Entrepreneurship among Baby Boomers: Recent evidence from the Health and Retirement Study

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Why study Boomers' entrepreneurship?

- Baby Boomers are a large part of the older population and have been prolific entrepreneurs
- According to the 2012 Survey of Business Owners, about 25% of entrepreneurs are between the age of 55-64
- Entrepreneurship (including self-employment) has been a very common pathway to retirement
- Entrepreneurship provides support in older age that can be needed in view of shrinking welfare systems and increased longevity
- Entrepreneurship is a form of attachment to the labor force in older age that could lead to higher quality of life and individual wellbeing

What affects entrepreneurship in older age?

- Existing literature provides useful insights
- Entrepreneurship can be both physically and cognitively demanding; hence, **health** problems can impede it (Cahill et al., 2013; Zhang and Carr, 2014)
- **Family structure and changes in family structure** can affect entrepreneurship. Divorce can lead to the splitting of assets or sale of a business (Özcan, 2011). Older individuals may also want to dedicate more time to children/grandchildren
- Entrepreneurship often involves intellectually demanding activities. Hence, having a higher **level of education** can facilitate entrepreneurship (Zissimopoulos and Karoly, 2007; Giandrea et al., 2008; Cahill et al., 2013).

What affects entrepreneurship in older age? (cont.)

- **Optimism** is another important variable to explain entrepreneurship (Puri and Robinson, 2013)
- **Wealth** can have an impact on entrepreneurship, as it can alleviate liquidity constraints. However, wealth proxies for more than liquidity. Hurst and Lusardi (2004) find that only very high levels of wealth have a positive impact on entrepreneurship
- Boomers have accumulated considerable **debt** (Lusardi and Mitchell, 2013). This could also affect entrepreneurship

Our objectives

- We focus on Baby Boomers and study the determinants of entrepreneurship of this generation in 2012
- To examine how determinants have changed over time, we compare Baby Boomers' entrepreneurship to that of a similar age group in 1998
- We study the role of wealth and its relationship to entrepreneurship in older age

Data

- We use data from the Health and Retirement Study (HRS), a biennial survey of individuals age 50 and older.
- The HRS started in 1992 and data are comparable across waves
- The HRS is the richest source of information on those age 50+. It includes modules on demographics, occupation, income, assets, physical health, psychological health, cognition, expectations about the future, etc.
- We study Baby Boomers using the most recent data possible (2012 wave)

Data (cont.)

- Given the structure of the HRS, we study Baby Boomers age 52 to 65 in the 2012 wave. Our sample consists of 9,063 observations

- We compare the Boomer entrepreneurs to a previous cohort of entrepreneurs of the same age range, using data from the 1998 HRS wave so as to limit any overlap between the two cohorts

HRS | HEALTH AND RETIREMENT STUDY
A Longitudinal Study of Health, Retirement, and Aging
Sponsored by the National Institute on Aging

Definition of entrepreneurship

- Very difficult to define entrepreneurship, especially at an older age
- Self-employment has been used as an indicator of entrepreneurship; on the other hand, many self-employed undertake small-scale business activities
- Business ownership is also an imperfect indicator of entrepreneurship

Definition of entrepreneurship (cont.)

- In the HRS both business ownership and business income are reported at the household level

- For our measure of entrepreneurship, we use as auxiliary variables:
  - labor force participation
  - self-employment
  - the receipt of business and wage incomes
  - whether the partner works in the family business as reported by a self-employed individual in a couple

- We experimented with five different definitions of entrepreneurship based on business ownership

Definition of entrepreneurship (cont.)

