

Supplement to “The right stuff? Personality and entrepreneurship”

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APPENDIX SA: ADDITIONAL ANALYSES AND ESTIMATES

We first show summary statistics for a larger sample of individuals observed in 2004, but for whom some information is missing. For each variable, we use the maximum sample of working men available. Summary statistics for the larger sample are found in Table S1 and are comparable to those computed for the main analytic sample presented in Table 2. Next, we show reduced-form estimates for a variety of sector choice models (probits). Basic patterns relating choices to personality remain largely the same when we control for additional explanatory variables for both the analytic sample and the aforementioned larger sample. In general, we find that openness to new experiences predicts entry along with age, marriage, and spousal employment. Sector choice estimates are found in Table S2 for the main analytic sample and in Table S3 for the larger sample.

In assessing the impact of personality on self-employment, a potential issue is the possibility of simultaneity. The concern is that personality, like other socioemotional skills, may be somewhat mutable over the life-cycle, at least in comparison to other individual characteristics that predict economic outcomes, such as race, gender, and cognition (Heckman and Rubinstein (2001)). Therefore, in studying personality, we must address the possibility that not only does personality drive economic decisions, but economic decisions, such as self-employment, affect personality through the technology of skill formation (Cunha, Heckman, and Schennach (2010)). We cannot address this assumption using a single latent factor. However, we can indirectly assess it by considering 1995 personality scores, earnings, assets, and sector decisions along with 2004 personality scores. For each personality trait, we regress the 2004 score onto 1995 score, age,

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APPENDIX TABLE S1. Summary statistics—full sample.

	Full Sample	Paid Employment	Self Employment	Δ (Self-Paid)	p -Values
Earnings in 2004	\$77,267.99	\$73,610.47	\$92,908.23	\$19,297.76	0.002
Median earnings (2004)	\$57,500	\$57,500	\$57,500	\$00.00	0.812
Assets in 1995	\$117,259.80	\$95,808.60	\$210,178.6	\$114,370.00	0.000
High school degree	0.20	0.20	0.20	0.00	0.902
Some college	0.26	0.27	0.24	-0.03	0.431
College graduate	0.25	0.25	0.26	0.01	0.739
Age	49.29	49.29	52.82	3.53	0.000
Married	0.79	0.78	0.80	0.02	0.586
Number of children	2.22	2.21	2.27	0.06	0.634
Spouse's education (years)	11.44	14.47	14.30	-0.17	0.385
Spouse employed in 1995	0.66	0.65	0.70	0.05	0.237
Fluid cognitive ability	0.34	0.34	0.31	-0.03	0.670
Openness (1995)	3.07	3.05	3.12	0.07	0.076
Openness (2004)	2.97	2.95	3.05	0.10	0.012
Conscientiousness (1995)	3.40	3.39	3.42	0.03	0.353
Conscientiousness (2004)	3.46	3.46	3.46	0.00	0.951
Extraversion (1995)	3.14	3.12	3.23	0.11	0.013
Extraversion (2004)	3.05	3.03	3.13	0.10	0.025
Agreeableness (1995)	3.29	3.29	3.32	0.03	0.457
Agreeableness (2004)	3.25	3.24	3.28	0.04	0.312
Neuroticism (1995)	2.17	2.19	2.10	-0.09	0.082
Neuroticism (2004)	2.04	2.05	2.00	-0.05	0.309

Note: Summary statistics for all 1108 working men (ages 25–64, of whom 210 are self-employed) who are observed in the second wave of MIDUS data collection (MIDUS II). The number of observations varies for each variable since we include individuals who are missing some information. For example, all five personality traits are available in 2004 for 1099 individuals in the sample.

self-employment in 1995, log assets in 1995 and log earnings in 1995. We would be concerned if self-employment or earnings affected the 2004 score once we have conditioned on the 1995 score.

