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FinTech: Overview, Payments, and Regulation

Key Considerations in FinTech

Professor Christopher Geczy PhD

FinTech: Some Key Considerations

- A window into the millennial heart and mind
- Issues of trust
  - Trust in the financial industry
- Choice architecture
- Know your customer
  - Social media and what can be known

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FinTech: Overview, Payments, and Regulation

Millennials Attitude Towards Financial Advice

Professor Christopher Geczy PhD

Millennials

- Millennials (aka “Gen Y”) are individuals born 1977-1995 (roughly 20 to 40 years old)
  - 25% of U.S. population (83 million) (U.S. Census Bureau, 2015)
  - Globally - 40% of the adult population (2015)
  - “Diverse, expressive and optimistic” (Nielsen's characterization, for its marketing clients)
  - Median income
    - $25K for younger Millennials (18-27)
    - $48K for older Millennials
  - 25% married compared with 42% of Boomers at same age
  - More racially diverse than previous generations

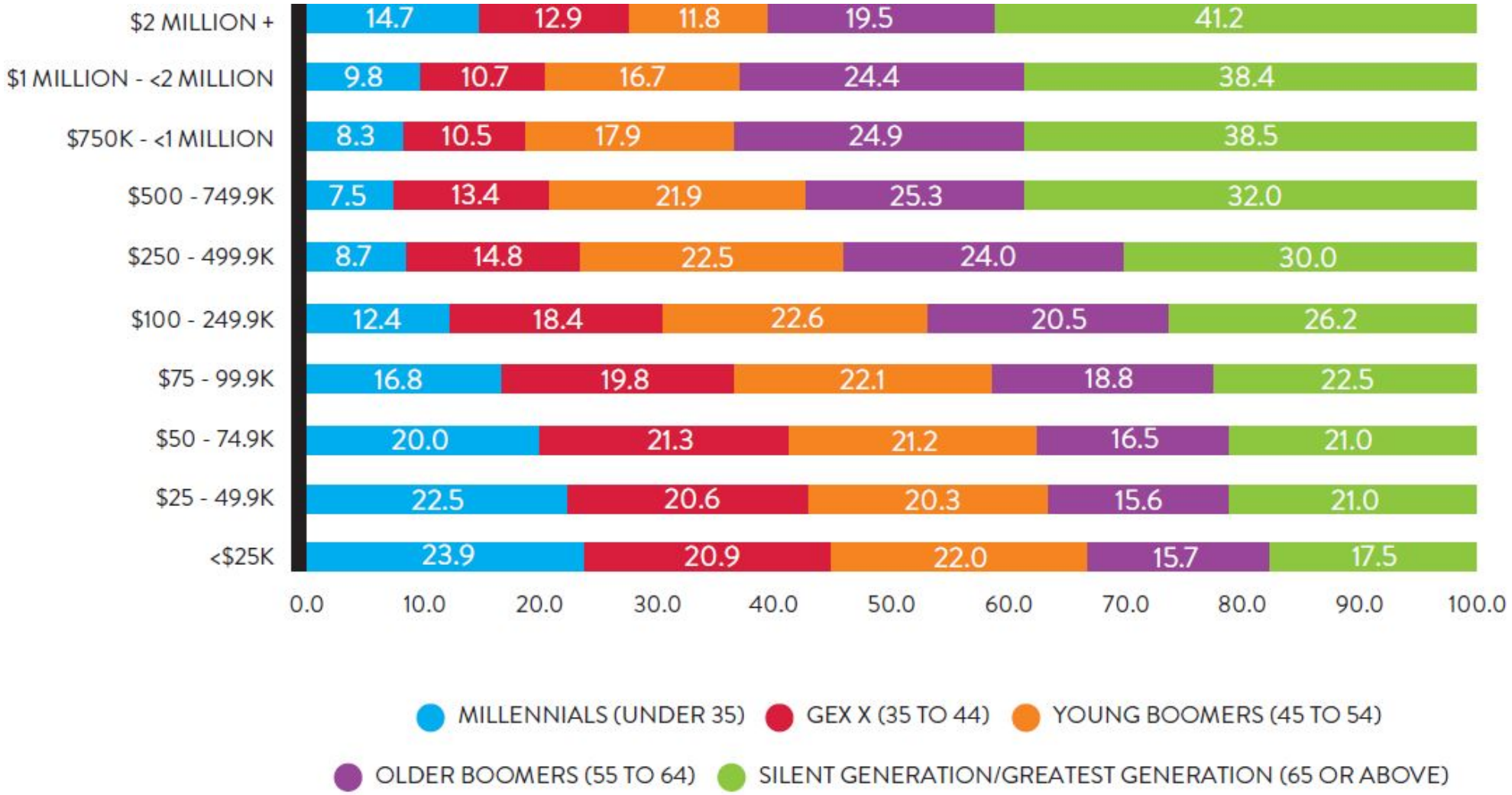
Source: Neilsen, “Millennials: Breaking the Myths” (2014) and Deloitte, “Millennials and Wealth Management” (2015).

Millennials

- **Wealth accumulation:** A greater percentage of double millionaires are Millennials (14.7%) than Gen X (12.9%) and Young Boomers (11.8%)

Source: Neilsen, “Millennials: Breaking the Myths” (2014) and Deloitte, “Millennials and Wealth Management” (2015).

Generational Wealth Distribution



Source: Neilsen, “Millennials: Breaking the Myths” (2014).

Millennials: Attitudes to Financial Advice

- Optimism about their future
- Half think there will be no money for them from Social Security when they retire
  - 6% expect to receive SSRI at levels available to current retirees
- According to a 2014 U.S. Trust survey, two-thirds of Millennials see their investment decisions as a way to express their social, political or environmental values
- According to a Sept. 2015 survey by *Financial Advisor* and *Private Wealth* magazines, about one-third of advisors are *not very likely* to recommend an impact investment, one-third *might* recommend, and the remaining third are *very likely* to*
- 68% of advisors report client inquiries about impact investing

* Tom Kostigen, "Impact Investing Survey Results," *Financial Advisor* (Nov. 10, 2015).

Millennials

- Only 68% of Millennials (here 1981-1996) felt confident to handle their family's money
  - 73% for Gen X (1965-1980)
  - 86% for Boomers (1946-1964)
  - 88% for Silent Generation (Before 1946)
- Over 80% of millennials own a smartphone globally
- 90% of Millennials check their smartphones within the first 15 minutes of waking up
  - Most common activity: checking social networks
- 54% have started or plan to start their own business
  - 27% self-employed

US Trust "Insights on Wealth and Worth" (2016 and 2018)
Deloitte "Millennials and Wealth Management Trends and Challenges of the New Clientele"
Federal Reserve Bank of St. Louis Center for Household Financial Stability

Millennials

- However, from the Federal Reserve Ban of St. Louis…
  - 60% of U.S. Millennials have zero stock market exposure
  - If they hold, they hold only $7,600, lower than Gen X at the same age
  - Millennials households - average net worth of $90,000 in 2016 compared to $130,000 for Gen X in 2001
- 81% of Millennial workers don't believe Social Security will be there for them
  - 51% expect nothing from Social Security (Pew Research Center)
  - More believe in UFO's than believe that Social Security will persist (Peterson Institute)
- And yet they're optimistic about the future and want to matter in the world

US Trust "Insights on Wealth and Worth" (2016 and 2018)
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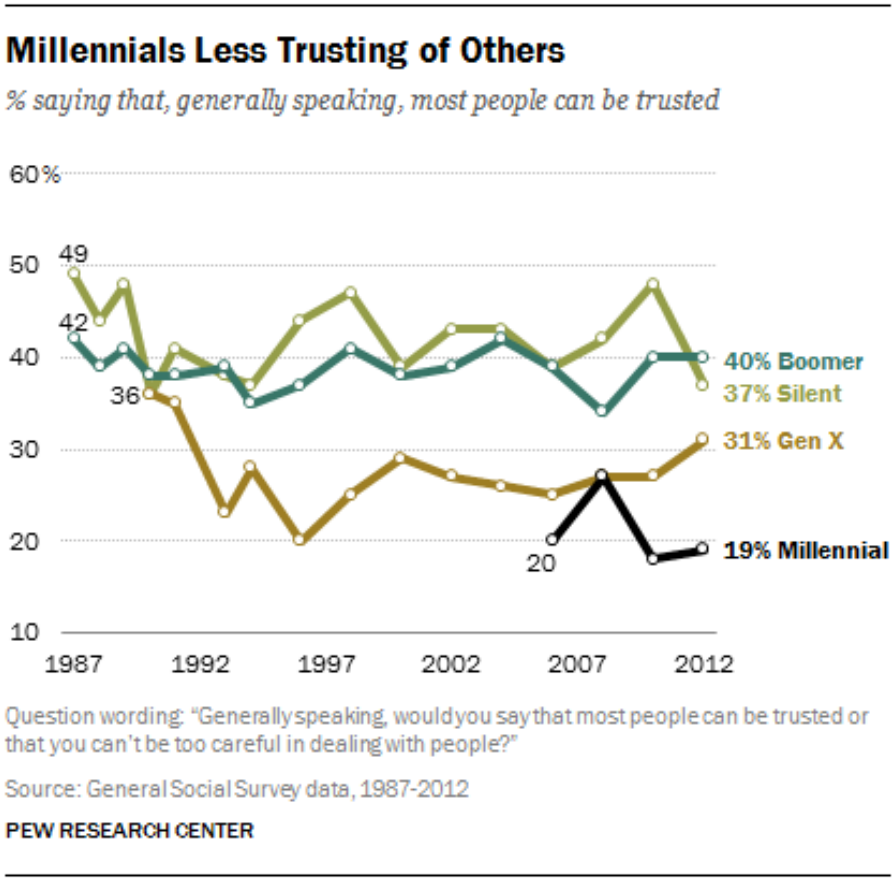
Millennials: Attitudes to Financial Advice

- A characteristic of Millennials is relatively low trust in other people



Source: Pew Research Center, "Millennials in Adulthood: Detached from Institutions, Networked with Friends" (March 7, 2014).

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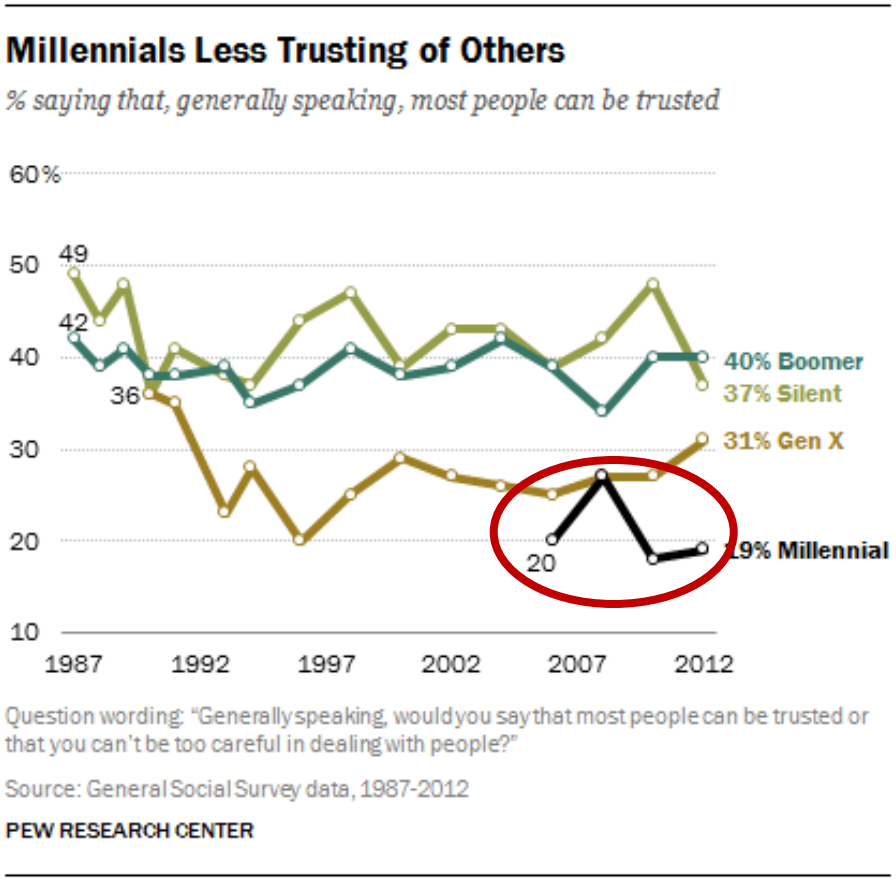

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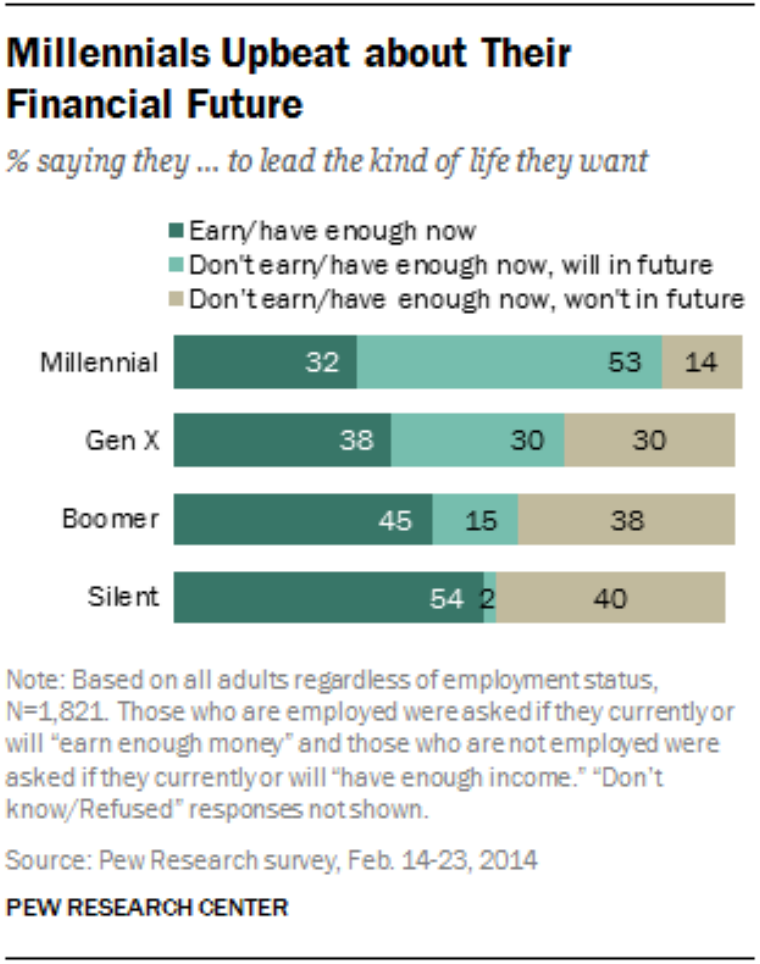
Millennials: Attitudes to Financial Advice

- They are optimistic about their financial future



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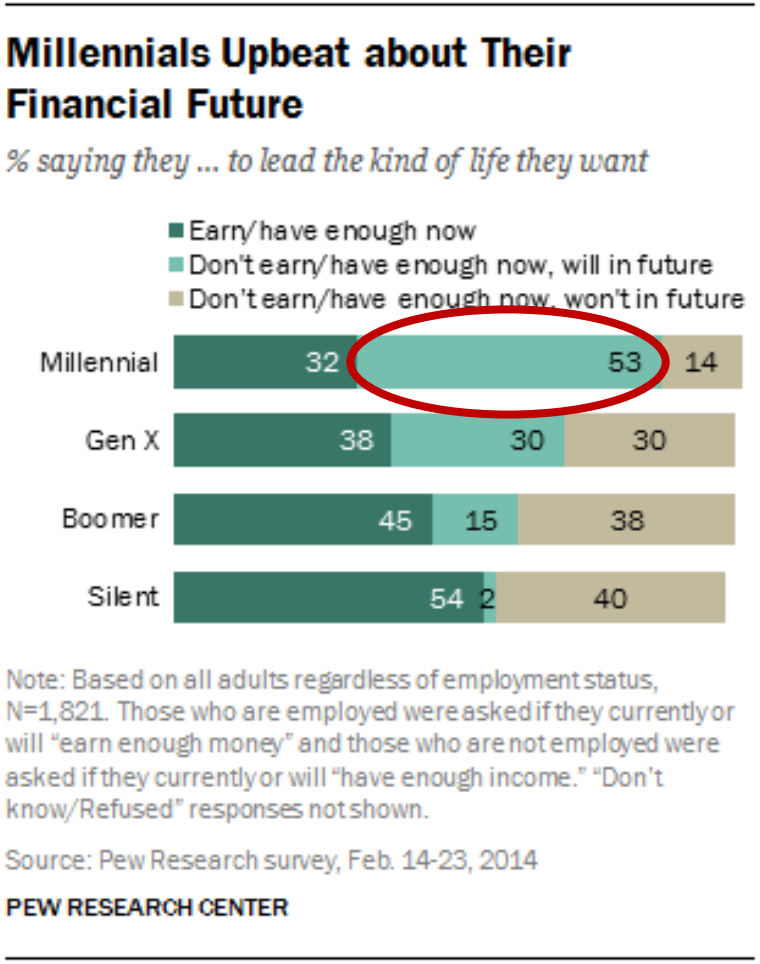

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Millennials: Attitudes to Financial Apps

- They use mobile devices for financial services

Table 3. Use of mobile banking in past 12 months by age

Percent, except as noted

Age group	2011	2012	2013	2014	2015
18–29	45	54	63	60	67
30–44	29	37	43	54	58
45–59	12	21	25	32	34
60+	5	10	9	13	18
Total	**22**	**29**	**33**	**39**	**43**
Number of respondents	1,859	2,180	2,187	2,437	2,151

Note: Among those with a mobile phone and a bank account.

Table 5. Use of mobile payments in the past 12 months by age

Percent, except as noted

Age group	2011	2012	2013	2014	2015*
18–29	20	26	28	34	30
30–44	16	18	21	31	32
45–59	8	9	13	16	20
60+	5	8	7	7	13
Total	**12**	**15**	**17**	**22**	**24**
Number of respondents	2,002	2,291	2,341	2,603	2,244

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Source: Federal Reserve Board of Governors, “Consumers and Mobile Financial Services,” March (2016)

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Risk Aversion

Professor Christopher Geczy PhD

Time-Varying Risk Aversion

- Depression Baby Affect
  - Behavioral characteristics or actions taken/not taken by those who lived through The Great Depression OR those of their children
    - Less tolerant of risk
    - Save more
    - More introverted

Source: Malmendier and Nagel (2010), "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking? *Quarterly Journal of Economics,* February 2011.

