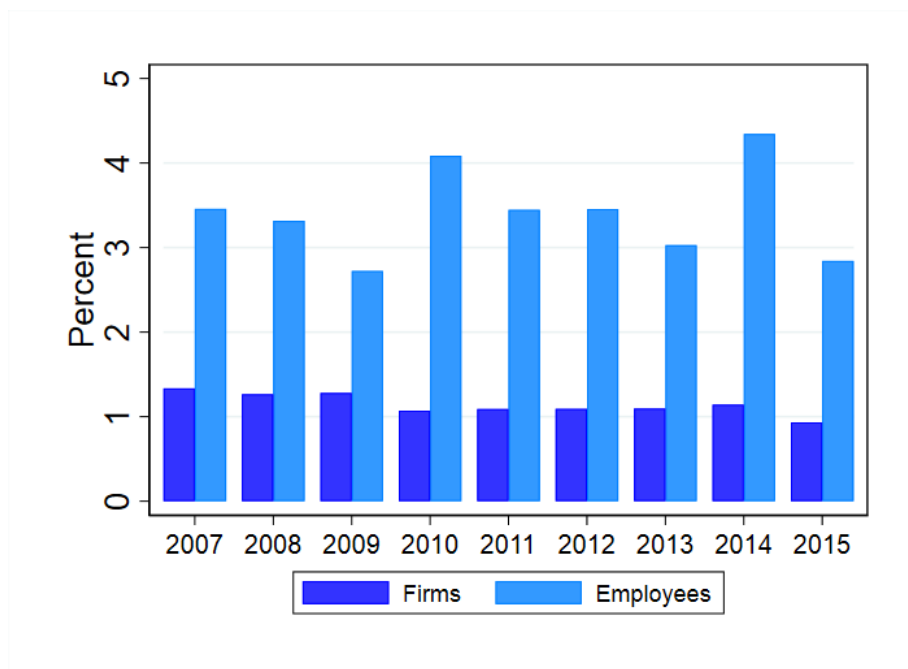


A Online Appendix to:

**“How Do Mergers Affect the Mental Health of
Employees?”**

Appendix Figure A1: Prevalence of mergers

This figure shows the prevalence of mergers in Sweden during the period 2007-2015. The dark blue columns show the share of Swedish limited liability companies with at least five employees that are involved in a merger during a given year. The light blue columns show the number of employees of limited liability companies (with five or more employees) involved in a merger relative to all employees in limited liability companies (with five or more employees). We measure employees in the year prior to the merger.

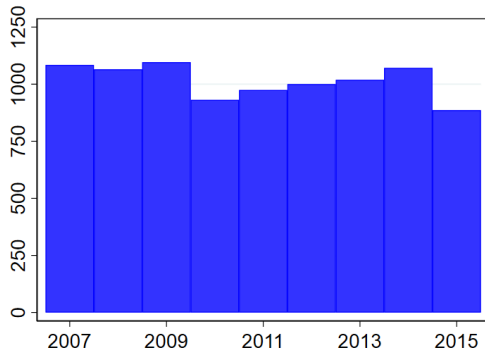


Appendix Figure A2: Sample mergers versus all Swedish mergers

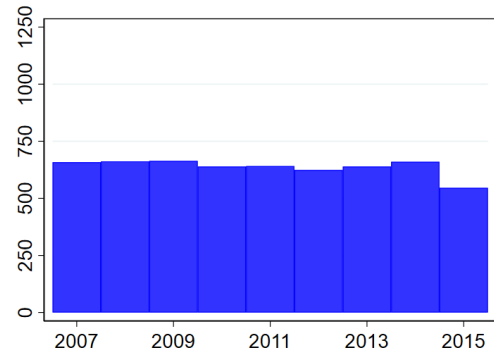
This figure compares the mergers included in our sample to all merger events in Sweden during the sample period. Panel (a) reports the number of mergers among limited liability firms in Sweden. Panel (b) shows the subset of such mergers where the acquirer and/or target firm has five or more employees in the year prior to the merger (a pre-condition to enter our sample). Panel (c) shows a histogram of the number of employees in Swedish limited liability firms, while Panel (d) reports the employee distribution in the sample firms. Panels (e) and (f) report the employee distribution in the target and acquirer firms of the sample, respectively (employees are recorded in the year prior to the merger announcement). The sample period is 2007 to 2015.

