The Age of Reason: Financial Decisions Over the Lifecycle and Implications for Regulation

Brooke Astor, Age 51, 1953

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Performance Peaks

Late 20s:	Baseball (James 2003)
Early 30s:	Mathematicians, theoretical physicists, lyric poets: (Simonton 1988)
Mid-30s:	Chess players (Charness and Bosnian 1990)
Early 40s:	Autocratic rulers (Simonton 1988)
50:	Novelists (Simonton 1988)

Our Findings

- Financial “performance” rises then declines with age in the cross-section
- Performance:
  - pay fewer fees
  - negotiate low (borrowing) interest rates

- This regularity is confirmed for 10 separate consumer credit markets:
  - Home equity loans
  - Home equity lines of credit
  - Eureka moments for balance transfers
  - Late payment fees
  - Over credit limit fees
  - Cash advance fees
  - Auto loans
  - Credit cards
  - Small business credit cards
  - Mortgages
- On average, financial performance peaks at age 53

Explanations

Three leading explanations

- Age-related cognitive effects
  - Analytical ability (“I.Q.”) falls with age
  - Experience rises
- Selection effects (no)
- Cohort effects (no)

Other explanations

- Risk (no)
- Opportp2 0m (“cost of timeno)

Related literature

- Household finance (Campbell 2006)
- Shrouded Attributes (Gabaix and Laibson 2006)
- Personal finance: Benartzi and Thaler (2002,7)
- Korniotis and Kumar (2006): older adults manage their stock portfolio less well. Also, Zinman (2006)
- Lusardi and Mitchell (2006,7): decline in knowledge of basic financial concepts

Plan

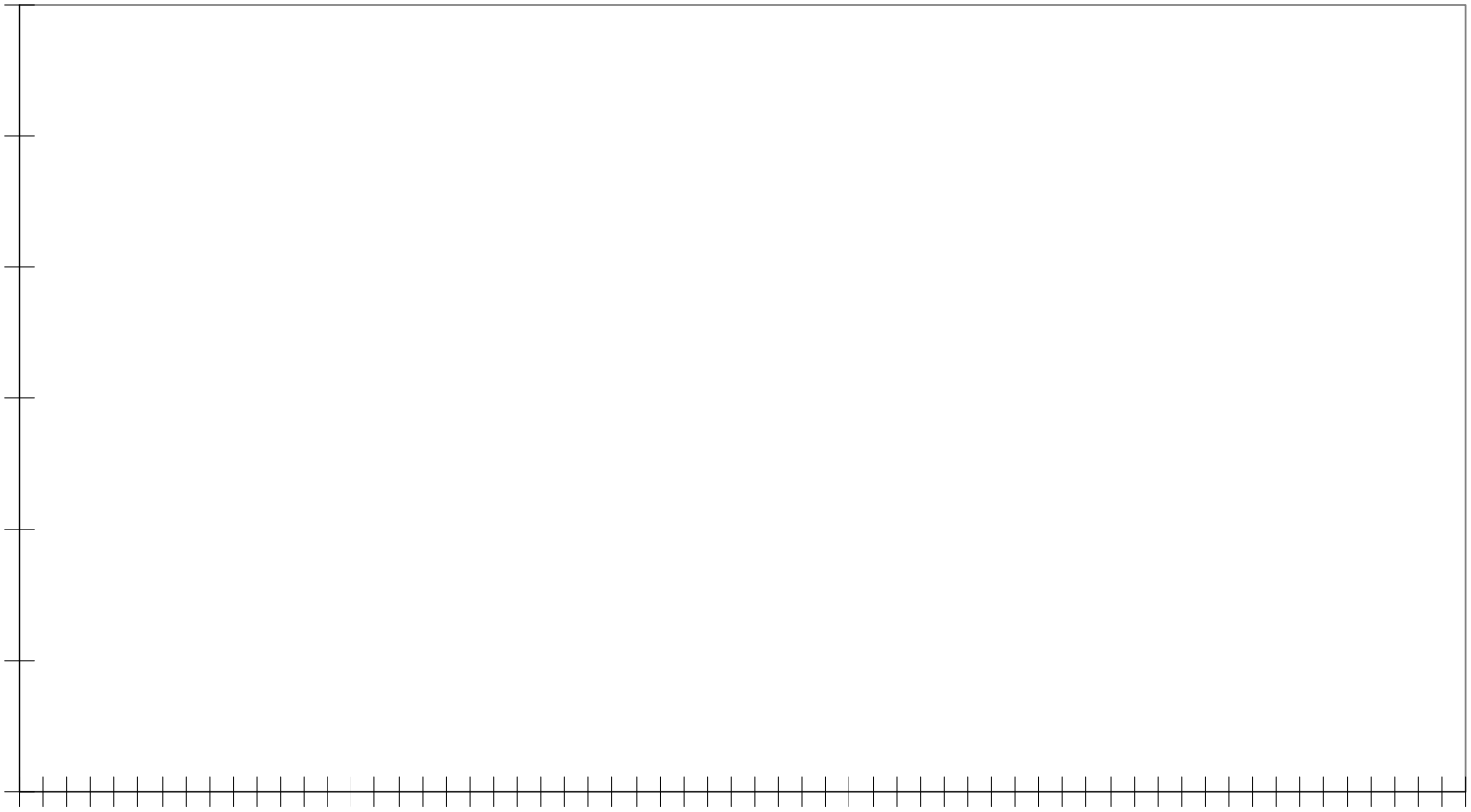
- Present ten studies
- Discuss explanations, emphasizing changes in cognitive function over the lifecycle
- Policy considerations
- 7 open questions

