

Does Wealth Change the Way You Think?

Risk tolerance, tangible assets, and risk
management: observations for prosperous
families and their advisors*

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Overview

“Let me tell you about the very rich. They are different from you and me,” wrote F. Scott Fitzgerald. (“Yes,” commented his friend Ernest Hemingway, “they have more money.”) Fitzgerald’s point was that great wealth tends to give rich people distinctive attitudes toward life that people with considerably less money don’t share.

To advise more effectively, financial advisors to the rich seek to develop a profound understanding of their clients’ attitudes toward money and life. But there is so much more than the amount of a client’s assets that can affect his or her attitudes, goals, and tolerance for risk.

It’s also apparent from both academic research and financial advisors’ work with clients that the higher-net-worth cohorts tend to view wealth as more than just a tally of liquid assets, which are only one element of an individual’s – or family’s – total net worth. Nobel laureate labor economist Gary Becker analyzed the economic value of human capital, defining it as: “activities that influence future real income through the imbedding of resources in people” (Becker, 1962).¹ John Heaton and Deborah Lucas, studying the portfolio allocations of investors who own businesses, estimated that 48% of household wealth is human capital, while only 6.8% is in financial assets (Heaton and Lucas, 2000). Amit and Lichtenstein (2011), in their single-family office survey of offices serving families with an average of more than \$300 million in net assets, found that approximately one-third of a family’s wealth remained in privately owned operating businesses.

For business owners, the business(es) represent(s) potential liquidation or sale value as well as a set of cash flows, along with both systematic and idiosyncratic risks. Furthermore, looking at family finances through a multi-generational lens implies that the human-capital investment and earnings potential of younger-generation family members should be part of the “total balance sheet” as well. Of course, other tangible or durable assets including lifestyle assets could be considered to be part of the balance sheet (Geczy and Kitching, 2008).

¹ In a 1994 revision of his 1962 definition of human capital, Becker further specified the output from the investment in human capital to include psychic as well as monetary income, based on the assumption that people can derive emotional utility (i.e., happiness) from productive activity even when it doesn’t result in real income. Measuring such utility presents a challenge, of course.

The inclusion of important assets, such as human capital, and the systematic and idiosyncratic risks of closely held businesses can influence an advisor's judgment regarding optimal asset allocation. David Blanchett and Philip Straehl, in a white paper for *Morningstar*, modeled optimal portfolio allocations for hypothetical investors in ten industry-specific forms of human capital, as well as an optimal allocation with no human capital component. They found that the average difference between human-capital-inclusive portfolios and the non-total wealth portfolio was 37.6% of value due to human capital. (In the analysis, they assumed that human capital was 80% of total wealth for the human-capital-inclusive investors, which may differ from the ratio of ultra-high-net-worth asset owners.) (Blanchett and Straehl, 2014)

For advisors, it's useful to think of the holistic inventory of family assets, inclusive of human capital (which can sometimes be thought of as "contingent assets" or cash flows) and sources of financial risk (which can sometimes be thought of as "contingent liabilities"), as a family's total balance sheet. Consideration of the broader balance sheet includes recognizing that net worth and portfolio allocation is not only affected by human capital and non-financial income and assets, but that the investor's risk tolerance, a necessary input to the portfolio allocation decision, is dynamic.

Insights from psychology and behavioral finance have illuminated some of the differences in historical and expected aggregate behavior caused or influenced by lifetime financial experiences – including making and possibly losing significant wealth – and how external influences and events can change attitudes and behavior over time. One of the more important characteristics of an individual's personality is risk tolerance. As is well known, it affects investment behavior. But risk tolerance also affects other life activities that influence financial goals and outcomes, as well as utility derived from work, leisure, personal relationships, and happiness generally.

For a financial advisor, the evaluation of a client's risk tolerance or preferences is not only practically important, it is also often an explicit professional requirement. Brokers must determine if an investment is suitable for a client (FINRA Rule 2111(a)):

A member or an associated person must have a reasonable basis to believe that a recommended transaction or investment strategy involving a security or securities is suitable for the customer, based on the information obtained through the reasonable diligence of the member or associated person to ascertain the customer's investment profile. A customer's investment profile includes, but is not limited to, the customer's age, other investments, financial situation and needs, tax status, investment objectives, investment experience, investment time horizon, liquidity needs, **risk tolerance**, and any other information the customer may disclose to the member or associated person in connection with such recommendation.² [Emphasis added.]

Certified Financial Planners are required to "know the client." CFP Board/Financial Planning Association Rules of Conduct reference suitability as implying the confirmation of an investment's utility to meet the client's goals within the context of the client's personality. From CFP Board practice standards: "... the practitioner will need to explore the client's values, attitudes, expectations, time horizons as they affect client's goals ..." Although financial risk tolerance is not specifically mentioned, it may be inferred it should be considered when assessing the client's attitudes.

² FINRA Rule 2111(a), at <https://www.finra.org/rules-guidance/rulebooks/finra-rules/2111>

For Chartered Financial Analysts, the CFA Institute's Standard III(C) Suitability requires they "[m]ake a reasonable inquiry into investment experience, risk and return objectives and financial constraints" as well as "[j]udge the suitability of investments in the context of the client's total portfolio." Specifically, regarding risk tolerance, the Standard continues.

Understanding the client's risk profile

One of the most important factors to be considered in matching appropriateness and suitability of an investment with a client's needs and circumstances is measuring that client's tolerance for risk.

The investment professional must consider the possibilities of rapidly changing investment environments and their likely impact on a client's holdings, both individual securities and the collective portfolio. The risk of many investment strategies can and should be analyzed and quantified in advance.³

Moreover, the CFA Candidate Body of Knowledge references "cautious," "sensible," "confident," and "individualist" as personality characteristics related to risk tolerance.⁴ The instructional "Refresher Reading" for CFA Level III candidates specifies how an advisor's knowledge of a client's personality characteristics can improve financial outcomes:

In recent decades, financial service professionals and researchers have been attempting to classify investors by their psychographic characteristics – in other words, by personality, values, attitudes, and interests – rather than classifying simply based on demographic characteristics. Psychographic classifications are particularly relevant with regard to individual strategy and risk tolerance. An investor's background, past experiences, and attitudes can play a significant role in decisions made during the asset allocation process. If investors fitting specific psychographic profiles are more likely to exhibit specific investor biases, then practitioners can attempt to recognize the relevant behavioral tendencies before investment decisions are made. It is important to note that because psychology is involved, no exact diagnosis can be made of any individual or situation. Although there are limitations to this type of analysis, if financial market participants can gain an understanding of their behavioral tendencies, the result is likely to be better investment outcomes.⁵

³ CFA Standards of Practice Guidance (2014) at <https://www.cfainstitute.org/en/ethics-standards/codes/standards-of-practice-guidance/standards-of-practice-III-C#understanding>.

⁴ "Portfolio Management: Behavioral Finance and Investment Processes," 2021 CFA Program - Level III - Reading 8, by Michael M. Pompian, Colin McLean, and Alistair Byrne, Charlottesville, VA: CFA Institute, p. 4

⁵ *Ibid.*, p. 2.

“Personality typing” is now a familiar concept in psychology.

How does an advisor evaluate a client’s personality? “Personality typing” is now a familiar concept in psychology. “The Big Five” model of personality typing, also known as the five-factor model (FFM) as named and refined by Lewis Goldberg, Paul Costa, and Robert McCrae (Goldberg 1981, 1989, 1990; Costa & McCrae, 1989, 2003), is the most widely accepted personality theory used by psychologists today: “seemingly ubiquitous” (John, 2008) and “the dominant paradigm in personality research” (Joshanloo, 2018). The theory identifies *openness to experience* (curious vs. cautious), *conscientiousness* (organized vs. careless), *extraversion* (outgoing vs. reserved), *agreeableness* (friendly vs. callous), and *neuroticism* (nervous vs. resilient) – five factors with the first letter of each forming the acronym OCEAN – as the most important traits comprising personality. Adding *agency* (preference for aggressiveness vs. passivity) in the “Midi” version of the Big-Five adds a letter as OCEANA. There is a vast literature on the FFM but comparatively little work relating these personality traits with specifically investment-oriented decision-making.

To narrow the gap in understanding between psychologists analyzing personality in terms of the OCEANA model (see Midi, above) and economists analyzing investment behavior in light of the investor’s personality, the Wharton School in conjunction with Chubb Personal Risk Services conducted a survey to gain a better understanding of the perception of risk, the emotional relationship to it, and how decisions are made about risk. Both high-net-worth (HNW) individuals and their financial advisors were surveyed. The survey questions included ones focusing on personality characteristics, plus ones on how the survey respondents select hedging techniques and providers.

Summary of findings

In our research seeking to advance understanding of “how the wealthy are different,” we asked a number of questions that have arisen in both practice and academia but especially are relevant for broad cross-sections of the investing population. In our sample, we focus on approximately 100 substantial investors and advisors from a larger sample of 400 participants who completed at least part of the survey described above.

A number of key takeaways for prosperous families and for those in their constellation of advisors with an emphasis on wealth managers arise from our exploration. Some confirm what has been demonstrated in industry or academic research. Others are novel and point out an existing gap between owners of wealth and their advisors:

- **Complexity.** *The wealthy have risks and financial portfolios that are indeed different. They often have complicated financial situations compared to those with lower wealth levels. Their assets and liabilities tend to be multi-faceted and include tangible assets like artwork, lifestyle assets like boats, planes, and collectibles, as well as homes, other real estate, and operating businesses.*
- **Traditional Risk Tolerance Assessment.** *Traditional measures of financial risk tolerance gathered by now-standard Risk Tolerance Questionnaires indicate that tolerance for risk-taking rises with survey measures of investor sophistication (e.g., regularly reads investment publications) yet is mitigated based on a number of demographics including age and gender. That finding is typically referenced in financial planning and management for retail investors who may face, for instance, challenges of retirement. We find that even for the wealthy, age and risk aversion are correlated.*
- **Gender.** *Regardless of wealth levels, as confirmed by this survey and results from non-ultra-high-net-worth (UHNW) investors, women are slightly more risk-averse than men.*
- **Risk Management and Insurance Preferences.** *In contrast to an assumption perhaps made for the population at large, UHNW respondents generally indicate that they do not view risk management services (i.e., insurance) as purely commoditized. While financial stability of providers is ranked first among all those in the survey, we find that price and price-for-value is consistently ranked low in the preferences of the wealthy. For example, for those with net worth above \$50 million, 95% of respondents say they prefer service over price. Moreover, for the UHNW sub-sample (whether defined as greater than \$30 million or \$50 million in net worth), we find the ability to handle complexity to be ranked second highest as compared to those with less wealth who rank payment speed second.*

There is an unexpected gap between advisors to the wealthy and the wealthy themselves.

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- **Mind the Gap – Part I.** There is an unexpected gap between advisors to the wealthy and the wealthy themselves. While advisors might be thought of as more sophisticated than non-advisors – a fact that is borne out by simple measures of sophistication including following the equity markets and self-perceptions of sophistication – wealthy investors nonetheless generally consider tangible assets to be a part of their balance sheet of wealth and frequently (wish to) coordinate investment and risk management activities.

- **Mind the Gap – Part II.** Moreover, there is a significant gap between advisors and those investors in the recognition of the importance of tangible assets in the allocation of investors with significant wealth and in their direct incorporation and coordination across investor balance sheets. Financial advisors who are not insurance brokers are significantly less likely to recognize, incorporate and coordinate tangible assets in the investment portfolio than are clients.

- **Addressing the Gap.** However, this gap may be addressed. According to our results, prosperous clients seek total-balance-sheet coordination. Advisors to this class of investors and families can lessen the gap by attuning themselves to the importance of risk management across all elements of clients' wealth including managing the idiosyncratic risk inherent in those assets.

- **Advisors Coming Together.** Insurance advisors (typically with practices in property and casualty insurance) are far more in tune with the importance of both recognition and coordination of tangible assets. This is evident in the data. Coordination across advisory input may represent an opportunity for wealth managers.

