

# Insurance and Portfolio Decisions A Wealth Effect Puzzle

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# Disclaimer

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- We study household's decisions to:
  1. Invest in risky assets
  2. Insure against risk
  
- The two decisions reflect opposite risk retention tradeoff:
  - An agent **increases** his risk exposure by **investing**
  - An agent **reduces** his risk exposure by purchasing **insurance**
  
- Thus, factors that promote risk taking should
  - Increase the demand for risky assets
  - Lower the demand for insurance



- So far, the literature has studied the two decisions separately.
- Object of the paper:
  - Explore possible joint determinants and frictions
  - In particular: Test whether wealth has opposite effect on portfolio and insurance coverage decisions
- We do so using detailed micro level data from survey in U.S.

# Preview of Results

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- We find that
  1. Joint determinants (subjective expectations, risk attitude)
  2. Common frictions (liquidity constraints, literacy, information)
  3. Insurance and risky investments **both increase** with wealth
  
- We try to explain this ***Insurance-Portfolio Puzzle*** theoretically
  - With conventional theory
  - By considering various behavioral factors
  
- We cannot explain the puzzle fully

# Empirical approach

- Strategy:

1. Estimate a baseline, easily interpretable, model
2. Conduct battery of robustness tests

- Baseline model:

$$I_i = \alpha_0 W_i + \alpha_1 X_i + \alpha_2 Y_i + \varepsilon_i^I$$
$$R_i = \beta_0 W_i + \beta_1 X_i + \beta_2 Z_i + \varepsilon_i^R$$

$I_i$  and  $R_i$  = insurance and risky investments, left censored at zero  
( $\varepsilon_i^I, \varepsilon_i^R$ ) follow bivariate normal distribution with correlation  $\rho$

- **Exercise:** Test  $H_0 = \{ \alpha_0 * \beta_0 < 0, > 0 \}$ ,  $H'_0 = \{ \alpha_1 * \beta_1 < 0 \}$

- Baseline model is estimated with data collected in the *Survey of Consumer Expectations* and focuses on car insurance decisions

# Survey of Consumer Expectations (SCE)

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- Produced by Federal Reserve Bank of New York since June 2013
- Key features:
  - Monthly
  - Internet-based
  - ~1,300 respondents
  - Nationally representative of U.S. household heads
- In total four waves
  - Aug-Sept 2015
  - Aug-Sept 2016
  - Feb 2021
  - April 2021

**Thank you SCOR !!!**



# Index of insurance coverage ( $I_j$ )

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- We focus on auto and homeowner insurance
- We ask about 7 components of auto insurance contract:
  1. Liability (covers damages caused by insured to others)
  2. Personal injury (pays for insured medical bills regardless of who is at fault)
  3. Under/Uninsured (pays when other party has not enough insurance)
  4. Collision (covers insured vehicle after accident regardless of who is at fault)
  5. Comprehensive (covers insured vehicle from damage not due to collision)
  6. Rental (pays for a rental car while the insured vehicle is being repaired)
  7. Towing/road side assistance





# Insurance and risky investments variables ( $Y_i, Z_i$ )

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- Insurance Variables ( $Y_i$ ):
  - **Value of vehicle**
  - Premium paid
  - Population density within zip code
  - Measure of **objective risk** (damages incurred past 2 years)
  - Measure of **subjective risk** (expected damages next 2 years)
  - Knowledge of car insurance
  
- Risky investments variables ( $Z_i$ ):
  - **Expectations** (change in U.S. stock market next 12 months)
  - Knowledge of debts and savings



# Individual Characteristics ( $X_i$ )

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- Age of household head
- Education attainment
- Wealth
- Measure of **financial literacy**
- Measure of **credit worthiness** (credit score)
- Measure of **liquidity constraint** or financial fragility
- Subjective **measure of risk attitude**
- Other: race, marital status, employment status, number of kids...

## Insurance Coverage

## Risky Investments

|                     |                         |                         |                         |                         |                          |
|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|
| Wealth              | 6.5e-04***<br>(7.0e-05) | 5.5e-04***<br>(6.6e-05) | 3.7e-04***<br>(6.7e-05) | 3.0e-04***<br>(6.2e-05) | 3.3e-04***<br>(6.4e-05)  |
| Car Value           |                         | 2.4e-02***<br>(4.5e-03) | 2.3e-02***<br>(4.4e-03) | 1.6e-02***<br>(3.9e-03) | 1.7e-02***<br>(3.9e-03)  |
| Objective Risk      |                         | 1.2e-01**<br>(5.6e-02)  | 1.1e-01**<br>(5.5e-02)  | 5.6e-02<br>(5.8e-02)    | 5.8e-02<br>(5.8e-02)     |
| Premium             |                         | 5.7e-05<br>(1.1e-04)    | 1.1e-04<br>(1.2e-04)    | 1.8e-04<br>(1.2e-04)    | 1.8e-04<br>(1.2e-04)     |
| Age                 |                         |                         | 1.8e-02***<br>(2.7e-03) | 1.2e-02***<br>(2.6e-03) | 1.1e-02***<br>(2.6e-03)  |
| Zip Density         |                         |                         | 4.9e-03<br>(9.0e-03)    | 2.8e-03<br>(8.7e-03)    | 3.5e-03<br>(8.7e-03)     |
| Education           |                         |                         | 2.0e-01***<br>(6.2e-02) | 6.6e-02<br>(6.2e-02)    | 8.1e-02<br>(6.2e-02)     |
| Subjective Risk     |                         |                         |                         | 1.2e-01**<br>(4.8e-02)  | 1.7e-01***<br>(4.6e-02)  |
| Low Numeracy        |                         |                         |                         | -2.3e-01**<br>(9.6e-02) | -2.5e-01***<br>(9.6e-02) |
| Know Car Insurance  |                         |                         |                         | 2.4e-01***<br>(2.7e-02) | 2.4e-01***<br>(2.7e-02)  |
| Credit Worthiness   |                         |                         |                         | 3.0e-02<br>(3.3e-02)    | 2.7e-02<br>(3.3e-02)     |
| Financial Liquidity |                         |                         |                         | 6.7e-01***<br>(1.4e-01) | 7.0e-01***<br>(1.4e-01)  |
| Risk Attitude       |                         |                         |                         |                         | -5.7e-02**<br>(2.5e-02)  |
| AtanhRho            | 1.0e-01***<br>(2.8e-02) | 8.7e-02***<br>(2.8e-02) | 8.6e-02***<br>(2.8e-02) | 6.8e-02**<br>(2.8e-02)  | 6.9e-02**<br>(2.8e-02)   |

