DISCUSSION PAPER SERIES

Unemployment Persistence: How Important Are Non-Cognitive Skills?

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June 2012

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Discussion Paper No. 6654
June 2012

ABSTRACT

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Using a random effects dynamic panel data model and the 2000-2008 waves of the German SOEP this paper shows that non-cognitive skills have a predictive power on unemployment transitions.

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1. Introduction and Background

The case for the use of non-cognitive skills in economics is becoming stronger. There is growing evidence on the relationships between personality and a variety of life outcomes, including health, criminal activity and economic success. In the labour market non-cognitive skills are at least as relevant as cognitive abilities (Heckman et al., 2006) and have a predictive power on occupational choices (Judge et al., 1999, Ham et al., 2009), job search strategies (Caliendo et al., 2010), earnings (Mueller and Plug, 2006, Heineck and Anger, 2010) and employment (Mohanty, 2010).

This note explores whether and to what extent non-cognitive skills have a predictive power on unemployment propensity. To the extent that these skills are part of an individual's set of productive traits they may affect the probability of maintaining a job or receiving a job offer. Moreover, personality is associated with work-related preferences and attitudes that can affect job search intensity and may induce certain individuals end up in occupations with less employment stability. While the personal determinants of unemployment are an important economic issue, the literature has devoted so far little attention to the role of non-cognitive skills.

This note is close in spirit to Heineck (2011), who uses a similar dynamic setting to investigate how cognitive abilities affect unemployment entry and exit rates. The results here complement this line of research by changing the focus from cognitive to non-cognitive skills. Still, a distinct feature of the present analysis is a dynamic random effects model that exhibits three important properties. First, it exploits the panel structure of the data to take account of the unobserved heterogeneity that surrounds unemployment transitions. Secondly, it explicitly addresses the 'initial conditions' problem (Heckman, 1981), as it is likely that the set of individuals who are unemployed at the start of the observation period are not a random sample of the population. Thirdly, the model controls for unemployment state dependence, i.e., the fact that the probability of being unemployed at some point is largely influenced by a previous unemployment condition.

The convenience of these refinements has been highlighted by previous work on labour market transitions (Stewart, 2007, Cappellari and Jenkins, 2008). The case of unemployment state dependence is particularly relevant due to important policy

implications (Arulampalam et al., 2000, Knights et al., 2002). As for its causes, the lack of conclusive data has produced a lively debate pointing to several explanations: disincentive effects of unemployment insurance (Mortensen, 1986), reduced search effort because of discouragement (Clark et al. 2001), decay of human capital (Pissarides, 1992), and stigma effects (Bikhchandani et al., 1992, Kübler and Weizsäcker, 2003). Yet the potential role of (typically unobserved) non-cognitive skills has not been explored to date. Diverging inertia effects may be at work if, for example, low self-steemed or less committed individuals are more conditioned by a previous unemployment spell. This paper adds to this debate by examining whether state dependence is enhanced or mitigated by specific personality traits.

2. Data and Methods

The data is taken from the German Socio-economic Panel dataset (SOEP), a wide-ranging representative longitudinal study that contains a large set of personal and labour market characteristics of household members. In 2005 the panel includes a set of questions aimed at capturing various concepts of personality: i) the Big Five Inventory, a model that represents a widely accepted approach to conceptualize personality and that provides a score for the five major traits that define human personality: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness; ii) the respondents' external locus of control (LOC), i.e., the extent to which respondents feel they are not in command of their circumstances; and iii) reciprocity, an important concept in social psychology that captures how individuals respond to other individuals' actions. The score in each personality facet is an average across items that can range from 1 to 7. We refer the reader to Budría and Ferrer-i-Carbonell (2012) for the description of the questionnaire, validity issues and (favourable) tests of internal consistency for the various measures.