- **Personality.** We also confirm and extend the research emerging in the plenum among psychology, neuroscience, wealth management, and risk management, linking personality typologies to measures of risk tolerance as well as to hedging motives. Personality traits correlate with features of risk tolerance and decision involving risk management. Advisors and investors alike would benefit from understanding the implications for behavioral preferences for the management of wealth, goals, hedging, and communication. Failing to do so may eliminate a powerful path to self-knowledge and a better chance to “know your client,” which appears to run at a premium in the UHNW world.

- **COVID-19.** During Summer 2020, the effects of the COVID-19 pandemic on both the U.S. and global economy were becoming evident. The survey, which had been designed before the epidemic, was updated to include questions asking how COVID-19 was changing their attitudes and behaviors. However, no parts of the survey were conducted pre-COVID-19.

- **Implications for Asset Allocation.** Portfolio allocations that account for the risk and reward of insurable tangible assets and the ability to hedge can substantially alter allocations over additional parts of optimal portfolios. In other words, when investors face typical levels of personal risk or property damage risk without the hedge provided by risk management/insurance, their global asset allocations look less efficient from a reward to risk perspective than when they hedge those risks with reasonably priced insurance coverage. In other words, they have less expected return per unit of expected risk. This is especially true for personal liability but is also true for property damage risk. Of course, in combination, the implication is even stronger.

Survey Design and Administration

Our survey was offered to attendees of live sessions on risk and risk management held virtually using Zoom in educational sessions of the Wharton School of the University of Pennsylvania in May and June 2020, in association with Chubb Personal Risk Services.

Suitability for attending the session was based on net-worth level (investors/families) or advised net-worth level (single-family office advisors, multi-family office advisors, private bankers, and the like), and was determined in a pre-session assessment. Completion of the survey was not required to attend the sessions. After each session, the survey was offered again to attendees. Attendees were allowed to attend a single session.

The survey was designed to gain a better understanding of investors' and advisors' perception of risk, their relationship to it, and how they make decisions with respect to it. In addition, the questionnaire also focuses on whether prosperous families and investors take into account non-portfolio assets that still fall within the broader definition of their total balance sheet (which includes both assets and liabilities.) In addition, the paper focuses on personality characteristics as defined by the OCEANA model, and on how advisors and investors select hedging techniques and providers. These examinations of the survey respondents' risk tolerance when studied together with their personality characteristics helps us paint a picture of the relationship between risk tolerance and personality.

Respondents are generally from three groups: those who were qualified and invited to attend the session (156 specifically identified respondents who were given personal survey links); those who were not invited to the session but qualified based on their wealth level and/or occupation (10,668 specifically identified respondents who were given personal survey links); and an anonymous pool who responded to an open-invitation link published in newsletters of Knowledge@Wharton, the online business analysis journal of the Wharton School (circulation is 3 million subscribers; knowledge.wharton.upenn.edu).

These examinations ... help us paint a picture of the relationship between risk tolerance and personality.

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The two groups of identified respondents (156 invitees and 10,688 non-invitees) were not able to submit more than one response each. Once they submitted their response, subsequent visits using their link would only show their responses for review (with no option to change their responses). For those who responded through the Knowledge@Wharton anonymous survey link, a comparison of demographic responses shows that there were no double entries.

The survey begins with demographics questions. Beyond the customary questions about age, gender, etc., the questions sought in-depth data about respondents' income, assets, and financial experience. Class background (upper, middle, or working class) and political orientation (conservative/liberal) were also requested.

Since we sought responses from financial advisors as well as asset owners, respondents identifying as advisors were asked to choose from among the following types of advisor:

- Investment advisor
- Financial planner
- Registered representative of a broker/dealer
- Insurances advisor (life or annuity)
- Insurances advisor (property casualty or other);

and asked to answer questions about investing based on what they would recommend to their client.

After demographic questions, the remainder were organized under the following headings:

- General questions about risk management and insurance
- Perspectives on key phrases
- Anecdotes of client experiences/Examples of coverages
- COVID-19 (before & after)
- Your TBS [total balance sheet, representing the total of investment and non-investment assets]
- Your personality
- Your attitude toward risk/Your thoughts on risk-taking/Your thoughts on risk perception/
Your thoughts on risk and expected benefits.

Finally, respondents were asked four questions about changes to their financial plans and risk tolerance resulting from the COVID-19 pandemic.

The wealthy: sample demographics and characteristics

The sample of respondents is highly diverse. Of the 408 overall respondents, 75.3% are male, and 24.7% are female (Exhibit demo 1). Moreover, the distribution of wealth owned or advised on among respondents is also quite diverse. The sample is heavily tilted toward those who report having greater than \$10 million in net worth.

In addition, 31% of the sample reports having wealth below the minimum level we used for what classifies as high net worth: \$30 million. The sample still is heavily tilted toward those with wealth above \$30 million, with 39.7% indicating wealth greater than \$90 million. (See Exhibit demo 2.) The age distribution in the sample also provides diversification, as seen in Exhibit demo 3. In the sample, 1% are younger than 25; 13.8% fall between the ages of 25 and 34; 25.4% are between 35 and 44; 21.2% are between 45 and 54; and 12.8% are 55 or older.

We also aggregate UHNW participants and advisors defining wealthy participants or advisors either as those who have or advise on more than \$30 million in net worth and/or if they self-identify as UHNW. (On a 10-point scale where 10 represents “highly agree,” we consider respondents self-identifying as UHNW as those with an 8, 9, or 10 response.) Just over 30% of the sample report having or advising \$30 million and/or self-identifying as UHNW.

With respect to marriage and partnership, we find that most participants were married as of May 2020 (80.9%) whereas 10.6% of the sample was single (never married), far below the national percentage, and 8.5% were divorced or widowed, far below the national proportions.⁶ (Exhibit demo 4) Moreover, the majority of respondents had at least one child, a characteristic that is marginally correlated with risk tolerance as discussed below. Finally, the sample appears to be approximately evenly split between family members (members of UHNW families or individual investors), and their advisors overseeing or consulting on the investment of these assets.

⁶ In 2018, 32% of all adults age 15 and over had never been married, compared to 10.6% of the sample. Source: U.S. Census Bureau. The U.S. government stopped collecting detailed marriage and divorce statistics in 1996, so these statistics are now estimated from other sources.

