Conformity and Soft Skills as Determinants of Alternatively Credentialed Non-College Graduate Hireability

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Abstract

Despite targeting technical skills, vocational school graduates are paid less than college graduates. This paper hypothesizes that conformity selection and a perceived deficit in soft skills substantially explain reduced alternatively credentialed non-college graduate (ACNG) hireability. Microdata from the United States confirm a perceived soft skill deficit for ACNG labor. Results also indicate that conformity is a key factor of hireability, but the direction of effect is heterogenous by employer type. Conformity and perceived skill gaps explain about one third of hireability variance. Opposite a conventional explanation, the results of this study suggest that hireability is negatively correlated to conformity on average. ACNG job candidates tend to be perceived as creative types and an even mix of high and low performers. Evidence of risk aversion from employers with respect to labor productivity is found, which contributes to lower ACNG demand. This analysis demonstrates the importance of perceived skill gaps and conformity selection when compared to other widely recognized factors of hireability. Perceived soft skill gaps explain about as much as the sum of the effects from state of residence and industry of occupation. The skill of communicate using body language is perceived as a key comparative advantage of recent college graduates over ACNG job candidates. The conclusion incorporates discussion of public misperception on the cost of vocational school and suggests that nontraditional postsecondary education is undervalued in the

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1. Introduction

A substantial gap exists between the skills expected by employers and those possessed by college graduates[1, 2, 3, 4]. Experts view college alternatives including vocational school as useful for technical training, but the traditional college degree retains a wage premium over vocational education. Unemployment, underemployment, and other negative labor outcomes follow a similar pattern[5]. This paper seeks to resolve the apparent descrepancy between these outcomes while preserving the mainline view that employers pay for perceived job candidate skill. To explain the apparent descrepancy, this paper tests the hypothesis that employers expect an offsetting non-technical skill deficit when considering an alternatively credentialed non-college graduate (ACNG). I find evidence that the general population of the United States, including employers, does apply a stigma to the ACNG in which soft skills are assumed to be deficient.

Alternative credentials refer to credentials other than the undergraduate degree[8]. The category includes, for example, industry certifications, portfolios of work, digital badges, and other records of unaccredited learning and achievement. Individuals pursuing alternative credentials typically intend to leverage the credential toward better employment. That is, they typically have the same goals as a college student. Many individuals obtain alternative credentials as a supplement to the college degree. Such a situation is pareto-superior to degree attainment alone and is therefore intentionally excluded from analysis. This paper focuses on factors of ACNG hireability in order to validate whether ACNG labor outcomes are a general problem, or a problem limitted in scope to specific skills. If the gap is limitted to a particular set of skills, such as soft skills, then alternative credential suppliers could modify their credentialling requirements to overcome the outcome deficit.

The signalling model has become one of the two standard explanations of the value of the college degree. Signalling theory provides three advantages over human capital theory for the purposes of the present study. First, signalling

theory is able to explain labor outcome variance when human capital is held constant.

Second, the signalling model empowers a survey research design. In an idealized human capital model, the measures of human capital would correspond to production process inputs. To establish a wide array of skill measures would be complicated and prone to measurement sensitivies, assumptions, and errors of various and potentially subtle kinds. Survey measures could be used as a second-best proxy, but they would never be an ideal measure of human capital. Signaling theory takes the reverse approach. According to the signalling model, labor demand is formed on the basis of job candidate value as perceived by an employer. Whether this corresponds to any concrete ability is secondary. Employer perception can be assessed through a simple survey. An additional benefit of using a questionnaire is the ability to ask hypothetical questions. In pondering hypotheticals, employer evaluation of a credential or signal can be isolated from job candidate human capital variance.

Third, signalling theorists have laid out a testable hypothesis for weak labor outcomes among non-college graduates. Following this model, scholars claim that the college degree signals intelligence, conscientiousness, and conformity[6]. Non-traditional education, in contrast, is hypothesized to signal nonconformity. Non-traditional courses can also be completed in a shorter span of time and with reduced entry qualifications relative to the traditional degree. For this reason, alternative credentials are thought not to signal concientiousness.