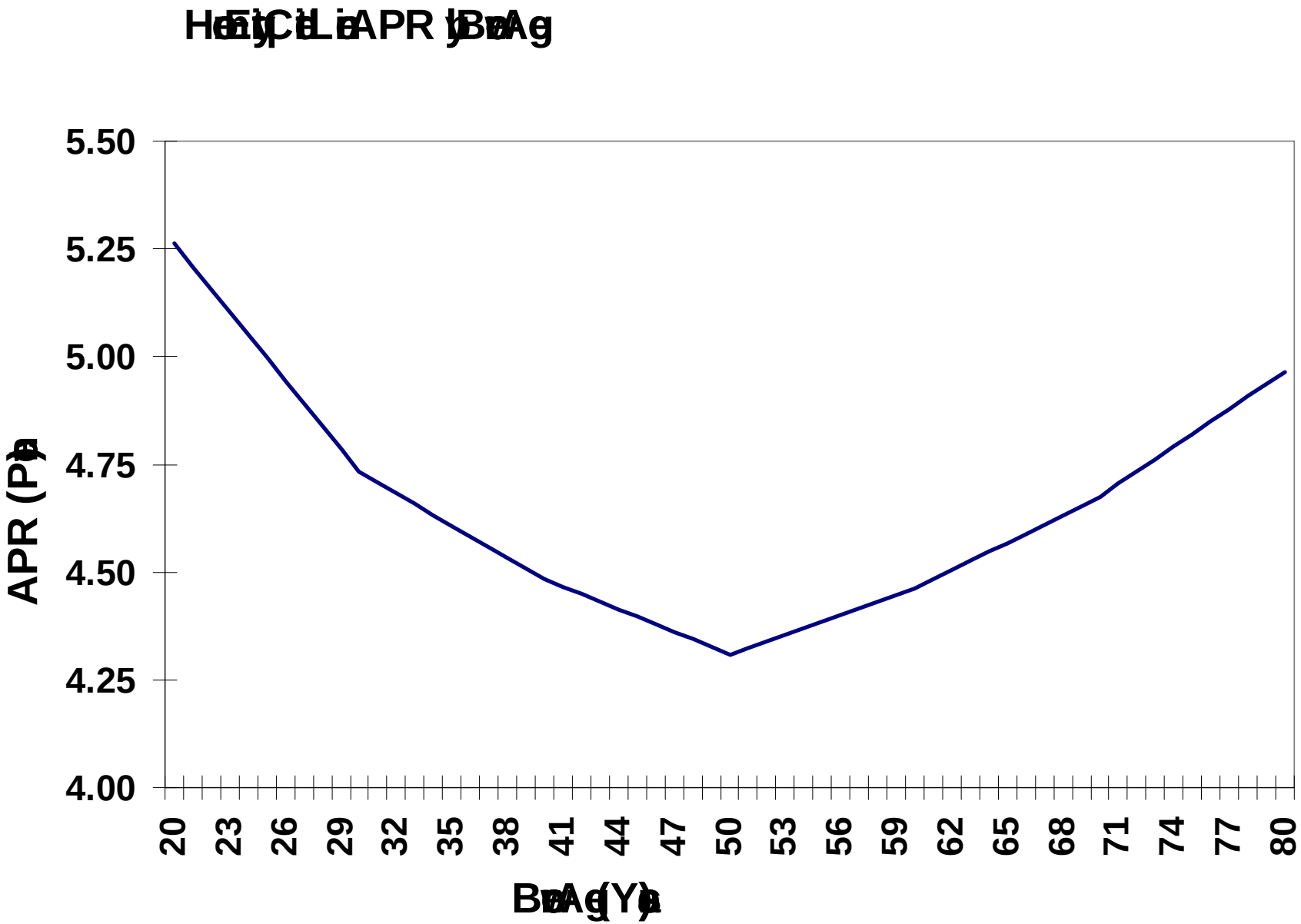
(1,2) Home Equity Loans and Home Equity Credit Lines

- Proprietary data from large financial institutions
- 75,000 contracts for home equity loans and lines of credit, from March-December 2002 (all prime borrowers)
- We observe:
  - Contract terms: APR and loan amount
  - Borrower demographic information: age, employment status, years on the job, home tenure, home state location
  - Borrower financial information: income, debt-to-income ratio
  - Borrower risk characteristics: FICO (credit) score, loan-to-value (LTV) ratio

Home Equity Regressions

- Regress APRs for home equity loans and credit lines on:
  - Risk controls: FICO score and Loan to Value (LTV)
  - Financial controls: Income and debt-to-income ratio
  - Demographic controls: state dummies, home tenure, employment status
  - **Age** : piecewise linear function of borrower age with knots at age 30, 40, 50, 60 and 70.
- Next slide plots fitted values on age splines

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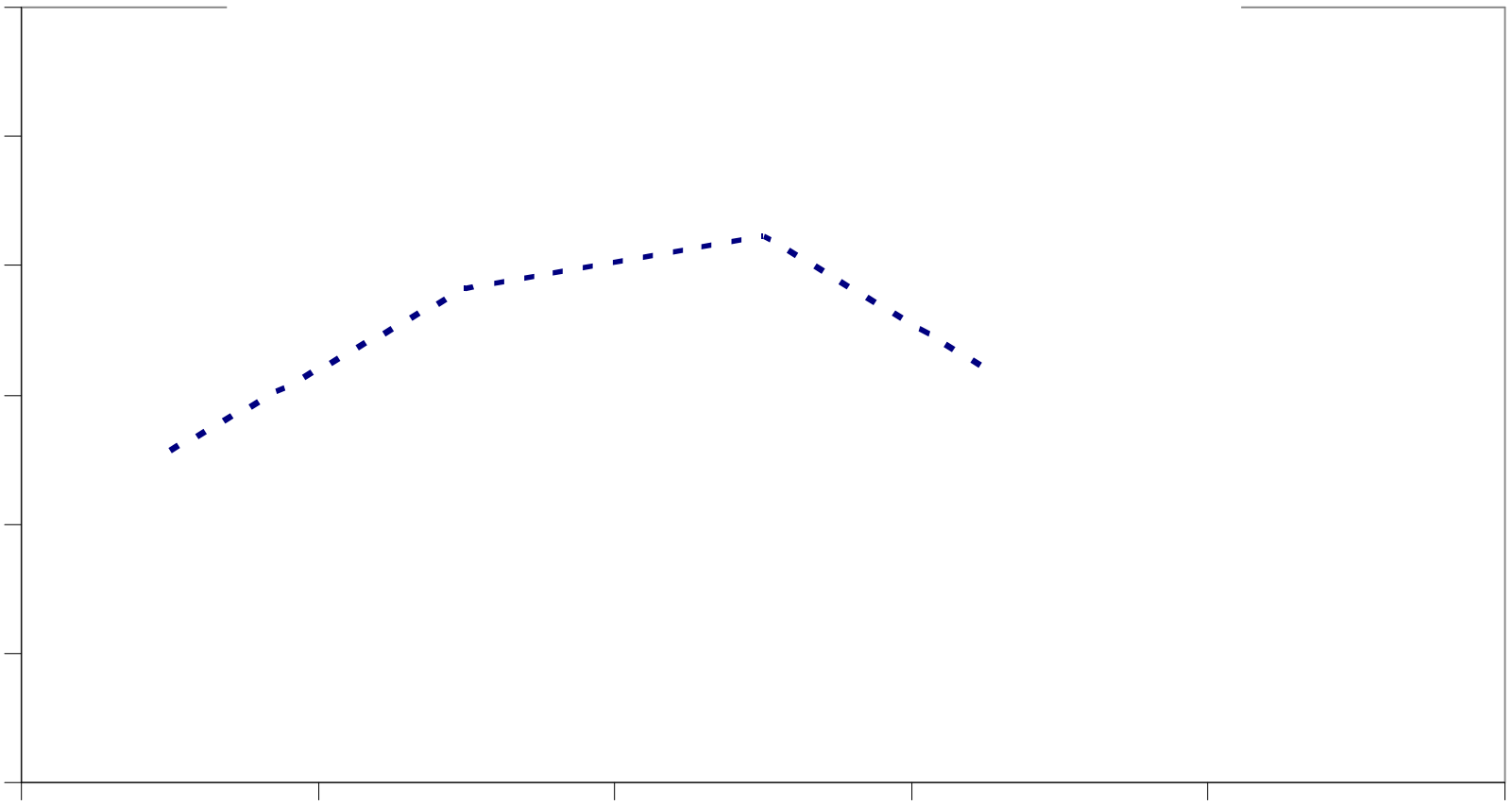
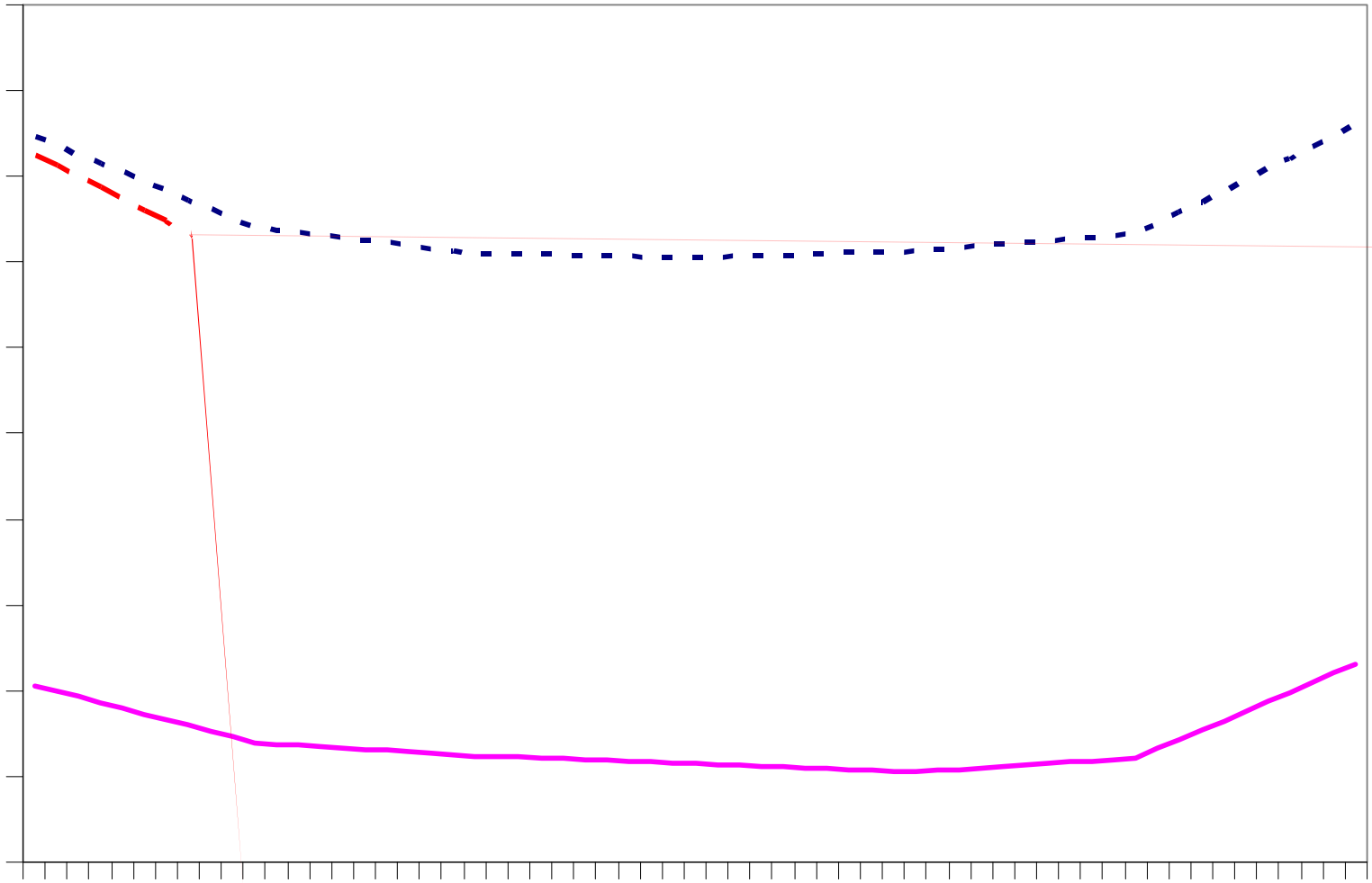
(3) Ek LigAida ClgBlTfOs

