# The Sustainability Wage Gap

Finance Working Paper N° 718/2020
April 2022

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## Abstract

Using detailed administrative employer-employee matched data and a novel measure that quantifies the environmental sustainability of different economic activities of Swedish private sector firms, we provide evidence that workers earn about 9 percent lower wages in firms that operate in more sustainable sectors. We hypothesize that this Sustainability Wage Gap arises because workers, especially those with higher skills and from younger cohorts, value environmental sustainability and accept lower wages to work in more environmentally sustainable firms and sectors. Accordingly, we find that the Sustainability Wage Gap is larger for high-skilled workers and increasing over time. In further analysis, we document that more sustainable firms are also better able to recruit and retain high-skilled workers. We argue that our results are difficult to reconcile with many alternative interpretations suggested in prior research and that the Sustainability Wage Gap carries important implications for firms' human resource strategies and firm value.



Keywords: Wage differentials; Allocation of talent; Human capital; Sustainability; ESG; CSR

JEL Classifications: J24, J31, Q56, G32



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# I Introduction

Attracting and retaining talent is important not only for a firm's competitiveness, but also for economic development (Murphy, Shleifer, and Vishny 1991). But what affects this allocation of talent? There is mounting evidence that individuals increasingly care about the environment. For instance, a survey conducted by the Pew Research Center in 2017 found that almost three quarters of Americans think that the country should do whatever it takes to protect the environment (Anderson 2017).

In this paper, we systematically analyze whether workers value the environmental sustainability of the companies, or the sectors in which they work. Using detailed employer-employee matched data from Sweden, we uncover and provide novel evidence that workers have preferences for environmental sustainability[1] and are willing to accept lower wages to work in more sustainable firms and sectors. Specifically, our analysis provides direct evidence that employees in firms and sectors that are considered most environmentally sustainable earn about 9% lower wages. We coin this empirical regularity the *Sustainability Wage Gap*. Our analysis also shows that the Sustainability Wage Gap is bigger for more skilled workers and increasing over time, consistent with anecdotal evidence that preferences for protecting the environment are more pronounced among highly talented individuals and younger birth cohorts such as Generation Y (Millennials) and Generation Z (birth cohorts after 2000).

We start by motivating our analysis of the Sustainability Wage Gap using an online survey. The survey produces several pieces of evidence consistent with our main hypothesis: first, many individuals care about the sustainability characteristics of their jobs and these preferences tend to be more pronounced for more skilled individuals. The survey also demonstrates that individuals are willing to accept lower wages to work for more sustainable firms: specifically, the Sustainability Wage Gap is almost 20% conditional on willingness to accept a wage cut to work for more environmentally sustainable firms and about 10% unconditionally.

While the evidence based on our survey is consistent with the main premise of our paper—i.e., people are willing to work for less in more sustainable jobs—it is not clear if survey responses capture intentions only, or whether stated intentions also translate into true labor market outcomes. To overcome this concern, our main analysis makes use of administrative

[1] As discussed more comprehensively in Appendix A, Sustainability, Corporate Social Responsibility (CSR), and the recently popularized umbrella concept ESG (Environmental, Social and Governance) are all related and difficult to delineate exactly. We believe that these concepts are ultimately concerned with similar matters, namely how firms address social and environmental issues—or more generally—firms' overall societal impact. In our paper, we assume that measures of sustainability, CSR, and ESG tend to be positively correlated and we choose to refer to them collectively as "Sustainability" or "ESG."

employer-employee matched data from Sweden. These data contain highly detailed information on wages, standard Mincerian controls such as age and education, as well as information on occupation and detailed measures of cognitive as well as non-cognitive skills from military enlistment tests. To test whether workers do indeed accept lower wages to work in jobs that are considered more sustainable, we combine the administrative labor data with several different measures of sustainability, both at the firm- and the sector-level. Specifically, we use standard firm-level Environmental, Social, and Governance (ESG) data and a novel survey-based measure that quantifies the environmental sustainability of economic activities.

Using firm-level ESG scores from MSCI and Refinitiv, two prominent sources for ESG data that have been used in prior financial economics research (see, for example, Dyck et al 2019 and Pedersen, Fitzgibbons, and Pomorski 2021), we provide evidence that firms with better ESG scores (especially those with better environmental scores) pay lower wages. Our analysis compares otherwise similar workers in the same occupation and in the same sector. We find that, on average, the most sustainable firms in a sector pay 4.3% (Refinitiv) and 3.1% (MSCI) lower wages. Moreover, we analyze whether wages react to negative ESG news (or reputational shocks) using data from RepRisk, a data provider specialized in monitoring firm-specific ESG news. We document that firms that are subject to negative ESG news tend to increase wages by 2.7% in the year following the negative news incidents.

However, the use of firm-level ESG scores is potentially problematic for at least two reasons. First, firm-level ESG scores are generally only available for large and listed firms in the most recent past. Second, there are potential methodological issues with such scores (see, for example, Gibson, Krueger, and Schmidt 2021, Berg, Fabisik, and Sautner 2021, or Berg, Koelbel and Rigobon 2022) and it is not always clear how these scores are constructed ("black box"). Given these problems, we choose a survey-based sustainability measure at the sector-level in our main tests. In contrast to the potential problems with ESG scores, the novel sector-level sustainability measure is based on an intuitive, straightforward, and transparent methodology, which is also available for private companies. We develop the survey-based measure explicitly for the analysis in our paper by asking a sample of online survey participants to classify 95 different economic sectors (covering 98% of the Swedish private sector worker population) in terms of their environmental sustainability. Another important advantage of our survey-based measure is that the environmental sustainability of a firm's main economic activity is likely to be more comprehensible for potential workers than information captured by commercially available ESG scores. Overall, we believe that our survey-based sustainability measure is better at capturing the perceived sustainability of firms than commercially available ESG scores.

Using our sector-level sustainability measure, we compare two otherwise very similar workers, in the same occupation, in the same year who work in a sustainable versus an unsustainable sector. For instance, when comparing selected occupations that are likely to exist in all sectors (e.g., secretaries, human resource professionals, accountants, lawyers, etc.), we find that the Sustainability Wage Gap for these professions ranges from about -7.2 % for executives and directors to -18.6 % for human resources professionals. Across all occupations, we find robust evidence that workers in firms that belong to the most sustainable sectors earn about 9-15% lower wages.

A potential concern with our findings could be related to unobserved worker heterogeneity. For instance, individuals who self-select into working for firms belonging to more sustainable firms or sectors might be less talented than workers in other sectors, which, in turn, could explain lower wages. Given our detailed employer-employee matched data, we are able to control for many worker characteristics such as education and experience as well as for—*usually unobservable*—talent measures such as cognitive and non-cognitive skills from military enlistment tests. Importantly, in all our regressions we also control for detailed occupational information. Moreover, we also analyse how wages of workers *change* after workers switch sectors. Consistent with our hypothesis, we find that workers who move from more (less) sustainable to less (more) sustainable sectors experience a wage increase (decrease). Specifically, in these tests, we investigate job switches that happened for arguably more exogenous reasons after firms face bankruptcies or mass layoffs.

We also examine heterogeneity in the documented Sustainability Wage Gap and find that the wage gap is larger for workers with high cognitive or non-cognitive skills and growing over time (about 2% percentage points per decade). Moreover, the wage gap is growing even faster for the most skilled workers. An equivalent reading of our hypothesis is that, fixing a wage, more sustainable firms are better able to attract and retain workers that are more talented. Focusing on outcome variables capturing worker attraction, retention, and turnover we indeed find that workers in firms operating in more sustainable industries are more highly educated and talented using several different measures for education and talent (e.g., when workers have university respectively doctoral degrees or when they exhibit higher cognitive and non-cognitive capabilities). We also find that those workers are less likely to leave a firm in a sustainable sector on a voluntary basis. Taken together, the tests focusing on turnover and retention lend support to the view that firms in more sustainable sectors are better able to attract and retain talented workers including workers with high non-cognitive skills, a component of skill that has been found to be of growing importance in the workplace (see Deming 2017).

While we rely on non-experimental data, we argue that the proposed Sustainability Wage Gap channel is more difficult to reconcile with reverse causation or other already proposed channels through which sustainability may explicitly (or implicitly) affect wages. First, many alternative explanations would predict *higher*, or at least not lower wages for workers of firms with better sustainability. Second, our survey reveals heterogeneous preferences for sustainable jobs among different subpopulations of the labor force (e.g., by skill). Any alternative explanation would need to explain such differences as well. Econometrically, the additional hypotheses allow us to exploit within firm-year-variation and control for unobserved time-varying firm heterogeneity by including firm-year fixed effects. An example of this firm-year heterogeneity is profitability, for instance. In the tests focusing on worker heterogeneity, we find evidence consistent with the Sustainability Wage Gap hypothesis.

One possibility could be that high sustainability sectors offer non-wage amenities that are associated with lower wages. For instance, prior research has stressed that firms offer non-wage compensation in the form of, for instance, maternity benefits (see, e.g., Liu et al (2021)), and workers might accept lower wages in return for such amenities. In addition, there is a rich literature in labor economics highlighting inter-industry wage differentials (see, for instance, Krueger and Summers (1988), Katz and Summers (1989), Gibbons and Katz (1992)). Hence, a valid concern is that well known compensating wage differentials such as firing risk, hazardous work conditions, work flexibility, or better training opportunities are correlated with the sustainability of a sector, and thus driving the relation between wages and the sustainability of the sector.

Using several non-wage worker-level outcomes as dependent variables, we examine whether and how job- and worker-level outcomes that are potentially the result of certain industries offering compensating differentials are related to our sector-level sustainability measure. These tests show that, if anything, the most sustainable sectors often offer amenities in the *opposite direction* of what one would expect if these amenities would indeed drive the Sustainability Wage Gap. To further address the issue of compensating differentials and alternative explanations for our findings, we leverage our online survey: we explicitly ask the survey respondents to rate sectors in terms of other compensating differentials (e.g., work-life benefits). When we use these survey-based assessments sector-level assessments of sector-level compensating differentials alongside our main sustainability measure, we find that that the Sustainability Wage Gap remains highly significant and orders of magnitude larger than the wage gaps (or premiums) associated with the other sector characteristics (e.g., work-life benefits or dangerous working conditions). Last, and importantly, the firm-level tests using

Best-of-class ESG scores also address the concern of unobserved industry heterogeneity given that in those tests we compare workers within the same sector (at the 3-digit level), further alleviating concerns that the documented wage differences are unrelated to sustainability and driven by other sectoral differences.

The rest of the paper is organized as follows: In the next section, we discuss our contribution to the literature. Section III introduces the main data sources and explains how we construct our main measures for sustainability. Section IV uses the data from our online survey to motivate our analysis and develop the main hypotheses. Section V presents the main evidence on the Sustainability Wage Gap using detailed administrative employer-employee matched data from Sweden. Section VI investigates labor market consequences of sustainability for the most talented workers and also examines whether there are time trends in the Sustainability Wage Gap. Section VII presents a battery of additional tests aimed at ruling out leading alternative interpretations for our findings. In Section VIII, we relate commercial ESG scores to wages. In Section IX we examine how measures of employee turnover and retention relate to our sustainability measure. Section X concludes.

# II Related Literature

In this paper, we contribute to several strands of the economics and finance literature. First, we add to research concerned with the financial performance implications of sustainability by documenting a new channel through which sustainability can affect the bottom line of firms. Second, we add to the debate on how to measure sustainability at the firm-level by proposing an intuitive and straightforward way of quantifying the sustainability of firms. Finally, our paper also connects to the labor-economics literature on inter-industry wage differentials and non-monetary incentives and the meaning of work.

Our paper contributes to the literature that studies the relation between sustainability policies and firm performance. The evidence in this literature is ambiguous. For example, early meta-studies such as Margolis, Elfenbein, and Walsh (2007) show evidence of positive, negative, and no relation between financial performance and sustainability policies. However, more recent, and more comprehensive meta-studies argues in favour of a predominantly non-negative correlation between financial performance and sustainability characteristics (e.g., Friede, Busch, and Bassen 2015). From a corporate finance perspective, firms' sustainability efforts could translate into higher firm value either by lowering discount rates or by increasing cash flows. Several recent papers provide evidence that firms with better ESG performance

exhibit lower cost of capital (e.g., Chava 2014; Dunn, Fitzgibbons, and Pomorski 2018; Albuquerque, Koskinen, and Zhang 2019). In contrast, prior research has been less able to credibly identify channels and mechanisms through which ESG policies would causally affect a firm's cash flows. Servaes and Tamayo (2017) is a notable exception in this respect. They provide evidence consistent with the view that consumer facing firms with better ESG policies have higher firm value, possibly due to such firms being able to sustain higher margins if sustainability aware customers are willing to pay higher prices. While more sustainable companies might attract customers with sustainability preferences willing to pay higher reservation prices, it cannot be ruled out that products of more sustainable firms also exhibit higher quality and thus command higher prices. In our setting, we can control more directly for the quality dimension given that we have detailed demographic information including cognitive- and non-cognitive skills of the workers. In relation to this literature, our paper identifies another channel through which sustainability can potentially positively affect cash flows.

Another dimension along which we improve on the existing literature is that many of the papers that study the question of whether firms can do well by doing good (see Benabou and Tirole 2010) fail to provide causal evidence of the respective channels. In particular, a simple reverse causation explanation, i.e., well-performing firms having more financial slack to invest into sustainability, appears to be an alternative explanation that is usually difficult to rule out. The availability of very granular data at the worker-level as well as additional predictions on specific subpopulations, derived from heterogeneity of workers' preferences for jobs in sustainable sectors, allows us to rule out many other explanations. Hence, we believe that our paper makes a step forward in identifying a specific channel through which sustainability can affect cash flows, namely lower labour costs.

Our paper also contributes to the discussion on the measurement of sustainability. There is an ongoing debate about the divergence, opaqueness and methodological issues concerning commercially available ESG scores (Berg, Koelbel, and Rigobon 2022; Gibson, Krueger, and Schmidt 2021). Recent research also points to ESG data providers "rewriting history" by changing historical ESG scores (see Berg, Fabisik, and Sautner 2021). We offer a novel and intuitive sector-wide measure of the environmental sustainability of firms based on a simple survey that can be easily replicated and applied in other, related domains. Using our measure, we also show that individuals form meaningful expectations about the sustainability of different sectors and that those expectations have real consequences.

We also contribute to the rich labor economics literature. A large body of work starting at least with Slichter (1950) documents significant industry-differences in wages paid to workers (Schweitzer 1969; Dickens and Katz 1987; Summers and Krueger 1988; Katz and Summers 1989; Murphy and Topel 1990). Our analysis suggests that some of these inter-industry wage differentials can potentially be attributed to the environmental sustainability characteristics of different industrial sectors, in particular since we explicitly control for typically unobservable ability measures which have been thought to be behind observed wage differences across sectors (Gibbons and Katz, 1992; Gibbons et al. 2005). Other papers in the labor literature have focused more on firm-specific factors related to firm productivity differences (see Syverson 2011; Card et al 2018) or more generally unobserved firm heterogeneity (e.g., Abowd, Kramarz, and Margolis 1999; Card, Heining, and Kline 2013; Card, Cardoso, and Kline 2015; Song et al, 2019) in driving wage differentials. Our analysis suggests that some of these observable and unobservable firm effects could potentially be related to sustainability. In a recent paper, Card et al (2018) synthesize insights from the literature on rent-sharing and the literature emphasizing two-way fixed effects models (Abowd, Kramarz, and Margolis 1999) and proposes a theory of wage setting in which workers have idiosyncratic tastes for different workplaces. Our paper is strongly related to this modelling approach, since our paper suggests that one dimension of these idiosyncratic tastes is the environmental sustainability of the economic activity of firms. We also contribute to the labor literature on compensating differentials, which goes back at least to Adam Smith (see Rosen 1986). In a recent paper, Sorkin (2018) estimates that compensating differentials account for over half of the firm component in the variance of wages. Our analysis suggests that firm- or industry-level environmental sustainability is an important compensating differential that is not captured by more established compensating differentials such as firing risk, health risk, or the flexibility to move to other sectors.

Last, we also add to a large literature on non-monetary incentives and the meaning of work in labor economics. Cassar and Meier (2018) summarize the literature and point out that, "in principle, job meaning could be either a substitute or a complement to monetary compensation, which in turn will influence whether people accept lower pay for a meaningful job, or whether job meaning and pay tend to rise together. The evidence on this point is mixed." Our findings show that workers accept lower wages for more environmentally sustainable jobs, suggesting that in our setting *meaning*—as proxied by the environmental sustainability of the job— acts as a substitute to wages. Dur and van Lent (2019) show that most workers care about having a socially useful job and suffer when they consider their job useless. We show that workers are

willing to "pay" in order to work in a more environmentally useful job by accepting lower wages and thus foregoing compensation. Our paper is also closely related to Burbano (2016), Hedblom, Hickman, and List (2022), Bunderson and Thakor (2020), or Schneider, Brun, and Weber (2020) who use mainly surveys and experiments to show that workers are willing to give up parts of their wages to work in more sustainable, more meaningful, or less immoral jobs. For instance, Hedblom, Hickman, and List (2022) make use of a very rich natural field experiment to show, among other results, that workers in corporate social responsible firms are more productive. Moreover, their findings suggest that Corporate Social Responsibility (CSR) may have implications for retention, a hypothesis that could not be tested in their data. Our analysis using observational data is complementary to their analysis and shows consistent results. One reading of our findings is, that more sustainable firms are able to recruit better (that is, more talented) workers, for the same wage. Moreover, we also show that more sustainable firms are indeed better at attracting and retaining more talented workers. Similarly, Burbano (2016) uses an online experiment to show workers accept 44% lower wage bids for the same job after learning about the employer's social responsibility. Her paper provides causal empirical evidence of revealed preferences for social responsibility in the workplace and of workers' willingness to give up pecuniary benefits for nonpecuniary benefits. She also shows stronger social preferences among the highest performers, a point that our analysis also makes. While the internal validity of such experiments is high, it remains unclear whether these findings generalize and transfer to workers actually accepting lower wages. Our paper uses non-experimental data from the whole Swedish private sector working population to show the external validity of such preferences for sustainable jobs. At the same time, the internal validity of our analysis remains arguably high as we can include a set of very detailed worker-, occupation-, and sector-level controls, including detailed measures of talent. Moreover, we make use of an online survey to uncover important heterogeneities in the preferences for sustainable jobs. We believe that documenting these heterogeneities is already a contribution in itself but most important for us the insights on heterogeneous preferences for sustainable jobs also generate additional predictions regarding the Sustainability Wage Gap channel that we can test in our administrative wage data, and which are more difficult to reconcile with alternative explanations. On the empirical side, we make use of unique and granular measures of different dimensions of skills to show that the Sustainability Wage Gap is higher for workers with high cognitive, but also with high non-cognitive skills, a component of skill that has been found to be of growing importance in the workplace (see Deming 2017). We also find that retention rates

of individuals with better non-cognitive skills are higher among firms that operate in more sustainable sectors.

# III Data

## III.A Measuring the Sustainability of Firms and Sectors

In our empirical analysis, we use different ways to quantify the sustainability of a job. While we are agnostic about the precise definition of sustainability (see also our discussion in Appendix A), we do think that an increasingly important component of sustainability concerns the impact of firms on the environment. Indeed, Hartzmark and Sussman (2019) run a survey on MTurk to examine which elements of a company's business practices are most related to the concept of "sustainability." According to their survey, the majority of respondents believes that the sustainability of a firm's business practices relates primarily to a firm's environmental impact (79%) and its products (48 %). We build on this idea and construct our primary measure of sustainability based on the extent to which a firm's primary economic activity can be considered environmentally sustainable. Secondly, we also rely on traditional ESG data from commercial data providers.

### III.A.1 Survey Based Measure of the Environmental Sustainability of Economic Activities

To assess the environmental sustainability of economic activities we make use of on an online survey[2] using Prolific, a participant recruitment tool for online surveys. In the survey, which we run in November 2021, participants are primarily asked to (i) answer several questions regarding the importance of environmental aspects in choosing an employer and (ii) classify economic sectors in terms of their environmental sustainability (1=unsustainable, 5=sustainable).

In Appendix Table B.1, we show some demographic and other information of the survey participants. In total, we recruit 300 survey participants and balance male and female participants ex-ante. Our sample of 300 survey participants contains 50.33% male and 47.33% female participants. About 2.34% identify as Non-binary or Other in terms of gender. The mean age of the participants is 26 years. The respondents are mainly from developed countries (as defined by the OECD). On average, the respondents take about 26 minutes to complete the survey.

[2] Appendix B provides more detail on the survey.

In Panel A (B) of Appendix Table B.2, we provide an overview of the ten most sustainable (unsustainable) industries according to the 300 survey participants. We focus on 95 economic sectors that cover 98% of employment in our matched worker-firm data. Appendix E shows the survey questions in greater detail. Each survey participant is asked to classify 30 randomly drawn economic sectors in terms of sustainability, which leads to about 90 survey responses for each sector. The responses are highly plausible with undoubtedly unsustainable activities such as extraction of crude petroleum and natural gas, manufacture of rubber and plastic products, or mining of coal being classified as unsustainable. In contrast, activities such as recycling of metal waste and scrap as well as education are classified as being more sustainable.[3]

Classifying sectors in terms of environmental sustainability might be obvious for some economic activities, but difficult for others. Therefore, we allow survey participants to choose the response "Do not know" (DNK). We examine the issue of DNK responses more systematically by plotting the percentage of DNK answers for a given sector against the average sustainability of the sector. Intuitively, the chart displayed in Appendix Figure B.3 suggests a hump-shape, indicating that sectors that end up in the middle of the environmental sustainability distribution are more difficult to classify in terms of their environmental sustainability (i.e., exhibit a higher fraction of DNK responses). In contrast, there is less uncertainty about the most sustainable and unsustainable sectors in the tails, as evidenced by a lower fraction of DNK answers. In particular, survey respondents appear most certain (low percentage of DNK answers) about the most sustainable industries (right tail). Hence, our empirical analysis will use primarily specifications that focus on the tails and thus the most informative parts of the distribution of the survey-based environmental sustainability measure.