Merger frequency

(a) All limited liability firms

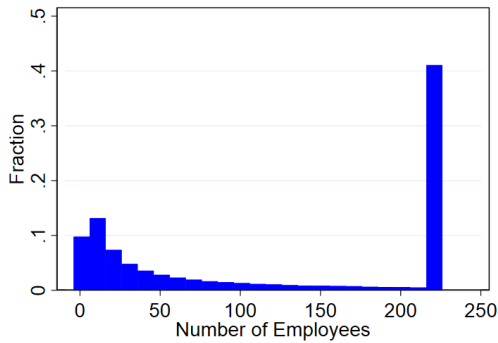


(b) Limited liability firms in the sample

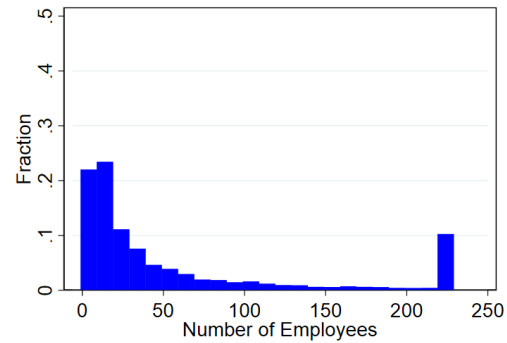


Employee distributions

(c) Employees at limited liability firms

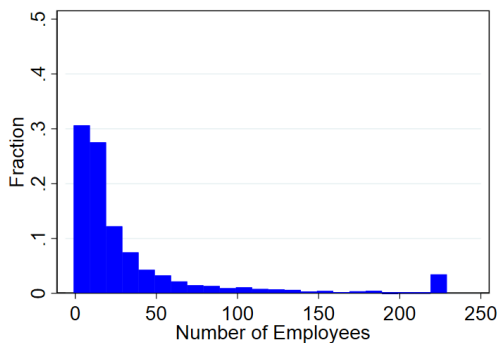


(d) Employees in sample firms

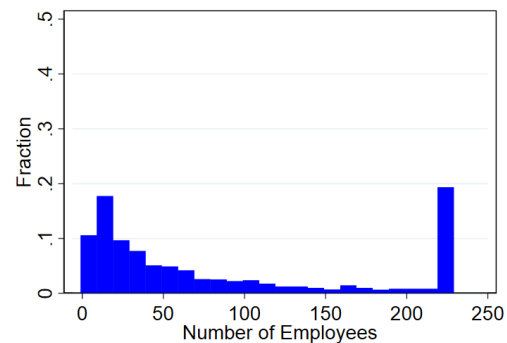


Employee distributions: target vs. acquirer

(e) Employees in target firms



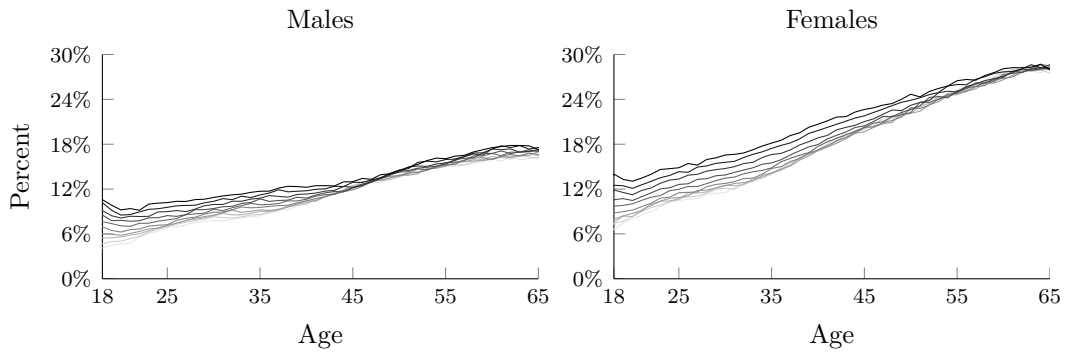
(f) Employees in acquirer firms



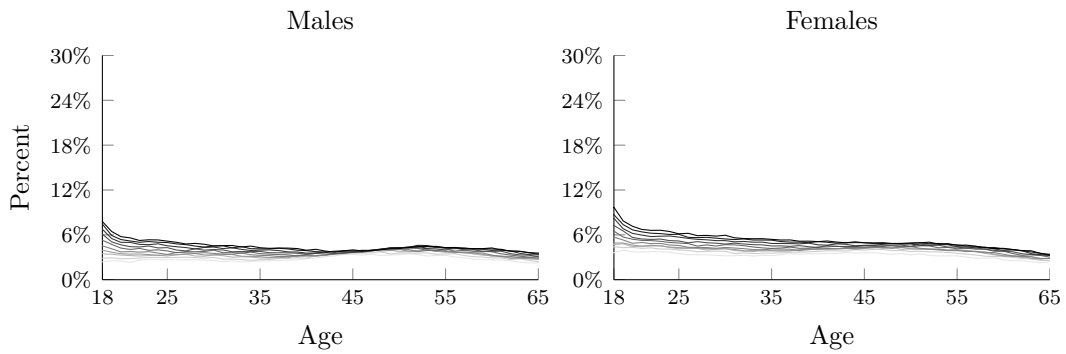
Appendix Figure A3: Share of individuals with mental health problems in the general population

These figures plot the share of men and women in the Swedish working age population, by age and cohort, during the sample