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Entrepreneurial Tendencies among People with ADHD

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Abstract. This paper studies the impact of people having attention deficit hyperactivity disorder (ADHD) on their predisposition toward entrepreneurship. We employ hand-collected survey data and psychometric tests to study the relationship between ADHD and occupational choice. The results of regression analysis suggest that ADHD sufferers have a significantly higher marginal probability of being entrepreneurs, while ADHD does not affect the likelihood of being a wage earner or being unemployed. Moreover, people with ADHD exhibit significantly higher values in the entrepreneurial tendency measures relative to others. By exploring the determinants of entrepreneurial tendencies, we find that ADHD affection has a positive impact on many entrepreneurial characteristics. Furthermore, we find that the significance of the ADHD variable maintains in the presence of entrepreneurship and demographic controls. Overall, these findings highlight the importance of the ADHD community as a rich source of entrepreneurs.

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1. Introduction

Why do some people engage in entrepreneurship while others choose salaried employment? The answer to this fundamental question is of the high importance to both policy makers and academic researchers. Decisions on how to promote entrepreneurial activity depend on understanding the determinants of people's choice of occupation. Whether people become entrepreneurs due to the potential economic outcomes, their behavioral heuristics, or personality traits is still an ongoing debate in the literature.

Debate over economic outcomes concentrates on the difference between the payoffs from entrepreneurship and wage employment.[3] Another argument about

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the determinants of entrepreneurial entry is based on the way people perceive the external economic environment (behavioral heuristics) and how misperceptions are linked to economic actions related to entrepreneurship.[4] Furthermore, a large body of literature recognizes the source of entrepreneurship not as being in economic outcomes or distorted beliefs about reality, but rather in personality traits. It follows then that, some groups of people may have a specific set of personality characteristics that are responsible for their predisposition toward entrepreneurship.[5]

Ever since the initial discovery in 1970's, the research on ADHD has risen rapidly to public and professional prominence. Medical literature has significantly advanced over the past few decades. While the earlier studies view the disorder rather as a disturbance in personal life and the society as whole, recent evidence suggest that ADHD should be considered as an affliction that could offer a rich source of people suited for particular occupation.[6] Adults with ADHD succeed in stimulating environment they need constantly adapt to and, therefore, tend to work in fast-paced and high-intensity manner that resembles sensation seeking behavior. At the same time, sensation seeking and willingness of taking an excessive risk as a behavior is more common to the entrepreneurs than to the wage earners (Zuckerman, 2004). Due to the higher arousal threshold needed to achieve an optimal level of dopamine neurotransmitter, sensation seeking people incline toward self-employment as one of the sensation seeking activities (Nicolaou et al., 2011). This brings about the hypothesis of possible causal relationship between attention deficit hyperactivity disorder (ADHD) and entrepreneurship.

The purpose of this study is to explore the inclination toward entrepreneurship of people affected by ADHD. We examine how ADHD influences a person's choice of occupation. In particular, we study how decisions to embark on entrepreneurship are affected by having ADHD and in turn how the presence of ADHD shapes a person's entrepreneurial characteristics.

The core symptoms of ADHD are inattention, hyperactivity and impulsivity. As attention deficit affects emotional regulation (Stringaris and Goodman (2008)) and cognitive processes (Young and Gudjonsson (2005), Lamberk et al. (2011)) it also has a substantial impact on academic and occupational outcomes. Adults with ADHD struggle with poor test performance and grade retention, are likely to

3. The great discussion about the payoffs from the entrepreneurship was started by Evans and Jovanovic (1989) showing that the entrepreneurship pays. Similar evidence was found in recent works of Hurst, Li and Pugsley (2012), Åstebro and Chen (2013), and Sarada (2013). In contrast, Hamilton (2000) argues that the entrepreneurs typically make less than similarly skilled people on the labor market.
4. See the discussion on behavioral heuristics in Bernardo and Welch (2001), Landier and Thesmar (2009) and Camarer and Lovallo (1999).
5. ee the discussion on groups of people with particular demographics and other characteristics, for instance, in Fairlie (2002), Williams (2004) and Heckman, Stixrud and Urzua (2006).
6. See the history of research and comprehensive overview of the ADHD in Barkley (1997) and Barkley, Fischer, Smallish and Fletcher (2006).

drop out of school, and underachieve in the formal education system (Kent et al. (2011), Birchwood and Daley (2012)). Similar to many entrepreneurs, problems that ADHD-affected people have at early stages of their lives usually evolve into difficulties in pursuing higher level education, and in finding and maintaining stable employment as adults (Biederman et al. (2006), Barkley at al. (2006), Knapp et al. (2011)). Kirby and Honeywood (2007) emphasizes that in addition to the struggle with the formal education system, people with ADHD display many more of the entrepreneurial characteristics. Therefore, we test if this particular group of people exhibit behavioral characteristics traditionally associated with entrepreneurs, and if it has a predisposition toward entrepreneurship.

