

**Statistical Appendix
to accompany**

**DOES LABOR MARKET STATUS INFLUENCE
SELF-ASSESSED HEALTH?**

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Abstract

This study examines whether individuals' self-assessed health is related to their previous standing in the labor market and their self-assessed health at that time. We find that, once self-assessed health in the past is controlled for, none of the specified reasons behind individuals' labor market status at that time, including the inability to find work, have a statistically significant adverse impact on current assessment of physical or mental health. We do find, however, that women obtaining a job in the past period will currently perceive that their physical health is improved, and that previously unemployed men with a job to return to in the current period also experienced perceptions of better health in the current period. We present evidence that these perceptions share a common factor with other health indicators such as sick days and quasi-objective measures of physical and mental health.

JEL classifications: I110, I112, E24

Key words: physical health, mental health, employment, individual dynamics, state dependence

VI. Statistical Appendix

A. Positional Listing of Health and Labor Market Status Indicators

The health data can be described by their variable name and the lines in the longitudinal date file in which the variables are found. The “self-assessed physical health status” variable is coded RTHLTH by MEPS (lines 923-932). The “self-assessed mental health status” variable is coded MNHLTH (lines 933-942). The two sickness variables are “number of work days missed due to illness, coded WKINBD (lines 1987-2000) and “other days in bed” DDBDYS (lines 2024-2038). The “physical component summary” variable is coded PCS (lines 1792-1801) and the “mental component summary” variable is coded MCS (lines 1802-11). These last two variables were collected only for the second and fourth rounds and were calculated by MEPS using the approach of Quality Metric SF-36v2 Health Survey, www.qualitymetric.com/Default/Permissions/TryaSurvey/-tabid/238/Default.aspx, which focuses more on difficulties the respondent has in performing a variety of tasks and on particular mental states of the respondent.

The labor market status data can be described by their variable name and the lines in the longitudinal date file in which the variables are found. “Employment status” is coded as EMPST (lines 2355-2364). “Why changed jobs between rounds” is coded as YCHJ (lines 2595-2602). “Reason for not working” is coded as NTKW (lines 2577-2586).

B. Factor Analysis of Health Indicators

Factor analysis is a statistical technique to search for latent variables underlying the generation of measured variables. In this case, we wish to confirm that our five measures of health are manifestations of a single underlying variable “health.”

The analysis starts with the 5×5 correlation matrix of the five measures of health. A likelihood ratio test of the null hypothesis that this correlation matrix is diagonal (reported in the notes to Table S1) is overwhelmingly rejected. Thus, it is sensible to proceed with the factor analysis. Table S1 reports the initial results from the factor analysis. (The descriptions of Tables S1 and S2 that follow draw upon Stata Annotated Output Factor Analysis, UCLA: Academic Technology Services, Statistical Consulting Group <http://www.ats.ucla.edu/stat/stata/output/fa_output.htm>, accessed June 17, 2011). The eigenvalue is the variance of the factor. The first factor accounts for the most variance, the second accounts for the next highest amount of variance, and so on. Some of the eigenvalues are negative because the matrix is not of full rank. That is, although there are five variables, the dimensionality of the factor space is much less. There are at most three factors possible. The column labeled “difference” gives the differences between the current and following eigenvalue. Proportion gives the proportion of variance accounted for by the factor. Cumulative gives the cumulative proportion of variance accounted for by this factor plus all of the previous ones.

According to the Kaiser criterion, we should retain only those factors with an eigenvalue greater than one. This leaves us with one factor. Therefore, in Table S2, we calculate the factor loadings, which show how the variables are weighted for the factor but also the correlation between the variables and the factor. The uniqueness gives the proportion of the variance of a variable not associated with the factor. The relatively high uniqueness for days sick and the quasi-objective mental health measure suggests that they are less well explained by the common factor. The factor loadings suggest that an appropriate interpretation of the common factor is “health.” An increase in the self-assessed health measures and the quasi-objective health measures is asso-

ciated with an increase in the common factor (“better health”). An increase in the number of days sick is associated with a decrease in the common factor (“worse health”).