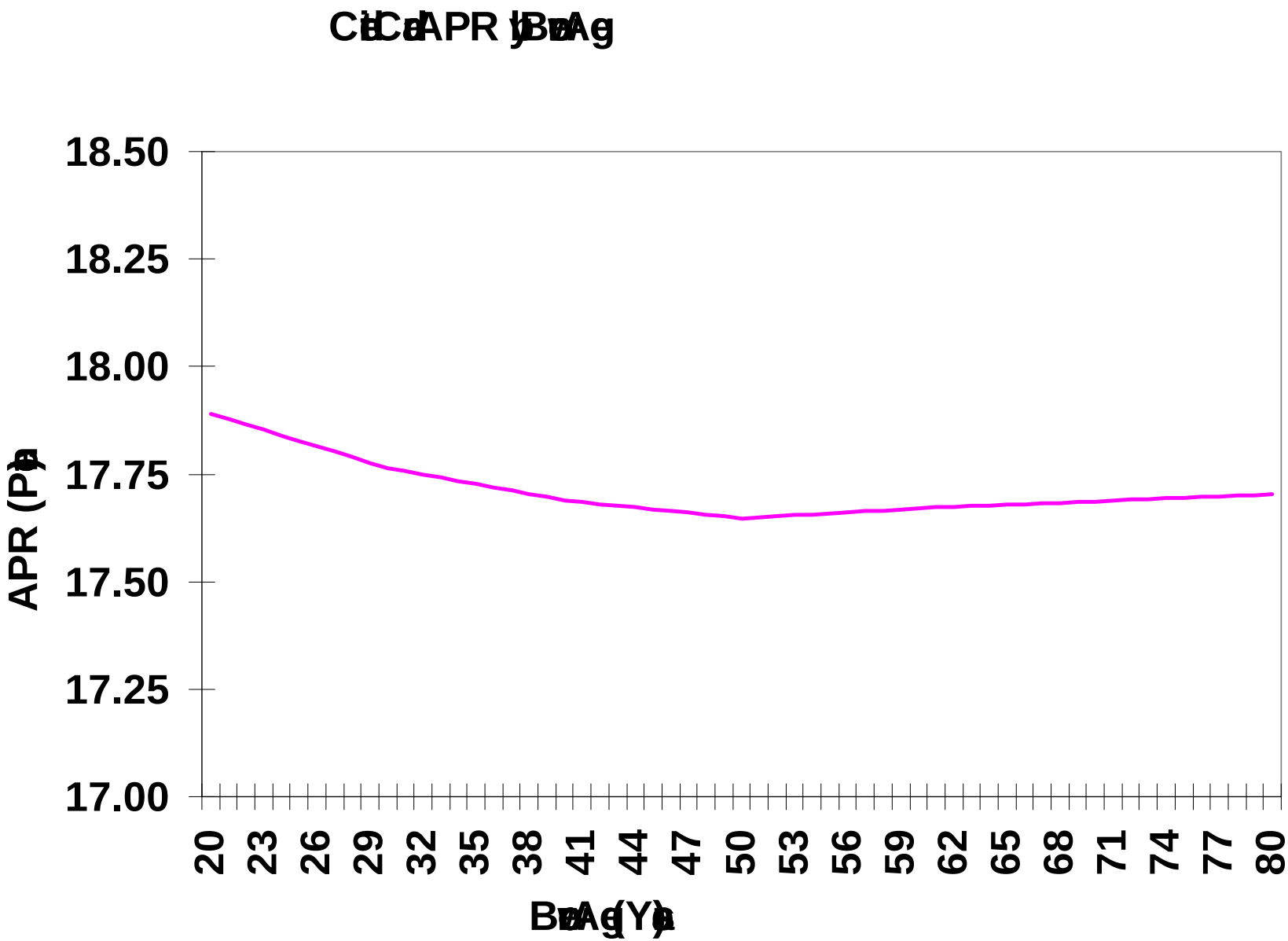
- Balance transfer offers: borrowers pay lower APRs on balances transferred from other cards for a six-to-nine-month period
- New purchases on card have higher APRs
- Payments go towards balance transferred first, then towards new purchases
- Optimal strategy: make no new purchases on card to which balance has been transferred



