



Hamburg Institute
of International
Economics

Does better education cause higher income?

Malte Hoffmann, Uwe Jensen

HWWI Research

Paper 145

Corresponding author:

Malte Hoffmann

Hamburg Institute of International Economics (HWWI)

Heimhuder Str. 71 | 20148 Hamburg | Germany

Phone: +49 (0)40 34 05 76 - 349 | Fax: +49 (0)40 34 05 76 - 776

HWWI Research Paper

Hamburg Institute of International Economics (HWWI)

Heimhuder Str. 71 | 20148 Hamburg | Germany

Phone: +49 (0)40 34 05 76 - 0 | Fax: +49 (0)40 34 05 76 - 776

info@hwwi.org | www.hwwi.org

ISSN 1861-504X

Editorial Board:

Prof. Dr. Thomas Straubhaar (Chair)

Prof. Dr. Michael Bräuninger

Dr. Christina Boll

© Hamburg Institute of International Economics (HWWI)

December 2013

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the publisher.

Does better education cause higher income?

Malte Hoffmann *^o Uwe Jensen †

Preliminary Version of 13.12.2013

Abstract

While the positive influence of higher education on income has been repeatedly confirmed, the linking channel can be ambiguous. Within the framework of estimating the effect of income on life satisfaction, various sources of endogeneity caused by joint determination are addressed and the earnings equation is reconsidered, too: We cast doubt on the hypothesis of the direct influence of educational achievement on income, using two separate cross-section datasets for full-time employed, male white- or blue-collar workers from German SOEP data. Our data rather suggest that the socio-economic rank of an occupation serves as a factor which links educational achievement and income. One explanation relates to the signaling theory by Spence, another possible explanation is yielded by the existence of a regime of regulations in Germany that require certain formal qualifications to obtain highly-prestigious jobs which are, in general, also better paid.

1 Introduction

Wage differentials can, to a considerable extent, be explained by differences in human capital. The term encompasses knowledge, experience and talents to perform a specific task in a production process. It is observed that knowledge yielded by higher education, typically measured in years of schooling or the type of graduation, is strongly associated with increasing income. One of the two most prominent explanations of how human capital works on income is due to Becker (1964) who views collected qualifications as an input factor which directly raises productivity. In a competitive labor market there is no arbitrage; differences in productivity must be differently rewarded. Beside the general doubt about the degree of competitiveness of labor markets, the observation of increasing labor division and specialization leads to a second objection: When highly specialized work meets "general education", using human capital as a measure of productivity in the sense of Becker or Mincer (1974) is not fully convincing because it is unlikely that all human capital can be used productively in the process. One extra year of schooling or obtaining a higher degree induces acquiring general human capital that is unrelated to the specialized production process. Moreover, the ratio of useful and not useful knowledge for a given job does not only depend on the success of finding an appropriate job but also on the employer's ability to recognize the most productive usage of the worker.

Like productivity, unobserved individual ability strongly influences the accumulation of human capital. Acknowledging that employers cannot fully observe the workers ability either, the Spence (1973) view interprets formal measures of human capital as signals of underlying ability which indicate higher productivity and better coping strategies with changing situations. The assumption that employers in this model make is that higher education is not worthwhile for those who are less able than others, because the less able would have to invest too much effort and time to obtain higher education.

These views do not necessarily exclude one another; on the contrary, they might contribute a

*Hamburg Institute of International Economics, Heimhuder Str. 71, 20148 Hamburg. The author is grateful to Laura Blackburn for advice and suggestions.

†Institut für Statistik und Ökonometrie, Christian-Albrechts-Universität, Olshausenstr. 40, 24118 Kiel, Germany

piece to the truth. Furthermore, due to different environments the explanatory power of these theories might differ not only across countries but also across industries. For instance, it might depend on the specialization degree or on the possibility to measure skills objectively.

This paper analyzes which of these views can be regarded as most suitable for the data set at hand. The question is analyzed within a model that tries to explain the effect size of income on life satisfaction. Despite the fact that there is some evidence for increasing income not having any long-term effect on life satisfaction (Easterlin et al. 2010), there are still good reasons why it is worthwhile to estimate the short-term effect that income has on well-being. In general, the estimation is useful for cost-benefit analyses whose cost side is measured by the reduction in life satisfaction leading to the need for monetary compensation (for further examples, s. Frey et al. 2009: 319ff.).

Assuming income that stems from labor as being the main determinant for total income, the effect of absolute income on life satisfaction in a single-equation model may be endogeneous due to simultaneity. A single-equation estimation of a standard life satisfaction model with labor income as an explaining variable would not take arising interdependencies between income, working hours, occupational prestige¹ and life satisfaction into account and thus lead to biased estimations. While the interdependency between life satisfaction, income and working hours has been pointed out for instance by Pouwels et al. 2007 or Powdthavee 2010, the idea is extended here by (a) including occupational prestige and (b) arguing and estimating the model by means of a system of equations that takes into account endogeneity concerns and controls for the usual confounding variables. The variables life satisfaction, working hours, income and occupational status are henceforth called endogenous variables. Section 2 explains the theoretical framework thoroughly. Prior to the estimations a canonical correlation analysis is conducted to obtain first insights in the relationship between the sets of variables. The main finding is that education does not directly influence income; in lieu it affects the variable occupational prestige which in turn affects income. Furthermore several of the endogeneity issues cannot be found in the data. The remainder of the paper is organized as follows. Section 3 describes the data used; Section 4 describes the deployed methods shortly and presents the empirical results; The final section concludes. The research question will be examined for full-time employees between 18 and 55 years of age within two separate cross-sectional datasets drawn from GSOEP-data from the years 2005 and 2009.

2 Theory

2.1 The endogeneity problem

The following paragraph describes the endogeneity problem of including labor income in life satisfaction equations which constitutes the reasoning for the choice of the simultaneous equation modeling.

The rise of an individual's income usually causes their life satisfaction to rise, too, as their set of opportunities with regards to consumption and saving becomes larger and sorrows owing to shortage of money decline. Considering the origin of income, which is usually labor market income, it can be argued that the determinants of income have an influence on life satisfaction as well. Income can therefore not be assumed exogenously in the estimation of life satisfaction. The amount of income depends typically on the number of working hours. Thus, working hours should be taken into account of when estimating the effect of income, since they are associated with disutility if the actual number of hours deviates from the individual's favored number of working hours (Pouwels et al. 2008: 74). In this respect, the effect of income on life satisfaction is likely to be underestimated for full-time workers when they work more than desired. On a related note, given that working hours can be adjusted to some degree, one would expect that higher satisfaction with work, which is highly correlated with life satisfaction, should result in a *ceteris paribus* increased level of working hours. So far this issue could be solved by including and therefore controlling working hours in the life satisfaction equation. The effect of income on happiness is presumably not a one-way relationship yet. Psychological studies have found evi-

¹Measured by the Wegener-Scale, which assigns occupations a number that expresses their prestige in the view of the population.

dence that happy people are more successful in work life (Lyubomirsky et al. 2005: 832). From these results it can be suggested that being of a happy nature (high life satisfaction) in turn influences income, so that a bidirectional channel can be suspected (Diener et al. 2002: 241ff.). This can also find indirect expression in an increased likelihood of obtaining an occupation with better prestige. Such jobs come with higher income but often also with a higher responsibility and therefore more workload. Socially more prestigious jobs are usually connected with increased benefits and presumably more challenging and interesting work. Individuals can be expected to feel more confident and eminent, resulting in higher life satisfaction (Mottaz 1985: 365ff.).

While higher occupational status demands more hours-of-work, the latter can also constitute an a-priori condition for attaining a higher occupational status at all. Overtime, for example, can signal assiduousness and sacrifice for the company. On the other hand, working many hours voluntarily only seems appealing if satisfaction with work is high, promotion wants to be reached at all costs or fear of getting fired is prevalent. Satisfaction with work will, however, not be explicitly dealt with in this paper, although it is involved in the mutual dependences considered here. The strong correlation with life satisfaction would produce isolation problems with the estimation techniques used here. Instead life satisfaction alone will be considered and regarded as a valid superset of work satisfaction.

Against this background, a simultaneous equation model is set up. The four equations in the model are fed with different explanatory variables whose particular foundations are described subsequently.

2.2 The Income equation

Income, defined as the income that has been attained by work in the labor market including all gratifications resulting from it, is closely related to occupational prestige. The main components influencing the magnitude of disposable income are taxes, nominal hours of work, skills, effort, and ability. The first component will not be explicitly regarded in this thesis, as it is assumed that only net income should matter for the determination of life satisfaction and the amount of tax induced reductions are known by the worker beforehand. As ability cannot be measured and effort merely to a certain extent, the focus lies on working hours which can usually be measured and skills that can at least be approximated by different variables. Skills include knowledge and experience. The acquisition of the former is anon influenced by ability which leads to the well-known ability bias in the estimation; therefore the magnitude of the parameters should be interpreted carefully. Because years of schooling do not differentiate between the types of schooling (e.g. apprenticeship versus college education) and are misleading when it comes to class repetition and the like, education is measured by the highest degree of education obtained according to the CASMIN-scale. Experience can be divided into firm-specific human capital which is approximated by tenure and into general job human capital approximated by years of full-time experience. Both are controlled for marginally decreasing returns. There are several theoretical reasons and evidence that these factors positively affect income.