In the survey, we also explicitly ask the respondents to characterize sectors in terms of other compensating differentials. Very similar in spirit to the sector-level sustainability classifications, each survey respondent is asked to rate ten randomly selected sectors in terms of several other dimensions. Section V of the survey (see Appendix E) lists the dimensions the survey

[3] We also ran pilot surveys on a sample of second year Bachelor students in Economics and Management enrolled in a Corporate Finance lecture in December 2019 and 2020. Appendix Figure B.1 in Appendix B shows a scatterplot of the sector-level sustainability measures obtained from the 2019 and 2020 student populations. We find that the assessments of the sustainability of different industries is very stable across the 2019 and 2020 student cohorts, with the correlation being 0.92. Appendix Figure B.2 shows a scatter plot between the average industry classifications resulting from the student surveys in 2019 and 2020 and the Prolific sample in 2021. The correlation between the sustainability classifications from the Prolific and the student populations is also high (0.9136). Overall, our analyses of industry classifications resulting from different survey populations show that classifications do not vary much across samples, suggesting relatively high external validity of our survey-based approach to measuring the sustainability of economic activities.

respondents were asked to evaluate. For instance, we ask respondents to state their agreement (or disagreement) with statements like *Working in sector [xyz] is physical demanding or dangerous (high risk of accidents)* or *working in sector [xyz] allows for a good work-life balance.* We also ask the survey participants to evaluate the corporate governance or social responsibility of the sectors. Given that it could also be difficult for survey respondents to rate certain sectors in terms of these other dimensions, we always allow for the answer of "Do not know". Based on about 30 survey evaluations per sector and evaluated dimension, we calculate the average sector characteristics, which we use as controls in some of the wage regressions later on.

### III.A.2 Commercial ESG Data assessing Corporate Policies, Practices, and Processes and Shocks to firms' ESG profiles

The environmental sustainability of a firm's primary economic sector is one way of thinking about a firm's sustainability. However, a second way to quantify if a firm is sustainable is to evaluate its policies and practices. There are now many commercial data providers that rank and score firms in terms of their ESG policies, practices, and processes. While it might be difficult for firms to change their primary economic activity (e.g., selling coal or drilling oil), firms can choose to implement better environmental policies to mitigate the negative impacts of their activities. The quality of these policies is what we intend to capture using ESG scores.

Despite the recognition that ESG scores for the same firm can disagree across data providers (see Berg, Koelbel, and Rigobon 2022; Gibson, Krueger, and Schmidt 2021), such measures have been used in prior economics and finance research (see, for example, Hong and Kostovetsky 2012; Lins, Servaes, and Tamayo 2017; Liang and Renneboog 2017). To address the issue of disagreement[4] and ensure robustness of our results, we use ESG scores from two different data providers, namely MSCI and Refinitiv. We choose these data providers because they provide data for a meaningful number of Swedish firms.[5] Note that besides the limitations of ESG scores in terms of disagreement and methodologies, another limitation of these measures is that they are generally only available for publicly listed companies and in more recent periods. This is a big advantage for our sector-level measure, which we can use for 98% of our employment data.

[4] Using a sample of S&P500 firms between 2010 and 2017 and ESG scores from seven different ESG data providers, Gibson, Krueger, and Schmidt (2021) find that the average correlation for the total ESG score is about 0.45.

[5] In Section 4 of the Internet Appendix, we provide further details and background on the ESG scores data we use in the paper.

In a final set of tests leveraging commercial ESG data we use more "event-driven" ESG news data from RepRisk. This company identifies and tracks negative news related to firms' ESG policies reported by third parties. The information is collected from media sources including newspapers, social media, online news, blogs, and NGOs using artificial intelligence and human analysis. Using proprietary methodology, Reprisk combine these news and event data into a reputational risk index (RRI) which falls in the interval of 0 and 100. The index increases when negative ESG news is reported for a firm. Higher values indicate higher negative ESG news flow. In case no further negative ESG news is published, the RRI decays naturally over time until it reaches zero. We use these data to identify negative "shocks" to a firm's ESG performance.

## III.B Worker and wage data

Our main data source for the administrative worker information is the Longitudinal Integration Database for Health Insurance and Labor Market Studies (LISA), provided by Statistics Sweden (SCB). LISA contains employment information (such as employment status, the identity of the employer, and occupation), tax records (including labor and capital income), and demographic information (such as age, education, and family composition) for all individuals 16 years of age and older, domiciled in Sweden, starting in 1990. Our main analysis focus on the period after 2000 as our tests make use of detailed occupational information which is not available for the period between 1991 and 2000. We also exclude workers in the public sector from our analysis given, as it may be special with respect to wage setting and job security, for instance.[6] In LISA, the sector in which an individual works is reported according to the Swedish Standard Industrial Classification (SNI) code at the level of the establishment at which they are employed. Note that a firm can have establishments in different sectors, for instance, if it is a multi-segment firm. For labor income, we use reported annual earnings before tax. Importantly, this information is not censored or top-coded, and includes bonus payments.

We also make use of talent measures consisting of estimates of cognitive and non-cognitive abilities from military aptitude tests. Cognitive ability (similar to IQ) was assessed through subtests covering logic, verbal, spatial, and technical comprehension. The four test results were aggregated into an overall integer valued score ranging from 1 (lowest) to 9 (highest), according to a Stanine (standard nine) scale that approximates a normal distribution with a mean of about

[6] When we do include the public sector in the analysis, it increases the magnitude of the Sustainability Wage Gap estimates.

5 and standard deviation of about 2. A certified psychologist assessed the non-cognitive ability score through a 25-minute semi-structured interview. The individual was graded on his willingness to assume responsibility, independence, outgoing character, persistence, emotional stability, and power of initiative. The psychologist would weigh these components together and assign an overall non-cognitive score on a 1 to 9 Stanine scale. We complement these measures with detailed information on secondary education, including high-school grades and track, which enables us to impute a corresponding talent measure for women. Please refer to Böhm, Metzger, and Strömberg (2021) for more information on the imputed ability scores for women as well as for a more extensive discussion on the Swedish data in general.

We also use additional data from the Swedish Labor Force Survey (LFS) that collects data on actual working hours. Please note that these data cannot be linked to the other administrative data and, hence, we have more limited information of workers in this sample.

Table I provides descriptive statistics of the data. All variables are defined and described in Appendix Table D.1. The employer-employee matched data is described in further detail in Section 3 of the Internet Appendix.

# IV The Sustainability Wage Gap – Hypotheses

We argue that firms' sustainability policies can benefit their bottom lines by lowering labor costs and allowing firms to attract and retain workers that are more talented. The main idea is that more sustainable firms can hire workers with explicit sustainability preferences at lower wages, or, equivalently, by offering a certain wage, they can hire workers that are more talented. Two central assumptions underlying our main hypothesis are that

(i) workers exhibit preferences for the sustainability of their jobs and

(ii) these preferences affect their labor market choices.

To motivate our analysis and illustrate that workers do indeed have preferences for the environmental sustainability of their jobs consistent with our main hypothesis we make use of the data collected through the Prolific survey. First, we provide evidence that workers exhibit sustainability preferences related to their labor choices. In our Prolific survey, we ask participants the question of how important it is for them to have an environmentally sustainable job. Our analysis reveals that a total of 65% of the respondents state that it is either *Very important* or *Important* to have an environmentally sustainable job (see Table B.3, Panel A). Second, we demonstrate that individuals also display labor choices consistent with our main hypothesis. More specifically, we ask survey participants if they would consider accepting a

lower wage to work for a firm that is environmentally sustainable. We also ask the survey participants if they would be willing to work harder for an environmentally sustainable firm. The analysis shows that about 52% of the participants state that they would be willing to accept a wage cut to work for a more environmentally sustainable firm. The average wage concession is almost 20% conditional on willingness to accept a wage cut to work for more environmentally sustainable firms and about 10% unconditionally.[7] In addition, an economically large 82% state that—for the same wage—they would be willing to work harder for an environmentally sustainable firm. Consistent with the evidence from the Prolific survey we formulate our first hypothesis on the Sustainability Wage Gap:

*Hypothesis 1: Workers in firms that operate in more sustainable industries or in firms that have better ESG policies relative to industry peers are paid less.*

We now also show that preferences for sustainability aspects of jobs are systematically related to meaningful worker characteristics. For instance, more skilled workers might care more about the environmental sustainability of their jobs. Documenting such heterogeneity would be interesting for two reasons. First, accommodating the preferences of more skilled workers in order to attract and retain the most talented workers is increasingly important for firms to remain competitive, in particular in today's knowledge-based economy. Second, heterogeneity in sustainability preferences leads to additional predictions which we can test in the administrative wage data, and which allow us to rule out possible alternative explanations.

Indeed, our Prolific survey provides evidence that preferences for environmental aspects of jobs are systematically related to the talent (or skill) of a worker. To measure the talent of our survey respondents we ask them to answer the following two questions: "In high school, how was your academic performance relative to your classmates?" and "Where did you rank in terms of your grades in high school." When conditioning responses to the question of "How important is it to have a job that is environmentally sustainable" on high values of the survey-based proxies for talent, we generally find that more talented respondents also exhibit stronger environmental preferences for their jobs. For instance, Table B.3, Panel B shows that 78.5% of respondents who stated to have ranked in the Top 10 of their high-school class answered that it is important or very important to have an environmentally sustainable job. This figure is only 61.7% in the group of respondents outside of the Top 10. The difference in the responses between the two groups is significant at the five percent level. Secondly, the respondents who

[7] See Appendix Table B.3 in Appendix B.

state that their academic performance in high school was much better relative to their classmates also attach more importance to the environmental sustainability of jobs. While 77.1% of respondents with above average high-school performance state that it is important or very important that their job is environmentally sustainable, this figure is only 47.9% in the group of respondents with below average performance. The difference in responses is statistically significant. Based on this, we formulate

*Hypothesis 2a: The Sustainability Wage Gap is larger for workers that are more talented.*

Finally, we also explore the issue of trends in the Sustainability Wage Gap. For instance, anecdotal evidence suggests that firms find it increasingly difficult to retain talent and that Generation Y ("Millennials") and Z (i.e., cohorts born after 1980) have strong preferences for meaning or purpose in their jobs. While we would like to test the prediction that environmental preferences vary across birth cohorts in the Prolific survey data, we do not have enough variation in terms of birth cohorts: the median age of our respondents is 24 years (see Table B.1) and the 95 percentile is 45 years. Given that we only have one single survey run, we can also not compare changes in sustainability preferences over time. However, other research suggests that environmental issues, in particular those related to climate change, have become more important over time. For example, Sautner et al (2021) provide evidence that since the early 2000s, the extent to which climate change issues are discussed in earnings conference calls has increased. In addition, our analysis of a representative labor market survey from the International Social Survey Programme (ISSP) (see the Internet Appendix) also provides evidence that preferences for sustainability of jobs have increased over time.[8] In line with this evidence, we state

*Hypothesis 2b: The Sustainability Wage Gap is increasing over time.*

While the evidence from the Prolific survey on the Sustainability Wage Gap hypothesis is suggestive, it is not clear whether survey responses capture intentions only, or whether they also translate into true labor market outcomes. Thus, we will test Hypotheses 1, 2a, and 2b using detailed employer-employee matched data from Statistics Sweden.

[8] We also motivate our main hypotheses using a representative labor market the International Social Survey Programme (ISSP). The ISSP is a cross-national collaboration that runs annual surveys on topics important to the social sciences and includes the Work Orientations Survey, which seeks to collect data on attitudes toward work and working conditions (see Dur and van Lent 2019). For brevity, we explain these data and our tests in detail in Section 2 of the Internet Appendix.

# V The Sustainability Wage Gap: Do Sustainable Sectors Pay Lower Wages?

To test the main hypothesis that workers are willing to work for lower wages in more sustainable sectors and firms, we make use of the administrative employer-employee matched data of the Swedish population, which we match with our survey-based measure described in the previous section. The survey evidence was suggestive of individuals considering to work for lower wages in more environmentally sustainable firms. While this result is supportive of our main hypothesis, it remains unclear whether intentions expressed in surveys also translate into real choices in the labor market, which is why we now examine administrative employer-employee matched data from Sweden.

We start our analysis of the administrative wage data by running standard Mincerian wage regressions augmented by an indicator variable capturing the environmental sustainability of the sector of employment of the individual. The dummy variable *Sustain. (high)* equals one if the sector belongs to the top sustainability quintile of all sectors.[9] To set the stage, we estimate in Panel A of Table II the Sustainability Wage Gap for a selected set of occupations which exist in virtually all sectors (e.g., receptionists and secretaries, human resource professionals, or accountants, among others). The estimates show sustainability wage gaps ranging from about -7.2% for executives and directors to -18.6% for Human resources professionals.

In our main regression analysis (see Panel B, Table II) we use the full sample of occupations. Consistent with Hypothesis 1, Column (1) in Panel A of Table II shows that male workers earn about 15.6% less if they work in sectors considered to have high environmental sustainability.[10] The magnitude of the effect is remarkably similar to the median wage concession of 15% that we find in our survey of Prolific subjects (see Appendix Table B.3).

Although we control for education and experience, there is the concern that other omitted factors explain why workers or occupations in more sustainable sectors are less productive. For instance, education is a very broad measure of ability and there might be considerable variation among university graduates. To address this concern, we control for cognitive and non-cognitive skills from military enlistments tests (or predicted cognitive skills for women) in

[9] We describe alternative specifications allowing for different functional forms later in the paper and find robust results.

[10] We cluster standard errors at the firm-level. In Internet Appendix Table IA.1, we take several alternative structures for the error terms into consideration. Our results remain robust to various ways of clustering.

Column (2). These measures have been found to be very informative for labor related outcomes (see Lindqvist and Vestman 2011 or Böhm, Metzger, and Strömberg 2021). Once we control for these skill measures, the coefficient estimate on the sustainability dummy stays almost unchanged.

In columns (3) to (5) we make use of different granularities of occupation-year fixed effects, controlling for occupation-specific, time-varying heterogeneity.[11] Hence, we compare two otherwise very similar workers, in the same occupation, in the same year who work in a sustainable versus an unsustainable sector. For instance, we are comparing wages of an otherwise similar secretary, accountant, or lawyer in a mining company vs. a recycling company. In the specification with the highest level of occupation-specific granularity, i.e., the specification in Column (5), we find that the wage difference between workers in the same occupation, of the same education, same experience, same cognitive and non-cognitive skills in sectors with high and low environmental sustainability is about 8.4%. Given that occupational and sectoral choices are sometimes indistinguishable[12], we think of this 8.4%, which is still very sizeable, as a lower bound for the Sustainability Wage Gap. In the analysis that follows, we will be conservative and include occupation-year fixed effects at the highest level of granularity (i.e., *Ssyk4*, 4-digit).[13]

Last, we replicate the main results for women as well. Panel C of Table II shows very similar sustainability wage gaps for women. Please note that we do not have cognitive or non-cognitive skills measure for women. Instead, we impute their cognitive skills by making use of detailed information on grades and tracks at high school. Given these limitations we focus the subsequent analyses on men for which we have more detailed skills measures.

While our measure of sustainability at the sector-level is time-invariant, we can exploit within-worker variation, analyzing job changes across sectors. In Column (1) of Table III, we include worker fixed effects. The coefficient of working in a high sustainability sector is 5.5%, a bit smaller than the OLS results but still very sizeable. One concern with this specification is that it implicitly assumes that workers randomly move between firms and sectors. This assumption is unlikely to be true in general and is particularly difficult to defend in our setting. The (timing of) job changes across different sectors might be correlated with some

[11] We employ Swedish Standard Classification of Occupations (SSYK) codes at different level of granularity. The finest level (*Ssyk4*, 4-digit) corresponds to 354 unique occupations, the 3-digit level *Ssyk3* to 113 unique ones, and *Occ8* corresponds to eight unique occupational groups.

[12] For instance, the occupation "Health professionals (except nursing)" (*ssyk3* code 222) does not exist outside the health sector.

[13] In unreported analysis we also include region fixed effects. These tests produce slightly larger (in absolute terms) estimates of the Sustainability Wage Gap.

unobservable time-varying characteristics of workers such as expected changes in household compositions or changes of preferences (e.g., due to a "midlife crisis"). We discuss the issue that job changes are non-random and predictable using important life-events in Appendix C.

However, we partly address the concerns that moves between firms and sectors are not random by looking at "more" exogenous job changes. We focus on workers who had to change jobs because of their firms going bankrupt in the previous year (see Columns (2) and (3), Table III) or because their firms experienced a massive layoff of more than 75% of their workforce (see Columns (4) and (5)), Table III). We analyze the wage changes (difference of log wages) of those workers by comparing the wage the worker received in the job he got laid off from and the wage he received in the new job. This means that we condition on workers who lost their job but had a smooth transition to the next job. Please also note that while the timing of changing jobs is reasonably exogenous, the decision which sector to join is endogenous and might still depend on time-varying omitted variables. We regress the wage changes on a variable that measures the changes in the sustainability of the jobs as well. The variable takes the value of 1 if a worker moves from an unsustainable job to a sustainable job, the value of -1 if the worker moves from a sustainable job to an unsustainable one, and the value of 0 if the level of sustainability remains the same. We denote this variable as *Ch. in sustain. (high)*. We also analyze upgrades/downgrades in terms of sustainability using separate dummy variables. Columns (2) and (4) of Table III show that moving to a more sustainable (unsustainable) sector is, on average, related with a wage decrease (increase) of 4.3-5.5%. This holds for workers who changed jobs because their company went bankrupt or underwent a mass layoff. When we investigate upgrades/downgrades separately, we observe that workers who move to more sustainable firms afterwards, experience a wage decrease of between 6.1 – 6.5% relative to workers who moved across firms of similar sustainability (omitted category). Workers who move to firms in less sustainable sectors, on the contrary, experience a wage increase of 2.4 – 3.9% relative to the omitted category. Overall, our analysis shows robust evidence that workers in more sustainable firms earn less, exploiting both cross-sectional variation as well as exploiting within-worker variation.

Next, we analyze the validity of our environmental sustainability measure as well as its robustness by analyzing different functional forms. In Panel A of Table IV, Column (1), we use the continuous version of the measure, which we denote by *Sustain. (cont.)*. The point estimate is –0.081 and significant at the 1%-level. The estimated effect is very large in absolute terms, suggesting that a worker moving from the lowest rated sector to the highest rated sector earns about 32% less. However, investigating the raw data suggests that it is likely that there are

important non-linearities in the effect. The binned scatter plot in Figure I that relates wages to our sustainability measures suggests, for instance, moving by one notch in the middle of the sustainability distribution is not the same as moving by one notch in the top of the distribution.

In Column (2), Table IV, Panel A we therefore split the continuous variable into quintiles. This analysis reveals two interesting facts: i) the wage difference is growing (in absolute terms) almost monotonously; ii) the results are mostly driven by the highest rated sectors (and to a certain extent by the sectors that are least sustainable). For instance, in Column (2) we see a sizeable difference between the least sustainable sectors (the omitted category) and the sectors in the middle of the distribution (-0.037 to -0.067). We then observe another, even bigger, jump between the most sustainable sectors and the other ones. The point estimate for the dummy identifying the most sustainable sectors is -0.128, suggesting a jump of about 6 percentage points between the most sustainable sectors and the sectors in the second most sustainable category. In terms of insights, the analysis exploring functional forms is similar to the graphical evidence provided in Figure I: using a binned scatter plot on the association between wages and our sustainability measure, the figure showed stronger effects in the tails as opposed to the middle of the sustainability distribution. These non-linear patterns are also consistent with results from auxiliary analysis where we show that people find it relatively straightforward to classify the most sustainable and unsustainable sectors in the tails of the sustainability distribution, whereas classifying sectors in the middle of the distribution appears more difficult.[14]

In Column (3), we define a worker-weighted dummy for high sustainability sectors. More specifically, *Sustain. (high – empl.)* is a dummy variable that is equal to one if the sustainability score of a worker's job belongs to the top 20% of all workers' jobs, i.e., we compute a worker-weighted dummy of high sustainability jobs. Consistent with previous analysis, we find that those workers earn about 10% less than comparable workers in less sustainable sectors.

In Panel B of Table IV, we conduct additional robustness tests by looking at several subsamples or adding additional controls. In Column (1), we consider only observations from the most recent years of the sample periods (2016-2017), given that our sustainability measure is not time-varying, and the survey was conducted in 2021. There is the concern that the sustainability of some sectors may have changed over the full period and that our measure is less relevant for early years of the sample. Focusing on the most recent years does not change the results and the estimates are virtually unchanged (-0.077 vs -0.084). In Column (2), we

[14] The fraction of "Do not know" survey responses is higher for industries in the middle of the distribution and lower in the left and right tail (see Figure B.3 in Appendix B and the discussion in Section III.A.1 of the paper).

focus only on full-time workers as there might be the concern that the composition of fulltime vs. part-time workers is systematically different in high vs. low sustainability sectors. However, the estimate is again basically unchanged (-0.087). In column (3), we control for municipality-year fixed effects, addressing the concern that sustainable jobs might be clustered across regions with different price-levels. In column (4) we exclude sectors that have obvious other positive/negative amenities, e.g., mining, which is a dangerous activity or are similar to public sector jobs (e.g., education or health).