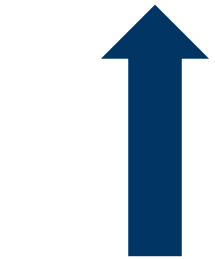
Time-Varying Risk Aversion

- Investor market experience impacts
  - Risk aversion
  - Risk capacity
  - Actual risk taking
- Investors who have earned low stock market returns
  - Less likely to take financial risk
  - Less likely to participate in the stock market
  - When they do, they invest less
- More recent experiences have stronger effects on an investors risk appetite
- Early life experiences especially can have long-lasting (decades) effects

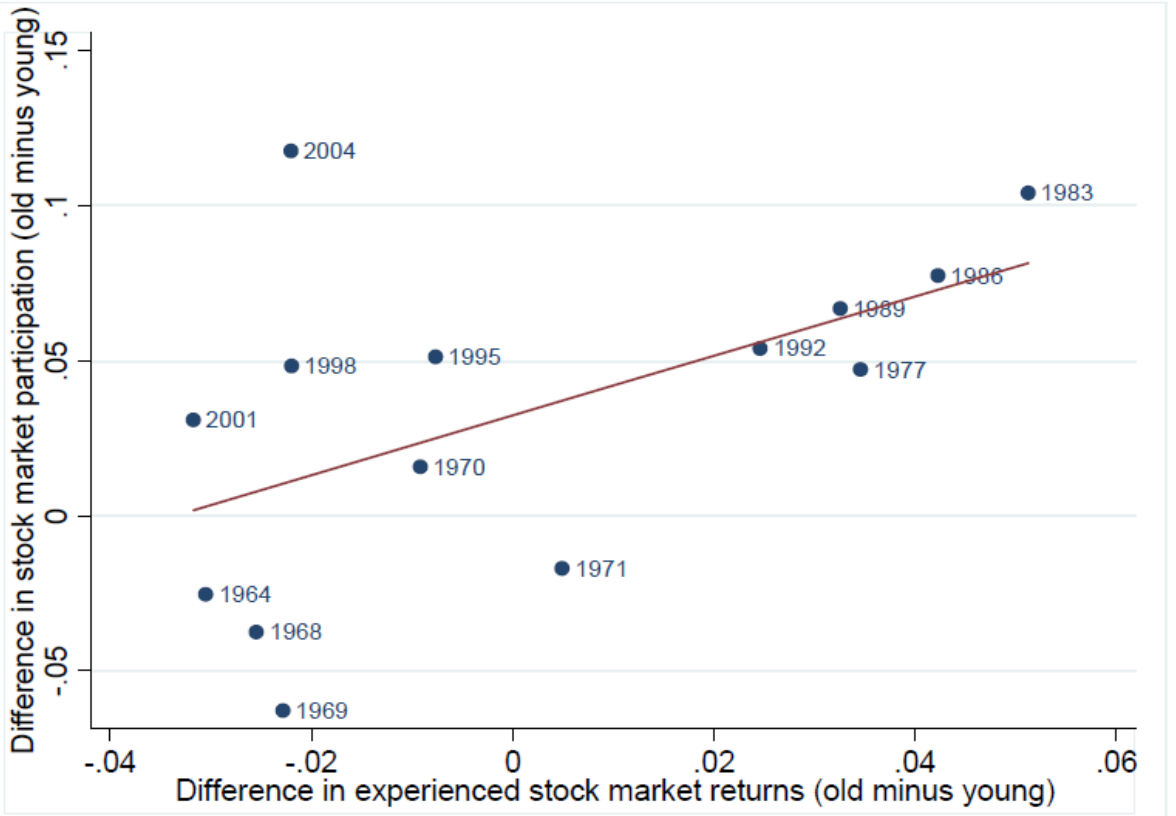
Source: Malmendier and Nagel (2010), "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking? *Quarterly Journal of Economics,* February 2011.

Willingness to Take Financial Risk Depends on Investor Market / Macro Experience

Older Investors Participate Relatively More in the Stock Market



Older Investors Participate Relatively Less in the Stock Market



Older Investors Experienced Greater Lifetime Return Up Until Date Indicated

Prior 50-year minus 20-year Stock Market Return

Figure 1: Differences in stock-market participation rates of old and young individuals plotted against differences in lifetime average stock-market returns. Stock market participation rates are the fraction of households who invest in stocks (including stock mutual funds). The y-axis shows the participation rate of old (household head age > 60 years) minus the rate of young (household head age ≤ 40 years) households. The x-axis shows the average real stock market return (S&P500 index) over the prior 50 years (as proxy for the return experienced by old households) minus the return over the prior 20 years (as proxy for the return experienced by young households). The years refer to the respective SCF survey waves.

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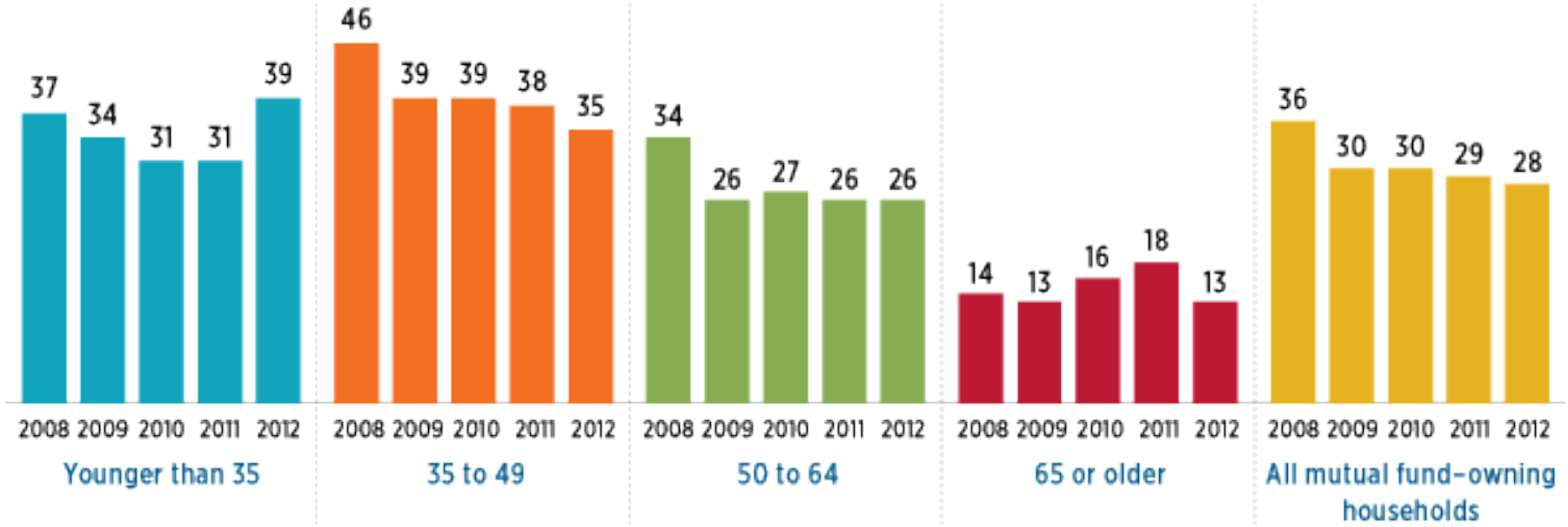
Investment Company Institute Annual Mutual Fund Tracking Survey

Reluctance to Take Risk Rose During the Financial Crisis, Especially Among the Young

Percentage of all US households willing to take "above-average" or "substantial" risk.



Source: ICI Annual Mutual Fund Shareholder Tracking Survey

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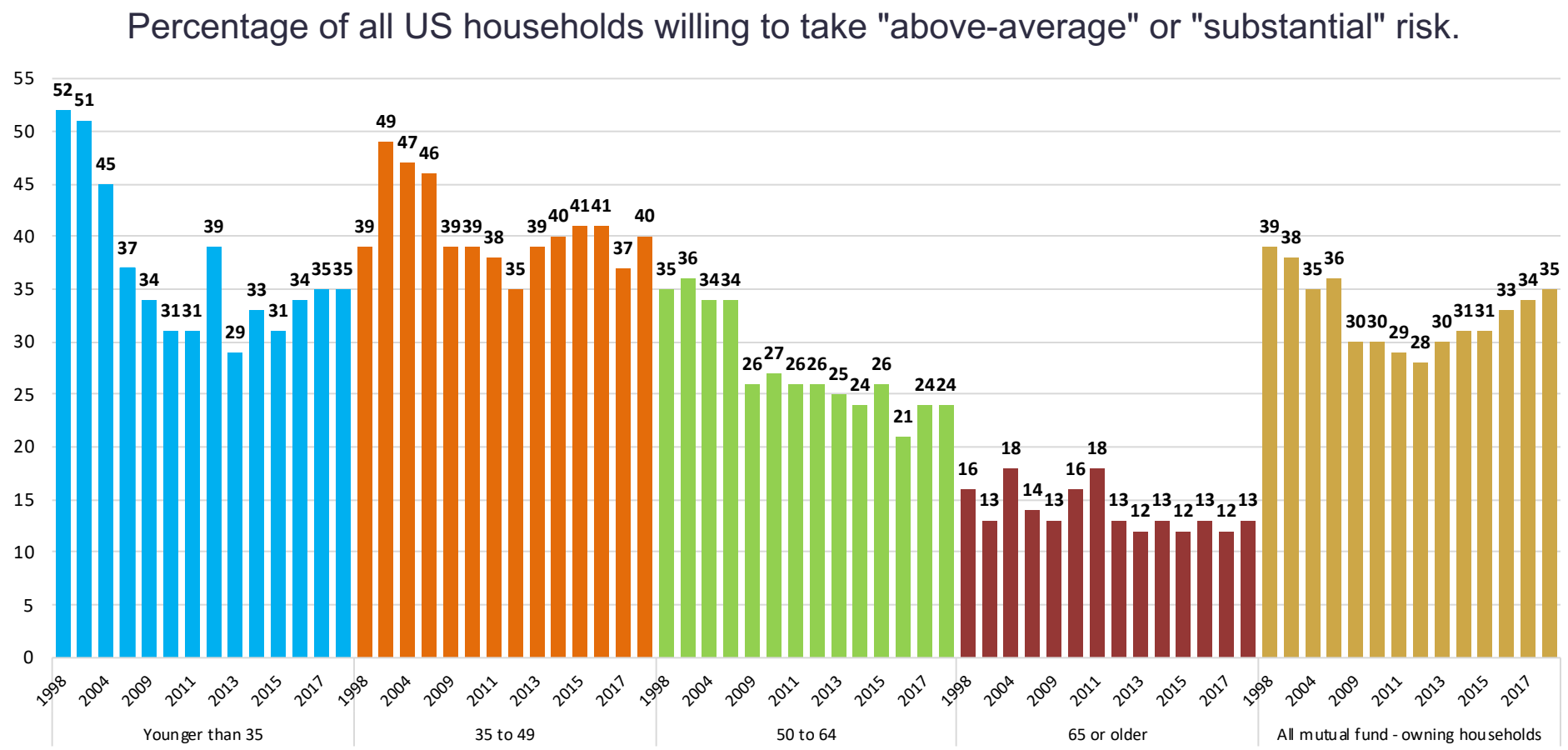

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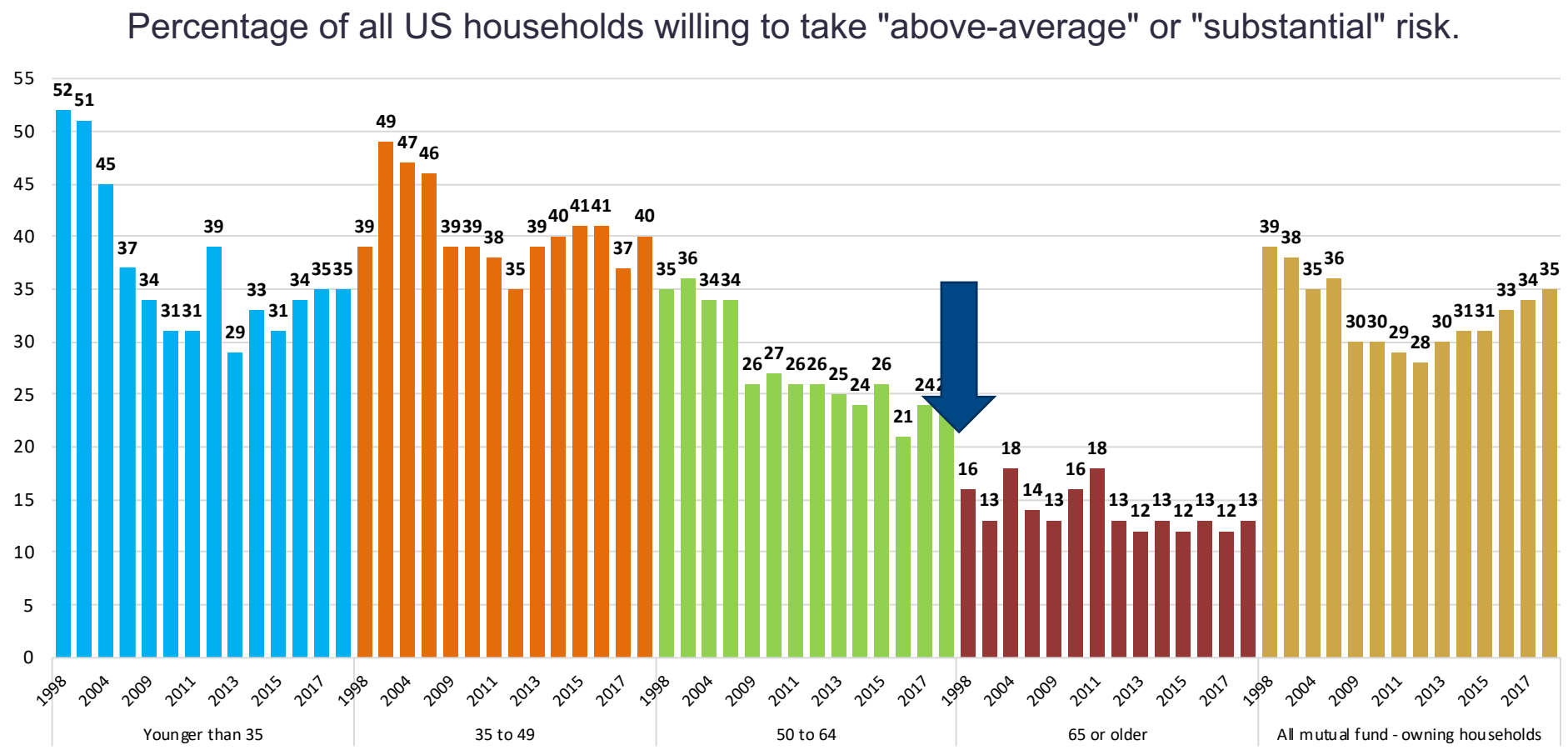

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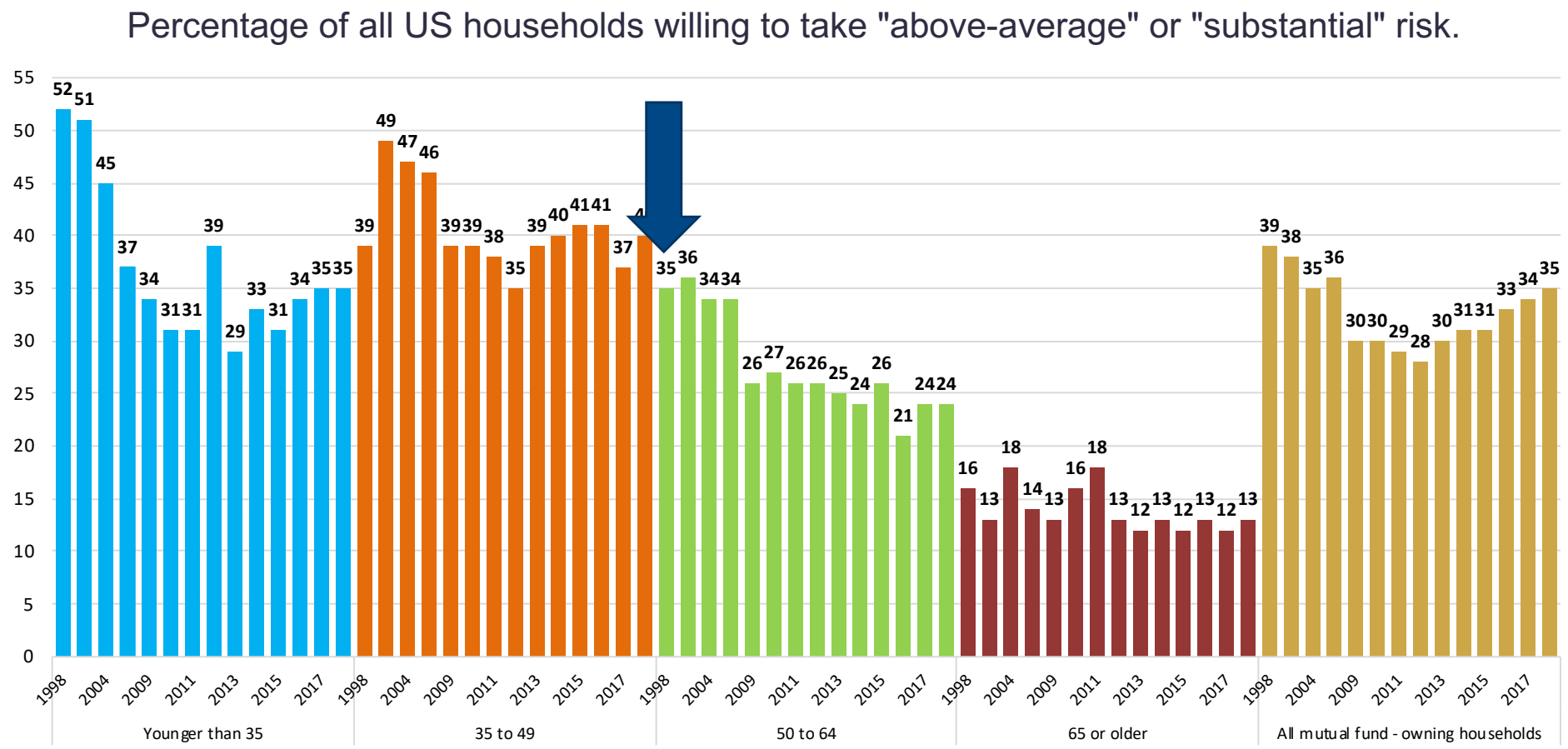