Research indicates a goldilocks level or bliss point for both concientiousness and conformity is likely to exist. Excess individual concientiousness can disturb team performance[12]. Conformity can lead to a lack of innovation and suboptimal organizational practices[7]. Psychologists also state that conformity selection may occur through heuristic decisioning rather than conscious choice.

Risk aversion is another explanation for conformity selection. An employer may not be able to value an alternative credential. From the point of view of such an employer, an ACNG may range in value from a positive outlier to a negative outlier. The employer may not prefer to hire such a candidate on the

basis of risk aversion, even if their point estimate for ACNG labor value is higher than their point estimate for a recent college graduate. If employers with many employees are positively associated with ACNG hireability, this will add weight to an explanation based on risk aversion.

2. Methodology

The hypothesis in this paper is based on a simple model of demand for labor which is clarified in Equations 1a and 1b:

$$S_j = f(H_j) \tag{1a}$$

$$w_{ij} = E_i(MRP_j) = f_i(S_j) \tag{1b}$$

Job candidate j, generates a signal of productivity, S_j from unobserved human capital, H_j. Employer i, forms an expectation of the marginal revenue product of j on the basis of an employer-specific evaluation of S_j. The specific employer is willing to pay the specific job candidate wages of w_ij.

This study uses ordinary least squares (OLS) regression analysis to estimate the effect of perceived skill gaps on hireability. Hireability is a proxy for w_{ij}. That is, an employer would be willing to pay more for a candidate with higher hireability. In order to explain reduced willingness to pay for ACNG labor relative to college graduate labor, this paper hypothesizes that employers preferentially value soft skills. If employers preferentially value soft skills then soft skill gaps should be identified as important and negatively relate to ACNG hireability.

Regression analysis was conducted using original cross-sectional data from an online self-completed questionnaire ($n = 212$). The data is available for replication or any other use[1]. Respondents were obtained through the Ama-

[1]See `https://osf.io/8qtxf/?view_only=95b0c0b0c65e4b7983198cc87c2ab733` for data used in this study.

zon Mechanical Turk crowdsourcing service. Respondents were United States citizens at or over the age of eighteen, paid for participation, and selected on an opt-in, first-come, first-serve basis. The survey administration took place in July of 2020.

The survey includes 65 questions in two sections[2]. The first section captures respondent characteristics and the second section captures perceived skill relative to hypothetical job applicants. Employer responses did not significantly differ from the general population, so respondent characteristics are also interpreted as employer characteristics.

Regression variables in this study are categorical or Likert-type responses based on a scale from 1 to 10. Higher Likert-type values indicate greater agreement with a statement that varies by variable. Categorical variables include state of residence, industry of occupation, employer status, firm size, and a measure called duration.

Duration measures the length of time the respondent believes it takes to obtain an alternative credential. Employer status describes whether an individual makes hiring and firing decisions in the course of their employment. The variable takes one of three values: yes, no, or unemployed. Employer effects refer to the case where an individual states that they do make hiring and firing decisions. State of residence refers to a state within the United States. Respondents were allowed to select the District of Columbia as a state of residence, but no such responses were obtained.

Three other factor groups are investigated in the regression analysis. These variables are measured using Likert-type units and they include hireability, rulebreaker effects, and perceived skill gaps. Hireability is the dependent factor and it indicates the degree of agreement that, "For many professions, alternative credentials can qualify a person for an entry-level position."

Rulebreaker effects refer to a collection of three factors that measure respondent agreement with statements about rulebreakers, or "People who are

[2]See Appendix A for a full copy of the survey.

willing to break formal or informal rules and norms." The first statement indicates that rulebreakers present a risk to the reputation, productivity, or value of a company. This statement received the least agreement and greatest response variance among three qualitatively different descriptions of people that are willing to break rules ($\mu = 6.40, \sigma = 2.55$).

The second statement indicates that rulebreakers are held back by rules and "could just as easily be high performers as low performers." This statement received the most agreement and least variance among rulebreaker statements ($\mu = 7.42, \sigma = 1.91$). The agreement with this statement provides evidence against the thesis that employers value conformity for its own sake. In turn, this adds weight to the theory that employers value conformity as a risk aversion tactic while knowing that nonconformity signals positive outlier potential. The third description of rulebreakers states that they tend to be gifted in the areas of innovation or creativity, and that such people may benefit the culture of a company ($\mu = 7.25, \sigma = 2.03$).

