Stakes and mistakes

Steffen Andersen
Copenhagen Business School

Abhiroop Mukherjee
Hong Kong University of Science and Technology

Kasper Meisner Nielsen
Copenhagen Business School & Danish Finance Institute

Stakes and mistakes: Motivation

A prominent old critique of behavioral finance is that a lot of our evidence comes from decisions involving small stakes

- Many households have limited financial wealth
- If losses are small, benefit to correct them may be limited by transaction costs
    - "Among everything I could spend my time fixing, financial mistakes are not top priority"

Vissing-Jorgensen (2002) on the stock market participation puzzle:

- Many households have insufficient wealth to make participation worthwhile
    - Even a moderate per-period participation cost of USD 50 (USD 260) is sufficient to explain why half (three-quarters) of non-stockholders do not participate

Stakes and mistakes: Motivation

Evidence from psychology, which underpins the field of behavioral finance, is often from experiments with little at stake:

- If we examine behavior in situations with high stakes – like real-world financial decisions – many documented biases may disappear [Levitt and List, 2008]

- Andersen et al (2011) examine ultimatum games, and show that increasing stakes can indeed change rejection rates in the experiment.

Stakes and mistakes: Motivation

Kahneman (“Thinking: Fast and Slow”):

- System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control. “Intuition”
- System 2 allocates attention to the effortful mental activities that demand it, including complex computations. “Effort”

- “The best we can do is a compromise: learn to recognize situations in which mistakes are likely and try harder to avoid significant mistakes when the stakes are high.”

    - How much of this do we do in reality?

Stakes and mistakes: Research question

Research question:

- How sensitive are investment mistakes to how much is at stake?
    - How much of these mistakes are inherent?

Stakes and mistakes: Research question

Ideal experiment:

- Test whether random variation in individual's investment endowments reduce mistakes

Our experiment:

- Examining shocks to investable endowments caused by inheritances due to sudden parental deaths
    - For many people, a large real-life shock to wealth/income
    - Results in a larger sample, helpful for statistical power

Stakes and mistakes: Contribution

Experimental studies vary participant incentives to see whether higher rewards reduce mistakes [Camerer and Hogarth, 1999]

- Magnitude of rewards do not change behavior, but “high” rewards are economically small due to budget constraints

Another creative way to increase rewards is to conduct experiments in environments with poorer people [Ariely et al., 2009]

- Experience and financial sophistication matter for financial decisions, which makes it difficult to find a setting with external validity

Stakes and mistakes: Contribution

Alternatively one can examine whether mistakes disappear for wealthy individuals
[Vissing-Jørgensen, 2003]

- Wealthy individuals have individual characteristics (e.g. education) that correlate with the tendency to make mistakes
    - Omitted variable problems

Stakes and mistakes: Data

1. Portfolio holdings from the Danish Tax and Customs Administration (*SKAT*)
   - Holdings of stocks & mutual funds at the end of the year