Seven other examples

- Three kinds of credit card fees:
  - Late payment
  - Over limit
  - Cash advance
- Credit card APRs
- Mortgage APRs
- Auto loan APRs
- Small business credit card APRs

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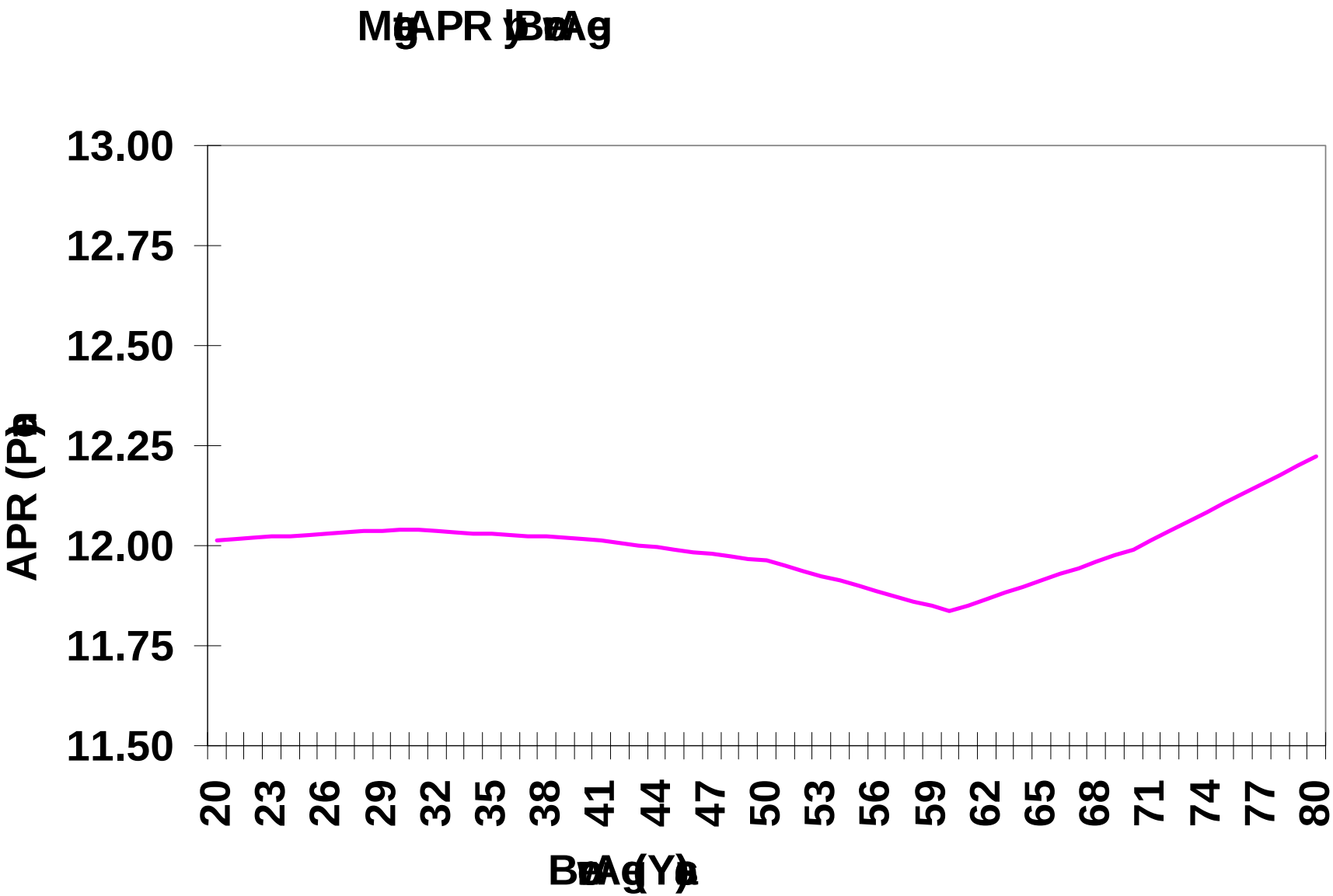
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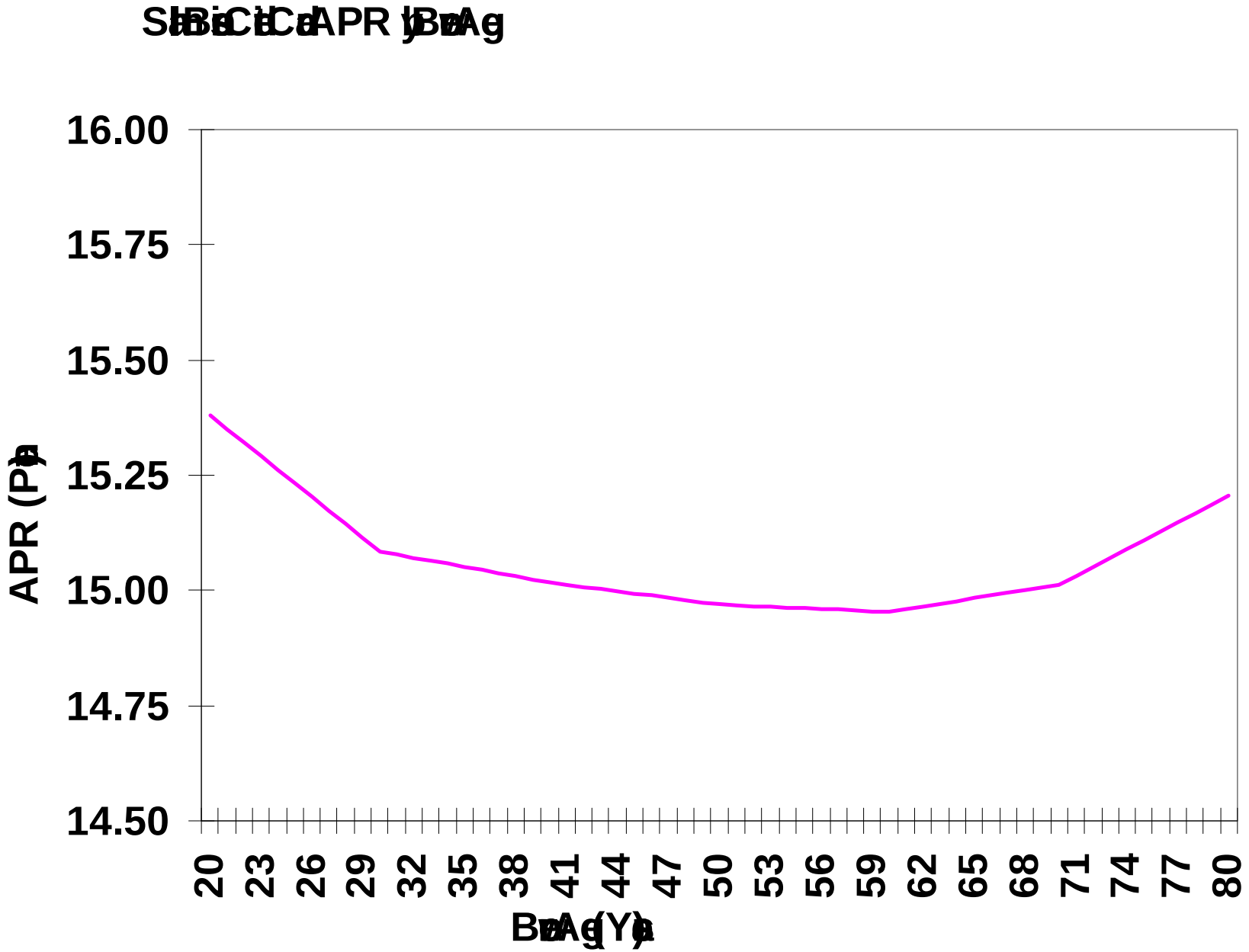
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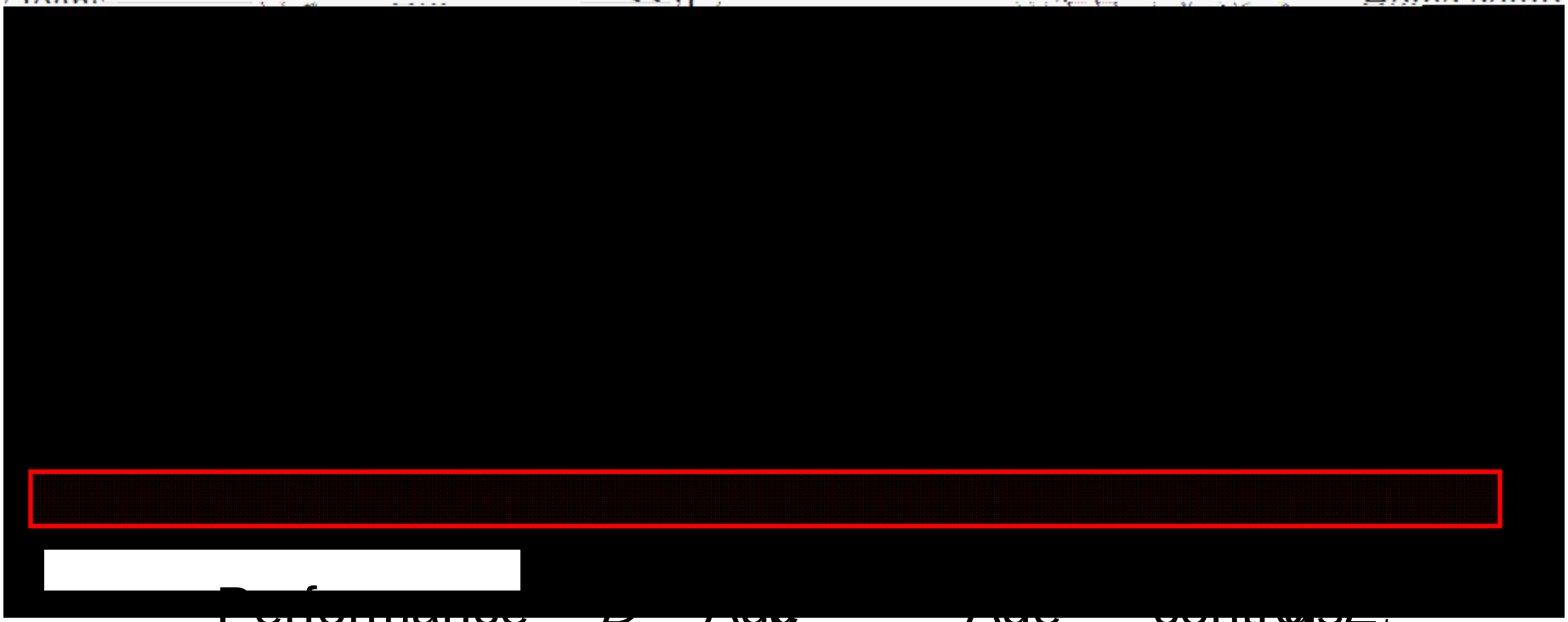
Table 2 Age of Peak Performance for 10 Financial Tools