Another positive impact may be due to certain personality traits. One hypothesis is that happy individuals are more productive because they exhibit more verve and have less psychological problems which results in a higher income. Moreover, the manifestation of these attitudes is also positively linked to a good performance in school and therefore influences earnings twofold (assuming the traits remain constant) (Duckworth/Seligman 2005: 942ff.). In particular, conscientiousness is positively associated with success in school (Uhlig et al. 2009). A model to test these traits upon is the five-factors (or Big Five Personality Traits) conception by amongst others Costa and McCrae (1987). The model includes five conceptual factors: extraversion, agreeableness, conscientiousness, neuroticism and openness. Character traits are obviously latent, but manifest answers to questions about the degree of agreement to factor-typical behavior traits can together serve as proxies. Hence, these characteristics should be regarded in the income equation as well. The sensibility of the interpretation of these factors depends on whether they or their measured magnitude remain stable over time. McCrae and Costa (1990) suspect that this is the case only for people from around the age of 30 upwards, a result that was later cast

doubt upon by e.g. Roberts & Mroczek (2009). Assuming that the changes are not too strong in increasing age, a potential bias remains for younger individuals in the sample, for instance by the existence of dynamic feedback effects of endogenous variables like income (Wichert/Pohlmeier 2010: 10f.).

As mentioned in the introduction, there are two theories of how education works on income - either by raised productivity or/and by signaling intelligence and the general capability to cope with more exigent occupations. While the first points at a direct relationship between education and income, the second idea leads to the thought that workers are, from the off, put on different occupation levels owing to the productivity signals they impart by their different education levels. Higher education then increases the likelihood of obtaining a more prestigious position, leading in turn to higher income. Thus, education as an ability signal also helps to overcome some of the mismatch problems in the labor market when more suitable individuals are allocated to important positions.

With income still growing after finishing formal education, experience, training and tenure are suspected to be the driving forces, due to different reasons, however (Filer et al. 1996). Time spent in unemployment, on the other hand, is expected to counteract a higher income: This can be owing to lowered relative productivity caused by depreciation of human capital over time or, if one pertains to signaling theory, the bad signal of previous unemployment; the next potential employer will always ask herself why other companies rejected the applicant and whether that was due to an unobserved problem. Consequently, the individual (in case of obtaining the job at all) won't be able to enforce his or her claims on income as successfully. Above all, if a person is on the verge of leaving a longer spell of unemployment, the expected and demanded wage conception may have been lowered. Therefore past unemployment might affect income directly, too.

Further covariates include the marital status, location (former East or West Germany) and size of the firm, measured by the number of employees, an individual is working at. Also sector differentials are controlled for (Wagner 1991) Finally, there is evidence that commuting time to work and wage are positively related. Search theory states that wages are positively related to commuting distance, as workers want to be compensated for experiencing the disutility of commuting (Rupert et al. 2009: 1ff.)

2.3 The Hours-Of-Work equation

When examining the amount of hours of work, actual hours instead of standard contract hours are considered, i.e. absence and overtime are regarded. Thus, it is possible to explicitly model the effects that working hours have on life satisfaction.

The neoclassical framework considers time spent laboring as generally spending disutility, although there is evidence for an inversely U-shaped relationship between life satisfaction and working hours which can be interpreted as a moderate amount of working being optimal (Raetzl 2012). Standard contracts, by contrast, often do not allow a full adjustment. A partial adaption to the designated amount can therefore only be caused by absence or overtime/moonlighting, where absence and overtime are usually the most relevant, whereas moonlighting might also be due to different reasons. Overtime can, in fact, also be necessitated by other factors such as the wish to reduce the lay-off risk by signaling productivity, importance and loyalty. As the considered sample consists of full-time workers, we expect the sample to be on the right arm of the inversely U-shaped curve - the influence on life satisfaction of an additional hour of work thus to be negative. In general, someone decides to work if the wage is higher than the reservation wage. The wage itself, however, is not used in the regression as it is strongly correlated with income. As the sample only consists of men we expect, if at all present, selection effects nevertheless to be small. Since income is composed mainly of wage and hours, the same argument could be applied to working hours. However, the sample is restricted to full-time employed individuals, who, although differing strongly in actual working hours, should not differ extensively in contract work hours.

Theoretical considerations suggest that increasing non-labor income decreases the number of

hours worked (Borjas 2013: 35f). Furthermore, individuals that commit to social engagement on a regular basis have fewer incentives to increase their working hours provided they want to maintain their community work engagement in the future. Although volunteer work can be classified as one possibility to use leisure time, it can also take on certain characteristics of work; the hurdle of quitting such a position is usually somewhat higher than quitting another leisure activity, since executing this position goes along with social reputation. Another factor is time spent commuting to work. Gimenez-Nadal and Molina (2011: 10f.) have found that increasing commuting time is associated with more working hours, although there are divergent theories on how commuting time works on working hours.

An increasing level of education leads to a growing probability of obtaining a job with high occupational prestige. These jobs usually entail more factual hours of work, as they go along with higher responsibility. On the other hand, it is conceivable that with increasing education, productivity rises and a designated level of income is reached with a lower number of working hours.

Regarding family factors, the number of children living in the household should be included, because two opposed effects may take place: the more children there are, the more money must be earned to keep a family. This may be reflected by an increased designated number of working hours. On the other hand, the father may want to see and spend time with his children. The more children he has, the more difficult it may become to accomplish this with every child if his working hours remain constant. Thus, a reduction in working hours - substituting the lost income partially with increased child allowance - would also be possible. One can also argue that conscientious individuals will stay longer at work, may it be owing to finishing an important task or working more thoroughly in general which takes a longer time. As conscientiousness is hardly measurable, the information disclosed by the Big Five Personality Traits will be used. Finally, contracts are more often than not collective agreements that do not usually allow for any deviations from working hours and sometimes even wage. These collective contracts can be different across sectors and the type of work. This implies that the analysis of working hours should also take account of the sector of occupation.

2.4 The Occupational-Prestige equation

Occupational prestige (or status) of a job is defined by the worthiness that it displays to people. Different responsibilities and different working environments make it hard to have a valid objective comparison between individuals. However, if many people are asked how worthy they consider it a job, a measure can be developed. Here we use the Wegener scale. The classification is carried out independently of the individual who does the job.

As mentioned in the introduction there could be a two-way relationship between life (work) satisfaction and status, as happy people are supposed to be more successful in school and in the job, a fact which lets them obtain better jobs more easily, which in turn enhance their life satisfaction. Higher satisfaction with work may also lead to accelerated promotion. A second two-way relationship exists between occupational prestige and working hours. In order to climb the career ladder working many hours will be expedient as motivation is thereby signaled; but similarly with increasing occupational prestige and enhanced responsibility, individuals are usually expected to work more hours. The resulting excess in work experience should therefore also contribute to receiving a better job. It is reasonable to distinguish between pure work experience and job tenure in a firm at this point. Whilst long tenure encompasses both individuals who have climbed the company ladder, and individuals who were either not good enough or not willing to be headhunted out of their jobs for a better position, work experience is, if at all, the more reliable measure for a stellar career. This holds especially true for young professionals who job hop in the first years of their career, looking for the right job, often connected with an increase in status, whereas clerks may not be headhunted and remain in their position for the course of their career. Tenure may therefore not affect job prestige as much as work experience does. On the other hand, if one assumes that education positively alters occupational prestige, full-time experience may be negatively related to status. Since most jobs with high occupational prestige

demand - sometimes by law - a university degree or even a doctoral degree, the assumption seems reasonable. A negative correlation between full-time experience and status may arise because those who undertake higher education start working considerably later than those with low education.

A further possible factor explaining the status is the duration of past unemployment; similarly to the explanation for income losses, past unemployment or gaps in the CV may be seen as a "signal of failure" making it more difficult for the person to obtain a prestigious job. Firm size might turn out to be an influential factor in determining the status. Measured by the number of employees, it cannot be excluded that there are relative differences in the distribution of high-prestige positions between large and small firms. This would imply that the relative chances to climb up the career ladder are significantly different between large and small firms. Likewise, it is conceivable that the distribution of occupational prestige is unlikely to be uniform across different sectors; sector specific effects should therefore be controlled for, too.