2. Causes of deaths from The Danish Cause-of-Death Register at the Danish National Board of Health (*Sundhedsstyrelsen*)

3. Individual and family data from the official Danish Civil Registration System (*CPR Registeret*)

4. Income and wealth information are from the official records at the Danish Tax and Customs Administration (*SKAT*)

5. Educational records from the Danish Ministry of Education

Stakes and mistakes: Descriptive statistics

Table 1, Individual and portfolio characteristics

	All	Financial wealth vigintile					Difference
		1	5	10	15	20	(20) – (1)
Panel A: Demographic characteristics							
Income (1,000 DKK)	379.6	247.1	322.1	363.1	402.4	716.4	469.4***
	(621.0)	(655.31)	(210.2)	(236.6)	(300.4)	(2471.5)	(13.1)
Net wealth (1,000 DKK)	888.4	-130.1	50.8	364.0	921.1	7009.9	7140.0***
	(7071.3)	(1522.1)	(1077.3)	(1223.1)	(29427.9)	(31404.4)	(166.3)
Age (years)	45.6	37.6	40.8	44.6	50.0	53.4	15.8***
	(13.6)	(13.7)	(13.7)	(13.4)	(11.8)	(9.4)	(0.1)
Gender (percent male)	55.3	58.4	54.4	54.4	53.8	64.7	6.3***
	(49.7)	(49.3)	(49.8)	(49.8)	(49.8)	(48.0)	(0.3)
Education (years)	14.5	13.6	14.2	14.6	14.7	15.4	1.8***
	(2.5)	(2.3)	(2.3)	(2.4)	(2.5)	(2.6)	(0.2)
Financial literate (percent)	7.5	3.7	5.4	7.6	8.6	14.0	10.3***
	(26.3)	(18.9)	(22.5)	(26.5)	(28.0)	(34.7)	(0.2)
Married (percent)	52.0	39.7	48.4	53.8	57.6	54.8	15.1***
	(50. 0)	(48.9)	(50.0)	(49.9)	(49.4)	(49.8)	(0.4)
Panel B: Portfolio characteristics							
Risky asset share (percent)	35.7	37.0	25.4	31.8	41.2	60.1	23.1***
	(32.2)	(32.1)	(26.7)	(30.1)	(32.1)	(33.2)	(0.2)
Market value of risky assets (1,000 DKK)	320.2	1.8	12.8	53.9	195.1	3688.5	3656.6***
	(6469.6)	(2.3)	(13.5)	(51.3)	(152.9)	(28703.3)	(151.8)
N	715,172	35,761	35,756	35,758	35,738	35,738	

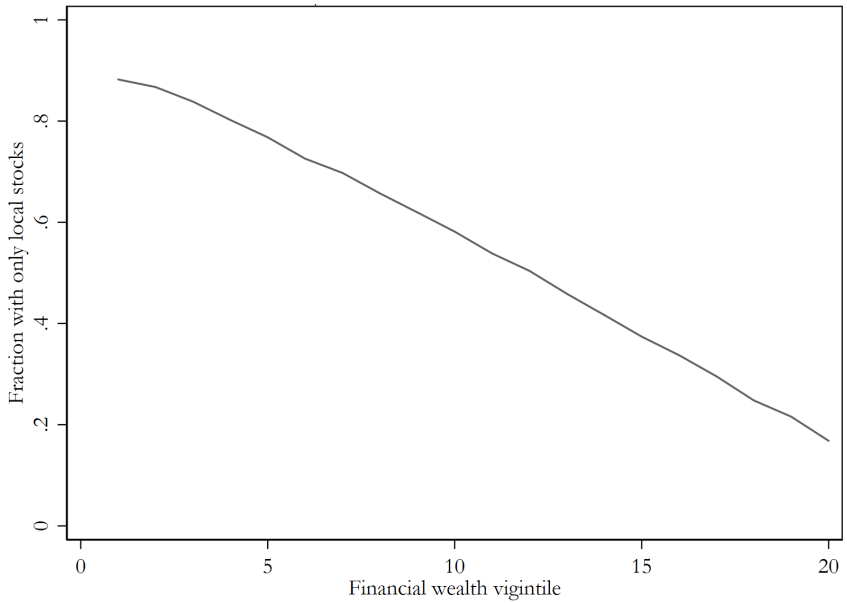
Stakes and mistakes: Measures of mistakes

1. Underdiversification
    a) Lack of geographical diversification (home bias)
    b) Lack of investment in mutual funds
    c) High portfolio concentration ($HI = \sum x_i^2$)