Finally, we also examine the Sustainability Wage Gap along the wage distribution by using quantile regressions. Figure II plots marginal effects of different quantiles of worker wages to the sustainability of the sector. We document a sizeable wage gap across all quantiles of the wage distribution. We see that the size of the wage gap (in logs) is larger in absolute terms for low wages (e.g., -23.9% at the $10^{th}$ quantile) and lower for high wages (e.g., -7.9% at the $90^{th}$ quantile). Overall, these results show that working in a more sustainable sector is not just a luxury good available to the best earning individuals and percentagewise, the wage gap is higher for workers in the lower quantiles of the wage distribution.

# VI The Sustainability Wage Gap for Highly Educated Workers and its Evolution over Time

As discussed in Section IV, there exists substantial heterogeneity among workers with respect to preferences towards sustainability. Our survey suggest that more talented people care more about environmental aspects of their jobs. In addition, there is anecdotal evidence that these sustainability preferences are increasing over time. This evidence leads to additional predictions, which we can test in our administrative data. These tests are informative and important for at least two reasons.

First, they are helpful in terms of more credibly identifying an effect of sustainability on wages as any alternative explanation would also need to explain such heterogeneity. For instance, if firing risk or hazardous work conditions were driving the results, it remains unclear why higher educated workers would be more affected by those. If anything, one would expect that higher educated workers could more easily find a new job or have white-collar jobs that expose them less to hazardous work conditions. Moreover, it remains unclear and would need to be explained why alternative channels such as firing risk or hazardous work conditions are becoming more important over time.

Second, if preferences towards sustainability were indeed more relevant for younger cohorts, our findings are expected to become even more important for firms in the future. Younger

cohorts (e.g., Generation Y (Millennials) and Generation Z) have entered the labor market and are climbing up the corporate ladder and, hence, accommodating their preferences might become increasingly important for firms to attract and retain the most talented workers. In other words, given the generational changes in the composition of the work population our analysis carries policy implications of increasing relevance in the future.

In the analysis of the administrative wage data, we proxy for talent using a university dummy as well as measures for cognitive and non-cognitive skills. Compared to using the achievement of a university degree as a crude measure of talent, an advantage of the skill-based talent measures is that they are sufficiently detailed to allow analysis of the upper percentiles of the talent distribution. Another benefit of these detailed skills measures is that they are comparable over time since the distributions in the population are the same across cohorts.[15] Moreover, it has been documented that especially non-cognitive skills have been of growing importance in the workplace (see Deming 2017).

In Table V, we now examine differential effects for groups with different levels of education or skills. Column (1) tests whether there are differences in the Sustainability Wage Gap for workers with and without a university degree. Given that there are workers with different levels of education (or skills) within the same firm-year, we can now also include firm-year fixed effects in our specifications, absorbing any time-varying firm-heterogeneity.[16] We find that the interaction term between the sustainability dummy and the university dummy is -5.0%. In columns (2) and (3), we analyze whether there are differential effects for the most talented workers using our measures of cognitive and non-cognitive skills. We define dummy variables *Cog89* (*Noncog89*) that are equal to one if cognitive skills (non-cognitive skills) are either 8 or 9, corresponding approximately to the top 5% of workers according to the skills distributions. Please note that we estimate positive and sizeable coefficients for the main effects of skills (and on top of education). The interaction term between the dummy variable identifying high-skilled individuals in terms of cognitive skills *(Cog89)* and sustainability is (-1.9%). The interaction between the sustainability dummy and high non-cognitive skills is (-1.2%). Summing up, the evidence is consistent with Hypothesis 2a, which states that the Sustainability Wage Gap is more pronounced for more talented workers.

[15] As pointed out by Böhm, Metzger, and Strömberg (2021), using educational attainment as a proxy for talent is problematic in time-series comparisons. Due to a large expansion of education, the cohort of university graduates has increased sharply over the last decades, resulting in a substantial decline of average talent in the group of university graduates. For instance, as shown in Böhm, Metzger, and Strömberg (2021), during 1990–2014, post-secondary attainment rose from 21 % to 37% accompanied by a decline in average cognitive ability of more than a fifth of a standard deviation in the working population.

[16] We obtain consistent results when we use firm fixed effects instead of firm-year fixed effects.

In column (4) we investigate whether, as stipulated in Hypothesis 2b, the documented Sustainability Wage Gap is indeed increasing over time. To test this hypothesis, we interact our sustainability dummy and time, which we measure using a linear trend. The interaction term is negative (-0.2%) implying that the Sustainability Wage Gap is increasing by about 2 percentage points per decade.

Given our previous findings and the growing importance of skill (especially, of non-cognitive skills (see Deming 2017)), we also test whether the wage gap is increasing at a higher rate for the most skilled workers. Thereby, we include, besides the main effects, double and triple interaction terms between education/talent, our sustainability dummy, and time, which we again measure using a linear trend. We document significant estimates on the triple interaction terms (about -0.1%) for the talent measures that capture high cognitive and non-cognitive skills (columns (6) and (7)). The increase of the effects of sustainability over time for workers with high cognitive and non-cognitive skills are also economically significant as they suggest that the wage gap is increasing by an additional percentage point every decade. Third, while returns to education are decreasing over time, the returns to skills are increasing over time, especially returns to non-cognitive skills. The triple interaction term between the university dummy, sustainability, and time is not significant (see column (5)). This also stresses the importance to use talent measures such as cognitive and non-cognitive skills with time-invariant distributions as educational attainment measures are becoming less informative due to a severe expansion of schooling over time (see Böhm, Metzger, and Strömberg 2021).

Taken together the results of Table V are supportive of the hypotheses that more talented workers have stronger preferences toward sustainability and are willing to accept lower wages and that these effects are growing over time. These findings increase our confidence in a causal interpretation of the Sustainability Wage Gap as any alternative explanations would need to explain those heterogeneities as well. Moreover, these tests also allow us to include firm-year fixed effects, controlling for time-varying, unobserved variables at the firm-level such as profitability, for instance.

# VII Alternative Explanations

A source of concern with our analysis could be that heterogeneity at the worker-, job-, or industry-level might explain our findings. For instance, the composition of jobs might be quite different across industries or there might be other aspects of the job or industry that make working in sustainable sectors more attractive (e.g., compensating differentials). We have

already addressed such concerns in several ways: First, given that we have information on occupation, we compared two workers in the same occupation, in the same year but in different sectors. Second, exploiting heterogeneity in workers' preferences for sustainability, we compared workers within the same firm, controlling for unobserved heterogeneity at the firm- or firm-year level and showed that the Sustainability Wage Gap is more pronounced for more skilled workers. Any alternative explanation would need to explain those heterogeneities as well. Also, one might argue that workers who select into more sustainable sectors or firms could potentially be less productive than workers in other sectors, which, in turn, could explain lower wages. Our baseline specifications have already addressed parts of such concerns. While we do not directly observe productivity, we made use of our detailed administrative data to control for worker characteristics that are expected to be correlated with productivity: on top of standard Mincerian controls, we controlled for detailed cognitive and non-cognitive talent measures from military enlistment tests, variables that have been found to be highly informative in explaining labor market outcomes (see Lindqvist and Vestman 2011 and Dal Bo et al. 2017, for instance).

While the evidence presented so far is consistent with the hypothesis that workers are willing to accept lower wages to work in a sector that is more sustainable, there might still be other aspects of working in these sectors that could possibly explain lower wages but are unrelated to environmental sustainability. For example, there might be compensating wage differentials such as firing risk, hazardous work conditions, work flexibility, or better training opportunities. In the following, we conduct several additional tests to explicitly rule out such alternative explanations. We structure these tests in three ways.

First, we examine whether job- and worker-level outcomes that could potentially be the result of certain industries exhibiting specific characteristics are related to our sector-level sustainability measure. For instance, if industries that exhibit higher sustainability are also subject to higher job security, we would expect that individuals working in high-sustainability sectors are less likely to be terminated (i.e., have lower firing risk). Given the detail of our data, we can directly test such hypotheses.

In a second series of tests aimed at addressing compensating differentials and alternative explanations for our findings, we further leverage the survey data collected through Prolific. In the survey, we explicitly ask the respondents to characterize sectors in terms of other compensating differentials. Similar in spirit to our sector-level sustainability classifications, each survey respondent was asked to rate ten randomly selected sectors in terms of issues such as whether working in the sector would, for instance, be considered physically demanding or allowed for good work-life balance. In the second series of tests, we use these sector-level

assessments (or ratings) alongside our main sustainability measure in Mincerian wage regressions as explanatory variables. Running "Horse-race" type regressions allows us to further rule out alternative explanations.

Third, in Section VIII, we will also make use of commercial ESG scores to compare wages of workers working in the same sector, but for firms with different ESG scores. While those scores have certain shortcomings (e.g., they only exist for publicly listed firms or can be inconsistent across ESG data providers), the analysis based on the ESG scores deliver additional insights since the ESG scores display within-industry variation. Moreover, we also document that firms that are subject to negative ESG news in a year tend to increase wages in the years following the negative news incidents. Overall, we argue that the firm-level evidence is inconsistent with an explanation based on non-ESG related sectoral differences but supportive of the Sustainability Wage Gap explanation.

## VII.A Compensating differentials

In this Section we directly address several alternative explanations based on non-ESG related compensating differentials.

### VII.A.1 Firing and wage risk

The first aspect we address is firing risk. One might hypothesize that firms in more sustainable sectors provide more stable employment, which in turn could explain lower wages in such sectors. To examine this possibility, we study in columns (1) and (2) of Table VI, Panel A whether and how several wage and non-wage worker-level outcomes capturing firing risk relate to our sustainability measure. More specifically, in Column (1), we examine whether the tenure of an employee, as measured by the number of years a worker has been in the same job, is related to our sustainability measure. The coefficient estimate on the *Sustain (high)* dummy is negative implying that workers in the most sustainable sectors have *shorter,* but certainly not longer work tenure. In Column (2), we examine if a dummy indicating whether a worker has been fired in a given year is related to our sustainability measure. The coefficient estimate on *Sustain (high.)* is significant and positive. Hence, the analysis shows that firing risk is actually *higher* in sectors with better environmental sustainability. The differences are large in relative terms – the risk of getting fired is 40% higher in sustainable sectors. Hence, if a compensating differential related to firing risk was driving our results, we would expect *higher*, but not lower wages for workers in more sustainable sectors. In columns (3)-(5) we also examine whether the risk of wage cuts of at least 10/20/30% is associated with the sustainability of the sector.

Consistent with the evidence in columns (1) and (2), we find that wage risk as measured through a significant reduction in wages is higher in sectors that are most sustainable. The estimates are also large in relative terms. For instance, the risk of experiencing a wage cut of more than 20% is about 25% higher in the most sustainable sectors compared to the remaining sectors. Overall, the evidence on firing and wage risk would imply *higher* not lower wages in more sustainable sectors.

As outlined at the beginning of this section, we also use our survey data to further address the issue of compensating differentials. In Table VI, Panel B, Column (1) we run a Mincerian wage regression in which we include a dummy variable identifying the sectors which the survey participants rated to have the highest job (*Job security (high)*). The coefficient estimate is virtually zero. When we run a Mincerian wage regression that includes all survey-based sector-level assessments (e.g., dummies identifying sectors with high job security, high work-life benefits, physically demanding work, etc.) alongside our sustainability measure (see Column (7)), the estimate on the *Job security (high)* becomes significant, but more important for us, the coefficient on *Sustain. (high)* remains highly economically and statistically significant. In fact, the estimate on *Sustain. (high)* is several orders of magnitude larger than any of the coefficient estimates on the other survey-based variables capturing other compensating differentials in Column (7).

### VII.A.2 Promotion, training, and career opportunities

Another alternative hypothesis that we can also explicitly test for is that firms in the most sustainable sectors provide better learning and training opportunities, which is why employees in such sectors would accept lower wages. In other words, working in these sectors could allow workers to enter a path of higher wage growth (despite lower starting levels) and catch up with, or even overtake workers (in terms of wages) who start in less sustainable sectors. We test this hypothesis directly in our data. To be specific, we investigate how wages of cohorts of 30-year old men develop over time. We analyze whether they work in sustainable or non-sustainable sectors at age 30 and follow those cohorts over time (until 2017, the last year of our data) and record their wage at age of 40 and age of 50. Please note that we do not require that workers stay in their firms or sectors and that they work fulltime (or even work at all) during their career. Indeed, the ability to switch industries, the likelihood of staying employed or of working full time might all be margins (compensating differentials) through which an initial job in a sustainable sector might have positive long-term consequences on wages. Columns (6) and (7) in Panel A of Table VI, show, however, that this is *not* the case. Individuals who worked in

sustainable sectors at age 30 still have a significant wage gap at age 40 (50): the difference is -0.104 log points (-0.113) at age 40 (50). Please note that we can only control for year fixed effects and not occupation-year fixed effects as our tests require to follow workers over a period of 10 or 20 years and occupational data becomes only available after 2000. We conclude, that overall, there is not much support in favor of the training hypothesis.

The next two tests deal with the concern that workers might be "stuck" in certain industries or occupations. If accumulated human capital is more specific in more sustainable sectors and less valuable in others, outside options might be smaller, negatively affecting the wage progression of workers in those industries or occupations. To address this issue, we look at subsamples of workers that are expected to be more "movable." First, we calculate the concentration of different occupations across sectors, i.e., we calculate how specific occupations are distributed across different sectors using the Herfindahl-Hirschman Index (HHI). We then focus our analysis on occupations with a low sector-specific concentration using cut-offs from the anti-trust literature (HHI < 0.25). This means we are focusing on occupations that exist in many different sectors, suggesting that movements across sectors are feasible. The specification in Column (1), Panel C of Table VI shows the results for this subsample. The estimate on *Sustain. (high)* is -0.087, once again almost unchanged relative to our baseline estimates. Next, we directly analyze the movements of workers across different sectors. For that test, we specify a sector-to-sector matrix of job switchers, including those who change firms but stay within the same sector. We then calculate the HHI for each "departing" sector and restrict our analysis to sectors from which workers can move more easily to other sectors (i.e., HHI < 0.25). The specification in Column (2) of Panel C Table VI shows an estimate of -0.083 which is slightly smaller but still very sizeable in absolute terms.

We also conduct tests using the survey data to rule out that training and career opportunities are driving the Sustainability Wage Gap. In Column (2) of Table VI Panel B we examine wages in sectors which the survey participants associate with the highest career opportunities. While jobs in industries which our survey participants consider having better training opportunities pay about 1.9% higher wages on average, controlling for this dimension (see columns (7) and (9) Table VI, Panel B) does not affect the estimates of the Sustainability Wage Gap.

### VII.A.3 Health risk

Another potentially omitted sector-level dimension is health risk. Perhaps, industries with higher sustainability also provide jobs that are less physically demanding and subject to lower health risk. Lower health risk could then potentially explain lower wages in these sectors. We

examine whether worker-level outcomes resulting from higher health risk exposure are related to our sustainability measure (see Columns (8) and (9) of Table VI Panel A). We find that workers in the most sustainable sectors are subject to *more* sick days and face a *higher* incidence of hospitalization. Hence, based on these proxies, health risk actually appears *higher* in high sustainability sectors. If health risk was behind the Sustainability Wage Gap, wages in more sustainable sectors should be *higher* not *lower*.

Further analysis using the survey-based assessment of health risk (as proxied by the extent to which our survey respondents believe that a sector is associated with physically demanding work) confirms that the Sustainability Wage Gap is not driven by high sustainability sectors exhibiting lower health risk (Table VI, Panel B, columns (3), (7), and (9)).

### VII.A.4 Work-life balance

Prior research has stressed that firms offer non-wage compensation in the forum of, for instance, maternity benefits or other non-wage amenities (see, e.g., Liu et al (2021)). Workers potentially value such work-life benefits or amenities (e.g., flexible work arrangements, high parental benefits, or a low stress work environment). In return, workers could accept lower wages. Hence a valid question is whether the Sustainability Wage Gap is driven by work-life balance related amenities being more prevalent in more sustainable sectors, thus explaining the Sustainability Wage Gap.

As already seen in the previous section, working in more sustainable sectors is *not* positively related to health outcomes as would be expected if sustainable sectors truly offered a better work-life balance for workers. In columns (10)-(12) of Table VI, Panel A, we make use of a labor force survey collecting data on actual hours worked per week. Please note that the data is only available for a smaller sample and cannot be matched with the other administrative data. This means that we cannot control for cognitive and non-cognitive skills in those tests. We focus on workers with full-time employments. Column (10) shows that workers in more sustainable sectors do not work less than workers in unsustainable sectors. Actually, the coefficient is positive, suggesting that these workers work 0.5% hours more per week – economically, this number seems negligible though. We also analyze whether workers in more sustainable sectors are less likely to work more extreme working hours per week (i.e., more than 50 or 60 hours per week). Columns (11) and (12) show that this is not the case. Actually, workers in more sustainable sectors are more likely to work more extreme hours. The likelihood to work more than 50 hours (60 hours) is 1.4 percentage points (1.6 percentage points) higher than for workers in less sustainable sectors. These effects are economically sizeable, especially

for working very extreme hours of 60h or above. Workers in more sustainable sectors are about 25% more likely to work more than 60 hours compared to workers in unsustainable sectors. Those findings are consistent with our survey evidence in which survey participants expressed their willingness to work harder for more sustainable firms.

We also examine other personal outcomes that would result from better work-life benefits being offered by more sustainable firms. Specifically, we use the extent to which a worker is married or divorced, whether the worker has children (as well as the number of children), and the extent to which the worker has been enjoying parental leave (as measured by the number of parental leave days the worker takes). The analysis in columns (13) to (17) shows that, if anything, worker-level outcomes associated with good work-life benefits are *less* prevalent for individuals working in high sustainability sectors. For instance, workers in high sustainability sectors are less (more) likely to be married (divorced), have fewer children and are also less likely to have children all together. There is no evidence that workers in these sectors take more parental leave days either.

In column (4), Panel B, Table VI, we also examine to what extent the wages are related to the survey-based assessment of a sector's work life balance. Consistent with the intuitive notion that workers accept lower wages for better work-life balance, the estimate for the coefficient of the dummy identifying the sectors with the highest work-life balance is negative: wages are on average about 2.9% lower in these sectors. Importantly, the Sustainability Wage Gap (-8.4%) is, in absolute terms, almost three times larger than this this estimate. Also, when we run a horse-race type of regression including all industry assessments in columns (7) and (9) the Sustainability Wage Gap remains highly statistically significant and its magnitude five times larger than that for work life benefits.

Overall, based on the tests of Table VI, there is little empirical support for the view that the reason for why workers in high sustainability sectors earn lower wages is that these sectors offer better work-life benefits to their workers. In fact, if anything, the opposite should be the case as work-life benefits seem lower in high sustainability sectors.

## VII.B Social responsibility and governance of the sector

In Table VI, Panel B, we also explore two other dimensions, namely the perceived social responsibility of the sector in which a company operates and the sector's perceived corporate governance. The tests on the social responsibility of the sector also help to connect our findings to the literature documenting that companies included in the list of the "Best companies to work

for" (BC) outperform other companies (see Edmans 2011 and Edmans, Li, and Zhang 2020). The predictions of being a BC (or a firm being "socially responsible") on wages are ambiguous. First, a company might be voted a BC by their workers because they pay *higher* wages. In that case, lower wages in more sustainable sectors are thus inconsistent with the hypothesis that our measure of sustainability is a proxy for BC. [17] Alternatively, it might also be the case that firms end up on the list of "Best companies to work for" because their employees like working in more environmentally sustainable firms. That would be fully consistent with our hypothesis of the Sustainability Wage Gap. However, BCs may also treat their workers better in non-pay dimensions, allowing these companies to pay lower wages. For instance, they may provide employees with mentorship, skills development, opportunities to step up, or a great corporate culture. We have already tested for some of these alternative explanations to the extent that those dimensions are correlated with our measures of compensating differentials. When we examine how wages are related to the perceived social responsibility of the sector (see Table VI, Panel B, Column (8)), we find evidence consistent with the view that otherwise similar workers earn about 1.4% lower wages in high responsibility sectors. However, the effect is much smaller than the Sustainability Wage Gap, which we estimate to be -12.3% in the same specification. Interestingly, firms in sectors with perceived good governance seem to pay higher wages. This might be related to firms with good governance also being more profitable. Interestingly, when we relate wages to commercially available firm-level ESG scores in Section VIII of the paper we find similar patterns of wages being positively related to the governance scores of the firms and negatively related to the social and environmental scores of a firm.