Exhibit demo 1

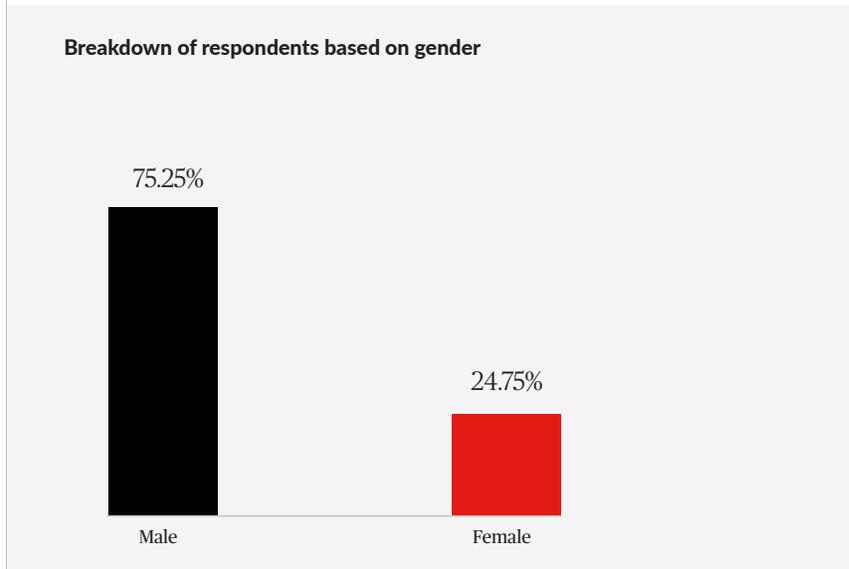


Exhibit demo 2

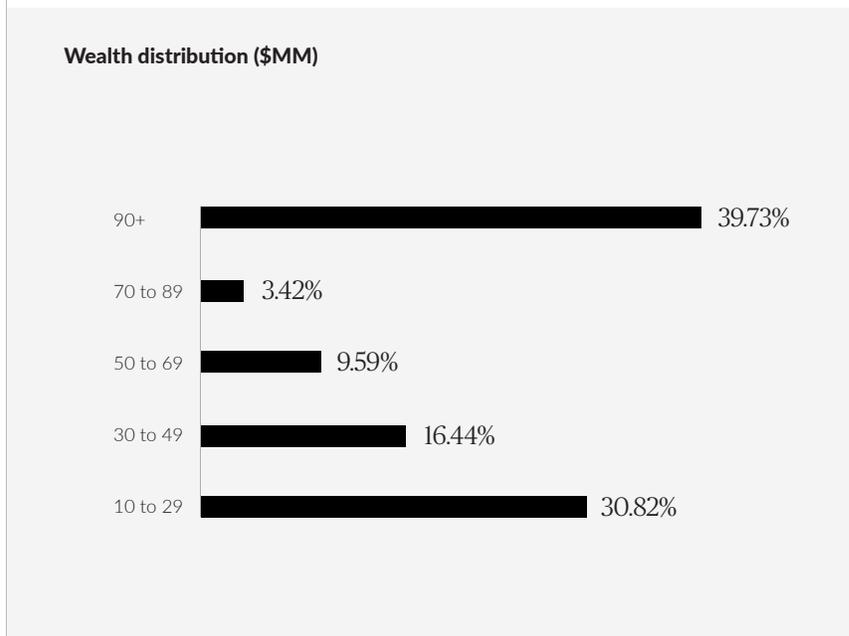


Exhibit demo 3

Breakdown of respondents based on age

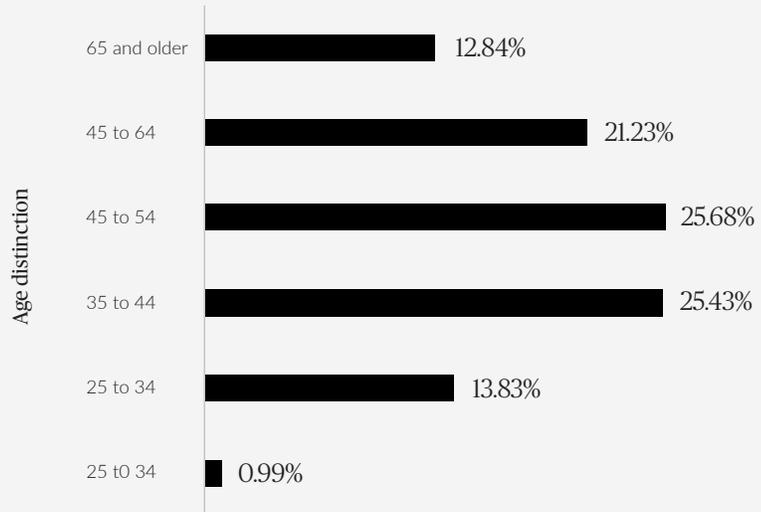


Exhibit demo 4

Breakdown of respondents based on family status

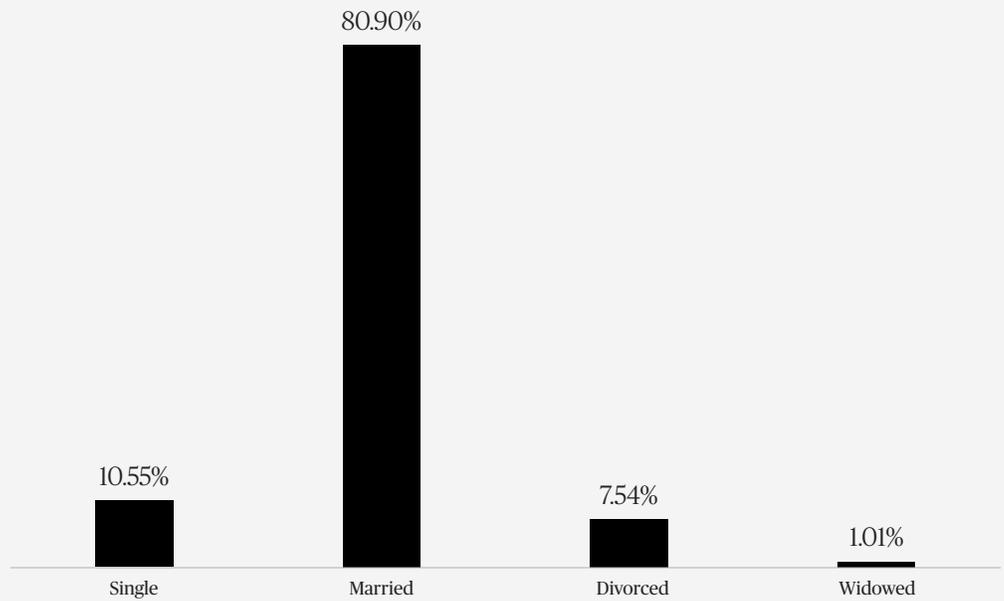


Exhibit demo 5

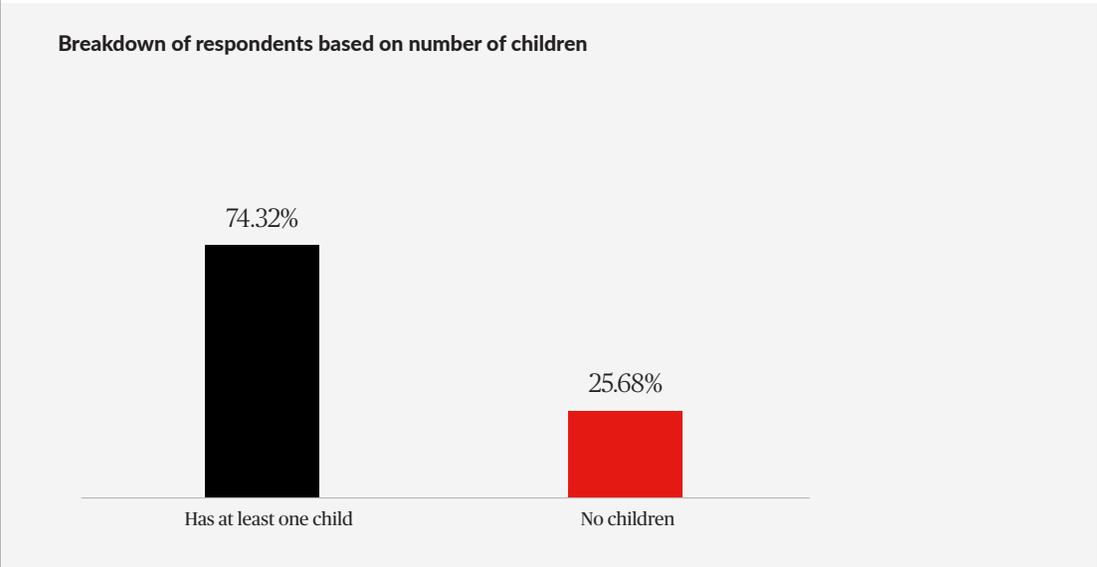
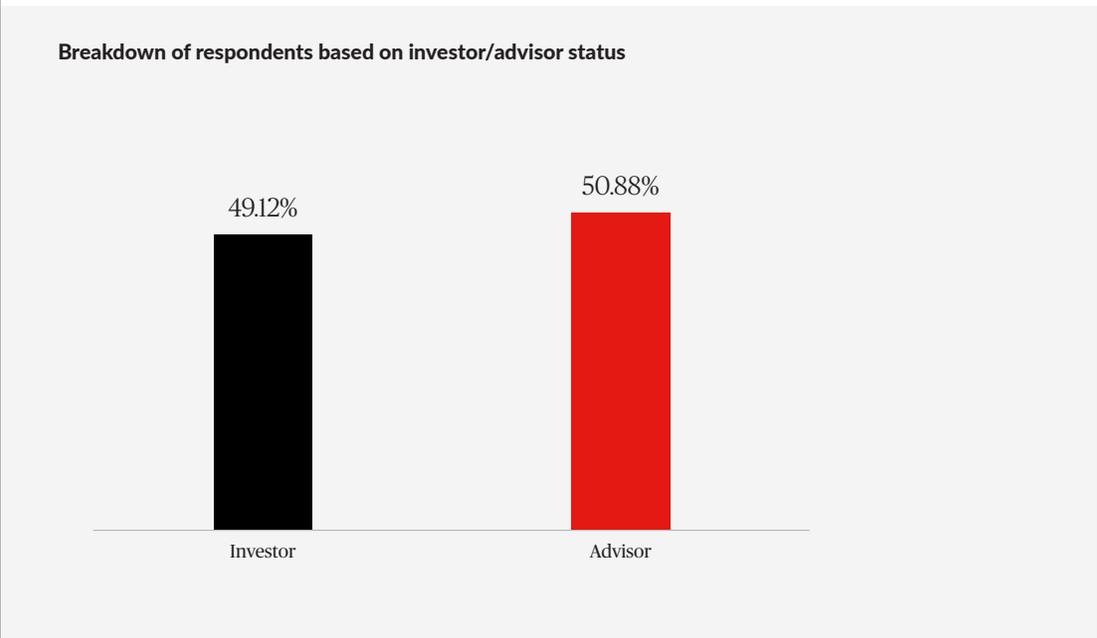


Exhibit demo 6



Risk tolerance

One of the standard assumptions of Modern Portfolio Theory as understood by wealth managers is that risk tolerance and levels of wealth are unrelated. Yet at the deepest level of classical utility theory, a maintained assumption is that as wealth increases, aversion to risk - the inverse of risk tolerance - should increase.

On the other hand, when often-mentioned goals of transferring wealth to future generations or to philanthropy are at play, the idea that the wealthy are “stewards” of wealth on behalf of future inheritors or for beneficiaries of future good works often arises. In this case, risk tolerance may be only a weak and declining function of current-generation risk tolerance. In other words, as respondent age rises, so might tolerance for risk (and its inverse, risk aversion). Yet another view is that substantial family and personal wealth historically has often arisen as a result of risk-taking by entrepreneurs or those with substantial equity risk and in some cases as a result of entrepreneurial personality topology.

Occasionally, even a so-called “entrepreneurial gene” is referenced. Under this logic, higher risk tolerance may associate with wealth, especially in so-called “G-1” or first-generation wealth creation. Note that ever-present survivorship bias may also be inherent under this last line of thinking. Risk-taking may have resulted in wealth, but we may only see those whose wealth survived because of continued risk-taking. Bessembinder (2017) points out, for example, that even among publicly-listed companies in the United States, only 4% have created all the value, presuming reinvestment of dividends. In other words, most firms fail or have assets that are acquired.

Is Financial Risk Tolerance (FRT) correlated with wealth in our sample? It appears to be, backing up prior research but also creating some surprises for advisors. (See Exhibit FRT.) Here we define “low risk tolerance” as the bottom 20% of the aggregate score of the Lytton-Grable Risk Tolerance Questionnaire (RTQ) and “high risk tolerance” as the highest 20%. Wealthy, defined alternatively as those with greater than \$30 million in wealth in May 2020; or who self-identify as UHNW; or as those with greater than \$50 million in wealth; or who also self-identify as UHNW, is correlated with risk tolerance levels.

Exhibit FRTa

Wealth distribution by high net worth and risk tolerance

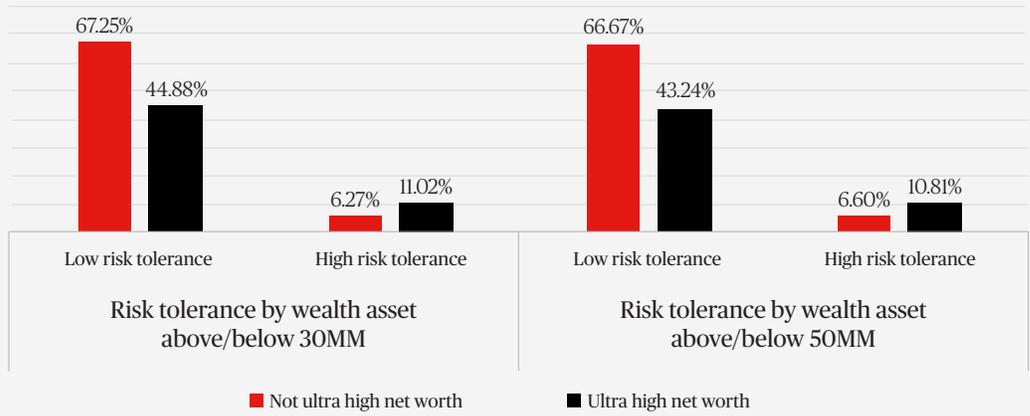
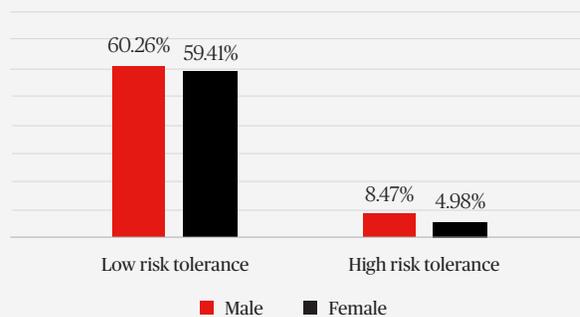


Exhibit FRT indicates that investors who are not classified as UHNW by either classification level have a greater preponderance of low risk-tolerance scores (approximately 67% at both wealth levels) whereas UHNW investors are less likely to have low risk tolerance and therefore are less likely to have higher aversion to risk (44.9% and 43.2%, respectively for \$30 million and \$50 million wealth levels). Moreover, UHNW respondents more commonly report high levels of Lytton-Grable Financial Risk Tolerance scores (and therefore have low aversion to risk; 6.27% and 6.6% vs. 11.0% and 10.8%). Taken together, the results suggest, perhaps surprisingly, that those investors or family office advisors who manage or advise on high wealth evince greater tolerance for risk, the opposite of what the mathematics of classical Markowitz’s Modern Portfolio Theory imply.

Exhibit FRTb

Wealth distribution by risk tolerance of sex



Risk tolerance is also correlated both with demographics and with measures of financial sophistication. Exhibit FRTb shows that at the margin, women are at least mildly more risk intolerant (more risk averse) than men. This finding is directionally consistent what has been found before (Barber and Odean, 1991 and others): that women are significantly more risk-averse in an average sense both with and without controls for respondent age. Here, we see that women are slightly less likely to have high levels of risk tolerance (4.98% vs. 8.47%) and nearly imperceptibly lower preponderance of being of low risk tolerance (59.41% for women and 60.26% for men).

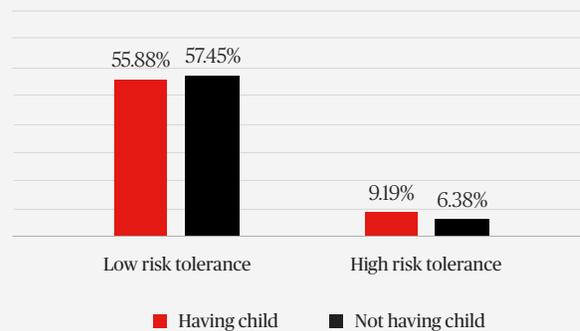
Those who have the higher tolerance for risk display the greater attention to markets.

It is important to note here and elsewhere that we do not extrapolate to the population beyond our sample or simultaneously control for other effects in the sample like age. However, part of our sample selection specifically focuses on the demographics under study: wealth levels.