Since the personality questions were only asked in 2005 and despite the fact that personality traits tend to be quite time consistent and that the paper corrects for observable determinants of the personality scores (see section 2.1), the empirical analysis focuses on the years around 2005 only. In concrete the 2000-2008 waves are used. The results concentrate on the core segment of the labour market: men over 25

and under 56 years. Periods where the sample members are neither employed nor unemployed were discarded. The case of women was disregarded due to potential endogeneity bias in market participation. The final (unbalanced) sample consists of 36,727 observations and 4,704 individuals. Table 1 reports summary statistics.

The dynamic random effects probit equation is:

$$U_{it} = \gamma U_{it-1} + X'_{it}\beta + NC'_{it}\delta + \bar{X}_i^M\alpha + v_i + \varepsilon_{it} \tag{1}$$

$(i = 1, \dots, N); (t = 2, \dots, T)$, where U_{it} is a dummy variable that takes value 1 if individual i is unemployed at time t, zero otherwise, γ measures the unemployment state dependence; X includes variables that proxy individual search intensity and potential productivity: age, years of schooling, number of children and adults at home, marital status and health condition; NC contains the personality scores; $\bar{X}_i^M$ is a Mundlak term with the time-averaged value of a subset of the explanatory variables; v_i is an individual time-invariant effect and ε_{it} is a normally distributed error term $N(0, \sigma_\varepsilon^2)$. Year fixed-effects are also included to account for changing macroeconomic conditions.

The initial condition problem is addressed by specifying an unemployment equation for the initial period,

$$U_{i1} = Z'_{i1}\pi + \theta v_i + \varepsilon_{i1} \tag{2}$$

where Z_{i1} includes X_{i1}. Identification of the model requires Z_{i1} to include instruments significantly related to initial unemployment but unrelated to unemployment transitions $(E(\varepsilon_{it}|Z_{i1})=0)$. The selected information was the parent's education level (coded in 5 dummy variables) when the respondent was aged between 14 and 15. The suitability of parental background as relevant instrument is supported by previous work on low pay and unemployment dynamics (Stewart, 2007, Cappellari and Jenkins, 2008). In our data validity was supported by encompassing tests[1]. The econometric model is then solved

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[1] F-statistic for the significance of the instruments in the initial condition equation: F = 3.109 (p-value = 0.008).

by maximizing the likelihood function[2]:

$$\prod_i \int_{\left(\frac{v}{\sigma_v}\right)} \left\{ \Phi\left[\left(Z'_{i1}\pi + \theta\sigma_v\left(\frac{v}{\sigma_v}\right)\right)(2U_{i1} - 1)\right] \prod_{t=2}^{T} \Phi\left[\left(\gamma U_{it-1} + X'_{it}\beta + \sigma_v\left(\frac{v}{\sigma_v}\right)\right)(2U_{it} - 1)\right] \right\} dF\left(\frac{v}{\sigma_v}\right)$$

where F is the distribution function of $\frac{v}{\sigma_v}$.

2.1 The stability of personality traits

The BFI, LOC and reciprocity measures were gathered only in the 2005 wave of the SOEP. To deal with this limitation, it was assumed that these constructs are constant over time. This should not be seen as a stringent assumption, as it is generally accepted that adult's personality traits are fairly stable (Costa and McCrae, 2002). In the sample, the respondents mean age is 40.3 years and on average they are interviewed during no more than 7 consecutive years, so that the potential interdependency between early life events and personality should not matter much.

Still, some concerns may persist under the light of studies pointing to changes in personality traits over the life cycle and following changes in one's living arrangements (Roberts et al., 2006, Soto et al. 2011). To rule out this concern, each personality trait was regressed on age and age squared and marital condition (single, divorce, widowed; reference: married) using the total SOEP sample (not just individuals in the labour market). Although the impact of unemployment on personality traits is modest (Specht et al., 2011), additional controls for labour market status were included (employed, unemployed; reference: inactive). The predicted residuals are free from these specific life events and, therefore, used as the relevant measures of personality. To ease interpretation, these were normalized to mean zero and unit variance.