Results for each of the five personality traits are presented in Table S4. Estimated coefficients on log assets, log earnings and 1995 sector choice are insignificant (both individually and jointly) and the increase in R^2 is 0 for each additional variable.¹ This provides some evidence against concerns of simultaneity, for example, the concern that earlier exposure to self-employment drives personality. Moreover, we learn from this set of tests that personality scores can change with age, a pattern consistent with previous research on personality assessments (McCrae et al. (1999)). In particular, we find that older people score more highly on openness, extraversion, and agreeableness and perhaps slightly lower on neuroticism. In our structural estimation, we therefore account for the possible impact of age on personality scores. In particular, and given evidence that personality is mostly stable in adulthood, we treat both personality scores (mea-

¹These findings hold if we restrict attention to individuals who were not self-employed in 1995.

APPENDIX TABLE S2. Sector choice (analytic sample).

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Openness (2004)	0.18 (0.12)	0.2* (0.12)	0.21* (0.12)	0.22* (0.12)	0.25** (0.12)	0.24* (0.13)	0.23* (0.13)	0.23* (0.13)
Conscientiousness (2004)	-0.03 (0.12)	-0.03 (0.12)	-0.03 (0.12)	-0.04 (0.12)	-0.07 (0.12)	-0.06 (0.12)	-0.06 (0.12)	-0.08 (0.13)
Extraversion (2004)	0.17 (0.11)	0.15 (0.11)	0.15 (0.11)	0.14 (0.11)	0.13 (0.11)	0.15 (0.11)	0.2* (0.12)	0.21* (0.12)
Agreeableness (2004)	-0.002 (0.11)	-0.04 (0.11)	-0.04 (0.11)	-0.03 (0.11)	-0.03 (0.11)	-0.03 (0.12)	-0.05 (0.12)	-0.06 (0.12)
Neuroticism (2004)	-0.006 (0.08)	0.05 (0.08)	0.04 (0.08)	0.04 (0.08)	0.03 (0.09)	0.04 (0.09)	0.05 (0.09)	0.05 (0.09)
Cognition	-0.04 (0.05)	0.03 (0.05)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.03 (0.06)	0.03 (0.06)
Age	.	0.04*** (0.007)	0.04*** (0.007)	0.04*** (0.007)	0.04*** (0.007)	0.04*** (0.007)	0.04*** (0.007)	0.04*** (0.007)
Years of education	.	.	-0.01 (0.02)	-0.02 (0.02)	-0.004 (0.03)	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.03)
Married	.	.	.	0.24* (0.14)	0.58** (0.27)	0.58** (0.27)	0.58** (0.28)	0.58** (0.28)
Number of kids	.	.	.	-0.06 (0.04)	-0.06 (0.04)	-0.06 (0.04)	-0.07* (0.04)	-0.07* (0.04)
Spouse employed (1995)	.	.	.	.	0.22** (0.11)	0.22** (0.11)	0.21* (0.11)	0.21* (0.11)
Spouse education	.	.	.	.	-0.03* (0.02)	-0.03* (0.02)	-0.03* (0.02)	-0.03* (0.02)
Father education	.	.	.	.	.	0.02* (0.01)	0.03* (0.01)	0.02 (0.01)
Mother education	.	.	.	.	.	-0.007 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Father self-employed	.	.	.	.	.	.	0.43*** (0.12)	0.44*** (0.12)
Mother self-employed	.	.	.	.	.	.	0.12 (0.19)	0.11 (0.19)
Live for today	.	.	.	.	.	.	.	-0.02 (0.09)
Observations	896	896	896	896	896	896	896	895

Note: Probit estimates for the analytic sample of 898 individuals where the outcome variable is an indicator for self-employment (as opposed to paid employment) reported in 2004. Standard errors are in parentheses and significance at the 10%, 5%, and 1% levels are indicated with one, two, and three stars, respectively.

sured in 1995 and 2004) as possible mismeasurements of an underlying, stable factor and permit age to explain some of the measurement error.

Tables S5 and S6 provide structural parameter estimates for parameters of the measurement system, including distributions of latent traits and measurement error, coefficients on unobservables, and factor loadings. In Tables S7 and S8, we exploit two periods of data to assess the relationship between experience in self-employment and 1995 self-employment and earnings. First, for the 170 individuals who were self-employed in 1995, we ask if self-employment in 2004 is predicted by personality or other observable factors,

APPENDIX TABLE S3. Sector choice (larger sample).

