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Happiness of economists

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Happiness of Economists*

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Abstract

This study investigates the determinants of economists' life satisfaction. The analysis is based on a survey of professional, mostly academic economists from European countries and beyond. We find that certain features of economists' professional situation influence their well-being. Happiness is increased by having more research time while the lack of a tenured position decreases satisfaction in particular if the contract expires in the near future or cannot be extended. Surprisingly, publication success has no effect on satisfaction. While the perceived level of external pressure also has no impact, the perceived change of pressure in recent years has. Economists may have accepted a high level of pressure when entering academia but do not seem to be willing to cope with the increase observed in recent years.

Keywords: Happiness, academic labor market, extrinsic and intrinsic motivation, publish or perish-culture
JEL-Codes: I31, A11, J28

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1 Introduction

Working in academia differs from conventional employment. An academic career provides few pecuniary advantages. Salary is relatively low and occupational uncertainty is higher than elsewhere. An important extrinsic motivation is to be the first to make a discovery and therefore obtain recognition from one's peers (Merton 1957). A considerable part of the reward of doing academic work is assumed to derive from puzzle-solving (e.g., Kuhn 1962; Stephan 2012). Researchers benefit, e.g., from high autonomy and flexibility in working hours. The winner-take-all nature of scientific contests, however, also puts strong pressure on researchers to be successful in discovering new phenomena and publish the results in established journals. Economists have shown an increasing interest in studying the determinants of life satisfaction (e.g., Dolan et al. 2008) on the one hand, and their own behavior (e.g., Kirchgaessner 2005) on the other. To the authors' knowledge, however, so far no study analyzes how economists' professional situation affects their satisfaction with life. Happiness research instead emphasizes average happiness in the general population (e.g., Frey and Stutzer 2001).

The aim of this study is to analyze the importance of economists' professional situation toward their well-being. The analysis is based on a unique data set containing information on the general life satisfaction, the professional situation, and the perception of the research environment. The data has been gathered in an online survey of professional, mostly academic economists from mainly European countries. We hypothesize that extrinsic and intrinsic rewards, measured by the respondent's publication success and the fraction of time available for research, increase satisfaction. Occupational uncertainty in terms of a position without tenure or subjective publication pressure are expected to have the opposite effect.

According to our survey, economists report to be highly happy with life. On average, the survey participants' response to the question "Generally speaking, how satisfied are you with the life you lead?" is 4.6, given a scale which ranges from 1=highly dissatisfied to 6=highly satisfied. The empirical analysis shows that features of the occupational situation indeed affect economists' well-being. Economists' happiness is increased by having more research time. Not having tenure decreases satisfaction. Distinguishing by contract terms, however, reveals that the effect is only statistically significant for those whose contract expires in the near future or cannot be extended. Publication success has no effect on satisfaction. While the perceived level of external pressure also has no impact, the perceived change of pressure in recent years has. Economists may have accepted a high level of pressure when entering academia but do not seem to be willing to cope with the increase observed in recent years. A high level of subjective publication pressure tends to crowd out the positive effect of a high fraction of research time and fuel the negative effect of not having tenure.

We study a specific subset of social scientists. Our analysis does not allow a direct assess-

ment of whether the results also apply to researchers from other disciplines. The results of previous analyses of academics' job satisfaction are, however, largely similar. We believe that the results should extend to apply to researchers from related disciplines.

Our results contribute to the happiness literature by showing that when a narrowly defined subgroup of the population is studied, life satisfaction does not differ by gender and age. The review of previous literature by Dolan et al. (2008) comes to this conclusion with respect to gender. In studies of the general population's happiness, basic socio-demographic characteristics seem to capture omitted variables. Our results contribute to labor market economics by showing that researchers' job insecurity matters in particular if the contract implies imminent and final expiration of the current employment relationship. While previous literature comes to a similar conclusion with respect to the general labor market, our study is the first showing that this also applies to the academic labor market. The system of tenure creates occupational uncertainty that is higher than the one in a typical corporation. Perceived insecurity seems to be more important than actual insecurity even under these conditions.

The paper is structured as follows. Section 2 reviews previous literature and develops hypotheses. The data and the empirical analysis are described in section 4. Section 5 concludes.

2 Previous literature and hypotheses

It has been well established that people do not work merely for the money (e.g., Frey 1997). As described in the "Self-Determination Theory" by Deci and Ryan (1985), autonomy is another important factor. This applies in particular to occupational groups with a "work preference," such as researchers, who are assumed to derive satisfaction rather than dissatisfaction, as supposed by standard economic theory, from the process of work itself (Throsby 1994). More precisely, scientists are assumed to be motivated by three factors: money, recognition by peers, and the ability to solve puzzles (Stephan 2012).

The economic approach to human behavior focuses on extrinsic motivation. Income, recognition, reputation or winning in a competition are assumed to increase utility (e.g., Becker 1976). Extrinsic motivation should also be important to economists. The reward system in science, however, assigns a limited role to monetary compensation. Academia is characterized by a rigid salary system in which pay is relatively low (Stephan 2012). Scientists seem to tolerate the relatively flat shape of the earnings profile. Economists surveyed in the Economics Job Market Report rate salary as only the fourth most important factor when choosing a job (Inomics 2012). Stern (2004) finds that researchers indeed forego monetary compensation for working in a job related to research. The evidence provided by Roach and Sauermann (2010) suggests that PhD scientists concerned with salary are more likely to sort into industry than into academia. The relationship between researchers' income and job satis-

faction is also unclear. While Ward and Sloane (2000) find an insignificant effect, Bender and Heywood (2006) find a positive relationship. Although scientists are certainly not immune to monetary rewards, this does not seem to be their central motivation.

In the winner-take-all market of academia, an important extrinsic reward is to be the first to make a discovery and therefore obtain recognition from one's peers (Merton 1957). As pointed out by Dasgupta and David (1994), acknowledgment by colleagues is the "fundamental 'currency' in the reward structure". Stephan (2012) provides several examples and strategies of researchers striving after recognition for a discovery. Edelman and Larkin (2009) show that researchers "game" the Social Science Research Network (SSRN) to gain the status of being author of a top 10-downloaded paper.

Recognition, however, is not only an end in itself. Publications are crucial for survival in academia (e.g., Graber and Walde 2008). Several papers analyze how the quantity and quality of economists' publication record translate into salary (e.g., Hamermesh et al. 1982; Hamermesh and Pfann 2011). The studies focus on the US. In Europe, at least historically, performance had virtually no effect on salary and position (Frey and Eichenberger 1993). In an attempt to increase scientists' output, however, several countries recently introduced cash bonuses for published articles (Franzoni et al. 2011).

A better publication record should therefore, for multiple reasons, increase researchers' satisfaction. One might, however, also argue that a higher level of satisfaction increases productivity (e.g., Boehm and Lyubomirsky 2008). While the literature studying this relationship is ambiguous, empirical evidence attributes a strong chance element to successful publication (e.g., Cole et al. 1981; Neff and Olden 2006; Osterloh and Frey 2011). Following this reasoning, the presumed causality goes from publication success to life satisfaction, and not in the reverse direction.

Hypothesis 1 (H1): Economists' satisfaction is positively related to publication success.