## VII.C Other ESG-related Explanations: Customer Awareness, Discount Rates, and Reverse Causation

One of the contributions of our paper is to provide direct evidence on a new channel through which sustainability or more generally ESG policies can potentially affect firms' cash flows, namely through the reduction of labor costs. Scholars have offered different (non-exclusive) explanations for a beneficial effect of ESG policies on financial performance: increased cash flows, lower discount rate, or a generally larger "corporate pie" to be shared between all stakeholders. Moreover, well performing firms being more able to invest into improving ESG policies, appears also consistent with most evidence presented in the previous literature. All of

[17] Interestingly, however, we do not find a positive correlation between "Best companies to work for" and being a highly sustainable company. When we compare "Best companies to work for" (BC) to the universe of the Swedish public companies, we document negative correlations between BC and sustainability.

those channels may also affect wages. In the following, we discuss these alternative explanations and their implications for wages and wage heterogeneity in more detail.[18]

(1) Investing into ESG might increase free cash flows of a firm, for instance, by allowing to sustain higher margins if customers with sustainability preferences are willing to pay higher prices (see Tamayo and Servaes 2013) or if suppliers are willing to deliver inputs at lower prices to sustainable firms. Explanations of this type would predict that ESG investments should increase the value added, and standard rent-sharing models would then predict higher (or at least not lower) wages for workers in high sustainability firms. Moreover, those explanations do not have any clear predictions on the heterogeneities of the wage gap that we document, i.e., the differential effects for high-skilled workers.

(2) Investing into ESG might decrease the cost of capital of a firm for two reasons. First, investors might be willing to forego some returns when providing capital to more sustainable firms (Pastor, Stambaugh, and Taylor 2021). For instance, there are governmental programs that support the transition into cleaner production processes by providing cheap loans or loan subsidies. These types of explanation would also predict that workers in high ESG firms would earn higher (or at least not lower) wages and, again, differential implications for high vs. low skilled workers and more recent cohorts are less clear. Second, investing into ESG might decrease the costs of capital by lowering the exposure to systematic risk of the company, e.g., by lowering the dependence on certain types of energy. Lower systematic risk may translate into lower wage risk or lower firing risk, which might then relate to lower wages as risk-averse workers require a risk premium for riskier jobs. The channel, in that case, would go through risk preferences and not directly through preferences for more sustainable jobs. We do not generally object to this interpretation, and it also operates through the same margin: more sustainable firms are able to pay lower wages. However, as we have shown in the previous subsections, job and wage risks are actually positively related to our sustainability measure. Moreover, the evidence from the heterogeneity tests is not supportive of a risk explanation. We documented that the wage gap is relatively larger for more talented workers and that it is increasing over time, consistent with heterogeneity in preferences towards sustainable jobs. It is less obvious why we would expect to see similar patterns in risk preferences. If anything, we would expect that more skilled workers are *less* exposed to wage or firing risks as highly skilled individuals have more outside options and lower unemployment risk. Moreover, as we shown in above, we can directly control for firing risk, for instance, in different sectors.

[18] Table IA.3 in Section 1 of the Internet Appendix tabulates the alternative explanations and provides references to related papers.

(3) One plausible explanation for positive correlations between ESG investments and (financial) performance is simple reverse causation. Firms which are (or expected to be) more profitable are more likely to invest into ESG. In this case, we would expect to see higher (or at least not lower) wages in high ESG firms due to rent sharing.

However, there might be more evolved channels through which ESG policies and wages are associated, without ESG having an effect on wages. For instance, a firm might be more profitable because it is able to pay lower wages for other reasons – and, because of being more profitable, it is also able to invest in its environmental sustainability. While we cannot formally rule out this alternative explanation, we can control for various observable characteristics that might be correlated with a firm's ability to pay lower wages for reasons not related to sustainability (see Section VII.A). Moreover, this alternative explanation also needs to explain the heterogeneity of the documented sustainability gap with respect to talent or cohorts, for instance (in particular because in the tests exploiting differences in worker preferences for sustainable jobs, we are able to absorb unobserved heterogeneity at the firm-level).

(4) Last, it has been advocated that investments into ESG can help "growing the corporate pie" and sustainability does not need to come at the expense of any stakeholder (see Edmans 2020). In this case, we would also expect to see higher wages in high ESG firms or sectors, but not lower wages.

Overall, we conclude that the alternative interpretations discussed in sections VII.A and VII.B are more difficult to reconcile with the full set of presented results. On the contrary, the results are fully consistent with the set of hypotheses derived from worker preferences toward sustainability and their heterogeneities.

# VIII The relation between Wages and firm-level ESG Scores

In the previous sections of the paper, we used a survey-based measure of sustainability at the sector-level. Using this measure had several advantages. First, the sustainability of sectors (compared to individual firms) can be easily assessed and judged by potential employees. Second, the methodology we used for the assessment of the sustainability of economic sectors is transparent. The interpretation of commercially available ESG scores, on the contrary, is not always straightforward: such scores are complex, their methodologies are often opaque ("black box"), and the scores rely to a large extent on self-reported data by firms. Third, there is increasing evidence of relatively low correlations between the ESG scores from different data providers (see Gibson, Krueger, and Schmidt 2021 or Berg, Koelbel, and Rigobon 2022).

Fourth, recent research has also documented changes to the historical scores by some ESG data providers (Berg, Fabisik, and Sautner 2021). Finally, historic data on firm-level ESG scores are available for publicly listed firms only, with the data often being available only for a relatively small number of years, which also restricts the sample in both the time-series and the cross-section. In contrast, our survey-based measure allows us to cover firms representing 98% of Swedish employment.

Despite the shortcomings of firm-level ESG scores, we believe that it is still interesting and potentially informative to analyze whether and how wages are related to ESG scores. Hence, we run some basic tests using ESG scores from MSCI and Refinitiv (former Thomson Reuters Asset4), two data providers that have been used in finance research before (e.g., Pedersen, Fitzgibbons and Pomorski 2021; Liang and Renneboog 2017; Ferrell, Liang, and Renneboog 2016). These tests are interesting as they assess firms' sustainability policies relative to their peers ("Best-of-class"). Note also that ESG scores seek to primarily assess the sustainability of the ESG policies and practices of firms and not of the sustainability of the products and services a firm sells. Hence, firms can be part of an unsustainable sector (e.g., oil) but still obtain good ESG scores. While it is more difficult for firms to change their main economic activity or to improve the sustainability of a whole sector to attract and retain talent, firms might be able to improve their ESG practices and policies compared to their peers by, for instance, investing into cleaner production technologies, improving their carbon footprint, and/or sourcing green energy. We complement those firm-level ESG scores with "event-driven" ESG data by RepRisk that identifies and tracks negative news related to firms' ESG policies. This allows us to analyze how wages of workers react to negative firm specific "ESG shocks".

Importantly, as already touched up on in the previous section, the analysis relying on firm-level ESG data further alleviates concerns that the sector-wide measures of sustainability may capture other sectoral differences, unrelated to sustainability. Indeed, the tests based on firm-level ESG scores or ESG news shocks compare firms within the same sector, with different ESG scores or workers within the same firm after ESG-related news shocks.

## VIII.A Best in class ESG scores

In our firm-level tests using ESG scores of MSCI and Refinitiv, we focus on the environmental pillar as the environmental dimension is most closely related to the sector-level measure used in the previous sections and also likely to be easier to interpret by potential workers. Indeed, we believe that it is more straightforward to objectively quantify the quality of a firm's environmental policies and practices since aspects such as water and energy use or greenhouse

gas emissions can be measured. In contrast, scoring firms regarding social and governance aspects requires more value judgements and is thus inherently more subjective. In addition, we do not have clear predictions regarding the impact of the social (S) or the governance score (G) on wages. For instance, the social score could potentially also incorporate the level of wages. In that case, one would expect a positive relationship between the social score and wages as ESG data providers are likely to assign higher scores to firms that pay higher wages. On the other hand, some of the aspects of the social score might also be related to compensating differentials such as work flexibility.

As pointed out before, ESG scores are relative to industry and geographical peer groups. For example, Refinitiv's ESG scores are "best of class" and are supposed to enable investors to choose companies that have better environmental and social policies than industry peers. Given that governance standards vary more strongly at the country-level, Refinitiv ranks firms relative to geographic peers when it comes to governance.[19] Refinitiv and MSCI use different industry classifications. We observe that the granularity of their industry peer-groups lies somewhere between a 2- or 3-digit industry classification in our data. In our regressions, we use peer firms in the same 3-digit industry as our main specification but we also investigate peer groups at the 2-digit level.

In Panel A of Table VII, we show summary statistics for the ESG scores of Refinitiv and MSCI. We report statistics on the composite ESG scores and the individual components (or pillar scores). Refinitiv scores have a support between 0 and 1 whereas that of MSCI lies between 0 and 10. In both cases, higher values indicate better ESG policies.[20] Consistent with the analysis using the industry-level measures, we use dummy variables as regressors. Specifically, the dummy variables identify for each industry year combination the firm with the highest ESG score. For instance, the variable *Best-of-class environ. (ind3)* identifies the firms in a given year that have the best environmental scores relative to their 3-digit industry peers. We use three (two) digit industry definitions, which reduces the number of firm years we can use in our analysis because at least one peer firm needs to be available. The mean of *Best-of-class environ. (ind3)* is 35% for MSCI (43% for Refinitiv) suggesting that there are about three firms (two firms) available in each industry-year cell. This implies that in the regressions, we

[19] As an example, Refinitiv states that their "ESG Scores are designed measure a company's relative ESG performance, commitment, and effectiveness across the three E, S and G pillars."
[20] Section 4 in the Internet Appendix provides more details and further descriptive statistics on the ESG score data.

are going to compare the best-of-class firm with one (Refinitiv) or two firms (MSCI) in the same sector.[21]

Panel B shows the results from the wage regressions using the scores from Refinitiv. In columns (1) and (2) we use the environmental (E) component of the Refinitiv ESG scores to construct the dummies. The specifications differ in terms of the granularity of the industry classifications (2-digit in Column (1) and 3-digit in Column (2)). The best firms in terms Refinitiv's environmental score pay between 3.4-4.3% lower wages. In columns (1) and (2) of Panel C we repeat the same analysis using the corresponding MSCI scores. The effect sizes are slightly smaller (-1.5% to -3.4%), but of somewhat of comparable magnitude. The coefficient in column (1) is not significant though.

We also analyze the effects of the social (S) and governance (G) components of the ESG scores as well as of the composite score. Again, we code best-of-class dummy variables of the abovementioned type. We evaluate the composite ESG score in Column (3) Table VII Panels B and C. The composite score is a combination of all three ESG pillar scores. For Refinitiv, wages are negatively correlated with the best-of-class dummies based on the composite score. The best firms based on the composite score pay an about 3.5% lower wage. The results are not significant for MSCI.

Column (4) in Panels B and C show that firms that are doing well with respect to the social score are also paying lower wages on average: the highest ranked firms according to Refinitiv pay about 4.3% lower wages. The effect is weaker (and not significant) for MSCI (-1.6%). While these findings are consistent with a social preference channel, i.e., workers are willing to give up parts of their wage to work for a company that is doing well in terms of social policies (e.g., does not engage in child labor), the interpretation is less clear. For instance, the S component could include (expected) wages.

With respect to the governance pillar (which we examine in column (5) of Panels B and C), we do not have a strong prior as sustainability preferences are expected to be less related to governance aspects. We find no significant effects here.

In Column (6) we include all pillars scores at once. The coefficients on the environmental pillar are slightly lower but remain economically and statistically significant. In the case of the MSCI sample, the social and governance pillars remain non-significant. In the Refinitiv sample, however, the coefficient on the social pillar remains large and negative (-4.2%) and the

[21] If we broaden the definition of industries to the two digit-level, there are, on average, four (MSCI) and three (Refinitiv) firms in an industry-year cell. We report basic tests on the two digit industry-level as well but use the tighter definition at the three digit-level as our main specification.

governance pillar becomes positive and significant (2.6%). The results for Refinitiv are quite similar to those obtained using the survey-based environmental, social, and governance ratings at the sector-level from Panel B in Table VI: the coefficient estimates for the dummies based on the environmental and social pillar are negative, while the estimate on the governance pillar score is positive.

While we cannot be affirmative, we do not believe that the higher wages for firms with better governance are driven by preferences (i.e., preferences *against* good governance). It is more likely, that other mechanisms explain this association. For instance, we know from a large literature on corporate governance that good corporate governance is associated with higher firm performance (e.g., Gompers Ishii, and Metrick 2003 or Bebchuk, Cohen, and Ferrell. 2009), maybe because good governance is causing high performance (Cunat, Gine, and Guadalupe 2012) or maybe because of omitted variables or reverse causation (Hermalin and Weisbach 1998; Adams, Hermalin, and Weisbach 2010). In any case, the positive association between the G component of the ESG score and the wages might be reflective of the high performance of firms with high governance scores.

Overall, the evidence using a firm-level best of class measure of the quality of environmental policies is consistent with our findings using the sector-level sustainability measure. An important implication of the firm evidence of this section is that firms can attract talent at lower wages by investing into environmentally friendly (and maybe also into pro-social) policies, and thus might be able to "do well by doing good."

## VIII.B Event based ESG data

In a final set of tests leveraging firm-level ESG data, we use data capturing negative ESG incidents. Specifically, this data comes from RepRisk, a firm that collects negative news related to firms' ESG policies reported by third parties. The information is collected from media sources including newspapers, social media, online news, blogs, and NGOs using artificial intelligence and human analysis. Using proprietary methodology, Reprisk combine these news and event data into a reputational risk index (RRI) which falls in the interval of 0 and 100. The index increases from zero when negative ESG news is reported for a firm. Higher values indicate higher negative ESG news flow. In case no negative ESG news is published, the RRI decays naturally over time until it reaches zero.

The data is available for nine years, i.e., between 2007 and 2015 and for a mix of public and private firms. Panel A of Table VII shows that we have on average about 190 firms per year

(1,708/9) for which the RRI measure is available. We define a dummy which identifies firm-years with a positive change of that index (*Negative ESG news*). We see that approximately 23% of the firm-year observations are subject to positive increases in the index. Given the shock nature of the variable, we are interested in examining if increases in the RRI index are associated with *increases* in wages. Hence, we use wage changes (difference of log wages) of individual workers as the dependent variable. Consistent with the Sustainability Wage Gap channel, Panel D of Table VII shows that wages increase in years following positive shocks to the RRI (i.e., shock induced deterioration of a firm's ESG profile) by 2.7%. Please note that our wages include bonus payments as well. In other words, firms adjust wages upwards after they are hit by negative ESG news, which is consistent with the view that they need to pay higher wages to attract and keep workers given that their ESG performance has deteriorated.

While existing research suggests that negative ESG-related news are related to *lower* firm performance (see, e.g., Krüger 2015 or Derrien et al 2022), the opposite might be true as well (at least in the short-run, using accounting-based measures).[22] To be specific, there is the concern that some firms might have engaged in unethical or environmentally hostile behavior or policies that might have led to higher profits and, at the same time, triggered the negative ESG shock. The increase in profits could then also explain the increase in wages. In columns (2) and (3), we, hence, control for directly for changes (and lagged changes) of log of Value Added over Total Assets. Interestingly, the coefficient on the Negative ESG news dummy *increases* once we control for changes in Value Added. The coefficient on changes in value added is is negative and borderline significant when analyzing contemporaneous changes and positive and significant when considering lagged changes.

Overall, the evidence of wage *changes* after negative ESG news shocks complements the analyses that compare workers across sustainable and unsustainable sectors (Section V) and across sustainable and sustainable firms within the same sector (Section VIII.A) and thereby, further supports the hypothesis that ESG policies affect wages through workers' preferences.

# IX Attracting and Retaining Talent

An alternative reading of our main hypothesis is that, fixing wages, more sustainable firms are better able to attract workers that are more talented. We test this hypothesis directly in Panel A of Table VIII. The outcome variables consist of several education and skills based dummy

[22] Temporary higher accounting profits (or value added) due to unsustainable behavior can still lead to a lower market value if investors expect lower profits in the future.

variables. *UNI* and *PhD* are dummy variables equal to one if a worker has obtained a university respectively a doctoral degree. *Cog9*, *Cog89*, *Noncog89*, and *Noncog9* are indicator variables that are equal to one if the cognitive skill measure of a worker takes on values of 8 or 9, which corresponds to the top five percent of the skill distribution. Consistent with our hypothesis, we find that workers in firms that operate in more sustainable sectors are indeed more highly educated or talented. For instance, workers with university or doctoral degrees are more likely to work in more sustainable firms (see columns (1) and (2)). When looking at our skill measures in columns (3) to (6), we find results consistent with the analysis on education.

Preferences for sustainability may not only affect reservation wages of workers but also their loyalty to stay with a firm. We make use of the panel structure of the wage data to test whether workers in sustainable sectors are less likely to change firms. We define a *Stay in firm* outcome variable, which is a dummy variable that is equal to one if a worker is still employed with the same firm in the next year.

Panel B shows the results. We regress the *Stay in firm* dummy on interactions between proxies of skill and the *Sustain (high)* dummy. The interaction terms between our measures of education/talent and the dummy marking high sustainability sectors are positive and significant. For university graduates working in high sustainability sectors, the likelihood of staying with a firm in the next year increases by about 1.7 – 2.5 percentage points; effects are smaller for workers with high cognitive or non-cognitive skills, but these are still positive and highly significant. In general, an interpretation of these coefficients is not straightforward, however, as the likelihood of a turnover will also depend on other, potentially endogenous, factors such as wages. For that reason, we report regressions with and without wages as additional controls.

While the previous regressions analyze turnover more generally, we are particularly interested in whether more sustainable firms are better able to retain talented workers. For that reason, we aim to distinguish between firings and voluntary turnovers. We consider a worker as fired if i) he moves to a new firm and ii) claims unemployment benefits in the current or in the next year; or if he moves into unemployment in the next year. We define a turnover as voluntary if a worker changes firms and is neither fired nor above 60 years old.

In Panel C of Table VIII, we then focus on such voluntary turnovers. We find, similar to our previous analysis, that university graduates as well as workers with high cognitive or non-cognitive skills are less likely to leave a firm on a voluntary basis in a sustainable sector, with the estimated effects being between -0.1% and -0.4%.

Overall, our analyses suggest that university graduates and highly skilled workers are more likely to work for more sustainable firms. In addition, they are also more likely to stay with

their employer and are less likely to leave on a voluntary basis whenever they work in firms that are operating in more sustainable sectors, despite such firms paying lower wages.

# X Conclusion

In this paper, we hypothesize that workers value the environmental sustainability of their jobs and accept lower wages to work in more environmentally sustainable firms and sectors. Using administrative employer-employee matched data from Sweden and sustainability measures at the firm- and sector level, we provide evidence that firms with better sustainability characteristics tend to pay lower wages (about 9%) and attract and retain workers that are more skilled. We coin this empirical regularity as the Sustainability Wage Gap.

We argue that workers are willing to give up part of their financial compensation because they derive nonpecuniary benefits related to their preferences to work in more sustainable firms or sectors. Those preferences are more pronounced for highly skilled workers. Consistent with the evidence from an online survey on heterogeneous preferences for sustainable jobs across the talent distribution, we then document important heterogeneities in the Sustainability Wage Gap itself: we show that the wage gap is indeed more pronounced for workers that are more highly skilled and increasing over time. Providing a battery of additional tests, we argue that our results are difficult to reconcile with many alternative interpretations suggested in prior research.

The Sustainability Wage Gap carries important implications for firm value. While many prior studies document a positive correlation between a firm's sustainability characteristics and its financial performance, few studies manage to credibly identify actual mechanisms through which sustainability translates into higher financial performance. We believe to provide evidence of a specific mechanism through which sustainability can positively affect firms' bottom line, namely through lowering a firm's wage bill. We argue that most other explanations such as a customer awareness channel or lower discount rates are not consistent with the presented evidence on wages.

Our findings are particularly relevant for firms today as younger cohorts such as generations Y (Millennials) and Z are entering the labor market and climbing the corporate ladder. Accommodating the sustainability preferences of these younger workers—who arguably care more about sustainability aspects than preceding generations such as Baby Boomers or the Silent Generation—might be a decisive factor for firms to attract and retain the most talented workers and hence remain competitive in the future.

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# Figures

**Figure I:** Wages and Sustainability

This figure shows a binned scatterplot of the relation between wages and sustainability. *Wages* are measured in (deflated) Swedish Kronor (SEK) terms. *Sustainability* is an industry-level sustainability measure ranging from 1=Unsustainable to 5=Sustainable. We control for occupation, education, potential experience, and cognitive and non-cognitive skills. Given that we have more precise skill measures for men, we focus on men. The sample period spans the last three years for which we have data (2015-2017). Data come from Statistics Sweden (SCB) and the sustainability survey.

