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The effect of soft skills on French post-secondary graduates' earnings

Abstract

Purpose – This paper constructs soft-skill indicators and measures their effects on graduates' earnings using survey data from a sample of master's degree graduates in France.

Design/methodology/approach – We use a quantile analysis to measure the effects of soft skills on income.

Findings – Certain soft skills explain a proportion of the earnings of recent master's graduates. In particular, they influence the highest salaries and are important for the most highly skilled jobs.

Research limitations – Most of these soft skills are measured using declarative responses and may result from the feeling of having skills rather than actually possessing the skill. Moreover, this paper only looks at graduates who are employed, and a deficit in soft skills may be more penalizing for job seekers.

Social implications – While some young people take advantage of soft skills early and benefit from them in the labour market, it is likely that it is even more important for those less endowed with these skills to further develop them before entering the labour market.

Originality/value – This research illustrates the heterogeneous nature of the skills that young post-secondary graduates acquire. French diplomas do not seem to homogenize all of the skills that young people develop through their academic and professional experiences.

Keywords – France, post-secondary graduates, soft skills, wages, quantile regression

Paper type – Research paper

1. Introduction

Although young graduates in France, and particularly master's graduates, enjoy an advantage in the labour market, they do not seem to be spared by rising unemployment (Ménard, 2014). Some young graduates find themselves relegated to low-paying, deskilled jobs. In France, as in many developed countries, graduates may suffer from a deficit in certain skills in comparison with job requirements upon joining the labour market (Garcia and Van der Velden, 2008; Allen and Van der Velden, 2011). It is therefore important to examine employers' expectations in terms of skills.

The pioneering works of Green et al. (1999) in Britain has also emphasized the weight in the recruitment phase of certain skills pertaining to relationships, attitudes, and motivation, which are reportedly more important for employers than technical skills. The need to work as part of a team, with autonomy and without hierarchical supervision, supposedly creates a growing need for social, relational, and emotional skills at the level of the human resource policies of the employers (Green, 2004; Bennet, 2002; Borghans et al., 2006). A range of studies emphasize in various economic sectors, the increase in employers' demands for these types of skills when filling more or less skilled positions (Callaghan and Thompson, 2002; Grugulis and Vincent, 2009; Robbles, 2012; Baily and Léne 2013), even if the term "skilled" is debatable, especially for low-skilled jobs (Payne, 2000; Keep et al., 2006; Payne 2009).

One might ask why soft skills are valuable in the labour market. These skills are more transferable to new highly flexible jobs, and thus sought after by employers. Several studies that have investigated employers' requirements in terms of more general skills provide evidence that graduates with soft skills are generally considered as more employable (Taylor, 2005; Andrews and Highson, 2008; Ito and Kawazoe, 2015). There is some agreement in the research on employability; notably, a recent literature review by Suleman (2016) on skills required in the labour market, also concludes that soft skills (including relational skills, such

as interpersonal skills, communication and teamwork ability) are generally viewed as essential skills for employability.

This paper enquires into the impact of these soft skills in the labour market in France and measures their influence on graduate salary levels. Several studies suggest that a deficit in such skills may impede access to employment and that some soft skills may be extremely important to employers for certain positions (Deming, 2015; Cuesta and Budra, 2017). However, in France, little research has been conducted into the impact of soft skills on the position of individuals in the labour market. Based on the Céreq survey of the skills of post-secondary graduates, the present paper questions the effects of certain soft skills on graduate income levels four years after graduation. The paper is divided into four sections. Section 1 examines the results of different studies on the impact of soft skills in the labour market. Section 2 explains the survey data and the methodology used for measuring these skills. Section 3 presents the main findings on the effect of soft skills on graduate earnings. Section 4 discusses these findings, emphasizing their value and limitations.