period (2006-2015) that are either diagnosed with a mental illness or take psychiatric medication (Panel a); are diagnosed with a mental illness (Panel b); take psychiatric medication (Panel c).

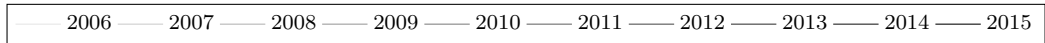
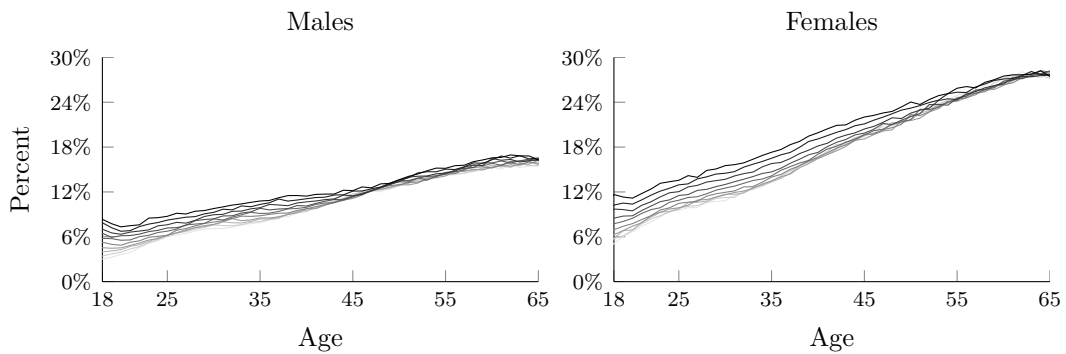
(a) Individuals diagnosed with a mental illness or with psychiatric medication intake



(b) Individuals diagnosed with a mental illness



(c) Individuals taking psychiatric medication



Appendix Table A1: Depression definition

The diagnosis codes reported below are used to define the variable *Depression diagnosis*. ICD-10 is the 10th revision of the International Statistical Classification of Diseases and Related Health Problems, a medical classification list by the World Health Organization.