These findings about risk aversion are important for investors and their advisors for this sample. Among asset owners, very often women inherit wealth at some point in their lives. Research confirms both the intent that women have regarding changing advisors and the observation that women in fact do make changes in the constellation of advisors serving them at that life event. The usual enlightened advisory approach acknowledges and envelops both marriage or relationship partners. In addition, structures for wealth management often incorporate this transfer of wealth. Finally, in our sample, respondents who report having children appear also to have marginally higher levels of risk aversion, a result that also conforms to known results. Having a child corresponds generally to lower tolerance for risk/higher risk aversion.

Exhibit FRTc

Wealth distribution by risk tolerance and having child or not



Interestingly, financial risk tolerance is correlated with measures of participant sophistication and attention measures. In the survey, we asked participants whether they "... regularly follow the stock market," and whether they follow "... [o]ther financial markets." Exhibit self-perception indicates that responders with low risk-tolerance scores (high risk aversion) follow the equities market as well as other markets with lower preponderance (82.8% and 70.5%) than those with high levels of risk tolerance (96.7% and 75%, respectively). In other words, most investors and advisors alike "follow the stock market"; however, those who have the higher tolerance for risk display the greater attention to markets.⁷ It is also this group that we find below is most likely to consider and actually coordinate their entire portfolios to include tangible assets explicitly.

One of the more important elements of investing is risk management, whether it includes diversification, hedging systematic risk, immunizing future liabilities, or addressing the idiosyncratic risk of assets including tangible assets, which we discuss below. We asked the investors, families, and advisors in our sample whether when it comes to insurance, broadly construed, which is more important: "the lowest cost coverage and service available" or "the right coverage and service even if it costs more." The standard wisdom suggests that the wealthy may not consider price or even price-for-value, and we generally confirm this result and find that it is stratified across shades of wealth at high levels.

Specifically, when we characterize UHNW investors at the \$30 million wealth level, we find that approximately 80% of respondents indicate that they prefer appropriate coverage and service that are accompanied by a higher price tag.

When we use the \$50 million definitional level, approximately 95% of respondents indicate that they prefer service over price. Moreover, when we observe preference across risk-management (e.g., insurance) providers

⁷ Importantly, the finding is that individuals with higher risk tolerance, in the aggregate, subjectively believe (self-reporting) they have a relatively greater level of attention to the stock market, but it is not an objective finding that they are, actually, more attentive. In this sense, higher risk tolerance may correlate only with individuals' stronger beliefs that they are closely following the market.

and consider whether “financial stability,” “the ability to handle the most complexity,” “the most experience” and the one that “pays claims the fastest,” we find differences across wealth levels. For example, overwhelmingly, survey participants ranked stability as the most important characteristic of an insurer (see Exhibit RM pref).

However, at either wealth-threshold value (\$30 million+ or \$50 million+), consistent with their having considerably more complex balance sheets, larger presence of real/tangible assets, and sophisticated risk management needs, UHNW respondents value the ability of insurers to handle complexity second, behind firm stability. They value experience third and fast payment of covered claims fourth. In contrast, those with lower wealth levels rank payment of claims speed second, followed by experience, and ability to handle complexity last.

If the assumption that the rich are different was not clear previously, their service preferences bear out the distinction and are consistent with the notion that they have more complex asset and liability mixes as well as more complex financial situations.

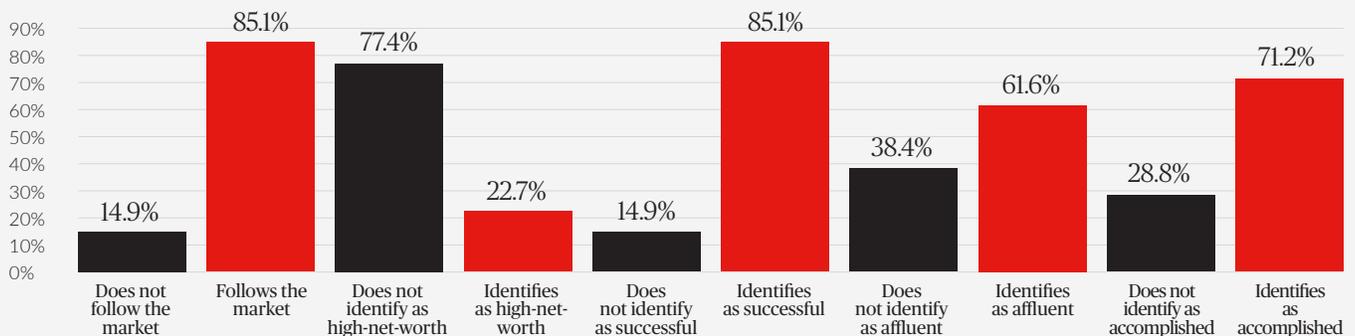
When we combine financial risk tolerance and risk management preferences (not tabled), we find significant variation, with those respondents having the lowest risk tolerance levels (bottom 20%) also ranking insurer stability highest and fast payment second. For those with the highest risk tolerance, while stability remains the most valued characteristic, fast payment is the least valued aversion.

Exhibit RM pref

Risk management (insurance) preferences

Wealth class	Rank	Level \$30MM	Level \$50MM
UHNW	First	Stability	Stability
	Second	Handle complexity	Handle complexity
	Third	Most experience	Most experience
	Fourth	Pays covered claims fastest	Pays covered claims fastest
Not UHNW	First	Stability	Stability
	Second	Pays covered claims fastest	Pays covered claims fastest
	Third	Most experience	Most experience
	Fourth	Handle complexity	Handle complexity

Exhibit self-perception



Lytton-Grable Risk Tolerance Questionnaire

In 1999, John Grable and Ruth Lytton published a financial risk-tolerance scale in *Financial Services Review* that “has since been widely used by consumers, financial advisors, and researchers to evaluate a person’s willingness to engage in risky behavior.” (Kuzniak et al., 2015) The questionnaire has 13 items. It is one of a number of evaluation tools used by investment advisors and broker/dealers at customer intake, to fulfill the duty to evaluate a prospective customer’s risk tolerance.

Grable and Lytton based their scale conceptually on Modern Portfolio Theory, as developed by Harry Markowitz beginning in 1952. Its central proposition regarding risk is that risk and return are correlated, so that an investor seeking a higher return must accept a greater level of risk (volatility) in a portfolio. (Kuzniak et al., 2015) The scale measures three factors: investment risk, risk comfort and experience, and speculative risk (“gambling”).

Subsequent research by Grable and Lytton, as well as other researchers, confirmed the scale’s reliability and validity. This, combined with the availability of the tool to the public at no cost, has made the G&L scale a useful means of evaluating financial advisors’ clients’ risk tolerance, alone or in conjunction with other risk tolerance evaluation tools. High scores are positively correlated with greater equity (stock) ownership and negatively correlated to cash and fixed-income security ownership. This is consistent with the academic hypothesis that investor demand for higher return and greater tolerance for volatility (risk) allows, and indeed requires, a higher proportion of equity risk exposure in a portfolio.

Tangible assets and investor balance sheets

Potential financial complexity and the multifaceted nature of the assets owned by those with significant means is one of the enduring correlates of wealth. As wealth increases, so does the possibility of having a complex balance sheet replete with investment portfolios possibly held with multiple wealth managers, custodians, or brokers.

In addition, tangible assets like homes, land, art, vehicles, boats, and physical commodities may be owned by prosperous families and their associated entities. Furthermore, the possibility of various forms of capital structure including loans or other types of leverage and additional liabilities may be present. Risk management, ranging from financial hedges to life insurance or property and casualty insurance, might commonly appear in the balance sheet of those with substantial wealth. On the asset side, investments may also be public or private in nature and of course can reflect a spectrum of liquidity ranging from those that can be quickly turned into cash to those that may be illiquid for some time.

The implications of the presence of total balance sheet assets and liabilities of investors and families are many. First, without taking the entire collection of assets and liabilities including so-called real assets into account in wealth management, it might be challenging to define a financial plan, much less execute on it or apply best governance practices. In addition, the correct tabulation and tracking of exposures to asset classes and risks become nearly impossible. For instance, understanding a family's exposure to real estate would be incomplete without recognizing and even optimizing personal and commercial property holdings simultaneously with real estate funds and real estate investment trust (REIT) shares in investment portfolios.

Another example arises around referencing business assets such as operating enterprises as well as assets held by private businesses, like commercial real estate. Finally, assets that may be held at least in part for their consumption value such as personal art, homes, vehicles, and the like can be important for optimizing investor allocations, especially since they and other classes that are illiquid represent – over any arbitrarily short period of time – a binding constraint. They also appear to be held in substantial portion in UHNW balance sheets. Moreover, those assets bear systematic risk characteristics (e.g., certain types of art like so-called “Old Masters” paintings are less correlated with other asset classes historically,⁸ and the values of aircraft, yachts, and luxury real estate vary according to complex factors including interest rates, government regulation, fashion risk, and the state of the world).

⁸ Jianping Mei and Michael Moses co-founded the Mei Moses Art Indices, which calculated annual (and, eventually, monthly) returns on art objects in eight collecting categories, based on resale prices at the Sotheby's and Christie's auction houses. Sotheby's acquired the indices in 2016 which are now used as a proprietary pricing and marketing tool, and the returns are no longer publicly available. Further information on the performance of art as an asset class can be found in Jianping Mei's and Michael Moses's paper "Art as an Investment and the Underperformance of Masterpieces," NYU Finance Working Paper No. 01-012 (2001), and "Wealth Management for Collectors," *Journal of Investment Consulting* 11 (1) (2010), pp. 50-59.

While tangible assets may provide a modicum of diversification, they may also be highly correlated and have market and other risk exposures important for the successful expression of expected return and risk in investor allocations. Systematic risk can impinge upon tangible assets as it can on their intangible counterparts. Moreover, these real assets, like all assets, have idiosyncratic risk related to their own unique natures and to the possibility of the realization of certain risks. For instance, houses can burn down, artwork can be destroyed, and these risks can represent substantial dollar value and wealth proportions for investors of all varieties, but perhaps are most relevant for those we define here as UHNW.

With respect to managing risk across the balance sheets of successful individuals and prosperous (UHNW) families, it has been a bit of an open question as to how and whether investors consider and coordinate tangible asset allocations, risks and potential rewards, and the desire to link investment portfolios to one another as well as take into account tangible assets. In the Amit, Lichtenstein, Prats and Millay (2008) single-family office survey of more than 100 such offices dedicated to serving single, prosperous families, approximately 30% of family wealth post-liquidity typically was in the form of operating businesses. Additional allocation to tangible assets including homes, artwork, land, and the like would presumably bring those levels significantly higher.⁹

To understand whether in our survey sample tangible assets are of concern to prosperous families, investors, and their advisors, we queried respondents by asking directly "Do you (or if you are an advisor, do your clients) consider tangible assets to be a part of wealth to be managed in a connected manner with traditional investment assets?" and "Do you or your clients manage specific risks of such assets in a coordinated manner?" The first question targets awareness and recognition of tangible assets — not generally treated in traditional wealth-management relationships for investors not directly involving planning or insurance. The second question specifically targets not only coordination of asset management but focuses on risk management, per se. This question incorporates assessment and management of risks specific to those classes in a connected manner with other, perhaps more traditional assets.

First, we find quite clearly in our sample (with heavy representation of those with more than \$10 million in wealth — and their advisors — taking all participant categories into account) more than half of respondents consider tangible assets to be managed in a connected manner (see Exhibit gap 1). Specifically, 66.7% of investors and 67.5% of advisors alike overtly recognize that tangible assets are indeed assets, presumably from a perspective of risk/reward in financial planning. In addition, we find that more than half of survey participants also actively coordinate risk-management activities of tangible assets in a cognizant manner referencing their total balance sheets (54.7% of investors, and 60.0% of advisors).