High status positions are usually quickly attained by young professionals who are well-educated, high performing and flexible. A hurdle to flexibility could be that a person is married, or is at least not single, and therefore more likely to be regionally bound to their partner. Subsequently, potential offers for higher positions which demand relocation or flexibility, are more probable to be rejected. On the other hand, marriage might make an individual take work more seriously, i.e. striving harder for better jobs. This behavior may be further boosted by the existence of children in the household. Marriage could also send a signal of reliability and be associated with better performance (Korenman/Neumark 1990). A cross-section analysis is, however, not suitable to discover the effect of marriage as it usually occurs somewhat later in life when an individual may have already reached a better job position.

2.5 The Life Satisfaction equation

There have been several attempts to find a consistent theory to explain life satisfaction. Set theory serves as a theoretical starting point for this analysis here. Its premise is that an (adult) individual has some natural degree of happiness that is shaped by genetic predisposition and molding in early childhood (Lyubormisky et al. 2005: 842-843). The set point level can be altered in the one or the other direction by one-off events that concern it. It is further assumed that this alteration is of temporary nature and an individual gradually loses the attention on such an event. By this process, the initial effect on the well-being also gradually decreases and the person adapts to the new situation and returns to the original set point of life satisfaction (s. Wilson et al. 2008 for a more detailed description of such a model). One-off effects such as an asset increase due to a lottery win can serve as an example: An individual at first gains happiness but then, over time, steadily loses attention, so that the lottery win has only a temporary positive effect on life satisfaction. Consequently, the effect of income on life satisfaction is usually not observed with longitudinal data but it is in cross-section analyses.

Often relative income instead of absolute income was found to be important for life satisfaction. Relative is meant as relative to a peer group that one compares oneself to, which can include neighbors, schoolmates or colleagues (Luttmer 2004; Clark/Oswald 1996: 363ff.). It is understood that when absolute income is raised, relative income rises all other things equal too. So, well-being increases due to two reasons. Therefore measuring the effect of absolute income would lead to overestimation. Due to the lack of sensible peer-group data, absolute income is yet utilized in this work.

Besides income, there are other factors determining life satisfaction that should be controlled for. This set of (interdependent) factors includes internal ones such as an individual's mental and physical traits, i.e. certain character traits and the individual's own state of health. Other, rather external factors also play an important role in life - dividing time classically into work and leisure time, satisfaction with work and information on family and friends might be crucial (Lyubormisky et al. 2005: 822).

Regarding character traits, basic, presumably stable attitudes like extraversion or resilience are correlated with a more positive attitude towards life, i.e. a naturally more cheerful disposition. The manifestation of important traits can be described by means of the previously mentioned Big Five factor model. Favorable manifestations for the mentioned traits make for being less easily upset and having an extended social life. The arising higher degree of sociability also feeds back on life satisfaction. A high degree of neuroticism is found to be vitally negatively correlated with life satisfaction (Schimmack et al. 2004: 1065ff.).

Regarding the physical situation, the age of an individual is supposed to have an impact on life satisfaction. Empirical studies show a U-formed relation of life-satisfaction to age (s. e.g.: Blanchflower/Oswald 2008: 10f.). Although increasing age typically worsens the health situation and therefore reduces life satisfaction, the extent is likely to be rather limited in this investigation as the sample is restricted to individuals younger than 55. However, there may be chronic diseases or some recent illness or injury that reduces life satisfaction. The GSOEP provides an approximating variable for the health situation, namely the number of doctor's visits in the past three months. The advantage of this variable is that it likely proxies the personal health situation but, and at least equally important, it indicates the disutility of doctor visits themselves.

When it comes to external influences, satisfaction at work is significantly affected by the number of hours worked. Headey et al. (2010: 17925f.) find severe discontent caused by deviations from the preferred number of working hours in both directions. Thus, one might assume that there exists an inversely u-shaped relationship between satisfaction and working hours. As the sample is restricted to full-time working employees, working already consumes a large amount of time. Except for workaholics, a further increase in labouring is likely to decrease life satisfaction. Unless work hours are explicitly controlled for, an omitted variable bias arises. A-priori, the effective bias of the income coefficient is therefore upwards in the case of few working hours and downwards in the case of many working hours. Empirical evidence regarding this point is for instance reported by Pouwels et al. (2007: 72ff.): The authors indicate an underestimation of the effect of income on life satisfaction of up to 25%.

Another determinant of work satisfaction includes the occupational prestige of a job. An individual's self-assessment is improved by the feeling of being an important member of society and the receipt of appreciation and respect from others. The impact of prestige does not necessarily have to be limited to the work world but can also have impacts on the social life of individuals. On the contrary, in a state of unemployment the individual does not benefit from this. In addition, social norms like that one should live from one's own earned money are defied. Not conforming and being unemployed, usually causes unemployed individuals to be afflicted with psychological pain, for instance by societal pressure (Winkelmann/Winkelmann 2003; Chadi 2011: 2ff.). Since only employed individuals are considered here, no one will be suffering from acute unemployment but there may also be scarring effects from past unemployment which find expression in a higher risk of unemployment, and concomitant fear to experience it once more, and/or also a lower wage (Clark et al. 2003: 230f.). It would be sensible to argue that the scarring effect of unemployment in the past is weaker the longer it dates back. The data utilized here does not differentiate past unemployment with respect to the time point but is merely the accumulated sum.

Another vital factor of life satisfaction is how leisure time is spent. Thus, controlling for marital status and certain familial traits such as the number of children in the household is necessary. However, interpretation should be carefully conducted as those people who have a taste for marriage or for having children are more likely to be in one of the respective states. Social life is also affected by having of numerous (close) friends and by participation in social events. Other important factors regarding happiness are the frequency of exercise and being involved in social engagement, e.g. in community work (Lyubormisky et al. 2005: 834ff.).

Cultural differences in determining subjective well-being are not regarded, as they are expected to be rather small in a single-country investigation. However, it is taken into account whether an individual lives in the newly formed German states or not. Owing to the fact that life situations in East and West Germany were fundamentally different after the reunification, life satisfaction was found to be significantly lower in East Germany (Vatter 2012; Frijters et al. 2004: 730ff.). Although there is a convergence pattern visible, the variable controls for possible aftermaths (Wunder 2009: 179f.).

3 Data and summary statistics

This work uses cross-sectional SOEP data from 2005 and 2009 which was made available by the German Socio Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin.

The sample is restricted to men for two reasons. Firstly, it is to avoid sample selection issues, for different propensities to work between men and women exist. Secondly, even if full-time working women were selected, different specifications for the model would be necessary as employment biographies are often fundamentally varied, for instance because of motherhood. To check the robustness, estimation is conducted for two years, namely 2005 and 2009, which implies that questionnaire data of 2004 and 2008 are used. When certain questions were not asked in a particular year but the values could be assumed to be constant over time, questionnaires of the previous years were also utilized. The years are chosen such that they reflect the effects of different economic environments, namely a recession and a boom year.

To identify full-time employed workers, the following procedure was applied. As there are two variables in the SOEP that indicate the type of employment, contradictions may arise and it is up to the researcher to remove them. First of all, only those who stated to have contracted working hours of least 35 hours per week were included. To check plausibility and to improve consistency, the sample was further restricted to individuals who also state in words to work either full-time or part-time. Thus, individuals who state to be in marginal employment and to work more than 35 contract hours per week are excluded. But those stating to work part-time and working more than 35 hours per week were included. The reason for so doing is that while the number of working hours is objectively available in the work contract, the formal assignment to part-time or full-time is not necessarily given or known to the individual.

As freelancers often have a more volatile income, workload and are usually freer to adjust their working hours to some degree, they are excluded in this analysis. So are individuals in the armed forces and apprentices. Civil servants are also excluded as their income progression over life is automatically determined at the beginning of their career and they can foresee every change in income. In the same way, potential adjustments of working hours through overtime move in a much narrower frame for civil servants - facts which are fundamentally different in the private sector. To rule out effects of partial retirement, like reduced work time, the age of the individuals is bound from the top at 55. The lower bound is 18 years.

The dependent variable for life satisfaction is an individual's self-reported, current life satisfaction that is measured on an 11-point Likert scale with 0 meaning totally dissatisfied and 10 totally satisfied. Discussing the estimation of life satisfaction equations it is assumed that the self-statement on life satisfaction of an individual at a certain point in time is indeed a valid measure for the purpose here. There are justified concerns about whether what we want is really measured (s. e.g. Kahnemann et al. 2006 for a critique) and it can be assumed that the measure is prone to be erroneous. We observe, however, that the (left-skewed) distribution of this variable is rather flat at the very tails. If we interpret possible problems in determining life satisfaction as random measurement error in the dependent variable, the concerns due to measurement error become small (Wooldridge 2012: 318-320).

The choice of the dependent variable for income is the monthly net labor income. Added to this are extra payments that are related to the labor income divided by 12 (extra vacation pay etc.). The extra payments measures could be flawed for two reasons: Firstly, the values are from the previous year and secondly, they are only available as gross-values. The first concern becomes ultimately rather small, as the interrogation is usually conducted in the first quarter of a year and so the extra payments are not too far in the past. The second concern might be mitigated by the relatively low size in comparison to the monthly labor income. The composed variable was logarithmised. Working hours are measured by the statement of an individual concerning the actual number of an individual's weekly working hours times 10 and thus different from the initial sample restriction variable. Implausible statements - of more than 80 working hours per week - were eliminated. The actual number of working hours in the month of the survey may be very low or even zero due to long-term holidays, absence, illness or misstatements. This hetero-

Table 1: Summary statistics. Values are rounded to three decimal points. k denotes 1000. (D) denotes a dummy variable.