Perceived skill gaps are computed two ways from perceived skill questions in the second section of the survey. Perceived skill gaps are measured seperately with and without overqualification effects. Overqualification effects have been identified as important[9, 10], but these effects are sometimes ignored during skill gap analysis[11].

Perceived skill is a Likert-type response reporting agreement with the statement that a particular candidate has a particular skill. For each of 13 skills, the respondent is asked to imagine and report skill levels for the ideal candidate, the average actual employee, the average recent college graduate, and the average ACNG. Raw perceived ACNG skill gaps are calculated by differencing the perceived skill of an ideal candidate with the perceived skill of an ACNG. The perceived skill gap with overqualification effects equals the raw perceived skill gap. The perceived skill gap without overqualification effects is calculated as the raw skill gap or zero if the raw skill gap value is negative.

Rulebreaker effects and perceived skill gaps are structurally linked. The willingness to break formal and informal norms is a soft skill and respondents

did evaluate this skill. Structurally, the gap in the rulebreaking skill interacts with employer perception on rulebreaking. For this reason, discussions on the importance of skill gaps will consider the importance of rulebreaker effects as well.

These methods allow for identification of a preferred model that explains hireability using perceived ACNG skill gaps. The identified model will support the hypothesis if soft skills are more important than technical skill gaps. The model will support the risk aversion explanation of ACNG hireability over an explanation from conformity selection if large employer size is positively associated with hireability.

Comparative analysis provides additional confidence in the data by replicating a hireability gap between ACNG labor and recent college graduates. A comparative skill gap variable is constructed for each perceived skill gap that is important in the preferred hireability model. Comparative skill gap variables are constructed by subtracting perceived recent college graduate skill from perceived ACNG skill. Multiple regression of these comparison factors on hireability demonstrates which, if any, perceived skill gaps are important distinguishers of the ACNG from the college graduate. Identification of significant differences with a negative total effect on hireability will replicate external data on the lower job market value of ACNG labor and provide a diagnostic on which skill or skills must be better addressed through alternative learning programs.

3. Results

Results confirm that employers, and the population in general, associate a soft skill deficit with ACNG candidates. At the same time, ACNG hireability was generally positive. The mean response was 7.5 on a scale from one to ten ($\sigma = 1.80$). Hireability critically depends on rulebreaker effects. Rulebreaker effects have more explanatory power than perceived skill gaps. Evidence favors an explanation of ACNG hirability from risk aversion over conformity selection. Employer status was associated with an insignificant positive coefficient.

Table 1 reports selected factor statistics across five OLS multiple regressions. The selected factors which are reported include any perceived skill gap which is important in any specification. Factor importance is determined by the ability of a factor to improve adjusted explanatory power. Model 1 is a multiple regression using skill gaps that allow for overqualification. Model 2 is a multiple regression without overqualification.

Models 3 and 4 are equivalent to models 1 and 2, respectively, after normalizing for industry, state, and firm size effects. These effects are normalized for robustness by retaining those factors which appear in both models 1 and 2. For example, Alabama had a significant effect when skills are measured with overqualification in Model 1. Alabama was not significant in Model 2, so it was dropped in models 3 and 4.

Model 5 is specified as Model 4 plus two adjustments. First, the factor for salary is dropped. The salary factor improved adjusted explanatory power in Model 2, but it provided no such benefit in any other model. Moreover, the p-value of this factor was unacceptably low in Model 4 ($p > 0.9$).

The second adjustment is to insert a variable for duration[3]. The belief that it takes more than a year to obtain an alternative credential is importantly and positively associated with willingness to hire ($\beta = 0.875, p < 0.01$). Employer effects are positively signed in all five models, but the significance is lost after normalizing effects. This suggests that ACNG hireability is sensitive to industry, state of residence, and firm size, which are the normalized effects.