A considerable part of the reward of doing academic work is assumed to derive from puzzle-solving (e.g., Stephan 2012). As put by Kuhn (1962, p. 36) "Bringing a normal research problem to a conclusion is achieving the anticipated in a new way, and it requires the solution of all sorts of complex instrumental, conceptual, and mathematical puzzles. The man who succeeds proves himself an expert puzzle-solver, and the challenge of the puzzle is an important part of what usually drives him on." The Economics Job Market Report reveals that time to conduct own research is the most important factor for economists when choosing a job (Inomics 2012). Roach and Sauermann (2010) show that PhDs sort into sectors by their "taste for science". PhDs in science and engineering fields that, e.g., assign higher importance to the freedom to choose projects, prefer to work in academia over a career in industry. Bender and Heywood (2006) show that job satisfaction of US PhD graduates is increased by a close

relationship between job and degree (as assessed by respondents). Scientists who report that their primary activity at work is doing research report a higher job satisfaction compared to those whose main activity is managing or computer work. No difference is found with respect to those whose primary activity is teaching.

Hypothesis 2 (H2): Economists' satisfaction is positively related to the share of time available for doing research.

The reward system in science may, however, also have adverse effects on economists' satisfaction. The winner-take-all nature of the market creates high pressure to be successful. If researchers get the impression that all that matters is publishing in a top-journal independent from the article's content, their satisfaction may suffer. Miller et al. (2011) find that subjective publication pressure is negatively related to the satisfaction derived from publishing. At the same time, it is found to be positively correlated to a feeling of stress related to publishing and "publication burnout", i.e., feeling exhausted or thinking about leaving academia.

Hypothesis 3 (H3): Economists' satisfaction is negatively related to perceived publication pressure.

A central feature of academic employment is the institution of tenure. An academic career involves an intensive initial screening process - or as McPherson and Winston (1983) put it "an explicit and risky probation that precedes obtaining the guarantee". The institution of tenure is defended by its ability to select the most able researchers. A striking feature of academic employment is the large number of researchers that have to expect not to be allowed to stay. The system creates occupational uncertainty that is much higher than the one in a typical corporation (McPherson and Winston 1983). Evidence suggests that scientists without tenure report significantly lower job satisfaction (Bender and Heywood 2006; Bozeman and Gaughan 2011). Tenure also seems to play a critical role for the job satisfaction of academics relative to non-academics. Academics with tenure report substantially higher job satisfaction than non-academics. Academics without tenure, however, report similar satisfaction (Bender and Heywood 2006).

Hypothesis 4 (H4): Economists' satisfaction is negatively related to occupational uncertainty (not having a tenured position).

3 Data

The analysis is based on a unique data set generated by the authors. The data have been gathered in an online survey which contained questions on economists' research norms, research behavior, perceptions of the research environment, socio-demographics, and satis-

faction with life. The European Economic Association, the German Economic Association (Verein für Socialpolitik), the French Economic Association (Association Française de Science Economique) and the Applied Microeconomic Congress (Journées de Microéconomie Appliquée) kindly allowed us to use their mailing lists. Participants were invited by email. The invitation contained a non-personalized link to the questionnaire which was accessible for eight weeks. A reminder was sent after four weeks. The survey was conducted in three waves which took place in fall 2010, winter 2010 and summer 2011. The analysis is based on information from all three survey waves. A detailed description of the survey's methodology and content can be found in Necker (2012a).

The questionnaire was started 1735 times, 1046 respondents continued until the last page.[1] The response rate ranges from 11 to 17%. The survey focused on scientific misbehavior, i.e., a highly sensitive topic, which may have influenced the willingness to participate. An analysis shows that the sample is representative of the population (Necker 2012a,b). The latter two survey waves contained a randomization procedure which skipped the section on own behavior for one sixth of the respondents (to check whether inquiring own behavior influenced other responses). Since information from this section is employed in the analysis, these 112 observations are discarded. This leaves us with responses from 934 participants.

Although item non-response rates are rather low, deleting observations with missing values results in an up to 14% smaller sample available for the empirical analysis. Complete-case analysis discards all information contained in non-missing values of these observations. It might lead to an efficiency loss due to smaller sample size and biased inference when remaining complete cases are not representative of the population of interest. Complete-case analysis has been found to be an acceptable approach if the fraction of incomplete cases is below 5% (Schafer 1997). An alternative is to fill in the missing values by a statistically sound procedure. The missing data are imputed using an iterative multiple imputation (MI) procedure (multiple imputation using chained equations). The objective of MI is to handle missing data in a way resulting in valid statistical inference - not to predict missing values as close as possible to the true ones (Rubin 1987, 1996). In contrast to single imputation methods (e.g., mean imputation), MI allows the uncertainty due to imputation be reflected in subsequent analyses of the data. Five complete data sets are created. They are used separately for the analysis and results are combined using Rubin's rule, i.e., such that they reflect uncertainty due to imputation. The details of the imputation procedure are explained in section A in the appendix.

Individuals from all parts of the world participated in the survey. It has to be taken into account, however, that two of the three invitations were sent out by national organizations of economists. This is the reason why Germans and French form a large majority of the sample (66% with respect to citizenship or 60% with respect to the location of their workplace). Table

[1] Additional 54 indicated that they already participated in an earlier wave. They were forwarded to the last page.

1 contains summary statistics of the sample.

4 Empirical Analysis

4.1 Empirical approach

Our aim is to analyze the relationship between economists' professional situation and their well-being. Studies of occupational groups often deal with job satisfaction (e.g., Benz and Frey 2008; Steiner and Schneider 2012). Fisher (2010), however, points out that "happiness at work is far more than job satisfaction". As discussed in section 2, this should be particularly true for researchers. To capture all dimensions of happiness related to researchers' work, the questionnaire included the question "Generally speaking, how satisfied are you with the life you lead?" Participants were asked to indicate their response on a scale ranging from 1 "highly unsatisfied" to 6 "highly satisfied". The question corresponds to those employed in large scale surveys, e.g., the Eurobarometer (4-point scale) or the European Value Survey (10-point scale).[2]

From a statistical point of view, economists' life satisfaction is a latent variable, y_i^*. It is measured by the ordinal variable $y_i = m$ if $\tau_{m-1} \leq y^* \leq \tau_m$ for $m = 1, ..., 6$ with τ_m as thresholds dividing y_i^* into the categories. When the latent variable crosses the threshold τ_m, the observed category changes. The structural model is given by

$$y_i^* = \beta_0 + \beta_1 \text{Publications}_i + \beta_2 \text{Research Time}_i + \beta_3 \text{Pressure}_i + \beta_4 \text{Tenure}_i + \beta_5 X_i + \epsilon \quad (1)$$

The survey requested respondents' publication record in the past three years (0 (reference group), 1, 2, 3-4, 5-7, more than 8) which allows us to test the hypothesis that publication success increases happiness. To measure the quality of the publications, we include a binary variable which is one, zero otherwise, if the respondent published in the American Economic Review, Quarterly Journal of Economics, Journal of Political Economy, Econometrica, or Review of Economic Studies in the past three years. It should be noted that the publication record refers to the past while happiness refers to the time of the survey. This helps to identify a causal effect from publications to happiness, rather than the other way around. The survey also requested economists' proportion of time available for doing research which allows us to test the second hypothesis. Response possibilities were a share of less than 25% (reference group), 25-49%, 50-75% or more than 75%. Furthermore, the perceived publication pressure was inquired. Economists were asked whether they perceive publication pressure at all and in

[2]The number of response possibilities provided in the different surveys ranges from three to eleven (Dolan et al. 2008).

case of an affirmative answer, to report the intensity on a scale from 1 ("very low") to 6 ("very high"). Due to the low frequency of individuals that perceive no or low publication pressure (intensity 1 to 3), we group those respondents in one category. The reference group is "very high". To analyze the impact of tenure, we include a dummy that is one if the individual reports to have a limited contract.