C. Full Regressions: Linear Probability Models

Tables 3 to 5 report the full set of results from the regressions. The key diagnostics for these regression models are the Arellano and Bond (1991) test for zero autocorrelation of order two in Δu and the Sargan (1958, 1988)-Hansen (1982) test of the over-identifying restrictions. Since the dependent variable is an indicator variable, equation (1) is a linear probability model. By construction, heteroskedasticity is present. In the presence of heteroskedasticity, the Sargan-Hansen test statistic does not have a chi-squared distribution. Thus, this statistic is not calculated below.

The estimates in model A.2 are sensitive to the assumption made about the stochastic structure of idiosyncratic error in equation (1). For example, when it is assumed that $u \sim IID$, the state dependence parameter estimate is 0.093 (9.3 percent). The Arellano and Bond (1991) test for zero autocorrelation of order two in Δu rejects at the five percent level: the p-value for the Arellano and Bond statistic is 0.047. This rejection implies that the moment conditions used produce the estimate of 0.093 and the other estimates are not valid. The parameter estimates of model A.2 in the text assume that the idiosyncratic error in equation (1) has a MA(1) structure. Model A.4 also assumes that the idiosyncratic error in equation (1) has a MA(1) structure because of a rejection of the null hypothesis of the Arellano and Bond (1991) test.

The estimate of the state dependence parameter in model A.2 suggests that there is a high degree of persistence in self-assessed physical health. Blundell, Bond, and Windmeijer (2000) show that in this case the Arellano-Bover-Blundell-Bond system generalized method of

moments estimator has highly desirable finite sample properties (increased efficiency and reduced bias) relative to the standard first-differenced generalized method of moments estimator.

We appeal to the 95 percent confidence intervals in order to convey the range of possible impact surrounding some of the more important point estimates in Tables 3 through 5 in the text. All of the standard errors are computed using the Arellano-Bond robust estimator.

In regression model A.1 of Table 3, the 95 percent confidence intervals for the impact of lagged “self-assessed physical health”, “changed jobs”, and “job ended” are (0.055, 0.150), (-0.004, 0.069), and (0.001, 0.070), respectively. In regression model A.2 of Table 3, the 95 percent confidence intervals for the impact lagged “self-assessed physical health” and “job to return to” are (0.138, 1.780) and (-0.016, 0.432). In regression model A.3 of Table 3, the 95 percent confidence intervals for the impact of lagged “self-assessed mental health” and “job ended” are (0.010, 0.118) and (0.012, 0.072). In regression model A.4 of Table 3, the 95 percent confidence intervals for the impact of lagged “self-assessed mental health” and “job to return to” are (-1.240, 1.195) and (-0.017, 0.259). Interestingly, the confidence interval for lagged self-assessed mental health for men permits large impacts in either direction in model A.4.

In regression model B.1 of Table 4, the 95 percent confidence intervals for the impact of lagged “self-assessed physical health” is (0.026, 0.143). In regression model B.2 of Table 4, the 95 percent confidence intervals for the impact of lagged “self-assessed physical health” is (-0.012, 0.152). In regression model B.3 of Table 4, the 95 percent confidence intervals for the impact of lagged “self-assessed mental health” is (0.001, 0.124).

In the regression models in Table 5, the lagged dependent variables are not significant. In model C.4, however, the 95 percent confidence intervals for the impact of lagged “self-assessed mental health” at (-0.481, 0.184) does admit the possibility of economically meaningful

impacts. In regression model C.2 of Table 4, the 95 percent confidence interval for the impact of lagged “couldn’t find work” is (-0.001, 0.142).

We find that in many cases age has an impact on self-assessed health and, for those not working, the holding of health insurance also has a significant impact (although the sign differs for men and women). In general, however, very few of the control variables have any significant impact on changes in self-assessed physical or mental health once past health assessments are controlled for.

D. Statistical Software

All of the statistical calculations in this paper were performed using STATA.