We find that the marginal probability of being an entrepreneur grows if the respondent has ADHD. In turn, the presence of ADHD does not affect the likelihood of being a wage earner or being unemployed. Additionally, the likelihood of engaging in entrepreneurship grows with age and, with an even higher magnitude when respondents are men. Adding other controls has only a modest impact on the effect of ADHD.

Next, we examine the reasons why ADHD sufferers might be more likely to be entrepreneurs. Specifically, we investigate and compare the entrepreneurial tendencies of various groups of people. The major hurdle to obtaining evidence on entrepreneurial characteristics is measurement. To overcome this hurdle we employ the General Enterprising Tendency (GET) test. We find that people diagnosed with ADHD exhibit significantly higher values in most of the entrepreneurial tendency measures and for the average test score than respondents free of ADHD.

Next, we ask whether demographics or other individual characteristics are responsible for that relationship. In essence, we perform regression analysis of entrepreneurial tendencies on dummy variables for different demographic characteristics (e.g., gender, marriage status, race, etc.), including a dummy for ADHD. We find that ADHD is associated with such entrepreneurial characteristics as the need for achievement, autonomy/independence, and moderate risk taking. Furthermore, we find that the ADHD variable remains significant in the presence of demographic controls.

These findings connect to a number streams of economics literature. In particular, existing literature shows that groups of people with particular demographics and other characteristics (e.g., age, gender, race, parental self-employment, adolescent entrepreneurship, optimism level, risk aversion etc.) are more inclined toward entrepreneurship than other people (see e.g., Fairlie (2002), Williams (2004), Heckman, Stixrud and Urzua (2006), Kaniel, Massey and Robinson (2010), and Robinson (2012)). Additionally, the findings on entrepreneurial tendencies link this study to the vast literature addressing entrepreneurial characteristics in general (see e.g., de Meza (1996), Arabsheibani et. al. (2000), and Puri and Robinson (2007, 2013)). Furthermore, as ADHD has

a strong genetic component our findings provide some support to Nicolaou et. al.'s (2008) results that around half of the variation in entrepreneurial entries is attributable to genetic factors.

The remainder of the paper is organized as follows. In Section 2, we describe the dataset, the data collection process, and provide descriptive statistics. Section 3 introduces the GET methodology. In Section 4, we turn to the relation at the center of the current study and examine the entrepreneurial tendencies of different groups of people. We also investigate the relationship between ADHD and employment status. To explore the question of causation, Section 4 examines the demographics of entrepreneurial tendencies and provides robustness in the context of our data. Section 5 concludes the paper.

2. Data

We employed hand-collected survey data to study the relationship between ADHD and occupational choice. The data used in this paper were obtained through a survey conducted by the authors and is drawn from random samples of both ADHD-affected adults and adults without ADHD. The data from the random sample within the ADHD sufferer community were collected with help of ADHD-liitto ry – the association providing support, communication, education, counseling and rehabilitation for people with diseases and afflictions including Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorder (ADD), and Metabolic Bone Disorder (MBD). With help of ADHD-liitto ry we were able to be sure that the respondents at the time of the survey are not taking mood affecting medication and their answers were not biased.

The survey was conducted from September 2013 through January 2014 and consists of 270 observations after adjustments.[7] Respondents were surveyed on a number of dimensions: five entrepreneurial tendencies, age, gender, race, employment status, marital status, whether they were affected by ADHD, whether they owned their own business (engaged in entrepreneurship), and many other facets relating to demographics and background. To gauge the various aspects of entrepreneurship the survey includes questions on whether the respondent is self-employed full-time/part-time; whether the respondent organizes and manages their own business; and, whether the respondent has their own business. We treat respondents who answered those questions positively as entrepreneurs.

7. In order to reduce the possible impact of self-reported bias on the results we relied on the well-known and robust GET test, and ensured the data collecting process was anonymous and confidential. Additionally, to maintain the validity of the conclusions we corrected for outliers.