The vector X captures further control variables. Previous studies show that happiness varies with socio-demographic characteristics. The happiness distribution conditional on age is found to correspond to a U-curve. While women tend to report higher life and job satisfaction (e.g., Frey and Stutzer 2001; Dolan et al. 2008), Ward and Sloane (2000) find that job satisfaction of academics does not differ by gender. We include a dummy for gender and dummies for the age/cohort. To control for the occupational position, we include the academic rank (professor (reference group), assistant professor, PhD, researcher, other position) and the employer (university (reference group), other higher education institution, research institute, other). We include dummies for the country/region of origin (reference group: Germany) to control for differences in culture.[3] Wave dummies capture the effect of different timing of the surveys. Summary statistics of all control variables can be found in table 1.

The data do not provide information on some variables frequently considered in happiness research. The homogeneity of the sample, however, obviates the need to control for several variables, e.g., education (as also argued by Ward and Sloane 2000). As pointed out in section 2, monetary compensation is expected to be less important to researchers. Information on basic income was not requested in the survey. Monetary rewards related to academic success are to some extent captured by the number of publications. We know that salary in academia depends on age, academic position (e.g., Stephan 2012), and country of workplace which are included in the set of controls.

We first include each (set of) variable(s) used for testing the four hypotheses individually. Second, we jointly include the variables. The ordinal nature of the dependent variable suggests the use of ordered probit estimation. We estimate the model using this method and report average marginal effects for the highest satisfaction level. Much of the happiness literature treats the dependent variable as cardinal and uses ordinary least squares (OLS) regression analysis (Frey and Stutzer 2001; Ferrer-i Carbonell and Frijters 2004). We also report results from the full specification using OLS. The five multiply imputed complete data sets are used separately for the analysis. We report averages of the estimates, the results are combined using

[3] It is controlled for country if more than 20 observations are available. Otherwise countries are grouped by geographical proximity.

Rubin's rule.[4,5]

4.2 Economists' satisfaction - descriptive statistics

Economists tend to report a high level of life satisfaction. Figure 1 shows the distribution of responses. The mean response is 4.6 with a standard deviation of 1.2.[6] The coefficient of variation is 25.5, the skewness is -1.0. The data do not allow making a direct comparison to other populations. Suggestive evidence can be gathered by comparing the distribution of responses in our survey to the one obtained in other surveys. The European Value Surveys (EVS) provide data on life satisfaction in Europe. The EVS asks "All things considered, how satisfied are you with your life as a whole these days?" (dissatisfied 1-satisfied 10). The mean response in 2008, i.e., the most recent wave, is 6.7, the standard deviation is 2.3. The coefficient of variation is 33.3. It is plausible that the dispersion of responses is lower in our sample. The general population is much more heterogeneous than the sample of economists who have, e.g., similar education. The skewness is - 0.75, suggesting a slightly lower happiness in the general population than economists surveyed in our sample (-1.0). The distribution of economists' satisfaction, however, seems to be largely similar to that of other populations.

4.3 Baseline results

Table 2 reports average marginal effects on the probability to report being "highly satisfied" calculated from an ordered probit regression of equation (1). The evidence suggests that economists' publication success is unrelated to their life satisfaction. Compared to respondents without a refereed publication, respondents with any positive publication record do not have a higher probability to be "highly satisfied". The quality of a respondent's publications, i.e., a publication in one of the top-journals of the discipline, also does not appear to matter. The marginal effects are statistically insignificant whether they are included without the other variables of interest (model (1)) or with them (model (5)). The first hypothesis must therefore be rejected. A possible explanation is that publications per se do not increase satisfaction; rather, the credit received due to those publications, e.g., high reputation or a large number of citations, does.

The fraction of time available to do research is positively and statistically significantly related to life satisfaction as shown in columns (2) and (5) of table 2. The relationship is not

[4]The MI estimate of β, the vector of parameters of interest, is $\bar{\beta}_M = \frac{1}{5}\sum_{i=1}^{5}\hat{\beta}_i$. The variance-covariance matrix of $\bar{\beta}_M$ is $T = \bar{U} + (1+\frac{1}{5})B$ where $\bar{U} = \sum_{i=1}^{5}\frac{\hat{U}_i}{5}$ is the within-imputation variance-covariance matrix and $B = \sum_{i=1}^{5}\frac{(\beta_i-\bar{\beta}_M)(\beta_i-\bar{\beta}_M)'}{5-1}$ is the between-imputation variance-covariance matrix .

[5]Results are unchanged if only observed data are used. Available upon request.

[6]The means of life satisfaction in the different waves are 4.6 (EEA), 4.7 (German economic association), 4.5 (French economic associations). The difference between the latter two is significant.

as strong for those reporting 25-50% of time available for research in comparison to those reporting less than 25% of time; the probability of being "highly satisfied" is 4.2%-points higher (statistically significant at the 10%-level). Researchers that have more than 50% of research time, however, report substantially and at the 1%-level statistically significantly higher life satisfaction. Respondents that can use 50-75% of their time for research are 14.4%-points more likely to be "highly satisfied" than researchers with less than 25% of research time. Having even more research time, i.e., more than 75% of one's time, does not additionally increase happiness. The likelihood that a researcher with that amount of research time reports to be "highly satisfied" is 13.7%-points higher (see model (5)). In line with expectations, autonomy seems to be an important factor for economists' satisfaction. The result also supports the conjecture that researchers are motivated by a desire to "solve puzzles". The finding that more than 75% of time for research does not further increase satisfaction suggests that researchers also enjoy other tasks, e.g., sharing their insights with students or colleagues. Bender and Heywood (2006) find that job satisfaction derived from research does not differ from the one derived from teaching.

The perception of a high level of publication pressure seems to be unrelated to life satisfaction as can be seen in columns (3) and (5) of table 2. Compared to those that perceive "very high" publication pressure, those that perceive only "high" publication pressure are 1.5%-points (model (5)) more likely to report to be "highly satisfied". Respondents that perceive a "moderately high" or "no/low" pressure are 5.4 or 6.3%-points, respectively, more likely to be "highly satisfied". Though a negative relationship is suggested, none of the effects is statistically significant at conventional levels. In contrast, occupational uncertainty indeed seems to matter for economists' well-being. Individuals without a tenured position are 6.6%-points less likely to report that they are "highly satisfied," the effect is significant at the 5%-level in the complete model (5). The effect is slightly lower and less significant when the other variables of interest are not included (model (4)). The finding by Bender and Heywood (2006) with respect to job satisfaction thus extends to life satisfaction.