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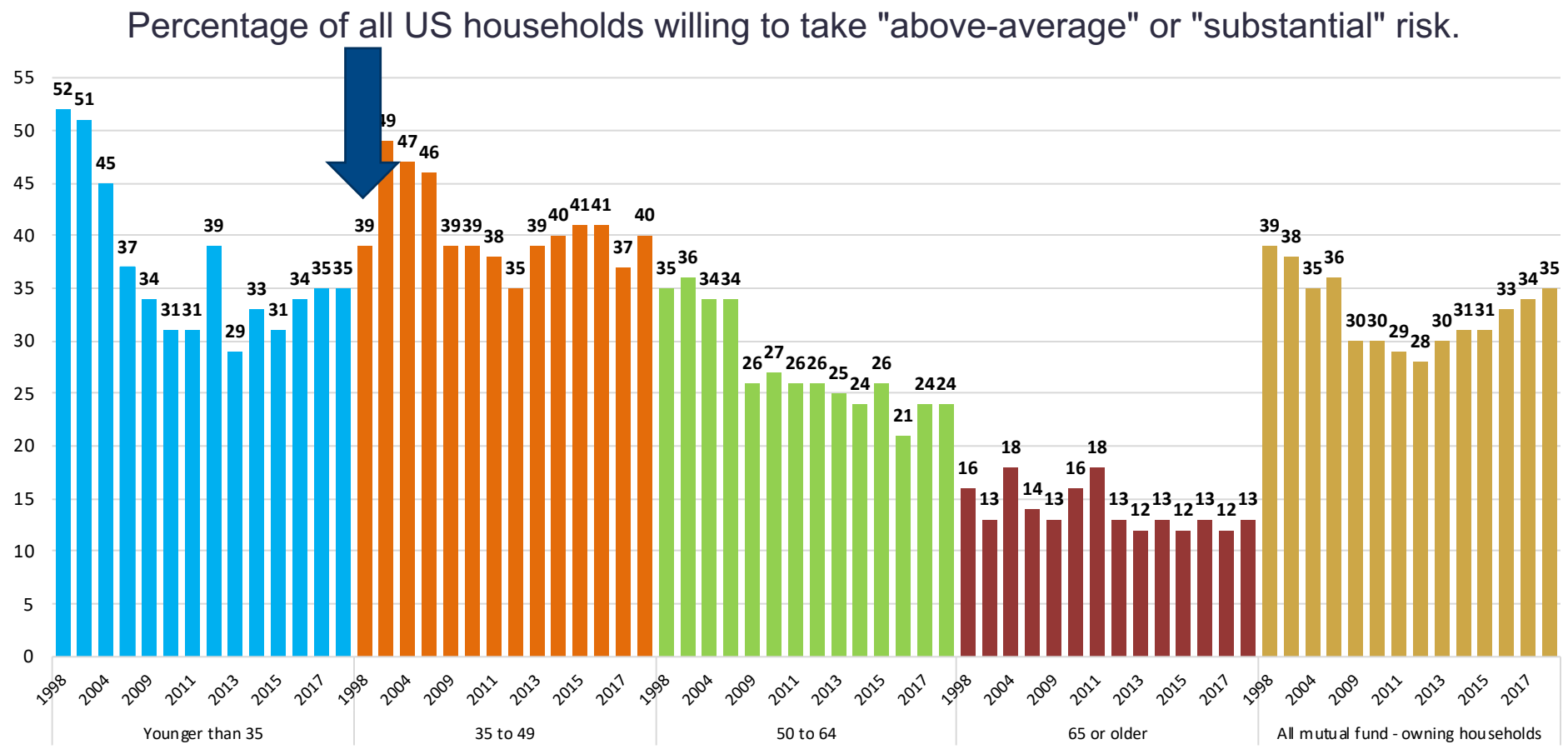

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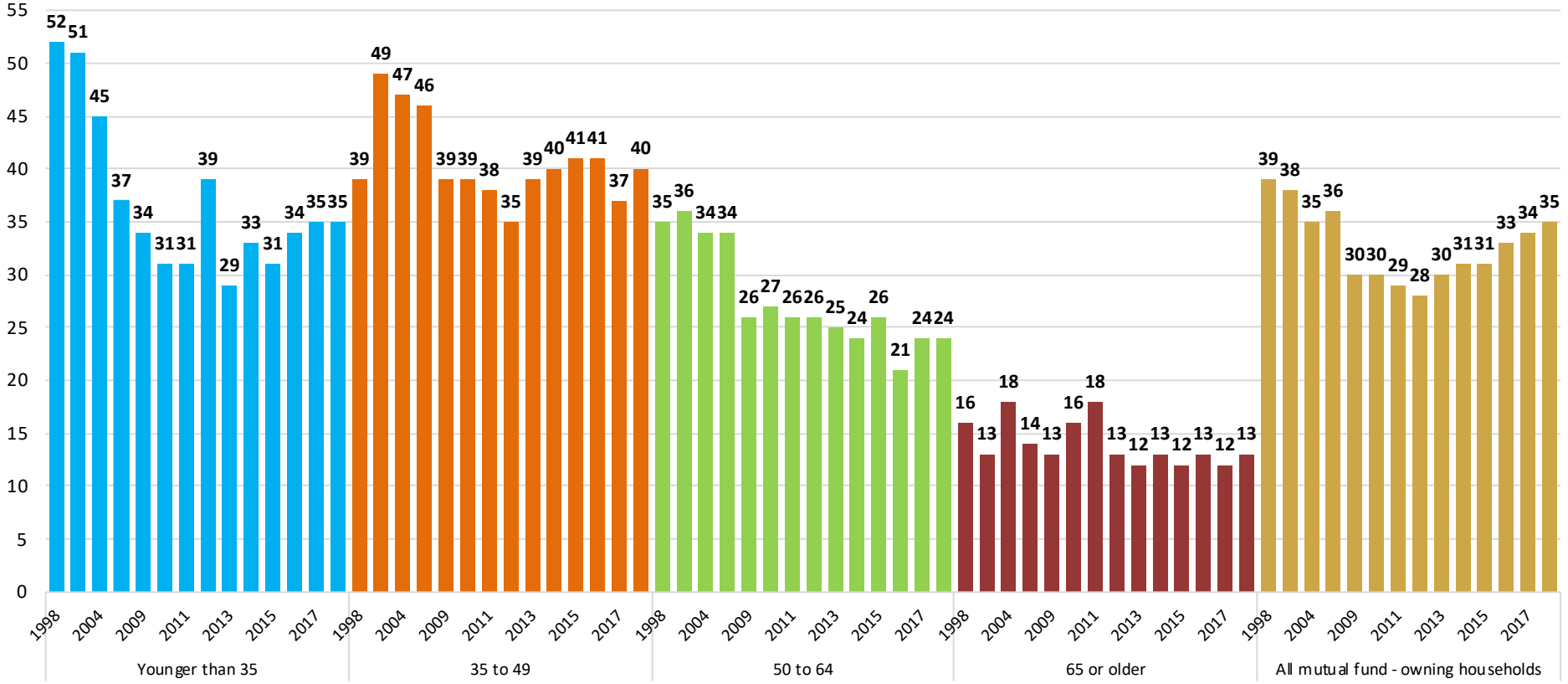
Percentage of all US households willing to take "above-average" or "substantial" risk.



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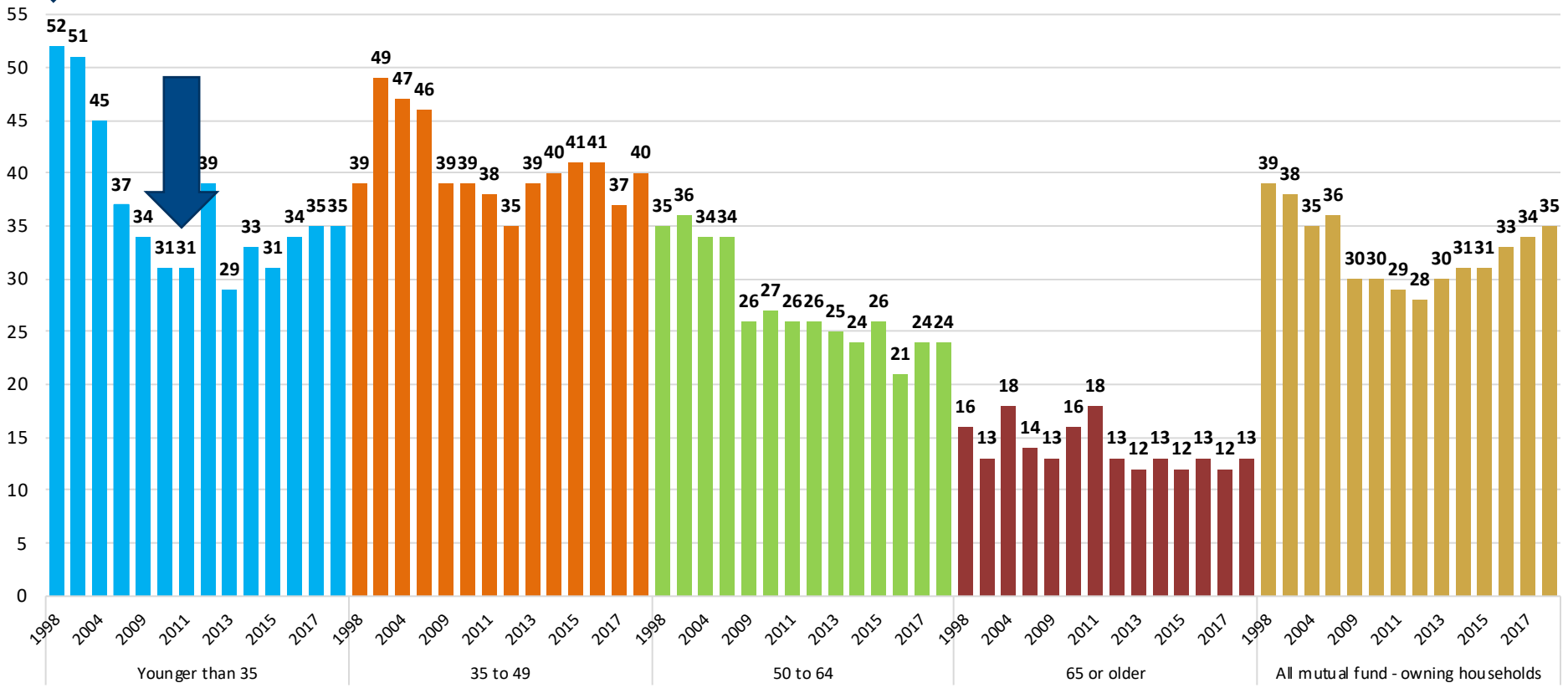

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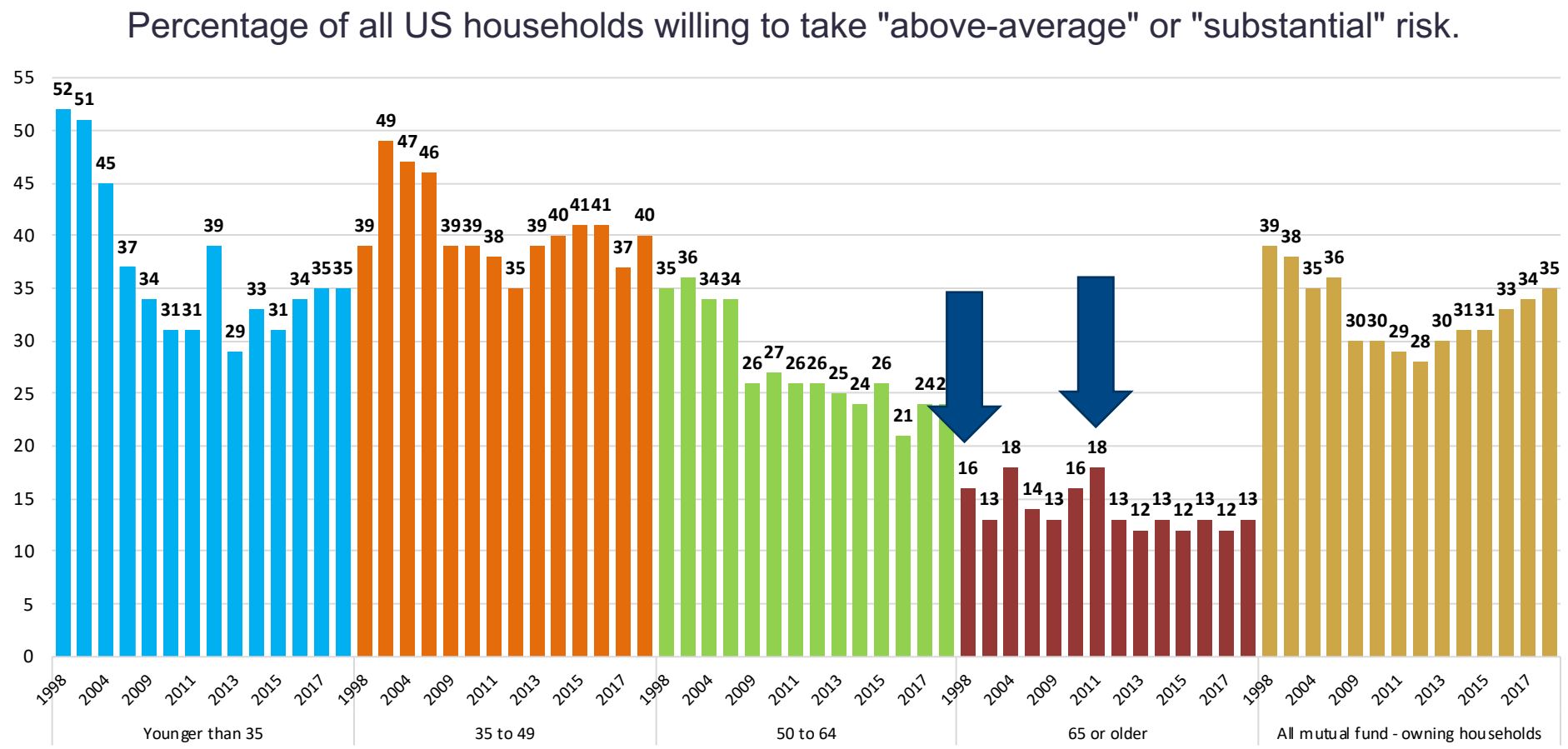

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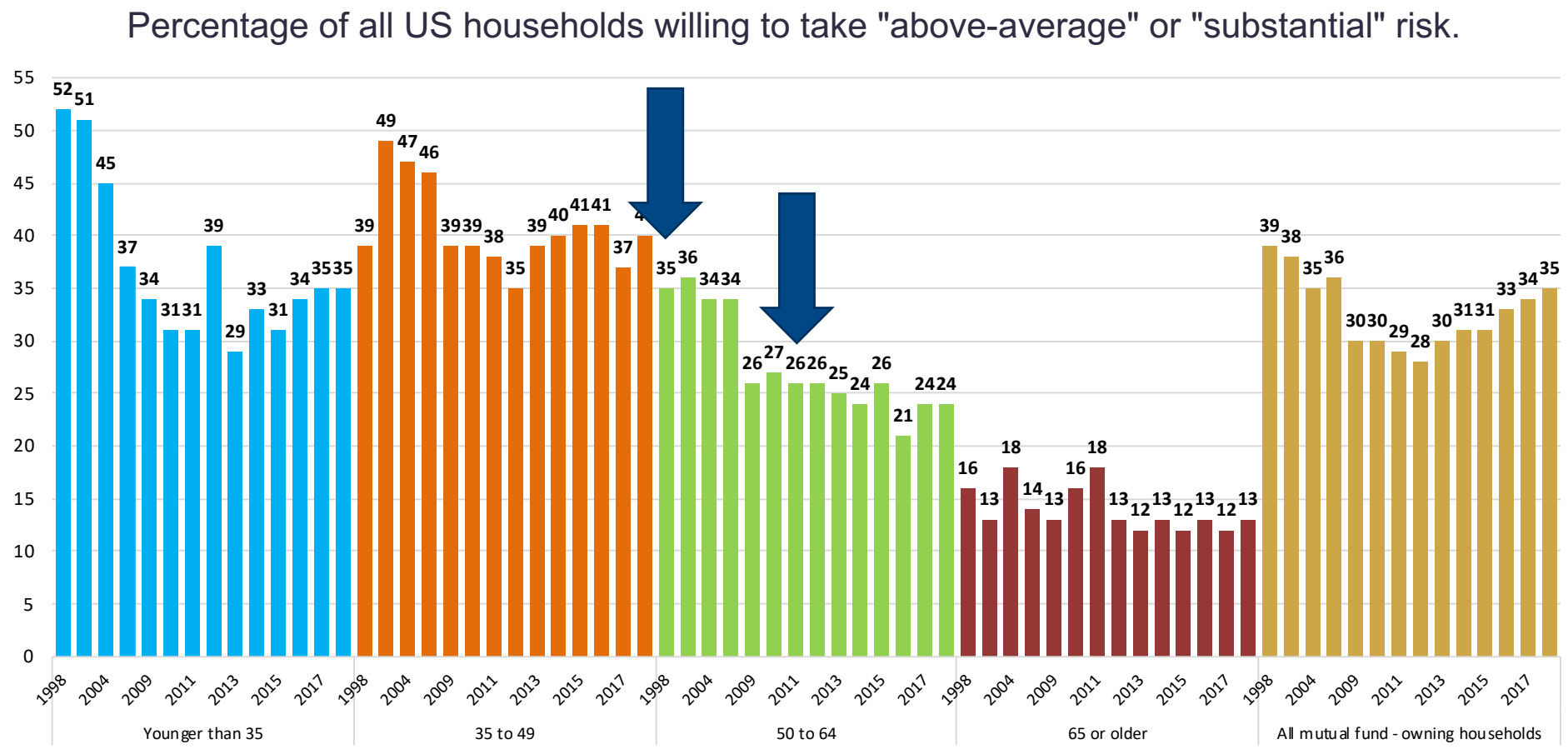

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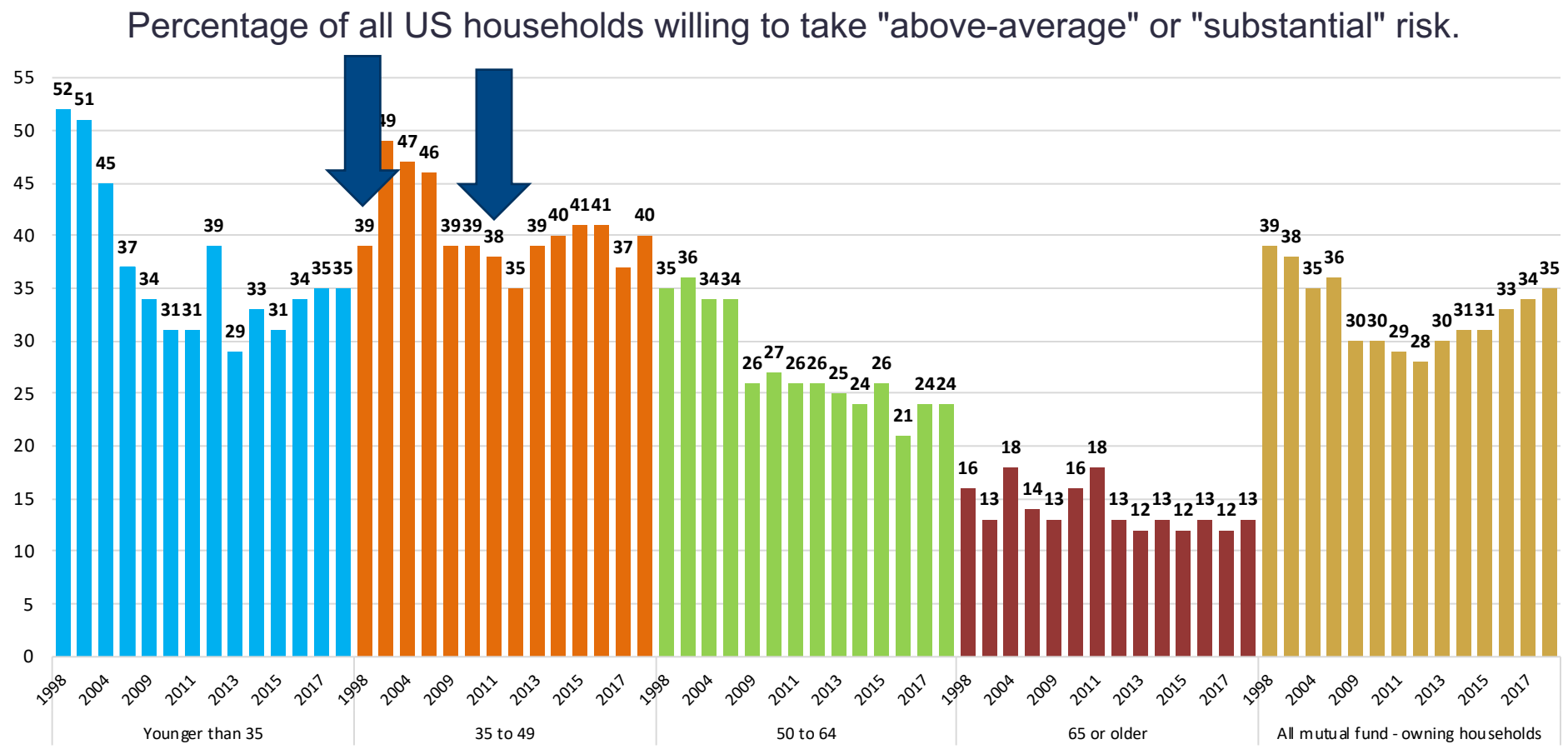