- Our preferred definition of entrepreneurship includes **business owners** who
  - are self-employed or live in a household that earns business income
  - are still working (even part time) or reported (by their partner) working in the family business
  - are not the sole wage earner in the household (in the case of couples)

- Our preferred definition of entrepreneurship aims to capture active participation in a business. The unadjusted business ownership rate is much higher than our adjusted one (see below)

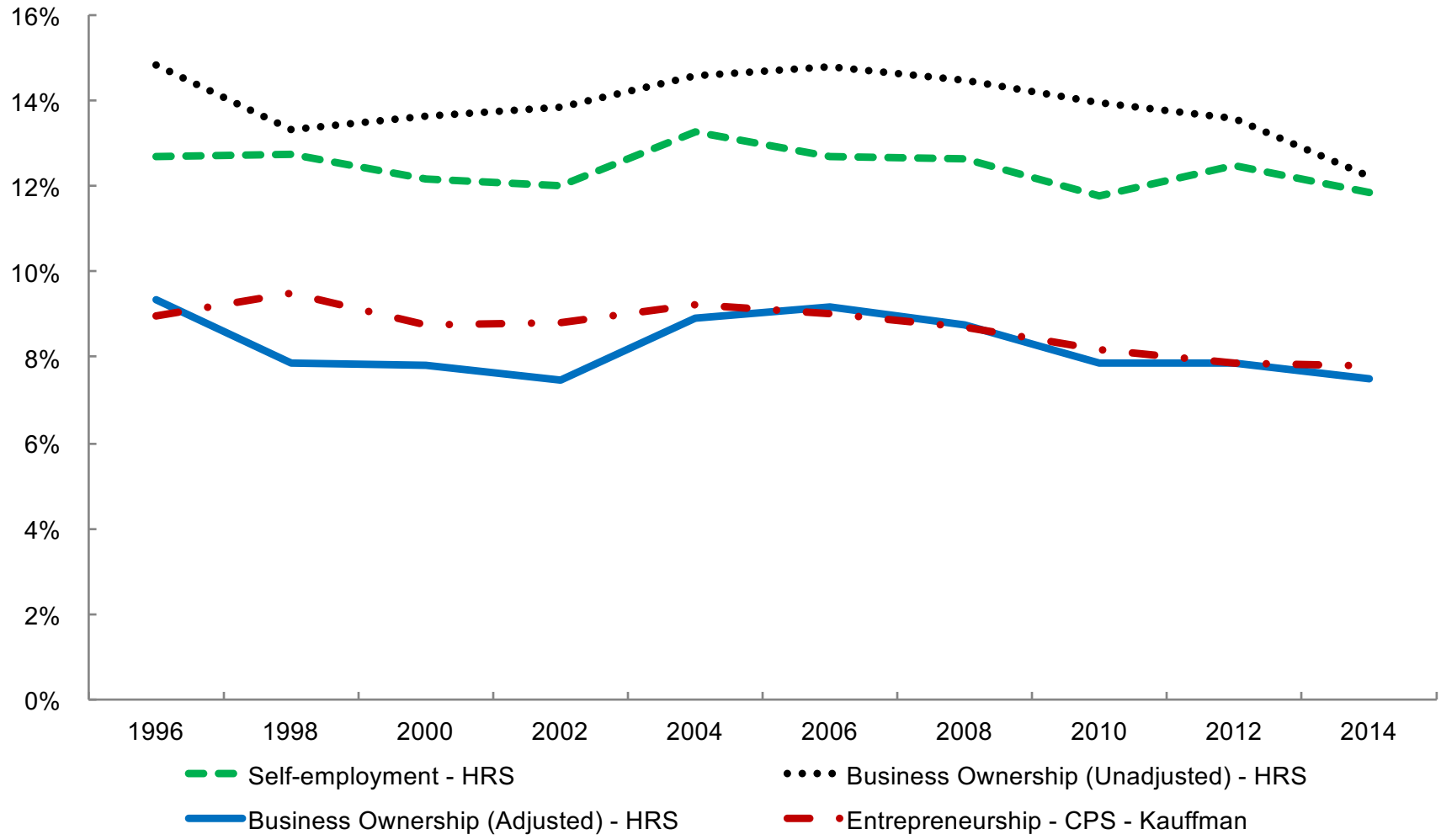
- We also use self-employment in our work as a comparison measure

Comparing definitions of entrepreneurship

- We compare our definition to the entrepreneurship rate reported in the 2015 Kauffman Index: Main Street Entrepreneurship, calculated using the US Census Bureau's Current Population Survey (CPS)

- Our business ownership rate matches the Kauffman Index rate relatively closely. On the other hand, self-employment and unadjusted business ownership rates in the HRS are much higher than the Kauffman Index rate