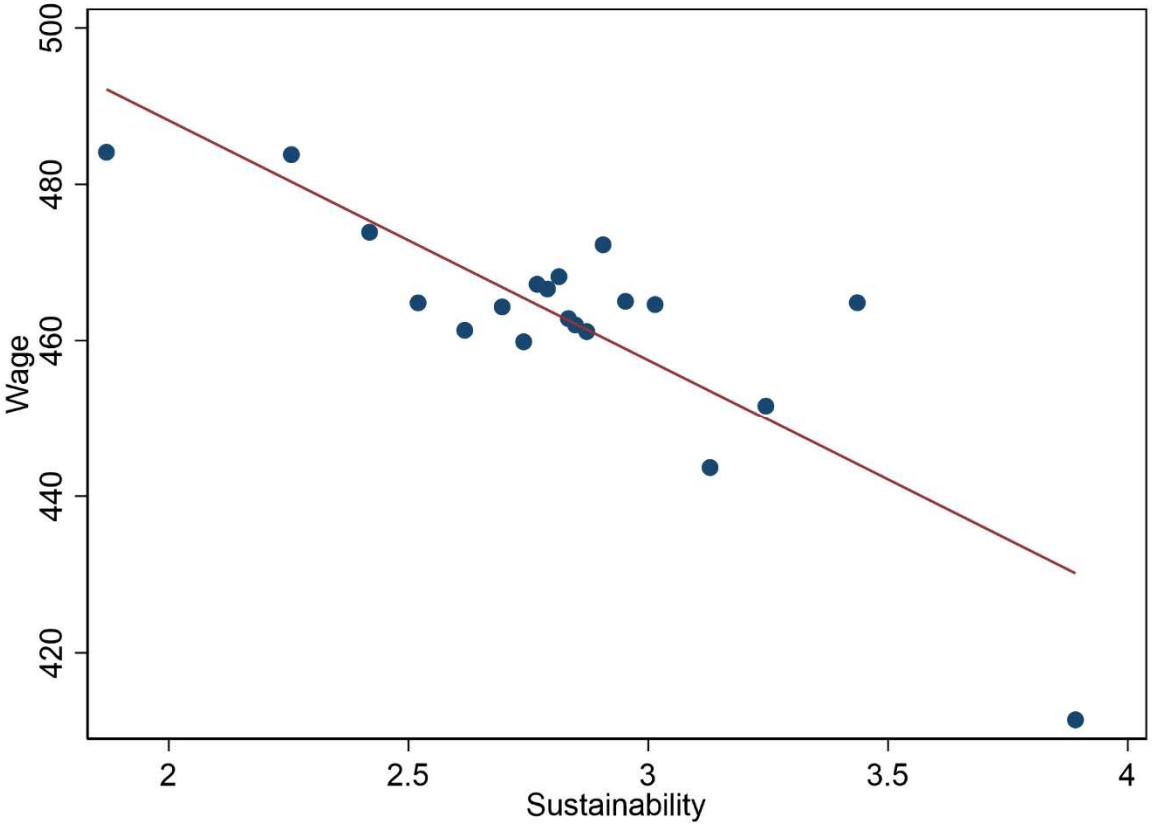
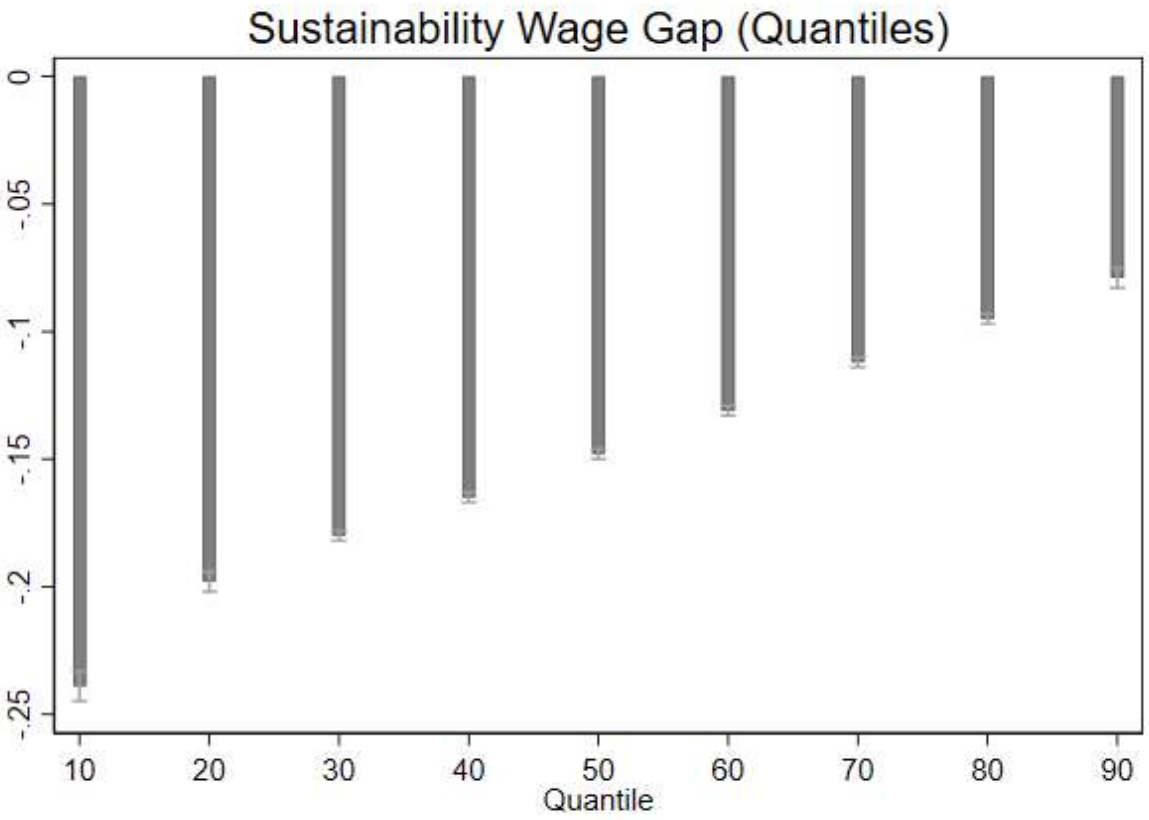


**Figure II:** Sustainability Wage Gap (Quantiles)

This figure shows the Sustainability Wage Gap for different quantiles of the wage distribution. We plot the coefficient estimates obtained for the baseline *Sustain. (high)* dummy variable from estimating Mincerian-like wage regressions. The dependent variable is *Log(Wages)* which is regressed on the dummy variable for sustainability *Sustain. (high)*, which equals one if the industry belongs to the top quintile of the sustainability distribution (i.e., most sustainable sectors). We control for years of schooling and potential experience, cognitive and non-cognitive skills, as well as occupation-year fixed effect (at the 4-digit level). Please note that for computational reasons we worked with a random subsample. All variables are described and defined in Appendix Table D.1.



# Tables

**Table I:** Descriptive Statistics (Administrative employer-employee matched data)

This table reports descriptive statistics of the main variables used in the worker-level analysis. Public sector workers are excluded. Panel A examines the wage-related data. Panel B shows summary statistics of demographic variables and the talent measure. Panel C displays descriptive statistics of the industry-level sustainability measures. Panels A, B, and C are restricted to the Male subsample. Panel D reports select variables for the Female subsample. Detailed definitions and explanations of all variables is provided in Appendix Table D.1.

**Panel A:** Demographic and education variables

| | **Obs in millions** | **mean** | **sd** | **p10** | **p25** | **p50** | **p75** | **p90** |
|---|---|---|---|---|---|---|---|---|
| *Age* | 17.1 | 41.255 | 10.595 | 27.000 | 33.000 | 41.000 | 49.000 | 56.000 |
| *Schooling* | 17.1 | 12.239 | 2.391 | 9.000 | 10.500 | 12.000 | 13.500 | 16.000 |
| *UNI* | 17.1 | 0.203 | 0.402 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *PhD* | 17.1 | 0.014 | 0.117 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Pot. Exp.* | 17.1 | 22.197 | 10.720 | 8.000 | 14.000 | 22.000 | 30.500 | 37.000 |
| *Cog. Skills* | 17.1 | 5.199 | 1.891 | 3.000 | 4.000 | 5.000 | 7.000 | 8.000 |
| *Cog9* | 17.1 | 0.043 | 0.204 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Cog89* | 17.1 | 0.122 | 0.327 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *Non-cog. Skills* | 17.1 | 5.105 | 1.696 | 3.000 | 4.000 | 5.000 | 6.000 | 7.000 |
| *Noncog9* | 17.1 | 0.016 | 0.125 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Non-Noncog89* | 17.1 | 0.075 | 0.264 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Pred. cog. Skills* | 12.3 | 4.528 | 2.832 | 1.000 | 2.000 | 4.000 | 7.000 | 8.000 |
| *Married* | 17.1 | 0.418 | 0.493 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Divorced* | 17.1 | 0.083 | 0.276 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Children* | 17.1 | 0.555 | 0.497 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *Number of children* | 17.1 | 1.031 | 1.104 | 0.000 | 0.000 | 1.000 | 2.000 | 2.000 |
| *Parental leave (days)* | 14.8 | 6.164 | 21.844 | 0.000 | 0.000 | 0.000 | 0.000 | 16.000 |

**Panel B:** Labor-related variables

| | Obs in millions | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *Ln(Wages)* | 17.1 | 7.922 | 0.565 | 7.316 | 7.701 | 7.949 | 8.212 | 8.520 |
| *Stay in firm* | 16.1 | 0.837 | 0.369 | 0.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| *Voluntary turnover* | 16.1 | 0.097 | 0.296 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Fired* | 16.1 | 0.065 | 0.247 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Tenure (years)* | 15.2 | 6.333 | 5.305 | 1.000 | 2.000 | 5.000 | 9.000 | 14.000 |
| *Parttime work* | 6.4 | 0.091 | 0.288 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Sick days* | 16.5 | 5.939 | 34.159 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Hospitalisation* | 16.5 | 0.002 | 0.049 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Wage cut (>10%)* | 13.5 | 0.127 | 0.333 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *Wage cut (>20%)* | 13.5 | 0.068 | 0.251 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Wage cut (>30%)* | 13.5 | 0.042 | 0.200 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Working hours (actual)* | 0.7 | 44.094 | 7.439 | 40.000 | 40.000 | 40.000 | 45.000 | 53.000 |
| *Work. Hours >50h* | 0.7 | 0.185 | 0.389 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *Work. Hours >60h* | 0.7 | 0.063 | 0.244 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Panel C:** Sustainability measures on sector level (KMW survey)

| | Obs in millions | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *Sustain. (high)* | 17.1 | 0.312 | 0.463 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Sustain. (cont.)* | 17.1 | 2.798 | 0.693 | 2.095 | 2.319 | 2.653 | 3.295 | 4.000 |
| *Sustain. (high - empl.)* | 17.1 | 0.186 | 0.389 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *Physical demandingness (high)* | 17.1 | 0.130 | 0.337 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *Work-life balance (high)* | 17.1 | 0.337 | 0.473 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Career opportunities (high)* | 17.1 | 0.330 | 0.470 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Job security (high)* | 17.1 | 0.383 | 0.486 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Governance (high)* | 17.1 | 0.373 | 0.484 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *Social responsibility (high)* | 17.1 | 0.327 | 0.469 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |

**Panel D:** Women (selected variables from Panels A-C)

| | Obs in millions | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *Age* | 15.4 | 37.773 | 10.380 | 24.000 | 29.000 | 38.000 | 46.000 | 52.000 |
| *Schooling* | 15.4 | 13.348 | 2.133 | 10.500 | 12.000 | 13.500 | 16.000 | 16.000 |
| *Uni* | 15.4 | 0.335 | 0.472 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| *PhD* | 15.4 | 0.009 | 0.094 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Pot. Exp.* | 15.4 | 18.148 | 10.416 | 4.500 | 9.000 | 18.000 | 26.000 | 32.500 |
| *Pred. cog. Skills* | 15.4 | 4.418 | 2.832 | 1.000 | 2.000 | 4.000 | 7.000 | 8.000 |
| *Ln(Wages)* | 15.4 | 7.540 | 0.661 | 6.659 | 7.285 | 7.669 | 7.933 | 8.193 |
| *Sustain. (high)* | 15.4 | 0.668 | 0.471 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |

**Table II:** The Sustainability Wage Gap – Baseline Results

The table shows results from estimating Mincerian-like wage regressions. The dependent variable is log of wage. The main independent variable is the dummy variable *Sustain. (high)* which equals one if the industry belongs to the top quintile of the sustainability distribution (i.e., most sustainable sectors). Panel A estimates the Sustainability Wage Gap for a selected set of occupations that exist in virtually all sectors (e.g., secretaries or receptionists, human resource professionals, accountants, etc.). In the regressions, we control for year of schooling and potential experience, year fixed effects, and controls for cognitive and non-cognitive skills. Panel B uses the full sample of male workers. In the regressions, we control for year of schooling and potential experience. In Column (2) through (5), we add skill controls (*Cog./Non-cog skills.*). In addition, the specifications across the columns include different fixed effects in the estimation. In columns (3) to (5), we include occupation-year fixed effects at different levels of granularity. *Occ8* corresponds to eight unique occupational groups, *Ssyk3* is a 3-digit level classification using 113 unique occupations, and *Ssyk4* (4-digits) is the most granular classification, corresponding to a total of to 354 unique occupations. In Panel C, we estimate the specifications from Panel B for the sample of women. Given that the military-based skills measures are not available for women, we control for predicted cognitive skills. All variables are described and explained in Appendix Table D.1. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel A:** Men (selected occupations)

| | **Ln(Wages)** | | | | | |
|---|---|---|---|---|---|---|
| | **Receptionists & Secretaries** | **HR** | **IT** | **Accountants** | **Lawyers** | **Executives & Directors** |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Sustain. (high)* | -0.129*** | -0.186*** | -0.069** | -0.127*** | -0.178*** | -0.072*** |
| | (0.021) | (0.018) | (0.034) | (0.017) | (0.026) | (0.011) |
| *Schooling* | 0.014*** | 0.027*** | 0.026*** | 0.052*** | 0.038*** | 0.105*** |
| | (0.003) | (0.003) | (0.002) | (0.003) | (0.005) | (0.002) |
| *Pot. Exp.* | 0.059*** | 0.049*** | 0.057*** | 0.065*** | 0.066*** | 0.074*** |
| | (0.002) | (0.002) | (0.003) | (0.003) | (0.003) | (0.002) |
| *Pot. Exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 41,093 | 42,618 | 32,642 | 92,610 | 25,306 | 156,130 |
| *Sample* | Men | | | | | |
| *Skills* | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. |
| *Year f.e.* | Yes | Yes | Yes | Yes | Yes | Yes |
| *R-squared* | 0.289 | 0.290 | 0.328 | 0.220 | 0.210 | 0.224 |

**Panel B:** Men

| | Ln(Wages) | | | | |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| *Sustain. (high)* | -0.156*** | -0.154*** | -0.132*** | -0.090*** | -0.084*** |
| | (0.010) | (0.009) | (0.007) | (0.006) | (0.006) |
| *Schooling* | 0.081*** | 0.060*** | 0.034*** | 0.029*** | 0.028*** |
| | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) |
| *Potential Experience* | 0.061*** | 0.061*** | 0.051*** | 0.047*** | 0.046*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) |
| *Pot. Exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 17,148,707 | 17,148,707 | 13,287,745 | 17,148,707 | 17,148,693 |
| *Sample* | | | Men | | |
| *Skills* | No | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. | Cog./Non-cog. |
| *Year f.e.* | Yes | Yes | No | No | No |
| *Occ. – year f.e.* | No | No | Occ8 | Ssyk3 | Ssyk4 |
| *Person f.e.* | No | No | No | No | No |
| *R-squared* | 0.254 | 0.277 | 0.376 | 0.405 | 0.422 |

**Panel C:** Women

| | Ln(Wages) | | | | |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| *Sustain. (high)* | -0.187*** | -0.171*** | -0.125*** | -0.081*** | -0.078*** |
| | (0.008) | (0.007) | (0.006) | (0.006) | (0.005) |
| *Schooling* | 0.081*** | 0.063*** | 0.020*** | 0.027*** | 0.025*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| *Potential Experience* | 0.051*** | 0.052*** | 0.043*** | 0.040*** | 0.038*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) |
| *Pot. Exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 15,421,941 | 15,421,941 | 11,636,793 | 15,421,938 | 15,421,879 |
| *Sample* | | | Women | | |
| *Skills* | No | Graderank | Graderank | Graderank | Graderank |
| *Year f.e.* | Yes | Yes | No | No | No |
| *Occ. – year f.e.* | No | No | Occ8 | Ssyk3 | Ssyk4 |
| *Person f.e.* | No | No | No | No | No |
| *R-squared* | 0.261 | 0.269 | 0.329 | 0.339 | 0.348 |

**Table III:** The Sustainability Wage Gap – Fixed Effects & Turnovers

In column (1), we estimate a worker fixed-effects model using panel regressions. The dependent variable is log of wage which is regressed on the dummy variable *Sustain. (high)*, which equals one if the industry belongs to the top quintile of the sustainability distribution (i.e., most sustainable sectors). In columns (2) to (4) we examine job switchers after bankruptcies and mass layoffs. The dependent variable is the change in log wage. *Ch. in sustain. (high)* is a variable that takes on the value of -1 if a worker moves into a sector of lower sustainability, 0 if the worker remains in a sector of the same sustainability, and +1 if the worker moves into a sector of higher sustainability. *Sustain. (high) – up* is a dummy variable that takes on the value of 1 if the worker switches to sector of higher sustainability and 0 otherwise. *Sustain. (high) – down* is a corresponding dummy variable which is equal to one if following the bankruptcy or layoff the worker switches into a sector of lower sustainability. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

| | **Ln(Wages)** | **ΔLn(Wages)** | | | |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| *Sustain. (high)* | -0.055*** | | | | |
| | (0.003) | | | | |
| *Ch. in sustain. (high)* | | -0.055*** | | -0.043*** | |
| | | (0.016) | | (0.002) | |
| *Sustain. (high) – up* | | | -0.065*** | | -0.061*** |
| | | | (0.023) | | (0.004) |
| *Sustain. (high) – down* | | | 0.039 | | 0.024*** |
| | | | (0.024) | | (0.003) |
| *Schooling* | 0.043*** | -0.001 | -0.001 | 0.001*** | 0.002*** |
| | (0.003) | (0.004) | (0.004) | (0.000) | (0.000) |
| *Potential Experience* | -0.013*** | -0.006*** | -0.006*** | -0.010*** | -0.010*** |
| | (0.003) | (0.002) | (0.002) | (0.000) | (0.000) |
| *Pot. Exp. (squared)* | -0.001*** | 0.000 | 0.000 | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 17,055,018 | 12,554 | 12,554 | 440,017 | 440,017 |
| *Sample* | Men | Men | | | |
| | All | First position after bankruptcy | | First position after mass layoff | |
| *Skills* | No | Cog./Non-cog. | | | |
| *Occ. – year f.e.* | Ssyk4 | Ssyk4 | | | |
| *Person f.e.* | Yes | No | | | |
| *R-squared* | 0.708 | 0.156 | 0.156 | 0.036 | 0.036 |

**Table IV:** Robustness

The table displays estimation results for different functional forms of our sustainability measure (Panel A) and subsample analysis (Panel B). In Column (1) of Panel A we use the continuous version of our environmental sustainability measure. In Column (2) we split the continuous variable into quintiles. In Column (3), the sustainability measure is a worker-weighted dummy which equals one if the sustainability score of a worker's job belongs to the top 20% of all workers' jobs. Panel B present subsample analysis and further robustness tests. Column (1) displays the results considering only the most recent years of the sample (after 2015). In Column (2), we show the results on a subsample of full-time workers only. In Column (3), we include municipality-year fixed effects. In Column (4) we focus on arguably uncontroversial green/brown sectors or exclude certain sectors based on considerations such as workplace safety (e.g., fishing or mining). *Year##Occupation* fixed effects are based on the 4-digit classification *Ssyk4*, corresponding to 354 unique occupations. All variables are defined and explained in Appendix Table D.1. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel A:** Functional form

| | Ln(Wages) | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| *Sustainability* | -0.081*** | | |
| | (0.003) | | |
| *Sust. Quintile = 2* | | -0.038*** | |
| | | (0.008) | |
| *Sust. Quintile = 3* | | -0.037*** | |
| | | (0.008) | |
| *Sust. Quintile = 4* | | -0.067*** | |
| | | (0.009) | |
| *Sust. Quintile = 5* | | -0.128*** | |
| | | (0.009) | |
| *Sust. (high – empl.)* | | | -0.107*** |
| | | | (0.006) |
| *Schooling* | 0.028*** | 0.028*** | 0.028*** |
| | (0.001) | (0.001) | (0.001) |
| *Potential Experience* | 0.046*** | 0.046*** | 0.047*** |
| | (0.000) | (0.000) | (0.000) |
| *Pot. Exp. (squared)* | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) |
| *Obs* | 17,148,693 | 17,148,693 | 17,148,693 |
| *Sample* | | Men | |
| *Skills* | | Cog./Non-cog. | |
| *Occ. – year f.e.* | | Ssyk4 | |
| *R-squared* | 0.423 | 0.422 | 0.420 |

**Panel B:** Subsample analysis and further robustness tests

| | Ln(Wages) | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| *Sustain. (high)* | -0.077*** | -0.087*** | -0.087*** | -0.084*** |
| | (0.001) | (0.012) | (0.005) | (0.006) |
| *Schooling* | 0.021*** | 0.028*** | 0.027*** | 0.028*** |
| | (0.000) | (0.001) | (0.001) | (0.001) |
| *Potential Experience* | 0.051*** | 0.039*** | 0.046*** | 0.047*** |
| | (0.000) | (0.001) | (0.000) | (0.000) |
| *Pot. exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 2,025,264 | 5,788,073 | 17,148,693 | 16,338,428 |
| *Sample* | Men (after 2015) | Men (fulltime) | Municipality-year fixed effects | Exclude controversial sectors |
| *Skills* | | | Cog./Non-cog. | |
| *Occ. - year f.e.* | | | Ssyk4 | |
| *R-squared* | 0.348 | 0.539 | 0.429 | 0.425 |