⁹ R. Amit, H. Lichtenstein, J. Prats and T. Millay, "Single family offices: The art of effective wealth management" in J. Tapias and J. Ward (Eds.), *How do Family-Owned Businesses Foster Enduring Values?* Palgrave Macmillan Publishing (2008).

*49.7% of UHNW
(non-insurance)
advisors and
27.3% of Non-
UHNW advisors
report actual
coordination of
tangible assets.*

However, these initial results, while obviously important for any advisor, prosperous family, or investor, to understand may mask a dangerous perception gap between and among investors and their advisors, and apparently between advisors with different roles.

Note that for those who don't consider tangible assets to be a part of a connected management of assets, coordination is low (19.7%); if, for example, a client may not consider it but his or her advisor does, or even when clients don't actively consider tangible assets to be a part of their overall wealth, they still coordinate. However, when they do consider it part of their wealth, overall, 76.8% also coordinate.

The converse correlation is also observed. When we condition on respondents coordinating their assets (in other words 100% coordinate), 90% also consider those assets to be a part of their total balance sheet of wealth. In the first case, they might not actively consider all of their wealth to be part of a one big balance sheet and yet about 20% still coordinate, perhaps out of necessity. Finally, we note that there exists the expected gap across levels of wealth, which also correlate with complexity measures in the survey.

Specifically, with regard to those who are classified as having more than \$30 million versus those who have less for consideration of tangible assets to be managed alongside traditional assets, 14% more say they do consider those assets to be managed alongside traditional assets (13.9% for those with \$50 million+). Moreover, for the actual coordination and risk management, the differences are 17.5% and 20.8% for \$30 million+ and \$50 million+, respectively. Once again, the rich are different, and this difference grows in proportion with wealth. Participants are much more likely to treat tangible assets as investment and risk management assets as wealth grows.

A concerning gap, perhaps indicative of an opportunity for advisors, emerges in the comparison between Non-Advisor (Investor) Participants and Advisors, which disaggregates the findings above. We find (Exhibit gap 1) that among UHNW (\$30 million+) investors, 80.7% recognize and consider tangible assets to be wealth-management assets while Non-UHNW investors do so nearer the average of the sample (56.7%). Yet among advisors to the UHNW group, only 76.5% have the same recognition. Furthermore, the same pattern is seen when comparing investors and advisors in the Non-UHNW group, where the gap is 2.2%. The gap continues under the coordinated risk-management assessment question, with 69.2% of UHNW respondents pursuing risk management of intangible assets (only 44.7% for Non-UHNW participants). Respectively, we find levels of 2.6% and 2.3% lower with advisors in the corresponding groups.

However, it turns out that this gap widens even further when we remove advisors with the specific role of insurance advisor (property and casualty) and who specifically classify themselves as such. It seems obvious that P&C insurance and risk-management advisors would consider risk management of tangible assets to be a part of a client's total wealth and would address and coordinate across those tangible assets. We find that there are 5.6 and 4.4 percentage point differences in the proportion of the respondent sample comparing Non-P&C Advisors and the rest of the sample for consideration and coordination over tangible assets.

The gap grows even larger when we isolate wealth managers in the sample from insurance advisors (and of course there could be overlap) and compare them to Non-Advisor participants. Here we find that fully 86.7% of UHNW (\$30 million+) participants consider the importance of tangible assets in the span of their wealth. By contrast, 64.5% of Non-UHNW Non-Advisor participants do; while only 52.7% of Non-Insurance UHNW Advisors do; compared to 42.6% of Non-UHNW Non-insurance advisors.

The wider gap is also present for those who actually coordinate risk management of tangible assets: 73.8% of non-advisor participants versus 49.7% of UHNW (non-insurance) advisors and 27.3% of Non-UHNW advisors report actual coordination of tangible assets. The resulting gaps between UHNW (non-insurance) advisors and investors for consideration and coordination regarding tangible assets are 34.0% and 24.1%, respectively. Despite lower absolute levels, the gaps for Non-UHNW advisors are 21.9% and 25.5% in frequency.

The substantial gap between advisors and clients may represent an industry failure if clients recognize the relevance of tangible investments as assets to be coordinated with financial and other assets, or if they further target their risk management (either systematic or idiosyncratic). However, it's likely that this gap represents a market opportunity for wealth advisors to expand the horizon of their practices to include the incorporation of risk-management assets outside traditional investment portfolios.

From a financial planning perspective, this idea may seem rather obvious. But the results here are unequivocal. UHNW investors (e.g., clients) are looking for this service and advisors may not be considering it. In fact, in perhaps the most important comparison – that between the proportion of UHNW (Non-Advisor) clients who consider tangible assets and the proportion of UHNW Advisors (or advisor firms) who coordinate risk management of those assets – there is a 37-percentage point difference ($-37.0\% = 49.7\% \text{ (Advisors)} - 86.7\% \text{ (Investors)}$). That represents a substantial gap between recognition and capitulation.

It is important to recognize that certain regulatory restrictions or firm policies and procedures may not permit or facilitate the total balance sheet approach to clients for wealth and risk management. That said, the industry trend toward the availability and democratization of family-office style services, “outcomes-based” wealth management, and fundamental financial planning services may provide an indication of supply meeting demand. Our results suggest that there are remaining potential open opportunities for wealth managers to bring to bear the direct treatment of total balance sheet asset management including risk management of those assets.

Exhibit gap 1

Tangibles and the advisor gap

Consider or coordinate tangibles	Non-Advisor participants	Advisors	The gap
Consider tangible assets	66.7%	67.5%	0.8%
Coordinate tangible assets	54.7%	60.0%	5.3%

Consider or coordinate tangibles	All participants \$30MM+		All participants \$50MM+		The investor gap	
	UHNW	Non-UHNW	UHNW	Non-UHNW	\$30MM+	\$50MM+
Consider tangible assets	75.0%	61.0%	75.6%	61.7%	-14.0%	-13.9%
Coordinate tangible assets	68.0%	50.4%	71.4%	50.6%	-17.6%	-20.8%

Consider or coordinate tangibles	Non-Advisor participants		Advisors		The advisor gap	
	UHNW (\$30MM+)	Non-UHNW	UHNW	Non-UHNW	UHNW	Non-UHNW
Consider tangible assets	80.7%	56.7%	76.5%	54.5%	-4.2%	-2.2%
Coordinate tangible assets	69.2%	44.7%	66.6%	42.4%	-2.6%	-2.3%

Consider or coordinate tangibles	Non-P&C advisors	Advisor/Non-P&C advisor gap
Consider tangible assets	61.9%	-5.6%
Coordinate tangible assets	55.6%	-4.4%

Consider or coordinate tangibles	Non-Advisor participants		Non-P&C advisors		The gap	
	UHNW (\$30MM+)	Non-UHNW	UHNW	Non-UHNW	UHNW	Non-UHNW
Consider tangible assets	86.7%	64.5%	52.7%	42.6%	-34.0%	-21.9%
Coordinate tangible assets	73.8%	52.8%	49.7%	27.3%	-24.1%	-25.5%

Investor consider / Advisor coordinate gap	
UHNW (\$30MM+)	-37.0%
Non-UHNW	-37.2%

For advisors: making use of these findings

Incorporating consideration of clients' total balance sheet assets implies not only some additional complexity for advisors' client onboarding, but also some subtle, yet consequential changes in the nature of the advisor-client relationship. What are some of the ways in which advisors can improve clients', and their own, understanding of the risk spectrum and the effect of personality on wealth?

- **Today, advisors need to focus on value curation.** *Perhaps more than ever, advisors need to create and deliver on a value proposition that extends beyond the provision of products into the provision of a multi-dimensional portfolio of services and products that place the client at the center. This client-centric model in its broadest sense stands up against the perception of commoditized offerings reinforced by the advent of FinTech providers and the digitalization of the financial services industry. It also stands alongside the democratization of information clients themselves can now tap into as the barriers of inaccessible financial jargon and industry secrets have been torn down by the public lexicon. Critical to the client-centric model is the notion of a custom solution. The adoption of the concept itself need not be specific or tailored, but the solutions offered to and provided to clients must be. While the data presented in this report indicates certain truths about commonalities in attitudes held by UHNW individuals, it would be a mistake to think that commonalities in solutions would be appropriate. Indeed, given clients' indicated preference for service over price, such an approach will likely help engender a feeling of trust between an advisor and client. Create relationships; don't merely execute transactions.*

While single-family offices of the UHNW set have long internalized the importance of bespoke solutions and the ultimate in client-centricity (Amit, 2020), advisors should consider the extent to which their own knowledge of the client and the ability to curate services, even if not directly paid to do so, can provide value. Advisors should think about how "sticky" business can be when clients come to understand an advisor's ability to marshal resources providing benefit to those clients even and perhaps especially if the advisor does not directly benefit financially from marshaling such resources. The advisor should think about not just the goodwill of providing those value-adding elements but of the actual gain in knowledge of a client in helping her achieve her goals. As they deepen their knowledge of clients, they are better able to provide solutions and become a valued and trusted resource. The accumulation of assets and wealth is a dynamic process, and protection of same must be as well.

- **Share the concept of risk inherent in all assets with clients.** The idea can be introduced informally in conversation or explained in a written communication. Rather than introducing this concept as the “flavor of the month,” advisors should think of it as a natural part of the ongoing conversation about “hopes and fears” that they routinely have with clients (especially clients who are sensitive to market fluctuations and news events and want to discuss their implications frequently with their advisor). It became evident during the first severe wave of the COVID-19 pandemic, in Spring 2020 (when this research was conducted) that people’s perceptions can create and alter their own sense of reality. If people fear that one type of asset will depreciate or no longer be of any value, they will respond accordingly. Indeed, one UHNW individual, believing that a genuine global currency crisis was imminent, bought more than \$1 million worth of luxury watches so he could use them as currency. One good insight to share is that there are many risks besides asset price volatility that can affect investment outcomes. Likewise, there are many opportunities to enhance family wealth besides investment portfolio performance.
- **Risk assessment of clients’ tangible assets.** Advisors should attempt to discover, by whichever methods seem best, how risks of clients’ tangible assets are minimized or hedged. What insurances are in place? What is the expected depreciation, and the expected or upkeep liability, if any?
- **Coordinate with risk management partners.** The consideration and incorporation of risks across a broad variety of assets with their own important characteristics and idiosyncrasies, such as art and lifestyle assets, are the expertise of high net worth insurers. Experts who focus on the specific risks stand next to family advisors in serving clients. Many are not only experts in hedging specific risks but also focus on asset valuation, a critical element of asset/liability coordination among components of wealth.
- **Revise client’s risk budget** based on new information recorded on the TBS. Advisors should consider **recommending changes to asset allocation** if appropriate. But they should remember not to overreach and urge changes to a client’s lifestyle in the name of aligning his or her risk profile with investment objectives.
- **Understand clients’ attitudes toward what they own and why they own it.** Advisors should assess what “emotional value” clients assign to certain assets. Art and jewelry, for example, are assets that can have significant financial value. However, people may purchase them not primarily as investments but because they can be actively enjoyed and “used” – art can be displayed; jewelry can be worn. People’s emotional attachment to such items could influence whether they choose to insure it and also whether they would be willing to liquidate it. Also, some items may have high value both financially and emotionally but because they could never be replaced, insurance might not be considered important.
- **Recognize that people’s risk tolerance will change with their personal circumstances and with their environments including the market environment.** Personality type may be static to an extent, but it can be changed by life events. One HNW individual admitted that he was less risk-tolerant now in practice than he was ten years ago because he is now the father of three children; he says in ten years he will again be more risk-tolerant in his actions because he will not have the same level of responsibility. (It was pointed out that children, from a balance sheet perspective, are at a certain stage, “liabilities”.)