3. Results

The estimates in Table 2 are marginal probability effects (MPE). For comparison, the first column reports pooled probit estimates, which abstract from individual unobserved

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[2] See Stewart (2006) for further technical issues. The number of Gaussian-Hermite quadrature points in the evaluation of the integral over v/σ_v was set at 24.

effects and the initial condition problem. The lag of unemployment is highly significant, which demonstrates that unemployment is a self-perpetuating state. An individual with average characteristics is, under the benchmark specification, 9.75 percentage points (pp) more likely to be unemployed if she was unemployed at t-1. This MPE represents an increase by a factor of 3.2 relative to the probability of unemployment for an average individual predicted by the model (4.38%, bottom part of the table). The significantly larger MPE of lagged unemployment in the first column, 47.19 pp, warns that about two thirds of the state dependence observed in the cross-section model is indeed due to unobserved heterogeneity and the non-random selection of individuals into initial unemployment. The bottom part of the table reports the test for the exogeneity of initial employment condition. This hypothesis must be rejected (p-value = 0.000).

Non-cognitive skills are significant determinants of the unemployment propensity. The estimates are conditional on previous employment status and, therefore, uncover the role of certain personality traits in unemployment transitions. Individuals with high extraversion, agreeableness and external LOC are more likely to be unemployed, the MPE for a one standard deviation increase in these variables being 0.41, 0.45 and 1.12 pp, respectively, in the benchmark model. Reversely, individuals high on conscientiousness and positive reciprocity are significantly less likely to be unemployed (-0.43 and -0.38). These effects are significant at conventional statistical levels and sizable relative to the impact of other covariates. Thus, for example, a 1-standard deviation increase (0.21) in log years of schooling (a variable that is arguably related to the unemployment risk) is expected to decrease the unemployment probability by 2.63*0.21 = 0.56 pp. This effect is only slightly higher than the variation induced by a corresponding increase in conscientiousness and positive reciprocity, and twice as low (in absolute value) as the external LOC effect. Finally, neuroticism, openness and negative reciprocity do not play a significant role when accounting for the unemployment propensity.

In a recent paper, Uysal and Pohlmeier (2011) use a proportional hazard model to show that the most relevant traits for having better labour market prospects are conscientiousness and neuroticism. The results here are only partially supportive of this view, for they suggest that neuroticism is unrelated to the unemployment risk and that a larger number of traits are at work. The partial divergence with Uysal and Pohlmeier's

findings may be driven by the larger set of personality measures and the alternative econometric approach used in the present analysis.

To test whether the extent of state dependence diverges between personality groups, the third column includes interactions between the lag of unemployment and the different personality scores. With one exception (openness), the results are not supportive of diverging effects, and one must conclude that the extent of state dependence is similar between individuals endowed with different sets of non-cognitive skills.

4. Conclusions

This note shows that non-cognitive skills significantly affect an individual's unemployment propensity. Extraversion, agreeableness and, specially, external LOC significantly raise the unemployment risk. Curiously enough, these traits were identified as negative determinants of earnings in previous work (Nyhus and Pons, 2005, Heckman et al., 2006, Heineck and Anger, 2010). Our results also uncover conspicuous effects of positive reciprocity. This is consistent with the positive relationship between this aspect of personality and work effort documented in Dohmen et al. (2010).

The analysis presented does not enable us to distinguish between the various competing hypotheses as to the causes of state dependence. But it does allow us to discard the channel of idiosyncratic factors rooted to personality: the hypothesis that the extent of unemployment persistence is similar between individuals endowed with different sets of non-cognitive skills could not be rejected.

In their attempt to fight against unemployment, Governments typically focus on labour market institutions and observed individual-related characteristics, especially education. The results of this note warn that the effectiveness of such policies may differ importantly among individuals with different unobserved characteristics. Successful public policies should give some importance to the mediating role of non-cognitive skills and their determination during childhood and early adulthood.