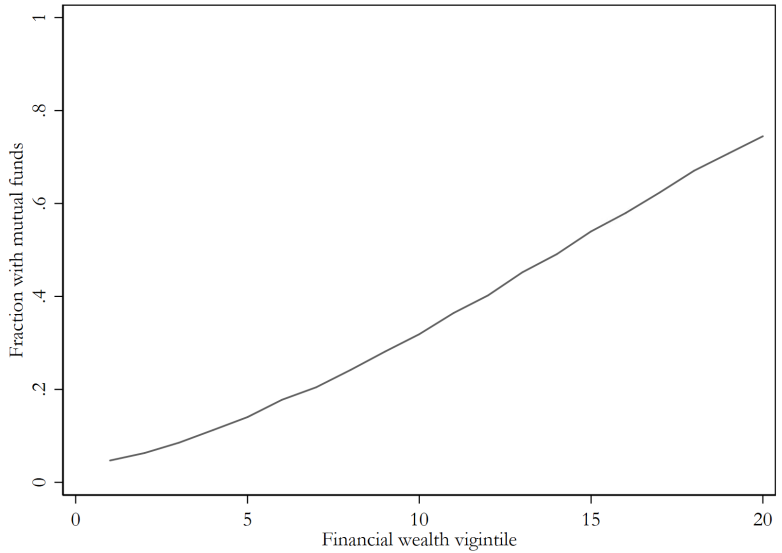
2. Investment in high fee index funds

3. Disposition effect
    - Tendency to sell winners and hold on to losers

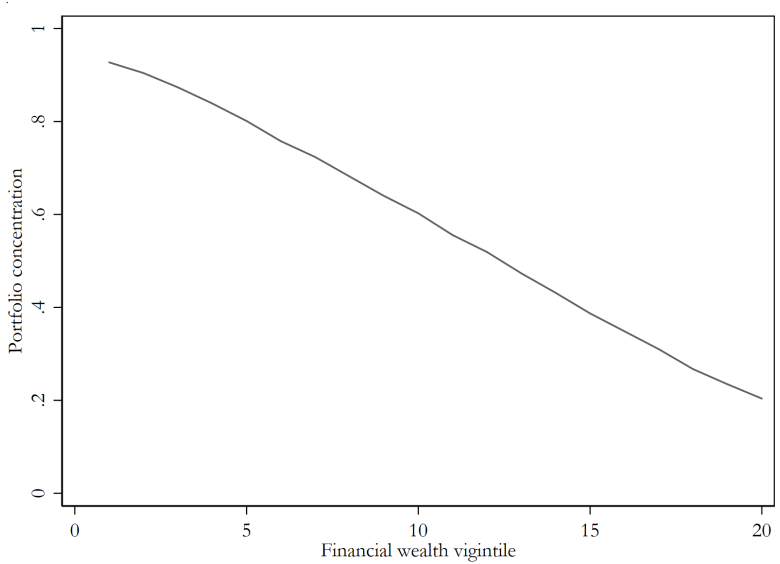
Stakes and mistakes: Only local stocks



Stakes and mistakes: Mutual funds



Stakes and mistakes: Portfolio concentration



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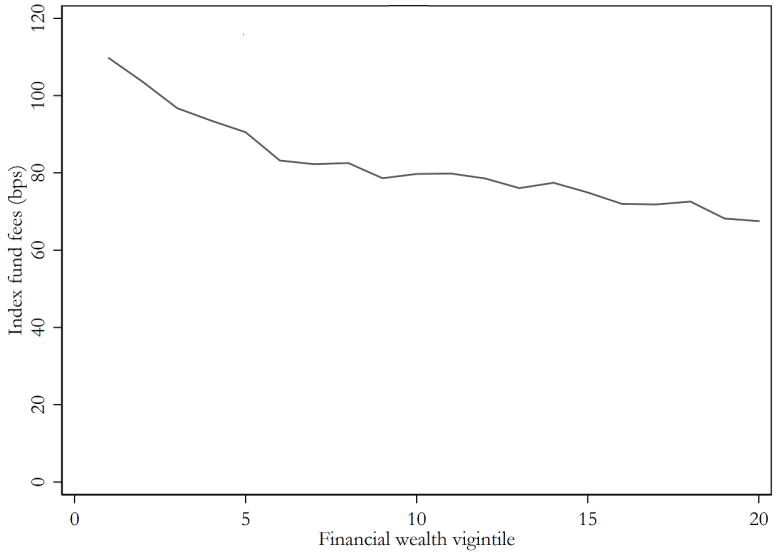
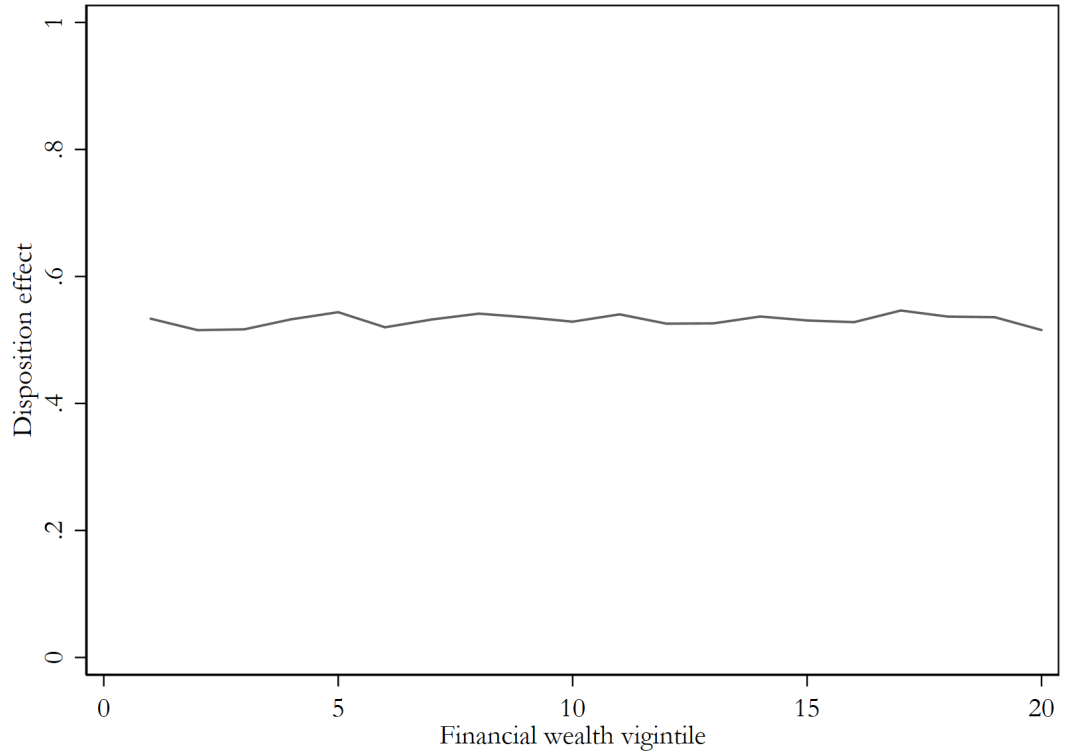
Stakes and mistakes: Index fund fees



Stakes and mistakes: Disposition effect



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Stakes and mistakes: Identification strategy

Difference-in-differences estimates

- Inheritance due to (sudden) parental death
- Identifying assumption:
  - Timing of inheritance is random relative to investment decision

- Specification:

  a) $Mistake_{it} = \alpha_i + \alpha_t + \beta\ Post\ inheritance_{it} + \varepsilon_{it}$

  b) $Mistake_{it} = \alpha_i + \alpha_t + \beta\ Inherited\ wealth_{it} + \varepsilon_{it}$

- Control:
  - Individual fixed effects (α_i)
  - Time fixed effects (α_t)