2. The effects of soft skills in the labour market

Although some researchers prefer to see these skills in terms of personality traits (Semeijn et al., 2005), other more recent studies favor the term “soft skills”, meaning, a set of skills that relate more to “people skills” and less to theoretical knowledge. These skills purportedly depend on the ability of individuals to interact with others and unlike “hard skills”, they are less specific to jobs or fields of study. The conceptualisation and operationalization of such soft take multiple forms amongst the various existing studies. For this reason, Cobb-Clark (2015) attempted to synthesize the research by focusing on one non-cognitive skill: locus of control. He pointed out that this skill is related to other concepts such as self-efficacy, motivation and self-control. Locus of control is particularly important for understanding economic decisions. Heckman and Kautz (2013), for their part, select measures similar to personality traits used by psychologists to show their importance in the labour market. However, unlike personality traits, for these authors, “soft skills” are skills in the sense that they require learning and can evolve over the course of individuals’ school and working lives as well as within their social and family relations. A recent OECD report (2015) prefers the terms “social” and “emotional” skills, which are defined as individual abilities that can be developed in various formal and informal learning contexts and which have socio-economic effects on individuals’ lives. They are purportedly transversal, meaning they are skills common to various areas of activity in the labour market. They remain likely, however, to determine the acquisition of other more specific skills required by certain jobs.

The definition of soft skills used in many studies converge on the idea that a set of non-cognitive skills might prove valuable in the labour market and possibly even more valuable than cognitive skills (Gutman and Schoon, 2013).

Bowles and Gintis (1976) are among the first to have investigated the effect of behaviour on access to the labour market. Dunifon and Duncan (1998) show the importance of motivation on labour-market success. By introducing several scales of behaviour borrowed from work in psychology, Bowles, Gintis, and Osborne (2001) show the influence of different behavioural variables on wage equations in the United States, the effects being captured neither by education and cognitive variables, nor by parents’ socio-economic status. Heckman *et al.* (2006) report that the effect of non-cognitive skills such as motivation, self-esteem, or perseverance may sometimes prove greater than the effect of cognitive skills in terms of academic success and in the labour market. Although they acknowledge that measurements of such skills may be imperfect, especially because they are often influenced by the characteristics of the family environment, they find that different estimates systematically lead to positive and significant effects of such skills, in particular when controls are included

for ethnic membership, labour market conditions, residential region, cognitive skills, family environment, and place of residence. These skills influence experience in the labour market, education, employment, choice of profession, and the probability of engaging in or avoiding "risky" behaviour (such as teenage pregnancy and marriage, marijuana consumption, imprisonment, or unlawful activities).

However, soft-skills affect earnings quite differently depending on several variables. For example, their effect is not identical for all levels of diplomas and all social circles. In the United States, young people from low-income backgrounds with a history of academic failure seem to be more sensitive to the absence of such skills. Certain skills may, therefore, have differing effects for different levels of diplomas (Heckman *et al.*, 2006). Kuhn and Weinberger (2005) tested the effect of leadership skills acquired in high school on adult salaries 10 years later, controlling for cognitive skills and socio-economic characteristics. They emphasize not only the effect of this variable on salary independent of the school-leaving diploma, but also the augmentation of this effect with occupational experience. In Russia, Semykina and Linz (2007) find a significant impact on earnings of locus of control and challenge-affiliation, but they also emphasize gender differences in personality traits. Moreover, Lindqvist and Vestman (2011) use Swedish data to show that a deficit in non-cognitive skills is far more of a handicap for people experiencing difficulties in the labour market. The absence of a minimum of non-cognitive skills may explain low levels of remuneration and long-term unemployment better than an absence of cognitive skills.

In addition, some authors highlight the complementarity between soft skills and cognitive skills. Recently, Deming (2015) emphasized the importance of the development of jobs requiring a high level of skills in the United States since the 1980s and showed the effect of social skills on remuneration. Those social skills notably reduce coordination costs and enhance teamwork and non-routine activities. Their complementarity with cognitive skills seems to have risen over time, partly because the use of new technologies is not a replacement for relational skills in skilled jobs. Weinberger (2014) also emphasizes this complementarity between social skills and cognitive skills, which has increased in the United States since the 1980s. When hiring, employers' demands have reportedly shifted towards young graduates with both technical and social skills, even if some of them are more closely related to managerial positions than others. In the Czech Republic, Balcar (2016) provides evidence that soft skills are as productive as hard skills: He finds that a standard deviation increase in hard skills is associated with a wage premium in the order of 8.8% and the same increase in soft skills was accompanied by an 8.5% wage increase.