|                        |                         |                         |                         |                          |                         |
|------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| Wealth                 | 2.6e-04***<br>(2.2e-05) | 2.6e-04***<br>(2.2e-05) | 2.5e-04***<br>(2.3e-05) | 1.9e-04***<br>(2.0e-05)  | 1.8e-04***<br>(1.9e-05) |
|                        |                         |                         |                         |                          |                         |
|                        |                         |                         |                         |                          |                         |
|                        |                         |                         |                         |                          |                         |
| Age                    |                         |                         | -1.3e-03**<br>(6.6e-04) | -2.3e-03***<br>(6.4e-04) | -1.6e-03**<br>(6.6e-04) |
| Zip Density            |                         |                         | -9.7e-04<br>(1.2e-03)   | -1.2e-04<br>(1.1e-03)    | -4.8e-04<br>(1.2e-03)   |
| Education              |                         |                         |                         | 9.4e-02***<br>(1.6e-02)  | 4.4e-02***<br>(1.6e-02) |
| Expected Stock Change  |                         |                         |                         | 3.7e-01***<br>(1.2e-01)  | 3.0e-01**<br>(1.2e-01)  |
| Low Numeracy           |                         |                         |                         | -7.4e-02***<br>(2.4e-02) | -6.2e-02**<br>(2.4e-02) |
| Know Savings and Debts |                         |                         |                         | 3.0e-02**<br>(1.2e-02)   | 1.7e-02<br>(1.2e-02)    |
| Credit Worthiness      |                         |                         |                         | 2.1e-02**<br>(8.1e-03)   | 2.0e-02**<br>(8.1e-03)  |
| Financial Liquidity    |                         |                         |                         | 3.2e-01***<br>(3.6e-02)  | 3.0e-01***<br>(3.6e-02) |
| Risk Attitude          |                         |                         |                         |                          | 4.4e-02***<br>(6.1e-03) |
| N                      | 1811                    | 1811                    | 1811                    | 1806                     | 1806                    |
| AIC                    | 8.8e+03                 | 8.7e+03                 | 8.6e+03                 | 8.4e+03                  | 8.3e+03                 |



# Result 1: Joint Determinants and Frictions

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## ***Joint Determinants :***

- Subjective expectations
- Risk attitude
- Age

## ***Joint Frictions :***

- Liquidity constraints
- Numeracy
- Information/knowledge
- Education



## Result 2: Wealth Effect

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- Insurance coverage and risky assets holding are both positively correlated with wealth
- This is a puzzle, i.e. inconsistent with standard theory
- Puzzle driven in part by a surprising behavioral asymmetry:
  - The poor are more likely to under-invest,
  - The rich are more likely to over-insure.
- We estimate the aggregate cost of over-insuring by the wealthy to exceed \$14 billion per year in the U.S.

# Robustness Checks

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1. Alternative definitions of key variables (wealth, insurance,..)
2. Restricted samples (e.g. states with similar legal minima,...)
3. Interaction effects (e.g. Car Value \* Wealth)
4. Possible wealth endogeneity
5. Other forms of insurance (homeowner, extended warranty)
6. Different country (France) + Industry data (Bancassurance)

# Robustness tests: Bottom line

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- Robustness tests confirm :
  - Common determinants and frictions
  - Insurance and risky investments **both increase** with wealth
  
- Question: Can we reconcile this puzzle with theory?

# Standard Theories

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- Simultaneous decisions
- Background risks
- Wealth-dependent losses ; probabilities ; risk aversion
- Liability insurance
- Liquidity constraints
- Adverse selection/moral hazard
- **Supply side effects**



# Behavioral Theories

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- Prospect theory
- Risk (mis)perception
- Rational inattention
- Information frictions
- Participation costs
- Context-dependent preferences
- Non-monetary benefits
- **Regret avoidance**

# New theories we are investigating

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- Preference for positively skewed lotteries
- Consumption commitments
- Loss aversion
- Mental accounting
- Salience theory
- Disappointment aversion

# Conclusion

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- We find robust evidence of
  1. Joint determinants and frictions
  2. Insurance-portfolio puzzle: demand **increases** with wealth
- The puzzle is statistically robust and economically relevant
- Puzzle is driven in part by a specific behavioral pattern: the poor invest too conservatively ; the rich over-insure.
- So far, we have failed to explain the puzzle with either standard or behavioral theories

**We welcome suggestions !!!!**