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DISCUSSION PAPER SERIES

IZA DP No. 13180

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ABSTRACT

2D:4D and Self-Employment Using Soep Data: A Replication Study

The 2D:4D digit ratio, the ratio of the length of the 2nd digit to the length of the 4th digit, is often considered a proxy for testosterone exposure in utero. A recent study by Nicolaou et al. (2018) reported an association between the lefthand 2D:4D and self-employment (in a sample of about 1,000 adults). In this preregistered study we replicate these results on a new and larger sample of about 2,600 adults from the German Socioeconomic Panel-Innovation Sample (SOEP-IS). We find no statistically significant associations between 2D:4D and self-employment and thus cannot confirm the findings of Nicolaou et al. (2018) for left-hand 2D:4D. Our estimated 99.5% confidence intervals are within an about 2 percentage points change in self-employment for a one standard deviation change in the 2D:4D when we pool results for men and women (the association does not differ significantly between men and women). Even larger studies are needed to rule out smaller effect sizes.

JEL Classification: J23, L26

Keywords: self-employment, entrepreneurship, hormones, testosterone, digit ratio

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1 Introduction

What determines who becomes self-employed? Self-employment has been linked to risk preferences (Caliendo et al., 2009; Kihlstrom & Laffont, 1979), personality traits (Caliendo et al., 2014), a number of socio-economic characteristics and the regional culture and policy environment (see Parker, 2018 for an overview). There is also a large gender gap in self-employment: Men are much more likely to be self-employed than women (Caliendo et al., 2015; Minniti et al., 2009).

Understanding the determinants of self-employment (with or without employees) is important because as entrepreneurs, they tend to innovate and prompt competition, and thereby they directly and indirectly contribute to job creation and economic growth (e.g., Acs and Armington, 2006; Carree and Thurik, 2010; Van Stel et al., 2005). A central policy relevant question is how much entrepreneurial behavior is inherent in an individual's nature and how much it can be nurtured and taught.

Relatively recently, the potential roles of biological factors have received substantial interest in the entrepreneurship literature. For example, some studies have found that the tendency to engage in self-employment partly has a genetic basis (e.g., Lindquist et al., 2015; Nicolaou et al., 2018; Zhang et al., 2009). There is an even larger literature exploring the association between testosterone, a sex steroid, and self-employment. Some of these studies have explored circulating levels of testosterone with mixed results (e.g., Nicolaou et al., 2018; Van der Loos et al., 2013; White et al., 2006). It has been argued that the mixed results could potentially be due to endogeneity between self-employment and testosterone since testosterone levels are not something fixed, but may react to e.g. social context. Prenatal testosterone exposure in utero has thus been argued to play a clearer causal role on self-employment through the impact of prenatal testosterone exposure on fetal brain development that in turn affects personality and preferences (Nicolaou et al., 2018). As testosterone exposure in utero is difficult to measure, various proxies have been proposed, with the most commonly used proxy being the ratio of the length of the 2nd digit to the length of the 4th digit (2D:4D) on each hand (Manning et al., 1998). Supposedly, a lower 2D:4D digit ratio is an indication of higher testosterone exposure.

There have been many attempts to link 2D:4D to for example personality, various cognitive abilities and economic preferences including risk taking. The results are often contradictory (see e.g. Neyse et al., 2020; Parslow et al., 2019 for reviews), with mixed evidence for publication bias (see e.g. Hilgard et al., 2019; Puts et al., 2008). There are also papers relating 2D:4D to economic outcomes outside the lab (e.g. Coates et al., 2009; Nye et al., 2017).

There are only a few papers testing for an association between 2D:4D and self-employment related outcomes (Bönte et al., 2016; Nicolaou et al., 2018; Trahms et al., 2010; Unger et al., 2009). Bönte et al. (2016) study entrepreneurial intent in a sample of 432 German university students and find negative and statistically significant associations for the right-hand 2D:4D, while for the left-hand 2D:4D they do not report any results but note that their "data indicate that the right hand 2D:4D is more strongly related to both operationalizations of entrepreneurial intent". In a sample of 64 male German entrepreneurs, Unger et al. (2009) correlate 2D:4D and entrepreneurial success and find no direct statistically significant association for either hand. However, they find for both hands a statistically significant interaction between 2D:4D and the psychological measure of need for achievement that predicts entrepreneurial success. Trahms et al. (2010) study a sample of 90 American entrepreneurs and report statistically significant negative correlations between 2D:4D and strategic goal commitment and firm performance. It is in this study unclear whether they conducted the analysis using the average of both hands.[1]

The most relevant study to ours is Nicolaou et al. (2018) - this is the only previous study that looks at the association between 2D:4D and actual self-employment. Nicolaou et al. (2018) use the largest sample prior to our study, and test this relation for 450 men and 524 women separately (total N=974) using survey data from Understanding Society's Innovation Panel Wave 6 with data collected in 2013 on both self-employment and 2D:4D (this is part of the UK Household Longitudinal Study, a panel survey of individuals in

[1] Another indirectly related example is Guiso and Rustichini (2018) who look at a sample of 1313 Italian entrepreneurs and find that women in regions with less female emancipation on average have lower 2D:4D than men while the opposite is in the case in regions with higher female emancipation. These results are reported for both left and right 2D:4D. The authors interpret these results as suggesting that there exists gender related obstacles to entering entrepreneurship.

the UK). Nicolaou et al. find that left hand 2D:4D is statistically significantly negatively related to men's self employment ($p<0.01$) whereas for women they report a "marginally significant" negative relation ($p<0.10$). For the right hand 2D:4D they find no statistically significant associations and they do not report results for data pooled for men and women.

The aim of this study is to as closely as possible replicate the analyses carried out in Nicolaou et al. (2018) on the association between 2D:4D and self-employment; but in a new and larger sample (N about 2,600, more than 2.5 times larger than Nicolaou et al., 2018). The study was pre-registered at OSF (https://osf.io/t94fv/), detailing all the analyses to be conducted before we had access to the complete data-set (we had access to the 2D:4D data before pre-registration, but this data-set was merged with the data on self-employment after pre-registration). The effect sizes in Nicolaou et al. (2018) for the left hand digit ratio was a 5.8 percentage units change in self-employment for men and a 3.3 percentage units change in self-employment for women, for a one standard deviation change in 2D:4D.[2] Based on the estimated standard errors in our study, we have about 80% power to detect effect sizes of about half that magnitude at the 0.5% statistical significance level.[3]

We find no statistically significant association between left-hand or right-hand 2D:4D and self-employment for either men or women. Our non-significant point estimates of a 1.0 percentage units change in self-employment for men and a 0.2% percentage units change in self-employment for women for a one standard deviation change in left-hand 2D:4D, are more than 80% lower than those reported in Nicolaou et al. (2018). In addition to estimating results separately for men and women and separately for left-hand and right-hand 2D:4D as in Nicolaou et al. (2018), we also report pre-registered results pooled for men and women as part of our primary analyses. By pooling data for men and women we provide results for an about 5 times larger sample size than used in the separate analyses for men and women in Nicolaou et al. (2018). In pre-registered exploratory analyses we

[2]These effect sizes are based on our own estimations as Nicolaou et al. (2018) did not report marginal effects from their logistic regression analyses (we re-estimated their logistic regressions based on their posted data and added marginal effects to the estimation code).

[3]Based on the recommendations of Benjamin et al. (2018) we pre-registered 0.5% as the threshold for statistically significant evidence and 5% as the level for suggestive evidence.

also test if the association between 2D:4D and self-employment differs between men and women, but we find no statistically significant gender difference supporting that pooling the data is appropriate. In the pooled data our estimated 99.5% confidence intervals are within about 2 percentage points change in self-employment for a one standard deviation change in 2D:4D. Larger effect sizes than this are thus unlikely. Smaller effect sizes than this may be considered economically important, and even larger studies are needed to rule those out. We perform several pre-registered robustness tests related to for instance potential outliers. We find no statistically significant evidence for an association between 2D:4D and self-employment in these robustness tests, but in three estimations within our robustness tests there is suggestive evidence ($p<0.05$) of an association. Given the number of tests we perform we should however expect some $p<0.05$ results by chance.

The paper is organized as follows. We describe the study, including the sample and variables, and then we report the results. We end with a discussion.

2 Data and variables

Nicolaou et al. (2018) carried out logistic regressions with self-employment (1/0) as the dependent variable and 2D:4D as the independent variable of interest, and a number of control variables. Below we describe these variables in our data and note any differences compared to Nicolaou et al. (2018).

2.1 Sample and 2D:4D digit ratio variable

The 2D:4D data was collected as part of another project investigating the association between 2D:4D and economic preferences (risk taking, altruism, negative reciprocity, positive reciprocity and trust) (Neyse et al., 2019). That study was pre-registered prior to starting the data collection (https://osf.io/5vpdn/), including details about the data collection, measurement procedures and statistical tests. Data on 2D:4D was collected between September 2018 and December 2018 in the German Socioeconomic Panel-Innovation Sample (SOEP-IS). SOEP is a longitudinal survey study that started in 1984 and that

today has about 30,000 participants (Goebel et al., 2019). SOEP-IS, which we use, was established in 2012 and includes experimental and survey modules (Richter & Schupp, 2015). According to the 2018 release of SOEP-IS, it has a total number of 5,722 participants from 3,232 households, with 4,860 individuals participating in the 2018 wave. The survey committee decided to get the 2D:4D data collected from 3,958 participants, and since 2D:4D measurement was voluntary, a sample of 3,482 participants with a right or left hand measure of 2D:4D was obtained (3,433 participants with a right hand measure, 3,454 individuals with a left hand 2D:4D measure, and 3,405 individuals with an average measure of the right and left hand 2D:4D). Due to missing data on self-employment and control variables we end up with a sample of N=2,637 for right-hand 2D:4D (N=1,235 for men and N=1,402 for women) and N=2,652 for left-hand 2D:4D (N=1,247 for men and N=1,405 for women). This is our analysis sample, where the sample size thus differs slightly depending on which hand is included.