**Table V:** Education, Skills, and Cohorts

The table displays differential effects of sustainability on wages for groups with various education and skill levels. In columns (1)-(3) we focus on groups with different educational background, i.e., groups with or without a university degree and different levels of cognitive and non-cognitive skills. The dummy variables Cog89 (NonCog89) identify the 5% workers with the highest cognitive (non-cognitive) skills. In column (4), we interact the Sustainability dummy with a linear time trend. In columns (5)-(7), we estimate specifications on different cohorts to test the hypothesis whether the Sustainability Wage Gap for highly educated and talented workers is increasing over time. All specifications are estimated only for the male subsample. *Year##Occupation* fixed effects are based on the 4-digit classification *Ssyk4*, corresponding to 354 unique occupations. All variables are defined and explained in Appendix Table D.1. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

| | Ln(Wages) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** |
| *Schooling* | | 0.024*** | 0.024*** | 0.022*** | | 0.024*** | 0.024*** |
| | | (0.001) | (0.001) | (0.001) | | (0.001) | (0.001) |
| *Potential Experience* | 0.045*** | 0.045*** | 0.045*** | 0.045*** | 0.045*** | 0.045*** | 0.045*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Pot. exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *UNI* | 0.127*** | | | | 0.246*** | | |
| | (0.003) | | | | (0.007) | | |
| *UNI# Sustain. (high)* | -0.050*** | | | | -0.038*** | | |
| | (0.005) | | | | (0.011) | | |
| *Cog89* | | 0.026*** | | | | 0.000 | |
| | | (0.002) | | | | (0.005) | |
| *Cog89 # Sustain. (high)* | | -0.019*** | | | | -0.003 | |
| | | (0.004) | | | | (0.008) | |
| *Noncog89* | | | 0.073*** | | | | 0.033*** |
| | | | (0.003) | | | | (0.004) |
| *Noncog89 # Sustain. (high)* | | | -0.012*** | | | | 0.006 |
| | | | (0.004) | | | | (0.006) |
| *Year=1 # Sustain. (high)* | | | | -0.002*** | | | |
| | | | | (0.000) | | | |
| *UNI# Year* | | | | | -0.006*** | | |
| | | | | | (0.000) | | |
| *UNI# Sustain. (high)# Year* | | | | | -0.001 | | |
| | | | | | (0.000) | | |
| *Cog89 # Year* | | | | | | 0.001*** | |
| | | | | | | (0.000) | |
| *Cog89 # Sustain. (high) # Year* | | | | | | -0.001** | |
| | | | | | | (0.000) | |
| *Noncog89 # Year* | | | | | | | 0.002*** |
| | | | | | | | (0.000) |
| *Noncog89 # Sustain. (high)# Year* | | | | | | | -0.001*** |
| | | | | | | | (0.000) |
| *Obs* | 16,243,076 | 16,243,076 | 16,243,076 | 16,243,076 | 16,243,076 | 16,243,076 | 16,243,076 |
| *Sample* | | | | Men | | | |
| *Skills* | Cog./Non-cog. | No | No | Cog./Non-cog. | Cog./Non-cog. | No | No |
| *Occ. - year f.e.* | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 |
| *Firm f.e.* | No | No | No | Yes | No | No | No |
| *Firm - year f.e.* | Yes | Yes | Yes | No | Yes | Yes | Yes |
| *R-squared* | 0.577 | 0.575 | 0.576 | 0.548 | 0.577 | 0.575 | 0.576 |

**Table VI:** Compensating differentials and alternative explanations

In this table we address compensating differentials and alternative explanations. In Panel A we examine how several wage and non-wage worker-level outcomes relate to the sector-level sustainability measure. The dependent variable in column (1) is the number of years a worker has been in his current job (*Tenure (years)*). In Column (2) the dependent variable is a dummy if the worker was fired in a given year (*Fired*). The dependent variable in columns (3)— (5) are dummy variables indicating if a worker has experienced a wage cut of at least x% (*Wage cut > x %*). In Columns (6) and (7), we Column (8) uses the number of days a worker has been ill in a year (*Days (ill)*). The dependent variable in Column (9) is a dummy if a worker has been hospitalized in a given year (*Hospital*). Columns (10)— (12) use the hours worked (*Ln(hours)*) and dummies if an individual has worked more than x hours (*>x h*). Columns (13) and (14) are indicators if an individual is married or divorced (*Married* or *Divorced*). Column (15) is a dummy if an individual has children (*Children*). The dependent variable in Column (16) is the number of children (*Children (#)*). Column (17) uses the number of parental days (*Parental leave (days)*). Year##Occupation fixed effects are based on the 4-digit classification Ssyk4, corresponding to 354 unique occupations. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel A:** Labor market, health, and personal outcomes

| | **Tenure (years)** | **Fired** | **Wage cut >10%** | **Wage cut >20%** | **Wage cut >30%** | **Ln(Wages at age 40)** | **Ln(Wages at age 50)** | **Days ill** | **Hospital.** |
|---|---|---|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** |
| *Sustain. (high)* | -0.908*** | 0.026*** | 0.024*** | 0.018*** | 0.013*** | -0.104*** | -0.113*** | 0.724*** | 0.001*** |
| | (0.098) | (0.003) | (0.001) | (0.001) | (0.001) | (0.009) | (0.009) | (0.055) | (0.000) |
| *Schooling* | -0.027*** | -0.002*** | -0.001*** | -0.000** | -0.000*** | 0.046*** | 0.046*** | -0.207*** | -0.000*** |
| | (0.007) | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.003) | (0.009) | (0.000) |
| *Potential Experience* | 0.268*** | -0.011*** | -0.005*** | -0.005*** | -0.004*** | 0.017 | -0.001 | 0.237*** | 0.000*** |
| | (0.006) | (0.000) | (0.000) | (0.000) | (0.000) | (0.014) | (0.021) | (0.011) | (0.000) |
| *Pot. exp. (squared)* | -0.002*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | -0.002*** | -0.003*** | 0.000 | -0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) | (0.000) | (0.000) |
| *Obs* | 15,204,070 | 16,129,467 | 13,480,483 | 13,480,483 | 13,480,483 | 569,604 | 234,343 | 16,497,904 | 16,497,904 |
| *Sample* | | | Men | | | Men at age 30 | | Men | |
| *Skills* | | | Cog./Non-cog. | | | Cog./Non-cog. | | Cog./Non-cog. | |
| *Occ. - year f.e.* | | | Ssyk4 | | | Year only | | Ssyk4 | |
| *R-squared* | 0.205 | 0.042 | 0.015 | 0.012 | 0.010 | 0.169 | 0.174 | 0.014 | 0.002 |

continued on next page

| | Ln(hours) | >50h | >60h | Married | Divorced | Children | Children (#) | Parental leave (days) |
|---|---|---|---|---|---|---|---|---|
| | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
| *Sust. (high)* | 0.005*** | 0.014*** | 0.016*** | -0.018*** | 0.006*** | -0.019*** | -0.036*** | 0.075 |
| | (0.001) | (0.003) | (0.002) | (0.001) | (0.001) | (0.001) | (0.003) | (0.051) |
| *Schooling* | 0.007*** | 0.018*** | 0.004*** | 0.011*** | -0.001*** | -0.005*** | -0.012*** | 0.179*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) | (0.001) | (0.009) |
| *Potential Experience* | 0.004*** | 0.010*** | 0.004*** | 0.035*** | 0.006*** | 0.048*** | 0.115*** | 0.516*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.009) |
| *Pot. exp. (squared)* | -0.000*** | -0.000*** | -0.000*** | -0.000*** | -0.000*** | -0.001*** | -0.003*** | -0.018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 487,584 | 487,584 | 487,584 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 14,824,672 |
| *Sample* | | Men (Labor force survey) | | | | Men | | |
| *Skills* | | N/A | | | | Cog./Non-cog. | | |
| *Occ. - year f.e.* | | Hunyk83/Husky4 | | | | Ssyk4 | | |
| *R-squared* | 0.125 | 0.111 | 0.066 | 0.158 | 0.048 | 0.094 | 0.108 | 0.083 |

In Panel B, we relate log wages to several survey-based assessments (or ratings) at the sector-level. Specifically, the independent variables are dummy variables that identify the sectors which our survey participants associated with, e.g., the highest job security (Column (1)), the best career opportunities (Column (2)), etc. Year##Occupation fixed effects are based on the 4-digit classification Ssyk4, corresponding to 354 unique occupations. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel B:** Industry ratings

| | Ln(Wages) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** |
| *Sustain. (high)* | | | | | | | -0.103*** | -0.123*** | -0.115*** |
| | | | | | | | (0.007) | (0.007) | (0.007) |
| *Job security (high)* | -0.000 | | | | | | 0.012** | | 0.005 |
| | (0.005) | | | | | | (0.005) | | (0.005) |
| *Career opportunities (high)* | | 0.019*** | | | | | 0.040*** | | 0.021*** |
| | | (0.006) | | | | | (0.005) | | (0.006) |
| *Physical demand. (high)* | | | -0.006 | | | | -0.007* | | -0.005 |
| | | | (0.005) | | | | (0.004) | | (0.004) |
| *Work-life balance (high)* | | | | -0.029*** | | | -0.003 | | -0.023*** |
| | | | | (0.007) | | | (0.006) | | (0.006) |
| *Governance (high)* | | | | | 0.004 | | | 0.068*** | 0.061*** |
| | | | | | (0.006) | | | (0.006) | (0.008) |
| *Social responsibility (high)* | | | | | | -0.018*** | | -0.014** | -0.030*** |
| | | | | | | (0.006) | | (0.006) | (0.007) |
| *Schooling* | 0.027*** | 0.027*** | 0.027*** | 0.027*** | 0.027*** | 0.027*** | 0.028*** | 0.028*** | 0.028*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| *Pot. exp.* | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Pot. exp. (sq.)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 |
| *Sample* | | | | | Men | | | | |
| *Skills* | | | | | Cog./Non-cog. | | | | |
| *Occ. - year f.e.* | | | | | Ssyk4 | | | | |
| *R-squared* | 0.420 | 0.420 | 0.420 | 0.420 | 0.420 | 0.420 | 0.423 | 0.423 | 0.423 |

In Panel C, we estimate wage regressions restricting the analysis to occupations which allow to switch across sectors. Specifically, in Column (1) we consider only occupations with low sector specific concentration (HHI<0.25 in terms of occupation). Column (2) considers sectors that are easier for workers to move out (HHI<0.25). Year##Occupation fixed effects are based on the 4-digit classification Ssyk4, corresponding to 354 unique occupations. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel C:** Movability across sectors

| | **Ln(Wages)** | |
|---|---|---|
| | **(1)** | **(2)** |
| *Sust. (high)* | -0.087*** | -0.083*** |
| | (0.006) | (0.005) |
| *Schooling* | 0.031*** | 0.028*** |
| | (0.001) | (0.001) |
| *Pot. Exp.* | 0.048*** | 0.047*** |
| | (0.000) | (0.000) |
| *Pot. Exp. (squared)* | -0.001*** | -0.001*** |
| | (0.000) | (0.000) |
| *Obs* | 11,668,616 | 13,209,793 |
| *Sample* | Men | |
| *Sample restriction* | HHI (occ) < 0.25 | HHI (SNI3) < 0.25 |
| *Skills* | Cog./Non-cog. | |
| *Occ. – year f.e.* | Ssyk4 | |
| *R-squared* | 0.423 | 0.414 |

**Table VII:** Firm-level ESG Data (MSCI / Refinitiv / Reprisk) and Wages

This table shows summary statistics for the firm-level ESG data from MSCI, Refinitiv, and Reprisk, as well as regression results relating wages to firm-level ESG measures. Panel A displays summary statistics of the ESG data for each data provider. The sample period for the data runs from 2002 to 2017 for the MSCI and Refinitiv data and 2007-2015 for Reprisk. Panel B shows Mincerian-like wage equations in which we relate wages to the ESG scores from MSCI. Panel C uses ESG data from Refinitiv. In Panels A and B we use best-of-class dummy variables that identify the firm with the highest ESG score in a given Industry. Moving from specifications in columns (1) to (2), we change the level of granularity of the industry classification from two to three digits. In columns (1) and (2) the main independent variable is best-of-class dummy based on the environmental pillar score. Columns (3), (4), and (5) use dummy variables based on the composite ESG score as well as the social and governance pillar scores. Column (6) includes all pillar scores jointly. *Year##Occupation* fixed effects are based on the 4-digit classification *Ssyk4*, corresponding to 354 unique occupations. In Panel D, the main independent variable is a shock variable that takes on the value of 1 if Reprisk's RRI exhibits positive changes. All variables are defined in Appendix Table D.1. Standard errors are clustered at the firm-level. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel A:** Summary Statistics

| **MSCI:** | Obs. | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *Composite score* | 790 | 4.91 | 1.45 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 |
| *Environ. pillar* | 790 | 5.62 | 1.89 | 3.30 | 4.40 | 5.40 | 6.80 | 8.00 |
| *Social pillar* | 747 | 5.43 | 1.73 | 3.10 | 4.47 | 5.40 | 6.60 | 7.70 |
| *Governance pillar* | 747 | 6.30 | 1.75 | 4.00 | 5.00 | 6.39 | 7.60 | 8.50 |
| *Best-of-class composite (ind3)* | 454 | 35% | 48% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class environ. (ind3)* | 454 | 35% | 48% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class social (ind3)* | 454 | 35% | 48% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class gov. (ind3)* | 454 | 35% | 48% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class environ. (ind2)* | 624 | 27% | 44% | 0% | 0% | 0% | 100% | 100% |

| **Refinitiv:** | Obs. | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *Composite score* | 469 | 0.65 | 0.29 | 0.18 | 0.42 | 0.78 | 0.90 | 0.93 |
| *Environ. pillar* | 469 | 0.66 | 0.30 | 0.17 | 0.38 | 0.81 | 0.93 | 0.94 |
| *Social pillar* | 469 | 0.64 | 0.28 | 0.18 | 0.42 | 0.73 | 0.89 | 0.93 |
| *Governance pillar* | 469 | 0.53 | 0.23 | 0.17 | 0.35 | 0.56 | 0.72 | 0.80 |
| *Best-of-class composite (ind3)* | 311 | 43% | 50% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class environ. (ind3)* | 311 | 43% | 50% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class social (ind3)* | 311 | 43% | 50% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class gov. (ind3)* | 311 | 43% | 50% | 0% | 0% | 0% | 100% | 100% |
| *Best-of-class environ. (ind2)* | 457 | 35% | 48% | 0% | 0% | 0% | 100% | 100% |

| **Reprisk:** | Obs. | mean | sd | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|---|---|---|
| *RRI index* | 1708 | 4.06 | 7.46 | 0.00 | 0.00 | 0.00 | 5.25 | 16.50 |
| *ΔRRI index* | 1504 | 0.79 | 6.28 | -5.50 | 0.00 | 0.00 | 0.00 | 10.17 |
| *Negative ESG news* | 1504 | 23% | 42% | 0% | 0% | 0% | 0% | 100% |
| *Δln(Value added)* | 1110 | -0.03 | 1.09 | -0.83 | -0.23 | 0.00 | 0.19 | 0.72 |
| *Lag Δln(Value added)* | 933 | -0.06 | 1.09 | -0.90 | -0.24 | -0.01 | 0.17 | 0.71 |

**Panel B:** Refinitiv

| | Ln(Wages) | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Best-of-class environ. (ind2)* | -0.034*** | | | | | |
| | (0.011) | | | | | |
| *Best-of-class environ. (ind3)* | | -0.043*** | | | | -0.030*** |
| | | (0.015) | | | | (0.010) |
| *Best-of-class composite (ind3)* | | | -0.035* | | | |
| | | | (0.019) | | | |
| *Best-of-class social (ind3)* | | | | -0.043** | | -0.042*** |
| | | | | (0.019) | | (0.012) |
| *Best-of-class gov. (ind3)* | | | | | -0.005 | 0.026** |
| | | | | | (0.021) | (0.012) |
| *Schooling* | 0.032*** | 0.035*** | 0.035*** | 0.035*** | 0.035*** | 0.035*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| *Potential Experience* | 0.045*** | 0.046*** | 0.046*** | 0.046*** | 0.046*** | 0.046*** |
| | (0.004) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| *Pot. exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 781,459 | 593,027 | 593,027 | 593,027 | 593,027 | 593,027 |
| *Sample* | | | Males | | | |
| *Skills* | | | Cog./Non-cog. | | | |
| *Occ. - year f.e.* | | | Ssyk4 | | | |
| *Ind. - year f.e.* | ind2 | | | ind3 | | |
| *R-squared* | 0.501 | 0.498 | 0.497 | 0.498 | 0.497 | 0.498 |

**Panel C:** MSCI

| | Ln(Wages) | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Best-of-class environ. (ind2)* | -0.015 | | | | | |
| | (0.010) | | | | | |
| *Best-of-class environ. (ind3)* | | -0.031** | | | | -0.029** |
| | | (0.013) | | | | (0.015) |
| *Best-of-class composite (ind3)* | | | 0.001 | | | |
| | | | (0.015) | | | |
| *Best-of-class social (ind3)* | | | | -0.016 | | -0.010 |
| | | | | (0.016) | | (0.016) |
| *Best-of-class gov. (ind3)* | | | | | 0.005 | 0.008 |
| | | | | | (0.019) | (0.016) |
| *Schooling* | 0.034*** | 0.036*** | 0.036*** | 0.036*** | 0.036*** | 0.036*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| *Potential Experience* | 0.044*** | 0.046*** | 0.046*** | 0.046*** | 0.046*** | 0.046*** |
| | (0.004) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| *Pot. exp. (squared)* | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 791,271 | 562,302 | 562,302 | 562,302 | 562,302 | 562,302 |
| *Sample* | | | Males | | | |
| *Skills* | | | Cog./Non-cog. | | | |
| *Occ. - year f.e.* | | | Ssyk4 | | | |
| *Ind. - year f.e.* | ind2 | | | ind3 | | |
| *R-squared* | 0.501 | 0.506 | 0.505 | 0.505 | 0.505 | 0.506 |

**Panel D:** Reprisk

| | ΔLn(Wages) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *Negative ESG news* | 0.027* | 0.029* | 0.035** |
| | (0.014) | (0.015) | (0.017) |
| *ΔLn(VA/Assets)* | | -0.008* | |
| | | (0.004) | |
| *Lag ΔLn(VA/Assets)* | | | 0.011** |
| | | | (0.005) |
| *Schooling* | -0.001*** | -0.001** | -0.001 |
| | (0.000) | (0.000) | (0.000) |
| *Potential Experience* | -0.011*** | -0.012*** | -0.011*** |
| | (0.001) | (0.002) | (0.001) |
| *Pot. exp. (squared)* | 0.000*** | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) |
| *Obs* | 224,525 | 167,291 | 144,358 |
| *Sample* | | Males | |
| *Skills* | | Cog./Non-cog. | |
| *Occ. - year f.e.* | | Ssyk4 | |
| *R-squared* | 0.049 | 0.053 | 0.052 |

**Table VIII:** Attracting and Retaining Talent

This table investigates the effect of workers' preferences for sustainability on the likelihood of joining and staying with the same firm. The outcome variables in Panel A are dummy variables which are equal to one if the worker has a university degree (Column (1)), a PhD (Column (2)), cognitive skills of 9 (Column (3)), cognitive skills of 8 or 9 (Column (4)), non-cognitive skills of 9 (Column (5)) and non-cognitive skills of 8 or 9 (Column (6)). Talent measures of 8 or 9 correspond approximately to the top five percent of the skill distribution. In Panel B, the outcome is defined as a dummy variable which is equal to one if a worker is still working in the same firm in the subsequent year. In Panel C, the outcome is a dummy variable that is equal to one if the worker left the firm voluntarily. *Year##Occupation* fixed effects are based on the 4-digit classification *Ssyk4*, corresponding to 354 unique occupations. Standard errors are clustered at the firm-level. All variables are defined in Appendix Table D.1. ***, **, * indicates statistical significance at the 1, 5 and 10% level, respectively.