Table 1: Descriptive Statistics

This table presents summary statistics for key variables for the overall sample as well as subsamples of respondents diagnosed with ADHD and respondents without ADHD. Additionally, we provide statistics of subsamples of current entrepreneurs and non-entrepreneurs (wage earners). Sampling weights are used. Dashes in parenthesis (-) indicate that either the variable is not defined in the subsample or that it is not possible to perform a t-test. Finally, the table presents the results for the Chi-squared test (t-test statistics) between current entrepreneurs and wage earners for both ADHD and non-ADHD subsamples. The critical value of the Chi-squared test is 3.8 for a Type I error of 5%.

Variable	Respondent Status:								
	Overall	ADHD	Non - ADHD	ADHD			Non - ADHD		
				Wage earner	Entrepreneur	Chi-sq.	Wage earner	Entrepreneur	Chi-sq.
Age:									
18-25 (%)	0,23	0,09	0,32	0,13	0,06	1,66	0,25	0,17	0,93
25-35 (%)	0,41	0,35	0,44	0,40	0,30	0,93	0,49	0,47	0,05
35-45 (%)	0,20	0,38	0,08	0,33	0,41	0,45	0,10	0,14	0,41
45-55 (%)	0,11	0,14	0,09	0,10	0,17	0,70	0,10	0,14	0,41
55-65 (%)	0,04	0,03	0,04	0,03	0,04	0,01	0,04	0,08	1,10
>65 (%)	0,02	0,02	0,02	0,00	0,04	1,14	0,02	0,00	0,90
Male (%)	0,38	0,37	0,38	0,33	0,43	0,69	0,30	0,64	12,17
Education:									
Compr. school (%)	0,09	0,17	0,05	0,10	0,20	1,49	0,01	0,06	1,86
Upper sec. school (%)	0,54	0,58	0,51	0,57	0,56	0,00	0,51	0,47	0,11
Bachelors degree (%)	0,21	0,15	0,26	0,07	0,19	2,21	0,31	0,22	0,92
Masters degree (%)	0,15	0,11	0,18	0,27	0,06	7,55	0,16	0,25	1,31
Doctoral degree (%)	0,00	0,00	0,01	0,00	0,00	(-)	0,01	0,00	0,45
Unemployed (%)	0,26	0,18	0,30	(-)	(-)	(-)	(-)	(-)	(-)
Marital status:									
Married (%)	0,28	0,41	0,20	0,40	0,52	1,09	0,21	0,28	0,65
Single (%)	0,48	0,43	0,51	0,43	0,30	1,60	0,46	0,50	0,19
Cohabitation (%)	0,24	0,17	0,28	0,17	0,19	1,94	0,33	0,22	1,47
Observations	270	103	167	30	54	(-)	81	36	(-)

Table 1 presents summary statistics for key variables for the overall sample as well as subsamples of respondents diagnosed with ADHD and respondents without ADHD. Additionally, Table 1 provides a break-down of how our data match the general definition of entrepreneurship. In total, respondents engaged in self-employment, or managing their own business, account for 33 percent of the sample.

The majority of the respondents were in the 25-35 age group. Interestingly, within the ADHD group, entrepreneurs tended to be older as most of them were 35-45 years old, while in the non-ADHD sample, we observed the opposite pattern of entrepreneurs being younger, but those differences are statistically insignificant. In the overall sample, 38% of respondents were male, whereas more than 50% of all of the respondents-entrepreneurs were male. The percentage of

men was even higher in the subsample of non-ADHD entrepreneurs at 64 percent, which is significantly different from that among the non-ADHD wage earners. There were no significant differences in ADHD or employment status by race. Respondents with ADHD are less likely to succeed in the formal education system relative to other respondents. Furthermore, within the ADHD sample, wage earners were more likely to have a college education, than entrepreneurs, while there was no significant difference in educational background for the rest of respondents. Around 28% of respondents were married. For the subsamples of ADHD people and ADHD entrepreneurs the proportion was higher, but no statistically significant difference was found.

The preceding demographics depict some modest differences between people with and those without ADHD as well as between entrepreneurs and wage earners. In general, the observations are consistent with previous findings on the portraits of the entrepreneur and wage earner.[8] This allows us to conclude that the dataset at hand is reasonable representation of reality. Later in the study, we explore the starkest difference in the patterns of entrepreneurial tendencies within those two subsamples.