2005	Variable	Mean	Std. Dev.	N	2009	Variable	Mean	Std. Dev.	N
	Life Satisfaction	7.036	1.611	2759		Life Satisfaction	6.967	1.595	2502
	Status	59.659	28.19	2753		Status	60.618	28.692	2492
	Status2/1k	4.354	4.941	2753		Status2/1k	4.497	5.112	2492
	Log Income	7.58	0.461	2762		Log Income	7.59	0.481	2509
	Working Hours*10	436.904	66.101	2762		Working Hours*10	440.379	67.773	2509
	Working Hours2/100k	1.953	0.657	2762		Working Hours2/100k	1.985	0.679	2509
	Contract Hours	390.854	27.286	2762		Contract Hours	393.911	26.153	2509
	Age	40.278	8.557	2762		Age	40.725	8.939	2509
	Age2/100	16.955	6.773	2762		Age2/100	17.384	7.043	2509
	No Low Education (D)	0.084	0.277	2762		No Low Education (D)	0.075	0.263	2509
	Apprentice (D)	0.6	0.49	2762		Apprentice (D)	0.591	0.492	2509
	A Levels (D)	0.093	0.291	2762		A Levels (D)	0.099	0.299	2509
	Technical College (D)	0.079	0.269	2762		Technical College (D)	0.083	0.275	2509
	University (D)	0.131	0.338	2762		University (D)	0.132	0.338	2509
	Tenure	11.015	8.788	2762		Tenure	11.091	9.024	2508
	Tenure2/1000	0.199	0.278	2762		Tenure2/1000	0.204	0.279	2508
	Full Time Experience	17.523	9.277	2758		Full Time Experience	17.645	9.531	2508
	Full Time Experience2/100	3.931	3.409	2758		Full Time Experience2/100	4.021	3.383	2508
	Unemployment Experience	0.414	1.015	2758		Unemployment Experience	0.547	1.308	2508
	Unemployment Exp.2/100	0.012	0.066	2758		Unemployment Exp.2/100	0.02	0.142	2508
	Number of Children	1.542	0.498	2758		Number of Children	1.598	0.49	2507
	Father (D)	0.228	0.419	2762		Father (D)	0.196	0.397	2509
	Recent Birth (D)	0.041	0.198	2762		Recent Birth (D)	0.043	0.203	2509
	Recent Loss (D)	0.001	0.027	2762		Recent Loss (D)	0.001	0.028	2509
	Married (D)	0.674	0.469	2762		Married (D)	0.617	0.486	2509
	Single (D)	0.244	0.43	2762		Single (D)	0.274	0.446	2509
	Divorced (D)	0.04	0.196	2762		Divorced (D)	0.052	0.222	2509
	Widowed (D)	0.004	0.06	2762		Widowed (D)	0.003	0.053	2509
	Agriculture (D)	0.016	0.125	2762		Agriculture (D)	0.011	0.105	2509
	Construction (D)	0.212	0.409	2762		Construction (D)	0.228	0.419	2509
	Manufacture (D)	0.304	0.46	2762		Manufacture (D)	0.29	0.454	2509
	Trade (D)	0.109	0.312	2762		Trade (D)	0.11	0.313	2509
	Transport (D)	0.063	0.244	2762		Transport (D)	0.067	0.25	2509
	Bank Insurance (D)	0.052	0.222	2762		Bank Insurance (D)	0.055	0.229	2509
	Social service (D)	0.079	0.27	2762		Social service (D)	0.079	0.27	2509
	Public service (D)	0.065	0.246	2762		Public service (D)	0.061	0.239	2509
	Service (D)	0.072	0.258	2762		Service (D)	0.074	0.261	2509
	Small Firm (D)	0.483	0.5	2762		Small Firm (D)	0.485	0.5	2509
	Medium Sized Firm (D)	0.255	0.436	2762		Medium Sized Firm (D)	0.242	0.428	2509
	Large Size Firm (D)	0.263	0.44	2762		Large Size Firm (D)	0.273	0.445	2509
	Lives East (D)	0.226	0.418	2736		Lives East (D)	0.249	0.432	2480
	Works East (D)	0.189	0.392	2747		Works East (D)	0.207	0.405	2484
	Extraversion	3.711	1.091	2750		Extraversion	3.636	1.143	2498
	Agreeableness	4.229	0.989	2747		Agreeableness	4.118	0.983	2499
	Neuroticism	3.348	1.134	2749		Neuroticism	3.491	1.122	2499
	Conscientiousness	4.958	0.83	2746		Conscientiousness	4.827	0.887	2501
	Openness	3.362	1.108	2741		Openness	3.247	1.1	2496
	Commuting Distance	18.433	19.596	2762		Commuting Distance	18.807	19.793	2509
	Commuting Distance2/1k	0.724	1.807	2762		Commuting Distance2/1k	0.745	1.912	2509
	Number of Friends	4.696	4.362	2704		Number of Friends	4.257	3.511	2456
	Number of Friends2/10	4.107	12.59	2704		Number of Friends2/10	3.045	8.466	2456
	Volunteering	0.639	1.015	2753		Volunteering	0.715	1.095	2499
	Exercise	1.432	1.245	2747		Exercise	1.573	1.239	2501
	Doctor Visits	1.511	2.372	2762		Doctor Visits	1.669	2.884	2509
	Doctor Visits2	7.906	28.105	2762		Doctor Visits2	11.1	83.972	2509

geneity could lead to a insensible results, so a compromise that takes into account such events up to a certain degree had to be found. Therefore the lower bound for actual weekly working hours was set to 18 hours, half the average weekly working time. Status is measured by the rank that a certain occupation has in the "Magnitude Prestige Scale" by Wegener. This scale orders occupations with regards to their cooperative prestige and can be interpreted metrically owing to open scales. A further advantage is that the scale is adjusted for Germany (Boll 2009: 71). For each Big Five personality trait there exist three statements in the SOEP to which the individual can state the degree of agreement on a scale from 1 to 7. Following the classification method in Wichert Pohlmeier (2010) all of the statements are used and if necessary, manipulated so that 'favorable' values are high. The average score on each Big Five trait constitute the values for each trait used in the regressions. Health status is indicated by the number of visits to the doctor in the last three months. Firm size is determined according to the number of employees and split into groups of 0-200, 201-1999, 2000+ employees. The sector classification is according to the 1 digit industry code. The service sector is further divided according to the 2 digit industry code due to a large number of cases and possible gains in precision. The sectors mining and quarrying were merged due to a low number of cases and found to be overall insignificant. As was the energy sector. The education classification was assigned based on the CASMIN scale. Tenure solely denotes the duration from the point of signing a contract to the present day and not potential previous work at this employer when the employment had been interrupted. Recent events like the birth of a child or death of the spouse are coded binary and take on the value 1 if a corresponding event took place in the current year or the year before and 0 otherwise. Sports and volunteer work are ordinally scaled and recoded such that favorable values are high, i.e. the more often the better. "HasChild01" indicates whether a child of age 0 or 1 lives in the household, whereas "Numchildren" denotes the total number of children under 16 living in the household. A "2" behind a variable name denotes the squared term of the variable.

4 Empirical Results

The empirical results are led by a canonical correlation analysis that analyses correlations between sets of variables (s. e.g. Sharma 1995: 391-409) and are followed by the estimation of the system of equations (s. e.g. Judge et al. 1988: 597-634). By estimating the equations by three-stage least squares, life-satisfaction is regarded as cardinal and comparable across respondents. Albeit this assumption may not hold, easy computation and the findings by Ferrer-i-Carbonell and Frijters (2004), who found that the difference between estimating life satisfaction by OLS or an Ordered Probit Model is small, lets us yet apply the method.

Table 2 shows the canonical correlation analysis conducted here. The analysis shows patterns which are similar across both years. All four canonical correlations are found to be statistically significant at the 1% level and all but the fourth canonical correlation are easy to interpret. When interpreting the correlation, a cutoff score for the size of the correlation must be found from which on a variable is assumed to be sufficiently high correlated to be interpreted. Due to rather low loadings for the set of explanatory variables a threshold of about 0.3, depending on the average correlation size, is laid down.