The preferred model is able to explain roughly one third of the variance in hireability. Rulebreaker effects are identified as significant regardless of specification. Seven perceived skill gaps are included in the preferred model. The perceived technical skill gap is included in the preferred model. The coefficient

[3]Duration is a categorical variable which was important in both Models 1 and 2. As a categorical variable, it was decomposed into a boolean series for factor analysis. Models 1 and 2 retained one or more duration boolean factors, but none overlapped. As a result, duration was dropped from Models 3 and 4.

Table 1: Table of Coefficients for Multiple Regressions on Hireability, Selected Variables

	Model 1	Model 2	Model 3	Model 4	Model 5
Gap, Body Language	-2.240e-01*	-3.831e-01**	-1.507e-01+	-3.155e-01*	-3.060e-01*
	(8.314e-02)	(1.124e-01)	(8.980e-02)	(1.173e-01)	(1.145e-01)
Gap, Body Language-IT	2.199e-01+	2.298e-01	1.837e-01	2.791e-01	2.771e-01+
	(1.269e-01)	(1.656e-01)	(1.334e-01)	(1.707e-01)	(1.665e-01)
Gap, Commute		-2.320e-01++	-4.953e-02	-1.197e-01	-1.582e-01
		(9.720e-02)	(6.862e-02)	(1.023e-01)	(1.010e-01)
Gap, Conscientiousness	2.416e-01*	3.223e-01*	1.387e-01	2.174e-01+	2.175e-01++
	(8.000e-02)	(1.045e-01)	(8.483e-02)	(1.129e-01)	(1.093e-01)
Gap, Customer Service	-1.259e-01+	-1.512e-01	-1.253e-01+	-1.276e-01	-1.323e-01
	(6.389e-02)	(9.599e-02)	(7.162e-02)	(1.037e-01)	(1.009e-01)
Gap, Rule Breaker		-6.336e-02	-3.896e-02	-8.535e-02	-1.034e-01
		(1.028e-01)	(6.054e-02)	(1.082e-01)	(1.036e-01)
Gap, Salary		-1.135e-01	3.873e-02	-6.250e-03	
		(8.284e-02)	(6.597e-02)	(8.575e-02)	
Gap, Teamwork		1.227e-01	6.812e-02	1.287e-01	1.131e-01
		(9.179e-02)	(6.963e-02)	(9.697e-02)	(9.505e-02)
Gap, Technical	-1.274e-01+		-9.408e-02	-1.010e-01	-9.806e-02
	(7.443e-02)		(7.702e-02)	(1.023e-01)	(1.001e-01)
Rulebreaker, Culture Add	2.612e-01**	2.829e-01**	2.114e-01*	2.279e-01*	2.235e-01*
	(7.057e-02)	(7.015e-02)	(7.187e-02)	(7.190e-02)	(7.036e-02)
Rulebreaker, Risky	1.688e-01**	1.758e-01**	1.517e-01*	1.472e-01*	1.686e-01**
	(4.993e-02)	(4.813e-02)	(5.160e-02)	(5.063e-02)	(5.006e-02)
Rulebreaker, Rockstars	1.406e-01+	1.748e-01++	1.669e-01++	1.546e-01++	1.655e-01++
	(7.646e-02)	(7.245e-02)	(7.851e-02)	(7.754e-02)	(7.599e-02)
Adj R-sqr	0.3100	0.3491	0.2317	0.2554	0.2866
R-sqr	0.4408	0.4663	0.3409	0.3613	0.3880

Standard errors in parentheses. $^{+}$ $p < 0.10$, $^{++}$ $p < 0.05$, * $p < .01$, ** $p < .001$

For each model, the probability of a greater F-statistic is less than 0.0001 and the sample size is 212.

is statistically insignificant, but it is robust in sign across models and it does possess the expected negative sign. The other six perceived skill gap factors in the preferred model are soft skills.

In the classic signalling explanation of ACNG aversion, the ACNG is expected to have a deficit of concientiousness and conformity. The explanation of ACNG aversion due to conformity selection is constrained in explanatory power because nonconformity is generally valued. The perceived concientiousness gap is not significantly different between an ACNG and the average recent college graduate. The data does validate that soft skills altogether are importantly different for ACNG and recent college graduate labor. Concientiousness and body language are the two most important skill gaps in the model. Other soft skills are less significant, but the coefficients of all soft skills in the preferred model are strictly larger than the coefficient for technical skill.

