A different measure for educational credentialing.

Online Supplement to "Occupational Closure and Wages in Norway"

Thijs Bol[*]   Ida Drange[†]

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[*]University of Amsterdam, t.bol@uva.nl

[†]Oslo and Akershus University of Applied Sciences, ida.drange@afi.hioa.no

A different measure for credentialing

In previous work on occupational closure, credentialing is measured differently than the measure that we exploit in our study. Weeden (2002) takes the percentage of workers in a given occupation with a tertiary degree. Bol and Weeden (2015) take the proportion of workers within an occupation that answered that a given educational qualification is required for an occupation. We believe that the first measure, used by Weeden (2002), picks up a lot of unmeasured factors (e.g., ability) that could falsely be attributed to credential closure. The measure used by Bol and Weeden (2015) does not have the problem that a high share of highly educated in an occupation implies that it is closed by an educational credential, but unfortunately a comparable measure is not available in for Norway. For this reason we use the strength of the education-occupation link as a measure of credentialing, which we believe is a much more direct measure of the actual mechanism (the extent to which occupations are closed by educational credentials). Nevertheless, to make our results comparable to Weeden (2002), we have replicated our analyses with her measure of credentialing: the proportion of occupational incumbents with a tertiary degree.

Table 1: Summary statistics for proportion with tertiary degree

	Mean_{ij}	SD_{ij}	Mean_j	SD_j
Tertiary degree	0.383	0.311	0.357	0.308

Source: 2007 data from Norwegian registers.

Table 1 presents the descriptive statistics of the proportion of tertiary educated. The weighted share of tertiary degrees in the working population is 38% (36% when we give occupations equal weight). The correlations between the proportion of tertiary degrees and the other occupational level data are displayed in Table 2. The correlation between our preferred measure of credentialing (using linkage strength, following DiPrete et al. (2016)) and the proportion with tertiary degrees in the occupation is relatively small (0.524). Although occupations with a high level of tertiary degree holders are more strongly linked,

Table 2: Pairwise correlations

	Proportion tertiary degree
Credentialing (linkage)	0.524
Licensure	0.220
Union	0.238
Certification	-0.084
Physical skills	-0.661
Emotional skills	0.327
Cognitive skills	0.458
Share of females	0.380

Source: 2007 data from Norwegian registers. N [occupations] = 294.

Table 3: Multilevel regression models (selected models and coefficients)

	Model 1		Model 2	
Individual controls	Yes		Yes	
Average share of women	-0.239***	(0.031)	-0.208***	(0.034)
Licensure	0.093***	(0.025)	0.102***	(0.025)
Certification	0.035	(0.030)	0.012	(0.027)
Union density	0.040	(0.031)	0.075**	(0.028)
Proportion with a tertiary degree	0.334***	(0.029)	0.072	(0.039)
Physical skill demands			-0.095***	(0.019)
Cognitive skill demands			0.223***	(0.032)
Emotional skill demands			0.005	(0.012)
Constant	10.313***	(0.027)	9.973***	(0.081)
σ^u	0.019***	(0.001)	0.015***	(0.001)
σ^e	0.197***	(0.000)	0.197***	(0.000)
ICC	0.089		0.071	
-2LL	-966,312		-966,275	
N	1,592,673		1,592,673	

Note. − 2007 data from Norwegian registers. N [occupations] = 294; N [individuals] = 1,592,673.The dependent variable is the natural logarithm of yearly wages. Standard errors are listed in parentheses.
* p<0.05; ** p<0.01; ***p<.001, two-tailed tests.

it is certainly not the case that the operationalizations measure the same. Most other correlations are comparable, although a strong correlation between physical work and credentialing is only found when we use the proportion of tertiary degree holders instead of the education-occupation linkage measure. We are not surprised by this difference, as the linkage measure that we use for our analyses does not restrict closure by educational degree to degrees from tertiary education.

In Table 3 we replicate Models 7 and 8 of Table 3 from the original article, using proportion with a tertiary degree as a closure indicator instead of linkage strength. The results from Model 1 show a strong and significant effect of tertiary degree associated with 39% ($e^{0.332}$) increase in yearly wages. An occupation where everyone has a tertiary degree is thus expected to receive 39% higher yearly wages compared with an occupation where no one has a tertiary degree. This coefficient is comparable to the estimated effect of educational credentialing in the US: Weeden (2002) estimated that the returns to a bachelor degree was 43.7%. In Model 2, the association between the proportion with tertiary degrees and yearly wages is reduced to 7.5% ($e^{0.072}$), after adjusting the coefficient for occupational skills. This implies that a large share of the observed wage effect in Model 1 is explained by skill demands in the occupation, which is not surprising given the high correlation with occupational skills. The effect is just insignificant, but still substantial in size. Changing the measure on educational credentialing does not affect the significance of the other closure institutions in Model 2, showing that these findings are robust to

either measure of credentialing.

As described in the article, we believe that the proportion with a tertiary degree is an insufficient measure for educational credentialing. There is no reason to assume that occupational closure by educational credentials only takes place in occupations where people have a tertiary degree. Rather, we believe that credential closure is likely when a high proportion of individuals in an occupation have the same educational qualification, defined both by level and field. This linkage measure indicates that a qualification is (formally or informally) required by the employer. Because we find a larger wage effect of proportion with tertiary degree and a small negative effect of linkage strength (Model 7, Table 3 in the main article), our interpretation of the effect in Table 3 is that the proportion of workers with a tertiary degree picks up unmeasured skills of the occupation.

References

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