**Panel A:** Attracting Talent

| | **UNI** | **PhD** | **Cog89** | **Cog9** | **Noncog89** | **Noncog9** |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Sustain. (high)* | 0.056*** | 0.005*** | 0.012*** | 0.007*** | 0.006*** | 0.002*** |
| | (0.004) | (0.001) | (0.002) | (0.001) | (0.001) | (0.000) |
| *Ln(Wages)* | 0.074*** | 0.011*** | 0.010*** | 0.004*** | 0.028*** | 0.008*** |
| | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.000) |
| *Schooling* | | | 0.040*** | 0.017*** | 0.014*** | 0.004*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| *Potential Experience* | -0.012*** | 0.001*** | -0.000*** | 0.000* | -0.002*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Pot. exp. (squared)* | 0.000*** | -0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Obs* | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 | 17,148,693 |
| *Sample* | | | Men | | | |
| *Occ. - year f.e.* | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 |
| *R-squared* | 0.453 | 0.301 | 0.170 | 0.090 | 0.057 | 0.022 |

**Panel B:** Stay in Firm

| | Stay in firm | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Schooling* | | | -0.001*** | -0.004*** | -0.001*** | -0.004*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| *Potential Experience* | 0.014*** | 0.008*** | 0.014*** | 0.008*** | 0.014*** | 0.008*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Pot. exp. (squared)* | -0.000*** | -0.000*** | -0.000*** | -0.000*** | -0.000*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Ln(Wages)* | | 0.131*** | | 0.131*** | | 0.131*** |
| | | (0.002) | | (0.002) | | (0.002) |
| *UNI* | -0.007*** | -0.024*** | | | | |
| | (0.001) | (0.001) | | | | |
| *UNI# Sustain. (high)* | 0.017*** | 0.024*** | | | | |
| | (0.002) | (0.002) | | | | |
| *Cog89* | | | -0.004** | -0.008*** | | |
| | | | (0.001) | (0.001) | | |
| *Cog89 # Sustain. (high)* | | | 0.006*** | 0.008*** | | |
| | | | (0.001) | (0.001) | | |
| *Noncog89* | | | | | -0.011*** | -0.034*** |
| | | | | | (0.001) | (0.001) |
| *Noncog89 # Sustain. (high)* | | | | | 0.007*** | 0.008*** |
| | | | | | (0.001) | (0.001) |
| *Obs* | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 |
| *Sample* | | | | Men | | |
| *Skills* | Cog./Non-cog. | Cog./Non-cog. | No | No | No | No |
| *Occ. - year f.e.* | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 |
| *Firm-year f.e.* | Yes | Yes | Yes | Yes | Yes | Yes |
| *R-squared* | 0.288 | 0.304 | 0.288 | 0.304 | 0.288 | 0.304 |

**Panel C:** Voluntary Turnover

| | Voluntary Turnover | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| *Schooling* | | | 0.001*** | 0.002*** | 0.001*** | 0.002*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| *Potential Experience* | -0.004*** | -0.003*** | -0.004*** | -0.003*** | -0.004*** | -0.003*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Pot. exp. (squared)* | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *Ln(Wages)* | | -0.007*** | | -0.006*** | | -0.006*** |
| | | (0.001) | | (0.001) | | (0.001) |
| *UNI* | 0.012*** | 0.013*** | | | | |
| | (0.001) | (0.001) | | | | |
| *UNI # Sustain. (high)* | -0.004*** | -0.004*** | | | | |
| | (0.001) | (0.001) | | | | |
| *Cog89* | | | 0.003*** | 0.003*** | | |
| | | | (0.001) | (0.001) | | |
| *Cog89 # Sustain. (high)* | | | -0.001* | -0.001** | | |
| | | | (0.001) | (0.001) | | |
| *Noncog89* | | | | | 0.028*** | 0.029*** |
| | | | | | (0.001) | (0.001) |
| *Noncog89 # Sustain. (high)* | | | | | -0.002*** | -0.002*** |
| | | | | | (0.001) | (0.001) |
| *Obs* | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 | 15,243,120 |
| *Sample* | | | | Men | | |
| *Skills* | Cog./Non-cog. | Cog./Non-cog. | No | No | No | No |
| *Occ. - year f.e.* | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 | Ssyk4 |
| *Firm-year f.e.* | Yes | Yes | Yes | Yes | Yes | Yes |
| *R-squared* | 0.256 | 0.256 | 0.256 | 0.256 | 0.256 | 0.256 |

# Appendix A: Sustainability, CSR, and ESG

A variety of concepts have been used in the debate on the societal impact of firms. These concepts typically center around the issues of externalities, the role of non-shareholding stakeholders, inter-generational equity, and whether and how firms take into consideration environmental, social, and governance issues. One of these concepts is corporate social responsibility (CSR). While there is no agreement on how to define CSR exactly, it is typically understood to relate to the extent to which firms integrate social and environmental concerns over and beyond what is required by the law.[23] More recently, the concept of corporate sustainability has gained more traction. Like CSR, corporate sustainability also lacks a tightly circumscribed definition, but it is also thought to be about the social and environmental impacts of firms. Importantly, in addition to environmental and social aspects, sustainability also incorporates dimensions of firm governance as well as notions related to the time horizon and inter-generational equity. Sustainability is sometimes equated with the umbrella term ESG.[24]

Given that CSR, sustainability, and ESG are somewhat vague concepts and different people may refer to different things when talking about sustainability, we think that it is difficult to cleanly delineate and formally define these concepts. However, we believe that they are concerned with similar matters, above all how firms address social and environmental issues—or more generally—firms' overall societal impact. In our paper, we assume that measures of CSR, sustainability, and ESG tend to be positively correlated, and we choose to refer to them collectively as "Sustainability" or "ESG." We also use several measures to capture different aspects of sustainability. First, we use measures that capture the environmental sustainability of a firm's primary activity via our sustainability survey (see also Appendix B). Second, we use ESG news data and best-of-class ESG scores from commercial data providers that capture the quality of a firm's ESG policies relative to industry peers.

[23] For example, the European Commission has defined CSR as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (see https://bit.ly/3hcMhlC). According to Kitzmueller and Shimshack (2012), the Worldbank's understanding of CSR is about "commitment of businesses to behave ethically and to contribute to sustainable economic development by working with all relevant stakeholders to improve their lives in ways that are good for business, the sustainable development agenda, and society at large."

[24] Lately, the umbrella concept of ESG has received a lot of attention in the Finance industry. The origins of ESG go back to the early days of the UN Global Compact—a non-binding United Nations pact to encourage businesses worldwide to adopt sustainable and socially responsible policies. In the context of the Global Compact, then United Nations Secretary General Kofi Annan sent a letter to leading financial institutions in 2005 asking them "to better integrate environmental, social, and governance issues in analysis, asset management and securities brokerage" (see Gobal Compact 2004), which essentially coined the concept of ESG.

# Appendix B: Survey on Sustainability – Overview

To obtain a measure of what people think about the environmental sustainability of economic activities, we run a survey on Prolific. Participants are paid approximately USD 17 per hour. Besides asking survey participants to classify economic sectors in terms of environmental sustainability, we also ask about several other aspects, such as, the importance of environmental sustainability in their job choices, the respondents' academic performance in high school, or the importance of aspects such as work-life benefits, the governance characteristics, or the social values of firms when choosing an employer. The survey participants are also asked to classify industrial sectors in terms of other compensating differentials (e.g., work life balance, career opportunities, etc.). Appendix F displays the survey questions in greater detail.

In the main part of the survey, participants classify 30 randomly drawn industries out of a total of 95 industries in terms of their environmental sustainability. Participants are asked to rate industries from 5=sustainable to 1=unsustainable. Respondents can also choose a "do not know" option. The survey was executed in November 2021 on a group of 300 Prolific subjects, yielding on average about 90 responses per industry. The 95 economic sectors make up 98% of employment in our administrative wage data.

Table B.1 shows summary statistics of the participants. In total, 300 respondents participated in the survey. Our sample of survey 300 participants contains about 50.33% male and 47.33% female participants. About 2.34% identify as non-binary or otherwise in terms of gender. The median participant answered the survey in about 22 minutes, which is close to the time we spent in our own pilot runs. The average time taken is higher (26 minutes), which is potentially due to some participants taking a long time to finish the survey.

Panel A (Panel B) of Table B.2 provides an overview of the ten most sustainable (unsustainable) industries according to the survey participants. Each participant rated 30 randomly selected industries, resulting in, on average, approximately 95 (=300*30/95) assessments per industry. Overall, the ranking appears plausible. The worst rated sectors are related to fossil energy sources or production involving chemicals. In contrast, the highest rated sectors are related to health, education, and recycling. Please note that we do not claim that our survey necessarily measures the "true" / scientific sustainability of a sector, but it measures the perception of their sustainability in the population. We argue, however, that it is the perceived sustainability that is relevant for the labor decisions of workers.

Table B.3 illustrates how important the survey respondents deem the role of ESG characteristics of a potential employer on their labor choices. Consistent with the main

hypothesis of our paper, about 60% would accept lower wages to work for a more sustainable firm. The median wage concession is 15%.

We also ran pilot surveys using participants of a Corporate Finance lecture in December 2019 and 2020. Figure B.1 shows a scatter plot between the industry classifications in the 2019 and 2020 student cohorts. The graph shows that the classification of sectors is extremely stable over time. The correlation is about 0.92. In Figure B.2. we display a scatter plot of the industry sustainability classifications assigned by the student sample in 2019/2020 and those assigned by the Prolific subjects in November 2021. The graph shows a correlation between the two different survey populations.

We also report the percentage of individuals who were unable to rate a particular industry (% of "do not know"). Those percentages are relatively low in the tails of the sustainability distribution but higher for sectors ranked in the middle. Figure B.3 illustrates this empirically plotting the fraction of "do not know" by quintiles of the average sustainability of the sector (from low sustainability to high sustainability sectors). The figure shows indeed a hump-shaped relationship, with more certainty for the highest and lowest rated sectors. For that reason, we expect our measure to be more informative in the tails.

**Table B.1:** Summary Statistics

This table presents summary statistics for the participants in the sustainability survey. The participants were recruited via Prolific.

| | Mean | median | N |
|---|---|---|---|
| Female | 47.33% | 0.00 | 300 |
| Male | 50.33% | 1.00 | 300 |
| Age | 26.70 | 24.00 | 297 |
| Survey duration (in sec) | 1,534.66 | 1,293.00 | 300 |

**Table B.2:** Sustainability classification of sectors (Bottom 10 and Top 10)

Panel A lists the most sustainable industries (Top 10) from the survey. Panel B presents the least sustainable industries (Bottom 10). *, **, ***: Significance at 10, 5 and 1%, respectively.

**Panel A:** Sustainability of industries (Top 10)

| | | mean | std. dev. | % of "do not know" | t-test (H0: mean =3) | p-value | Significance level |
|---|---|---|---|---|---|---|---|
| 1 | Physical well-being activities | 4.34 | 0.93 | 4.26% | 13.92 | 0.0000 | *** |
| 2 | Social work activities | 4.27 | 0.79 | 1.05% | 15.81 | 0.0000 | *** |
| 3 | Education | 4.22 | 1.09 | 3.13% | 10.89 | 0.0000 | *** |
| 4 | Recycling of metal waste and scrap and non-metal waste and scrap | 4.10 | 1.19 | 1.09% | 8.91 | 0.0000 | *** |
| 5 | Recreational, cultural, and sporting activities | 4.00 | 1.02 | 4.17% | 9.54 | 0.0000 | *** |
| 6 | Research and development | 3.71 | 1.09 | 10.64% | 6.32 | 0.0000 | *** |
| 7 | Human health activities | 3.70 | 1.15 | 8.42% | 5.86 | 0.0000 | *** |
| 8 | Collection, purification, and distribution of water | 3.65 | 1.30 | 1.05% | 4.84 | 0.0000 | *** |
| 9 | Legal, accounting and management consultancy | 3.60 | 1.29 | 2.06% | 4.58 | 0.0000 | *** |
| 10 | Veterinary activities | 3.52 | 1.18 | 3.23% | 4.58 | 0.0000 | *** |

**Panel B:** Sustainability of industries (Bottom 10)

| | | mean | std. dev. | % of "do not know" | t-test (H0: mean =3) | p-value | Significance level |
|---|---|---|---|---|---|---|---|
| 1 | Extraction of crude petroleum and natural gas | 1.39 | 0.92 | 0.04 | 17.16 | 0.0000 | *** |
| 2 | Manufacture of rubber and plastic products | 1.39 | 0.72 | 0.01 | 21.58 | 0.0000 | *** |
| 3 | Mining of coal | 1.42 | 0.80 | 0.03 | 18.86 | 0.0000 | *** |
| 4 | Mining of uranium | 1.53 | 1.10 | 0.01 | 12.89 | 0.0000 | *** |
| 5 | Manufacture of refined petroleum products | 1.55 | 1.05 | 0.04 | 13.31 | 0.0000 | *** |
| 6 | Retail sale of automotive fuel | 1.65 | 0.95 | 0.11 | 13.95 | 0.0000 | *** |
| 7 | Mining of metal ores | 1.66 | 1.17 | 0.08 | 11.11 | 0.0000 | *** |
| 8 | Manufacture of chemicals and chemical products | 1.71 | 1.09 | 0.01 | 11.56 | 0.0000 | *** |
| 9 | Manufacture of cars and trucks | 1.73 | 1.10 | 0.02 | 11.32 | 0.0000 | *** |
| 10 | Manufacture of aircraft and spacecraft | 1.81 | 1.14 | 0.03 | 10.24 | 0.0000 | *** |

**Table B.3:** Survey responses: Labor choices and wages

Panel A of the table summarizes selected responses to the survey questions related to labor choices and wages. The scale of responses to Question 1 ranges from 1 (not important at all) to 5 (very important). Responses to Question 2 and 5 can take on values of 0 (No) and 1 (Yes). Responses to Questions 4 and 6 range from 0 to 100 %. Panel B shows mean difference tests, which test if responses to survey responses differ across skill levels. Skill is assessed using responses to the following two survey questions: *In high school, how was your academic performance relative to your classmates? Where did you rank in terms of your grades in high school.* The group *Top* contains responses from individuals who state that their academic performance in high school was much better than average or who state to have ranked in the Top10 in relation to the second question. We test if the average response to a selection of questions in Panel A differs for the group *Top* relative to the rest.

**Panel A:** Questions related to labor choices and wages

| | Count | Mean | Median |
|---|---|---|---|
| Question 1: How important is it for you that your job is environmentally sustainable? | 300 | 2.253 | 2.000 |
| Dummy Question 1b: Dummy variable equal to 1 if the answer to Question 1 is either Very important or Important. | 300 | 0.653 | 1.000 |
| Question 2: Would you consider accepting a lower wage to work for a firm that is environmentally sustainable? | 300 | 0.520 | 1.000 |
| Question 3: If yes, what is the maximum reduction in wage you would accept in order to work for environmentally sustainable ("green") firm versus an environmentally unsustainable ("brown") firm (from 0% to 100%)?(Conditional responding yes to Question 2) | 156 | 19.603 | 15.000 |
| Question 4: For the same wage, would you be willing to work harder for an environmentally sustainable ("green") firm versus an environmentally unsustainable ("brown") firm? | 300 | 0.817 | 1.000 |
| Question 5: Would you require a higher wage to work for a firm that is environmentally unsustainable | 300 | 0.547 | 1.000 |
| Question 6: If yes, what is the minimum percentage increase in wage you would require to work for environmentally unsustainable ("brown") firm versus an environmentally sustainable ("green") firm (from 0% to 100%)? (Conditional responding yes to Question 5) | 164 | 28.610 | 20.000 |

**Panel B:** Mean difference tests: Labor choices and wages by different skills/talent group

| | Grade performance is at the Top 10% | | | Academic performance is much better than average | | |
|---|---|---|---|---|---|---|
| | Top | Rest | Diff | Top | Rest | Diff |
| Question 1: How important is it for you that your job is environmentally sustainable? | | | | | | |
| Very important or important | 78.50% | 61.70% | 16.8** | 77.10% | 47.90% | 29.2*** |
| Very important | 32.30% | 21.70% | 10.6* | 26.30% | 20.70% | 5.6 |
| Question 2: Would you consider accepting a lower wage to work for a firm that is environmentally sustainable? | | | | | | |
| Yes | 61.50% | 49.40% | 12.2* | 54.20% | 48.80% | 5.4 |
| | 65 | 235 | | 179 | 121 | |

**Figure B.1:** Survey-based measure of Sustainability 2019 vs. 2020 (Student sample)

This figure shows a scatterplot of the relation between the environmental sustainability of different economic sectors in the survey carried out in 2020 versus the survey carried out in 2019.

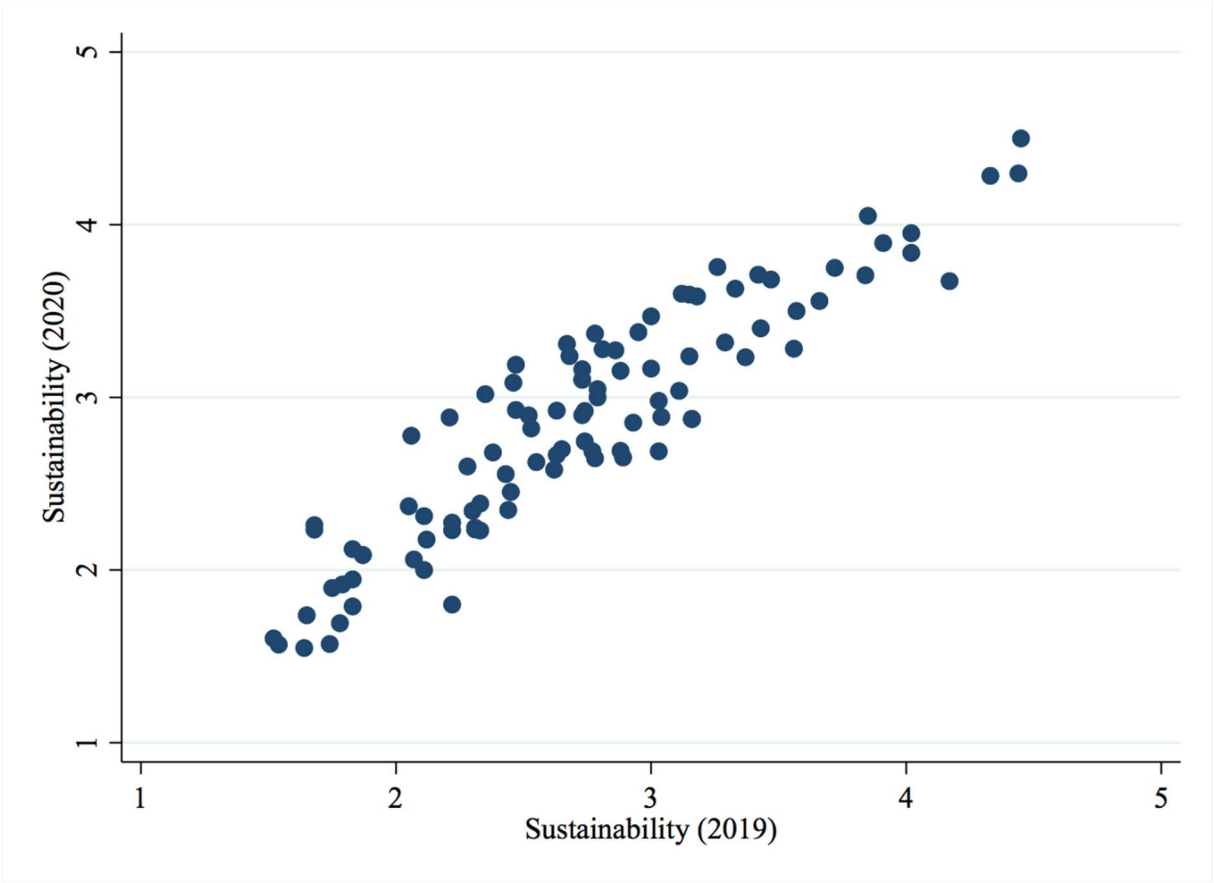


**Figure B.2:** Survey-based measure of Sustainability Student (2019/2020) vs. Prolific (2021) sample

This figure shows a scatter plot between the average industry classifications resulting from the student surveys in 2019 and 2020 and the survey carried out via Prolific in 2021.