The first canonical correlation indicates that status and log income are closely related since both variables are strongly correlated to the same variables in the first set of explanatory variables. The result holds for both samples. It can be observed that this set loads somewhat higher on log income than on status. Higher education seems to be a key correlating factor for reaching higher status and income, as the increasing sequence has the highest loadings in the set of explanatory variables - irrespective of the economic environment. Past unemployment is negatively correlated with both log income and status in the two samples. Additionally, the higher loadings for large-sized firms compared with that for medium-sized firms can be theoretically reasoned. However, it is not distinguishable at this stage whether large firms pay more, or whether they offer relatively more positions with high prestige than small and medium-sized firms. Based on results from the literature, one might infer that firm size does not affect status as much as it affects income. Therefore the first explanation seems to be more likely. Frequent exercise is

Table 2: Canonical Correlation Analysis

Sample:	2005				2009			
Canonical Correlation number:	1	2	3	4	1	2	3	4
Correlation:	0.7597	0.5939	0.3887	0.2610	0.7600	0.5849	0.4156	0.2822
	Canonical Loadings for variable list 1:				Canonical Loadings for variable list 1:			
Life Satisfaction			0.9702				0.9745	
Status	0.8193	0.5672			0.7579	0.6474		
Log Income	0.8660	-0.4326			0.9050	-0.3384		
Working Hours		0.3432		-0.9309				0.9537
	Canonical Loadings for variable list 2:				Canonical Loadings for variable list 2:			
Apprentice	-0.5319	-0.3681			-0.5231	-0.3790		
A Levels								
Technical College	0.3619				0.3528			
University	0.6295	0.4331			0.5848	0.4795		
Tenure		-0.5444				-0.5489		
Full Time Experience		-0.5350				-0.5824		
Unemployment Experience	-0.3136				-0.3565			
Number of Children								
Age		-0.3724	-0.3262		0.3228	-0.4146		
Recent Birth								
Recent Loss								
Agriculture								
Construction								
Manufacture		-0.3093						
Trade								
Transport								0.5023
Bank Insurance								
Social service						0.3452		
Public service				0.4557				-0.3179
Service								
Married		-0.4061		-0.4011		-0.3865		
Divorced								
Single		0.4278		0.4133		0.4491		
Medium Sized Firm								
Large Size Firm	0.3275				0.3574			
Works East		0.4623			-0.3097	0.3855		
Extraversion			0.3830				0.3479	0.3806
Agreeableness			0.4150				0.3482	
Neuroticism			0.7011				0.7382	
Conscientiousness			0.3815	-0.3223			0.3238	
Openness								
Commuting Distance								
Number of Friends			0.3431					
Volunteering								
Exercise	0.3110				0.3512			
Doctor Visits			-0.3198				-0.3551	

Table 3: Canonical Correlation Analysis. For reader's convenience, only loadings larger or equal to 0.3 are displayed.

also positively correlated with log income and status. When frequent exercise is taken as an indication for character traits like self-discipline or self-organization, this may explain why this variable loads that highly in both samples. It is also indicated that marriage, in contrast to being single, is linked to higher income. This might be true as a stable relationship is often tacitly expected to obtain high-status positions but can also be due to the common positive correlation of log income and marriage with age.

The second canonical correlation shows that the set of endogenous variables loads, in absolute terms, once more highly on status and log income. This observation is stable over both years. For the sample of 2005, the particular observation is that working hours load mediocly on this canonical correlation. The apparently stronger relation in this sample is confirmed again in the regressions later on. While the sign of status remains positive, log income now loads negatively. From the first canonical correlation can be inferred that status and income are, in fact, positively correlated to some factors concurrently. The second canonical correlation reveals that there are also distinct factors that are correlated to just one variable and not to the other.

To facilitate interpretation it is assumed that the explanatory variables with a positive loading are positively correlated with status, while variables from the explanatory set with a negative loading correlate with income. It follows that the associations found in the data become sensible for the most variables from the set of exogenous variables in terms of theoretical considerations. Status is correlated with education and also to the fact of whether someone is single or not. Being single appears to be associated with status in a favorable manner. An explanation might be that a successful career is easier to achieve if the individual is not bound to his or her partner as climbing up the career ladder is often linked to a demand of being flexible and mobile - factors that are possibly decreased by being married. The results of the three-stage least squares regressions show, on the other hand, that being single not statistically significant in the status equation. If marriage is a subtle factor for obtaining an executive position, then, in a cross-section analysis, it remains unclear whether being single is advantageous for men to obtain a better job.

Income, on the other hand, is mainly correlated to age, full-time experience, and tenure, as those three explanatory variables have negative loadings. While the inner-German location of the firm was of minor importance in the first canonical correlation, it now has a positive loading which implies a negative association between work location in former East Germany and income. This interpretation seems more familiar than the assertion that there are relatively fewer firms offering high prestige occupations in the new Laender, albeit this may be the case.

The third canonical correlation indicates which of the given factors are the main correlating components of life satisfaction. The other endogenous variables have only small loadings in this correlation. The Big Five factors and, in particular, a low value on neuroticism, are correlated highest to satisfaction. Further factors are social contacts approximated by the self-stated number of friends, and the health situation proxied by the number of doctor's visits. Age also seems to be weakly linked to life satisfaction; a small negative correlation is found. Surprisingly, factors like the recent death of a partner or community work are hardly correlated with life satisfaction. The last canonical correlation loads highly on working hours and, as the third canonical correlation, seems barely related to the other variables in the set of endogenous variables. While in the sample of 2005 we can observe some correlation in the second canonical correlation, there is no relation of working hours to the other endogenous variables whatsoever in 2009. Now one would expect to find the main factors that are correlated with working hours but there is only a weak pattern visible. Noting the reversed signs in the two samples there are mainly sector specific effects left. Individuals working in the transport sector are notably associated with more working hours, while individuals in the public sector to the opposite. Furthermore, a higher degree of extraversion (and not as presumed conscientiousness) seems to be positively correlated to an increased number of working hours. The relationship of working hours to the remaining endogenous variables is quite weak; at best present in the second correlation where they are more (in 2005) or less (2009) positively correlated.

Table 3 in the appendix shows the results for the equations in the framework of a system of equations for both years of investigation. Since the result emerged partly due to certain (arbitrary) decisions of the researcher, a comment on the methodology should be made. Four steps were taken to arrive at this result: firstly, the result emerged from the stepwise elimination of the least significant variables in a general-to-specific framework (Herwartz 2010:2) until all variables

with a t-value smaller than one in both samples were eliminated. Secondly, the initial results of the parameter estimation suggested a direct *negative* influence of education on income and the same of favorable character traits. These results being counterintuitive, the model deserved a closer look. We diagnosed that the simultaneous inclusion of status and education, and the simultaneous inclusion of Big Five factors and life satisfaction respectively, caused the trouble in the income equation. We also acknowledged that education is the most important influence in the status equation, and the Big Five factors play a similar role in the life satisfaction equation. The next step was to presume that instead of a direct impact of education and character traits, there might be an indirect influence on income: For education via status and for the Big Five factors via life satisfaction. The presumption itself was grounded on the following theoretical considerations: If education is taken only as a signal of ability and productivity, then individuals should a-priori be put on certain tracks by employees. The higher the education, the higher the track level, i.e. the occupational status is the main reason for income differences. For some institutions it is possible that a statutory reason causes this channel; this view is consistent with the observation that certain occupations demand some formal qualification before they are permitted to be practiced.² The second observation - the indirect influence of Big Five factors - can be explained by the idea that only their influence on life satisfaction as a whole leads to more income. The Big Five factors themselves do not have a direct impact on income. In consequence, these considerations led to the removal of education and Big Five variables from the income equation.

Furthermore, the results from the simultaneous equation estimation suggested that life satisfaction affected working hours negatively. As life satisfaction was considered as a proxy for satisfaction with work, this result pointed to a second problem. There was no elegant solution for this, so, in a third step, life satisfaction was removed from the working hours equation.

The last step was to remove a multicollinearity problem that arose by including age and full time experience concurrently.

The first striking observation is that only a few variables retained significance in the estimation of the hours-of-work equation. The coefficients in both samples differ to a certain extent. In the sample of 2009, the educational variables exert a stronger influence on working hours, while in 2005 status has a higher coefficient and the educational variables are insignificant at the 10 %-level. What can be derived from these two observations is a close relationship between education and status. As education affects status, the effect is obviously only differently yielded, so the interpretation is similar: Higher education and/or a better job are associated with increasing working hours.

Both samples also contain sector and firm size effects as important factors in explaining variation in working hours. In consonance with the canonical correlation analysis results, many hours are worked in the agricultural, trade and transport sectors, whilst fewer hours on average are worked in the public sector. Decreasing working hours with increasing firm size and also a positive influence of conscientiousness (at least in sample of 2005) are as expected. Age, approximated by full-time experience, is not related to any variation in working hours here. This observation maybe caused by the double restriction with respect to age and contract working hours. Thus, it seems that hours of work do to vary significantly between 18 and 55 year old full-time workers in this sample. The practice of volunteer work has neither an unequivocally positive nor negative effect. Finally, non-labor income does not cause variation in working hours, given our sample of full-time workers.