Left and right hand 2D:4D's of the participants were measured during the household surveys with the help of digital calipers.[4] As noted in Neyse et al. (2019), 263 interviewers were trained for the 2D:4D measurements, with the detailed hand measurement protocol posted on https://osf.io/5vpdn/.

While Nicolaou et al. (2018) excluded observations from the analysis if data were missing from the self-employment variable or for any of the control variables, they did not exclude any 2D:4D measurements.[5] We use the same approach in our main results, with the addition of two pre-registered robustness tests with alternative definitions of our 2D:4D variable. Steps to prevent outliers due to mismeasurement or injured fingers were included in the interviewer instructions - interviewers were told that the typical 2D:4D range is between 0.8 and 1.1 and to repeat the measurement for values significantly outside this range. We thus have two recorded 2D:4D measurements for some individuals (available

[4]We avoid scanners or mobile applications because of confidentiality of personal information as well as for mobility and time efficiency.

[5]Nicolaou et al. (2018) also carried out robustness tests based on winsorized results with 1% and 5% winsorization of the 2D:4D variable and reported these results to the reviewers during the review process and the code for these analyses are also included in their posted code on Dataverse. But these results were not reported or referred to in the published paper. We thank the original authors of Nicolaou et al. (2018) for pointing out this. According to the original authors their results were robust to 1% and 5% winsorization.

for right/left hand 2D:4D for 90/149 individuals). In our main results we included the first measurement, but we supplement this with a robustness test where the first measurement is replaced by the second measurement for the cases with two measurements. We refer to this robustness test as "the corrected sample". Interviewers were also instructed to not measure hands for interviewees with missing or severely injured second digits (2D) or fourth digits (4D). However, based on interviewer comments in the data it is clear that they sometimes still measured and commented on the injured hand. In our main results we included all 2D:4D measurements even when there are such comments. We also supplemented this with a robustness test where outliers due to injured fingers were excluded - we excluded digit ratios outside the range of 0.8-1.2 (corresponding to +/- 3-4 STDs away from the mean in our data). This robustness test excluded right/left hand 2D:4D for 14/30 individuals. We did this rather than trying to identify injured fingers from comments as the comments are not always clear (e.g., some comments mention crooked fingers without specifying whether these are caused by an injury). We refer to this robustness test as "the restricted sample".

2.2 Self-employment variable

The self-employment variable was generated from existing SOEP-IS data from 2018 (collected in the same year as the 2D:4D data). We followed a pre-analysis plan posted prior to merging the datasets (https://osf.io/t94fv/) - the SOEP-IS data administration can confirm that the self-employment variables of the current study were not generated and linked to the 2D:4D data until the pre-analysis plan had been posted.[6]

We defined a variable for self-employment that is as similar as possible to the one used by Nicolaou et al. (2018). The self-employment variable used by Nicolaou et al. (2018) was based on information about employment status in the year that 2D:4D (and the control variables included in the analysis) was measured as well as the employment status on the most recent job in previous years for those not working in the year of the data collection. See our pre-analysis plan for more details on how the sample of Nicolaou

[6]The questions can be addressed to SOEP-IS Survey manager, Prof. Dr. David Richter. E-mail: drichter@diw.de; Telephone: +49 30 89789 - 413; Address: Mohrenstraße 58, 10117 Berlin, Germany.

et al. (2018) can be characterized. We do the same in our analysis: for those working in 2018 the self-employment question is based on the current job and for those not working in 2018 when our 2D:4D data was collected we include information about the most recent job (if available).

In the SOEP data (including SOEP-IS), respondents are asked the following question in SOEP 2018 (translated to English by the SOEP group): "What is your current occupational status? If you are employed in more than one position, please answer the following questions for your main position only." We classify the response categories into the following three categories: "not working", "self-employed, and "working: not self-employed".

We coded individuals that in the 2018 survey data were in any of the "self-employment" categories as 1 for "self-employed", and we coded individuals that in the 2018 survey data were in any of the "working: not self-employed" categories as 0 for our self-employment variable. For those that in the 2018 survey data were in any of the response categories coded as "not working" we checked if they were included in any previous SOEP data waves, and if they were we used the same question as above to code them as "self-employed", "working: not self-employed", or "not working" in the previous waves and used information about self-employment for the most recent survey that they were coded as "self-employed" or "working: not self-employed". If participants were coded as "not working" in the 2018 survey data and they were not included in any of the previous SOEP data collections, they were excluded from the analysis. If participants were coded as "not working" in the 2018 survey data and all previous SOEP data collections they were included in, they were also excluded from the analysis.

Note that we do not define "help in a family business" as being "self-employed" as those who self-identify as helping family members are not usually considered self-employed. This response category was instead coded as "not working". We also coded the response category "Military, Community Service" as "not working"; as this consists of individuals doing voluntary military or community service. We furthermore coded the following categories as "not working": "Apprentice, Trainee Industry Technology", "Apprentice, Trainee Trade and Commerce", and "Trainee, Intern"; as an apprenticeship/trainee is somewhere in-

between working and studying (and some of these individuals could potentially become self-employed). We included self-employed farmers among the group of self-employed in our primary analysis; but we also carry out a robustness test excluding self-employed farmers from the analysis (see below in the robustness tests section for more details).[7] For further information on how we classify responses see our pre-analysis plan.

2.3 Control variables

When it comes to control variables, Nicolaou et al. (2018) included year of birth (as a continuous variable), education (as dummy variables with the following categories: no formal education, A-levels, college degree, other higher education), white (white=1; non-white =0), self-reported health (measured by a categorical variable from 1=excellent to 5=poor and included as a continuous variable between 1-5), urban (urban location=1; non-urban location=0), gross personal income (included as a continuous variable in euro 1000 per month), and handedness (1=right handed; 2= left-handed; 3=ambidextrous; the variable seems to be included as a continuous variable between 1-3). Our control variables are similar with the following differences. We neither have a "white" variable nor a "handedness" variable in our data. In the Nicolaou et al. (2018) data the correlations between these variables and self-employment and 2D:4D were low and the results are very similar when not controlling for those variables. Our dummy variables for educational attainment are i. school education below Abitur (the German analogue of A-levels) and no apprenticeship, ii. Abitur and/or apprenticeship (omitted base category), iii. college degree, and iv. vocational degree beyond apprenticeship. An urban area was defined as an urban settlement with a population of 10,000 or more in Nicolaou et al. (2018), in our case it is defined as a city or district with 20,000 or more inhabitants. See our pre-analysis plan for more details on our control variables. In Table 1 we show descriptive statistics for self-employment, 2D:4D, and the control variables.

[7] This robustness test excluding self-employed farmers was suggested by the original authors of Nicolaou et al. (2018) after reading a draft of our pre-registration document.

Table 1: Descriptive Statistics

	Mean	SD	Min	Max	N
Right hand digit ratio (R2D:4D)	1.0014	0.0551	0.7639	2.1750	2637
Left hand digit ratio (L2D:4D)	1.0020	0.0687	0.3714	2.2727	2652
Mean 2D:4D	1.0017	0.0488	0.6709	1.6513	2622
Self-employed	0.0743	0.2623	0	1	2652
Female	0.5298	0.4992	0	1	2652
Year of Birth	1967.04	17.20	1925	2001	2652
Below Abitur or Apprenticeship	0.1071	0.3093	0	1	2652
Abitur or Apprenticeship	0.4597	0.4985	0	1	2652
Other Higher Education	0.2017	0.4014	0	1	2652
College	0.2315	0.4219	0	1	2652
Health	2.5641	0.9339	1	5	2652
Urban	0.5577	0.4968	0	1	2652
Gross Personal Income	2.3656	2.1543	0	34.0000	2652

Notes: The descriptives for R2D:4D (L2D:4D) are for the n=2637 (n=2652) included in the primary analyses; and the descriptives for the mean 2D:4D are for the n=2622 included in robustness test 1. The descriptives for self-employment and the control variables are for the n=2652 included in the primary analyses for left-hand 2D:4D. Gross personal income is in euro 1000 per month.

3 Results

All analyses below were described in the pre-analysis plan. We divided the tests in the pre-analysis plan into: primary hypothesis tests, robustness tests, and exploratory analyses. In line with the recent recommendation of Benjamin et al. (2018), and as specified in our pre-analysis plan, we refer to hypotheses tests with a p-value below 0.005 as "statistically significant evidence" and tests with a p-value below 0.05 as "suggestive evidence". All tests report two-sided p-values.