Rates of entrepreneurship – HRS and CPS ages 55-64



Comparison between business owners and self-employed

- There is limited overlap between the self-employed and business owners in our sample of Baby Boomers
- In only 39% of the cases do the two definitions coincide
- Business owners who are not self-employed are different from self-employed who are not business owners

  They are:

  - more likely to be white, female, have a spouse/partner, college educated, and in good psychological health
  - considerably richer ($200,000 higher median net worth)

Comparison between business owners and self-employed – 2012 HRS

Variable	Is self-employed but not a business owner	Is a business owner but not self-employed	Difference	p value of the difference
White	0.817	0.885	-0.068	0.046
Female	0.403	0.507	-0.103	0.043
Couple	0.772	0.880	-0.108	0.002
Never married	0.058	0.005	0.053	0.000
Less than high-school	0.084	0.025	0.059	0.002
College and above	0.445	0.543	-0.098	0.055
CESD depression indicator	1.067	0.765	0.302	0.083
Smokes currently	0.140	0.068	0.072	0.010
Recall score (out of 20)	11.322	11.543	-0.221	0.476
Numeracy score (out of	4.069	4.001	0.068	0.639
Household net worth (median, 2012 prices)	228,000	429,000	-201,000	0.048
Number of observations	563	116	-..-	-..-

Comparison of entrepreneurs to non-entrepreneurs – 2012 HRS

Variable	Business owner	Not a business onwer	Difference	p value of the difference
White	0.896	0.789	0.106	0.000
Female	0.387	0.538	-0.151	0.000
Couple	0.831	0.692	0.140	0.000
Divorced or separated	0.118	0.170	-0.053	0.003
Less than high-school	0.035	0.105	-0.070	0.000
College and above	0.433	0.310	0.123	0.000
Number or health conditions	1.183	1.725	-0.541	0.000
CESD depression indicator	0.842	1.546	-0.704	0.000
Smokes currently	0.112	0.188	-0.075	0.000
Number of grandchildren	2.274	3.088	-0.814	0.000
Recall score (out of 20)	11.466	10.765	0.702	0.000
Numeracy score (out of 5)	4.166	3.789	0.378	0.000
Probability of survival to age 75 (in percentage points)	65.758	61.445	4.313	0.002
Household net worth (median, 2012 prices)	429,000	130,000	299,000	0.000
Number of observations	542	8,518	-..-	-..-

Comparison of Boomer entrepreneurs to entrepreneurs of the same age in 1998

- To understand how characteristics of entrepreneurs change over time, we compare Boomer entrepreneurs in 2012 to entrepreneurs of the same age (52-65) 14 years earlier (in 1998)

- We use the same definition of entrepreneurship in those two HRS waves

Comparison of Boomer entrepreneurs to entrepreneurs of the same age in 1998 (cont.)

Variable	Has a business in 1998	Has a business in 2012	Difference	p value of the difference
Age	56.513	58.174	1.661	0.000
White	0.945	0.896	-0.049	0.003
Less than high-school	0.090	0.035	-0.055	0.000
College and above	0.307	0.433	0.125	0.000
Number or health conditions	0.851	1.183	0.333	0.000
CESD depression indicator	1.073	0.842	-0.231	0.032
Smokes currently	0.185	0.112	-0.073	0.001
Number of children	2.936	2.473	-0.463	0.000
Number of grandchildren	3.019	2.274	-0.745	0.000
Recall score (out of 20)	12.040	11.466	-0.573	0.009
Probability of survival to age 75 (in percentage points)	70.842	65.758	-5.084	0.004
Household net worth (2012 prices)	414,104	429,000	14,896	0.723
Number of observations	759	542	-..-	-..-

Multivariate analysis

- So far, our analysis was univariate
- We also undertake multivariate analysis to examine which variables remain important once we account for all characteristics together
- The analysis involves running logistic regressions with entrepreneurship as our dependent variable and including all the characteristics discussed above as regressors
- We report marginal effects, i.e., the change in the probability of entrepreneurship due to a change in the value of the regressor