The subsequent table presents the results for the log income equation with education and Big Five variables excluded. Life satisfaction, representing amongst others the indirect effect of the Big Five factors, turns out to be highly significant and is observed to affect income positively with a small effect of approximately 3.7 % for one additional point on the life satisfaction scale. Occupational prestige, which has internalized the effect of educational achievement, is also a significant factor here: for one additional point on the Wegener Scale, log income rises at about 1.2% in both samples. Only in the sample of 2005 is the influence of working hours significantly

²To ensure qualification, the practice of an occupation is often tied to the possession of relevant certificates or a university degree.

different from zero. The sign is against theoretical considerations, but neglected here because the effect is very small.

Sector and location effects, however, are found to affect income substantially. The observation that otherwise equal workers in the East German states incur somewhat less loss in income in 2009 than in 2005 is notable. This may be either due to some convergence process between East and West, or owed to a better overall economic situation, or both. Commuting distance and tenure are positively associated with income, but the effects decrease marginally. The convex effect of unemployment experience is as expected. In comparison to the working hours equation the log income equation is much better explained.

The results for the regression on status are resumed in the following sub-tables. Throughout both samples a highly significant, positive impact of life satisfaction is observable. Thus, the notion that happy people are more successful in their job is confirmed here. The chain of transmission and thus the decomposition is, however, unclear in this cross-sectional analysis. If a happy disposition already leads to a better or more successful education, then the disposition effect on obtaining a higher status is overestimated.

The effect of working hours is ambiguous in sign and significance. Taking account of the slightly smaller effect size of educational variables in 2005 than in 2009, the explanation is presumably similar to the one given for the working hours equation. Higher education is associated with more working hours, so the total effect should be similar. The pervasive effect of education on status is clearly visible in both samples according to our interpretation of a direct influence. The effect of past unemployment is severe. Apparently, the sector an individual is occupied in also partially determines their status. Individuals in the agriculture sector are less prone to obtaining a highly prestigious position relative to the other sectors. Firm size is significant for the status of men and positively relating increasing firm size with status, although the effect is rather small. With regards to marital status, we see no effect. The same holds for tenure which we expected to be negatively related to status. However, age or full-time experience negatively affects status. We might see the effect of relatively short education here. The earlier an individual starts working, the longer his full-time experience. On the other hand, due to lower education implied by starting work at young age, the lower his status.

Comparing the results for the parameters of the life satisfaction equations, unexpected results with respect to the initially stated theory of the interplay of the endogenous variables become visible: At the 10% level, we cannot reject the null hypotheses of no influence on life satisfaction for all endogenous variables. Neither income, nor status, nor hours-of-work have an unambiguous influence. The findings should be interpreted cautiously with respect to the sample restrictions when it comes to working hours; when it comes to log income, adaption effects may have taken place for some individuals, depending on the level of income in the previous years.

The remaining variables from the set of exogenous variables behave by and large as expected. Ignoring selection effects, single and divorced individuals are less happy than married; the recent loss of the partner lowers life satisfaction at least in the sample 2009 enormously (but widowhood itself is statistically insignificant); neuroticism as well as doctor's visits should be kept at a low level to enhance happiness and friendships should be cultivated. Moreover, the negative effect of unemployment is highly significant. For one year of past unemployment today's life satisfaction decreases by about 0.07-0.13 points on average. Age-related effects can only be observed in the sample of 2005, where a weak negative effect is estimated.

5 Conclusions

We have investigated the relationship between income, working hours, status and life satisfaction for two samples of male full-time employees in Germany. The data allow the effect of different economic environments to be compared, there are, however, hardly any differences with respect to this fact.

The main finding of this paper is that the canonical correlation analysis showed a result that could be interpreted as a substantive relationship between status, income and education, but only the estimates for the system of equations indicate that income is influenced by status which is in turn mainly determined by education. This finding can be interpreted in two, not mutually exclusive, ways: Firstly, the level of education determines the track of occupation on which an

individual is set by the employer. The employer recognizes a certain set of skills by observing the certificate an applicant shows and assigns the vacant position to the seemingly most suitable candidate. Since different tracks go with different income levels, this result seems to be evidence soonest in favor of the signaling theory. A second explanation for the result having emerged could be given by laws and regulations that demand certain formal qualifications to be fulfilled to be allowed in order to work in certain professions. Professions like this include lawyers or doctors of medicine. But also more vocational occupations often demand a finished apprentice. Due to certain legislations there are different entry barriers in terms of educational and time investment. The larger this investment is, in tendency, the larger becomes the salary and occupational prestige. The legislations may have either been set up by the state in order to ensure encompassing knowledge and experience for professions that carry high responsibility or by professional associations in order to regulate and protect their business, the rent seeking motive. The answer to the question asked in the title is therefore: yes, but presumably not directly.

The prior ideas of the interrelationship between the four endogenous variables are barely confirmed for few parameters. While in the sample of 2005 the parameters for working hours are by and large as theoretically predicated (except for the weakly negative effect on income) several theoretical relationships of working hours with the other endogenous variables could not be found in the sample of 2009. In this regard, the findings are consistent with the results of the canonical correlation analysis. Working hours displayed a higher association with status and income in 2005 than in 2009. What is further difficult to explain is that no influence is exerted by the set of endogenous variables in the life satisfaction equation. Here we find the variables that are assumed exogenous playing the main role, which is in accordance to the canonical correlation analyses. In the third canonical correlation, they reveal that the main correlating variables stem from the set of exogenous variables.

Life satisfaction is highly significant when determining status, but the effect is negligibly small with an increase of between 1.9-2.5 points on average for one extra point of life satisfaction. The effect of working hours on status is significantly different from zero only in the older sample here. It is likely that the effect cannot be fully identified in a cross-sectional analysis as the time lag might show us either the result (a higher status) or the effort (many working hours). Another, at first rather unexpected, finding was that all results indicate a negative impact of full-time experience on status. This can, however, only be interpreted sensibly in the view of the fact that work starting ages differ.

In the working hours equation only status as an explanatory endogenous variable is included. Although the variable's size of effect differs by sample year, the relation to educational achievement becomes evident. The more working hours are encompassed by status, the smaller the effect of education becomes, because status has already been explained mainly by education. Sector effects are dominant as observed in the canonical correlation analysis, where working hours loaded highest in the fourth canonical correlation with sector effects dominating the set of exogenous variables.

Table 4: Three-stage least squares results

Variable	Coefficient (Std. Err.)	Variable	Coefficient (Std. Err.)
Equation 1 : Working Hours		Equation 1 : Working Hours	
Status	0.695*** (0.116)	Status	0.576*** (0.128)
Apprentice	1.266 (3.184)	Apprentice	8.130** (3.535)
University	8.456 (5.503)	University	16.330*** (6.076)
Agriculture	40.934*** (9.618)	Agriculture	63.814*** (12.526)
Trade	17.742*** (4.015)	Trade	13.499*** (4.351)
Transport	20.379*** (4.953)	Transport	40.178*** (5.464)
Public service	-21.266*** (5.082)	Public service	-18.853*** (5.675)
Medium Sized Firm	-18.382*** (3.094)	Medium Sized Firm	-12.623*** (3.405)
Large Sized Firm	-20.240*** (3.137)	Large Sized Firm	-16.813*** (3.369)
Conscientiousness	6.734*** (1.442)	Conscientiousness	2.303 (1.460)
Intercept	368.262*** (10.498)	Intercept	392.258*** (11.370)

Variable	Coefficient (Std. Err.)
Equation 2 : LogIncome 2005	
Life Satisfaction	0.038*** (0.012)
Status	0.012*** (0.001)
Working Hours	-0.001* (0.001)
Full Time Experience	0.041*** (0.003)
Full Time Experience2/100	-0.086*** (0.009)
Tenure	0.015*** (0.003)
Tenure2/1000	-0.240*** (0.085)
Unemployment Experience	-0.031** (0.013)
Unemployment Experience2/100	0.405** (0.177)
Works East	-0.276*** (0.020)
Trade	-0.132*** (0.025)
Social service	-0.167*** (0.027)
Public service	-0.274*** (0.033)
Service	-0.092*** (0.028)
Medium Sized Firm	0.041* (0.021)
Large Sized Firm	0.103*** (0.021)
Commuting Distance	0.002** (0.001)
Commuting Distance2/1000	-0.007 (0.008)
Intercept	6.691*** (0.273)

Variable	Coefficient (Std. Err.)
Equation 2 : LogIncome 2009	
Life Satisfaction	0.036*** (0.012)
Status	0.012*** (0.001)
Working Hours	-0.001 (0.000)
Full Time Experience	0.047*** (0.003)
Full Time Experience2/100	-0.100*** (0.008)
Tenure	0.012*** (0.003)
Tenure2/1000	-0.200** (0.080)
Unemployment Experience	-0.039*** (0.009)
Unemployment Experience2/100	0.197*** (0.070)
Works East	-0.255*** (0.017)
Trade	-0.160*** (0.024)
Social service	-0.254*** (0.029)
Public service	-0.182*** (0.032)
Service	-0.089*** (0.028)
Medium Sized Firm	0.085*** (0.019)
Large Sized Firm	0.147*** (0.019)
Commuting Distance	0.003*** (0.001)
Commuting Distance2/1000	-0.022*** (0.007)
Intercept	6.457*** (0.206)