3.1 Primary hypotheses tests

We report the results of the primary hypothesis tests in Table 2. For right-hand 2D:4D Nicolaou et al. (2018) did not report any significant association between 2D:4D and self-employment for men or women. Consistent with this, we find no significant associations either. This is also the case when we pool men and women to increase statistical power further.

Table 2: Regression Analysis: Primary Hypotheses

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.693	-0.193			-1.579	
	(2.028)	(2.342)			(1.513)	
L2D:4D			-2.090	-0.385		-1.248
			(1.575)	(1.570)		(1.123)
Female					-0.287	-0.263
					(0.161)	(0.160)
Year of Birth	-0.025**	-0.016*	-0.023**	-0.016*	-0.021**	-0.020**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.396	-0.955	-1.424	-0.947	-1.026*	-1.033*
	(1.024)	(0.539)	(1.024)	(0.539)	(0.471)	(0.470)
Oth. Higher Educ.	0.399	0.063	0.378	0.076	0.244	0.242
	(0.281)	(0.305)	(0.281)	(0.305)	(0.207)	(0.206)
College	0.687**	0.548	0.712**	0.603*	0.621**	0.653**
	(0.243)	(0.302)	(0.243)	(0.299)	(0.187)	(0.186)
Health	-0.022	0.022	-0.005	0.020	0.001	0.008
	(0.120)	(0.127)	(0.119)	(0.127)	(0.087)	(0.087)
Urban	-0.135	-0.070	-0.143	-0.048	-0.107	-0.100
	(0.205)	(0.237)	(0.206)	(0.236)	(0.155)	(0.154)
Gross Pers. Inc.	0.112**	0.054	0.113**	0.046	0.104**	0.103**
	(0.033)	(0.077)	(0.033)	(0.077)	(0.030)	(0.030)
Constant	48.184**	28.386	44.935**	27.911	40.179**	38.435**
	(13.741)	(15.112)	(13.453)	(14.948)	(10.112)	(9.959)
R2D:4D (ME)	-0.217	-0.010			-0.105	
	(0.164)	(0.125)			(0.100)	
L2D:4D (ME)			-0.167	-0.021		-0.083
			(0.126)	(0.084)		(0.074)
Observations	1235	1402	1247	1405	2637	2652
Pseudo R^2	0.075	0.028	0.074	0.028	0.060	0.060
χ^2	57.43	16.88	57.19	17.53	84.20	83.82
p-value	0.000	0.031	0.000	0.025	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

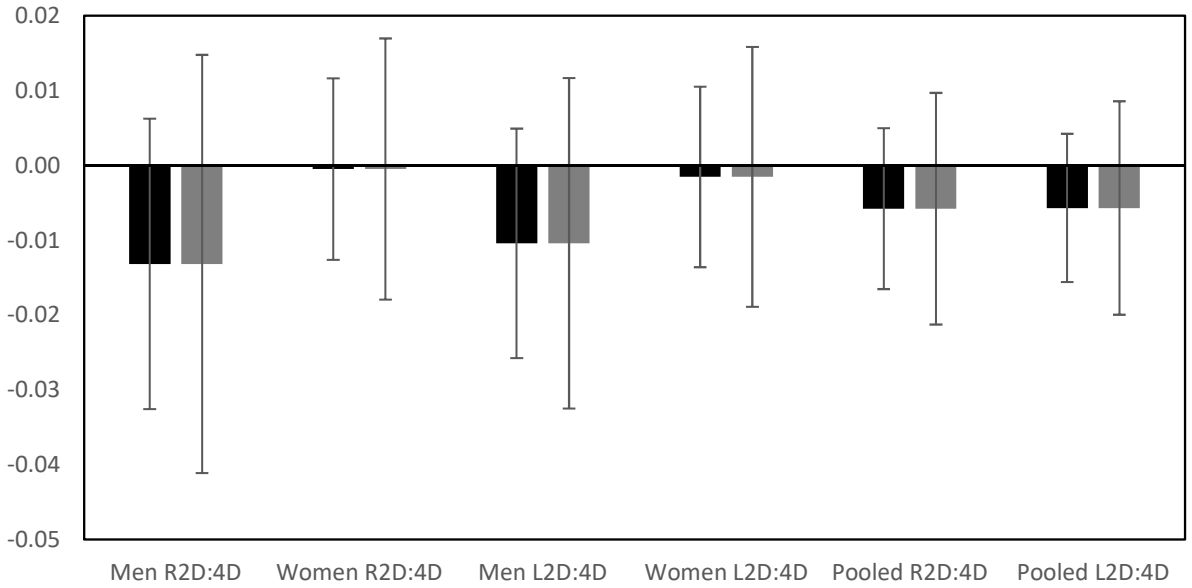
For left-hand 2D:4D Nicolaou et al. (2018) reported a statistically significant ($p<0.01$) association between 2D:4D and self-employment for men and a marginally significant ($p<0.10$) association for women (using their terminology for statistical significance). The negative signs of these associations implies an effect in the direction of their hypothesis that higher pre-natal testosterone is associated with a higher likelihood of being self-employed. In our replication the point estimates are in the same direction, but the associations are not significant. Also when we pool men and women the association between left-hand 2D:4D and self-employment is not significant. We thus fail to replicate their findings in the sense of finding a statistically significant (or suggestive) effect in the same direction.

It is also interesting to compare the estimated effect sizes between the studies. We compare the effect of a one standard deviation increase in 2D:4D on the probability of self-employment. Nicolaou et al. (2018) did not report marginal effects of their logistic regression coefficients, but we estimated the marginal effects based on their data to compare the effect sizes across the studies. We limit this comparison to left-hand 2D:4D where Nicolaou et al. (2018) reported significant associations. In Nicolaou et al. (2018) a one standard deviation increase in left hand 2D:4D decreased self-employment by 5.8 percentage units for men and 3.3 percentage units for women. In our study the corresponding effect sizes are 1.0 percentage units for men and 0.2 percentage units for women, and 0.6 percentage units if we pool men and women. Our non-significant point estimates of the effect sizes are thus more than 80% smaller for both men and women, compared to the effect sizes in Nicolaou et al. (2018).

In Figure 1 we plot 99.5% and 95% confidence intervals for the effect sizes in the six regressions in our primary hypotheses tests (for a one standard deviation change in 2D:4D). The upper bound of the 99.5% (95%) confidence interval is 3.3 (2.6) percentage units change in self-employment for men for left-hand 2D:4D.[8] The corresponding upper bound for women is 1.9 (1.4) percentage units. For right-hand 2D:4D, the upper bound of the 99.5% (95%) confidence interval is 4.1 (3.3) percentage units change in self-employment

[8]The upper bound here and below refers to the upper bound in absolute terms (as the point estimate of the 2D:4D coefficients is negative).

Figure 1: Effect Sizes for Primary Hypotheses Estimated by Logit Regressions



Note: %95 (left) and %99.5 (right) confidence intervals are presented. The units of the effect sizes are the percentage units changes in self-employment for a one standard deviation change in 2D:4D.

for men and 1.8 (1.3) percentage units change for women, for a one standard deviation change in 2D:4D. When we pool men and women the estimates get more precise and the upper bound of the 99.5% (95%) confidence interval is now 2.0 (1.6) percentage units change in self-employment for left-hand 2D:4D and 2.1 (1.7) percentage units change in self-employment for right-hand 2D:4D. Below we also test the appropriateness of pooling men and women, by testing if there is a gender difference in the association.

3.2 Robustness tests

We carried out a number of pre-registered robustness tests. In the first robustness test we use the average of the left-hand and right-hand 2D:4D to increase the precision of the 2D:4D measurement. As shown in Table 3, there is no statistically significant or suggestive evidence of an association between 2D:4D and self-employment in these robustness tests, in line with the primary hypotheses tests.

In a second and a third robustness test, we estimate our results using the "corrected sample" and the "restricted sample" as detailed above (including also analyses on the average of the left hand and right hand 2D:4D), but this leads to similar results and does

not affect our conclusions (the p-value is >0.05 in all these analyses). These results are reported in Appendix Tables S1-4.

Table 3: Robustness Test 1: Mean 2D:4D

	Men	Women	Both
Mean 2D:4D	-3.877	-1.086	-2.518
	(2.275)	(2.359)	(1.634)
Female			-0.280
			(0.161)
Year of Birth	-0.024**	-0.016*	-0.021**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.384	-0.951	-1.022*
	(1.025)	(0.540)	(0.471)
Oth. Higher Educ.	0.401	0.070	0.250
	(0.282)	(0.305)	(0.207)
College	0.700**	0.551	0.628**
	(0.243)	(0.301)	(0.187)
Health	-0.017	0.029	0.006
	(0.119)	(0.127)	(0.087)
Urban	-0.148	-0.069	-0.111
	(0.206)	(0.237)	(0.155)
Gross Pers. Inc.	0.112**	0.055	0.104**
	(0.033)	(0.077)	(0.030)
Constant	48.879**	29.200	41.024**
	(13.649)	(15.132)	(10.094)
Mean 2D:4D (ME)	-0.313	-0.058	-0.167
	(0.184)	(0.126)	(0.109)
Observations	1228	1394	2622
Pseudo R^2	0.076	0.028	0.061
χ^2	58.64	17.10	85.62
p-value	0.000	0.029	0.000

Logit regressions; standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

In a fourth robustness test, we estimate all our results using a linear probability model (estimated with robust standard errors) instead of logistic regressions. These results are estimated also for the "corrected sample" and the "restricted sample", and for the average of the left-hand and right-hand 2D:4D. These results are similar as well: We find no statistically significant evidence of an effect in any of these robustness tests. There is also no suggestive evidence when we use OLS to test our primary hypotheses (test 4a) or for the other robustness tests, with one exception: we obtain suggestive evidence (p<0.05) of a negative association for men in robustness test 4d using the corrected measure of

the mean 2D:4D. All the results from robustness test 4 are reported in Appendix Tables S5-10. An advantage of the linear probability model is that it is easier to interpret the coefficients, and in Figure S1 in the Appendix we show the 99.5% and 95% confidence intervals of the estimated effect sizes for the six regression models corresponding to the primary hypotheses tests in Table 2. These confidence intervals are similar to the ones shown in Figure 1.