ICD-10-CA	Definition
F31.31	Bipolar affective disorder, current episode mild or moderate depression
F31.32	Bipolar affective disorder, current episode mild or moderate depression
F31.4	Bipolar affective disorder, current episode severe depression without psychotic symptoms
F31.5	Bipolar affective disorder, current episode severe depression with psychotic symptoms
F31.6x	Bipolar affective disorder, current episode mixed
F31.9	Bipolar affective disorder, current episode unspecified
F32.0	Mild depressive episode
F32.1	Moderate depressive episode
F32.2	Severe depressive episode without psychotic symptoms
F32.3	Severe depressive episode with psychotic symptoms
F32.4	Depressive disorder, single episode, in partial remission
F32.5	Depressive disorder, single episode, in full remission
F32.8	Other depressive episodes
F32.9	Depressive episode, unspecified
F32.9	Depressive episode, unspecified
F33.0	Recurrent depressive disorder, current episode mild
F33.1	Recurrent depressive disorder, current episode moderate
F33.2	Recurrent depressive disorder, current episode severe without psychotic symptoms
F33.3	Recurrent depressive disorder, current episode severe with psychotic symptoms
F33.41	Recurrent depressive disorder, currently in remission
F33.42	Recurrent depressive disorder, currently in remission
F33.8	Recurrent depressive disorder, other
F33.9	Recurrent depressive disorder, unspecified
F34.1	Dysthymia
F34.8	Other persistent mood disorders
F34.9	Persistent mood disorder, unspecified
F38.0	Other single mood disorders
F38.1	Other recurrent mood disorders
F38.8	Other specified mood disorders
F39	Unspecified mood disorder
F41.2	Mixed anxiety and depressive disorder
F43.2	Adjustment Disorders
F43.2	Adjustment Disorders
F45.0	Somatization disorder
F45.1	Undifferentiated somatoform disorder
F45.9	Somatoform disorder, unspecified
F48.8	Other specified neurotic disorders
F48.9	Neurotic disorder, unspecified
F60.6	Anxious [avoidant] personality disorder
F60.8	Other specific personality disorders
F61	Mixed and other personality disorders
F62.8	Other enduring personality changes
F68.8	Other specified disorders of adult personality and behaviour
F99	Mental disorder, not elsewhere specified

Appendix Table A2: Definitions of variables

This table reports definitions of variables used in the article, in alphabetic order. Panel A reports the definitions of dependent variables. Panel B reports definitions of variables used in cross-sectional tests. All indicator variables in Panel A are multiplied by 100 in the tests.

Panel A: Dependent variables		
Variable	Definition	Registry / source
Antidepressants dosage	Number of predefined daily doses of antidepressant medication.	NPD
Antidepressants medication	A dummy variable that takes the value of one if there is an intake of antidepressant medication (that is, if ATC = N06A).	NPD
Anxiety diagnosis	A dummy variable that takes the value of one if an individual is diagnosed with anxiety (i.e., if the diagnosis code starts with F40 or F41).	NPR
Composite mental illness	A dummy variable that takes the value of one if an individual has either been diagnosed with a mental illness (variable <i>Mental illness diagnosis</i> = 1) or has been prescribed drugs to treat a mental illness (<i>Mental illness medication</i> = 1).	NPR/NPD
Depression diagnosis	A dummy variable that takes the value of one if an individual is diagnosed with depression (that is, the diagnosis belongs to a code listed in Appendix Table A1).	NPR
Inpatient	A dummy variable that takes the value of one if the individual has a diagnosis or surgical procedure registered within the inpatient registry.	NPR
Mental illness diagnosis	A dummy variable that takes the value of one if an individual is diagnosed with a mental illness (i.e., a diagnosis from the ICD10, F-chapter, is registered).	NPR
Mental illness medication	A dummy variable that takes the value of one if there is an intake of any mental health medication (that is, if ATC = N05A, or N05B, or N05C, or N06A, or N06B, or N03AE).	NPD
Outpatient	A dummy variable that takes the value of one if the individual has a diagnosis or surgical procedure registered within the outpatient registry.	NPR
Physical illness	A dummy variable that takes the value of one if an individual is diagnosed with a single-gene disorder (that is, the diagnosis belongs to a code listed in Appendix Table A4).	NDR
Profit margin	EBITDA divided by sales	Serrano
Return on assets	EBITDA divided by assets	Serrano
Sales per employee	Revenue divided by the number of employees	Serrano
Sick days per employee	Number of sick days during the year divided by the number of employees	LISA, Serrano