Life satisfaction of economists does not statistically significantly differ by gender which is in line with the result of Ward and Sloane (2000). In their review of the happiness literature, Dolan et al. (2008) also conclude that the gender effect often disappears when specific subsets of the population are examined. Statistically significant differences also cannot be found between the different age groups/cohorts. The marginal effects yet suggest that those born between 1950 and 1970, i.e., 30 to 60 years old, are less satisfied with life than the youngest and oldest age group/cohort. This is the same pattern usually established in studies of the general population's happiness. We find significant differences between respondents with different academic ranks. Economics professors are significantly more happy than every other academic economist. PhD students are 10.7%-points, full time researchers 9.2%-points, and

assistant professors 7.2% less likely to be "highly satisfied" with life. A professorship may provide several amenities beyond tenure, e.g., better pay, high reputation, and responsibility. Compared to those without an academic position ("other position"), however, no significant difference is found.

The results on economists' citizenship are reported graphically in figure 2. The results line up with the established cross-country pattern of happiness. Compared to German economists, Italian, French and researchers from Eastern European countries have a statistically significantly lower probability to report being "highly satisfied" (significant at least at the 5%-level). A similar effect is observed for economists from Spain, Portugal, and Austria; the effects are, however, at most significant at the 10%-level. Researchers from Switzerland, North America and Scandinavian countries tend to be more happy. A fraction of 20% does not work in the country of their citizenship. When we instead control for the location of the respondent's workplace, however, a largely similar pattern is obtained.[7] As can be seen in column (6) of table 2, results are also unchanged if OLS instead of ordered probit is employed.

4.4 Scrutinizing the effect of perceived pressure

Our results suggest that no statistically significant relationship between the level of subjective publication pressure and satisfaction exists. A possible explanation is that academic economists have integrated public pressure as a normal part of their professional life. In recent years, however, the pressure to publish has become even more intense (e.g., Graber and Walde 2008). While economists may have accepted a high level of pressure when entering academia, the perception that it increased beyond their accepted level may decrease their overall satisfaction. The "setpoint theory" of subjective well-being postulates that an individual's happiness tends to a setpoint level established by personality and genetic heritage. Positive and negative life events may shift happiness above or below this setpoint. Hedonic adaptation has usually been assumed to quickly re-establish the equilibrium level. Recent literature, however, takes into account that experienced changes may have long-run-effects (e.g., Easterlin 2006; Diener et al. 2006). We analyze whether the perceived change of pressure has an effect on economists' well-being. Respondents that stated that they perceive publication pressure were asked to assess how the pressure changed over the last decade.[8] We replace the level of pressure with a set of dummies capturing the perceived change in the regression model.

Results are reported in table 3. The reference group are respondents that perceive that publication pressure has "strongly increased". Those that perceive that it has only "increased" are 7%-points more likely to be "highly satisfied" (significant at 1%-level). The probability

[7] Average marginal effects reported in figure A.1 in the appendix. Results on the other variables are unchanged.
[8] 40% perceive that it "strongly increased", 45% that it "increased", 9% that it "slightly increased" and 6% report that it is unchanged or even decreased.

is even higher for those for whom publication pressure has only "slightly increased"; the difference is 10.6%-points (significant at the 5%-level). Those that perceive that the pressure is unchanged or even decreased have a 6.6%-points higher probability; the effect is, however, not statistically significant at conventional levels. We check whether the same applies to the pressure to raise external funds by including the perceived level and change thereof instead of publication pressure in the regressions. As shown in table 3, the level of this type of pressure does not have a significant effect on satisfaction, either. In contrast, the perception of a stronger increase in the pressure to raise external funds is negatively related to the probability to be "highly" satisfied. We conclude that while economists seem to accept a high level of pressure, they suffer from experienced increases of pressure. It was asked about the perceived change over the last decade. In line with the critics of setpoint theory, however, an adaptation to the new environment does not seem to have taken place.

Motivation crowding theory argues that external interventions that are perceived to be controlling crowd out intrinsic motivation (e.g., Frey 1997). It is possible that the perception of a high level of pressure does not influence economists' satisfaction directly but operates by crowding out the positive effect of research time. Individuals that feel pressured to be productive may derive lower utility from their autonomy. We study this question by including interactions of the dummies measuring the level of subjective publication pressure with those measuring research time in the full model shown in column (5) in table 2. As argued by Greene (2008), the process of statistical testing about interaction terms in non-linear models "produces generally uninformative and sometimes contradictory and misleading results". We follow his suggestion to rely on graphical presentations to interpret the results.

In figure 3, the predicted probability of being "highly satisfied" is plotted for individuals with different amounts of research time as a function of the level of subjective publication pressure. Only few individuals perceive no or low publication pressure as reflected in the large confidence intervals. We focus on the results on individuals perceiving at least "moderately high" publication pressure. The figure shows the already established pattern that having more research time increases satisfaction. The probability of being "highly satisfied", however, differs to the largest extent between individuals that perceive only "moderately high" pressure. A narrowing can be observed for those that perceive "high" or "very high" pressure. Our conjecture that a high level of pressure crowds out the positive effect of having more research time seems to be justified.

4.5 Scrutinizing the effect of tenure

Our results suggest that occupational uncertainty in terms of not having tenure decreases economists' satisfaction. Several studies that analyze the relationship between job insecurity and job satisfaction in general find that no general difference in job satisfaction between

permanent and limited-contract workers can be established (e.g., Booth et al. 2002; Origo and Pagani 2009). The relationship seems to depend on the features of the temporary contract. For instance, Ahn and García (2004) find that job satisfaction decreases with the length of the remaining contract. Origo and Pagani (2009) point out that what matters for workers' well-being is perceived security rather than the protection guaranteed by the contract. Workers with a temporary but secure job do not report a statistically significantly lower level of job satisfaction than workers with a permanent contract. We also study whether the effect of not having academic tenure differs by the (perceived) insecurity related to the respondent's position.

First, we analyze whether a more rapidly approaching expiration of the contract puts higher strain on economists. Respondents of our survey provided information on the remaining duration of their current contract. We replace the binary variable, capturing whether the respondent does not have tenure, by a set of dummies indicating if the contract expires within one year, two years, or three or more years in the regression reported in column (5) in table 2.[9] Results are shown in column (1) of table 4. Satisfaction clearly increases with the remaining duration of the contract. Economists whose contracts expire within three or more years are only 4.4%-points less likely to report to be "highly satisfied". Economists whose contracts expire within two years are 6.4%-points less likely to report that level of satisfaction. Neither of the effects is significant at conventional levels. Respondents who face expiration of their contract within the next year, however, are 8.8%-points less likely to report that their satisfaction is "very high", the effect is significant at the 1%-level. Not having tenure seems to cause less worries when the respondent does not face expiration of the contract in the near future.