3. Methodology

For decades scholars have devoted considerable attention to measuring entrepreneurial tendencies in an attempt to identify groups of people who are likely to succeed in the world of entrepreneurship. Most measures are based on responses to a series questions and statements related to the aspect investigated (Rotter (1966), Levenson (1973), Steers and Baunstein (1976), and Tziner and Elizur (1985)). These tests are psychometric in nature and their use within the industry is today widely accepted. In order to test the entrepreneurial characteristics of respondents, we rely on the General Enterprising Tendency (GET) test.[9]

The GET test was designed within the Foundation for Small and Medium Enterprise Development at Durham University. Originally created from a series of psychometric tests, the GET test comprises 54 statements made to assess five main dimensions of enterprise attributes indicating an entrepreneurial personality, namely, need for achievement, for autonomy, and for independence, the attitude to moderate risk taking, and the creative tendency. The following five psychometric tests were used to create measures of personality traits:

8. For more details on the general demographic picture of the entrepreneur drawn from large panels of US data please see the series of articles by David T. Robinson and coauthors (e.g., Puri and Robinson (2007, 2013) and Robinson (2012)).
9. For more details on how the test was developed and tested as well as the evidence on robustness of the test, see a series of articles by Sally Caird. In particular, the interested reader should refer to Caird (1990a, 1990b, 1991, 1993) and the references therein.

1. Thematic Apperception Test (McClelland, 1956) as a measure of achievement;

2. Edwards Personal Preference Schedule (Grubb and Grathwohl, 1967) as a measure of autonomy;

3. Measure of Learning Styles (Mumford and Honey, 1992; Mumford 1993) as a measure of creativity;

4. Jackson's Personality Inventory (Reddon and Jackson, 1989);

5. Myers-Briggs Type Indicator (Briggs et al. 1985) measuring drive and determination.

Each of the five dimensions of entrepreneurial personality receives a score of 0-12 while the autonomy dimension has a score 0-6. The important implication is that the GET test cannot determine with certainty whether or not a person will become an entrepreneur. However, it is a useful tool in assessing enterprise tendencies as well as the entrepreneurial orientation (Mazzarol, 2007).

4. Status of Employment and Entrepreneurial tendencies of people with ADHD

First we turn to the question of how ADHD influences people's choice of occupation. We use a Multinomial Probit analysis with categorical dependent variable for different occupational choices to test whether or not ADHD sufferers are more likely to become entrepreneurs than others. We derive point estimates of Multinomial Probit regressions as a marginal change in probability of having a different occupational status with a change in the independent variables (see Table 2). To assess the significance of the point estimates, we report z-statistics based on robust standard errors.

Table 2: Status of Employment and ADHD

In this table point estimates of Multinomial Probit regressions are reported as the marginal change in probability of being entrepreneur or wage earner versus being unemployed with a change in the independent variables. The dependent variable for models 1-3 is a categorical variable of occupational choice, which reflects whether the respondent is currently an entrepreneur, wage earner or unemployed. Also, table reports z-statistics that are based on robust standard errors and are reported below the point estimates. Additionally, we report test statistics, such as log-likelihood, Wald chi^2, Pseudo R^2, and the sample size N. Numbers annotated with asterisks "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Independent Variable	Model 1		Model 2		Model 3	
	Entrepreneurs	Wage earners	Entrepreneurs	Wage earners	Entrepreneurs	Wage earners
ADHD	1.062***	-0.060	0.887***	-0.219	0.825***	-0.105
	(4.11)	(-0.23)	(3.22)	(-0.81)	(3.21)	(-0.37)
Age			0.477***	0.292**	0.398***	0.253**
			(3.85)	(2.48)	(3.06)	(2.06)
Male			0.784***	-0.015	0.830***	0.039
			(2.89)	(-0.06)	(3.01)	(0.15)
Education					0.242	0.367**
					(1.50)	(2.44)
Married					0.746**	0.457
					(2.27)	(1.42)
Intercept	-0.244	0.393***	-1.602***	-0.179	-2.217***	-1.142**
	(-1.51)	(2.71)	(-4.70)	(-0.61)	(-3.92)	(-2.28)
Pseudo R- squared	0.046		0.095		0.115	
Observations	270		270		270	
Log likelihood	-278.138		-264.025		-258.194	
Wald chi-squared	26.520		48.660		57.980	
Prob > chi-squared	0.000		0.000		0.000	

In models 1 to 3 point estimates are the marginal change in probability of being entrepreneur or wage earner versus being unemployed with a change in the independent variables. Model 1 is targeted to estimate the effect of the ADHD variable (dummy) on corresponding employment type versus being unemployed, with no controls of any kind, while the rest of the models introduce other demographic controls.