Table 1 (continued)

Panel B: Variables used in cross-sectional tests

Variable	Definition	Registry / source
Above median change share MI	A dummy variable that takes the value of one if the increase in mental health problems (as measured by the variable <i>Composite mental illness</i>) among the merging firms' workers exceeds the sample median.	NPR/NPD
Above med. tenure	A dummy variable that takes the value of one if an individual has above median tenure at the firm at $t = -1$.	LISA
Age	Current year minus birth year plus one.	LISA
Age $x-y$	A dummy variable that takes the value of one if the individual is (or, if dying in pre-period, would be) of age between x and y at the time of merger.	LISA
Below median IQ (σ)	A dummy variable that takes the value of one if the cognitive skill score is strictly less than median cognitive skill score across cohorts. Available for males only.	Riksarkivet, Rekryteringsmyndigheten
Below median noncog. (σ)	A dummy variable that takes the value of one if the noncognitive skill score is strictly less than the median noncognitive skill score across cohorts. Available for males only.	Riksarkivet, Rekryteringsmyndigheten
Blue-collar	A dummy variable that takes the value of one if the first three digits of the occupation code (SSYK) of the individual is within the 400-999 range at $t = -1$.	LISA
Change task	A dummy variable indicating whether an individual's occupational (SSYK) code has changed in its first digit between $t = 0$ and $t = 2$.	LISA
Change location	A dummy variable indicating whether the county code for the establishment at which an individual works differs between $t = 0$ and $t = 2$.	LISA
Female	A dummy variable that takes the value of one if the worker is female, zero if male.	LISA
Foreign	A dummy variable that takes the value of one if either the individual is born outside of Sweden or both of the individual's parents are born outside of Sweden.	LISA
Horizontal n	A dummy variable that takes the value of one if both target and acquirer have the same n first digits in their SNI industry codes (variable <i>bransch_sni1</i> in Serrano) at $t = -1$.	Serrano
Lower wage	A dummy variable that takes the value of one if the wage at event times $t = 0, 1$ is lower than the wage at $t = -1$.	LISA
No higher educ.	A dummy variable that takes the value of one if the individual has not attended higher education post high school.	LISA
Small vs large	Dummy variable that is one for small target firms and zero for large ones (relative size ratio above 150%). Relative firm size is the ratio of number of employees at the target over number of employees at the acquirer measured at $t = -1$.	Serrano
Small vs mid	A dummy variable that is one for small target firms (corresponding to a relative size ratio below 50%) and zero for mid-size target firms (targets with relative size ratios between 50-150%).	Serrano
Stayer	A dummy variable that takes the value of one if an individual works at the same firm from $t = -1$ to $t = 1$ (with a possible switch between the target or acquirer firm at $t = 0$).	LISA
Successful merger	A dummy variable that takes the value of one if a merger is successfully consummated, zero if the merger fails. Failed mergers are those where the target firm continues to exist as an independent entity in Serrano more than 365 days after merger announcement.	Serrano
Target	A dummy variable that takes the value of one if the individual works at the target firm at $t = -1$.	Serrano