Variable	Coefficient (Std. Err.)
Equation 3 : Status 2005	
Working Hours	0.114*** (0.033)
Life Satisfaction	1.989*** (0.655)
Apprentice	4.329*** (1.244)
A Levels	17.343*** (1.684)
Technical College	33.776*** (1.953)
University	44.231*** (2.000)
Full Time Experience	-0.096** (0.044)
Unemployment Experience	-1.985*** (0.411)
Medium Sized Firm	3.535*** (1.128)
Large Sized Firm	5.935*** (1.120)
Agriculture	-12.600*** (3.064)
Trade	2.632* (1.493)
Transport	-3.391** (1.640)
Bank Insurance	9.558*** (1.673)
Social service	11.467*** (1.526)
Public service	9.835*** (1.698)
Service	6.496*** (1.621)
Intercept	-19.399 (15.098)

Variable	Coefficient (Std. Err.)
Equation 3: Status 2009	
Working Hours	-0.049 (0.040)
Life Satisfaction	2.511*** (0.723)
Apprentice	5.454*** (1.527)
A Levels	20.347*** (1.948)
Technical College	36.878*** (2.190)
University	51.182*** (2.471)
Full Time Experience	-0.095* (0.052)
Unemployment Experience	-1.259*** (0.363)
Medium Sized Firm	2.111* (1.260)
Large Sized Firm	3.644*** (1.277)
Agriculture	-6.793 (4.595)
Trade	6.079*** (1.711)
Transport	-1.837 (2.402)
Bank Insurance	9.015*** (1.961)
Social service	16.327*** (2.010)
Public service	3.672* (2.043)
Service	6.356*** (1.888)
Intercept	47.944*** (17.631)

Variable	Coefficient (Std. Err.)
Equation 4 : Life Satisfaction 2005	
Log Income	0.406 (0.286)
Status	0.003 (0.004)
Working Hours	-0.003 (0.002)
Full Time Experience	-0.046** (0.019)
Full Time Experience2/100	0.090** (0.045)
Unemployment Experience	-0.128*** (0.031)
Single	-0.235** (0.092)
Divorced	-0.420*** (0.149)
Doctor Visits	-0.025 (0.024)
Doctor Visits2	-0.002 (0.002)
Lives East	-0.345*** (0.100)
Recent Loss	0.104 (1.391)
Recent Birth	0.357** (0.142)
Exercise	0.062** (0.025)
Volunteering	0.054* (0.028)
Number of Friends	0.030*** (0.006)
Extraversion	0.095*** (0.029)
Agreeableness	0.107*** (0.031)
Neuroticism	0.292*** (0.027)
Conscientiousness	0.138*** (0.038)
Openness	0.055** (0.028)
Commuting Distance	-0.005 (0.003)
Commuting Distance2/1000	0.056* (0.034)
Intercept	2.972 (2.491)

Variable	Coefficient (Std. Err.)
Equation 4 : Life Satisfaction 2009	
Log Income	0.384 (0.266)
Status	-0.001 (0.004)
Working Hours	0.001 (0.002)
Full Time Experience	-0.019 (0.019)
Full Time Experience2/100	0.005 (0.046)
Unemployment Experience	-0.071*** (0.026)
Single	-0.196** (0.084)
Divorced	-0.399*** (0.130)
Doctor Visits	-0.076*** (0.015)
Doctor Visits2	0.001** (0.001)
Lives East	-0.203** (0.092)
Recent Loss	-1.690* (0.973)
Recent Birth	0.234 (0.143)
Exercise	0.097*** (0.026)
Volunteering	0.053* (0.028)
Number of Friends	0.024*** (0.009)
Extraversion	0.096*** (0.033)
Agreeableness	0.111*** (0.030)
Neuroticism	0.364*** (0.028)
Conscientiousness	0.088** (0.034)
Openness	0.016 (0.029)
Commuting Distance	-0.009*** (0.003)
Commuting Distance2/1000	0.068** (0.033)
Intercept	1.512 (2.276)

References

- [1] G. S. Becker. Human capital. *NBER, New York*.
- [2] D. G. Blanchflower and A. J. Oswald. Is well-being u-shaped over the life cycle? *Social Science & Medicine*, 66(8):1733–1749, 2008.
- [3] C. Boll. Lohnneinbußen von frauen durch geburtsbedingte erwerbsunterbrechungen. *Wirtschaftsdienst*, 90(10):700–702, 2010.
- [4] G. J. Borjas. *Labor Economics*. New York and NY: McGraw-Hill/Irwin, 6 edition, 2013.
- [5] A. Chadi. Employed but still unhappy? on the relevance of the social work norm. *On the Relevance of the Social Work Norm (January 14, 2011)*. *SOEPpaper*, (353), 2011.
- [6] A. Clark, Y. Georgellis, and P. Sanfey. Scarring: The psychological impact of past unemployment. *Economica*, 68(270):221–241, 2003.
- [7] A. E. Clark and A. J. Oswald. Satisfaction and comparison income. *Journal of public economics*, 61(3):359–381, 1996.
- [8] E. Diener and R. Biswas-Diener. Will money increase subjective well-being? *Social indicators research*, 57(2):119–169, 2002.
- [9] E. Diener, R. A. Emmons, R. J. Larsen, and S. Griffin. The satisfaction with life scale. *Journal of personality assessment*, 49(1):71–75, 1985.
- [10] E. Diener, C. Nickerson, R. E. Lucas, and E. Sandvik. Dispositional affect and job outcomes. *Social Indicators Research*, 59(3):229–259, 2002.
- [11] A. L. Duckworth and M. E. Seligman. Self-discipline outdoes iq in predicting academic performance of adolescents. *Psychological Science*, 16(12):939–944, 2005.
- [12] R. A. Easterlin, L. A. McVey, M. Switek, O. Sawangfa, and J. S. Zweig. The happiness–income paradox revisited. *Proceedings of the National Academy of Sciences*, 107(52):22463–22468, 2010.
- [13] A. Ferrer-i Carbonell and P. Frijters. How important is methodology for the estimates of the determinants of happiness? *The Economic Journal*, 114(497):641–659, 2004.
- [14] R. Filer, D. Hamermesh, and A. Rees. *The economics of work and pay* (6 th), 1996.
- [15] B. S. Frey, S. Luechinger, and A. Stutzer. The life satisfaction approach to valuing public goods: The case of terrorism. *Public Choice*, 138(3):317–345, 2009.
- [16] P. Frijters, J. P. Haisken-DeNew, and M. A. Shields. Money does matter! evidence from increasing real income and life satisfaction in east germany following reunification. *American Economic Review*, pages 730–740, 2004.
- [17] J. I. Gimenez-Nadal and J. A. Molina. Commuting time and labour supply: A causal effect? Technical report, Institute for the Study of Labor (IZA), 2011.
- [18] B. Headey, R. Muffels, and G. G. Wagner. Long-running german panel survey shows that personal and economic choices, not just genes, matter for happiness. *Proceedings of the National Academy of Sciences*, 107(42):17922–17926, 2010.
- [19] H. Herwartz. A note on model selection in (time series) regression models—general-to-specific or specific-to-general? *Applied Economics Letters*, 17(12):1157–1160, 2010.
- [20] G. Judge, R. C. Hill, W. E. Griffiths, H. Lutkepohl, and T.-C. Lee. *Introduction to the theory and practice of econometrics*. John Wiley& Sons, Inc., 605 Third Ave., New York, NY 10158, 1982, 880, 1982.