	Age		
	Standard deviation	Task	Mean
Minimizing APR on:			
loans	55.0		4.2
			Home equity



Performance $= D + \text{Age} + \text{Age} \times \text{control}_t$

$$\text{Peak} \quad \frac{D}{2E}$$

Explanations

Three leading explanations

- Age-related cognitive effects
  - Analytical ability (“I.Q.”) falls with age
  - Experience rises
- Selection effects
- Cohort effects

Other explanations

- Risk
- Opportunity cost of time
- Learning via social networks
- Discrimination
- Other supply factors

Possible explanations (I)

- Age-related cognitive effects
  - Declining analytical performance (“I.Q.”) with age
  - Rising experience with age

Cognitive performance over the lifecycle

Cognitive function comes in two key categories:

- Crystallized intelligence (skills, knowledge, experience)
- Fluid intelligence (ability to solve new problems)

- Crystallized intelligence rises until the 60’s
- Fluid intelligence starts falling quickly at age 20

Source: Cattell (1987)

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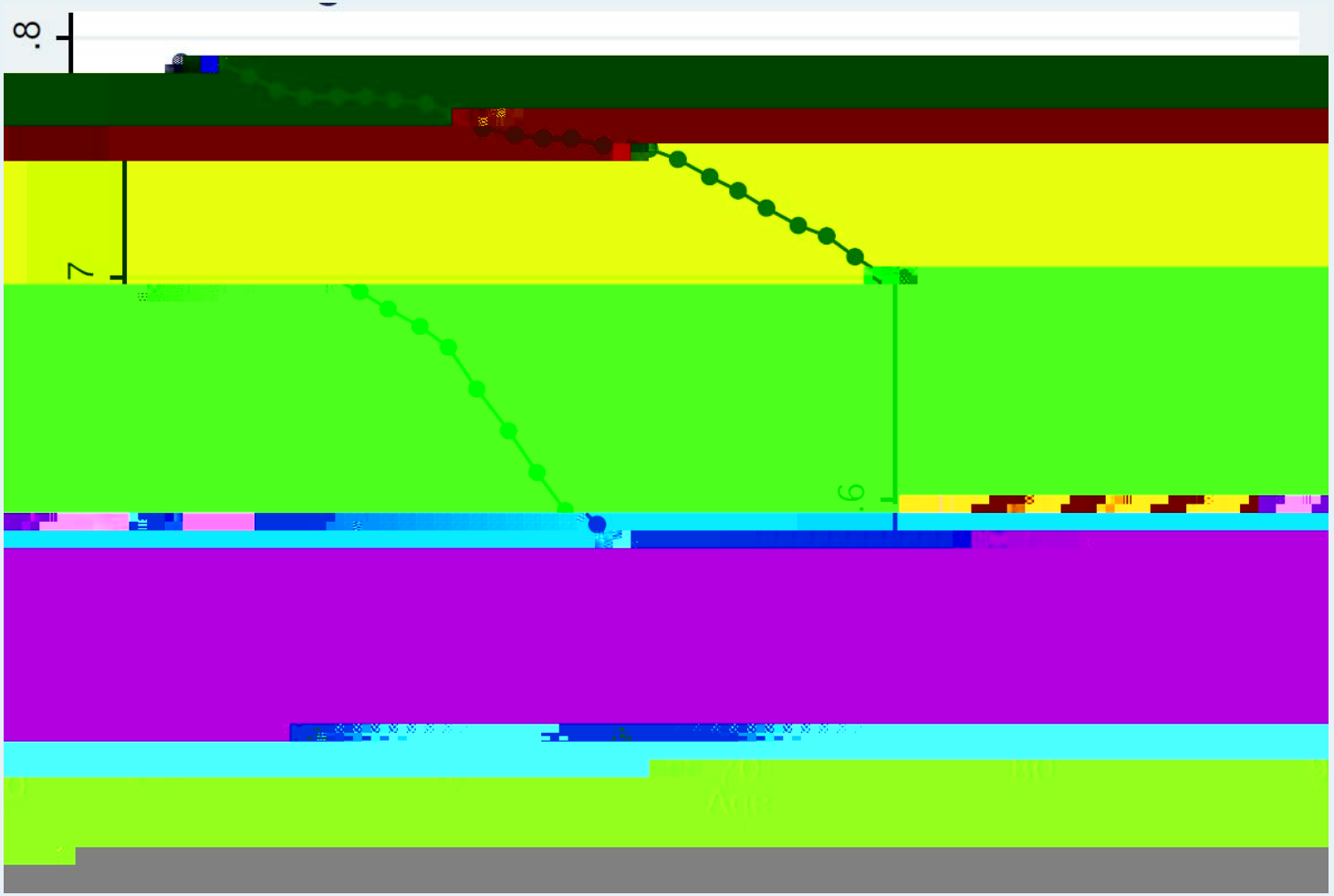
Percentile