Appendix Table A3: The effect of joining firms on mental health

This table reports (“non-stacked”) OLS regression models analyzing the evolution of the mental health of workers who join firms outside of, that is, before, a merger event (Panel A) and those who join during the merger restructuring period (Panel B). Specifically, in Panel A, we focus on workers who joined target or acquirer firms in the five years prior to the merger; we compare their mental health status before and after joining with that of workers already employed at the target and acquirer during this period. In Panel B, we focus on workers who joined the merged firms in the five years after the merger; we compare their mental health status before and after joining with that of employees already at the merged firms who joined before the merger and stayed afterwards. We employ the following variables in our analysis. *Mental illness diagnosis* is a dummy variable that takes the value of one if an individual is diagnosed with a mental illness (i.e., a diagnosis from the ICD10, F-chapter, is registered). *Mental illness medication* is a dummy variable that takes the value of one if there is an intake of any mental health medication (that is, if ATC = N05A, or N05B, or N05C, or N06A, or N06B, or N03AE). *Composite mental illness* is a dummy variable that takes the value of one if an individual has either been diagnosed with a mental illness (variable *Mental illness diagnosis* is one) or has been prescribed drugs to treat a mental illness (*Mental illness medication* is one). *Antidepressants dosage* is the number of predefined daily doses of antidepressant medication. *Post join* is a dummy variable that takes the value of one after a worker joins a merging firm, and it is zero before joining the merging firm. Standard errors, reported in parentheses below the coefficients, are clustered at the level of the firm that an employee is joining. Statistical significance at 1%, 5%, and 10% is marked with ***, **, and *, respectively.

Panel A: Workers joining firms in the pre-merger period (within five years prior to the merger)

	(1)	(2)	(3)	(4)
	Composite mental illness	Mental illness diagnosis	Mental illness medication	Antidepressants dosage
Post join	-0.317*** (0.067)	-0.200*** (0.033)	-0.282*** (0.064)	-1.615*** (0.338)
Observations	5,038,227	5,038,227	5,038,227	5,038,227
Percentage change	-3.0	-9.5	-2.8	-8.1
Mean of dep. var.	10.575	2.103	10.039	19.966
Age F.E.	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes
Sector - year F.E.	Yes	Yes	Yes	Yes

Panel B: Workers joining firms in the post-merger period (within five years after the merger)

	(1)	(2)	(3)	(4)
	Composite mental illness	Mental illness diagnosis	Mental illness medication	Antidepressants dosage
Post join	0.110* (0.059)	0.024 (0.037)	0.104* (0.057)	0.071 (0.242)
Observations	1,892,215	1,892,215	1,892,215	1,892,215
Percentage change	1.1	1.4	1.1	0.4
Mean of dep. var.	10.303	1.725	9.876	18.784
Age F.E.	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes
Sector - year F.E.	Yes	Yes	Yes	Yes

Appendix Table A4: **Physical illness definition**

The diagnosis codes reported below are used to define the variable *Physical illness*; our definition follows Gilchrist (2002) closely. ICD-10 is the 10th revision of the International Statistical Classification of Diseases and Related Health Problems, a medical classification list by the World Health Organization. We list the number of individuals who at any point during the sample period have been diagnosed.

ICD-10-CA	# Individuals	Definition
G71.0	117	Muscular dystrophy
G11.8	2	Other hereditary ataxias
G11.9	14	Hereditary ataxia, unspecified
G11.0	2	Congenital nonprogressive ataxia
G11.2	28	Late-onset cerebellar ataxia
G60.0	109	Hereditary motor and sensory neuropathy
G60.8	16	Other hereditary and idiopathic neuropathies
G24.1	9	Idiopathic familial dystonia
G30.0	140	Alzheimer disease with early onset
G35	1,201	Multiple sclerosis
G12.2	114	Motor neuron disease
Q85.0	157	Neurofibromatosis (nonmalignant)
Q61.2	221	Polycystic kidney, autosomal dominant
N00	84	Acute nephritic syndrome
N01	59	Rapidly progressive nephritic syndrome
D58.2	5	Other haemoglobinopathies
D68.5	775	Primary thrombophilia
E84.9	38	Cystic fibrosis, unspecified
M06.1	21	Adult-onset Still disease
E88.0	132	Disorders of plasma-protein metabolism, not elsewhere classified
I42.2	227	Other hypertrophic cardiomyopathy
E83.1	372	Disorders of iron metabolism
E72.1	12	Disorders of sulfur-bearing amino-acid metabolism
I78.0	28	Hereditary haemorrhagic telangiectasia
E31.2	0	Multiple endocrine neoplasia [MEN] syndromes
Single-gene disorder	3,833	Any of the diagnosis above