Model 1 shows that the probability of being entrepreneur versus being unemployed grows by a factor of around 1 if the respondent is affected by ADHD. This effect is found to be statistically significant at the one percent level. No effect is found for wage earners, implying that the odds of being a wage earner versus being unemployed do not depend on the presence of ADHD.

In the remainder of the models, a variety of demographic controls are introduced. We start with the addition of the variables for gender (male dummy) and age (model 2). This results in a slight drop in the ADHD point estimate, nevertheless, the impact of ADHD on the entrepreneurship is still highly statistically significant. Moreover, the marginal probability of being an

entrepreneur also grows with the age variable and, with an even higher magnitude, when respondents are male. Adding other controls has almost no impact on the ADHD variable. Additionally, model 2 shows that older respondents are more likely to be salaried employees, but the impact of age is slightly lower in the presence of controls for education and marital status (model 3). Interestingly, in model 3 we find that a one-unit increase in the education variable is associated with a .037 increase in the relative likelihood of being wage earner versus being unemployed, while the odds to become entrepreneur remain unaffected by the education.

Also in this section, we investigate the difference in entrepreneurial tendencies in respect of employment status and ADHD affection. To guard against the possible issue of ADHD being correlated with some other variable that leads to a greater probability of becoming an entrepreneur and to explore the reason for the greater likelihood of people affected by ADHD becoming entrepreneurs, we investigate and compare the entrepreneurial tendencies of various groups of people. Capitalizing on previous literature on entrepreneurship, we employ the GET test that measures a number of personal tendencies associated with an entrepreneur. It has been validated with a number of different groups and amended accordingly to identify entrepreneurial attributes, namely the need for achievement, the need for autonomy, a creative tendency, a risk taking tendency, and drive and determination.

Forward looking, self-sufficient, optimistic, and persistent people exhibit high scores in the need for achievement section of the GET test. Moreover, individuals demonstrating a strong need for autonomy prefer working alone, enjoy doing unconventional things, dislike taking orders, and are generally determined and stubborn. Furthermore, people showing innovative, versatile, intuitive and imaginative personality traits score high on the creative tendency element. The ability to act on incomplete information, to accurately assess one's own capabilities, and set challenging but attainable goals are relevant to the section on attitude to moderate risk taking. Finally, the drive and determination section tests whether the respondents exhibit high self-confidence, take advantage of opportunities, and believe in controlling their own destiny.

Table 3: Variations in Entrepreneurial tendencies and Difference in Means Tests

This table presents the results for key entrepreneurial tendencies for the subsamples of respondents diagnosed with ADHD and respondents without ADHD. It also records the statistics of subsamples of current entrepreneurs and non-entrepreneurs (salaried worker). Average values for each entrepreneurial tendency are reported with respect to corresponding subsamples. Therein the maximum possible value for "need for autonomy" is 6, while the range for the rest of the tendencies is from 0 to 12. Additionally, the average value of the overall test results are reported as "Test Average". Panel A presents evidence for the whole sample, whereas panel B breaks data in to ADHD and non-ADHD subsamples.
Results for difference in means test (t-test statistics) are reported in the table. Panel A contains the test statistics of difference between current entrepreneurs and salaried worker as well as ADHD and non-ADHD subsamples. Panel B contains the test statistics of difference between current entrepreneurs and non- entrepreneurs for both ADHD and non-ADHD subsamples. Additionally, the results of tests on ADHD-entrepreneurs and non-ADHD-entrepreneurs samples are presented in the last column of panel B. The null hypothesis (H_0) for those tests is that the means of two samples are equal (e.g. the means for salaried workers are not significantly different from the means for entrepreneurs). Numbers annotated with asterisks "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Panel A: Evidence from the whole sample