Multivariate analysis: Estimates, 2012 HRS

Variable	Probability of being self-employed (unconditional)			Probability of owning a business (unconditional)		
	Marginal Effect	Std. Error	t statistic	Marginal Effect	Std. Error	t statistic
Age 59 - 61	0.012	0.009	1.352	-0.009	0.007	-1.270
Age 62 - 65	-0.015	0.010	-1.480	-0.015	0.008	-1.837
White	0.026	0.008	3.209	0.035	0.007	4.805
Female	-0.057	0.007	-8.592	-0.032	0.005	-6.998
Couple	0.074	0.015	4.842	0.052	0.014	3.859
High-school graduate	0.032	0.013	2.459	0.053	0.014	3.733
Some college	0.053	0.013	4.110	0.062	0.014	4.438
College and above	0.065	0.014	4.565	0.065	0.015	4.386
Number or health conditions	-0.023	0.003	-8.055	-0.008	0.002	-3.979
CESD depression indicator	-0.008	0.002	-3.958	-0.005	0.002	-3.142
Recall score (out of 20)	0.005	0.001	4.181	0.002	0.001	2.036
Numeracy score (out of 5)	0.002	0.003	0.898	0.002	0.002	0.911
Probability of survival to age 75	0.000	0.000	1.978	0.000	0.000	1.857
Household net worth - 80th to 95th percentile	0.094	0.012	7.854	0.086	0.011	8.020
Household net worth - top 5th percentile	0.139	0.018	7.758	0.102	0.014	7.114
Number of observations	7,918			7,924		

Multivariate analysis: Estimates, 1998 HRS

Variable	Probability of being self-employed (unconditional)			Probability of owning a business (unconditional)		
	Marginal Effect	Std. Error	t statistic	Marginal Effect	Std. Error	t statistic
Age 59 - 61	-0.016	0.010	-1.578	-0.013	0.009	-1.514
Age 62 - 65	-0.037	0.011	-3.528	-0.032	0.009	-3.364
White	0.013	0.011	1.202	0.032	0.012	2.624
Female	-0.076	0.007	-11.137	-0.033	0.005	-6.552
Couple	0.025	0.020	1.246	0.012	0.019	0.640
High-school graduate	0.001	0.012	0.080	0.021	0.011	1.902
Some college	0.031	0.013	2.373	0.036	0.012	3.064
College and above	0.031	0.014	2.159	0.026	0.013	2.023
Number or health conditions	-0.015	0.003	-4.473	-0.009	0.003	-3.339
CESD depression indicator	-0.005	0.002	-2.458	-0.002	0.002	-0.839
Recall score (out of 20)	0.001	0.001	0.566	-0.001	0.001	-0.663
Numeracy score (out of 5)	0.007	0.003	2.551	0.004	0.002	1.542
Probability of survival to age 75	0.000	0.000	2.559	0.000	0.000	1.822
Household net worth - 80th to 95th percentile	0.117	0.014	8.243	0.126	0.016	7.861
Household net worth - top 5th percentile	0.195	0.018	10.976	0.161	0.019	8.656
Number of observations	7,711			7,738		

Breakdown of differences in entrepreneurship rates between 2012 and 1998

- The graph shown above suggests that there is a downward trend in entrepreneurship between 1998 and 2012
- It would be interesting to understand the reasons behind this decline
- To that effect, one can try to decompose the total estimated change
- Let the (unobserved) propensity to become an entrepreneur be for an individual i equal to

$$y_i^* = \boldsymbol{X}_i\boldsymbol{\beta} + u_i,$$

where $\boldsymbol{X}$ denotes a vector of characteristics, $\boldsymbol{\beta}$ a vector of associated coefficients, and u an error term consisting of unobservables

Breakdown of differences in entrepreneurship rates between 2012 and 1998 (cont.)

- Then, the change in the prevalence of entrepreneurship can be broken down into two parts:
  - One that is due to changes in the characteristics of the population (denoted by the $\boldsymbol{X}$ vector) between 1998 and 2012
  - Another that is due to changes in how these characteristics affect entrepreneurship (i.e., to the "entrepreneurship returns" of these characteristics). This part reflects changes in the $\boldsymbol{\beta}$ vector between 1998 and 2012

Breakdown of differences in entrepreneurship rates between 2012 and 1998 (cont.)