Table 1: Correlation Matrix of Five Different Indicators of Physical and Mental Health

	<u>Quasi-objective measures</u>			<u>Self-assessed measures</u>	
	Physical health	Mental health	Days sick	Physical Health	Mental health
<u>Quasi-objective measures</u>					
Physical health	1.000				
Mental health	0.124	1.000			
Days sick	-0.319	-0.221	1.000		
<u>Self-assessed measures</u>					
Physical health	0.589	0.357	-0.270	1.000	
Mental health	0.347	0.489	-0.224	0.633	1.000

Note: Cell entries are pair-wise correlation coefficients. Except for days sick, the health correlations are reported for the case where higher values of the measure denote better health. All coefficients are statistically significant at the .01 level. The sample is for the entire population between 25 and 62 years old. Sample covers survey rounds two and four. Sample size is 12752 observations.

Table 2: Summary Statistics

Panel A: Health Status Measures

	Self-assessed physical health	Self-assessed mental health
Mean	0.842	0.915
Std. Deviation	0.365	0.278

Panel B: Labor Force Categories

	Percent	Observations
<u>Employment status</u>		
Average number: currently employed	72.7%	25,377
Average number: job to return to	0.2	82
Average number: got job during period	2.7	949
Average number: not employed	23.4	8,186
<u>Reasons for employment change^a</u>		
Persons not changing jobs or working part time	92.4	25,805
Average number: job ended or business dissolved	1.2	326
Average number: quit voluntarily	1.1	294
Average number laid-off or fired	0.8	222
Average number: not working because of illness or injury	0.5	140
Average number: quit to take another job	2.8	772
Other reasons	1.3	369
<u>Reasons for not working</u>		
Inapplicable ^b	84.0	29,323
Average number: inability to find work	1.8	616
Average number: voluntarily stayed at home	7.2	2,527
Average number: ill or disabled	6.5	2,275
Average number: temporary laid-off	0.0	15
Average number: waiting to start a new job	0.1	29
Other reasons	0.3	125

Notes:

The self-assessed physical and mental measures have been redefined as an indicator variable equal to one if a respondent's health is good or better and equal to zero otherwise. That is, these indicators will equal one if the reported physical or mental health is excellent, very good, or good.

a. There are five rounds but only four chances for job changes between rounds, so this percentage breakdown is based only on four sets of changes.

b. The inapplicable consist of those who were employed and those who were never employed; both were excluded from the regression.

Table 3: Determinants of Employment Status
(Reference group: those employed)

	Self-assessed physical health (t)		Self-assessed mental health (t)	
	A.1	A.2	A.3	A.4
	Women	Men	Women	Men
Self-assessed physical health (t-1)	0.103*** (0.02)	0.959** (0.42)	-	-
Self-assessed mental health(t-1)	-	-	0.064** (0.03)	-0.023 (0.62)
Temp. unemployed but job to return to(t-1)	-0.101 (0.07)	0.208* (0.11)	-0.062 (0.05)	0.121* (0.07)
Changed jobs, temp. unemployment(t-1)	0.033* (0.02)	0.041 (0.04)	-0.020 (0.02)	-0.03 (0.02)
Job ended or business dissolved(t-1)	0.036** (0.02)	0.014 (0.04)	0.042*** (0.02)	-0.024 (0.03)
Hold health insurance(t-1)	-0.023 (0.02)	0.003 (0.03)	0.009 (0.02)	-0.014 (0.02)
Income(t-1)	0.003 (0.01)	-0.003 (0.01)	-0.005 (0.01)	0.003 (0.01)
Age(t-1)	0.027** (0.01)	0.009 (0.02)	0.030*** (0.01)	-0.01 (0.03)
Age squared(t-1)	0.000 (0.00)	0.000 (0.00)	-0.000** (0.00)	0.000 (0.00)
Widow(er) (t-1)	0.140 (0.15)	0.070 (0.14)	0.180 (0.15)	-0.517 (0.44)
Divorced (t-1)	0.121 (0.08)	0.102 (0.15)	0.053 (0.09)	-0.101 (0.15)
Separated from spouse(t-1)	-0.045 (0.10)	-0.024 (0.22)	0.030 (0.08)	-0.115 (0.14)
Never-married status(t-1)	0.021 (0.10)	0.231* (0.14)	0.099 (0.08)	0.144 (0.11)
Family size(t-1)	-0.006 (0.01)	-0.013 (0.01)	0.000 (0.01)	0.003 (0.00)
Live in metro. stat. area(t-1)	-0.059 (0.05)	0.02 (0.06)	-0.011 (0.05)	-0.045 (0.05)
Round 3	-0.004 (0.01)	-0.009 (0.01)	-0.003 (0.01)	0.002 (0.01)
Round 4	0.010 (0.01)	0.005 (0.01)	0.000 (0.01)	0.001 (0.01)