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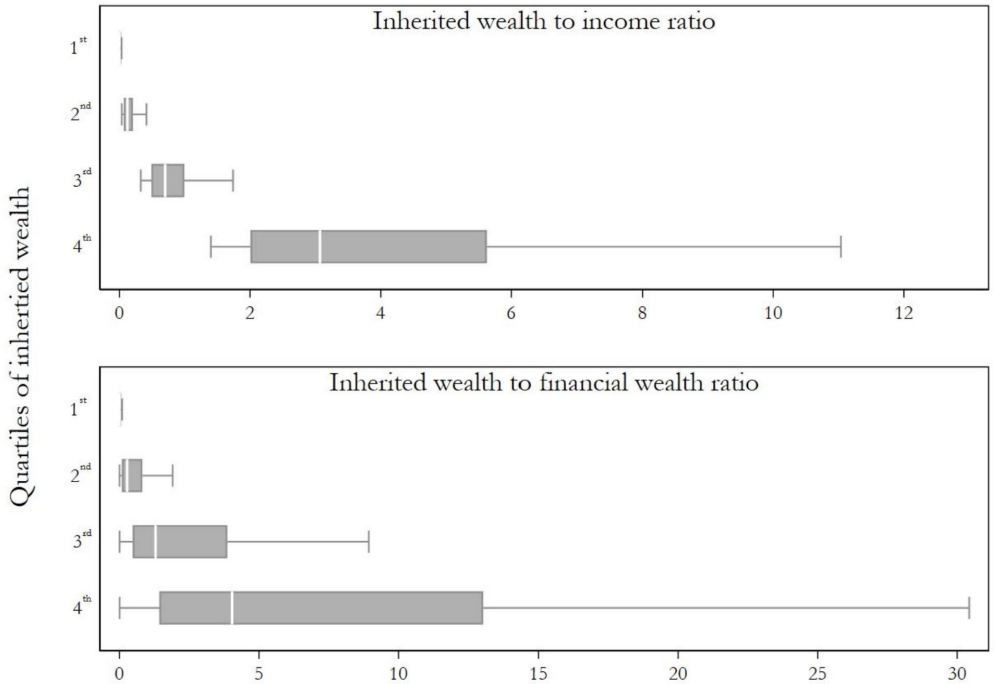
Stakes and mistakes: Inheritances

Figure 2: Size and distribution of inheritances



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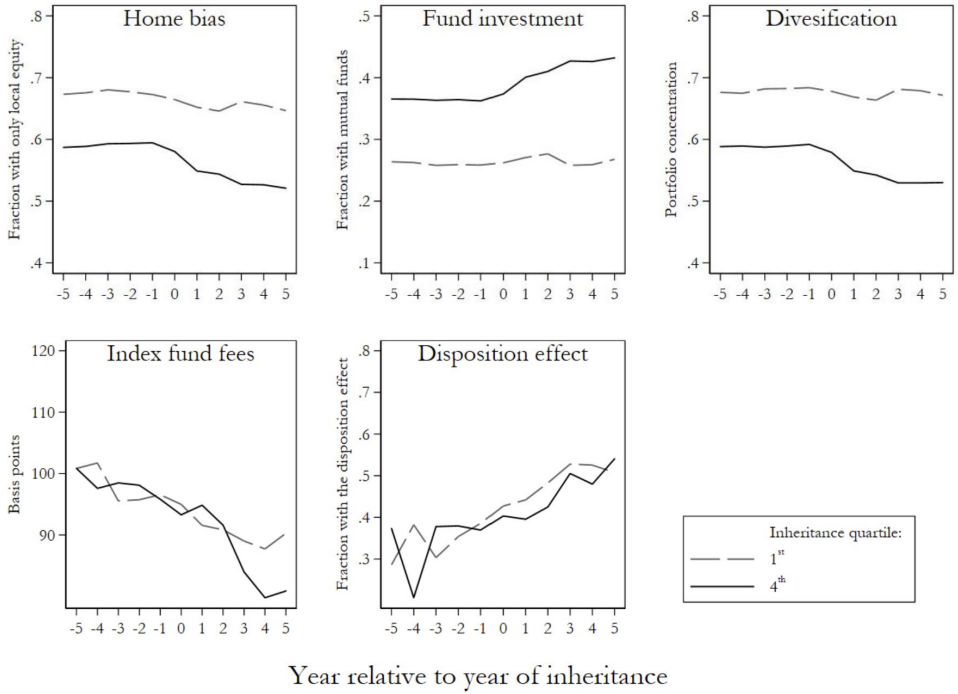
Stakes and mistakes: Results (1)