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Openness (2004)	0.2* (0.11)	0.25** (0.12)	0.26** (0.12)	0.27** (0.12)	0.3** (0.12)	0.28** (0.12)	0.27** (0.12)	0.28** (0.12)
Conscientiousness (2004)	-0.08 (0.11)	-0.04 (0.12)	-0.04 (0.12)	-0.06 (0.12)	-0.08 (0.12)	-0.08 (0.12)	-0.08 (0.12)	-0.1 (0.12)
Extraversion (2004)	0.12 (0.1)	0.14 (0.11)	0.13 (0.11)	0.12 (0.11)	0.11 (0.11)	0.13 (0.11)	0.18 (0.11)	0.19* (0.11)
Agreeableness (2004)	-0.05 (0.1)	-0.06 (0.11)	-0.06 (0.11)	-0.05 (0.11)	-0.05 (0.11)	-0.05 (0.11)	-0.06 (0.11)	-0.07 (0.11)
Neuroticism (2004)	-0.03 (0.07)	0.03 (0.08)	0.03 (0.08)	0.03 (0.08)	0.02 (0.08)	0.02 (0.08)	0.03 (0.08)	0.04 (0.08)
Cognition	.	0.03 (0.05)	0.03 (0.06)	0.04 (0.06)	0.04 (0.06)	0.03 (0.06)	0.03 (0.06)	0.02 (0.06)
Age	.	0.03*** (0.007)	0.04*** (0.007)	0.04*** (0.007)	0.03*** (0.007)	0.04*** (0.007)	0.03*** (0.007)	0.03*** (0.007)
Years of education	.	.	-0.008 (0.02)	-0.01 (0.02)	0.0001 (0.02)	-0.01 (0.03)	-0.008 (0.03)	-0.01 (0.03)
Married	.	.	.	0.26* (0.14)	0.6** (0.27)	0.6** (0.27)	0.61** (0.27)	0.6** (0.27)
Number of kids	.	.	.	-0.05 (0.04)	-0.05 (0.04)	-0.05 (0.04)	-0.06* (0.04)	-0.06* (0.04)
Spouse employed (1995)	.	.	.	.	0.2* (0.11)	0.2* (0.11)	0.19* (0.11)	0.19* (0.11)
Spouse education	.	.	.	.	-0.03* (0.02)	-0.03* (0.02)	-0.04* (0.02)	-0.03* (0.02)
Father education	.	.	.	.	.	0.02* (0.01)	0.02* (0.01)	0.02* (0.01)
Mother education	.	.	.	.	.	-0.002 (0.02)	-0.006 (0.02)	-0.006 (0.02)
Father self-employed	.	.	.	.	.	.	0.41*** (0.11)	0.42*** (0.11)
Mother self-employed	.	.	.	.	.	.	0.09 (0.18)	0.08 (0.18)
Live for today	.	.	.	.	.	.	.	-0.03 (0.08)
Observations	1099	952	952	952	952	952	952	951

Note: Probit estimates for the “full sample” of 1108 working men observed in the second wave of data collection (MIDUS II), where the outcome variable is an indicator for self-employment (as opposed to paid employment) reported in 2004. The number of observations varies for each variable since we include individuals who are missing some information. For example, all five personality traits are available in 2004 for 1099 individuals in the sample. Standard errors are in parentheses and significance at the 10%, 5%, and 1% levels are indicated with one, two, and three stars, respectively.

such as openness to new experiences. The concern would be that openness predicts a lower failure rate, which could encourage entry, but is interpreted as utility in our static model. Estimates in Table S7 show no evidence that personality traits, including openness, predict remaining in self-employment. Second, among the 104 individuals who are self-employed in both 1995 and 2004, we ask whether openness predicts higher earnings in 2004 once we have controlled for 1995 earnings. This would suggest that open individuals are drawn into self-employment because they expect steeper earnings profiles

APPENDIX TABLE S4. Personality assessments over time.