Entrepreneurial Tendency	Entrepreneurs	Wage earners	H_0 (Ent.=Wage)	ADHD	Non-ADHD	H_0 (ADHD = Non-ADHD)	
Need for Achievement	8,78	7,95	3,15***	8,21	7,80	1,66*	
Need for Autonomy	4,26	3,55	4,01***	4,20	3,46	4,65***	
Creative Tendency	8,60	7,31	4,68***	7,96	7,62	1,37	
Moderate Risk Taking	8,28	6,95	4,37***	7,51	7,06	1,55	
Drive and Determination	7,97	8,57	-2,07**	7,78	8,26	-1,90*	
Test Average	37,88	34,32	4,34***	35,67	34,19	1,84*	

Panel B: Evidence from the ADHD and non-ADHD subsamples

Entrepreneurial Tendency	ADHD			Non- ADHD			ADHD vs Non-ADHD
	Entrepreneurs	Wage earners	H_0 (Ent.=Wage)	Entrepreneurs	Wage earners	H_0 (Ent.=Wage)	H_0 (Ent.=Ent.)
Need for Achievement	8,63	8,07	1,27	9,00	7,90	3,03***	-1,00
Need for Autonomy	4,30	4,03	0,97	4,19	3,37	3,28***	0,40
Creative Tendency	8,46	7,20	3,04***	8,81	7,35	3,57***	-0,93
Moderate Risk Taking	8,15	6,70	2,78***	8,47	7,05	3,50***	-0,72
Drive and Determination	7,80	8,00	-0,41	8,22	8,78	-1,45	-0,89
Test Average	37,33	34,00	2,47**	38,69	34,44	3,74***	-1,17

This table presents the results for key entrepreneurial tendencies for the overall sample as well as subsamples of respondents diagnosed with ADHD and respondents without ADHD. In addition, we provide statistics on subsamples of current entrepreneurs and non-entrepreneurs (wage earners). We report the average values for each entrepreneurial tendency and average test score with respect to the corresponding subsamples. Therein the maximum possible value

for "need for autonomy" is 6, while the range for the rest of the tendencies is from 0 to 12. The range for average test score is 0 to 54. The results for the difference in means test (t-test statistics) are reported in the table, where the null hypothesis (H_0) for those tests is that means of two samples are equal (e.g. the means for wage earners are not significantly different from the means of entrepreneurs).

Panel A presents averages and the test statistics of difference between current entrepreneurs and wage earners and also between the ADHD and non-ADHD subsamples. The full sample averages are shown in the last column. We find that the entrepreneur respondents exhibit significantly different values in all entrepreneurial tendencies and average test scores relative to wage-earners respondents. Entrepreneurs score higher against all of the tendencies other than "drive and determination" compared to wage earners, regardless of the presence of ADHD.

Panel B provides the test statistics of the difference between current entrepreneurs and non- entrepreneurs for both ADHD and non-ADHD subsamples. Additionally, the results of tests for ADHD entrepreneurs and non-ADHD entrepreneurs' samples are presented in the last column of panel B. Consistent with previous findings, the results in panel B indicate that entrepreneurs outscore wage earners against most of the tendencies and the average test score. This pattern is strong in both subsamples. However, we note that higher values of some entrepreneurship tendencies ("need for achievement" and "need for autonomy") for entrepreneurs than for wage earners for the ADHD subsample do not show significant difference. Finally we observe no statistically significant differences between the test values of entrepreneurs from both subsamples, raising the question of whether the results are purely the effect of ADHD or can stem from a variation in other demographic characteristics.The overall average test score reveal that respondents diagnosed with ADHD score significantly higher than others. In particular, respondents with ADHD post higher scores against such tendencies as "need for achievement" and "need for autonomy" at ten and one percent level of significance, whereas non-ADHD respondents score higher in the "drive and determination" tendency (significant at ten percent level). We note that the most striking difference between the ADHD and non-ADHD samples is visible in the "need for autonomy" measure.

5. The Determinants of Entrepreneurial Tendencies

The previous section has suggested a close link between ADHD and entrepreneurship. The findings thus far indicate that people with ADHD are more likely to become entrepreneurs and exhibit different entrepreneurial attitudes (Table 3, Panel A). However, the question of causation remains. In this section we investigate whether ADHD is responsible for the relationship, or if it can be explained by demographics or other individual characteristics.

We conducted a regression analysis of entrepreneurial tendencies on dummy variables for different demographic characteristics (e.g., gender, marriage status, race, etc.), including a dummy for ADHD.