An important and complicated finding involves conscientiousness. The effect is robustly positive in multiple specifications. Simple intuition would indicate that a large conscientiousness gap is associated with reduced hireability. A simple regression of conscientiousness on hireability does produce the expected negative coefficient. There are two reasons for the sign change on conscientiousness in the multiple regression. The first reason is bliss point seeking and the second is an explanation from attenuation.

As previously discussed, excess individual concientiousness can disturb team performance[12]. It follows that there is some bliss point level of concientiousness. As a result, the sign of the coefficient on concientiousness is sensitive to the relationship between the model constant and the bliss point. If the model constant is above the bliss point, concientiousness is expected to be positively signed. The current data is consistent with this explanation from bliss point seeking. In a simple regression of conscientiousness in hireability, the model constant is about 7.5, and the coefficient on conscientiousness is negative. In the multiple regression, the model constant is near 0.5, and the coefficient on conscientiousness is positive.

The second explanation is that the direct measure of conscientiousness is

attenuating an overstatement of the effect in the multiple regression. Conscientiousness is importantly cross-correlated with several factors including willingness to commute and customer service skill. Conscientiousness also structurally interacts with rulebreaker effects. In theory, a person that is high in concientiousness will tend not to break rules. These factors are entered independently in the multiple regression, so a partial measure of conscientiousness is entered in redunantly. The direct factor for conscientiousness corrects, or attenuates, the overstated effect which is represented in those the correlated independent factors. Removal of other skill gap factors and rulebreaker factors from Model 5 demonstrates this by yielding a negative concientiousness coefficient ($\beta = -0.084, p < 0.31$).

The importance of conscientiousness does not add weight to the classic signalling explanation. The ACNG concientiousness gap and the recent college graduate concientiousness gap are not significantly different.

Employer size is an important factor in the preferred model. The largest category of employer is positively associated with willingness to hire an ACNG. This matches the risk aversion explanation of ACNG hireability.

Some state and industrial effects are identified. No particular relation among state effects was found, but further comparative policy research is encouraged. With respect to industry, an interesting interaction between body language skill and employment in the information technology industry yields a positive coefficient. Body language skill gaps on their own are associated with reduced willingness to hire. This specifically indicates a reduced penalty for lacking body language communication skills in the information technology industry. With less confidence and more generality, a positive coefficient to this interaction variable indicates a reduced penalty for generalized soft skill deficiency in the information technology industry.

A reduced penalty for soft skill deficit helps explain the particular flourishing of alternative credentials in the information technology industry. The reduced penalty in this particular industry might be related to a relative lack of deregulation in the industry. Another explanation is that the reduced penalty may be

related to cultural norms in the industry. There is less technical need for social skill in programming, so introverts may obtain a comparative advantage in this field.

The preferred model explains about one third of hireability variance, but how much of the explanatory power is attributable to perceived skill gaps? Table 2 provides evidence on the importance of perceived skill gaps and rulebreaker effects. This table compares the explanatory power of selected factor groups. Industry and state effects are widely regarded as important in explaining labor outcomes. The table shows that perceived skill gaps and rulebreaker effects are even more important in explaining hireability. Rulebreaker effects collectively explain more than three times as much response variance as do industrial or state effects.

Allowing for overqualification seems to weaken explanatory power. Overqualification effects seem to be heterogeneously signed per skill, so generalizing weakens overall explanatory power relative to ignoring these effects. With overqualification, perceived skill gaps explain about fifty percent more than industrial effects or robust state effects. Without overqualification, the adjusted explanatory power of perceived skill gaps is about three times the adjusted explanatory power of industry or state effects. Semi-robust state effects are state effects which are significant in any multiple regression described in Table 1. Robust state effects are the significant factors in a simple regression of semi-robust state effects on hireability. An example of a state which appears in a multiple regression from Table 1 but is not significant in a simple regression of semi-robust state effects on hireability would be [TODO].

Table 2 also describes the explanatory power of so-called rulebreaker effects. Whether the candidate is perceived as a rulebreaker is a perceived skill gap, but employers evaluate this gap in a heterogenous and multispecific way. In the first place, this heterogenous evaluation has sign and magnitude implications for the dependent variable of interest. Secondarily, heterogenous evaluation implies a qualitatively different evaluation. These differences are captured using three questions in the first section of the survey.

