	(-16.61)	(-11.79)	(-12.22)
R-squared	0.21	0.27	0.27	0.31	0.29	0.32	0.16	0.21	0.21	0.24	0.22	0.25
N. of cases	7714	7714	7714	7714	7714	7714	7714	7714	7714	7714	7714	7714

Source: SCF 2007-2009.Note: * p<0.1, ** p<0.05, *** p<0.01
Note: excluded categories are age less than 30; education less than high school; race-white; out of the labor force; other occupations

Table A7. Correlations between individual diversities in 2007 and their values in 2009.[1]

Diversity index used	Ten Assets	Three Aggregated Assets
Gini-Simpson Diversity Index	0.513	0.543
Diversity Index defined as inverse of generalized mean with $r = 2$	0.613	0.493
Diversity Index defined as inverse of generalized mean with $r = 10$	0.529	0.401

Table A8. Correlations between the individual diversity indices in a given year (separately for 2007 and 2009) in the case of ten assets.

Indices compared	2007	2009
Gini-Simpson and Diversity Index defined as inverse of generalized mean with $r = 2$	0.503	0.485
Gini-Simpson and Diversity Index defined as inverse of generalized mean with $r = 10$	0.365	0.356
Diversity Index defined as inverse of generalized mean with $r = 2$ and Diversity Index defined as inverse of generalized mean with $r = 10$	0.968	0.970

Table A9. Correlations between individual diversity indices in a given year (done separately for 2007 and 2009) in the case of three aggregated assets.

Indices compared	2007	2009
Gini-Simpson and Diversity Index defined as inverse of generalized mean with $r = 2$	0.758	0.758
Gini-Simpson and Diversity Index defined as inverse of generalized mean with $r = 10$	0.568	0.575
Diversity Index defined as inverse of generalized mean with $r = 2$ and Diversity Index defined as inverse of generalized mean with $r = 10$	0.952	0.954

[1] The correlation could not be computed in the case where $r \to 1$.