Similarly, the possibility that the contract can be extended may weaken the negative effect of not having tenure. Respondents were asked whether their contract is renewable.[10] We include two binary variables indicating whether or not the contract can be extended instead of the tenure variable in the regression reported in column (5) in table 2. Results are shown in column (2) of table 4. A statistically significant difference to those that have a tenured position can only be found for those whose contract cannot be extended. These respondents are 6.4%-points less likely to report being "highly satisfied" (significant at the 5%-level). The results suggest that not having academic tenure does not per se decrease researchers' satisfaction but only if it implies immediate uncertainty about the occupational future.

The "publish or perish"-maxim of science may fuel the feeling of job insecurity related to a non-tenured position. An economist who perceives lower publication pressure may suffer less

[9] 18.4% report that their contract expires within the next year, 11.7% within two years, 11.5% within three or more years.

[10] Of those without limited contract, 27.4% report that the contract can, 59.3% that it cannot be extended, 13.3% report that the question "does not apply". Since we do not know the reasons for reporting inapplicability, these observations are dropped from the analysis.

from not (yet) having tenure. It is similarly possible that an economist who already obtained a tenured position may experience a lower decrease in life satisfaction from high perceived publication pressure.[11] We study whether the effect of not having tenure varies with perceived pressure. We include interactions between the dummies measuring subjective publication pressure and the information on whether someone has tenure in the model reported in column (5) in table 2 to study the effect (again relying on graphical presentation).

The predicted probability of being "highly satisfied" is plotted for individuals with and without tenure as a function of the level of subjective publication pressure in figure 4. The probability does not differ between those that perceive no or low publication pressure, however, it should be noted that the probabilities again have large confidence intervals. A difference between those with and without tenure exists at every other level of perceived publication pressure. The figure suggests that the difference slightly widens with perceived pressure. Accordingly, the perception of pressure seems to some extent fuel the negative effect of not having tenure.

5 Conclusion

The paper provides evidence on the determinants of economists' life satisfaction and the consequences of incentives provided in the academic labor market. Considering researchers' satisfaction with life, economics does not seem to be a dismal science as has been claimed. In line with the conjecture that researchers are motivated by a desire to "solve puzzles", we find that economists' happiness is increased by autonomy (having more research time). Occupational uncertainty (in particular imminent or final expiration of the contract) decreases their satisfaction. Publication success and the level of pressure related to it have no effect on satisfaction. While economists seem to take pressure as a normal feature of their occupation, the increase of pressure over the past years seems to harm their satisfaction.

Recent government reforms implemented in many countries aim at increasing output by introducing a premium on published articles (e.g., Franzoni et al. 2011). Our analysis suggests that such incentives have little impact on economists' satisfaction. Other authors discussing incentives to increase researchers' output also question the effectiveness of pay-for-performance programs. Hamermesh and Pfann (2011) recommend that university administrators should pay less for the quantity of publications but rather spend on resources that favor the researcher's and institution's reputation. Frey and Neckermann (2009) discuss the role

[11] A Kolmogorov-Smirnov test for equality of distributions suggests that the hypothesis that the distribution of perceived publication pressure is equal for economists with and without tenure has to be rejected at the 10%-significance level. 81% of economists with tenure perceive "high" or "very high" pressure, the fraction is 87.7 for economists without tenure. While a connection between tenure and perceived publication pressure exists, it is still possible that a researcher without tenure perceives low pressure.

of awards as an incentive instrument. Our results suggest that providing incentives in terms of more research time instead of cash benefits may increase researchers' well-being. If this increases their performance, employees and employers would benefit.

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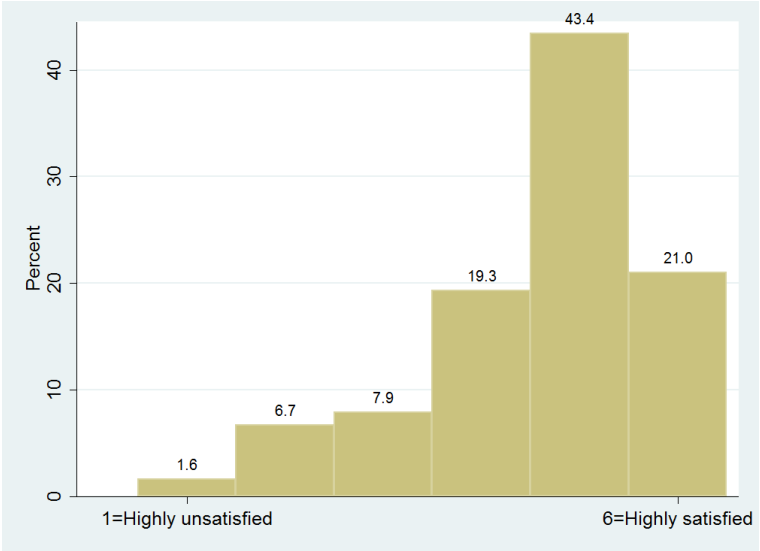
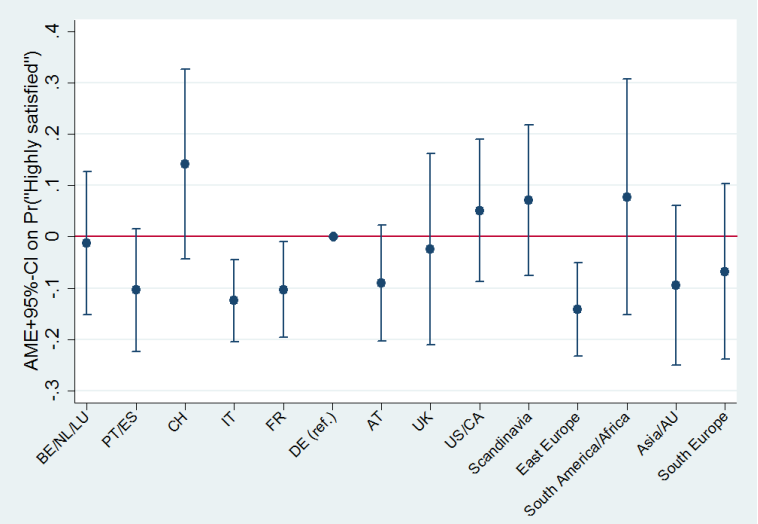
Figures and Tables

Figure 1: Distribution of economists' happiness



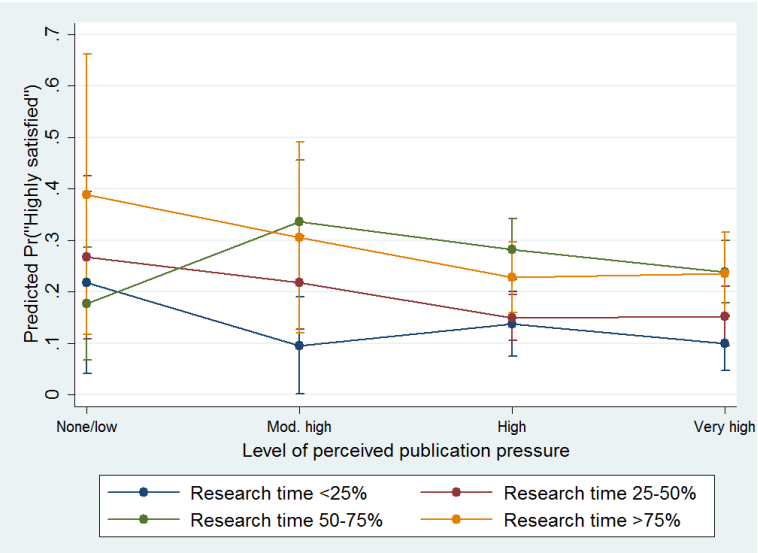
Note: Responses to the question "Generally speaking, how satisfied are you with the life you lead?". Based on observed data=923 observations.