	2004 Personality Scores				
	[O]	[C]	[E]	[A]	[N]
Openness (1995)	0.73*** (0.03)	.	.	.	.
Conscientiousness (1995)	.	0.64*** (0.03)	.	.	.
Extraversion (1995)	.	.	0.71*** (0.02)	.	.
Agreeableness (1995)	.	.	.	0.65*** (0.03)	.
Neuroticism (1995)	.	.	.	.	0.57*** (0.03)
Age	0.004** (0.002)	0.001 (0.001)	0.006*** (0.002)	0.006*** (0.002)	-0.003 (0.002)
Self-employment (1995)	0.04 (0.03)	-0.007 (0.03)	0.02 (0.04)	-0.01 (0.03)	0.005 (0.04)
Log assets (1995)	-0.004 (0.004)	0.002 (0.004)	-0.002 (0.004)	-0.005 (0.004)	-0.006 (0.005)
Log earnings (1995)	0.008 (0.01)	-0.001 (0.01)	-0.01 (0.01)	0.007 (0.01)	-0.005 (0.02)
Observations	896	896	896	896	896
R^2	0.45	0.4	0.49	0.43	0.37

Note: OLS regression coefficients where the outcome variables are 2004 personality trait scores (Openness to New Experiences [O], Conscientiousness [C], Extraversion [E], Agreeableness [A], and Neuroticism [N]), which are regressed onto 1995 scores along with 1995 labor market activity and outcomes. Standard errors are in parentheses and significance at the 10%, 5%, and 1% levels are indicated with one, two, and three stars, respectively.

compared to paid employment, which would be treated as strong preferences for self-employment. Estimates in Table S8 show no evidence for this concern. This holds if we do not control for 1995 log earnings as well.

APPENDIX TABLE S5. Results: latent personality traits.

Variable	Coefficient	Std. Error
FACTOR COVARIANCES:		
Openness and conscientiousness	0.052	0.006
Openness and extraversion	0.145	0.010
Openness and agreeableness	0.130	0.009
Openness and neuroticism	-0.058	0.010
Conscientiousness and extraversion	0.059	0.007
Conscientiousness and agreeableness	0.060	0.007
Conscientiousness and neuroticism	-0.041	0.007
Extraversion and agreeableness	0.164	0.010
Extraversion and neuroticism	-0.057	0.011
Agreeableness and neuroticism	-0.017	0.011
OPENNESS TO NEW EXPERIENCES:		
Mean	3.580	0.127
Variance	0.183	0.013
Factor loading	0.922	0.040
Meas. error variance (1995)	0.267	0.012
Meas. error variance (2004)	0.341	0.014
Age parameter (1995)	-0.012	0.002
Age parameter (2004)	-0.007	0.002
Education parameter (1995)	-0.002	0.007
Education parameter (2004)	-0.000	0.008
Cognition parameter (1995)	0.052	0.018
Cognition parameter (2004)	0.066	0.019
CONSCIENTIOUSNESS:		
Mean	3.780	0.124
Variance	0.124	0.009
Factor loading	0.991	0.038
Meas. error variance (1995)	0.328	0.012
Meas. error variance (2004)	0.302	0.015
Age parameter (1995)	-0.002	0.002
Age parameter (2004)	-0.001	0.002
Education parameter (1995)	-0.018	0.007
Education parameter (2004)	-0.014	0.007
Cognition parameter (1995)	0.008	0.016
Cognition parameter (2004)	-0.028	0.017

Note: Coefficients: distribution of latent personality traits (Openness, Conscientiousness and Extraversion).

APPENDIX TABLE S6. Results: latent personality traits (continued).