Table 4: The Demographics of Entrepreneurial Tendencies

This table presents OLS point estimates of entrepreneurial tendencies on a constant term, dummy variable for gender, marriage status, race, whether the respondents have ADHD, and whether the respondents without ADHD are engaged in entrepreneurial activities. Also, age and educational status at the time of the survey are included as independent variables. Results for such tendencies as "need for achievement", "need for autonomy" and "Creative Tendency" are reported in panel A, while panel B presents the results for the rest of the tendencies and "Test Average". T-statistics based on robust standard errors are reported below point estimates. Numbers annotated with asterisks "*", "**" and "***" are significant at the 10%, 5% and 1% level, respectively.

Panel A: Results for Need for Achievement, Autonomy and Creative Tendency

Independent Variable	Need for Achievement			Need for Autonomy/Independence			Creative Tendency		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	0,38***	0,36***	0,38***	0,20***	0,13*	0,14*	0,18	0,16	0,20
	(2,97)	(2,92)	(3,20)	(2,63)	(1,92)	(1,92)	(1,54)	(1,29)	(1,59)
Male	0,63**	0,64**	0,70**	0,33**	0,35**	0,36***	0,17	0,17	0,20
	(2,20)	(2,19)	(2,57)	(2,25)	(2,48)	(2,67)	(0,79)	(0,81)	(0,99)
ADHD		0,22*	0,44*		0,68***	0,74***		0,26	0,43
		(1,89)	(1,71)		(4,25)	(4,64)		(1,10)	(1,83)
Education			0,65***			0,18**			0,39***
			(4,62)			(2,12)			(2,65)
Married			-0,06			-0,02			0,15
			(-0,38)			(-0,22)			(0,73)
Intercept	-1,14***	-1,17***	-2,79***	-0,60***	-0,70***	-1,14***	-0,49153	-0,53*	-1,96***
	(-2,76)	(-2,78)	(-3,74)	(-2,58)	(-3,16)	(-2,85)	(-1,54)	(-1,66)	(-2,59)
Race Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R- squared	0,07	0,09	0,15	0,05	0,10	0,12	0,01	0,02	0,04
F-statistic	6,60	7,39	8,99	6,39	10,19	7,00	1,72	1,47	2,44
Prob(F)	(0,00)	(0,00)	(0,00)	(0,00)	(0,00)	(0,00)	(0,18)	(0,22)	(0,03)

Table 4 - Continued									
Panel B: Results for Moderate Risk Taking, Drive and Determination Tendencies and Test Average									
Independent Variable	Moderate Risk Taking			Drive and Determination			Test Average		
	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Age	0,36***	0,33***	0,40***	-0,10	-0,06	-0,09	1,01**	0,92**	1,02**
	(2,74)	(2,60)	(3,05)	(-0,99)	(-0,53)	(-0,78)	(2,43)	(2,27)	(2,48)
Male	0,86***	0,87***	0,92***	0,05	0,04	0,08	2,05***	2,06***	2,26***
	(3,02)	(3,04)	(3,40)	(0,19)	(0,16)	(0,32)	(2,73)	(2,74)	(3,33)
ADHD		0,27*	0,52*		-0,45	-0,39		0,97**	1,74***
		(1,86)	(1,68)		(-1,63)	(-1,38)		(2,21)	(3,19)
Education			0,57***			0,34**			2,13***
			(3,80)			(2,31)			(4,70)
Married			0,19			-0,29			-0,03
			(0,96)			(-1,54)			(-0,05)
Intercept	-1,17***	-1,21***	-3,26***	0,22	0,29	0,06	-3,18**	-3,32***	-9,08***
	(-3,17)	(-3,29)	(-4,60)	(0,70)	(0,90)	(0,09)	(-2,52)	(-2,60)	(-4,06)
Race Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R- squared	0,06	0,07	0,11	0,00	0,01	0,05	0,06	0,08	0,14
F-statistic	6,12	6,36	6,57	0,48	1,30	2,52	8,26	8,59	8,78
Prob(F)	(0,00)	(0,00)	(0,00)	(0,62)	(0,27)	(0,03)	(0,00)	(0,00)	(0,00)

We investigated how demographics are related to entrepreneurial tendencies. Following Puri and Robinson (2007), we conduct OLS regressions with dependent variables being the difference between self-reported and test average scores for each of the entrepreneurial tendencies. We report OLS point estimates of entrepreneurial tendencies on a constant term, dummy variable for gender, marriage status, race, whether the respondents have ADHD, and whether the respondents without ADHD are engaged in entrepreneurial activities (see Table 4).[10] We also included age and educational status at the time of the survey as independent variables. Results for such tendencies as "need for achievement", "need for autonomy" and "creative tendency" are reported in panel A, while panel B presents the results for the rest of the tendencies and the survey's average test score.