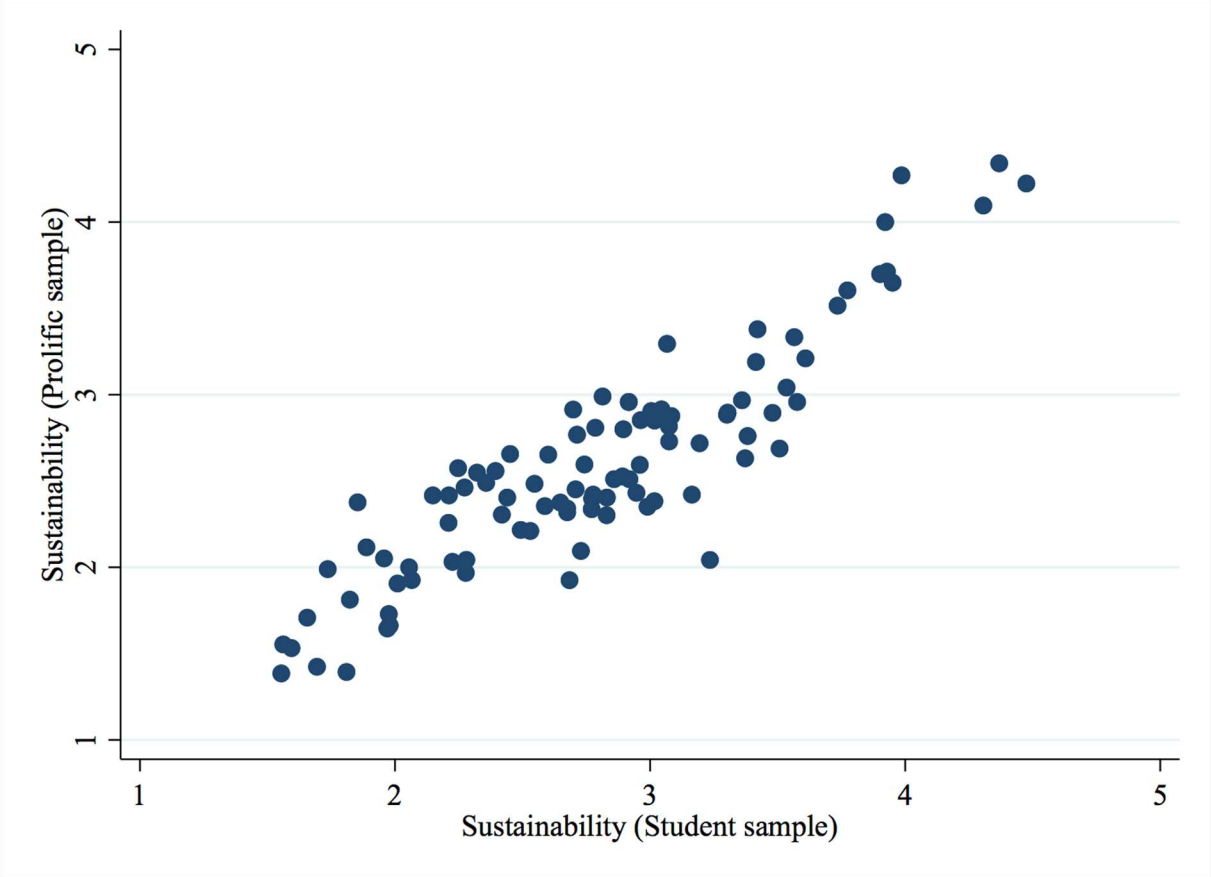
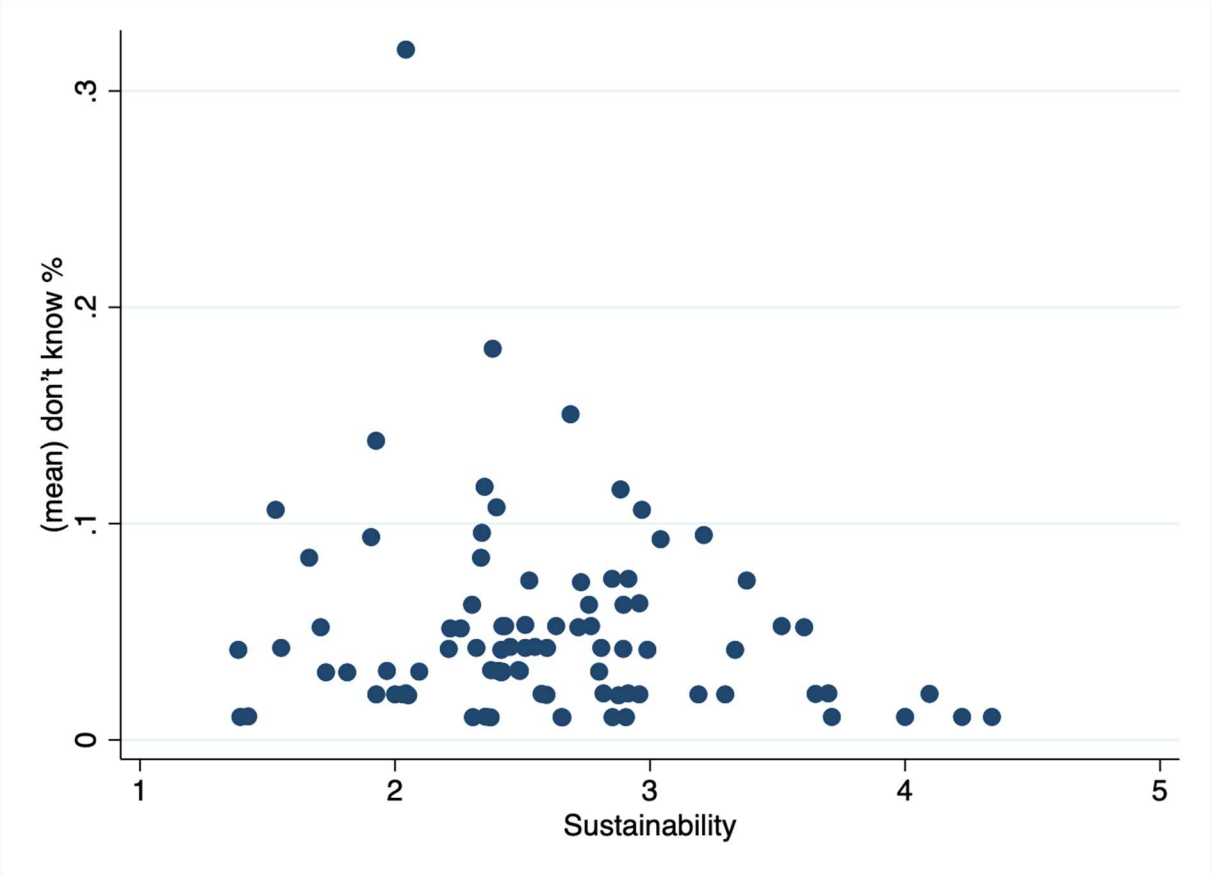


**Figure B.3:** Sustainability vs. "Do not know"

The chart shows the relationship between sustainability of industries and the percentage of "do not know" answers. For each of the 95 industries, we calculate the percentage of "Do not know answers" and plot it against the average sustainability of the sector.



# Appendix C: Is moving across sectors and firms random?

In Table III we use a model that includes worker fixed effects. As we explain in the paper, it is unlikely that workers randomly move between firms and sectors. In contrast, at least some of these switches are likely to be related to observable life events. Table C.1 shows that workers are more likely to move into *unsustainable* sectors when getting married or becoming parents and are more likely to move into a more sustainable sector around a divorce. In the analysis conducted in Table C.1, we focus on the subset of workers who are changing jobs and relate the type of job change (moving into the most sustainable sector / moving into the most unsustainable sector) with changes of worker-level variables around the move (+/- 2 years). This analysis is not only informative in our setting, but more generally useful for an interpretation of panel regressions that exploit within worker variation as those models typically assume that workers' changes across firms are basically random.

**Table C.1:** Moving into Sustainable and Unsustainable Sectors

The table analyzes worker-level determinants for moving into the most sustainable sectors (Sustainability score = 5) in Column (1) and most unsustainable sectors (Sustainability score = 1) in Column (2). The sample focuses on workers who move across firms. *Child born* is a dummy variable equal to one if the worker is becoming a parent +/- 2 years around the move. Similarly, *Married* and *Divorced* are dummy variables equal to one if the person got married or divorced during that period. We include education in years as a control as well as age groups fixed effects, cognitive and non-cognitive skill category fixed effects, and year fixed effects in the models. ***, **, * indicates statistical significance at the 1, 5, and 10% level, respectively.

| | **Move into the most *Sustainable* Sector (1)** | **Move into the most *Unsustainable* Sector (2)** |
|---|---|---|
| *Child born* | -0.004*** | 0.001** |
| | (0.000) | (0.000) |
| *Married* | 0.000 | 0.002*** |
| | (0.001) | (0.000) |
| *Divorced* | 0.004*** | -0.001** |
| | (0.001) | (0.001) |
| *Obs* | 3,833,612 | 3,833,612 |
| *Sample* | Men | |
| *Age groups (5yrs)* | Yes | Yes |
| *Education* | Yes | Yes |
| *Skill dummies* | Cog./Non-cog. | Cog./Non-cog. |
| *Year f.e.* | Yes | Yes |
| *R-squared* | 0.003 | 0.003 |

# Appendix D: Variable Descriptions

**Table D.1:** Variable Description

This tables presents the definitions and sources of the main variables used in our study.

***Employer-Employee matched Data:***

| *Name of variable* | Definition | Source |
|---|---|---|
| *Panel A: Labor-related variables* | | |
| Ln(Wages) | Log of deflated wage | LISA (SCB) |
| Δln(wages) | Difference of log of deflated wage | Serrano |
| Δ(Value added on asset) | Difference of value added on asset | Serrano |
| Lag Δ(Value added on asset) | Lag of difference of value added on asset | Serrano |
| Stay in firm | Dummy variable that takes the value of 1 if a worker is still working in the same firm in the subsequent year | LISA (SCB) |
| Voluntary turnover | Dummy variable that takes the value of 1 if the worker left the firm voluntarily. We define a voluntary turnover as a turnover when the worker is below 65 years old and not fired. | LISA (SCB) |
| Fired | Dummy variable that takes the value of 1 if the worker was fired in a given year. We define a worker be fired if she has claimed unemployment benefits. | LISA (SCB) |
| Tenure (years) | Number of years a worker has been in his/her current job | LISA (SCB) |
| Parttime work | Dummy variable that takes the value of 1 if the worker is a parttime worker | LISA (SCB) |
| Sick days | Average gross sickness days at the industry-level | LISA (SCB) |
| Hospitalization | Dummy variable that takes the value of 1 if a worker has been hospitalized in a given year | LISA (SCB) |
| Wage cut (>10%) | Dummy variable takes 1 if a worker has experienced a wage cut of at least 10% | LISA (SCB) |
| Wage cut (>20%) | Dummy variable takes 1 if a worker has experienced a wage cut of at least 20% | LISA (SCB) |
| Wage cut (>30%) | Dummy variable takes 1 if a worker has experienced a wage cut of at least 30% | LISA (SCB) |
| Work. Hours (actual) | Actual hours worked | LFS survey (SCB) |
| Work. Hours >50h | Dummy variable takes 1 if a worker has worked more than 50 hours per week | LFS survey (SCB) |
| Work. Hours >60h | Dummy variable takes 1 if a worker has worked more than 60 hours per week | LFS survey (SCB) |
| Days (ill) | The number of days a worker has been ill in a year | LFS survey (SCB) |
| HHI (occ.) < 0.25 | HHI Concentration measure in terms of occupation which is smaller than 0.25 indicating low specific concentration | LISA (SCB) |
| HHI (SNI3) < 0.25 | HHI Concentration measure in terms of industry (SNI3) which is smaller than 0.25 indicating the industry easier for workers to move out | LISA (SCB) |
| Ssyk* | Different level of Ssyk occupational classification ranging from Ssyk3 (113 unique occupations) to Ssyk4 (354 unique occupations) | LISA (SCB) |
| Occ8 | Occupation classification including 8 categories | LISA (SCB) |

| | | |
|---|---|---|
| ind* | SNI industry classification at different digit levels (e.g. 2 and 3) | LISA (SCB) |
| Hunyk83 | Occupation classification at a 2-digit level | LFS survey (SCB) |
| Husky4 | Occupation classification at a 4-digit level | LFS survey (SCB) |
| | | |
| *Panel B: Demographic and education variables* | | |
| Female | Dummy if the individual is female | LISA (SCB) |
| Age | Age in years | LISA (SCB) |
| Schooling | Years of schooling | LISA (SCB) |
| Potential Experience | Years of potential experience (Age – years of schooling – 6) | LISA (SCB) |
| UNI | Dummy variable takes 1 if the worker went to university | LISA (SCB) |
| PhD | Dummy variable takes 1 if the worker has a PhD degree | LISA (SCB) |
| Graderank | Grade rank of a worker in high school | LISA (SCB) |
| Cog. Skills | Cognitive ability score, ranging from 1 to 9 | Military enlistment test (SCB) |
| Cog9 | Dummy variable which equals 1 if cognitive ability score equals to 9 | Military enlistment test (SCB) |
| Cog89 | Dummy variable which equals 1 if cognitive ability score equals to 8 or 9 | Military enlistment test (SCB) |
| Non-cog. Skills | Non-cognitive ability score, ranging from 1 to 9 | Military enlistment test (SCB) |
| Non-cog.9 | Dummy variable which equals 1 if non-cognitive ability score equals 9 | Military enlistment test (SCB) |
| Noncog89 | Dummy variable which equals 1 if non-cognitive ability score equals 8 or 9 | Military enlistment test (SCB) |
| Pred. cog. Skills | Predicted cognitive skills, on a 1 to 9 Stanine scale | Military enlistment test (SCB) / LISA (SCB) |
| Married | Dummy variable takes 1 if a worker is married | LISA (SCB) |
| Divorced | Dummy variable takes 1 if a worker is divorced | LISA (SCB) |
| Children | Dummy variable takes 1 if a worker has children | LISA (SCB) |
| Children (#) | Number of children | LISA (SCB) |
| Parental leave (days) | The number of parental leave days | LISA (SCB) |
| Ln(hours) | Log of hours | LISA (SCB) |

***Sustainability Measures:***

| Name of variable | Definition | Source |
|---|---|---|
| Panel A: Survey-based sustainability measures | | |
| Sustain. (high) | Dummy variable that takes a value of 1 if the sector is a high sustainability sector, i.e., in the top quintile of the survey sectors | Authors' survey |
| Sustain. (cont.) | Sector-level sustainability measure (continuous) | Authors' survey |
| Sustain. (high- empl.) | Dummy variable that takes 1 if worker works in a sector that belongs to the top sustainability quintile of all worker-year observations | Authors' survey / LISA (SCB) |
| Ch. in sustain. (high) | Dummy variable that takes the value of -1 if a worker moves into a sector of lower sustainability, 0 if the worker remains in a sector of the same sustainability, and +1 if the worker moves into a sector of higher sustainability | Authors' survey / LISA (SCB) |
| Sustain. (high) – up | Dummy variable that takes the value of 1 if the worker switches to sector of higher sustainability | Authors' survey / LISA (SCB) |
| Sustain. (high) - down | Dummy variable that takes the value of 1 if following the bankruptcy or layoff the worker switches into a sector of lower sustainability | Authors' survey / LISA (SCB) |
| Sust. quintile = * | Dummy variable if the sector-level sustainability measure in quintiles equals to * (eg., Sust. quintile = 2) | Authors' survey |
| Physical demand. (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors of physically demandingness | Authors' survey |
| Work-life balance (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors in terms of work-life balance | Authors' survey |
| Career opportunities (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors in terms of career opportunities | Authors' survey |
| Job security (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors in terms of job security | Authors' survey |
| Governance (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors in terms of governance | Authors' survey |
| Social responsibility (high) | Dummy variable that takes 1 if the sector belongs to the top quintile of sectors in terms of social responsibility | Authors' survey |
| Panel B: ESG firm level measures | | |
| Composite score | Total sustainability scores of firms from Refinitiv. The rescaled scores are from 0 to 1. | Refinitiv |
| Environ. pillar | Environmental subscores from Refinitiv. The rescaled scores are from 0 to 1. | Refinitiv |
| Social pillar | Social subscores from Refinitiv. The rescaled scores are from 0 to 1. | Refinitiv |
| Governance pillar | Governance subscores from Refinitiv. The rescaled scores are from 0 to 1. | Refinitiv |
| Best-of-class composite | Dummy variables that identify the firm with the highest composite score from Refinitiv in a given Industry. | Refinitiv |
| Best-of-class environ. | Dummy variables that identify the firm with the highest environment score from Refinitiv in a given Industry. | Refinitiv |
| Best-of-class gov. | Dummy variables that identify the firm with the highest governance score from Refinitiv in a given Industry. | Refinitiv |
| Best-of-class social | Dummy variables that identify the firm with the highest social score from Refinitiv in a given Industry. | Refinitiv |
| Composite score | Sustainability scores of firms from MSCI. Scores range from 0 to 10. | MSCI |

| | | |
|---|---|---|
| Environ. pillar | Environmental subscores from MSCI. Scores range from 0 to 10. | MSCI |
| Social pillar | Social subscores from MSCI database. Scores range from 0 to 10. | MSCI |
| Governance pillar | Governance subscores from MSCI database. Scores range from 0 to 10. | MSCI |
| Best-of-class composite | Dummy variables that identify the firm with the highest composite score from MSCI in a given Industry. | MSCI |
| Best-of-class environ. | Dummy variables that identify the firm with the highest environment score from MSCI in a given Industry. | MSCI |
| Best-of-class gov. | Dummy variables that identify the firm with the highest governance score from MSCI in a given Industry. | MSCI |
| Best-of-class social | Dummy variables that identify the firm with the highest social score from MSCI in a given Industry. | MSCI |
| RRI index | Negative ESG news scores of firms from Reprisk. Scores range from 0 to 100. | Reprisk |
| ΔRRI index | Difference of the sustainability scores. | Reprisk |
| Negative ESG news | a shock variable that takes on the value of 1 if Reprisk's RRI exhibits positive changes | Reprisk |

# Appendix E: Prolific Survey

## Prolific Survey – Selection of industries

We include 95 industries in the survey, which make up 98% of the Swedish employment in our administrative wage data. The selection of these 95 industries is mainly based on the Swedish standard industrial classification code (SNI code). The SNI code is based on the EU's recommended standards, NACE Rev.2. There are 274 industries in the 3-digit level classification and 99 industries in the 2-digit level. We first considered to use all industries at the 3-digit level. However, we realized that that the 3-digit level sometimes provided too much granularity (or detail). For instance, might at the 3-digit level, "secondary education," "higher education," and "Adult and other education" are three separate 3-digit industries while we only need the 2-digit industry level "education" for our classifying purpose. Choosing too detailed industry classifications might also result in survey participants being less focused or even confused in classifying activities.

Therefore, we select the industries based mainly on the 2-digit industrial classification. If the 2-digit level descriptions are too vague or too coarse to distinguish activities, we turn to 3-digits or even 4 digits. For example, at the 2-digit level we have an industry "Manufacture of transport equipment" while at the more granular level we can see that it branches into "Manufacture of motorcycles" and "Manufacture of bicycles", which we considered to be potentially different in terms of sustainability. Moreover, we also revised some industry names to make them clearer and more understandable. For instance, at the 3-digit level we have "Wholesale on a fee or contract basis". After carefully reading the subsection industry descriptions at the 4- and 5-digit level, we found that "agents' involvement" is the key element, so we revised the name of the sector into "Wholesale with agents involved".

Overall, the 95 industries we chose are hence a mixture of industries at the 2-digit, 3-digit and 4-digit level.

# Prolific Survey - Questions

## I. Demographics and high school performance

Q1 Gender: how do you identify?

- ○ Woman (2)
- ○ Non-binary (3)
- ○ Man (4)
- ○ Other (5) _____

Q2 Which year were you born?

_____

Q3 What is the highest level of education that you have achieved?

- ○ High School (1)
- ○ Bachelors (2)
- ○ Masters (3)
- ○ PhD (4)
- ○ Other (5) _____

Q4 Did you take the Scholastic Aptitude Test (SAT)?

- ○ Yes (1)
- ○ No (0)

Q4b If you took the SAT, what was your total score?

_____

Q5 In high school, how was your academic performance relative to your classmates?

- ○ Much better (1)
- ○ Somewhat better (2)
- ○ About the same (3)
- ○ Somewhat worse (4)
- ○ Much worse (5)

Q6 Where did you rank in terms of your grades in high school.

- ○ In the top 1% (1)
- ○ In the top 5% (2)
- ○ In the top 10% (3)
- ○ Below the top 10% (4)
- ○ I am not sure (6)

## II. Preferences for environmental sustainability and job choices

Q7 How important is it for you that your job is environmentally sustainable?

- ○ Very important (1)
- ○ Important (2)
- ○ Moderately important (3)
- ○ Slightly important (4)
- ○ Not important (5)

Q8 Would you consider accepting a lower wage to work for a firm that is more environmentally sustainable?

- ○ Yes (1)
- ○ No (0)

Q8a If yes, what is the maximum **reduction** in wage you would accept in order to work for an environmentally sustainable ("green") firm versus an environmentally unsustainable ("brown") firm (from 0% to 100%)?

Q9 For the same wage, would you be willing to work harder for an environmentally sustainable ("green") firm versus an environmentally unsustainable ("brown") firm?

- ○ Yes (1)
- ○ No (0)

## III. Classification of environmental sustainability of economic sectors (95 different sectors; one sector shown)

How environmentally sustainable do you consider the following economic activity:

505 - Retail sale of automotive fuel

- ○ Sustainable (1)
- ○ Somewhat sustainable (2)
- ○ Neutral (Neither sustainable nor unsustainable) (3)
- ○ Somewhat unsustainable (4)
- ○ Unsustainable (5)
- ○ Do not know (6)

## IV. Questions measuring preferences with respect to dimensions of compensating differentials

Q10 When making job choices, how important are the following aspects of a potential employer to you?

| | Very important (1) | Important (2) | Moderately important (3) | Slightly important (4) | Not important (5) |
|---|---|---|---|---|---|
| Compensation (1) | ○ | ○ | ○ | ○ | ○ |
| Work-life balance (e.g., flexible hours, maternity benefits,...) (2) | ○ | ○ | ○ | ○ | ○ |
| Job security (3) | ○ | ○ | ○ | ○ | ○ |
| Career opportunities (4) | ○ | ○ | ○ | ○ | ○ |
| Environmental sustainability (6) | ○ | ○ | ○ | ○ | ○ |
| Governance (5) | ○ | ○ | ○ | ○ | ○ |
| Social values (7) | ○ | ○ | ○ | ○ | ○ |

## V. Classifying sectors in terms of other compensating differentials (95 sectors; one sector shown)

Q220 How much do you agree with each of the statements considering working in the following sector:
01 Agriculture

| | Strongly Agree (1) | Agree (2) | Neutral (Neither agree nor disagree) (3) | Disagree (4) | Strongly Disagree (5) | Do not know (6) |
|---|---|---|---|---|---|---|
| Working in this sector is physical demanding or dangerous (high risk of accidents). (1) | ○ | ○ | ○ | ○ | ○ | ○ |
| Working in this sector allows for a good work-life balance. (3) | ○ | ○ | ○ | ○ | ○ | ○ |
| Working in this sector provides good career opportunities (e.g., training, high wage growth, good promotion opportunities). (6) | ○ | ○ | ○ | ○ | ○ | ○ |
| Working in this sector provides high job security (low firing risk). (5) | ○ | ○ | ○ | ○ | ○ | ○ |
| Working in this sector is characterized by good corporate governance. (9) | ○ | ○ | ○ | ○ | ○ | ○ |
| Working in this sector is characterized by high social responsibility towards stakeholders (e.g., communities or workers). (10) | ○ | ○ | ○ | ○ | ○ | ○ |

## VI. Other questions

Q122 Would you require a higher wage to work for a firm that is environmentally unsustainable?

- ○ Yes (1)
- ○ No (0)

Q123 If yes, what is the minimum percentage **increase** in wage you would require in order to work for an environmentally unsustainable ("brown") firm versus an environmentally sustainable ("green") firm (from 0% to 100%)?

_____

Q111 We would really appreciate your feedback on the survey. Please provide any thoughts you might have here. Depending on the quality of your input, we will consider a bonus payment.

_____

_____

_____

_____

_____

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