“If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?”

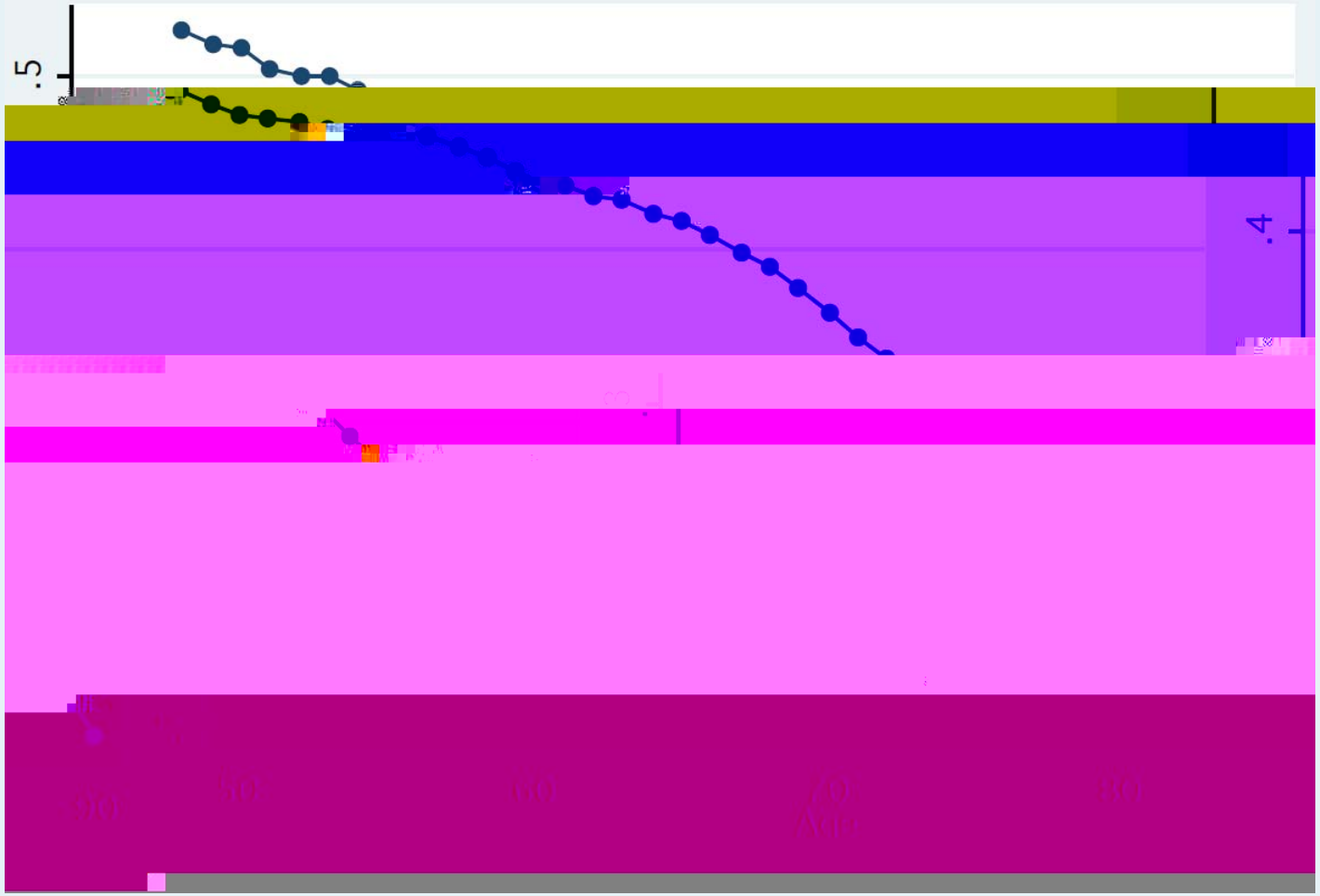
Fraction of people who answer “100”



Source: HRS; Agarwal, Driscoll, Gabaix, Laibson (2009)

“If 5 people all have the winning numbers in the lottery and the prize is two million dollars, how much will each of them get?”

Fraction of people who answer “400,000”



Source: HRS; Agarwal, Driscoll, Gabaix, Laibson (2009)

Dementia doubles every five years

Ferri et al (2005); Plassman et al (2008)

Prevalence of dementia	
60-64:	0.8%
65-69:	1.7%
70-74:	3.3%
75-79:	6.5%
80-84:	12.8%
85+:	30.1%