Table 3 continued

Round 5	0.016 (0.01)	0.007 (0.02)	0.01 (0.01)	0.011 (0.01)
Sample size	14400	12415	14402	12406
Chi square	88.007	47.087	31.809	19.798
P	0.000	0.000	0.016	0.285
P of AR(2) test	0.847		0.179	

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Note: t denotes time period. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.001$ where p denotes probability value. Estimated using the Arellano/Bover (1995) and Blundell/Bond (1998) system generalized method of moments estimator. The self-assessed physical and self-assessed mental measures have been redefined as an indicator variable equal to one if a respondent's health is good or better and equal to zero otherwise. That is, these indicators will equal one if the reported physical or mental health is excellent, very good, or good.

Table 4: Determinants for Employment Change (Reference group: those retaining existing jobs)

	Self-assessed physical health (t)		Self-assessed mental health (t)	
	B.1	B.2	B.3	B.4
	Women	Men	Women	Men
Self-assessed physical health (t-1)	0.085*** (0.03)	0.070* (0.04)	-	-
Self-assessed mental health (t-1)	-	-	0.063** (0.03)	0.005 (0.05)
Job ended or business dissolved(t-1)	-0.051 (0.03)	-0.047 (0.04)	-0.037 (0.03)	-0.016 (0.02)
Quit voluntarily(t-1)	-0.045 (0.03)	-0.031 (0.03)	-0.002 (0.02)	0.002 (0.02)
Laid off or fired(t-1)	0.051 (0.04)	0.012 (0.03)	0.021 (0.04)	-0.030 (0.03)
Quit for another job(t-1)	0.000 (0.02)	-0.007 (0.02)	-0.001 (0.02)	0.016 (0.02)
Other reasons(t-1)	-0.027 (0.04)	-0.003 (0.02)	-0.004 (0.02)	0.011 (0.02)
Held health insurance(t-1)	-0.006 (0.02)	0.018 (0.02)	0.03 (0.02)	-0.013 (0.02)
Income(t-1)	0.001 (0.01)	0.004 (0.01)	-0.007 (0.01)	0.005 (0.01)
Age(t-1)	0.030** (0.01)	0.026* (0.01)	0.026** (0.01)	0.035* (0.02)
Age squared(t-1)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000* (0.00)
Widow(er) (t-1)	0.123 (0.15)	0.283 (0.22)	0.162 (0.15)	-0.551 (0.44)
Divorced(t-1)	0.117 (0.08)	0.063 (0.10)	0.061 (0.09)	-0.081 (0.12)
Separated from spouse(t-1)	-0.042 (0.10)	0.044 (0.13)	0.028 (0.08)	-0.104 (0.09)
Never married(t-1)	0.011 (0.10)	0.123 (0.11)	0.092 (0.08)	0.159** (0.08)
Family size(t-1)	-0.012 (0.01)	-0.008 (0.01)	0.002 (0.01)	-0.001 (0.01)
Live In metropolitan stat. area(t-1)	-0.034 (0.06)	0.038 (0.05)	-0.016 (0.06)	-0.021 (0.05)
Round 4	0.011 (0.01)	0.004 (0.01)	0.003 (0.01)	-0.001 (0.00)

Table 4 continued

Round 5	0.017 (0.01)	0.003 (0.01)	0.010 (0.01)	0.008 (0.01)
Sample size	10709	9233	10711	9226
Chi square	76.762	73.324	23.178	15.017
P	0.000	0.000	0.184	0.661

*p < 0.10; ** p< 0.05; *** p< 0.01. For other notes, see Table 3.