Figure 2: Average marginal effects of origin on being "'highly satisfied'



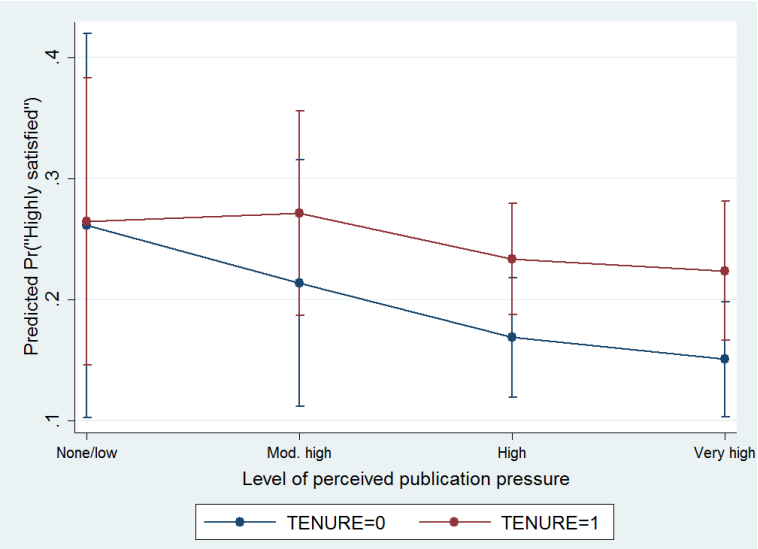
Note: Results from ordered probit regression shown in table 2. Average marginal effects compared to reference group "DE - Germany".

Figure 3: Relationship between subjective pressure and probability to be highly satisfied by research time



Note: Results from ordered probit regression of equation (1) including interactions between pressure and research time.

Figure 4: Relationship between subjective pressure and probability to be highly satisfied by tenure



Note: Results from ordered probit regression of equation (1) including interactions between pressure and tenure.

Table 1: Summary statistics of explanatory variables

Variable	Mean	Std. Dev.
Past 3 year publication success: 0	0.1820	0.3859
Past 3 year publication success: 1	0.1426	0.3497
Past 3 year publication success: 2	0.1394	0.3464
Past 3 year publication success: 3-4	0.2846	0.4513
Past 3 year publication success: 5-7	0.1400	0.3471
Past 3 year publication success: 8+	0.1113	0.3146
Publication in top-journal	0.1051	0.3068
Time research <25%	0.1460	0.3531
Time research 25-50%	0.2801	0.4491
Time research 50-75%	0.3495	0.4769
Time research >75%	0.2244	0.4172
Publication pressure: none/low	0.0653	0.2471
Publication pressure: moderately high	0.1212	0.3264
Publication pressure: high	0.4430	0.4968
Publication pressure: very high	0.3704	0.4830
Publication pressure: none	0.0139	0.1172
Publication pressure: unchanged/decreased	0.0572	0.2322
Publication pressure: slightly increased	0.0867	0.2815
Publication pressure: increased	0.4465	0.4972
Publication pressure: strongly increased	0.3957	0.4891
Pressure external funds: none/low	0.1687	0.3746
Pressure external funds: moderately high	0.2929	0.4552
Pressure external funds: high	0.3786	0.4851
Pressure external funds: very high	0.1597	0.3664
Pressure external funds: none	0.0953	0.2936
Pressure external funds: unchanged/decreased	0.0625	0.2421
Pressure external funds: slightly increased	0.1722	0.3776
Pressure external funds: increased	0.4088	0.4917
Pressure external funds: strongly increased	0.2612	0.4394
Tenured position	0.5837	0.4930
Contract expiration within 1 year	0.1857	0.3889
Contract expiration within 2 years	0.1152	0.3193
Contract expiration within 3+ years	0.1154	0.3196
Male	0.7392	0.4391
Year of birth: >1980	0.2212	0.4151
Year of birth: 1979-1970	0.3576	0.4793
Year of birth: 1969-1960	0.2229	0.4162
Year of birth: 1959-1950	0.1156	0.3198
Year of birth: <1950	0.0827	0.2754
Employer: university	0.6974	0.4594
Employer: other higher education institution	0.0469	0.2114
Employer: research institute	0.1882	0.3909
Employer: other	0.0675	0.2508
Rank: Professor	0.3522	0.4777
Rank: PhD	0.2540	0.4353
Rank: Researcher	0.1752	0.3801
Rank: assistant	0.0959	0.2945
Rank: other	0.1227	0.3281
Citizenship: BE/NL/LU	0.0293	0.1688
Citizenship: PT/ES	0.0368	0.1884
Citizenship: CH	0.0255	0.1576
Citizenship: IT	0.0655	0.2475
Citizenship: FR	0.2253	0.4178
Citizenship: DE	0.4186	0.4934
Citizenship: AT	0.0306	0.1723
Citizenship: UK	0.0171	0.1298
Citizenship: US/CA	0.0285	0.1664
Citizenship: Scandinavia	0.0364	0.1873
Citizenship: East Europe	0.0345	0.1825
Citizenship: South America/Africa	0.0163	0.1265
Citizenship: Asia/AU	0.0206	0.1419
Citizenship: South Europe	0.0150	0.1215
European Economic Association	0.4561	0.4981
German economic association	0.3266	0.4690
French economic associations	0.2173	0.4125

Note: Based on 934 observations, averages of five complete data sets.