In a final robustness test reported in Appendix tables S11-22, we exclude self-employed farmers from the analyses; excluding 6 observations in the analyses pooling men and women (4 men and 2 women). This analysis without self-employed farmers is carried out for the primary hypothesis tests as well as for robustness tests 1-4. Again, we do not find statistically significant evidence of an effect in any of these robustness tests. There is also no suggestive evidence when we exclude self-employed farmers from the primary hypothesis tests or the other robustness tests, with two exceptions: when we use the corrected measure of the mean 2D:4D and estimate the model by OLS (robustness test 5j), there is suggestive evidence ($p<0.05$) of a negative association for men and for the pooled sample.

In interpreting that we find suggestive evidence of an association between 2D:4D and self-employment in 3 estimations within our robustness tests, we should bear in mind that we carry out 108 tests in total (6 primary hypothesis tests and 102 robustness tests; 54 of which are for the analyses excluding self-employed farmers). In addition we conduct in total 18 exploratory analyses reported below. Even if the null hypothesis is true we thus expect to observe suggestive evidence ($p<0.05$) in some of these tests.

3.3 Exploratory analyses

As a pre-registered exploratory analysis we tested if the association between 2D:4D and self-employment differs between men and women. We carried out these tests for the linear probability model as the coefficients are more straightforward to compare in that model, and we used a z-test to test if the 2D:4D coefficient differed in the regressions for men and women. We did this test for the main sample included in Table 2 and for

the analyses based on the average of the left-hand and right-hand 2D:4D, and for the "corrected sample" and "restricted sample" analyses. We also carried out this test for the robustness test excluding self-employed farmers. We find no statistically significant or suggestive evidence of a gender difference in any of these tests. This provides support for pooling the results of men and women as also done above. These test results are reported in Appendix Tables S23-24.

3.4 Minimum detectable effect size (power)

As specified in the pre-analysis plan we also estimated the minimum detectable effect (MDE) sizes that we have 80% power to find at the 0.5% or 5% level. These estimations were based on the standard error of the 2D:4D coefficient in the linear probability models used in the robustness test as the regression coefficients in the linear regression models are most straightforward to interpret (so that the units of the MDE is the percentage units change in self-employment for a one standard deviation change in 2D:4D). We estimated the MDE by multiplying the standard error of the 2D:4D coefficient by 3.65 (2.8) for 80% power to detect an effect at the $p<0.005$ ($p<0.05$) level. To further improve the interpretability of these results we first multiplied the standard error of the 2D:4D coefficient by the standard deviation of 2D:4D for the sample included in the regression equation. We estimated the MDE for the primary hypothesis tests (the 6 regressions), but also for robustness tests 1-3 (the average of the left hand and right hand 2D:4D, the "corrected sample" and the "restricted sample").

A useful benchmark for interpreting these results is the effect sizes reported in Nicolaou et al. (2018) where a one standard deviation change in left hand 2D:4D increased self-employment by 5.8 percentage units for men and 3.3 percentage units for women. The minimum detectable effect size estimations are shown in Appendix Table S25. In the different analyses, the MDE varies between 1.5 and 2.9 percentage units for tests at the 0.5% level and between 1.1 and 2.2 percentage units for tests at the 5% level. The MDE of the primary hypothesis test for left-hand 2D:4D for tests at the 0.5% (5%) level is 2.5 (1.9) percentage units for men, 2.0 (1.5) percentage units for women, and 1.6 (1.2)

percentage units when men and women are pooled. We are thus very well-powered to detect effect size of the magnitude observed by Nicolaou et al. (2018); for men we have 80% power to detect 43% of the effect size observed by Nicolaou et al. (2018) and for women we have 80% power to detect 61% of the effect size observed by Nicolaou et al. (2018) for tests at the 0.5% level. When we pool results for men and women the power increases further, and the same is true for tests at the suggestive (5%) significance level.

However, given that the mean self-employment rate in our sample is 7.4%, smaller effect sizes than the MDEs would still be sizable in relative terms and may be considered economically important; our study does not provide strong evidence against such smaller effect sizes.

4 Discussion

We find no substantive evidence of an association between 2D:4D and self-employment, contradicting the conclusions for left-hand 2D:4D in Nicolaou et al. (2018). Our failure to find substantive evidence for the hypothesis that 2D:4D is associated with self-employment could be due to many reasons. First, it is noteworthy that there is a lack of direct and consistent evidence of a link between 2D:4D and testosterone exposure. It has for example been argued that one piece of evidence comes from men having lower 2D:4D than women. While this often is the case, the gender difference is small with substantial overlap in distributions, and not all studies find a gender difference (Apicella et al., 2015). The most direct evidence is based on a sample of 29 children where there is a statistically significant negative correlation between the testosterone-to-estradiol ratio in amniotic fluid and right hand 2D:4D, but not left hand 2D:4D (Lutchmaya et al., 2004). Similarly, it has also been reported that there is a weak negative correlation between maternal plasma testosterone levels and 2D:4D of newborns for both hands and both sexes in a small sample (Ventura et al., 2013) - but this result was not replicated in a considerably larger study where the results were not statistically significant (Hollier et al., 2015). There is also a theory of sex hormone transfer in utero, where female fetuses supposedly receive transfers of testosterone from their male co-twin (Van Anders et al., 2006). Some studies thus compare

the 2D:4D of same sex and opposite sex twins, where smaller studies report statistically significant associations while, again, larger studies do not (e.g. Hiraishi et al., 2012). Other indirect evidence includes the potential link between 2D:4D and congenital adrenal hyperplasia (CAH, a disease that results in an excess production of testosterone) as well as CAG repeat polymorphism (which affects the transcriptional activity of the androgen receptor). These results are also a mix of positive and null results (see, e.g. Buck et al., 2003). Men with Klinefelter's Syndrome, a syndrome with testosterone deficiency as one of the main features, have however been shown to have higher 2D:4D (Manning et al., 2013), as "expected", though the study is small with a sample of 51 men with Klinefelter's Syndrome (these are compared to control groups). Thus, the evidence in support of a link between 2D:4D and prenatal testosterone exposure is weak and it is not clear that 2D:4D is a valid proxy for testosterone exposure in utero.

Second, even if 2D:4D is a valid proxy of prenatal testosterone exposure, previous studies may have reported false positive results due to low power or small sample sizes, publication bias and "researcher degrees of freedom" (Gelman & Loken, 2013; Simmons et al., 2011). In most previous papers the researchers test for statistically significant correlations in both hands but only find them for one hand (including Nicolaou et al. (2018) who only find significant results for the left hand and not the right hand), and look at both men and women but only find them in one group, and sometimes report results as "marginally significant" ($p<0.10$), etc. With this type of analysis and reporting, $p<0.05$ results have high false positive probabilities. In contrast, our sample is more than 2.5 times larger than the previously largest sample size on this topic (and when we pool men and women there is a fivefold difference). With the hypothesis tests pre-registered there is little room for researcher degrees of freedom affecting our results.

Third, it is also important to note that even though we find no statistically significant association between 2D:4D and self-employment, this does not imply that the null hypothesis is correct. Our estimated confidence intervals include potentially economically meaningful effect sizes in the direction found by Nicolaou et al. (2018), and even larger sample sizes is needed to rule out such effect sizes.

Beside Nicolaou et al. (2018), the most relevant paper to ours is a paper by a subset of us (Neyse et al., 2019). Using the same sample as us (but with N=3482 which is larger since they do not match it to employment data), Neyse et al., 2019 have previously explored to what extent 2D:4D correlates statistically significantly with risk taking, altruism, positive reciprocity, negative reciprocity and trust - all economic behaviors that had previously been related to 2D:4D albeit with mixed success and in substantially smaller samples with many researcher degrees of freedom. In a pre-registered study, Neyse et al., 2019 find no statistically significant association between 2D:4D and the five economic preferences.

In sum, we fail to find substantive evidence for an association between 2D:4D and self-employment. The upper bound of the 99.5% confidence interval is a 2.0 (2.1) percentage point change in self-employment, for a one standard deviation change in left-hand (right-hand) 2D:4D. To rule out smaller effect sizes even larger sample sizes are needed. Apart from large sample sizes, it is also crucial to pre-register analyses plans in future studies to reduce researcher degrees of freedom.