- **Attitudes toward risk management and levels of risk tolerance/risk aversion will likely vary among family members and clients.** *This is especially true of those of different generations and even between couples. There may, of course, be a decision maker, but he or she may be influenced, in one direction or another, by the wishes, goals, and attitudes of other family members.*
- **Current events can radically change people's short-term thinking and strategies.** *It was clear that the COVID-19 pandemic, the effects of which were becoming evident during the time that these webinars were conducted, was influencing people's attitudes toward liquidity as a form of risk management. People were searching for liquidity, questioning whether they were sufficiently liquid, and assessing how they could ensure liquidity during the next crisis.*
- **Assumptions based solely on people's level of wealth will be incomplete.** *Factors such as geography and culture can greatly influence people's attitudes. One participant pointed out that in parts of South America, for example, HNW people tend to have bodyguards, have a higher level of mistrust of institutions ranging from government to entities like insurers, and are therefore less risk tolerant overall. Another person pointed out that because he was "a person of faith" he had a high tolerance for risk. A third participant pointed out that while his wealth was not family wealth – he had made money on his own – he would feel some obligation to help out extended family members.*

Incorporating the more nuanced understanding of risk factors affecting families, and individuals' differing attitudes toward and responses to risks, can enhance the advisor-client relationship, leading to better advice and more effective outcomes. A deeper comprehension of how wealth affects personality can enable advisors to increase not only their wealthy clients' risk-adjusted investment returns, but their emotional security and happiness as well.

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Appendix 1: Case studies

Christopher Geczy, Ph.D. and Thanos Tsirukis, Ph.D.

The importance of personal liability and personal property risk coverages for prosperous investors

We present two case studies to illustrate the concept of using insurance products to enhance the expected risk/reward of high-net-worth investor portfolios over long time periods. Although risk management via insurance products is not implemented in the typical financial markets use of classical Modern Portfolio Theory, analytical techniques used in MPT, specifically Mean Variance Optimization (MVO) and Monte Carlo simulations, are effective in demonstrating the potential impact on portfolio risk/reward of insurance hedging against the possibility of left tail events – i.e., infrequent, potentially catastrophic events of significant impact, that are idiosyncratic.¹⁰ The total balance sheet of prosperous families logically includes consideration of this liability management, as do some financial planning models like those of Chhabra.¹¹

Examples of these events are lawsuits, pandemics, death events, losses from fires and other natural events, and unexpected taxation events. Here we examine the importance of hedging unique risks that are otherwise challenging to hedge due to the lack of products and techniques used in more financial contexts, such as hedging concentrated equity positions (e.g., options or other derivatives, short positions in fungible or similar assets, and so on).

We use a combination of MVO and Monte Carlo simulations to address the possibility of rare events like a home and property sustaining damage or a child being involved in a car accident with probability of occurrence and expected damages taken from insurance industry statistics. We find that hedging the risk of potentially bad life events induces changes in the overall allocation of typical prosperous investor portfolios, highlighting the importance of hedging those risks in the overall total balance sheet of wealthy clients.

¹⁰ Mean-Variance Optimization is a way of constructing a portfolio to maximize expected returns for a given level of volatility, or minimize volatility for a given expected return. Such a portfolio is called a "mean-variance optimized portfolio." Since its introduction in the early 1950s, Mean-Variance Optimization (MVO) has proven a very flexible methodology to guide investors asset allocation in the presence of uncertainties and is often used in the practical construction of investor portfolios. Even though it is used almost exclusively in the allocation of traded assets—stocks, bonds, commodities, futures, etc.—it can be easily extended to include more illiquid assets, such as hedge funds, private equity investments, and privately-owned businesses. To date, the central assumption of Gaussian distributions of risks and reward assets has been a limitation in applying the methodology in more realistic situations such as the modeling of left-tail events.

¹¹ The Chhabra "Three-Bucket" financial planning model is developed in Ashvin Chhabra, "Beyond Markowitz: A Comprehensive Wealth Allocation Framework for Individual Investors," *Journal of Wealth Management* 7(4) (Spring 2005), pp. 8-34, and Ashvin Chhabra, *The Aspirational Investor: Taming the Markets to Achieve Your Life's Goals* (New York: HarperCollins, 2015).

Case study 1: UHNW investor and liability umbrella insurance

This case study tests the hypothesis that a certain level of liability insurance coverage, under certain assumptions, can enhance the expected risk-adjusted return on assets of a total balance sheet portfolio (liquid assets plus illiquid private business ownership) over a 40-year period.

That is, the cost of insuring against a liability loss is worth incurring for the hypothetical investor whose portfolio is modelled, given the stated assumptions for size of insured loss, probability of loss, cost of coverage, and Capital Market Expectations for the performance of the portfolio over 40 years. The expected risk/return and the cost-effectiveness of insurance would, of course, vary if different assumptions were used.

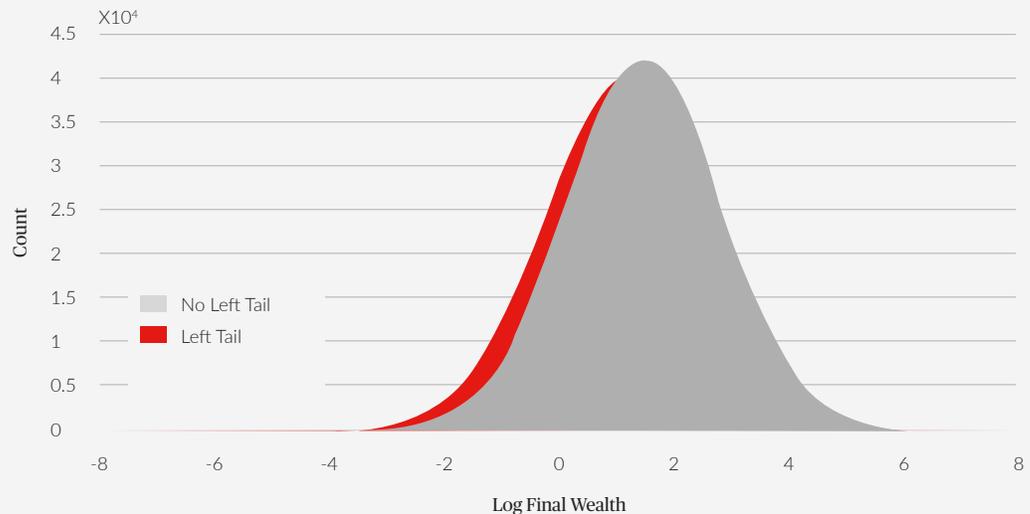
We start with the case a prosperous family or owner of assets with \$30 million net worth, whose wealth consists of a private business – ~38% of *Wealth* – and a non-business portfolio that contains *Equities, Nominal and Corporate Bonds, Real Estate, Commodities, Hedge Funds* and passive *Private Equity Investments*. This level is consistent with the Wharton Global Family Alliance survey of UHNW family investors (Amit *et al.*, 2008, and Amit, 2018). The private business is considered to be illiquid, i.e., it cannot be rebalanced. It is 38.5% of the total allocation. The non-business portfolio relies on data from the Federal Reserve Survey of Consumer Finances (2016). Capital Market Expectations for the above assets are based on the 2020 Horizon Survey of Actuarial Expectations 2020 Edition (Horizon Actuarial Services, LLC, July 2020). The private business is modeled as having 100% correlation with *Private Equity* but at twice its volatility, due to lack of diversification.

A summary of a hypothetical UHNW investor's portfolio

Assets	Average Wealth Allocation	Expected Volatility	T-Bill Return	Expected Return	Expected Sharpe Ratio	Lower Bound	Upper Bound	US Equity Large Cap	US Corporate Bonds Core	Real Estate	Hedge Fund	Commodity	Private Equity	Business	Left Tail	Insurance
US Equity Large Cap	20.1%	16.2%	1.0%	7.1%	0.37	0%	100%	1.0	0.2	0.5	0.6	0.3	0.7	0.7	0.0	0.0
US Corporate Bonds Core	15.1%	5.5%	1.0%	3.6%	0.47	0%	100%	0.2	1.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0
Real Estate	17.6%	16.8%	1.0%	6.6%	0.33	0%	100%	0.5	0.2	1.0	0.4	0.2	0.5	0.5	0.0	0.0
Hedge Fund	3.0%	8.0%	1.0%	5.7%	0.59	0%	100%	0.6	0.2	0.4	1.0	0.4	0.6	0.6	0.0	0.0
Commodity	3.0%	17.6%	1.0%	4.0%	0.17	0%	100%	0.3	0.1	0.2	0.4	1.0	0.3	0.3	0.0	0.0
Private Equity	3.0%	22.0%	1.0%	9.9%	0.40	0%	100%	0.7	0.0	0.5	0.6	0.3	1.0	1.0	0.0	0.0
Business	38.3%	44.0%	1.0%	9.9%	0.20	38%	38%	0.7	0.0	0.5	0.6	0.3	1.0	1.0	0.0	0.0
Left Tail	100.0%	7.0%	0.0%	-0.45%	-0.06	100%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	-1.0
Insurance	-	7.0%	0.0%	0.23%	0.03	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	1.0

Under these assumptions, the Average Wealth Allocation has an expected return of 7.48%, an expected volatility of 22%, and an expected Sharpe ratio of 0.29. We also assume that the investor is subject to infrequent, severe left-tail liability events; for example, there is a 1% per year probability that the investor will lose 50% of her Wealth due to an accident-related lawsuit award in the duration of her investment horizon, 40 years.¹² The following figure depicts the distribution of her wealth at the end of her 40-year career, under two assumptions: with and without the left-tail event.¹³

Histogram of Final Wealth



¹² These assumptions are for illustrative purposes only.

¹³ Loss Equivalence: We notice that the log final wealth distributions are approximately Gaussian, and that the wealth in the left tail appears as if it is shifted by an approximate constant which might be interpreted as a negative "alpha" or drag on performance. Assuming that the log of the final wealth in both cases \sim Gaussian($\mu - \sigma^2/2$, $T, \sigma/T$), by measuring the mean and volatility of both cases, and we can estimate the mean and variance of an equivalent Gaussian distribution—the negative "alpha"—that will have the same impact on the final wealth as the Left Tail (Loss Equivalence). In this example, the negative alpha distribution is Gaussian with annual mean of -0.45%, annual Volatility of 7%, and a Sharpe ratio of -0.064. The negative alpha is a continuous drag on portfolio returns. Under this liability scenario, the Average Wealth Allocation expected return has dropped to 7.03%, the expected Volatility has increased to 23.11%, and the expected Sharpe ratio has dropped to 0.26.

Modeling portfolio allocations with the possibility of left-tail events

We introduce two additional “Assets” to help us model the impact of Left Tails. First, the loss-equivalent negative alpha asset with a mean of -0.45% and a volatility of 7%.

This is simply the expression of the impact of the left-tail event-induced loss in the portfolio. The weight of the Left Tail in the portfolio will be either 100%, if the Left Tail is present, or 0% if the Left Tail does not exist. We also introduce the Liability Umbrella asset, which may exist if the Left Tail is Insurable in the market, i.e., if we can buy a short position against it. The Liability Umbrella asset has a volatility of 7%, and is -100% correlated with the Left Tail.¹⁴ The following table summarizes the assumptions, which allow us to utilize the Mean-Variance Portfolio optimization framework.

¹⁴ We assume that the mean of Liability Umbrella is -50% of the Left Tail mean, due to insurance costs. The weight of the Liability Insurance asset will be allowed to vary.