Table 2: Baseline regression results

	oprobit (1) "Highly" AME/SE	oprobit (2) "Highly" AME/SE	oprobit (3) "Highly" AME/SE	oprobit (4) "Highly" AME/SE	oprobit (5) "Highly" AME/SE	OLS (6) b/SE
Past 3 yrs. publication success: 0	(ref.)				(ref.)	(ref.)
Past 3 yrs. publication success: 1	0.009				0.020	0.047
	(0.035)				(0.037)	(0.163)
Past 3 yrs. publication success: 2	-0.003				-0.009	-0.057
	(0.036)				(0.037)	(0.168)
Past 3 yrs. publication success: 3-4	0.045				0.034	0.144
	(0.037)				(0.038)	(0.161)
Past 3 yrs. publication success: 5-7	0.055				0.023	0.094
	(0.046)				(0.046)	(0.190)
Past 3 yrs. publication success: 8+	0.070				0.034	0.116
	(0.048)				(0.047)	(0.188)
Top-journal among past 3 yrs. publication success?	0.034				0.020	0.011
	(0.039)				(0.037)	(0.134)
Time research <25%		(ref.)			(ref.)	(ref.)
Time research 25-50%		0.043*			0.042*	0.212
		(0.025)			(0.025)	(0.139)
Time research 50-75%		0.145***			0.144***	0.596***
		(0.028)			(0.028)	(0.139)
Time research >75%		0.125***			0.137***	0.530***
		(0.034)			(0.035)	(0.160)
Publication pressure: none/low			0.060		0.063	0.248
			(0.048)		(0.050)	(0.174)
Publication pressure: mod. high			0.045		0.054	0.211
			(0.036)		(0.036)	(0.131)
Publication pressure: high			0.013		0.015	0.105
			(0.022)		(0.021)	(0.088)
Publication pressure: very high			(ref.)		(ref.)	(ref.)
No tenured position				-0.058*	-0.066**	-0.253**
				(0.031)	(0.032)	(0.129)
Male	0.016	0.018	0.019	0.022	0.012	0.046
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.101)
Year of birth: > 1980	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
Year of birth: $1970 - 79$	-0.021	-0.012	-0.010	-0.023	-0.025	-0.094
	(0.030)	(0.029)	(0.030)	(0.031)	(0.031)	(0.128)
Year of birth: $1960 - 69$	-0.034	-0.002	-0.027	-0.048	-0.035	-0.167
	(0.038)	(0.037)	(0.037)	(0.040)	(0.040)	(0.162)
Year of birth: $1950 - 59$	-0.008	0.011	-0.010	-0.029	-0.015	-0.068
	(0.047)	(0.046)	(0.046)	(0.047)	(0.048)	(0.188)
Year of birth: < 1950	0.017	0.022	0.017	-0.001	-0.007	-0.043
	(0.054)	(0.052)	(0.053)	(0.054)	(0.054)	(0.197)
Rank: Professor	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
Rank: Assistant	-0.078**	-0.118***	-0.101***	-0.078**	-0.072*	-0.263*
	(0.038)	(0.035)	(0.036)	(0.038)	(0.038)	(0.139)
Rank: PhD	-0.103**	-0.166***	-0.144***	-0.111**	-0.107**	-0.413**
	(0.047)	(0.038)	(0.039)	(0.044)	(0.048)	(0.199)
Rank: Researcher	-0.067	-0.111**	-0.094**	-0.085*	-0.092**	-0.332*
	(0.049)	(0.046)	(0.047)	(0.046)	(0.046)	(0.196)
Rank: Other position	-0.063	-0.080*	-0.097**	-0.079*	-0.040	-0.065
	(0.046)	(0.045)	(0.042)	(0.043)	(0.049)	(0.181)
Employer: University	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
Employer: Other higher educ. institution	-0.020	0.000	-0.025	-0.024	-0.004	-0.027
	(0.047)	(0.051)	(0.046)	(0.047)	(0.051)	(0.214)
Employer: Research institution	0.025	0.017	0.028	0.032	0.016	0.068
	(0.034)	(0.034)	(0.035)	(0.035)	(0.034)	(0.136)
Employer: Other employer	0.018	0.041	0.014	0.008	0.025	-0.002
	(0.052)	(0.053)	(0.051)	(0.050)	(0.052)	(0.205)
Country dummies?	YES	YES	YES	YES	see figure 2	YES
Wave dummies?	YES	YES	YES	YES	YES	YES
Wald Chi2 (F in last column)	73.83	101.77	72.09	70.32	111.99	2.93
Pseudo R2 (R2 in last column)	0.026	0.034	0.025	0.026	0.038	0.096
N	934	934	934	934	934	934

Dependent variable is life satisfaction reported on a scale from 1-6. Controls are binary. All 5 imputations are used, results combined using Rubin's rule. Hypothesis tests based on robust standard errors. Measures of fit are the lowest statistic among results from the five imputations. AME=average marginal effect, (ref.)=category is reference group. Significance levels : $*$: 10% $**$: 5% $***$: 1%.

Table 3: Pressure and adaptation

	Publications (1) "Highly" AME/SE	External funds (2) "Highly" AME/SE	External funds (3) "Highly" AME/SE
Level pressure external funds: none/low		0.024	
		(0.037)	
Level pressure external funds: mod. high		0.026	
		(0.033)	
Level pressure external funds: high		0.018	
		(0.029)	
Level pressure external funds: very high		(ref.)	
Other controls as in column (5), table 2?		YES	
Does not perceive pressure	0.035		0.022
	(0.046)		(0.032)
Change pressure: unchanged/decreased	0.066		0.107**
	(0.048)		(0.051)
Change pressure: slightly increased	0.106**		0.063**
	(0.042)		(0.032)
Change pressure: increased	0.070***		0.059**
	(0.021)		(0.023)
Change pressure: strongly increased	(ref.)		(ref.)
Other controls as in column (5), table 2?	YES		YES
Wald Chi2	118.40	109.27	116.78
Pseudo R2	0.042	0.038	0.040
N	934	934	934

Ordered probit. Dependent variable is life satisfaction reported on a scale from 1-6. Controls are binary. All 5 imputations are used, results combined using Rubin's rule. Hypothesis tests based on robust standard errors. Measures of fit are the lowest statistic among results from the five imputations. AME=average marginal effect, (ref.)=category is reference group. Significance levels : $*$: 10% $**$: 5% $***$: 1%.

Table 4: Job insecurity

	(1) "Highly" AME/se	(2) "Highly" AME/se
Tenured position	(ref.)	
Contract expires within...		
one year	-0.088***	
	(0.033)	
two years	-0.064	
	(0.041)	
three or more years	-0.044	
	(0.037)	
Other controls as in column (5), table 2?	YES	
Tenured position		(ref.)
Contract renewable...		
Yes		-0.059
		(0.039)
No		-0.064**
		(0.031)
Other controls as in column (5), table 2?		YES
Wald Chi2	115.56	112.32
Pseudo R2	0.039	0.039
N	934	886

Ordered probit. Dependent variable is life satisfaction reported on a scale from 1-6. Controls are binary. All 5 imputations are used, results combined using Rubin's rule. Hypothesis tests based on robust standard errors. Measures of fit are the lowest statistic among results from the five imputations. AME=average marginal effect, (ref.)=category is reference group. Significance levels : $*$: 10% $**$: 5% $***$: 1%.

Appendix

A Multiple imputation for dealing with item non-response

The survey data are imputed using multiple imputation using chained equations (MICE) (e.g., Van Buuren et al. 1999). Despite its lack of theoretical justification, this is a popular method which is, e.g., used for the imputation of large-scale surveys (e.g., the SAVE study, see Schunk 2008). MICE has the advantage that it can handle variables of varying types and complexities like skip patterns. For each imputation variable X_i an own regression model is defined. Missing values are filled in by running a series of univariate models. The Stata routine "mi impute chained" provides a convenient way to implement the imputation.

