

Molecular Genetics, Risk Aversion, Return Perceptions, and Stock Market Participation

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Summary & Findings

- HRS took saliva samples from large number of individuals and sequenced their genes
- HRS calculates Polygenic Scores (PGS) based on out-of-sample findings
 - This paper uses PGS identified in prior studies – avoids data mining issues
 - Out-of-sample PGS weights is important – far more genes than dependent variables

Summary & Findings

- HRS also provides 10 principal components to use as control variables
 - Genetic variation closely related to cultural variation, historical wealth accumulation and opportunities, etc.
 - Control for principal components to remove common background effect that would produce spurious genetic relations. E.g., genes for brown eyes are less common among British than Portuguese.

Population	College Degree	Median HH Income	Own House	Brown Eyes
British	57.1%	\$79,872	74.0%	22%
Portuguese	28.6%	\$67,807	63.5%	65%
Somali	13.5%	\$24,185	9.1%	99%

Summary & Findings

- Authors consider PGS for: (1) educational attainment, (2) general cognition, (3) neuroticism, (4) depression, (5) heart attacks, (6) coronary disease, (7) body mass index, and (8) height
- Genes are related to stock market participation, risk aversion, and return expectations
- Orthogonalize variables to the 10 principal components. Decompose risk aversion and return expectations into:
 - (1) part correlated with 8 PGS and (2) residual
 - About 40% of risk aversion and return expectation relation with stock participation due to part correlated with PGS

Summary & Findings

- Variables prior studies show relate to stock market participation (income, wealth, etc.) are correlated with genes
- Orthogonalize variables to the 10 principal components. Decompose variables from prior studies into: (1) part correlated with 8 PGS and (2) residual
 - About a third of explanatory power of variables from prior studies due to part correlated with PGS

Why This Matters

- Possibility 1: variation in risk aversion and economic expectations are genetically fixed at birth
 - Risk aversion and expectations are exogenous
 - Effectively what most economic models do
- Possibility 2: variation in risk aversion and economic expectations are determined by experience
 - Risk aversion and expectations are endogenous
- Possibility 3: some combination of the above

Channel from Gene → Behavior

- Two step procedure decomposing explanatory variables into part correlated with genes and residuals points towards channels through which genes affect behavior
- For example, BMI PGS → stock market participation. Results show that BMI PGS → wealth → stock market participation. Points towards channel, still a lot of potential interpretations.
 - Gene affects self-control → BMI, wealth accumulation, and investment
 - BMI → health expenditures → wealth accumulation → investment
 - Labor market discrimination based on BMI → income → wealth accumulation → investment
- Still a lot of work possible to fully understand channels

Economic Outcomes vs. Investor Characteristics

- Paper decomposes effect of investor characteristics on economic outcomes into genetic and non-genetic parts
- Economic outcomes:
 - Equity participation, % equity, risk aversion, stock market return expectations
- Investor characteristics:
 - Wealth, income, education, cognition, trust, sociability, optimism, grew up poor, height, BMI, health
- Classifications a bit ad hoc. Decomposing the effect of wealth on risk aversion into genetic and residual components seems counterintuitive.

Return Expectations

- Study has three measures of stock market return expectations: $P(R_m > 0\%)$, $P(R_m > 20\%)$, $P(R_m < -20\%)$
- Create an extreme return probability measure as:
 $P(|R_m| > 20\%)$
- Create a skewness type measure: $\frac{P(R_m > 20\%)}{P(R_m < -20\%)}$

Conclusion

- Very interesting and innovative paper
- Clear evidence that genetic variation is related to stock market participation and portfolio allocation
- Shows there are complex multi-dimensional channels through which genes affect behaviors
 - E.g., educational attainment PGS is related to income, wealth, education, trust, optimism, health, risk aversion, and beliefs about equity returns → all of which are related to stock ownership
- A lot of scope for follow-up studies