Appendix Table A6: The merger wage premium

This table reports regression models estimating the ex-ante wage premium for workers working in firms that merge in the future. The dependent variable is $\ln(\text{Wage})$, the natural logarithm of the labor income obtained by an individual from the main employer in a given year. *Pre-merger* is a time-invariant dummy variable that takes the value of one for workers that will experience a merger during our sample period; it takes the value of zero for workers that never experience a merger during our sample period. *IQ* measures the cognitive skill of male workers; it takes values from one (low IQ) to nine (high IQ) on the Stanine scale. *Noncognitive skills* measures psychological abilities of workers (the score is also mapped onto the Stanine scale). In some specifications, we also employ the following firm-level variables which are winsorized at the 1% and 99% levels: $\ln(\text{Assets})$ is the natural logarithm of total firm assets; *Return on assets* is operating profit divided by total assets; *Leverage* is the ratio of total interest-bearing debt to assets; $\ln(\text{Sales per employee})$ is natural logarithm of net sales divided by number of employees. In the context of fixed effects employed, years of schooling denotes, for each individual, the number of scheduled schooling years required by an individual to obtain his/her highest earned degree, regardless of how many years it actually took the person to complete the degree (the latter information is unavailable): 12 years for a high school graduate, 15 years for an individual with a bachelor's degree, etc. Industry is categorized into 22 sectors. The sample covers the years 2006 - 2015; it includes all workers of limited liability firms with at least four workers that eventually merge (but excludes observations from the merger year onward) as well as workers from similar firms that never merge. Standard errors, reported in parentheses below the coefficients, are clustered at the level of the firm that an employee works at in a given year. Statistical significance at 1%, 5%, and 10% is marked with ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
	$\ln(\text{Wage})$			
Pre-merger	0.130*** (0.019)	0.096*** (0.010)	0.062*** (0.009)	0.037*** (0.009)
Female		-0.289*** (0.004)	-0.293*** (0.003)	-0.316*** (0.009)
IQ				0.012*** (0.001)
Noncognitive skills				0.042*** (0.001)
$\ln(\text{Assets})$			0.019*** (0.002)	0.016*** (0.002)
Return on assets			0.038* (0.023)	0.035** (0.018)
Leverage			-0.171*** (0.017)	-0.157*** (0.014)
$\ln(\text{Sales per employee})$			0.075*** (0.006)	0.078*** (0.006)
Observations	24,505,845	24,261,168	24,261,168	9,146,688
Year F.E.	Yes	No	No	No
Sector F.E.	Yes	No	No	No
Age - year F.E.	No	Yes	Yes	Yes
Sector - year F.E.	No	Yes	Yes	Yes
Years of schooling F.E.	No	Yes	Yes	Yes

Appendix Table A7: **Persistence of mental health problems in employees**

The regression model in this table is aimed at studying the persistence of mental health problems in individuals using a regression model with multiple lags of the dependent variable, *Composite mental illness*. The following regression model is estimated using the employees in our main sample: $Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \dots + \beta_6 Y_{i,t-6} + \epsilon_{i,t}$, where $Y_{i,t}$ represents mental health of employee i at time t , β represents the vector of coefficients listed in the table. Standard errors, reported in parentheses below the coefficients, are heteroskedasticity-consistent. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)
	Composite mental illness
Composite mental illness ($t = -1$)	0.406*** (0.002)
Composite mental illness ($t = -2$)	0.149*** (0.002)
Composite mental illness ($t = -3$)	0.102*** (0.002)
Composite mental illness ($t = -4$)	0.080*** (0.002)
Composite mental illness ($t = -5$)	0.061*** (0.002)
Composite mental illness ($t = -6$)	0.064*** (0.002)
Number of employees	520,586
Number of observations	1,502,822