Assets	Average Wealth Allocation	Expected Volatility	T-Bill Return	Expected Return	Expected Sharpe Ratio	Lower Bound	Upper Bound	US Equity Large Gap	US Corporate Bonds Core	Real Estate	Hedge Fund	Commodity	Private Equity	Business	Left Tail	Insurance
US Equity Large Cap	20.1%	16.2%	1.0%	7.1%	0.37	0%	100%	1.0	0.2	0.5	0.6	0.3	0.7	0.7	0.0	0.0
US Corporate Bonds Core	15.1%	5.5%	1.0%	3.6%	0.47	0%	100%	0.2	1.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0
Real Estate	17.6%	16.8%	1.0%	6.6%	0.33	0%	100%	0.5	0.2	1.0	0.4	0.2	0.5	0.5	0.0	0.0
Hedge Fund	3.0%	8.0%	1.0%	5.7%	0.59	0%	100%	0.6	0.2	0.4	1.0	0.4	0.6	0.6	0.0	0.0
Commodity	3.0%	17.6%	1.0%	4.0%	0.17	0%	100%	0.3	0.1	0.2	0.4	1.0	0.3	0.3	0.0	0.0
Private Equity	3.0%	22.0%	1.0%	9.9%	0.40	0%	100%	0.7	0.0	0.5	0.6	0.3	1.0	1.0	0.0	0.0
Business	38.3%	44.0%	1.0%	9.9%	0.20	38%	38%	0.7	0.0	0.5	0.6	0.3	1.0	1.0	0.0	0.0
Left Tail	100.0%	7.0%	0.0%	-0.45%	-0.06	100%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	-1.0
Insurance	-	7.0%	0.0%	0.23%	0.03	0%	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	1.0

Optimal portfolios and insurance

We study the optimal portfolio allocations for three different situations of the above investor.

- **The first case** – No Liability – shows the allocations of the investor if she is not exposed to the risk of a Left Tail event like that associated with the liability.
- **The second case** – No Insurance – shows the allocations if the investor is exposed to the potential of the Left Tail event but is underinsured. Here she is exposed to the chance of a potentially disastrous outcome but effectively chooses to remain underinsured.
- **The third case** – Insurance – is similar to the second case except that she decides to insure the risk entirely.

The following table shows the total budget and Asset Upper and Lower Bounds for all three cases in our modeling as might be familiar in traditional asset mixes appearing in a high-level asset allocation. In portfolio construction, we utilize Monte Carlo resampling to obtain robust asset allocations. The simulations are based on the distributions above.

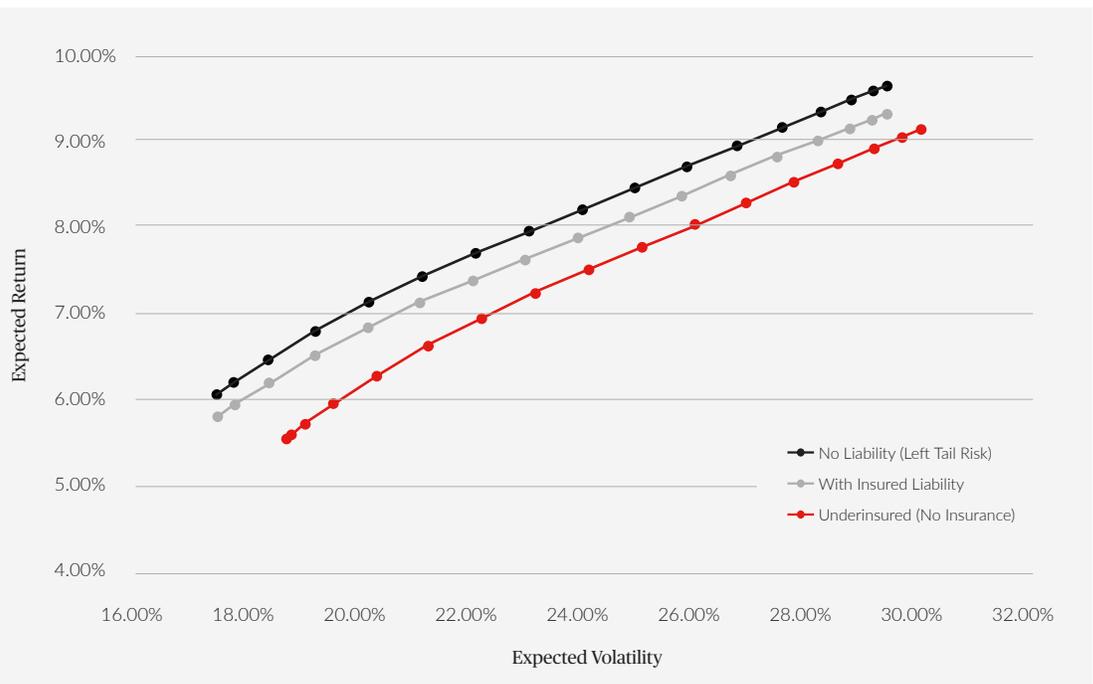
Assets	No Liability LB	No Liability UB	No Insurance LB	No Insurance UB	Insurance LB	Insurance UB
US Equity Large Cap	0%	100%	0%	100%	0%	100%
US Corporate Bonds Core	0%	100%	0%	100%	0%	100%
Real Estate	0%	100%	0%	100%	0%	100%
Hedge Fund	0%	100%	0%	100%	0%	100%
Commodity	0%	100%	0%	100%	0%	100%
Private Equity	0%	100%	0%	100%	0%	100%
Business	38.3%	38.3%	38.3%	38.3%	38.3%	38.3%
Left Tail	0%	0%	100%	100%	100%	100%
Insurance	0%	0%	0%	0%	0%	100%

Mean-Variance frontiers

The following graph depicts the expected Mean-Variance frontiers for the three cases above.

By comparing the No Liability and the No Insurance (but with liability) frontiers, we see that the left-tail risk reduces the expected returns and increases the risk of the achievable allocations. In other words, the No Liability expected frontier is more efficient at all levels of expected returns – expected risk is lower for each expected return due to the absence of the liability. In the underinsured case, our investor is exposed to the realistically calibrated liability but chooses to do nothing about it via the purchase of insurance specifically targeting the risk. Critically, the Insurance case allows the investor to operate a lower risk portfolio if desired.

Expected return-expected volatility efficient frontiers



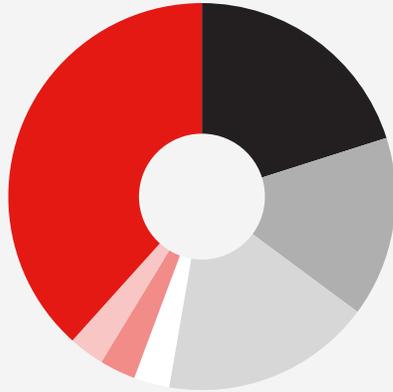
The Maximum Sharpe Ratio Allocations for the three cases above are shown on the next page and are compared with the Average Wealth Allocation from above.

Maximum Sharpe Ratio Asset Allocations

Maximum Sharpe Ratio Portfolios	Average Wealth Allocation	No Liability Exposure (Left Tail Risk)	Underinsured Liability (No Insurance)	Optimally Insured
Portfolio Volatility	22.00%	21.14%	28.56%	21.09%
Portfolio Return	7.45%	7.41%	8.72%	7.11%
Portfolio Sharpe Ratio	0.29	0.30	0.27	0.29
US Equity Large Cap	20%	3.8%	5.3%	3.9%
US Corporate Bonds Core	15%	10.2%	0.6%	11.0%
Real Estate	18%	12.9%	9.0%	12.9%
Hedge Fund	3%	27.0%	4.1%	26.4%
Commodity	3%	2.7%	0.9%	2.8%
Private Equity	3%	5.1%	41.9%	4.7%
Business	38%	38.3%	38.3%	38.3%
Left Tail Risk / Liability	None	None	Full	Full
Insurance	None	None	None	Optimal (78%)

Maximum Sharpe Ratio Asset Allocations

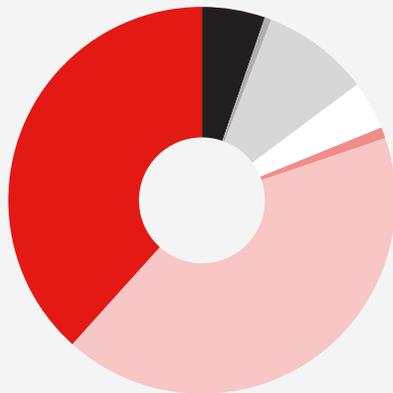
Average Wealth Allocation



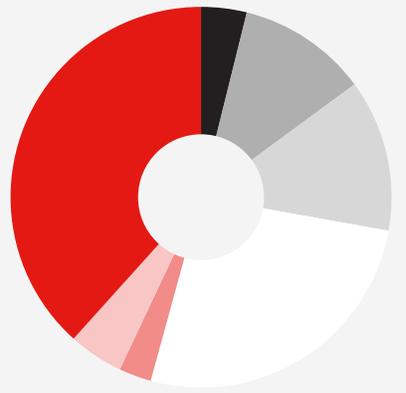
No Liability



Underinsured (No Insurance)



Optimally Insured



In the No Liability case, the Maximum Sharpe Ratio Allocations are relatively close to the Average Wealth Allocation, with the only exception being the under-weight of Hedge Funds and over-weight of Equities in the Average Wealth Allocation. The allocation when No Insurance is available is also intuitive; given the significant and disastrous possibility of losing 50% of her NAV, the investor maximizes the volatility of her investments in an effort to achieve a high final NAV, even after the left tail event. In other words, the investor adopts riskier asset allocations while holding expected return constant, resulting in a lower Sharpe ratio.

When insurance is available, the optimal allocation becomes almost identical to the No Liability case, and we see a rise in the efficiency of the allocation frontiers across the entire spans of risk and reward. It is interesting to notice that the optimal allocation does not need to completely hedge the left tail liability; it hedges almost 80% of it. The savings from the 20% lower insurance premiums can be invested for higher returns, compared to the marginal return of a complete liability hedge.

Insurance

The following table shows the asset allocations for the Insurance case. At all risk levels, the Mean-Variance Optimization never chooses to hedge more than 90% of the left tail liability; the more risk-tolerant the investor, the less left tail insurance in her portfolio.

Insurance provides the investor with the ability to avoid the impact of the left tail event, at a cost, albeit minor. In our current example, the cost is provided by the difference in returns between the *No Liability* and *Insurance* Maximum Sharpe Ratio portfolios, i.e., 7.45% - 7.11% = 34 bps for 80% of NAV. For \$30 million in wealth, this is equivalent to \$84,000 annual premium.¹⁵ The investment implication, possibly missed by investors, is that if an idiosyncratic but substantial liability exists, and insurance is available at a reasonable cost, for the same level of expected overall volatility, higher expected returns may be available as in this case. Said differently, for the same level of expected return at the overall balance sheet level, risk can be lower. The benefit is the ability to hedge the liability risk, and thus more of a "risk budget" may exist for financial investments.

¹⁵ Even though our example is fictitious, it is reasonable. Quotes from the industry price a liability umbrella policy for a \$30 million portfolio at approximately one-third of the above cost. There are three cost components that will influence the cost of insurance, namely: the frequency of the left tail – 1% per year in our example; the severity of Loss award – 50% of NAV in our example; and the industry's competitiveness – 50% of Liability alpha charged in our example.