Figure 3: Stakes and mistakes around inheritances, time series



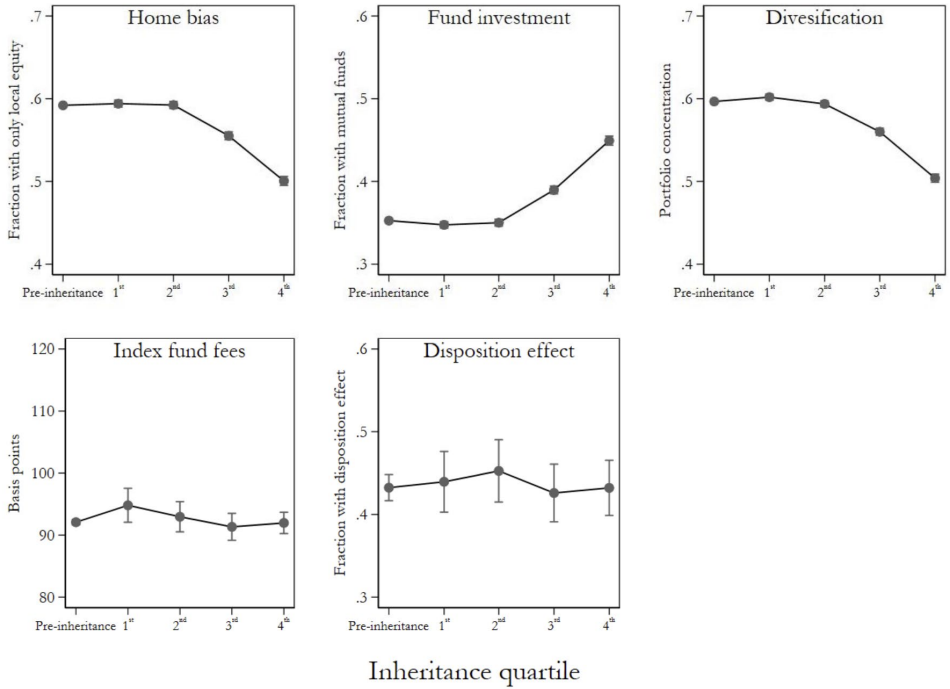
Stakes and mistakes: Results (2)

Table 3, Mistakes around inheritances

	Dependent variable:				
	Only local stocks	Invest in mutual funds	Portfolio concentration	Index fund fees (bps)	Disposition effect
	(1)	(2)	(3)	(4)	(5)
Constant	0.615***	0.342***	0.618***	95.5***	0.122***
	(0.002)	(0.002)	(0.001)	(2.1)	(0.012)
After inheritance	-0.033***	0.033***	-0.033***	-0.8	0.003***
	(0.001)	(0.001)	(0.001)	(1.0)	(0.017)
Individual fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.823	0.831	0.27	0.809	0.116
N	511,227	511,227	511,227	3.960	37,409

Stakes and mistakes: Results (3)

Figure 4: Stakes and mistakes: by size of inheritance



Stakes and mistakes: Results

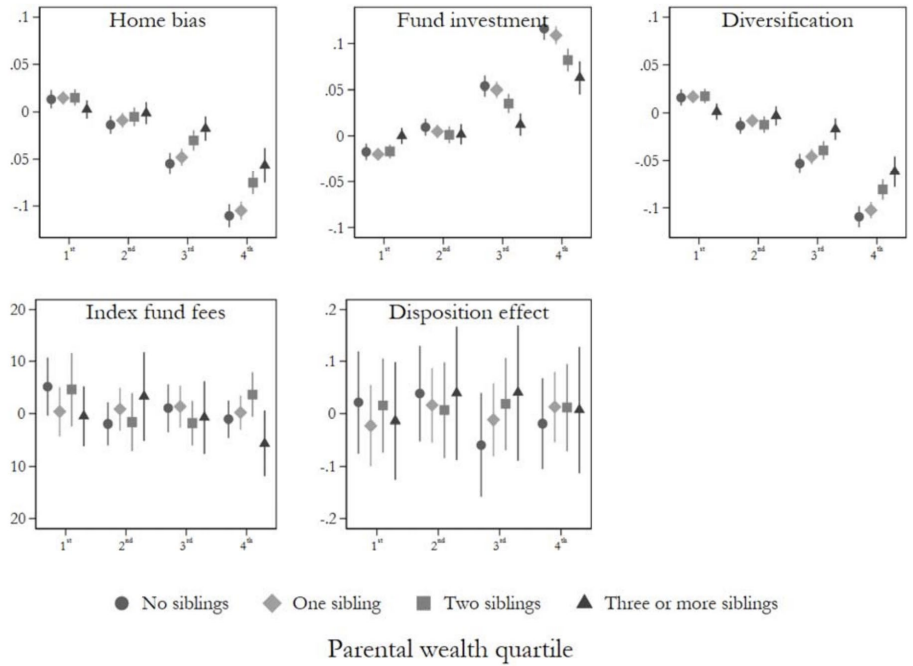
- Stakes reduce mistakes, but the effects are:
  - Local bias is reduced from 62% to 59%
  - Investment in mutual funds increase from 34% to 37%
  - Portfolio concentration is reduced from 0.62 to 0.59
  - No effect on index fund fees
  - No effect on the incidence of the disposition effect