Variable	Coefficient	Std. Error
EXTRAVERSION:		
Mean	3.841	0.150
Variance	0.265	0.019
Factor loading	0.954	0.042
Meas. error variance (1995)	0.270	0.013
Meas. error variance (2004)	0.345	0.013
Age parameter (1995)	-0.009	0.002
Age parameter (2004)	-0.002	0.003
Education parameter (1995)	-0.021	0.008
Education parameter (2004)	-0.034	0.008
Cognition parameter (1995)	0.021	0.021
Cognition parameter (2004)	0.032	0.024
AGREEABLENESS:		
Mean	3.995	0.145
Variance	0.238	0.017
Factor loading	0.897	0.040
Meas. error variance (1995)	0.275	0.013
Meas. error variance (2004)	0.412	0.020
Age parameter (1995)	-0.007	0.002
Age parameter (2004)	-0.000	0.002
Education parameter (1995)	-0.026	0.008
Education parameter (2004)	-0.021	0.008
Cognition parameter (1995)	0.019	0.021
Cognition parameter (2004)	0.026	0.021
NEUROTICISM:		
Mean	2.969	0.177
Variance	0.260	0.022
Factor loading	0.929	0.047
Meas. error variance (1995)	0.288	0.016
Meas. error variance (2004)	0.397	0.018
Age parameter (1995)	-0.007	0.003
Age parameter (2004)	-0.006	0.003
Education parameter (1995)	-0.035	0.010
Education parameter (2004)	-0.029	0.009
Cognition parameter (1995)	0.004	0.025
Cognition parameter (2004)	-0.020	0.026

Note: Coefficients: distribution of latent personality traits (Agreeableness and Neuroticism) and factor covariances.

APPENDIX TABLE S7. Openness and 2004 entry for 1995 self-employed.

	[1]	[2]	[3]	[4]
Openness (2004)	-0.13 (0.28)	-0.15 (0.28)	-0.13 (0.3)	-0.13 (0.31)
Conscientiousness (2004)	-0.17 (0.26)	-0.19 (0.26)	-0.28 (0.27)	-0.25 (0.28)
Extraversion (2004)	0.09 (0.23)	0.11 (0.23)	0.08 (0.24)	0.08 (0.25)
Agreeableness (2004)	0.23 (0.21)	0.2 (0.21)	0.2 (0.22)	0.22 (0.23)
Neuroticism (2004)	0.12 (0.18)	0.12 (0.18)	0.19 (0.18)	0.17 (0.18)
Cognition	-0.14 (0.1)	-0.17* (0.1)	-0.13 (0.12)	-0.12 (0.13)
Log earnings (1995)	.	0.12 (0.07)	0.09 (0.08)	0.12 (0.08)
Years of education	.	.	-0.001 (0.05)	-0.02 (0.05)
Age	.	.	0.04*** (0.01)	0.05*** (0.02)
Married	.	.	-0.45 (0.29)	0.009 (0.63)
Number of kids	.	.	.	-0.09 (0.07)
Spouse education	.	.	.	-0.03 (0.04)
Spouse employed (1995)	.	.	.	0.31 (0.23)
Observations	170	170	170	170

Note: Probit estimates of 2004 self-employment conditional on 1995 self-employment (170 individuals). Standard errors are in parentheses and significance at the 10%, 5%, and 1% levels are indicated with one, two, and three stars, respectively.

APPENDIX TABLE S8. Earnings for individuals self-employed in 1995 and 2004.

	[1]	[2]	[3]
Log earnings (1995)	0.24** (0.11)	0.23** (0.11)	0.21* (0.12)
Openness (2004)	.	0.14 (0.42)	0.04 (0.46)
Conscientiousness (2004)	.	0.23 (0.34)	0.27 (0.34)
Extraversion (2004)	.	0.03 (0.39)	0.04 (0.41)
Agreeableness (2004)	.	-0.68** (0.33)	-0.56 (0.35)
Neuroticism (2004)	.	-0.12 (0.24)	-0.11 (0.24)
Cognition	.	0.16 (0.16)	0.05 (0.17)
Years of education	.	.	0.1 (0.08)
Age	.	.	-0.02 (0.02)
Married	.	.	0.11 (0.38)
Observations	104	104	104

Note: OLS regressions for individuals who are self-employed in 1995 and 2004 (105 individuals). Standard errors are in parentheses and significance at the 10%, 5%, and 1% levels are indicated with one, two, and three stars, respectively.

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