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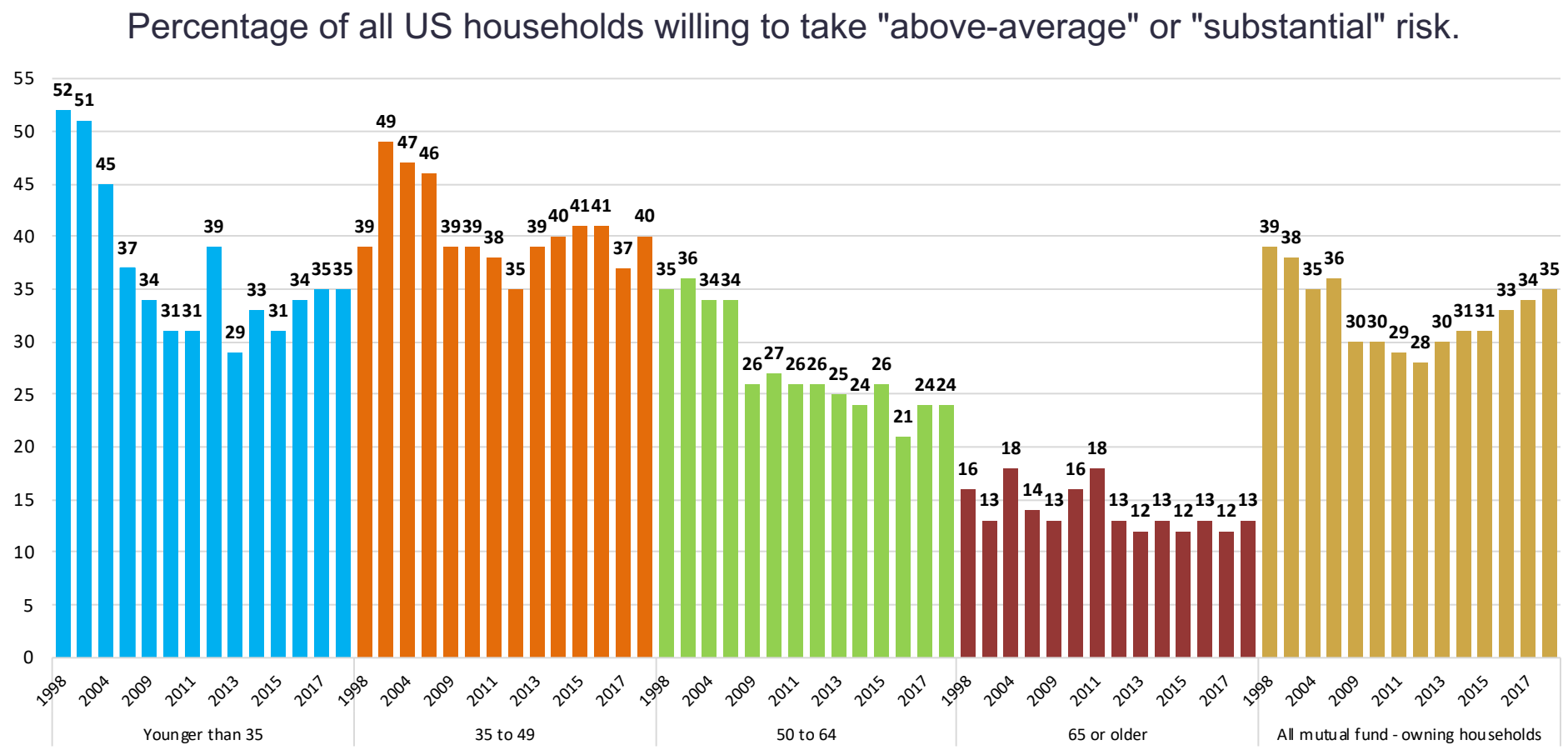

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Millennials and Social Impact

Professor Christopher Geczy PhD

Millennials

- A generational shift in social attitudes
  - Motivated millennials to matter in the world
  - Impact investment strategies have risen to high level of importance for millennial asset owners
- A 2018 U.S. Trust survey found 88% of millennial respondents owned or are in interested in social impact investments*
- A 2013 survey by the World Economic Forum of 5,000 investors in 18 countries found 36% of millennial respondents felt “improved society should be business’ top priority

Millennials

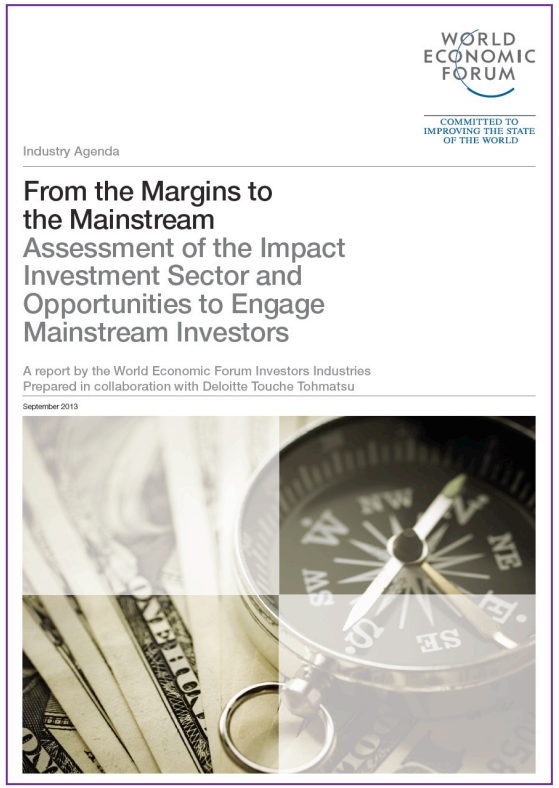
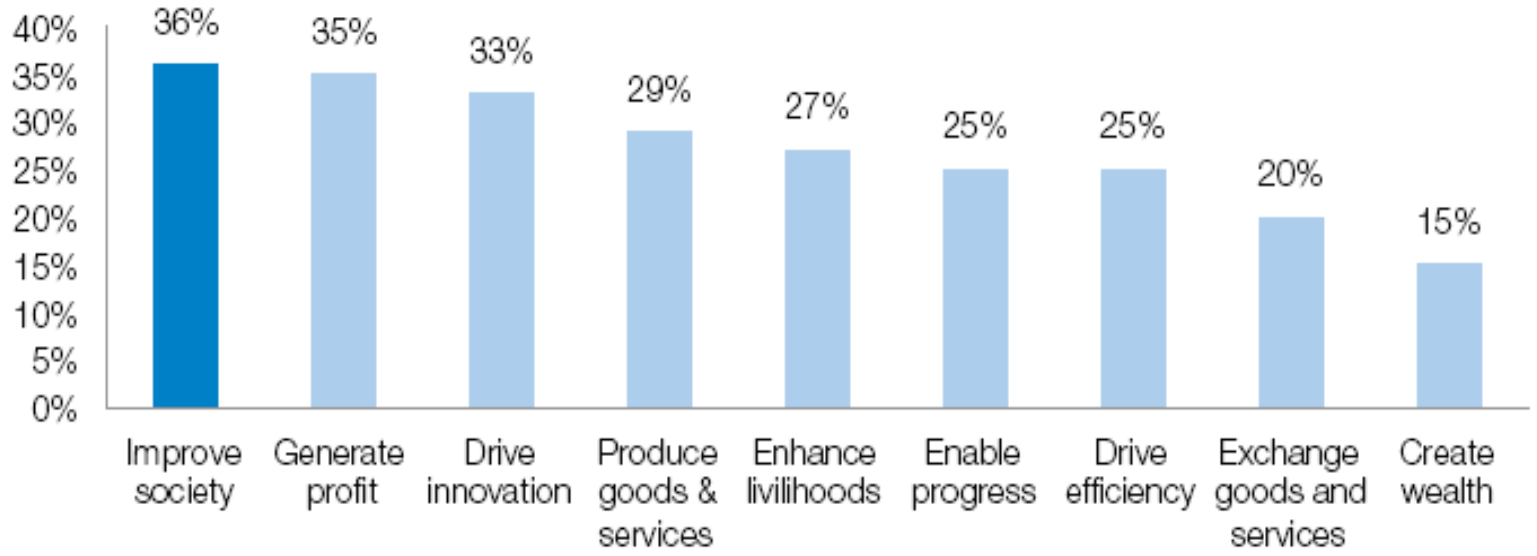


Figure 1: Primary Purpose of Business According to the Millennial Generation, % of Survey Respondents

Source: Deloitte



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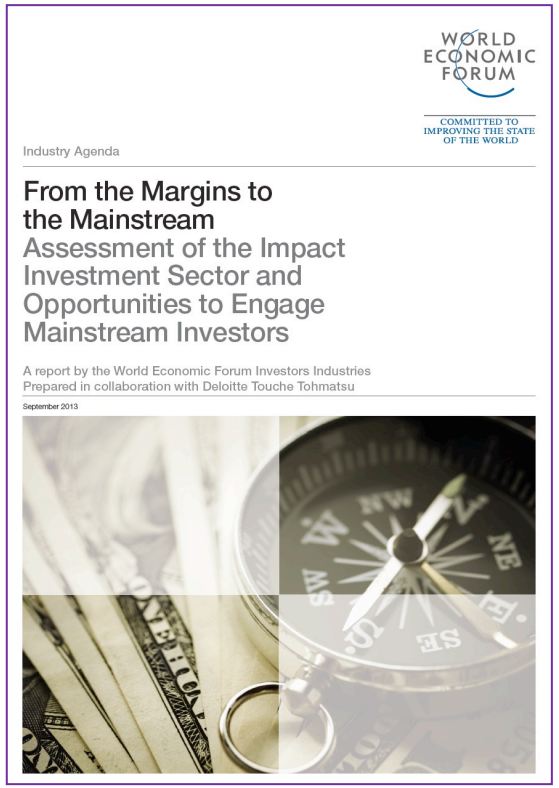

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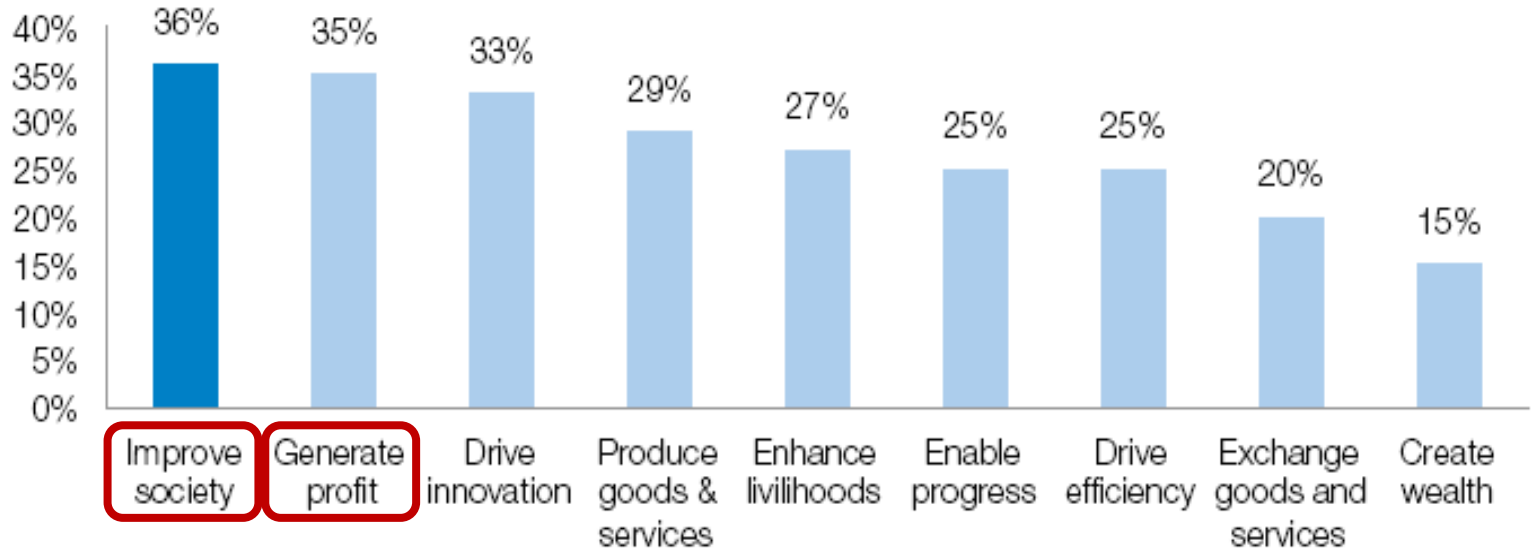

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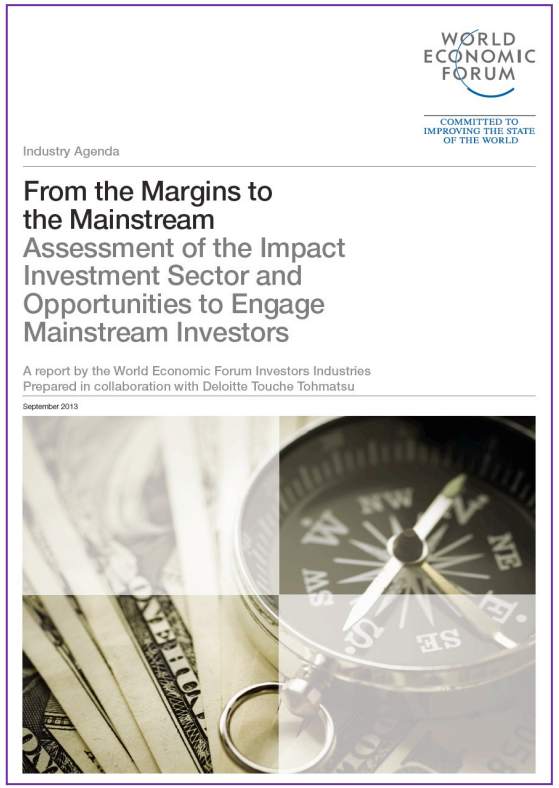

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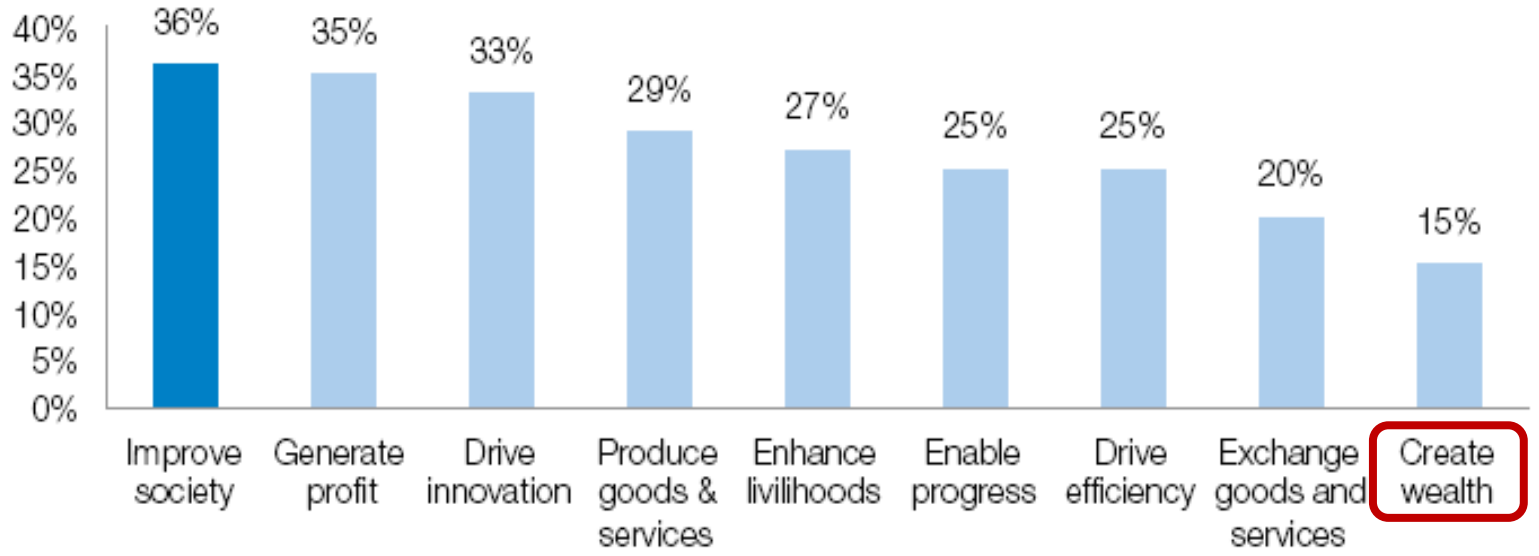
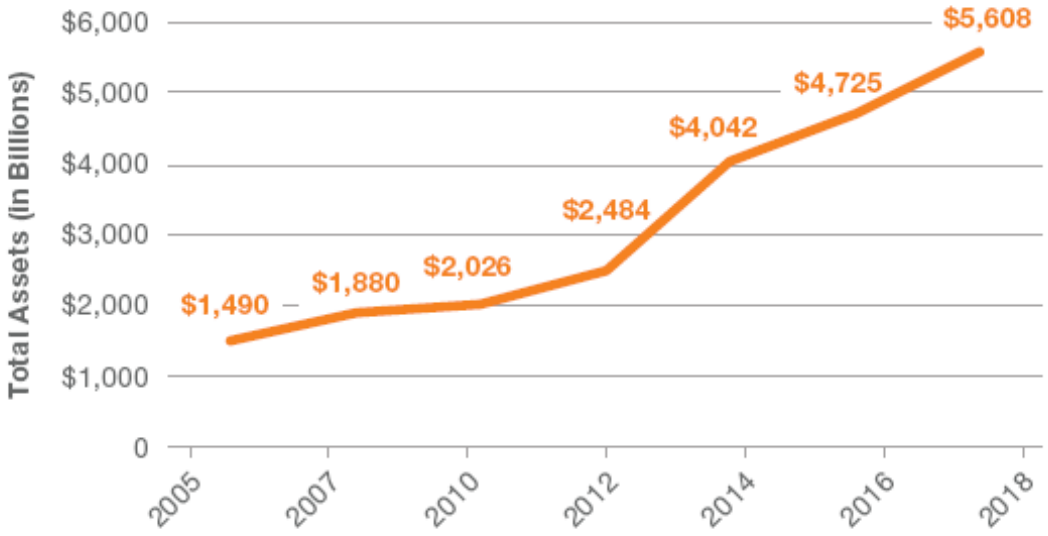


Socially Responsible Investing

ESG: Environmental, Social and Governance criteria

FIGURE 3.1

Growth of ESG Incorporation Reported by Institutional Investors 2005–2018



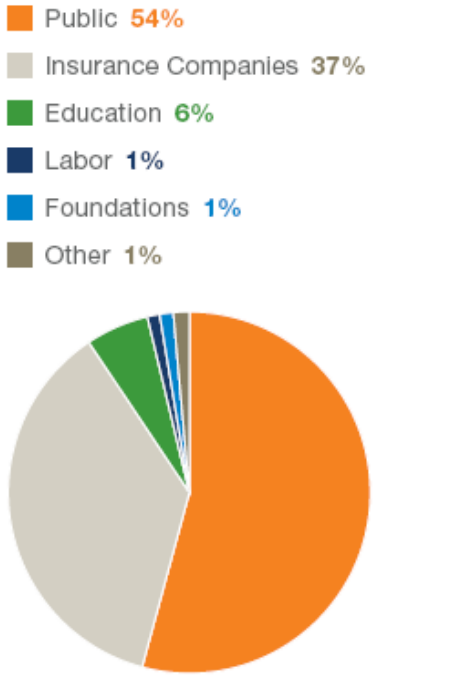
SOURCE: US SIF Foundation.