- In linear models, this is known as the Oaxaca-Blinder decomposition. We use a nonlinear variant of this decomposition that is credited to Yun (2004)

- We estimate a decline in entrepreneurship between 1998 and 2012 equal to 1.4 pp. This is due to a higher prevalence in the 2012 sample of Boomers of characteristics that are less conducive to entrepreneurship, such as being non-white, not in a couple, less healthy, and scoring lower on cognitive tests

- We find similar results for self-employment

The effect of wealth on entrepreneurship

- The impact of wealth on entrepreneurship is of particular policy relevance
- It is not easy to estimate how wealth affects entrepreneurship because there could be unobservables that affect both wealth and entrepreneurship. Examples could be personality traits (drive for success, conscientiousness, openness to new experiences)
- Wealth could also proxy for success in the business rather than credit constraints
- As a result, simple regressions could lead to inflated estimates of the effect of wealth on entrepreneurship

Partial identification methodology

- In order to properly estimate the effects of wealth on entrepreneurship we use nonparametric partial identification methods (Manski 1990,1997; Manski and Pepper, 2000)

- The way to estimate the effect of a change in wealth on entrepreneurship is to examine how the prevalence of entrepreneurship changes when wealth goes from A to B. Ideally:
  - we calculate what happens to entrepreneurship when wealth is equal to A for all individuals
  - we do the same with wealth equal to B
  - the effect of wealth is then equal to the difference in the prevalence of entrepreneurship between the two scenarios

Partial identification methodology (cont.)

- This calculation is infeasible, because in real life one cannot observe the same individuals with two different values of wealth
- What can be observed is only some individuals with value A and the others with value B
- Partial identification puts bounds on unobserved outcomes. E.g. it puts bounds on the prevalence of entrepreneurship in the group of individuals whose actual wealth is B in the hypothetical scenario that wealth would be A

Partial identification methodology (cont.)

- Putting bounds on unobserved outcomes implies putting bounds around the estimate of the effect of wealth on entrepreneurship

- In order to narrow the range of the bounds as much as possible, one has to make some assumptions

  We use the following 3 assumptions:

  - (1) Monotone treatment response (MTR): entrepreneurship is weakly monotonically increasing with wealth, on average.
  - This seems reasonable, as it is hard to imagine why higher wealth would lead to lower entrepreneurship on average in the population

Partial identification methodology (cont.)

- (2) Monotone treatment selection (MTS): when two groups that are observed with different level of wealth have different rates of entrepreneurship, the hierarchy between them is on average preserved in any comparison using the same level of wealth. This assumption implies that observed differences in entrepreneurship are due to factors that persist throughout the distribution of wealth (e.g., family socio-economic status, IQ, personality traits)

- (3) Monotone instrumental variable (MIV): a variable is a monotone instrument when it is weakly positively correlated with the outcome, given the value of wealth {this condition is much weaker than exogeneity, which is the typical requirement for instrumental variables estimation}

Our monotone instruments

- Optimism, as proxied by the probability of living to age 75 divided by the corresponding probability taken from the US life tables. There is considerable evidence that entrepreneurs are more optimistic than the general population (Puri and Robinson, 2013; Dawson et al., 2012; Fraser and Greene, 2006)
- Cognition, as measured by the score on a memory test. Entrepreneurship is a cognitively demanding activity, and we observe in our data a strong positive association between memory test scores and entrepreneurship. Similar evidence is provided by Levine and Rubinstein (forthcoming)

Advantages of partial identification methodology

- makes more credible assumptions
- is transparent about how each assumption affects results
- is completely non-parametric: no need to worry about other regressors or functional form assumptions
- accommodates endogeneity of various sorts (e.g., due to both time-varying and time-invariant unobservables, as well as sample selection)
- does not require an experimental design or panel data, it can be used in any survey