Table 2: Factor Group Explanatory Power in a Simple Regression

Effect Group Name	Adj R-Sqr	R-Sqr	Max p-value
Industry	0.0185	0.0510	0.288
Rulebreaker	0.1432	0.1554	0.053
Skill Gaps with Overqualification	0.0558	0.0737	0.106
Skill Gaps without Overqualification	0.0758	0.0933	0.115
State, Robust	0.0177	0.0503	0.227
State, Semi-Robust	0.0034	0.0648	0.831

Employer status is significantly and positively related to each of the rulebreaker effects. Rulebreaker effects are about twice as important as perceived skill gaps. These results provide evidence that ACNG hireability depends importantly on the way a particular employer views rulebreakers.

4. Conclusion

This study provides evidence that skill signals are an important factor of hireability and are unique for the ACNG. Perceived skill gaps do a better job of explaining willingness to hire than do other widely recognized effects including industry and state effects. Employer factors better explain candidate hireability than do the perceived skill gaps themselves. Technical skill gaps were identified with less relevance to the hiring decision when compared with soft skill gaps for the ACNG job candidate.

This paper provides evidence that some employers engage in conformity selection as a means of avoiding risk to the reputation, productivity, or value of a company. An explanation from risk aversion fully this kind of conformity

selection and also explains other behavior. Respondents were most favorable to the description of rulebreakers as individuals that could just as easily be high performers as low performers. Aversion to this kind of labor is better explained as risk aversion rather than positive selection for conformity.

Risk aversion and conformity selection are both partially unconcious biases which lead to suboptimal organizational operation. A practical recommendation is for organizations to implement bias controls with respect to ACNG evaluation. An example control would be to provide human resource procedures for formal evaluation of particular credentials which are relevant to specified job families. These procedures can be immediately executed among known credentials and job families. These procedures should be retained for ongoing application as new credentials are developed and encountered over time.

Some evidence on the role of misinformation is demonstrated in a survey on trade schooling taken in 2019[13]. Only 27 percent of respondents correctly responded that lower debt is an advantage of enrolling in trade school relative to college. Additionally, over 75 percent of respondents failed to notice that trade school graduates receive industry employment sooner and receive specialized training when compared to a four-year college. Obtaining a college degree after obtaining some work experience will allow students to leverage employer tuition benefits. Because ACNG hireability varies importantly by particular employer, ACNG job candidates are advised to apply to a substantial number of employers at the outset of the job search. Insight into ACNG hireability at a particular firm can be obtained prior to application through social networking with employees of the firm, online research into the policies of the target employer, or consulting a recruiter that specializes in the target employment industry.

The preferred model explains about one third of willingness to hire. Perceived skill gaps and rulebreaker effects account for most of the explanatory power in the model. The explanatory power of this study can be meaningfully improved in a few ways. Longitudinal study would allow for causal analysis and improve forecasting of ACNG hireability in the future. Other research has conducted some dynamic analysis of the same dependent variable with dif-

ferent regressors[14]. Integrated analysis would be useful for replication and the generation of new models of better explanatory power. Analysis that includes overqualification effects and heterogeneous nonlinear relations between skill gaps and hireability would improve estimates of hireability for a candidate of a particular skill profile.

If perceived skill is representative of actual skill, then the current study concludes that employers should be more willing to hire an ACNG. At the same time, this paper provides evidence that perceived and actual skill levels sometimes do not align. For example, the average recent college graduate in the sample is perceived to have better technical skill compared to the average ACNG. This is surprising because last mile training, a kind of alternative education, has been specifically recommended in popular literature as a remedy for the technical skill gaps that exist among recent college graduates.

Employers seem to be favorable to individuals with alternative credentials. In many cases, employer-perceived skill gaps are not statistically different when comparing recent college gradutes with ACNG candidates. Social preference for the college degree may be better explained by public ignorance about appropriate alternative programs, a lack of appropriate programs for certain occupations, and government financial and other policy which gives preference to accredited education.

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