91% of institutional ESG assets are managed by public funds (such as SRI mutual funds) and insurance companies.

Source: US Social Investment Foundation, 2018 Trends Report.

FIGURE 3.2

Institutional Investor ESG Assets, by Investor Type, 2018



SOURCE: US SIF Foundation.

NOTE: Other consists of family offices, healthcare institutions, faith-based institutions and other nonprofits that collectively represent about 1 percent of ESG assets in 2018.

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FinTech: Overview, Payments, and Regulation

Trust in FinTech

Professor Christopher Geczy PhD

Trust and Trust in Algorithms

- Trust in financial advice and in algorithms
  - Importance of trust
  - Trust and financial advice
  - Trust in algorithms and how they fail

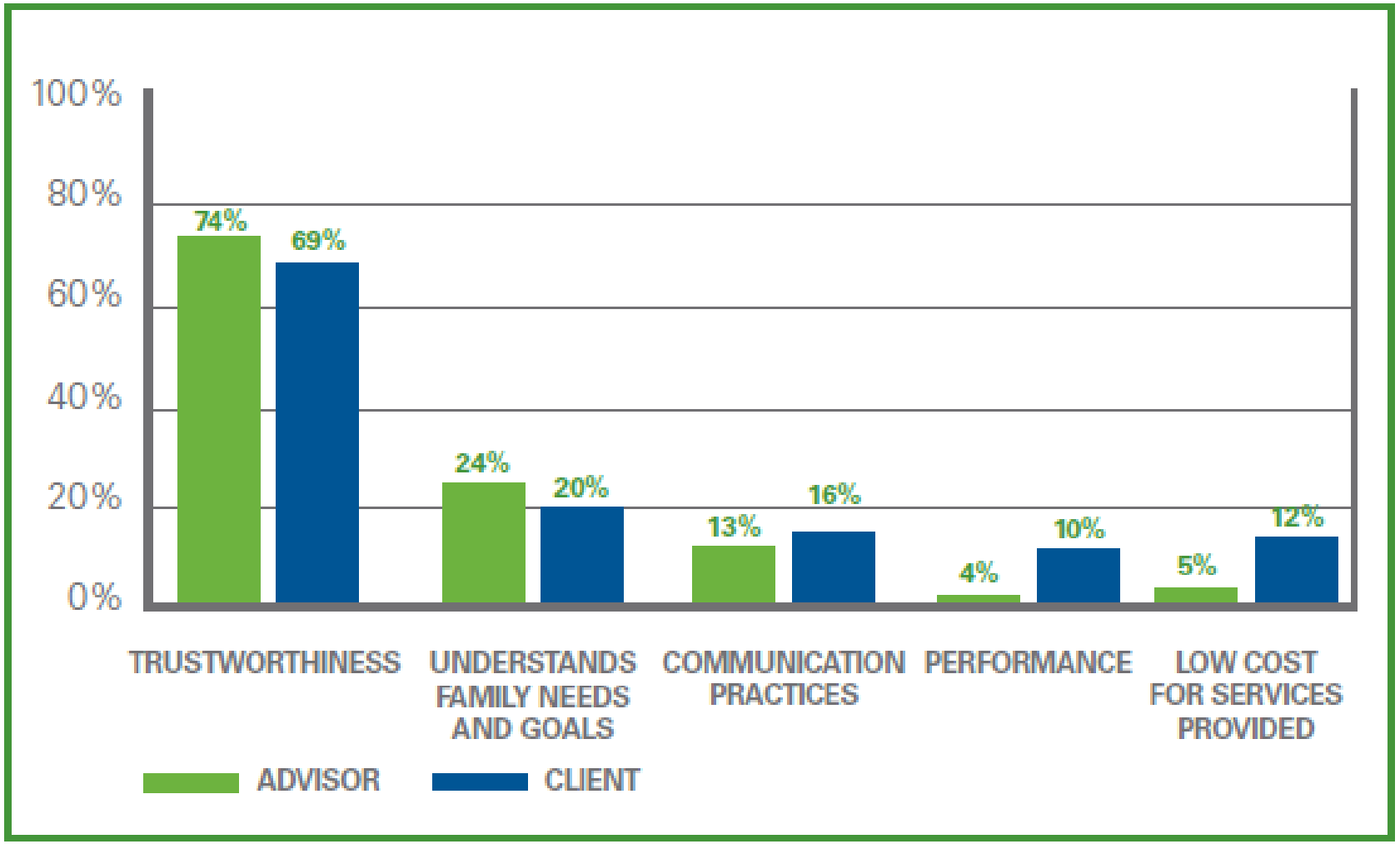
Components of Trust

1. Three Levels of Trust
    1. Trust in Technical Competence and Know How
        - “Do I trust that you know what you’re doing?”
    2. Trust in Ethical Conduct and Character
        - “Do I trust you not to steal money from me?”
    3. Trust in Empathic Skills and Maturity
        - “If I tell you personal things about myself or my family, I need to trust that you, the advisor, will handle that well”

Components of Trust

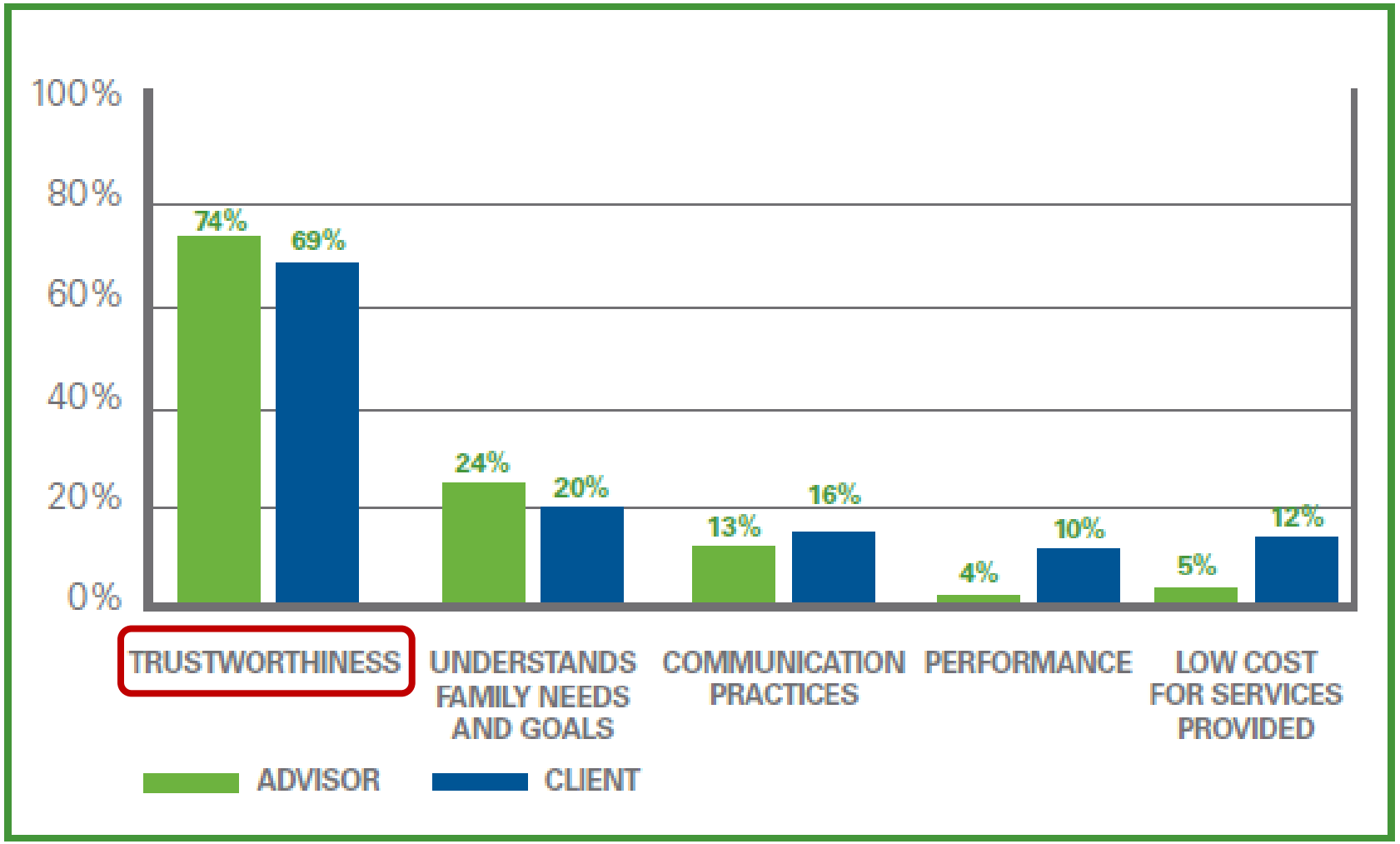
- What builds trust?
  - Taking time to clearly explain product offerings and reasons for recommendations
  - Clearly explaining fees
  - Stay up to date with current products and trends
  - Respond quickly to client needs

Importance of Trust



Source: Wharton/SSgA Survey

Importance of Trust



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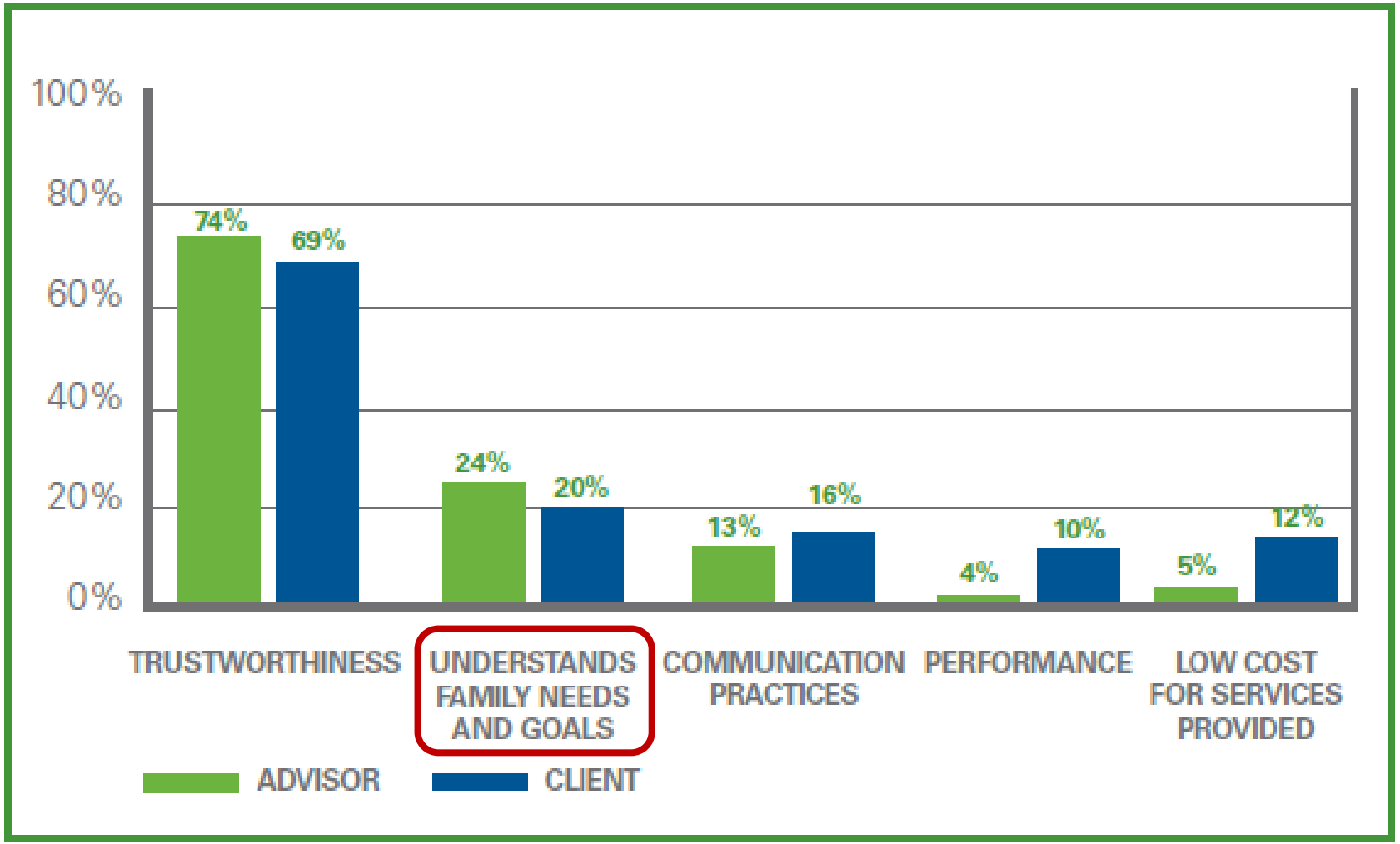

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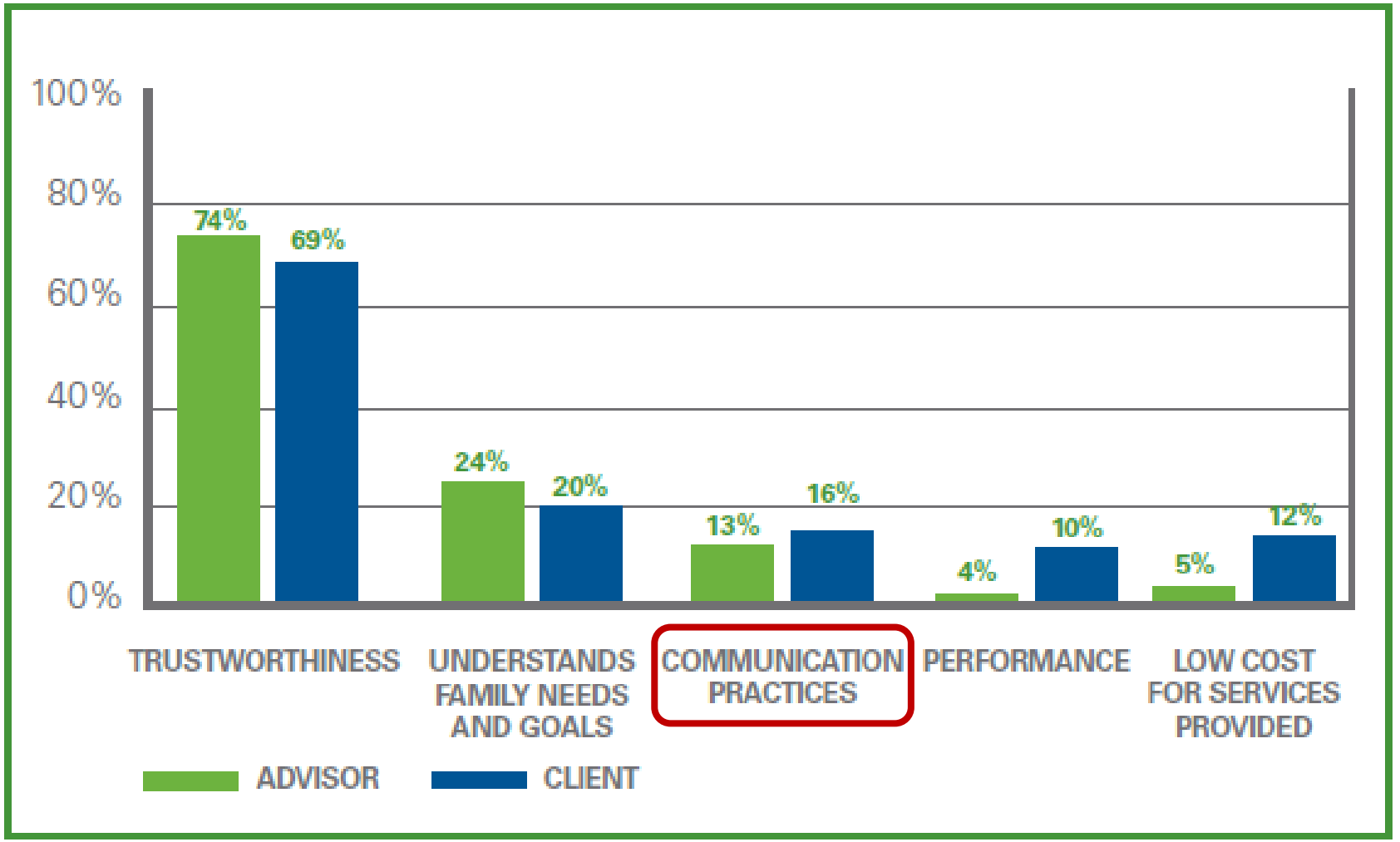