Stakes and mistakes: Alternative interpretation I

- Evidence might be explained by differences in parental “resources” and “abilities”
    - Parents might be rich due to high abilities, and given that they share genes with their offspring, high ability is a likely confound that positively bias the estimated effect of stakes on mistakes

Stakes and mistakes:
Controlling for parental resources and abilities

Figure 5: Stakes and mistakes: variation in inheritance driven only by sibling composition



Stakes and mistakes: Alternative interpretation I

- Still (potentially) problematic
    - People who grow up with different numbers of siblings might exhibit different behaviors – for example, they might react differently to parental death or to sudden inheritances or have different behavior when faced with risk
- How we make progress
    - Compare beneficiaries with similar parental wealth, who HAD the same number of siblings while growing up, but lost at least one adult sibling before the parent
        - larger bequest, but similar parental wealth & family composition growing up
    - Behavioral traits related to family size or resource sharing when growing up not systematically different across groups

Stakes and mistakes: Controlling for parental resources and abilities

Table 6, Mistakes and exogenous variation in inherited wealth

	First stage	Second stage				
Dependent variable	Inherited wealth (1)	Home bias (2)	Mutual fund investment (3)	Portfolio concentration (4)	Index fund fees (bps) (5)	Disposition effect (6)
Deceased sibling	0.145***					
	(0.008)					
Constant		0.619***	0.332***	0.627***	84.1***	0.321***
		(0.001)	(0.011)	(0.010)	(9.0)	(0.135)
Inherited wealth (million DKK)		-0.180***	0.183***	-0.193***	0.7	-0.060
		(0.057)	(0.054)	(0.049)	(0.5)	(0.594)
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.090	0.020	0.840	0.022	0.820	0.140
N	9,614	9,614	9,614	9,614	410	784

Stakes and mistakes: Alternative interpretation II

- Role of financial advise
    - Banks are more likely to offer financial advise to wealthy costumers
    - Implies our estimated effect of stakes on mistakes is “too large”
    - No such evidence:
        - Same effect of stakes on mistakes for banks that are more likely to provide financial advise

Stakes and mistakes: Alternative interpretation III

- Active vs Passive Mistakes
    - Previous evidence on inherited wealth reducing biases previously could also arise passively from inheriting better-manager portfolios
        - E.g., inheriting foreign stocks from parents would mechanically reduce a beneficiary's home bias

Stakes and mistakes: Alternative interpretation III

- Active vs Passive Mistakes

	Dependent variable:					
	Home bias		Mutual fund investment		Portfolio concentration	
Estate held investment	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.524***	0.648***	0.436***	0.306***	0.594***	0.639***
	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
After inheritance	-0.084***	-0.011***	0.090***	0.009***	-0.060***	-0.011***
	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.760	0.845	0.767	0.857	0.791	0.858
N	152,612	358,665	149,801	361,476	235,668	275,609

Stakes and mistakes: Moderators?

- Are mistakes more sensitive to higher stakes when investors
  - Are financially literate?
    - Yes, but effect still very small
  - Have more trading experience?
    - No evidence

Stakes and mistakes: Conclusion

- Stakes reduce mistakes, often in a statistically significant way
- Reduction in the incidence of mistakes appears to be economically small, given the baseline level of mistakes