5 Acknowledgements

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2D:4D and Self-Employment using SOEP Data: A Replication Study Supplementary Information

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1 Figure

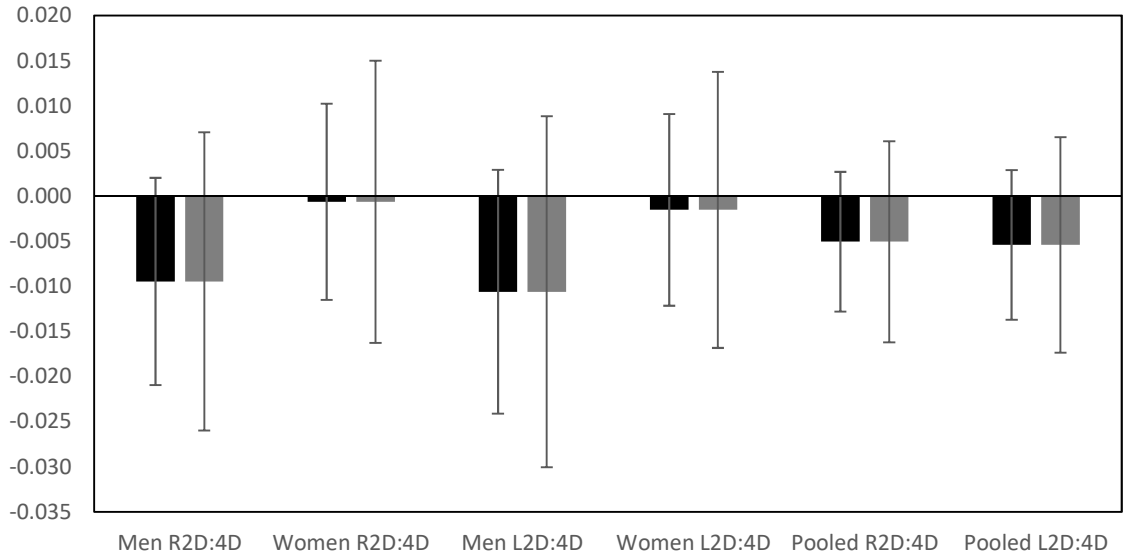

Figure S1: Effect sizes for primary hypotheses estimated by OLS (%95 and %99.5 confidence intervals). The units of the effect sizes are the percentage units change in self-employment for a one standard deviation change in 2D:4D.

2 Robustness tests

Table S1: Robustness Test 2a: Corrected Sample

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.910	0.359			-1.399	
	(2.196)	(2.396)			(1.603)	
L2D:4D			-3.164	-0.715		-2.051
			(1.997)	(2.184)		(1.462)
Female					-0.286	-0.257
					(0.161)	(0.160)
Year of Birth	-0.024**	-0.016*	-0.023**	-0.016*	-0.021**	-0.020**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.403	-0.954	-1.430	-0.947	-1.027*	-1.033*
	(1.024)	(0.539)	(1.024)	(0.539)	(0.471)	(0.470)
Oth. Higher Educ.	0.397	0.064	0.376	0.078	0.244	0.243
	(0.281)	(0.305)	(0.281)	(0.305)	(0.207)	(0.206)
College	0.687**	0.546	0.705**	0.603*	0.620**	0.651**
	(0.243)	(0.302)	(0.243)	(0.299)	(0.187)	(0.186)
Health	-0.020	0.022	-0.009	0.020	0.002	0.007
	(0.120)	(0.127)	(0.119)	(0.127)	(0.087)	(0.087)
Urban	-0.132	-0.069	-0.148	-0.048	-0.106	-0.103
	(0.205)	(0.237)	(0.206)	(0.236)	(0.155)	(0.154)
Gross Pers. Inc.	0.112**	0.055	0.114**	0.046	0.104**	0.103**
	(0.033)	(0.077)	(0.033)	(0.077)	(0.030)	(0.029)
Constant	47.932**	27.958	46.229**	28.190	39.826**	39.186**
	(13.694)	(15.102)	(13.540)	(15.005)	(10.091)	(10.004)
R2D:4D (ME)	-0.234	0.019			-0.093	
	(0.177)	(0.127)			(0.106)	
L2D:4D (ME)			-0.253	-0.038		-0.136
			(0.160)	(0.117)		(0.097)
Observations	1235	1402	1247	1405	2637	2652
Pseudo R^2	0.075	0.028	0.075	0.028	0.060	0.060
χ^2	57.40	16.90	58.02	17.58	83.86	84.56
p-value	0.000	0.031	0.000	0.025	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S2: Robustness Test 2b: Corrected Sample with Mean 2D:4D

	Men	Women	Both
Mean 2D:4D	-4.716	-1.408	-3.193
	(2.555)	(2.805)	(1.880)
Female			-0.276
			(0.161)
Year of Birth	-0.024**	-0.016*	-0.021**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.399	-0.950	-1.024*
	(1.025)	(0.540)	(0.471)
Oth. Higher Educ.	0.400	0.072	0.252
	(0.282)	(0.305)	(0.207)
College	0.694**	0.550	0.626**
	(0.243)	(0.301)	(0.187)
Health	-0.019	0.030	0.007
	(0.119)	(0.128)	(0.087)
Urban	-0.147	-0.069	-0.112
	(0.206)	(0.237)	(0.155)
Gross Pers. Inc.	0.113**	0.055	0.104**
	(0.033)	(0.077)	(0.030)
Constant	49.699**	29.414	41.578**
	(13.714)	(15.173)	(10.129)
Mean 2D:4D (ME)	-0.381	-0.075	-0.212
	(0.207)	(0.150)	(0.125)
Observations	1228	1394	2622
Pseudo R^2	0.077	0.028	0.062
χ^2	59.14	17.14	86.11
p-value	0.000	0.029	0.000

Logit regressions; standard errors in parentheses;

* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

Table S3: Robustness Test 3a: Restricted Sample

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.677	-0.022			-1.459	
	(2.107)	(2.387)			(1.576)	
L2D:4D			-2.567	-1.076		-1.933
			(1.943)	(2.142)		(1.432)
Female					-0.289	-0.266
					(0.161)	(0.161)
Year of Birth	-0.025**	-0.016*	-0.024**	-0.015*	-0.021**	-0.021**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.396	-0.951	-1.418	-0.950	-1.023*	-1.033*
	(1.024)	(0.540)	(1.024)	(0.539)	(0.471)	(0.471)
Oth. Higher Educ.	0.398	0.064	0.372	0.070	0.244	0.239
	(0.281)	(0.305)	(0.281)	(0.306)	(0.207)	(0.207)
College	0.683**	0.553	0.704**	0.555	0.619**	0.636**
	(0.243)	(0.302)	(0.243)	(0.302)	(0.187)	(0.187)
Health	-0.018	0.022	-0.007	0.026	0.003	0.010
	(0.120)	(0.127)	(0.119)	(0.128)	(0.087)	(0.087)
Urban	-0.135	-0.067	-0.146	-0.080	-0.106	-0.118
	(0.205)	(0.237)	(0.206)	(0.237)	(0.155)	(0.155)
Gross Pers. Inc.	0.112**	0.054	0.112**	0.059	0.104**	0.104**
	(0.033)	(0.077)	(0.033)	(0.077)	(0.030)	(0.030)
Constant	48.460**	28.430	46.635**	28.255	40.310**	39.582**
	(13.750)	(15.115)	(13.561)	(15.095)	(10.115)	(10.042)
R2D:4D (ME)	-0.216	-0.001			-0.097	
	(0.171)	(0.127)			(0.105)	
L2D:4D (ME)			-0.207	-0.058		-0.129
			(0.157)	(0.115)		(0.095)
Observations	1230	1400	1235	1389	2630	2624
Pseudo R^2	0.074	0.028	0.075	0.028	0.060	0.061
χ^2	57.06	16.91	57.33	17.13	83.96	84.49
p-value	0.000	0.031	0.000	0.029	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S4: Robustness Test 3b: Restricted Sample with Mean 2D:4D

	Men	Women	Both
Mean 2D:4D	-3.967	-0.736	-2.518
	(2.490)	(2.780)	(1.847)
Female			-0.280
			(0.161)
Year of Birth	-0.025**	-0.016*	-0.021**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.374	-0.952	-1.023*
	(1.025)	(0.540)	(0.471)
Oth. Higher Educ.	0.394	0.062	0.246
	(0.282)	(0.305)	(0.207)
College	0.690**	0.550	0.626**
	(0.243)	(0.302)	(0.187)
Health	-0.016	0.028	0.007
	(0.120)	(0.128)	(0.087)
Urban	-0.150	-0.079	-0.119
	(0.206)	(0.237)	(0.155)
Gross Pers. Inc.	0.111**	0.059	0.103**
	(0.033)	(0.077)	(0.030)
Constant	50.543**	29.222	41.934**
	(13.773)	(15.169)	(10.150)
Mean 2D:4D (ME)	-0.325	-0.040	-0.169
	(0.204)	(0.150)	(0.124)
Observations	1211	1377	2588
Pseudo R^2	0.076	0.028	0.062
χ^2	58.22	17.30	85.54
p-value	0.000	0.027	0.000

Logit regressions; standard errors in parentheses;

* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

Table S5: Robustness Test 4a: Primary Hypotheses (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.156	-0.013			-0.092	
	(0.097)	(0.112)			(0.072)	
L2D:4D			-0.170	-0.021		-0.079
			(0.111)	(0.074)		(0.062)
Female					-0.018	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.007	-0.030*	-0.009	-0.030*	-0.020	-0.021
	(0.018)	(0.014)	(0.018)	(0.014)	(0.011)	(0.011)
Oth. Higher Educ.	0.028	0.003	0.026	0.004	0.014	0.014
	(0.023)	(0.017)	(0.023)	(0.016)	(0.013)	(0.013)
College	0.061*	0.035	0.063*	0.039	0.047*	0.050**
	(0.026)	(0.022)	(0.025)	(0.022)	(0.017)	(0.017)
Health	-0.002	0.001	-0.001	0.001	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.011	-0.003	-0.012	-0.002	-0.007	-0.006
	(0.017)	(0.013)	(0.017)	(0.013)	(0.010)	(0.010)
Gross Pers. Inc.	0.014*	0.003	0.014*	0.003	0.012*	0.011*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.005)	(0.005)
Constant	3.716**	1.512*	3.513**	1.507*	2.546**	2.456**
	(0.908)	(0.622)	(0.884)	(0.621)	(0.529)	(0.522)
Observations	1235	1402	1247	1405	2637	2652
Adjusted R^2	0.041	0.006	0.041	0.006	0.030	0.030

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.
Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S6: Robustness Test 4b: Mean 2D:4D (OLS)

	Men	Women	Both
Mean 2D:4D	-0.276	-0.060	-0.155
	(0.143)	(0.113)	(0.089)
Female			-0.018
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.006	-0.030*	-0.020
	(0.018)	(0.015)	(0.011)
Oth. Higher Educ.	0.028	0.003	0.014
	(0.023)	(0.017)	(0.014)
College	0.061*	0.036	0.048*
	(0.026)	(0.022)	(0.017)
Health	-0.001	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.012	-0.003	-0.007
	(0.017)	(0.013)	(0.010)
Gross Pers. Inc.	0.014*	0.003	0.011*
	(0.006)	(0.007)	(0.005)
Constant	3.827**	1.564*	2.617**
	(0.920)	(0.631)	(0.536)
Observations	1228	1394	2622
Adjusted R^2	0.042	0.006	0.031

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

Table S7: Robustness Test 4c: Corrected Sample (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.171	0.016			-0.084	
	(0.109)	(0.119)			(0.079)	
L2D:4D			-0.241	-0.037		-0.128
			(0.145)	(0.133)		(0.098)
Female					-0.018	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.007	-0.030*	-0.009	-0.030*	-0.020	-0.021
	(0.018)	(0.014)	(0.018)	(0.014)	(0.011)	(0.011)
Oth. Higher Educ.	0.028	0.003	0.026	0.004	0.014	0.014
	(0.023)	(0.017)	(0.023)	(0.016)	(0.013)	(0.013)
College	0.061*	0.035	0.062*	0.039	0.047*	0.050**
	(0.026)	(0.022)	(0.025)	(0.022)	(0.017)	(0.017)
Health	-0.002	0.001	-0.001	0.001	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.011	-0.003	-0.013	-0.002	-0.007	-0.006
	(0.017)	(0.013)	(0.017)	(0.013)	(0.010)	(0.010)
Gross Pers. Inc.	0.014*	0.003	0.014*	0.003	0.012*	0.011*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)
Constant	3.719**	1.488*	3.593**	1.519*	2.535**	2.495**
	(0.904)	(0.621)	(0.884)	(0.627)	(0.527)	(0.524)
Observations	1235	1402	1247	1405	2637	2652
Adjusted R^2	0.041	0.006	0.041	0.006	0.030	0.030

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.

Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S8: Robustness Test 4d: Corrected Sample with Mean 2D:4D (OLS)

	Men	Women	Both
Mean 2D:4D	-0.329*	-0.077	-0.195
	(0.164)	(0.148)	(0.110)
Female			-0.018
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.007	-0.030*	-0.020
	(0.018)	(0.015)	(0.011)
Oth. Higher Educ.	0.028	0.003	0.015
	(0.023)	(0.017)	(0.014)
College	0.061*	0.036	0.047*
	(0.026)	(0.022)	(0.017)
Health	-0.002	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.012	-0.003	-0.007
	(0.017)	(0.013)	(0.010)
Gross Pers. Inc.	0.014*	0.003	0.012*
	(0.006)	(0.007)	(0.005)
Constant	3.885**	1.574*	2.650**
	(0.914)	(0.635)	(0.536)
Observations	1228	1394	2622
Adjusted R^2	0.042	0.006	0.031

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

Table S9: Robustness Test 4e: Restricted Sample (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.196	-0.004			-0.091	
	(0.155)	(0.118)			(0.095)	
L2D:4D			-0.195	-0.056		-0.122
			(0.149)	(0.124)		(0.096)
Female					-0.019	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.009	-0.030*	-0.009	-0.030*	-0.020	-0.021
	(0.019)	(0.015)	(0.018)	(0.015)	(0.011)	(0.011)
Oth. Higher Educ.	0.028	0.003	0.026	0.003	0.014	0.014
	(0.023)	(0.017)	(0.023)	(0.017)	(0.014)	(0.014)
College	0.060*	0.036	0.063*	0.036	0.047*	0.049**
	(0.025)	(0.022)	(0.026)	(0.022)	(0.017)	(0.017)
Health	-0.002	0.001	-0.001	0.002	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.011	-0.003	-0.013	-0.004	-0.007	-0.007
	(0.017)	(0.013)	(0.017)	(0.013)	(0.010)	(0.010)
Gross Pers. Inc.	0.014*	0.003	0.014*	0.003	0.011*	0.011*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.005)	(0.005)
Constant	3.765**	1.515*	3.642**	1.515*	2.565**	2.523**
	(0.915)	(0.623)	(0.903)	(0.633)	(0.532)	(0.533)
Observations	1230	1400	1235	1389	2630	2624
Adjusted R^2	0.041	0.006	0.041	0.006	0.030	0.030

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.

Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S10: Robustness Test 4f: Restricted Sample with Mean 2D:4D (OLS)

	Men	Women	Both
Mean 2D:4D	-0.293	-0.042	-0.159
	(0.190)	(0.159)	(0.123)
Female			-0.018
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.007	-0.030*	-0.020
	(0.019)	(0.015)	(0.012)
Oth. Higher Educ.	0.029	0.003	0.015
	(0.023)	(0.017)	(0.014)
College	0.062*	0.036	0.048*
	(0.026)	(0.022)	(0.017)
Health	-0.002	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.013	-0.004	-0.008
	(0.017)	(0.013)	(0.011)
Gross Pers. Inc.	0.014*	0.004	0.011*
	(0.006)	(0.007)	(0.005)
Constant	3.969**	1.576*	2.691**
	(0.941)	(0.643)	(0.548)
Observations	1211	1377	2588
Adjusted R^2	0.042	0.006	0.031

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

Table S11: Robustness Test 5a: Primary Hypotheses without Self-employed Farmers

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.705	-0.478			-1.723	
	(2.050)	(2.369)			(1.533)	
L2D:4D			-2.108	-0.663		-1.406
			(1.587)	(1.614)		(1.135)
Female					-0.292	-0.267
					(0.163)	(0.162)
Year of Birth	-0.024**	-0.017*	-0.023**	-0.017*	-0.021**	-0.021**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.412	-0.924	-1.437	-0.917	-1.020*	-1.025*
	(1.024)	(0.541)	(1.024)	(0.540)	(0.471)	(0.471)
Oth. Higher Educ.	0.313	0.095	0.294	0.109	0.213	0.211
	(0.289)	(0.307)	(0.289)	(0.307)	(0.210)	(0.210)
College	0.675*	0.532	0.699**	0.591	0.612**	0.645**
	(0.244)	(0.307)	(0.244)	(0.304)	(0.189)	(0.188)
Health	-0.014	0.020	0.004	0.016	0.004	0.011
	(0.121)	(0.129)	(0.120)	(0.129)	(0.088)	(0.088)
Urban	-0.093	-0.060	-0.102	-0.038	-0.078	-0.072
	(0.209)	(0.240)	(0.209)	(0.239)	(0.157)	(0.157)
Gross Pers. Inc.	0.101**	0.059	0.102**	0.051	0.095**	0.094**
	(0.033)	(0.078)	(0.033)	(0.077)	(0.030)	(0.030)
Constant	47.638**	30.996*	44.452**	30.540*	41.097**	39.337**
	(13.849)	(15.322)	(13.568)	(15.159)	(10.219)	(10.065)
R2D:4D (ME)	-0.213	-0.025			-0.111	
	(0.162)	(0.123)			(0.099)	
L2D:4D (ME)			-0.165	-0.035		-0.091
			(0.124)	(0.085)		(0.073)
Observations	1231	1400	1243	1403	2631	2646
Pseudo R^2	0.069	0.028	0.069	0.029	0.058	0.057
χ^2	51.92	16.79	51.79	17.48	78.82	78.63
p-value	0.000	0.032	0.000	0.025	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S12: Robustness Test 5b: Mean 2D:4D without Self-employed Farmers