For each entrepreneurial tendency and the average test score we constructed three models (giving 18 models in total). First we performed regressions with age and gender acting as independent variables and race controls. We then built on

10. Additionally, we check that multicollinearity among independent variables is not the issue in our analysis. We are grateful to anonymous referee for this suggestion.

this model by adding dummy variables for ADHD, constituting the second model for each tendency. The inclusion of this dummy allowed us to examine importance of ADHD in explaining the studied tendencies. Finally, in the third model we introduced variables for education and marital status.

We found that the age and male dummy variables are positive and statistically significant for achievements, autonomy/independence, moderate risk taking attributes and also to the overall test average score. This pinpoints the consensus in the literature that entrepreneurship is primarily the preserve of middle aged men. Further, no effect is found on creativity and drive/determination characteristics. Additionally, education plays an important role and positively affects each of the entrepreneurial tendencies. Moreover, success in the formal education system is the only variable found to have an effect on drive/ determination. In contrast, the dummy variable denoting being married does not exhibit any significance in explaining entrepreneurial characteristics.

Finally, the ADHD variable has a significant effect on some entrepreneurial tendencies. Notably, ADHD has a highly significant impact on the need for autonomy/independence tendency (with *t* statistic of 4,64 in all inclusive model), which is consistent with the evidence that ADHD sufferers face hurdles doing "inside the box" type of jobs that do not provide them with space and flexibility (Barkley at al. (2006) and Knapp et al. (2012)). Further, the moderate effect is found on such entrepreneurial characteristics as the need for achievement, and attitude to moderate risk taking. Finally, we find that the significance of the ADHD variable does not disappear in the presence of demographic controls.

The R-squares from the regressions are important in their own right. It is important to note that the studied models can explain at most around 15% of the variation in entrepreneurial tendencies. While we highlight the fairly statistically reliable loadings on demographics, many entrepreneurial attributes are particular to the individual respondent.

6. Conclusions

The overall importance of entrepreneurship to the economy is well understood and documented. In addition, it has been shown that the level of inclination toward entrepreneurship varies among different groups of people. The identification of these groups lies at the heart of understanding the supply and demand of entrepreneurship as a means of organizing economic activity. Furthermore, this question is a potentially lucrative policy issue and might play an important role in building financial literacy. We shed light on this question by exploring the evidence from the ADHD community.

The aim of this study is three-fold: (i) to explore the predisposition toward entrepreneurship of people affected by ADHD; (ii) to examine how ADHD

influences a person's choice of occupation and (iii) to investigate how the presence of ADHD shapes a person's entrepreneurial characteristics.

We find that respondents with ADHD have a significantly higher marginal probability of being entrepreneurs regardless of the model specification. At the same time, the presence of ADHD does not affect the likelihood of being a wage earner. We also find that people diagnosed with ADHD significantly outscore respondents without ADHD in the entrepreneurial tendency measures, such as need for achievement, need for autonomy/independence and the average test score. Further, by exploring the demographics of the entrepreneurial tendencies, we find that the ADHD variable is not subsumed by the presence of demographic controls. One interpretation of our results is that ADHD can be related to the wide range of demographics associated with entrepreneurship. Furthermore, the results suggest that the ADHD variable is positively associated with such characteristics as the need for achievement, autonomy/independence, and the attitude to moderate risk taking, leading us to the conclusion that ADHD is an asset that increases the likelihood of an individual making an occupational decision to become an entrepreneur.

This study has both academic and practical implications. We provide the new insight to the entrepreneurship literature by bridging the evidence from the studies on entrepreneurial demographics with the psychological attributes of the group of people with particular demographics. Further, this study add to the debate on determinants of entrepreneurial entries, contributing to a large body of literature recognizing personality traits as a foundation block of entrepreneurial activity.

Furthermore, we would like to emphasize the importance of the findings to policy makers. We suggest that ADHD should not be understood as a disturbance in society, but as an affliction that could offer a rich source of people suited for entrepreneurship. The findings of this study raise a number of intriguing questions for future research in both economics and psychology. Do entrepreneurs with ADHD succeed in a long term? Do those enterprises grow fast? How policies should be shaped to promote new firm creation? These questions can be viewed as both limitations of the current study and an interesting avenue for future research.

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