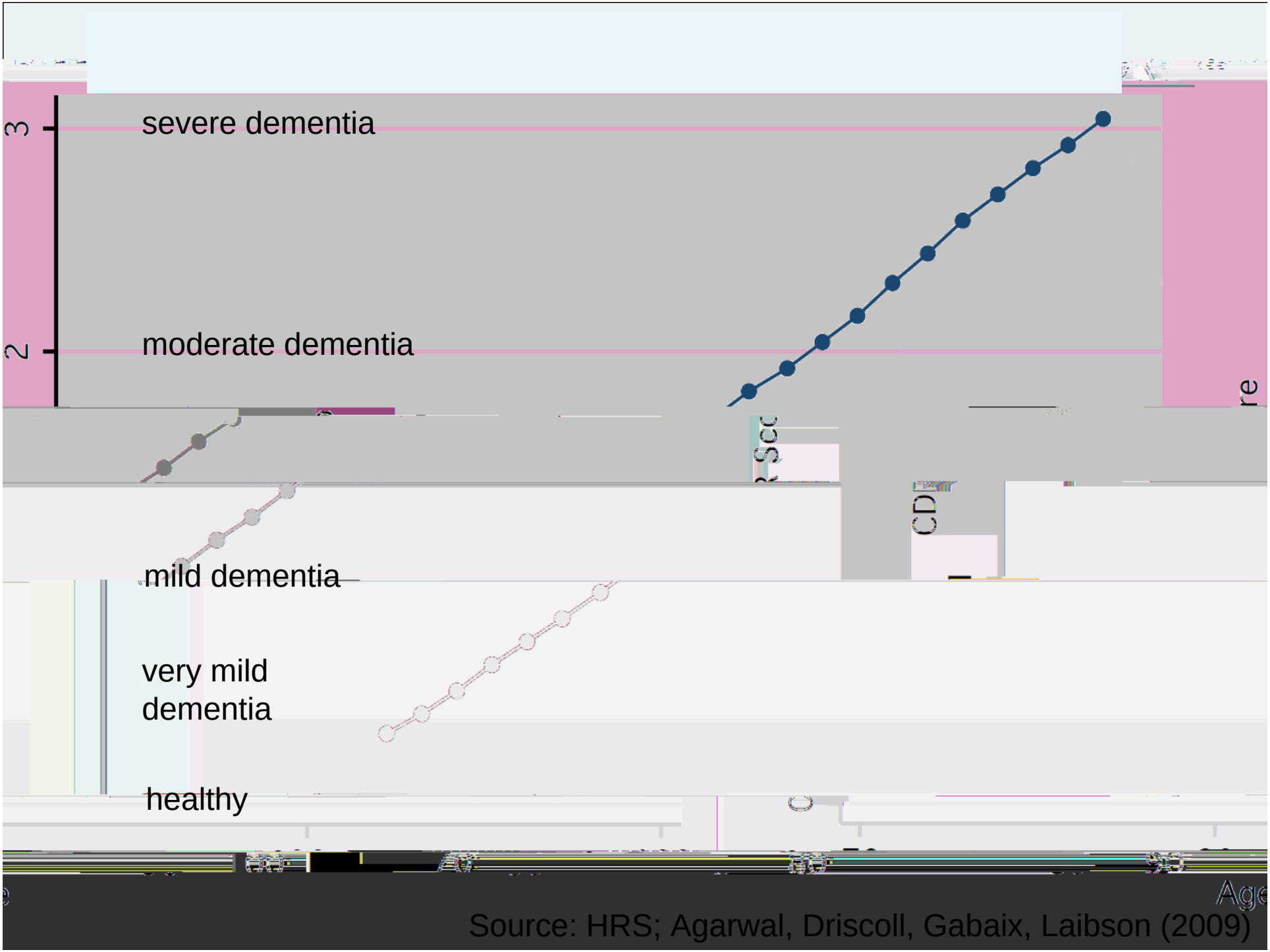
Pl[illegible]

71-79: 16.0%

80-89: 29.2%

90+: 39.0%

Pre-clinical symptoms affect investors at younger ages.



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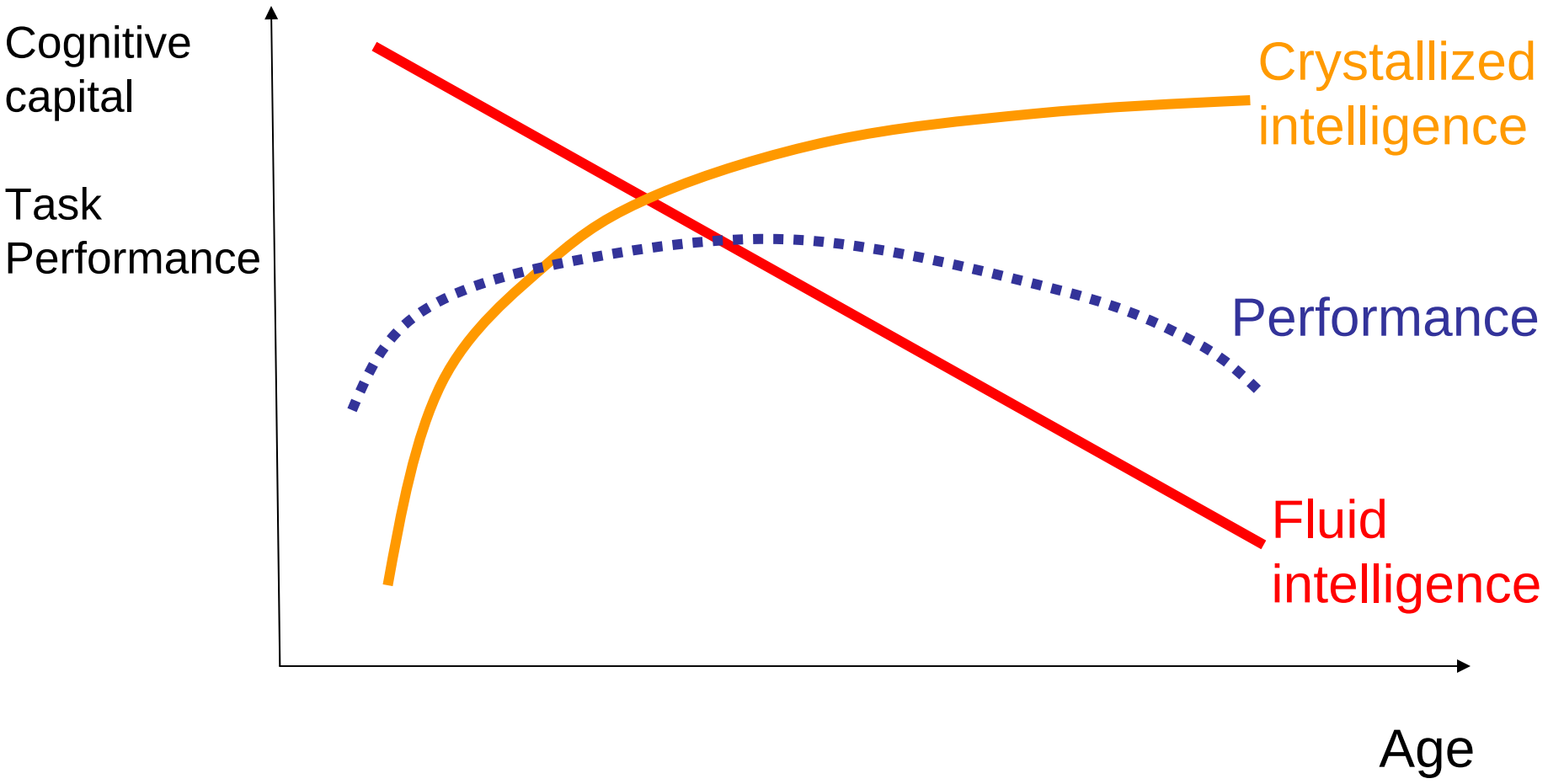


Hypothesized link between Performance and Age

One test of the age-based theory:

The later an activity starts in life the later the performance peak

$$Peak_j = \underset{(5.7)}{33} + \underset{(0.19)}{0.71} \times age_{j,10\%}$$

$Peak_j$ is the peak performance age of credit behavior j

$age_{j,10\%}$ is the 10^{th} percentile of the age distribution of people in our sample who have credit vehicle associated w/ behavior j