	Men	Women	Both
Mean 2D:4D	-3.913	-1.557	-2.781
	(2.297)	(2.403)	(1.654)
Female			-0.284
			(0.163)
Year of Birth	-0.024**	-0.017*	-0.021**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.399	-0.921	-1.015*
	(1.025)	(0.541)	(0.471)
Oth. Higher Educ.	0.316	0.102	0.219
	(0.289)	(0.307)	(0.210)
College	0.688**	0.537	0.620**
	(0.244)	(0.306)	(0.189)
Health	-0.009	0.026	0.009
	(0.121)	(0.129)	(0.088)
Urban	-0.106	-0.060	-0.083
	(0.209)	(0.240)	(0.157)
Gross Pers. Inc.	0.101**	0.060	0.095**
	(0.033)	(0.078)	(0.030)
Constant	48.340**	32.007*	42.030**
	(13.757)	(15.349)	(10.201)
Mean 2D:4D (ME)	-0.309	-0.081	-0.181
	(0.182)	(0.126)	(0.108)
Observations	1224	1392	2616
Pseudo R^2	0.071	0.029	0.059
χ^2	53.18	17.19	80.53
p-value	0.000	0.028	0.000

Logit regressions; standard errors in parentheses;

* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

Table S13: Robustness Test 5c: Corrected Sample without Self-employed Farmers

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.962	0.062			-1.573	
	(2.222)	(2.428)			(1.626)	
L2D:4D			-3.232	-1.282		-2.348
			(2.022)	(2.210)		(1.482)
Female					-0.291	-0.259
					(0.163)	(0.162)
Year of Birth	-0.024**	-0.017*	-0.023**	-0.017*	-0.021**	-0.021**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.419	-0.923	-1.443	-0.916	-1.021*	-1.026*
	(1.024)	(0.541)	(1.024)	(0.540)	(0.471)	(0.471)
Oth. Higher Educ.	0.311	0.096	0.291	0.112	0.213	0.212
	(0.289)	(0.307)	(0.289)	(0.307)	(0.210)	(0.210)
College	0.675*	0.531	0.691**	0.592	0.612**	0.642**
	(0.244)	(0.307)	(0.244)	(0.303)	(0.189)	(0.188)
Health	-0.012	0.019	-0.001	0.017	0.005	0.010
	(0.121)	(0.129)	(0.120)	(0.129)	(0.088)	(0.088)
Urban	-0.090	-0.060	-0.108	-0.038	-0.078	-0.076
	(0.209)	(0.240)	(0.209)	(0.239)	(0.157)	(0.157)
Gross Pers. Inc.	0.101**	0.060	0.103**	0.050	0.095**	0.095**
	(0.033)	(0.078)	(0.033)	(0.077)	(0.030)	(0.030)
Constant	47.425**	30.561*	45.772**	31.082*	40.757**	40.222**
	(13.802)	(15.311)	(13.653)	(15.219)	(10.198)	(10.112)
R2D:4D (ME)	-0.233	0.003			-0.102	
	(0.175)	(0.126)			(0.105)	
L2D:4D (ME)			-0.252	-0.067		-0.152
			(0.158)	(0.116)		(0.096)
Observations	1231	1400	1243	1403	2631	2646
Pseudo R^2	0.069	0.028	0.070	0.029	0.058	0.058
χ^2	51.93	16.75	52.66	17.64	78.48	79.62
p-value	0.000	0.033	0.000	0.024	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S14: Robustness Test 5d: Corrected Sample with Mean 2D:4D without Self-employed Farmers

	Men	Women	Both
Mean 2D:4D	-4.815	-2.109	-3.574
	(2.587)	(2.839)	(1.904)
Female			-0.279
			(0.163)
Year of Birth	-0.024**	-0.017*	-0.021**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.415	-0.919	-1.017*
	(1.025)	(0.541)	(0.471)
Oth. Higher Educ.	0.315	0.105	0.221
	(0.289)	(0.307)	(0.210)
College	0.681*	0.536	0.617**
	(0.244)	(0.306)	(0.189)
Health	-0.011	0.027	0.009
	(0.120)	(0.129)	(0.088)
Urban	-0.105	-0.061	-0.084
	(0.209)	(0.240)	(0.157)
Gross Pers. Inc.	0.101**	0.060	0.096**
	(0.033)	(0.078)	(0.030)
Constant	49.210**	32.407*	42.690**
	(13.822)	(15.393)	(10.238)
Mean 2D:4D (ME)	-0.381	-0.110	-0.232
	(0.205)	(0.149)	(0.124)
Observations	1224	1392	2616
Pseudo R^2	0.072	0.029	0.060
χ^2	53.74	17.31	81.21
p-value	0.000	0.027	0.000

Logit regressions; standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

Table S15: Robustness Test 5e: Restricted Sample without Self-employed Farmers

	Men	Women	Men	Women	Both	Both
R2D:4D	-2.706	-0.317			-1.617	
	(2.131)	(2.412)			(1.594)	
L2D:4D			-2.613	-1.622		-2.201
			(1.965)	(2.166)		(1.450)
Female					-0.294	-0.269
					(0.163)	(0.163)
Year of Birth	-0.024**	-0.017*	-0.024**	-0.017*	-0.022**	-0.021**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)
Below Abitur	-1.412	-0.920	-1.432	-0.920	-1.018*	-1.027*
	(1.024)	(0.541)	(1.024)	(0.541)	(0.471)	(0.471)
Oth. Higher Educ.	0.312	0.095	0.287	0.106	0.213	0.209
	(0.289)	(0.307)	(0.289)	(0.307)	(0.210)	(0.210)
College	0.671*	0.537	0.690**	0.542	0.611**	0.627**
	(0.244)	(0.307)	(0.244)	(0.307)	(0.189)	(0.189)
Health	-0.010	0.019	0.001	0.023	0.005	0.012
	(0.121)	(0.129)	(0.120)	(0.130)	(0.088)	(0.088)
Urban	-0.092	-0.057	-0.105	-0.072	-0.078	-0.091
	(0.209)	(0.240)	(0.209)	(0.240)	(0.157)	(0.157)
Gross Pers. Inc.	0.101**	0.059	0.101**	0.063	0.095**	0.096**
	(0.033)	(0.078)	(0.033)	(0.077)	(0.030)	(0.030)
Constant	47.936**	31.035*	46.199**	31.170*	41.239**	40.604**
	(13.858)	(15.324)	(13.677)	(15.315)	(10.222)	(10.151)
R2D:4D (ME)	-0.214	-0.016			-0.105	
	(0.169)	(0.126)			(0.103)	
L2D:4D (ME)			-0.206	-0.085		-0.143
			(0.155)	(0.114)		(0.094)
Observations	1226	1398	1231	1387	2624	2618
Pseudo R^2	0.069	0.028	0.069	0.029	0.058	0.058
χ^2	51.58	16.80	51.98	17.29	78.59	79.45
p-value	0.000	0.032	0.000	0.027	0.000	0.000

Logit regressions; standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects. Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S16: Robustness Test 5f: Restricted Sample with Mean 2D:4D without Self-employed Farmers

	Men	Women	Both
Mean 2D:4D	-4.038	-1.392	-2.853
	(2.519)	(2.810)	(1.870)
Female			-0.284
			(0.163)
Year of Birth	-0.025**	-0.017*	-0.022**
	(0.007)	(0.008)	(0.005)
Below Abitur	-1.390	-0.922	-1.017*
	(1.025)	(0.541)	(0.471)
Oth. Higher Educ.	0.308	0.096	0.215
	(0.290)	(0.307)	(0.210)
College	0.676*	0.536	0.617**
	(0.244)	(0.307)	(0.189)
Health	-0.007	0.025	0.009
	(0.121)	(0.129)	(0.088)
Urban	-0.108	-0.071	-0.091
	(0.209)	(0.240)	(0.157)
Gross Pers. Inc.	0.100**	0.064	0.095**
	(0.033)	(0.078)	(0.030)
Constant	50.067**	32.147*	43.018**
	(13.883)	(15.385)	(10.259)
Mean 2D:4D (ME)	-0.323	-0.074	-0.187
	(0.202)	(0.149)	(0.123)
Observations	1207	1375	2582
Pseudo R^2	0.071	0.029	0.059
χ^2	52.84	17.34	80.50
p-value	0.000	0.027	0.000

Logit regressions; standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$. (ME) shows marginal effects.

Table S17: Robustness Test 5g: Primary Hypotheses without Self-employed Farmers (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.156	-0.027			-0.098	
	(0.097)	(0.112)			(0.072)	
L2D:4D			-0.170	-0.035		-0.088
			(0.110)	(0.073)		(0.062)
Female					-0.019	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.010	-0.028	-0.012	-0.028	-0.020	-0.021
	(0.018)	(0.014)	(0.018)	(0.014)	(0.011)	(0.011)
Oth. Higher Educ.	0.021	0.004	0.019	0.005	0.012	0.012
	(0.022)	(0.016)	(0.022)	(0.016)	(0.013)	(0.013)
College	0.059*	0.033	0.061*	0.037	0.046*	0.048**
	(0.025)	(0.022)	(0.025)	(0.022)	(0.017)	(0.017)
Health	-0.001	0.001	-0.000	0.001	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.008	-0.003	-0.009	-0.001	-0.005	-0.004
	(0.017)	(0.012)	(0.016)	(0.012)	(0.010)	(0.010)
Gross Pers. Inc.	0.012*	0.003	0.012*	0.003	0.010*	0.010*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)
Constant	3.616**	1.598*	3.418**	1.596*	2.554**	2.467**
	(0.907)	(0.615)	(0.883)	(0.612)	(0.526)	(0.518)
Observations	1231	1400	1243	1403	2631	2646
Adjusted R^2	0.036	0.005	0.036	0.006	0.027	0.027

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.

Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S18: Robustness Test 5h: Mean 2D:4D without Self-employed Farmers (OLS)

	Men	Women	Both
Mean 2D:4D	-0.276	-0.083	-0.168
	(0.141)	(0.111)	(0.088)
Female			-0.018
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.009	-0.028	-0.021
	(0.018)	(0.015)	(0.011)
Oth. Higher Educ.	0.021	0.005	0.013
	(0.023)	(0.017)	(0.013)
College	0.060*	0.034	0.046*
	(0.025)	(0.022)	(0.017)
Health	-0.001	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.009	-0.003	-0.005
	(0.017)	(0.012)	(0.010)
Gross Pers. Inc.	0.012*	0.003	0.010*
	(0.006)	(0.007)	(0.004)
Constant	3.727**	1.659*	2.631**
	(0.919)	(0.623)	(0.533)
Observations	1224	1392	2616
Adjusted R^2	0.037	0.006	0.028

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

Table S19: Robustness Test 5i: Corrected Sample without Self-employed Farmers (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.172	0.000			-0.093	
	(0.108)	(0.118)			(0.078)	
L2D:4D			-0.243	-0.065		-0.145
			(0.143)	(0.132)		(0.097)
Female					-0.019	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.010	-0.028	-0.012	-0.028	-0.021	-0.021
	(0.018)	(0.014)	(0.018)	(0.014)	(0.011)	(0.011)
Oth. Higher Educ.	0.021	0.004	0.019	0.005	0.012	0.012
	(0.022)	(0.016)	(0.022)	(0.016)	(0.013)	(0.013)
College	0.059*	0.033	0.061*	0.037	0.046*	0.048**
	(0.025)	(0.022)	(0.025)	(0.022)	(0.017)	(0.017)
Health	-0.001	0.001	-0.001	0.001	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.008	-0.003	-0.009	-0.001	-0.005	-0.004
	(0.017)	(0.012)	(0.016)	(0.012)	(0.010)	(0.010)
Gross Pers. Inc.	0.012*	0.003	0.012*	0.003	0.010*	0.010*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)
Constant	3.621**	1.576*	3.499**	1.619*	2.544**	2.513**
	(0.903)	(0.614)	(0.883)	(0.618)	(0.524)	(0.520)
Observations	1231	1400	1243	1403	2631	2646
Adjusted R^2	0.036	0.005	0.036	0.006	0.027	0.027

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.

Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S20: Robustness Test 5j: Corrected Sample with Mean 2D:4D without Self-employed Farmers (OLS)

	Men	Women	Both
Mean 2D:4D	-0.332*	-0.111	-0.215*
	(0.163)	(0.147)	(0.108)
Female			-0.018
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.010	-0.028	-0.021
	(0.018)	(0.015)	(0.011)
Oth. Higher Educ.	0.021	0.005	0.013
	(0.023)	(0.017)	(0.013)
College	0.060*	0.034	0.046*
	(0.025)	(0.022)	(0.017)
Health	-0.001	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.009	-0.002	-0.005
	(0.017)	(0.012)	(0.010)
Gross Pers. Inc.	0.012*	0.003	0.010*
	(0.006)	(0.007)	(0.004)
Constant	3.787**	1.679*	2.670**
	(0.913)	(0.626)	(0.532)
Observations	1224	1392	2616
Adjusted R^2	0.037	0.006	0.028

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

Table S21: Robustness Test 5k: Restricted Sample without Self-employed Farmers (OLS)

	Men	Women	Men	Women	Both	Both
R2D:4D	-0.197	-0.019			-0.101	
	(0.154)	(0.117)			(0.095)	
L2D:4D			-0.196	-0.083		-0.137
			(0.147)	(0.123)		(0.094)
Female					-0.019	-0.017
					(0.011)	(0.011)
Year of Birth	-0.002**	-0.001*	-0.002**	-0.001*	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Below Abitur	-0.012	-0.028	-0.012	-0.028	-0.021	-0.021
	(0.018)	(0.014)	(0.018)	(0.015)	(0.011)	(0.011)
Oth. Higher Educ.	0.021	0.004	0.019	0.005	0.012	0.012
	(0.023)	(0.016)	(0.022)	(0.017)	(0.013)	(0.013)
College	0.059*	0.034	0.061*	0.034	0.046*	0.047*
	(0.025)	(0.022)	(0.026)	(0.022)	(0.017)	(0.017)
Health	-0.001	0.001	-0.000	0.002	0.001	0.001
	(0.010)	(0.007)	(0.010)	(0.007)	(0.006)	(0.006)
Urban	-0.008	-0.002	-0.009	-0.003	-0.005	-0.005
	(0.017)	(0.012)	(0.017)	(0.013)	(0.010)	(0.010)
Gross Pers. Inc.	0.012*	0.003	0.012*	0.004	0.010*	0.010*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.005)	(0.004)
Constant	3.665**	1.602*	3.547**	1.615*	2.575**	2.539**
	(0.914)	(0.617)	(0.902)	(0.624)	(0.529)	(0.529)
Observations	1226	1398	1231	1387	2624	2618
Adjusted R^2	0.036	0.005	0.036	0.006	0.027	0.028

OLS regressions; robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.005$.

Right and left 2D:4D's are represented by R2D:4D and L2D:4D respectively.

Table S22: Robustness Test 5l: Restricted Sample with Mean 2D:4D without Self-employed Farmers (OLS)

	Men	Women	Both
Mean 2D:4D	-0.296	-0.075	-0.179
	(0.188)	(0.158)	(0.122)
Female			-0.019
			(0.011)
Year of Birth	-0.002**	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)
Below Abitur	-0.011	-0.028	-0.021
	(0.019)	(0.015)	(0.012)
Oth. Higher Educ.	0.021	0.004	0.013
	(0.023)	(0.017)	(0.014)
College	0.060*	0.034	0.047*
	(0.026)	(0.022)	(0.017)
Health	-0.001	0.002	0.001
	(0.010)	(0.007)	(0.006)
Urban	-0.009	-0.003	-0.005
	(0.017)	(0.013)	(0.010)
Gross Pers. Inc.	0.012*	0.004	0.010*
	(0.006)	(0.007)	(0.005)
Constant	3.869**	1.679*	2.709**
	(0.940)	(0.634)	(0.544)
Observations	1207	1375	2582
Adjusted R^2	0.037	0.006	0.028

OLS regressions; robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.005$.

3 Exploratory analyses

Table S23: Exploratory Analysis: Gender Effect Tests

	Full Sample	Corrected	Restricted
	Coefficient Difference		
R2D:4D	0.144	0.187	0.192
	(0.148)	(0.161)	(0.194)
L2D:4D	0.149	0.204	0.139
	(0.133)	(0.197)	(0.194)
Mean 2D:4D	0.216	0.253	0.252
	(0.182)	(0.221)	(0.248)
	Z-tests		
R2D:4D	0.969	1.161	0.987
L2D:4D	1.120	1.037	0.714
Mean 2D:4D	1.188	1.142	1.013

Notes: Top panel shows 2D:4D coefficient differences between men and women, based on OLS models. Standard errors in parentheses. Bottom panel presents z-scores.

Table S24: Exploratory Analysis: Gender Effect Tests (Without Self-employed Farmers)

	Full Sample	Corrected	Restricted
	Coefficient Difference		
R2D:4D	0.128	0.172	0.178
	(0.148)	(0.160)	(0.193)
L2D:4D	0.135	0.178	0.113
	(0.132)	(0.195)	(0.192)
Mean 2D:4D	0.193	0.221	0.221
	(0.180)	(0.219)	(0.246)
	Z-tests		
R2D:4D	0.870	1.073	0.920
L2D:4D	1.028	0.913	0.589
Mean 2D:4D	1.073	1.009	0.898

Notes: Top panel shows 2D:4D coefficient differences between men and women, based on OLS models. Standard errors in parentheses. Bottom panel presents z-scores.

4 Minimum detectable effect size (power)

Table S25: Minimum Detectable Effect Sizes

Sample:	FS	FS	CS	CS	RS	RS
Confidence Interval:	%0.05	%0.5	%0.05	%0.5	%0.05	%0.5
(M) R2D:4D	0.021	0.016	0.022	0.017	0.027	0.020
(W) R2D:4D	0.020	0.016	0.021	0.016	0.021	0.016
(M) L2D:4D	0.025	0.019	0.028	0.021	0.029	0.022
(W) L2D:4D	0.020	0.015	0.026	0.020	0.025	0.019
(All) R2D:4D	0.015	0.011	0.015	0.011	0.017	0.013
(All) L2D:4D	0.016	0.012	0.019	0.015	0.019	0.014
(M) Mean 2D:4D	0.025	0.019	0.026	0.020	0.028	0.022
(W) Mean 2D:4D	0.020	0.016	0.023	0.017	0.024	0.019
(All) Mean 2D:4D	0.016	0.012	0.017	0.013	0.019	0.014

Notes: FS is the full sample, CS is the corrected sample, RS is the restricted sample; (M) is the abbreviation of men and (W) is of women. Right and left 2D:4D's are shown as R2D:4D and L2D:4D.