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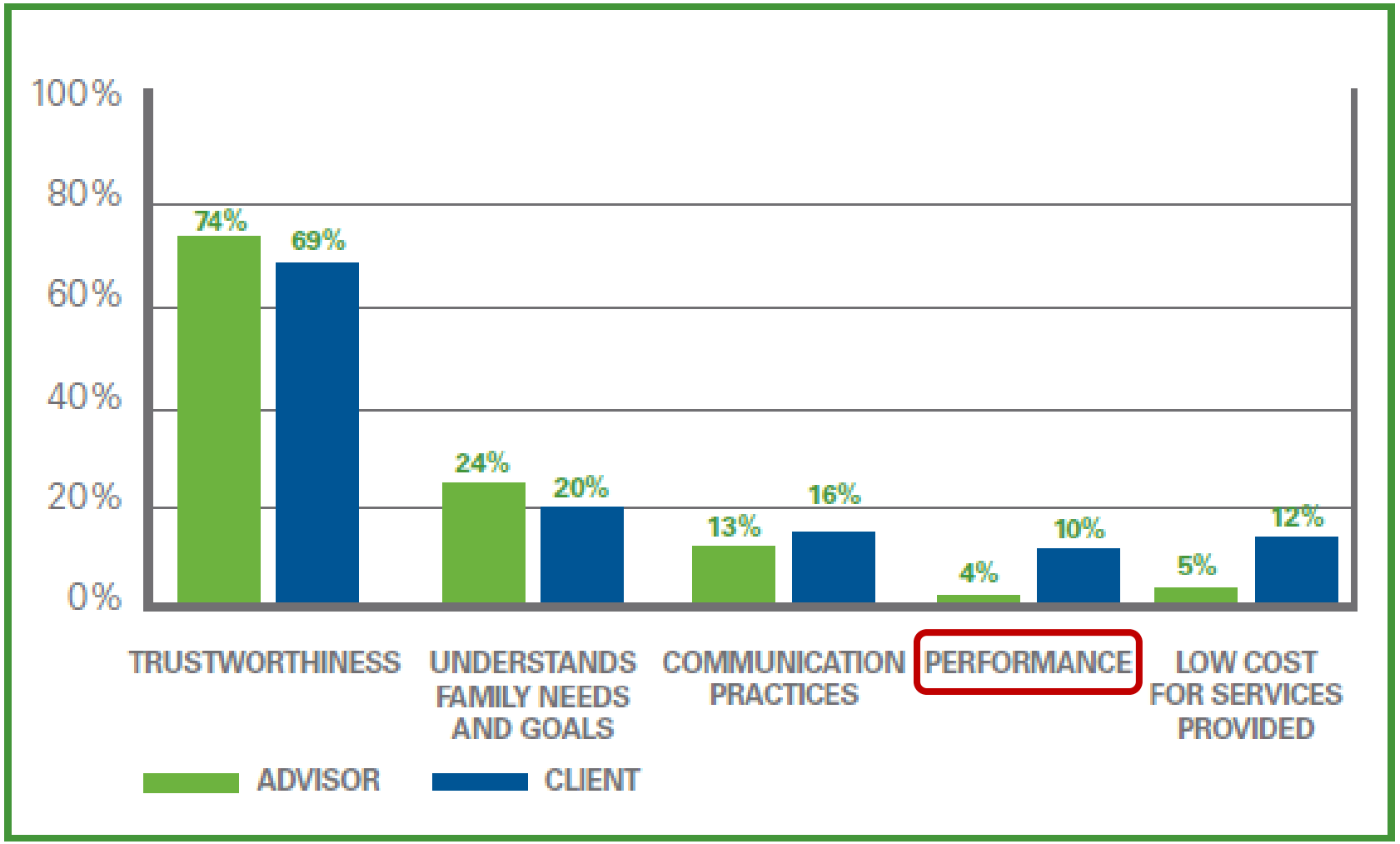

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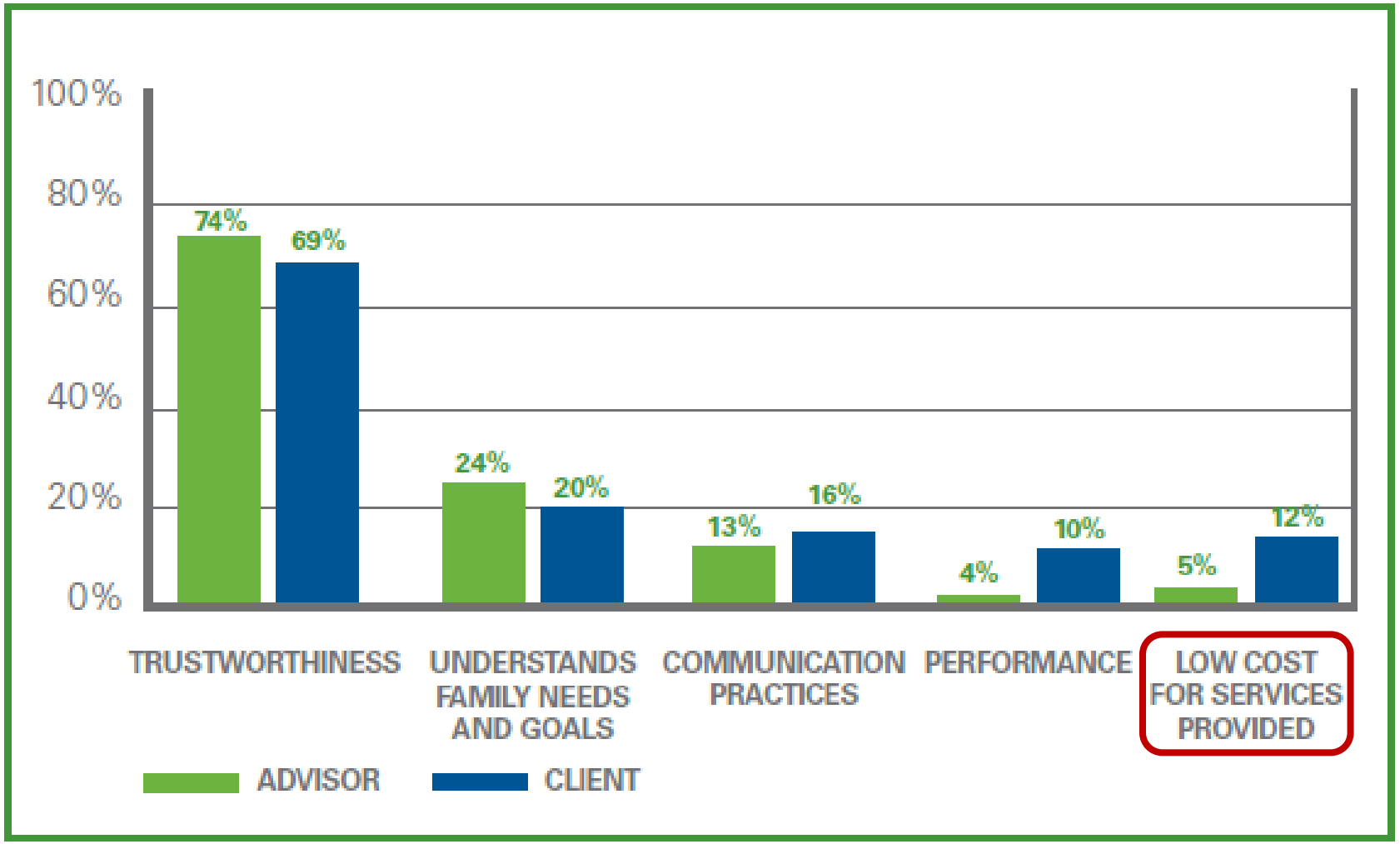
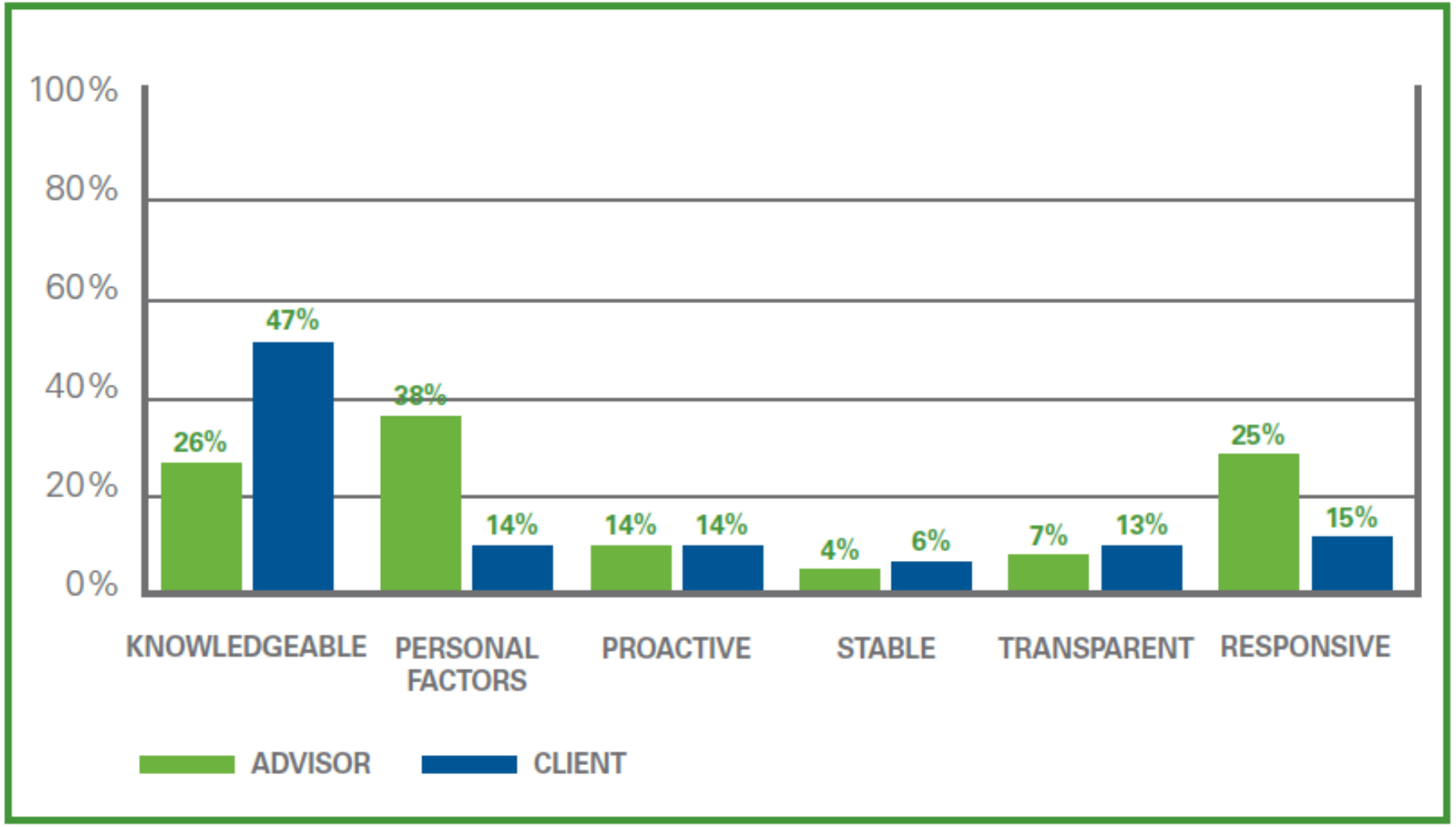
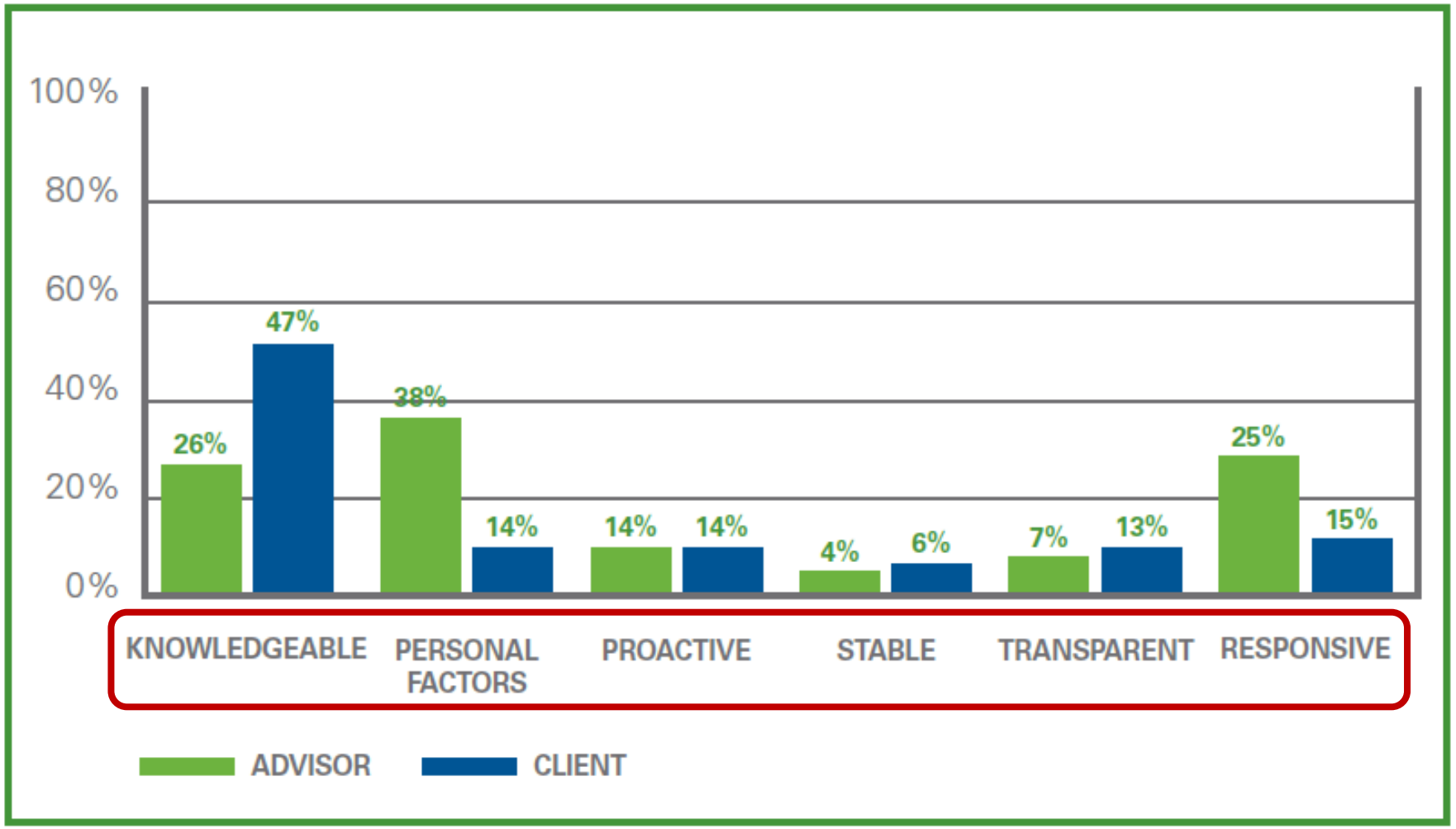


Source: Wharton/SSgA Survey

Importance of Knowledge



Importance of Knowledge



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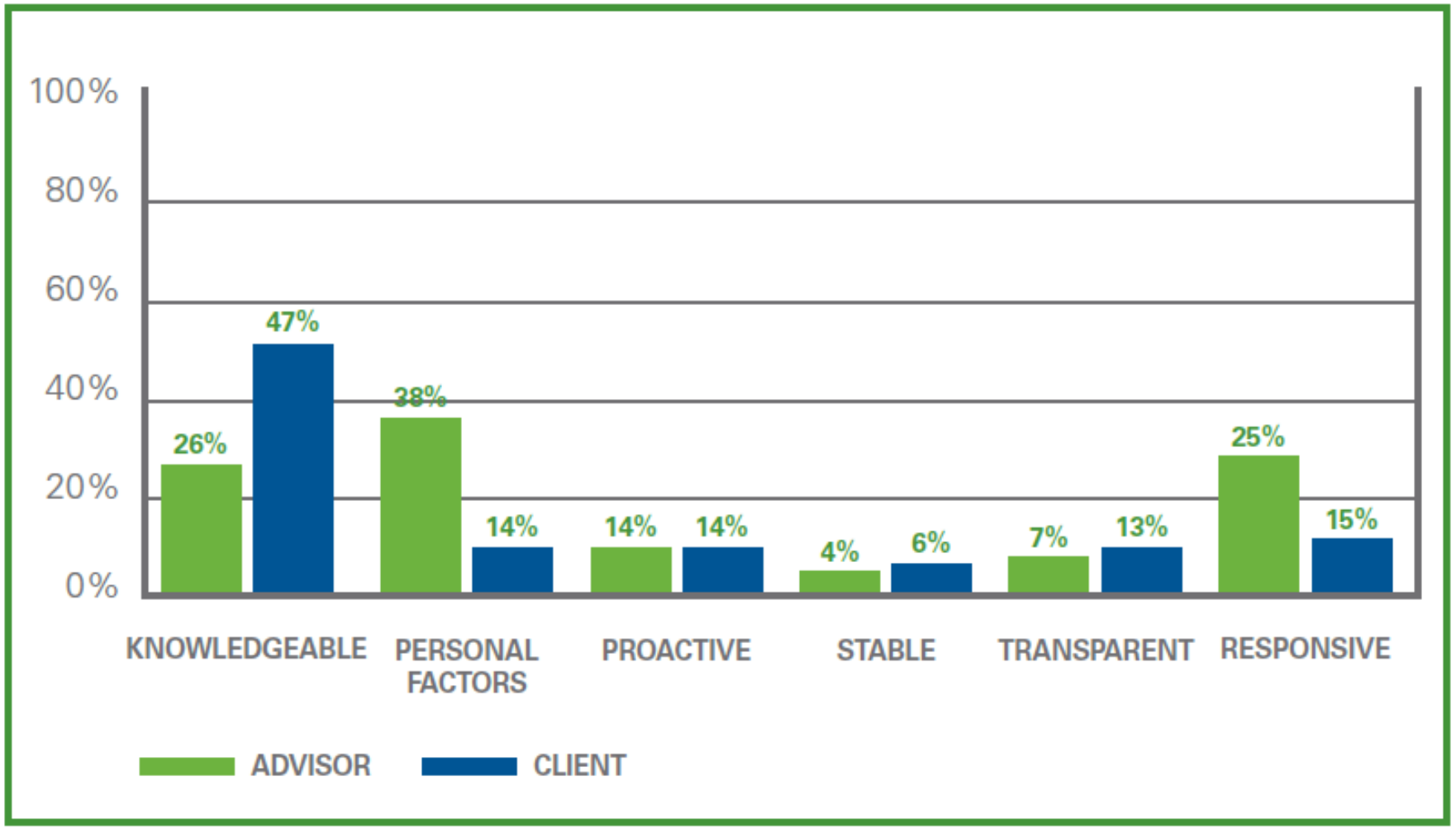

Important Aspects of Advisors - Knowledgeable and Friendly

Perceptions of Financial Planner Characteristics:
High and Low Complexity of Financial Planning Scenarios

Financial Planner Characteristics	High-Complexity Financial Planning Scenario		Low-Complexity Financial Planning Scenario		Cue Type	Significance Level
	Sample Size	Mean Score *	Sample Size	Mean Score *		(p-value)
Holds the Certified Financial Planner (CFP®) designation	63	1.428	63	1.619	Instrumental	.170
Has advanced training in a specialized field	63	1.539	63	1.682	Instrumental	.306
Uses the latest financial techniques and models	63	**1.741**	63	**2.079**	**Instrumental**	**.041****
Puts you at ease	63	2.015	63	2.079	Affective***	.705
Is caring	63	2.047	63	1.968	Affective***	.626
Was trained at a recognized university	63	2.158	63	2.301	Instrumental	.431
Is friendly toward you	63	**2.222**	63	**1.825**	**Affective*** **	**.014****

* (response options: 1= Extremely important; 2 = Important; 3 = Neither important nor unimportant; 4 = Unimportant; 5 = Extremely unimportant)
** indicates significance at < .05
*** further analysis indicates a significant difference between males and females at the < .05 level. More specifically, female respondents considered affective cues significantly more important than males in the low-complexity scenario. There were no gender differences in the high-complexity scenario.