Table 5: Determinants for Not Working (Reference group: those voluntarily staying at home)

	Self-assessed physical health (t)		Self-assessed mental health(t)	
	C.1	C.2	C.3	C.4
	Women	Men	Women	Men
Self-assessed physical health (t-1)	0.014 (0.05)	0.026 (0.13)	-	-
Self-assessed mental health (t-1)	-	-	0.024 (0.09)	0.148 (0.17)
Couldn't find work(t-1)	-0.011 (0.04)	0.071* (0.04)	0.043 (0.04)	0.025 (0.04)
Temporarily laid off(t-1)	0.026 (0.03)	-0.088 (0.15)	0.003 (0.02)	0.016 (0.04)
Waiting to start new job(t-1)	0.011 (0.02)	-0.107 (0.11)	0.003 (0.01)	-0.009 (0.04)
Other reasons(t-1)	0.012 (0.08)	-0.104 (0.09)	-0.023 (0.05)	0.036 (0.03)
Held health insurance(t-1)	-0.102** (0.05)	0.153** (0.06)	-0.033 (0.04)	0.021 (0.04)
Income(t-1)	0.004 (0.02)	0.03 (0.02)	-0.014 (0.02)	0.033 (0.02)
Age(t-1)	0.066*** (0.02)	0.053 (0.04)	0.039 (0.03)	0.025 (0.03)
Age squared(t-1)	-0.001** (0.00)	-0.001 (0.00)	-0.001 (0.00)	0.000 (0.00)
Widow(er) (t-1)	-0.444 (0.38)	0.714 (0.81)	-0.33 (0.45)	0.627 (0.52)
Divorced(t-1)	0.142 (0.16)	0.773 (0.51)	-0.128 (0.30)	-0.526 (0.48)
Separated(t-1)	0.032 (0.06)	-0.043 (0.54)	0.149 (0.35)	-0.173 (0.16)
Never married(t-1)	0.127 (0.21)	0.388 (0.63)	0.257 (0.30)	-0.315 (0.38)
Family size(t-1)	0.011 (0.02)	-0.025 (0.05)	-0.011 (0.01)	-0.019 (0.03)
Live in metropolitan stat. area(t-1)	-0.081 (0.11)	0.000 (0.05)	-0.069 (0.07)	-0.032 (0.03)
Round 3	-0.012 (0.02)	-0.034 (0.03)	-0.004 (0.02)	-0.042 (0.03)

Table 5 continued

Round 4	0.019 (0.02)	-0.022 (0.04)	0.018 (0.03)	-0.056 (0.04)
Round 5	0.042 (0.03)	0.008 (0.05)	0.037 (0.03)	-0.032 (0.05)
Size of sample	1897	616	1897	615
Chi square	41.032	19.131	10.471	19.095
P	0.002	0.384	0.915	0.386
P of AR(2) test	0.339	0.550	0.349	0.554

*p < 0.10; ** p< 0.05; *** p< 0.01. For other notes see Table 3.

Table S1: Initial Results for Factor Analysis

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.915	1.617	1.042	1.042
Factor2	0.297	0.254	0.162	1.203
Factor3	0.043	0.236	0.023	1.227
Factor4	-0.193	0.030	-0.105	1.122
Factor5	-0.223	.	-0.122	1.000

Notes: Likelihood ratio test: independent vs. saturated: $\chi^2(10) = 1.8e+04$ Prob> $\chi^2 = 0.0000$. Principal factors method. No rotation. One retained factor. Five parameters. Number of observations = 12752.

Table S2: Factor Loadings and Uniqueness

Variable	Factor1	Uniqueness
Measures of self-assessed health		
Physical health	0.805	0.352
Mental health	0.726	0.473
Days Sick	-0.381	0.855
Quasi-objective measures		
Physical health	0.596	0.645
Mental health	0.487	0.763

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