The chained equation algorithm starts by initializing missing values using monotone imputation at iteration $t = 0$. The imputation variables $X_i, i = 1, ..., p$ are ordered from the most to the least observed, X_c is a set of complete variables. Each variable is ideally regressed on all other variables, e.g., $\text{logit PR}(X_i = 1) = \beta_i X_{-i}$. At iteration $t = 0$, missing values of a variable X_i are simulated from conditional densities of the form $f_i(X_i|X_1, ..., X_{i-1}, X_c, \beta_i)$ where f_i is determined according to the imputation method and β_i is a set of parameters with uniform prior. From iteration $t = 1$ onwards, missing values are simulated from full conditionals, i.e., $g_i(X_i|X_1, ..., X_{i-1}, X_{i+1}, ..., X_p, X_c, \beta_i)$ where again g_i is determined according to the imputation method. Two types of uncertainty are considered in obtaining imputed values: (1) regression parameters β_i^* are randomly drawn from the posterior distribution of β_i ($\sim \mathcal{N}(\hat{\beta}_i, \hat{V})$), (2) imputed values are randomly drawn from the regression model using the sampled regression parameters β_i^*. The algorithm iterates for a prespecified number of iterations b. Iteration is needed to account for possible dependence of the estimated parameters on the imputed data. The distribution of the parameters is required to have converged ("become stable") until the final imputed values are obtained from the last iteration. The procedure runs independently to obtain m multiple imputations.

Imputation methods have to make assumptions about non-response mechanisms. MICE requires the assumption that the non-response mechanism is ignorable, i.e., the data are missing at random (MAR) and the parameters for the non-response mechanism are unrelated to the parameters of the imputation model. Ignorability implies that no explicit modeling of the non-response mechanism is needed. Missing data is defined to be MAR if the probability that X_i is missing does not depend on the value of X_i if it is controlled for X_{-i}.

$$X_i \text{ is MAR} \rightarrow PR[X_i \text{ is missing}|X_i, X_{-i}] = PR[X_i \text{ is missing}|X_{-i}] \tag{2}$$

The second condition is assumed to be almost always satisfied. It is difficult to test the validity of the MAR assumption because it can only be distinguished from data missing not at random (MNAR) by analyzing the missing data (Cameron and Trivedi 2005). To increase the validity of the assumption, the regression model should contain all variables that are predictive of the probability that X_i is missing.

The three waves of the survey are jointly imputed. The structure of the questionnaire, the type of variables, and the missing rates in each section are shown in table A.1. The missing rate of individual items is rather low in all sections. However, in empirical analyses a reduction of the sample size by up to 14% is observed. In principle all incomplete variables of the data set are imputed. However, open-ended questions or questions in skip patterns for which only few observations are available and which are not used in the empirical analysis are disregarded.

Table A.1: Structure of the questionnaire

Section	Content	Type of variables	Skip pattern/variable	Missing rate
1	Norms	Ordinal	No	$0-2\%$
2	Others' behavior	Ordinal, Binary	Yes: observed others misbehaving?	$0-5\%$
3	Own behavior	Binary, Categorical	Yes: pressure?	$0-4\%$
4	Personal situation	Ordinal, Binary, Categorical	Yes: studied abroad?/publications?	$0-7\%$

The imputation method is logistic regression in case of binary variables, ordered logistic regression in case of ordinal variables, and multinomial logistic regression in case of categorical variables. Each univariate model includes as many variables as possible. It is, however, not feasible to include all variables. As pointed out by Van Buuren et al. (1999), the increase in explained variance is usually negligible after the 15 best variables have been included. The selection of predictor variables is made according to the following strategy:

- In all models: Include complete variables Z (skip variables)
- Section 1 - Norms: include all other variables from the section, variables capturing the respondent's personal situation, own behavior w.r.t. that practice, expected others' behavior, pressure, probability of detection.
- Section 2a - Expected others' behavior: include all other variables from the subsection, norms, own behavior, variables capturing the respondent's personal situation, pressure.
- Section 2b - Observed others' behavior (= conditional on having observed misbehavior): include all other variables from the subsection, norms, variables capturing the respondent's personal situation, pressure.
- Section 2c - Probability of detection: norms, own behavior, variables capturing the respondent's personal situation.
- Section 3a - Own behavior: include all other variables from the subsection, variables capturing the respondent's personal situation, norm w.r.t. that practice, expected others' behavior, pressure, probability of detection.
- Section 3b - Pressure (= conditional on perception of pressure): include all other variables from the subsection, norms, own behavior, variables capturing the respondent's personal situation.
- Section 4a - Personal situation: all other variables capturing the respondent's personal situation.
- Section 4b - Happiness: all other variables capturing the respondent's personal situation, norms, own behavior, expected others' behavior, pressure, probability of detection.
- In case of non-convergence: delete among variables that are closely related

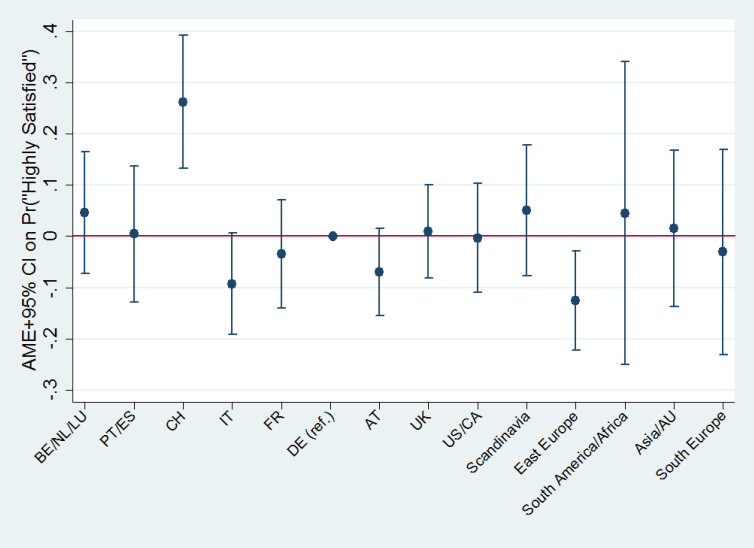
Some response options of the given scales were chosen by a low fraction. The respective variables are transformed by combining neighboring categories with few observations (as is also done for the empirical analysis). Following White et al. (2010), ordinal explanatory variables are included as linear while categorical variables are included as a set of dummies. In some multinomial logit regressions, perfect prediction causes a problem. While the issue is usually resolved by discarding the perfectly predicting observations and covariate from the analysis, their elimination during the imputation conflicts with the requirement that all variables and cases are included. The solution suggested by White et al. (2010) is employed. Following their approach, the data are augmented by adding a few extra observations with small weights that prevent perfect prediction.

As MICE is an iterative procedure, it is important that the means of regression parameters/imputed values are stable. Convergence is assessed by graphically investigating the development of summaries of the imputed values (means, standard deviations) over 100 iterations. The trace plots show no apparent trend. The number of iterations after which the first imputation is drawn ("burn-in period") is set to 10 which in the mid of the range of suggested iterations (e.g., Van Buuren et al. (1999) suggest 5-20). The accuracy of the univariate imputation models is assessed by checking whether imputed, observed, and complete data have similar distributions. The analysis shows that the imputed values have reasonable values.

The literature (e.g., Rubin 1987; Van Buuren et al. 1999) suggests that five imputations are sufficient to obtain valid inference. We obtain five complete data sets. A detailed description of the regression models and statistics used for the assessment of the imputation model are available from the authors upon request.

B Additional results

Figure A.1: Average marginal effects of location of workplace on being "'highly satisfied'



Note: Results from ordered probit regression. Average marginal effects compared to reference group "DE - Germany".

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