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Constant (Outgoing) Contact

- Trust and Constant Contact
  - Schmeiser and Hogarth, (FRB Working Paper, 2013), found that financial advice increases financial well-being and has a positive effect on financial behaviors.
  - Trust was a function of age and with contact

Table 9. Trust in Financial Advisors amongst Retired Persons

I would trust financial professionals and accept what they recommend	Received professional investment advice in past 5 years?					
	No		Yes		Total	
	freq.	%	freq.	%	freq.	%
1 - Strongly Disagree	481	17.2	94	5.3	575	12.6
2	286	10.2	120	6.8	406	8.9
3	305	10.9	221	12.5	526	11.5
4 - Neither Agree nor Disagree	1193	42.6	628	35.6	1821	39.9
5	253	9	317	18	570	12.5
6	163	5.8	246	13.9	409	9
7 - Strongly Agree	119	4.3	140	7.9	259	5.7
Total	2800	100	1766	100	4566	100

Pearson chi2(6) = 325.3155 Pr = 0.000

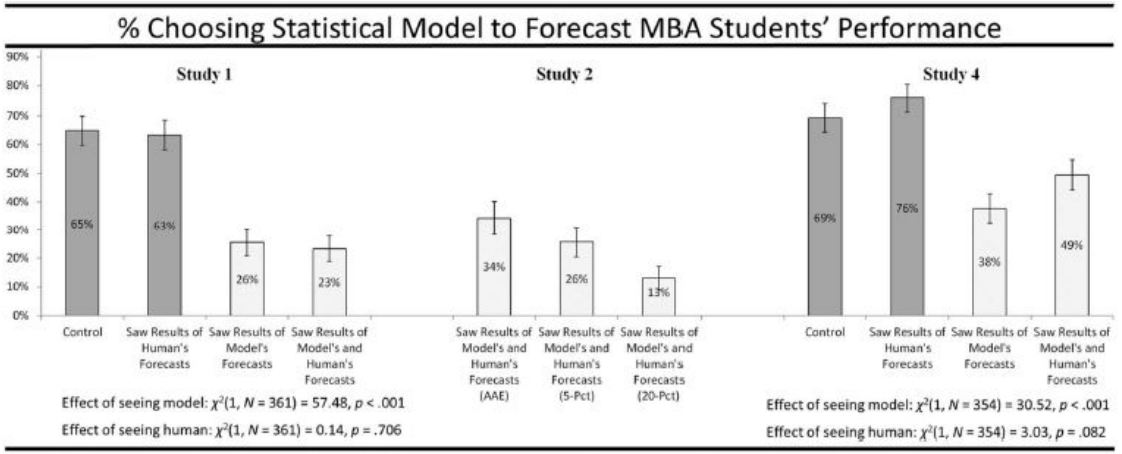
Trust in Algorithms

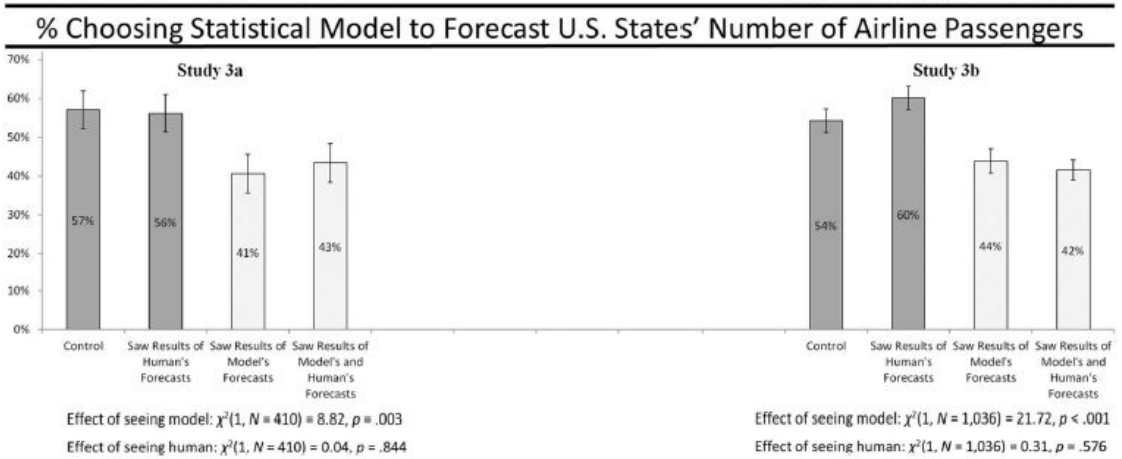
- Dietvorst, Simmons and Massey (Univ. of PA/Wharton) in Algorithm Aversion: People Erroneously Avoid Algorithms After Seeing Them Err (*Journal of Experimental Psychology: General,* 2014) found that
  - People prefer humans over algorithms generally
  - Trust in algorithms is lower when humans view them at work
    - Driven by when the algorithm was perceived to make a mistake

Trust in Algorithms

- Five studies on MBA application success or number of airline passengers

Studies 1–4: Participants who saw the statistical model's results were less likely to choose it. Errors bars indicate ±1 standard error. In Study 2, "AAE," "5-Pct," and "20-Pct" signify conditions in which participants were incentivized either for minimizing average absolute error, for getting within 5 percentiles of the correct answer, or for getting within 20 percentiles of the correct answer, respectively. AAE = average absolute error; Pct = percentile.





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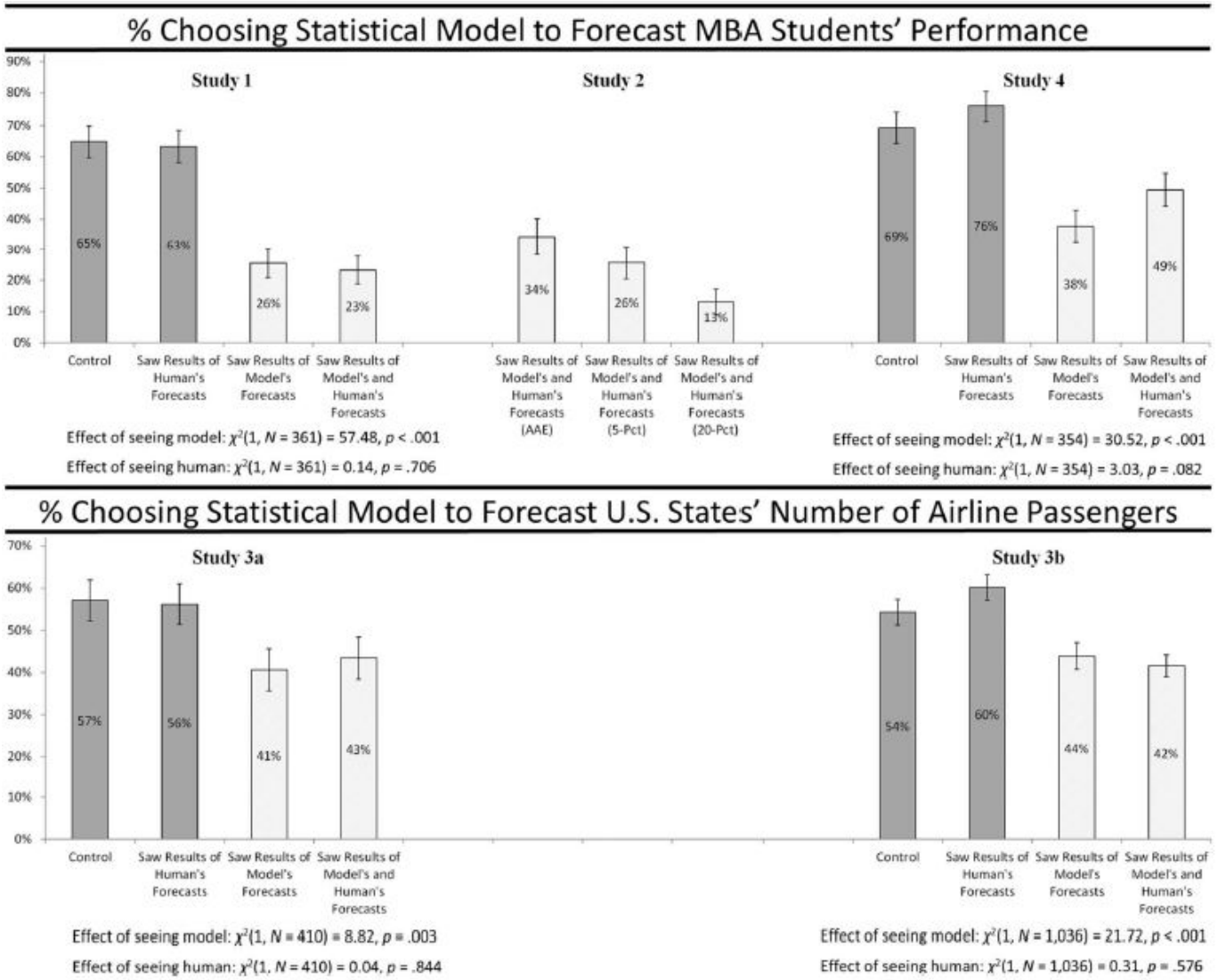
Forecasting Performance



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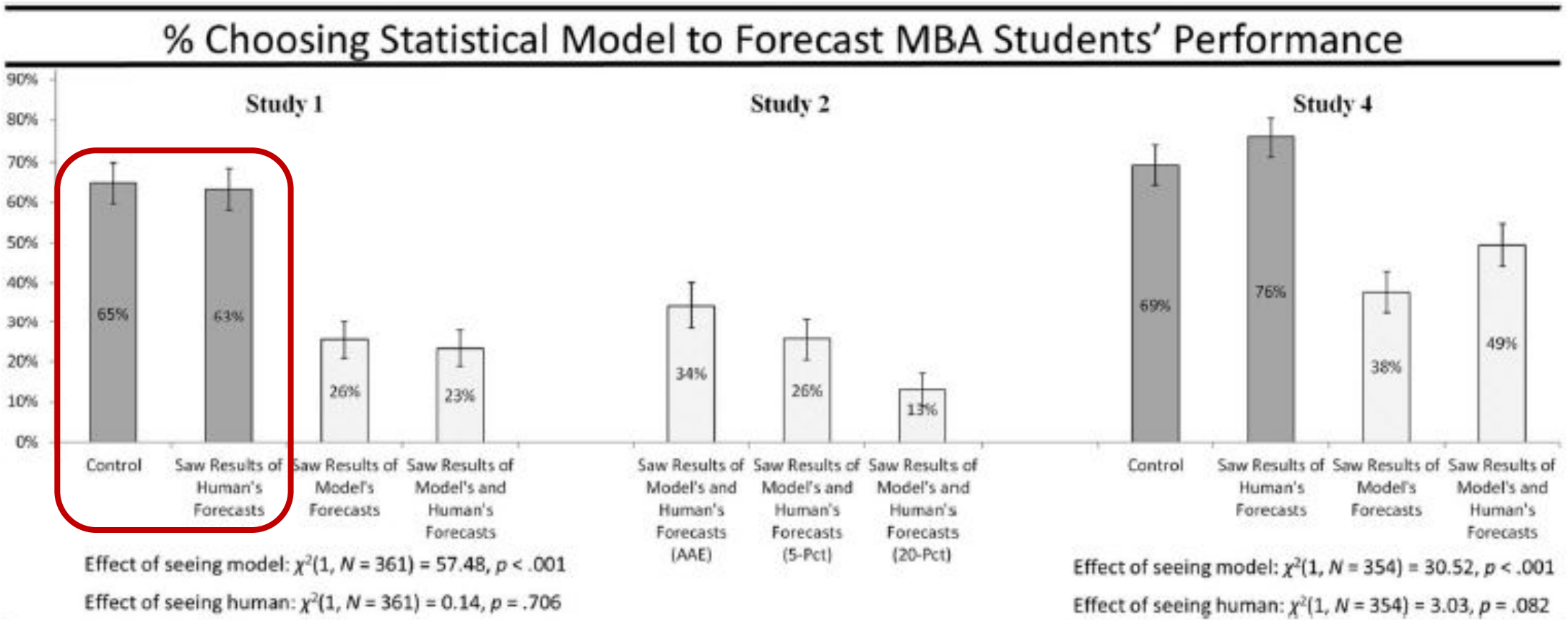

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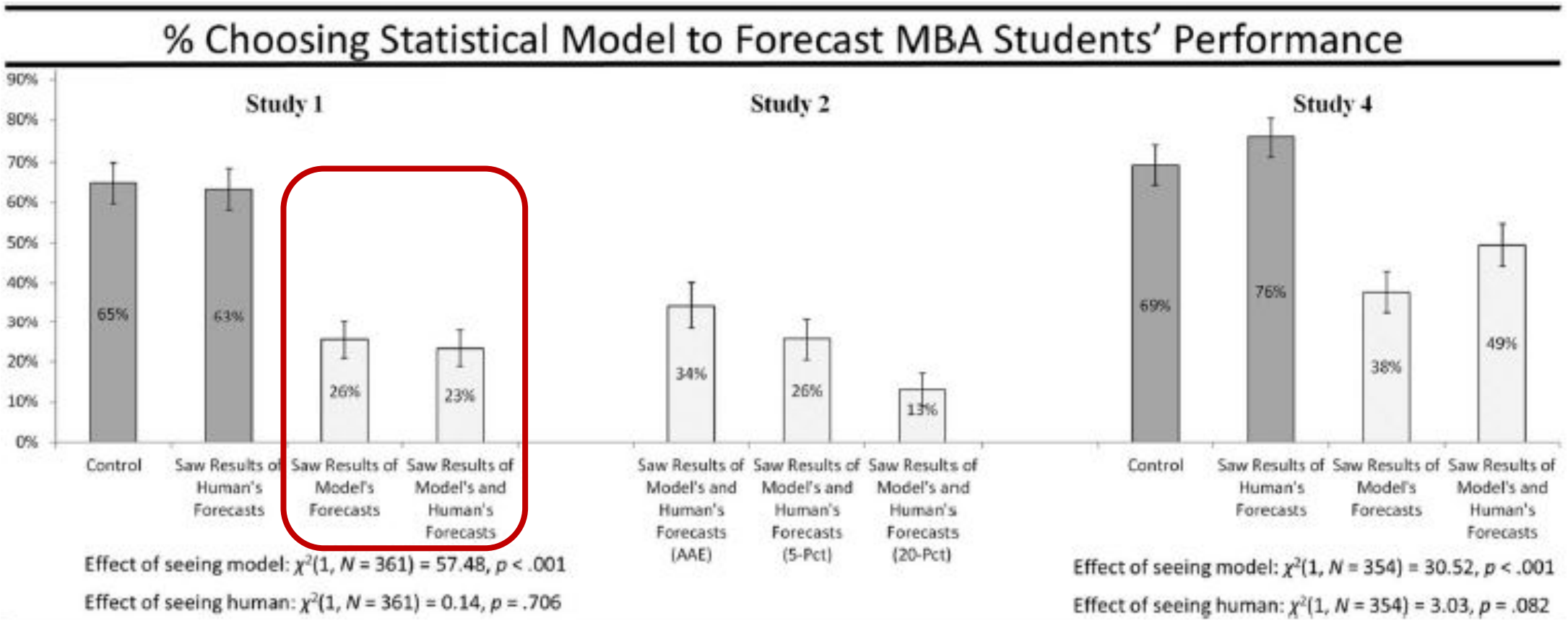

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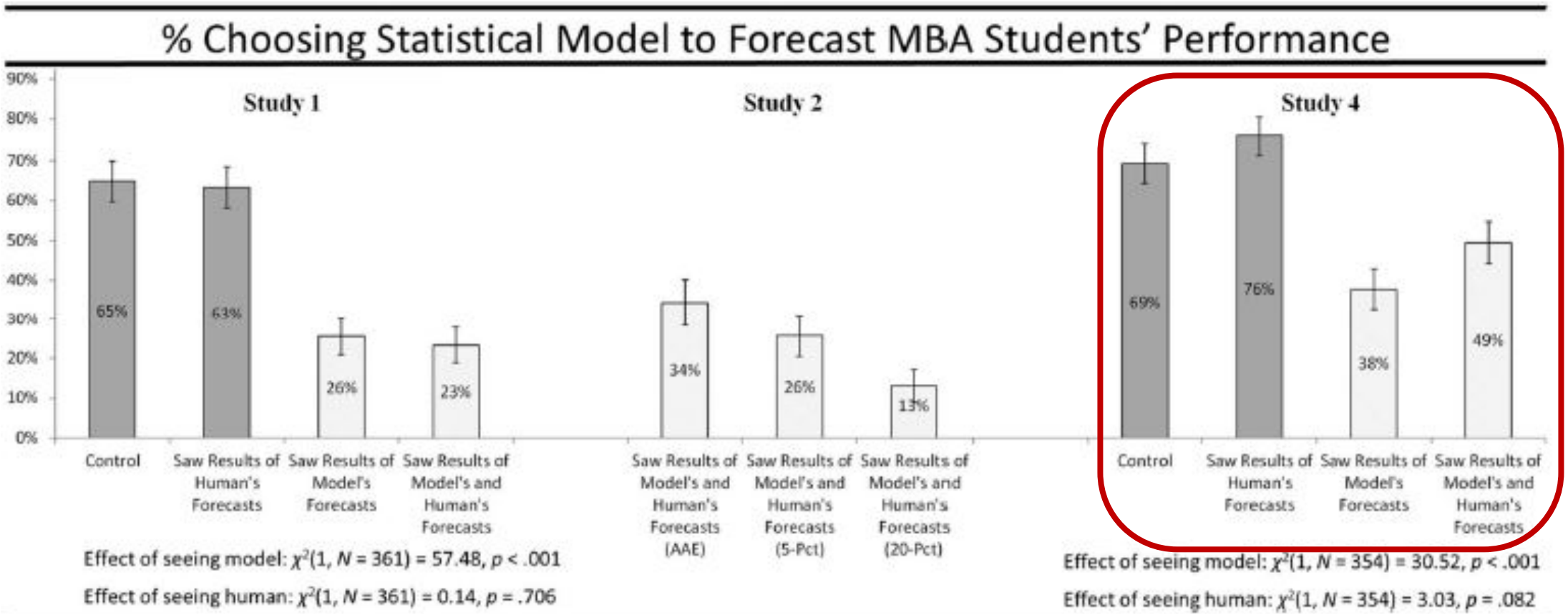