$R^2=0.62$

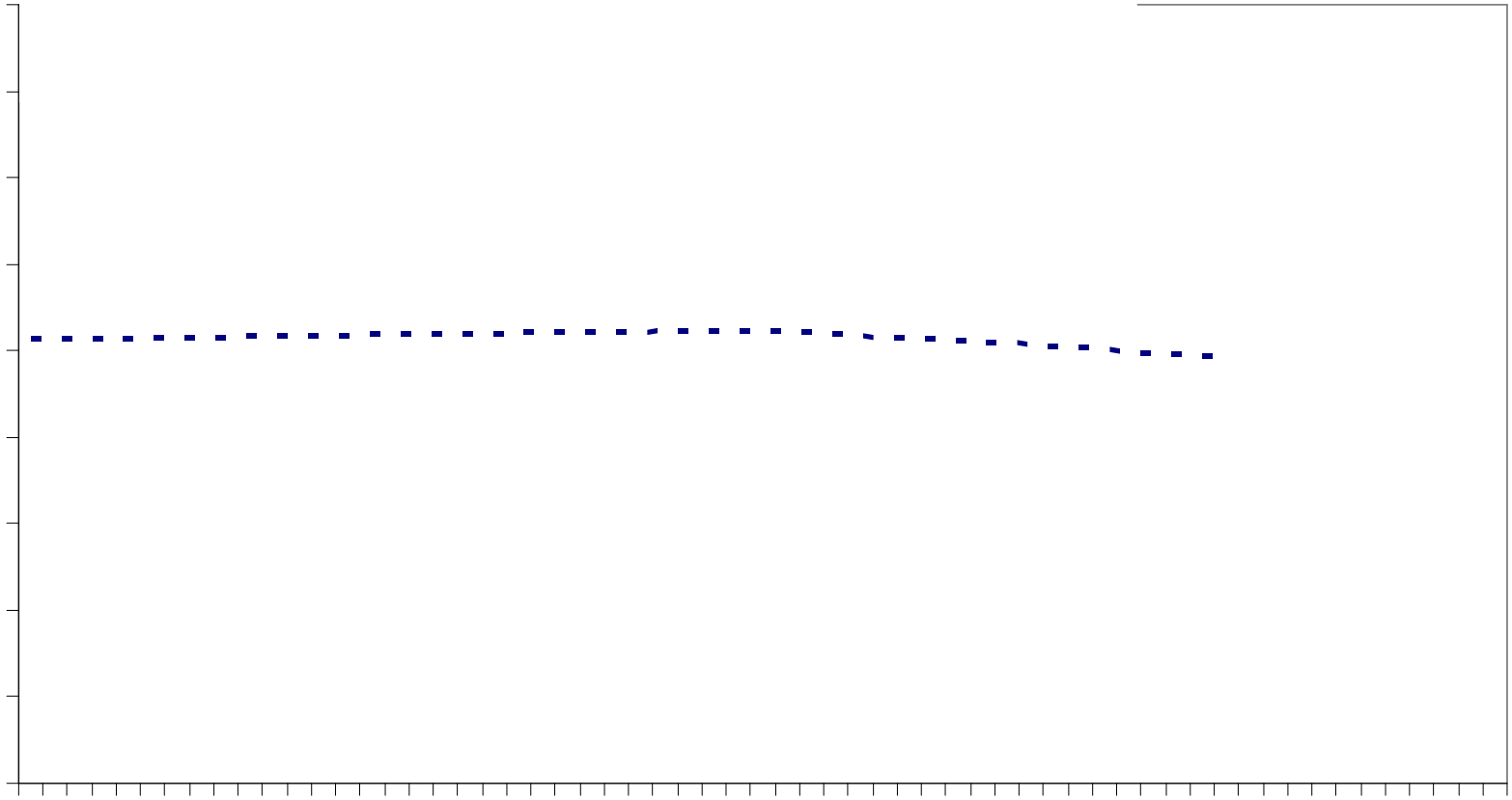
N=10

Possible Explanations (II)

Sample selection (two types of plausible effects)

1. Perhaps middle-aged borrowers are representative of all middle-aged households, whereas young/old borrowers are less sophisticated than most young/old households
2. Perhaps middle-aged borrowers are different (less risky) than the young/old who borrow

No evidence for either kind of selection.



Default rates don’t explain the U-shape of interest rates, since defaults predict an *inverse*-U shape of interest rates.

Possible explanations (III)

- Cohort effects
  - Data is cross-sectional
  - Current generations of 70-, 30-year olds may be less sophisticated than current generation of 50-year olds
- Cohort effects: Challenges
  - If cohort effects dominant, why is the young cohort doing so badly?
  - We see this pattern over many products, some of which have not changed much over time—for example, auto loans.
  - We also find that both sexes do about as well (might think current cohort of older women has less financial experience)
  - We see same pattern in 1992 data (credit card and Auto APRs)

Other possible explanations

- Cost of time?
  - That would predict an inverse U shape of mistakes (older adults have more time)
  - Link with Aguiar-Hurst: For “simple” and well-understood products (food), the cost of time effect dominates. For “complex” products (finance), the Analytical Capital+Experience effect dominates.
- Different default behavior by age?
  - Default rates follow an *inverse* U
  - U-shape pattern shows up even for fees and eureka (default is irrelevant in these cases)

Conclusion

- Inverse U-shape for performance, in all 10 examples
- The methodology is easy to replicate with other datasets:
  - Add age splines to the regressors, and check the shape
  - Use a quadratic term to evaluate the location of the peak.

Others who have found U-shapes

- Fiona Scott-Morton (auto loans)
- Luigi Guiso (portfolio choice)
- Lucia Dunn (credit cards)
- Paolo Sodini (investment choices)
- Ernesto Villanueva (mortgages)

Perverse policies

- Middle-aged investors are protected by ERISA
  - Fiduciary duty of plan sponsor
  - Delegation
- Older investors (in rollover IRA's) have no such protections

Summary

- Older adults experience substantial declines in analytic cognitive function
- Economic behavior and mistakes show strong age-based patterns, even among prime borrowers, with the middle-aged doing better than the old or young

7 key open questions

1. How important are losses from poor financial decisions?
2. What are the demographic risk factors?
3. How much do people anticipate or recognize their own cognitive decline?
4. Does financial education help?
5. Do third parties help?
6. What is the market response to this situation?
7. What is the appropriate regulatory response?

END

Thank You

(4,5,6) Fees

- We examine payments of three types of credit card fees:
  - Late payment fees
  - Over credit limit fees
  - C

(7) Auto Loans

- Proprietary data from several large financial institutions
- 6,996 loans for purchase of new and used autos
- We observe:
  - Contract terms: APR and loan amount
  - Borrower demographic information: borrower age and state of residence
  - Borrower financial information: income, debt-to-income ratio
  - Borrower risk characteristics: FICO score
  - Automobile characteristics: value, age, model, make and year.

(8) Credit Card APRs

- Proprietary data from a large financial institution that issues credit cards nationally
- 128,000 accounts over a 36 month period from 1/2002 to 12/2004
- We observe:
  - Card terms: APR, fees paid
  - Borrower risk information: FICO (credit) score, card balances, other debt
  - Borrower demographic information: age, gender, income

(9) Mortgage APRs

- Proprietary data from a large financial institution that originates first mortgages in Argentina
- 4,867 fixed-rate, first-mortgage loans on owner-occupied properties between June 1998 and March 2000
- We observe:
  - Contract terms: APR and loan amount
  - Borrower demographic information: age, employment status, years on the job, home tenure, home location
  - Borrower financial information: income, debt-to-income ratio
  - Borrower risk characteristics: Veraz (credit) score, loan-to-value (LTV) ratio

(10) Small Business Credit Card APRs

- Proprietary data set from several large financial institutions that issue small business credit cards nationally
- 11,254 accounts originated between 5/2000 and 5/2002
- Most businesses are small and owned by single families
- We observe:
  - Credit card terms: APR
  - Borrower demographic information: age
  - Borrower risk information: credit score, total number of cards, total card balance
  - Business information: years in business