Tables

Table 1 – Summary statistics

	Mean	SD
Unemployed at t-1	0.052	0.223
Age	40.246	8.339
Years of schooling	12.347	2.774
Married	0.706	0.456
Single	0.227	0.419
Divorced	0.063	0.242
Widowed	0.003	0.048
Adults	2.203	0.816
Children	0.901	1.066
Badhealth	0.103	0.304
Conscientiousness	5.936	0.910
Neuroticism	3.967	1.218
Extraversion	4.829	1.130
Agreeableness	5.459	0.973
Openness	4.496	1.200
External LOC	3.545	0.878
Positive reciprocity	5.883	0.909
Negative reciprocity	3.087	1.451

Note to Table 1: Source: German SOEP 2000-2008 waves

| | Pooled probit | | Dynamic random effects | | | |
| | | | Benchmark specification | | With interactions | |
	MPE	t-ratio	MPE	z-ratio	MPE	z-ratio
Unemployed at t-1	47.19 ***	41.62	9.75 ***	18.34	9.26 ***	17.07
Ln (age)	-4.89 ***	-5.05	-4.38 ***	-3.86	-4.40 ***	-4.21
Ln (age)^2	40.55 ***	4.95	31.12 ***	3.78	32.22 ***	4.12
Ln (years of schooling)	-3.34 ***	-2.46	-2.63 **	-2.09	-2.59 **	-2.04
Single	1.56 ***	3.93	1.64 ***	3.41	1.62 ***	3.39
Divorced	3.39 ***	4.81	2.35 ***	3.96	2.36 ***	3.96
Widowed	0.65	0.26	0.52	0.25	0.41	0.20
Ln (adults+1)	0.22	0.39	0.31	0.61	0.36	0.69
Ln (children+1)	0.26	0.51	-0.18	-0.43	-0.17	-0.41
Badhealth	5.29 ***	10.21	3.51 ***	9.02	3.55 ***	9.10
Conscientiousness	-0.52 ***	-3.36	-0.43 ***	-2.75	-0.44 ***	-2.72
Neuroticism	0.35 **	2.00	0.28	1.51	0.28	1.43
Extraversion	0.43 **	2.28	0.41 **	2.35	0.43 **	2.31
Agreeableness	0.48 ***	2.68	0.45 **	2.47	0.50 ***	2.63
Openness	0.02	0.13	0.09	0.46	0.18	0.96
External LOC	1.29 ***	6.79	1.12 ***	6.07	1.04 ***	5.49
Positive reciprocity	-0.37 **	-2.35	-0.38 **	-2.31	-0.41 **	-2.42
Negative reciprocity	0.03	0.18	0.18	0.98	0.15	0.75
Unemployed t-1*Conscientiousness					0.10	0.44
Unemployed t-1*Neuroticism					0.06	0.20
Unemployed t-1*Extraversion					-0.10	-0.35
Unemployed t-1*Agreeableness					-0.34	-1.18
Unemployed t-1*Openness					-0.53 *	-1.83
Unemployed t-1*External LOC					0.28	1.08
Unemployed t-1*Positive reciprocity					0.26	0.97
Unemployed t-1*Negative reciprocity					0.21	0.70
Exogenity of initial condition test (p-value)			0.000		0.000	
Prob(Unemployed at t)	2.86%		4.38%		4.39%	
Mundlak terms	Yes		Yes		Yes	
Log-likelihood	-5488.91		-5419.99		-5414.59	
No. of observations	36727		36727		36727	

Notes to Table 2: i) Source: German SOEP 2000-2008 waves; ii) MPE: Marginal probability effect; iii) *** denotes significant at the 1% level, ** denotes significant at the 5% level; * denotes significant at the 10% level; iv) All models contain year dummies; v) The Mundlak term contains the time-averaged value of three variables: years of schooling, number of children at home and number of adults. A more extensive set of terms yielded similar results; vi) Estimation results for initial unemployment condition not reported but available upon request.

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