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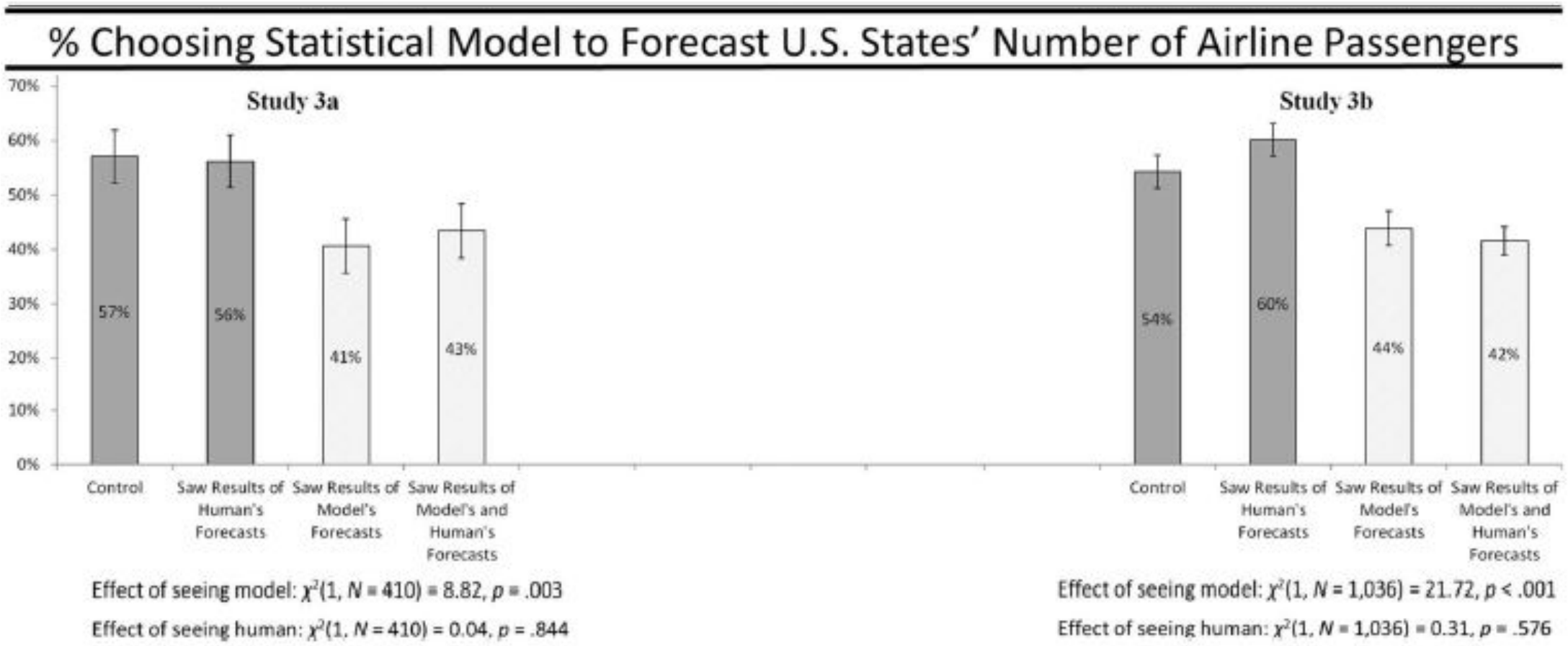

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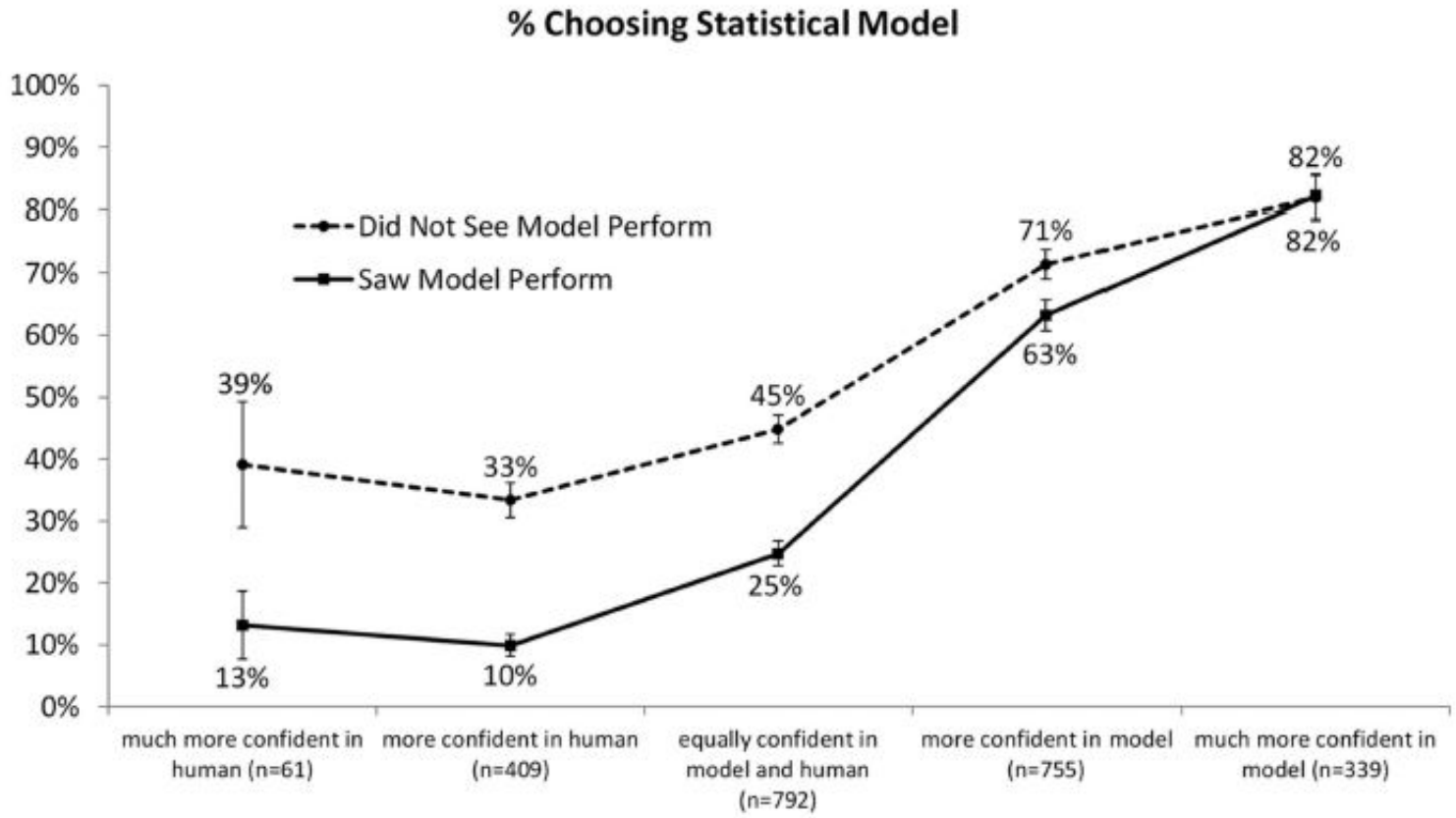
Confidence in Forecasting



Difference in Confidence in Model's vs Human's Forecasts

Most people do not choose the statistical model unless they are more confident in the model's forecasts than in the human's forecasts. Errors bars indicate %1 standard error. The "Did Not See Model Perform" line represents results from participants in the control and human conditions. The "Saw Model Perform" line represents results from participants in the model and model-and-human conditions. Differences in confidence between the model's and human's forecasts were computed by subtracting participants' ratings of confidence in the human forecasts from their ratings of confidence in the model's forecasts (i.e., by subtracting one 5-point scale from the other). From left to right, the five x-axis categories reflect difference scores of: <–1, -1, 0, +1, and >1. The figure includes results from all five studies.

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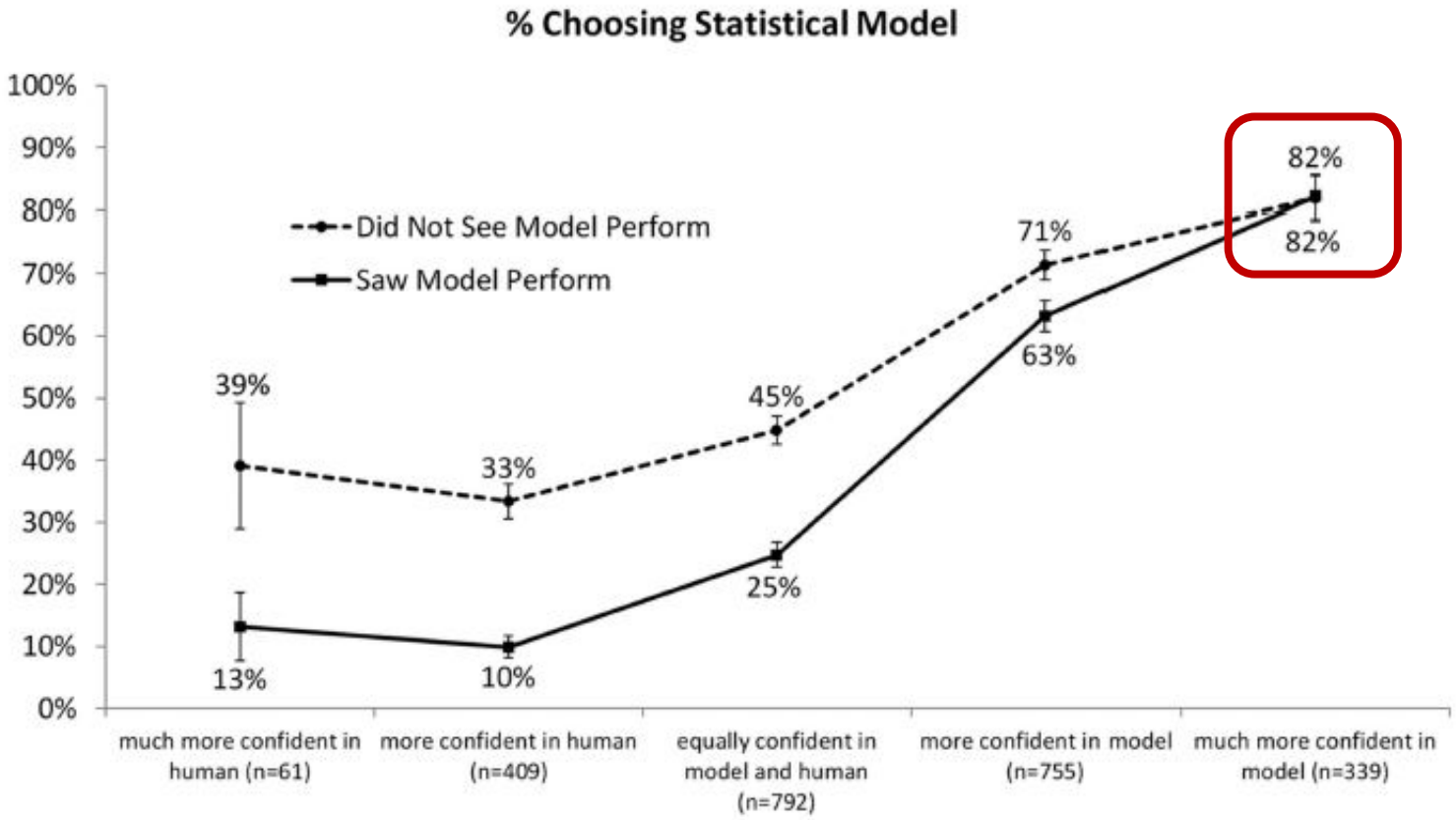

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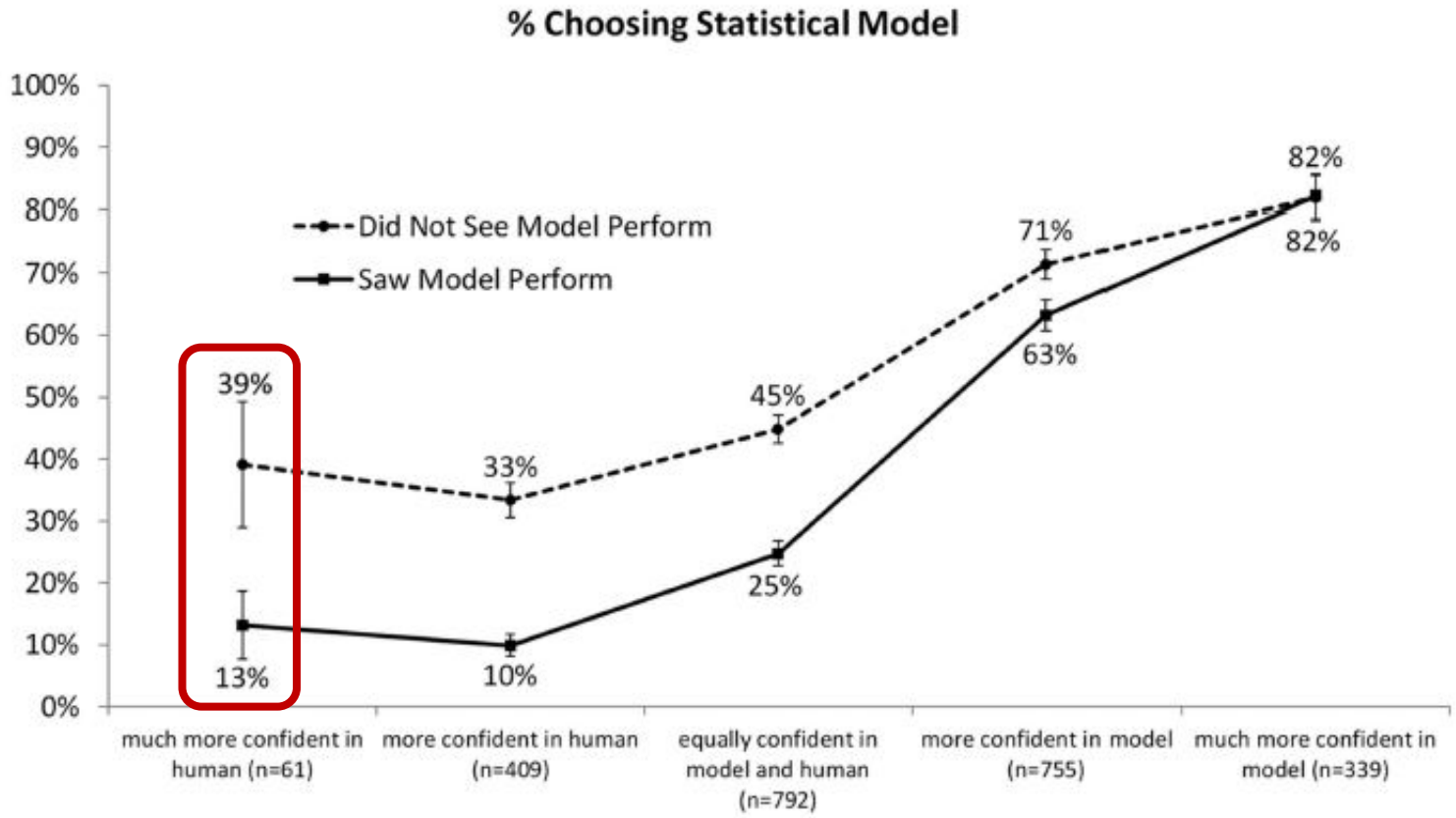

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Algorithm Trust

- Trust is important
- Algorithm aversion exists (people don't choose algorithms over humans) once people see the algorithm in action – even if it beats them!
- They may choose the algorithm if they haven't seen any results (even if those results are better than theirs!)
- If people see algorithms make mistakes, they strongly avoid it
- Found that if they could change the algorithm, even a bit, after seeing its performance, they were more likely to use it
  - Combining their judgement with their algorithm helped them feel confident

Algorithm Trust

- Dawes, Faust and Meehl ("Clinical Versus Actuarial Judgement," Science, 1989)
  - Actuarial approaches beat clinical in numerous contexts (including judging personality, parole violation predictions, progressive brain dysfunction, Hodgkin's disease diagnoses, college grades, diagnoses of psychological disorders, psychiatric hospitalization times, and others)
  - The combination of actuarial and clinical approaches dominated others
  - There were several reasons: consistency, rational and rules-based weighting of inputs, including of relevant variables, sample biases of clinical approaches (limited sample, skewed exposures to treated cases or the sick, and so on)

Wharton
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FinTech: Overview, Payments, and Regulation

Choice Architecture

Professor Christopher Geczy PhD

Complexity and Choice are Limiting

- Complexity and even the number of choices matters
- Research shows that “too much information” can:
  - skew client risk perceptions
  - make it harder for clients to come to decisions
  - make clients less happy with the outcome of their decisions
- Investors are more likely to invest (take risk) when shown presentations of performance over longer periods than when presented with a succession of short-period returns. (Diacon and Hasseldine (2007))

Complexity and Choice are Limiting

- When faced with many choices, investors choose not to participate or buy
  - Evidence from 401(k) plans
  - For every increase in options by 10, overall participation declined by 2%

Complexity and Choice are Limiting

- Not having an answer leads to declining trust
  - When a client asks a financial advisor a complex question or a question about a complex product/service/solution, if he or she doesn't know the answer, he should say so

Complexity and Choice are Limiting

- Not having an answer leads to declining trust
  - Bickart et al (2010) conducted a series of studies in which subjects rated hypothetical advisors on trustworthiness and intention to invest when them after being presented with three answers
    1. Correct and simple
    2. Admitting ignorance
    3. Appeared obfuscatory
       - It is always better for an advisor to admit ignorance than to obfuscate, whether or not the client perceives that the adviser hopes to earn a commission by discussing the product

Complexity and Choice are Limiting

Complexity and Advisor Action

Table 1
Main Study: Results as a Function of Salesperson's Motive and Response

	Commission motive			No commission motive		
	Don't know	Obfuscatory response	Correct answer	Don't know	Obfuscatory response	Correct answer
Percent of participants who said the salesperson will make a commission	71	63	60	14	19	10
Percent of participants who said the salesperson knew all the answers	6	24	72	4	16	71
Intention to invest	4.07^{a}	3.56^{ab}	4.43^{b}	4.06^{c}	4.36	4.52^{c}
Trust perceptions	4.42	3.66	4.61	4.80	4.34	4.91

Intention to invest and trust perceptions have a scale range of 1-7.

NOTE.— Cell means for intention to invest that share the same superscript are significantly different at $p < .05$.

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FinTech: Some Conclusions

- It’s here to stay and it’s a part of the way the world will work
  - Increasing in size and number of deals
  - Global nature
- Millennials matter
- Issues of trust
  - Trust in the financial industry
  - Trust in algorithms
- Choice architecture

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