Portfolio allocations with an insurable risk that is optimally insured

Allocations across various levels of risk

Assets	Portfolio 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Portfolio 17
Portfolio Volatility	17.5%	17.8%	18.4%	19.2%	20.2%	21.1%	22.0%	23.0%	23.9%	24.9%	25.8%	26.7%	27.5%	28.2%	28.8%	29.2%	29.5%
Portfolio Return	5.8%	5.9%	6.2%	6.5%	6.8%	7.1%	7.4%	7.6%	7.9%	8.1%	8.4%	8.6%	8.8%	9.0%	9.1%	9.2%	9.3%
Portfolio Sharpe Ratio	0.27	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.28
US Equity Large Cap	0%	0%	1%	1%	2%	4%	5%	7%	8%	8%	8%	7%	5%	4%	3%	2%	2%
US Corporate Bonds Core	59%	53%	42%	29%	19%	11%	7%	4%	3%	2%	1%	1%	1%	0%	0%	0%	0%
Real Estate	1%	2%	4%	7%	10%	13%	15%	17%	17%	16%	14%	12%	10%	8%	7%	5%	5%
Hedge Fund	2%	6%	13%	21%	25%	26%	23%	19%	15%	12%	9%	6%	4%	3%	2%	1%	1%
Commodity	0%	1%	1%	2%	3%	3%	3%	3%	3%	2%	2%	2%	1%	1%	1%	1%	1%
Private Equity	0%	0%	0%	1%	3%	5%	8%	12%	17%	22%	28%	34%	40%	45%	49%	52%	54%
Business	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%
Left Tail Risk / Liability	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Insurance	88%	87%	85%	83%	80%	78%	76%	74%	73%	72%	71%	70%	69%	68%	67%	65%	64%

Portfolio allocations with an insurable risk that is underinsured

Allocations across various levels of risk																	
Assets	Portfolio 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Portfolio 17
Portfolio Volatility	18.7%	18.8%	19.0%	19.5%	20.3%	21.2%	22.2%	23.1%	24.1%	25.0%	26.0%	26.9%	27.8%	28.6%	29.2%	29.7%	30.1%
Portfolio Return	5.5%	5.6%	5.7%	5.9%	6.3%	6.6%	6.9%	7.2%	7.5%	7.8%	8.0%	8.3%	8.5%	8.7%	8.9%	9.0%	9.1%
Portfolio Sharpe Ratio	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
US Equity Large Cap	0%	0%	0%	1%	1%	3%	4%	6%	7%	8%	8%	8%	7%	6%	4%	3%	3%
US Corporate Bonds Core	61%	59%	54%	44%	32%	21%	12%	7%	4%	3%	2%	1%	1%	0%	0%	0%	0%
Real Estate	0%	0%	1%	3%	6%	10%	13%	15%	16%	16%	15%	13%	11%	9%	7%	6%	5%
Hedge Fund	0%	1%	5%	12%	19%	24%	25%	23%	19%	15%	12%	9%	6%	4%	3%	2%	1%
Commodity	0%	0%	1%	1%	2%	2%	3%	3%	3%	3%	2%	2%	1%	1%	1%	1%	0%
Private Equity	0%	0%	0%	0%	1%	2%	5%	8%	13%	18%	24%	30%	36%	42%	47%	50%	53%
Business	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%
Left Tail Risk / Liability	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Insurance	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Case study 2: Property insurance

This case study uses the same techniques as case study 1 to model the impact on portfolio risk/reward of maintaining adequate property insurance coverage. Personal real estate (e.g., primary residence) - including its high-value contents - may account for a substantial portion of a prosperous investor's personal assets.

In this case study, based on industry statistics, we assume 17.5% of a high-net-worth family's assets are in the form of tangibles. Specifically, if a family has a net worth of \$30 million and a \$3 million primary residence, we assume that contents are worth \$1.5 million and that uncovered fine art are worth \$750,000.¹⁶ This value, \$5.25 million, represents approximately 17.5% of family assets. This abstraction is realistic given the very real and common insurance gaps arising from the difference between market value and higher replacement cost and the corresponding content limits driven from replacement cost. For example, a typical homeowner policy may give a policy holder 50% of dwelling value for personal contents. If the dwelling value is low, the policy will potentially under insure for personal contents as well.

We use the Mean-Variance decision framework to estimate the optimal amount of property insurance the investor may acquire as a function of her risk aversion as above. We assume that the frequency of loss is unchanged at 1% per year and the insurance cost is unchanged at 50% of Liability alpha.

The following table and charts show the Maximum Sharpe Ratio Allocations for three cases. The first, labeled as No Liability, No Insurance, and Insurance available. The property liability loss is not as extreme in wealth consequence as the 50% NAV-Net Asset Value loss previously examined. However, the value of primary residences and their contents is commonly underinsured. Yet with proper risk management, this is a gap that can be closed relatively inexpensively. After all, a large potential cost not specifically modeled here is the cost of time, effort, and psychic pain of those prosperous and successful owners of the insured assets in the event of a loss.

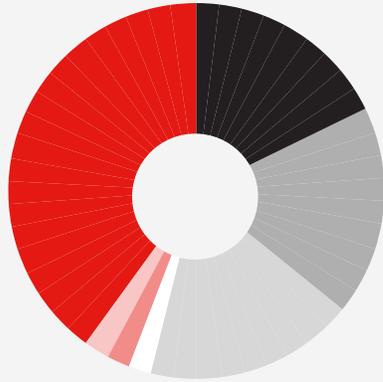
¹⁶ Note that standard riders might cover fine art and jewelry up to a point. The figure here references uncovered value.

Maximum Sharpe Ratio Asset Allocations

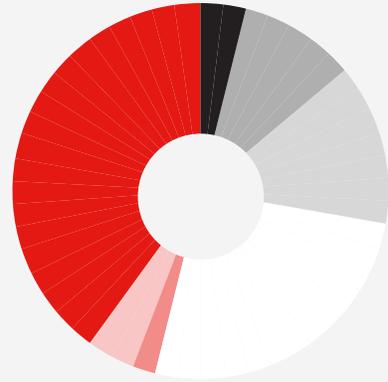
Maximum Sharpe Ratio Portfolios	Average Wealth Allocation	No Liability Exposure (Left Tail Risk)	Underinsured Liability (No Insurance)	Optimally Insured
Portfolio Volatility	22.00%	21.14%	21.12%	21.20%
Portfolio Return	7.45%	7.41%	7.20%	7.32%
Portfolio Sharpe Ratio	0.29	0.30	0.29	0.30
US Equity Large Cap	20%	4.2%	3.8%	3.8%
US Corporate Bonds Core	15%	10.5%	11.4%	10.3%
Real Estate	18%	13.6%	12.1%	13.5%
Hedge Fund	3%	25.3%	26.6%	26.1%
Commodity	3%	2.8%	3.0%	2.7%
Private Equity	3%	5.3%	4.7%	5.2%
Business	38%	38.3%	38.3%	38.3%
Left Tail Risk / Liability	None	None	Full	Full
Insurance	None	None	None	Optimal (67%)

Maximum Sharpe Ratio Asset Allocations

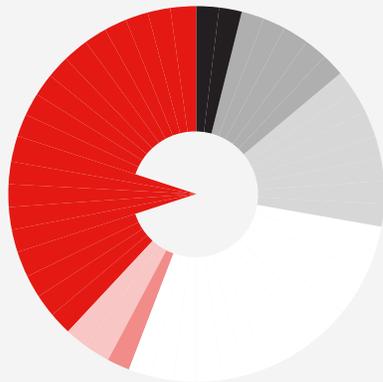
Average Wealth



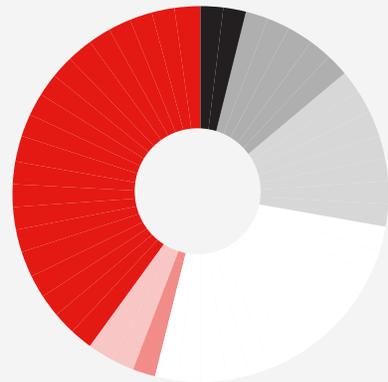
No Liability



No Insurance



Insurance





Conclusion

Given the stated assumptions about loss frequency and insurance industry competitiveness, obtaining a certain level of liability and/or P&C coverage can help insulate a high-net-worth investor's portfolio from the consequences of rare (left-tail) major losses, lowering expected volatility in the long run and improving the expected risk-adjusted return.

It is also important to note that the risk of actually receiving the expected payout from purchased insurance hedges is important. Wealth managers who hedge in financial markets may have experience using exchange-traded products or purchasing or advising on products that are ratified by an exchange which maintains requirements (like margin) that support the integrity of the trades. However, property and casualty insurance policies are contracts between the client and carrier, and insurance policy terms can vary from one carrier to the next. Because the facts of the applicable loss and policy terms will determine the amount of any particular claim payment, property and casualty insurance claims payout probabilities are not uniform across carriers.

Thus, for clients interested in hedging using insurance, payment fidelity risk may arise when coverage gaps exist. Premium insurers who focus on insuring prosperous clients with accurate estimates of replacement cost and are focused on insuring other valuable property such as jewelry and fine art may have better payoff probabilities. In other words, you might be with the right carrier, but you might make a risk decision not to insure your art or jewelry. If you are not properly insuring your property (home, contents, and other valuable property), you are accepting a certain level of risk that may affect the balance sheet of a client. We are not specifically modelling carrier stability in this case study, but our survey results indicate that decisionmakers prefer greater stability. The importance of insurance carrier stability, proper replacement cost on the home, and having adequate limits of liability is critical to having insurance that properly protects the personal assets and does not negatively affect the investment strategy.

Appendix 2:

Definition of investment and insurance terms

- **Alpha** *The abnormal rate of return on an investment or a portfolio, often net of investment costs, which is above the return which would be predicted by a model such as the CAPM. For an investment fund, alpha is usually considered to result from the skill of the manager.*
- **Gaussian** *Gaussian distribution (also known as normal distribution) is a bell-shaped curve describing the probabilities of ranges of outcome. It is assumed that such outcome ranges above and below the mean value have the same chances over repeated samples. For Gaussian distributed random variates, the mean, median and mode of their distributions are the same, and roughly 95% of the outcomes falls in the range of the mean, plus and minus 1.96 times the standard deviation of the distribution.*
- **Idiosyncratic risk** *A type of investment risk that is endemic to an individual asset (like a particular company's stock), or a group of assets (like a particular sector's stocks), or in some cases, a very specific asset class (like collateralized mortgage obligations). The opposite of idiosyncratic risk is systematic risk, which is the overall risk that affects all assets, such as fluctuations in the stock d, interest rates, or the entire financial system. (Source: Investopedia)*
- **Left tail** *In a Gaussian distribution of asset returns, the right tail is the set of data points with the higher standard deviations above the mean, and the left tail is the set of data points with the higher standard deviations below the mean, i.e., big losses. A "left-tail event" is shorthand for a loss which is at or near the higher historical or expected range of possible losses. For example, a stock going to zero would be a left-tail event relative to the range of possible returns on the stock over a certain period of time.*
- **Mean-Variance Optimization** *Mean-Variance Optimization (MVO) is a way of constructing a portfolio to maximize expected returns for a given level of volatility, or minimize volatility for a given expected return. Such a portfolio is called a "mean-variance optimized portfolio." Since its introduction in the early 1950s, MVO has proven a very flexible methodology to guide investors' asset allocation in the presence of uncertainties and is often used in the practical construction of investor portfolios. Even though it is used almost exclusively in the allocation of traded assets—stocks, bonds, commodities, futures, etc.—it can be easily extended to include more illiquid assets, such as hedge funds, private equity investments, and privately-owned businesses. To date, the central assumption of Gaussian distributions of risks and reward assets has been a limitation in applying the methodology in more realistic situations such as the modeling of left-tail events.*

- **Monte Carlo simulation** A risk analysis technique that builds models of possible results by substituting a range of values for any variable that is inherently uncertain. It is used with many iterations of the calculation (sometimes thousands) to produce a distribution of possible outcomes.

- **Sharpe ratio** A ratio developed by Nobel laureate William F. Sharpe to measure risk-adjusted performance. The Sharpe ratio is the portfolio rate of return minus the risk-free rate, divided by the standard deviation of the portfolio returns. The Sharpe ratio provides a way of judging whether a portfolio's performance came from savvy investing or simply from taking on more risk. The greater the Sharpe ratio, the better the risk-adjusted performance has been (or is expected to be, if returns and risk are forecast for the future).

- **Systematic risk** Also known as market risk. An undiversifiable risk characteristic of the overall market.

- **Umbrella policy** A type of personal liability insurance that can be indispensable when you find yourself liable for a claim larger than your homeowner's insurance or auto insurance will cover. If you own a boat, umbrella insurance will also pick up where your watercraft's liability insurance leaves off.

Umbrella insurance even covers certain liability claims those policies may not, such as libel, slander, and false imprisonment. And if you own rental property, umbrella insurance provides liability coverage beyond what your renter's policy covers. (Source: Investopedia)

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