Causal effect of a change in wealth from the 1st to the 5th quintile

Assumptions	(1)	(2)	(3)	(4)	(5)	(6)
	Business Ownership					
	Lower Bound	Upper Bound	Low 95% CI	High 95% CI	Low 90% CI	High 90% CI
Exogenous Treatment Selection	0.132		0.106	0.158	0.110	0.154
No Assumptions Bounds	-0.763	0.822	-0.772	0.831	-0.770	0.829
MTR	0.000	0.822	0.000	0.831	0.000	0.829
MTR + MTS	0.000	0.132	0.000	0.152	0.000	0.147
MTR + MTS + MIV (1 instrument)	0.003	0.119	0.000	0.151	0.000	0.144
MTR + MTS + MIV (2 instruments)	0.016	0.052	0.000	0.080	0.004	0.074
Number of observations	9,063					
Number of observations (with both monotone instruments)	7,997					

Findings using partial identification

- When combining all our assumptions, we find that when wealth changes from levels at the bottom of the distribution to levels at the top, the probability of business ownership increases by at least 1.6 pp and up to 5.2 pp (the result is significant at 10%)
- We do not obtain any statistically significant results for smaller changes in wealth, nor for self-employment, nor for 1998
- Results suggest that wealth has a positive causal impact on entrepreneurship but only at very high levels, i.e., its effect is highly nonlinear (as in Hurst and Lusardi, 2004).
- This finding is not consistent with liquidity constraints hampering Boomers' entrepreneurship

The estimated effect of wealth on entrepreneurship - discussion

- The relatively small effect of wealth on entrepreneurship could imply that older entrepreneurs experience fewer difficulties in finding funding due to:
  - good business plans due to experience, commitment and professionalism
  - more extended business networks acquired through experience that allow them to get funding from several sources

- Alternatively, the fact that we cannot exclude a zero effect of wealth could be attributed to the high uncertainty of the estimates due to the mild assumptions used in partial identification

Summary of our findings

- Boomer entrepreneurs are different than the older population. They differ in characteristics such as ethnicity, sex, education, physical and mental health, cognition, and economic resources

- We also find changes over time: Baby Boomer entrepreneurs are older, more racially diverse, better educated, and in worse health than entrepreneurs of comparable age observed in the 1998 HRS wave

Summary of our findings

- These findings suggest that entrepreneurship is not exclusive to a particular segment of the population, rather it can be undertaken by a progressively more diverse pool of people. This could be due to:
  - the Internet, which allows the quick gathering and processing of information
  - medical advances, which allow people with physical limitations and health problems to function well in a professional capacity
  - the expansion of outsourcing

Summary of findings (cont.)

- We find only a small impact of wealth on entrepreneurship, which suggests that funding opportunities are favorable enough for older entrepreneurs not to need high levels of wealth to start or maintain a business.

Policy implications

- Given that there is little evidence that wealth impacts entrepreneurship— thus indicating that liquidity constraints are not a widespread problem— credit supply to small businesses is less of a concern

- Even as recently as 2012, the share of minorities and women among entrepreneurs is quite small. This fact points to the existence of potential obstacles to entrepreneurship for these population groups

Policy implications (cont.)

- Entrepreneurship among Boomers is strongly associated with college education. Hence, enabling access to college could promote future entrepreneurship

- To the extent that medical problems are an impediment to entrepreneurship, policy initiatives that make health care less costly and more accessible are also likely to lead to a larger number of entrepreneurs

Further work

- While the HRS has very rich information on characteristics of business owners, it provides fewer details on the characteristics of the business owned

- We could use information from the 2014 Annual Survey of Entrepreneurs and the 2012 Survey of Business Owners to examine in more detail:
  - the reasons to become an entrepreneur
  - the sources of business funding
  - entrepreneurship among minorities and women

Further work (cont.)

- Using the 2014 Annual Survey of Entrepreneurs and the 2012 Survey of Business Owners, it is also possible to extend the analysis of entrepreneurship to study activities which can contribute to high growth in the business and the economy, which include:
  - the business resources dedicated to R&D
  - profitability
  - sales outside the US

Further work (cont.)

- There are micro datasets in England (ELSA) and continental Europe (SHARE, 19 European countries) that are comparable to the HRS – questionnaires are to a large extent harmonized

- Using these data, we can study international differences in
  - the prevalence of entrepreneurship, and transition to entrepreneurship among older individuals
  - the effect of wealth, physical and psychological health, and education on entrepreneurship

Thank you

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