- [21] D. Kahneman, A. B. Krueger, D. Schkade, N. Schwarz, and A. A. Stone. Would you be happier if you were richer? a focusing illusion. *Science*, 312(5782):1908–1910, 2006.
- [22] A. Knabe and S. Rätzel. Income, happiness, and the disutility of labour. *Economics Letters*, 107(1):77–79, 2010.
- [23] S. Korenman and D. Neumark. Does marriage really make men more productive? *Journal of Human Resources*, pages 282–307, 1991.
- [24] E. F. Luttmer. Neighbors as negatives: Relative earnings and well-being. Technical report, National Bureau of Economic Research, 2004.
- [25] S. Lyubomirsky, L. King, and E. Diener. The benefits of frequent positive affect: does happiness lead to success? *Psychological bulletin*, 131(6):803, 2005.
- [26] R. R. McCrae. Validation of the five-factor model of personality across instruments and observers. *Journal of personality and social psychology*, 52(1):81–90, 1987.
- [27] R. R. McCrae and P. T. Costa. *Personality in adulthood*. Guilford Press, New York, 1990.
- [28] J. A. Mincer. Schooling and earnings. In *Schooling, experience, and earnings*, pages 41–63. Columbia University Press, 1974.
- [29] C. J. Mottaz. The relative importance of intrinsic and extrinsic rewards as determinants of work satisfaction. *The Sociological Quarterly*, 26(3):365–385, 1985.
- [30] B. Pouwels, J. Siegers, and J. D. Vlasblom. Income, working hours, and happiness. *Economics Letters*, 99(1):72–74, 2008.
- [31] N. Powdthavee. How much does money really matter? estimating the causal effects of income on happiness. *Empirical Economics*, 39(1):77–92, 2010.
- [32] S. Rätzel. Labour supply, life satisfaction, and the (dis) utility of work. *The Scandinavian Journal of Economics*, 114(4):1160–1181, 2012.
- [33] B. W. Roberts and D. Mroczek. Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1):31–35, 2008.
- [34] S. L. Ross and Y. Zenou. Are shirking and leisure substitutable? an empirical test of efficiency wages based on urban economic theory. *Regional Science and Urban Economics*, 38(5):498–517, 2008.
- [35] P. Rupert, E. Stancanelli, and E. Wasmer. Commuting, wages and bargaining power. Working paper, 2009.
- [36] U. Schimmack, S. Oishi, R. M. Furr, and D. C. Funder. Personality and life satisfaction: A facet-level analysis. *Personality and Social Psychology Bulletin*, 30(8):1062–1075, 2004.
- [37] S. Sharma. *Applied multivariate techniques*. John Wiley & Sons, Inc., 1995.
- [38] M. Spence. Job market signaling. *The quarterly journal of Economics*, 87(3):355–374, 1973.
- [39] J. Uhlig, H. Solga, and J. Schupp. Bildungsungleichheiten und blockierte lernpotenziale: Welche bedeutung hat die persönlichkeitsstruktur für diesen zusammenhang? *Zeitschrift für Soziologie*, 38(5):418–440, 2009.
- [40] J. Vatter. Well-being in germany: What explains the regional variation? 2012.
- [41] J. Wagner. Sektorlohndifferentiale in der bundesrepublik deutschland: empirische befunde und ökonometrische analysen zu theoretischen erklärungen. *Jahrbuch für Sozialwissenschaft*, pages 70–102, 1991.
- [42] L. Wichert and W. Pohlmeier. Female labor force participation and the big five. *ZEW-Centre for European Economic Research Discussion Paper*, (10-003), 2010.

- [43] T. D. Wilson and D. T. Gilbert. Explaining away: A model of affective adaptation. *Perspectives on Psychological Science*, 3(5):370–386, 2008.
- [44] L. Winkelmann and R. Winkelmann. Why are the unemployed so unhappy? evidence from panel data. *Economica*, 65(257):1–15, 2003.
- [45] J. M. Wooldridge. *Introductory econometrics: a modern approach*. Cengage Learning, 2012.
- [46] C. Wunder. *Zufriedenheit und relatives Einkommen: Eine empirische Analyse von inter-und intrapersonellen Einkommensvergleichen aus ökonomischer Perspektive*. PhD thesis, 2009.

HWWI Research Papers

since 2012

- 144 [Towards a new measure of a country's competitiveness: applying canonical correlation](#)
Lars Wenzel, André Wolf, November 2013
- 143 [Economics of Extreme Weather Events in Cities: Terminology and Regional Impact Models](#)
Malte Jahn, Oktober 2013
- 142 [Regional Diversity in the Costs of Electricity Outages: Results for German Counties](#)
Simon Piaszeck, Lars Wenzel, André Wolf, September 2013
- 141 [A Zidane Clustering Theorem - Why top players tend to play in one team and how the competitive balance can be restored](#)
Henning Vöpel, September 2013
- 140 [Short-term Forecasting with Business Surveys: Evidence for German IHK Data at Federal State Level](#)
Lars Wenzel, André Wolf, August 2013
- 139 [Sektorale und regionale Betroffenheit durch den Klimawandel am Beispiel der Metropolregion Hamburg](#)
Xenia Frei, Julia Kowalewski, June 2013
- 138 [Equal matches are only half the battle. Why German female graduates earn 33% less than males](#)
Christina Boll, January 2013
- 137 [Protection against major catastrophes: an economic perspective](#)
Lars Wenzel, André Wolf, January 2013
- 136 [The political economy of trade and migration: Evidence from the U.S. Congress](#)
Paola Conconi, Giovanni Facchini, Max Friedrich Steinhardt, Maurizio Zanardi, December 2012
- 135 [Political Determinants of Budget Deficit in Pakistan: An Empirical Investigation](#)
Mumtaz Anwar, November 2012
- 134 [The Impact of Distance in Seaborne Trade: An Analysis of Bilateral Container Transport Flows](#)
Franziska Biermann, November 2012
- 133 [Forecasting Regional Growth in Germany: A panel approach using Business Survey Data](#)
Lars Wenzel, October 2012
- 132 [Public Sector Employment and Fertility in Germany](#)
Nora Reich, September 2012
- 131 [The effect of market access on the labor market: Evidence from German reunification](#)
Ulrich Zierahn, September 2012
- 130 [Monocentric Cities, Endogenous Agglomeration, and Unemployment Disparities](#)
Ulrich Zierahn, September 2012
- 129 [Impact of Benefit Sanctions on Unemployment Outflow – Evidence from German Survey Data](#)
Katja Hillmann, Ingrid Hohenleitner, September 2012
- 128 [Who leaves and when? Selective outmigration of immigrants from Germany](#)
Torben Kuhlenkasper, Max Friedrich Steinhardt, June 2012

- 127 Inter-industrial relations and sectoral employment development in German regions
Julia Kowalewski, June 2012
- 126 Regionalization of national input-output tables: empirical evidence on the use of the FLQ formula
Julia Kowalewski, June 2012
- 125 Does Dual Citizenship Increase Naturalization? Evidence from Indian Immigrants in the U.S.
Daniel Naujoks, May 2012
- 124 The Estimation of Reservation Wages: A Simulation-Based Comparison
Julian S. Leppin, April 2012
- 123 Trade and Economic Growth: A Re-examination of the Empirical Evidence
Matthias Busse, Jens Königer, April 2012
- 122 Immigration and Election Outcomes – Evidence from City Districts in Hamburg
Alkis Henri Otto, Max Friedrich Steinhardt, April 2012
- 121 Renewables in the energy transition – Evidence on solar home systems and lighting fuel choice in Kenya
Jann Lay, Janosch Ondraczek, Jana Stöver, April 2012
- 120 Weniger Rechtsverletzungen durch mehr Informationen? Arbeitsmarkterfahrungen und Informationsbedarf bulgarisch- und albanischsprachiger Zugewanderter in Berlin
Vesela Kovacheva, Dita Vogel, Mai 2012
- 119 Creative professionals and high-skilled agents: Polarization of employment growth?
Jan Wedemeier, March 2012
- 118 Unraveling the complexity of U.S. presidential approval. A multi-dimensional semi-parametric approach
Michael Berlemann, Soeren Enkelmann, Torben Kuhlenkasper, February 2012
- 117 Policy Options for Climate Policy in the Residential Building Sector: The Case of Germany
Sebastian Schröder, February 2012
- 116 Fathers' Childcare: the Difference between Participation and Amount of Time
Nora Reich, February 2012
- 115 Fathers' Childcare and Parental Leave Policies – Evidence from Western European Countries and Canada
Nora Reich, Christina Boll, Julian Leppin, Hamburg, February 2012
- 114 What Drives FDI from Non-traditional Sources? A Comparative Analysis of the Determinants of Bilateral FDI Flows
Maximiliano Sosa Andrés, Peter Nunnenkamp, Matthias Busse, Hamburg, January 2012

The **Hamburg Institute of International Economics (HWWI)** is an independent economic research institute, based on a non-profit public-private partnership, which was founded in 2005. The University of Hamburg and the Hamburg Chamber of Commerce are shareholders in the Institute . The HWWI has developed its own principles of good scientific practice in conjunction with the German Research Foundation (DFG).

The HWWI's main goals are to:

- Promote economic sciences in research and teaching;
- Conduct high-quality economic research;
- Transfer and disseminate economic knowledge to policy makers, stakeholders and the general public.

The HWWI carries out interdisciplinary research activities in the context of the following research areas:

- Economic Trends and Global Markets,
- Regional Economics and Urban Development,
- Sectoral Change: Maritime Industries and Aerospace,
- Institutions and Institutional Change,
- Energy and Raw Material Markets,
- Environment and Climate,
- Demography, Migration and Integration,
- Labour and Family Economics,
- Health and Sports Economics,
- Family Owned Business, and
- Real Estate and Asset Markets.

Hamburg Institute of International Economics (HWWI)

Heimhuder Str. 71 | 20148 Hamburg | Germany

Phone: +49 (0)40 34 05 76 - 0 | Fax: +49 (0)40 34 05 76 - 776

info@hwwi.org | www.hwwi.org