In France, little research has been done on the impact of non-cognitive skills in the labour market. One of the difficulties is the absence of measurements for such skills in surveys of the labour market. Using several opinion variables in the *Génération 2010* survey to construct proxies for such skills, Bensidoun and Trancart (2015) sought to highlight the role of non-cognitive skills in explaining wage differentials between men and women. Ten years after leaving full-time education, women's pay is 21.2% lower than men's in France. Non-cognitive variables (including optimism, career mindedness, and risk tolerance) account for 6.3% of the total wage differential, which is double that accounted for by experience.

However, no research has attempted to measure soft skills and the wage return for these skills, nor how these returns depend on income levels.

3. Data and methodology

3.1. Data

The data used are from the *Génération 2010* survey of the *Centre d'études et de recherches sur les qualifications* (Céreq). For conducting this survey, Céreq constructed a database with

more than 1,100,000 young people who left the educational system. Within this database, a representative sample of approximately 33,000 individuals of all levels of education was randomly drawn and interrogated in 2010. This sample was adjusted and weighted in relation to respondents' characteristics. This nationally representative survey can be used to retrospectively study the access to employment of the young people who left the educational system in the same year. It can also be used to collect information about the academic background, socio-economic characteristics, and professional career of these young people. Furthering the *Céreq* survey conducted in 2013 on those who left the education system in 2010, the *Céreq Département Entrées et Évolutions dans la Vie Active* (DEEVA), the *Institut de Recherche sur l'Education* (IREDU), and the *Centre d'Études et de Recherches Travail Organisation Pouvoir* (CERTOP) conducted an *ex post* survey on higher education graduates of 2010 who were surveyed in 2013 and again in 2014. In total, 2,719 young graduates were included in the second round of questioning via Internet four years after graduating. The response rate was 56%, corresponding to a sample size of 1,524 individuals. After removing respondents who did not specify their salary in 2014 and deleting anomalous values, the analysed sample comprises 1,291 young graduates.

The questionnaire provided information on:

- respondents' job status at the time of the 2014 survey,
- the transverse or general skills and the specific disciplinary skills both acquired in education and training and required in their work (Calmand et al., 2015), and
- their social and behavioural skills, which we refer to here as soft skills.

The portion of the survey focused on soft skills is comprised, on the one hand, of questions related to the experience of graduates within their work context, and on the other, of more general aspects of their professional and personal lives. A difficulty arises from the fact that there is often the possibility of a reverse causal connection between non-cognitive variables and the endogenous variable. The possession of certain soft skills may reflect the position of individuals in the labour market and not skills gained from their education and training, their careers to date, or even their personality traits. To reduce this bias it would have been necessary to question individuals before they entered the labour market, which would have required a specific methodology not included in the *Céreq* surveys. However, although we cannot pinpoint where they were acquired, we can use these data to capture the effect that soft skills have on the earnings and employment of post-secondary graduates in the French labour market.

3.2. Constructing indicators for measuring soft skills

A difficulty arises from the diversity of definitions and measurements of soft skills in the literature. Empirical research generally uses a wide variety of operationalizations that must be considered as more or less accurate proxies for these skills. Some measures were drawn from scales borrowed from studies by psychologists, others were constructed specifically for each line of research and adapted to the audience of respondents. The module developed in the *Céreq* survey on soft skills used both types of measurement. However, with a limited number of questions, it is only possible to identify certain skills: perseverance, self-esteem, sociability, and communication. A risk-taking measurement, which is sometimes used in studies of social skills focused on access to certain professions, was also included in the questionnaire. Appendix 1 lists each of the questions solicited for measuring skills.

Perseverance ("Grit")

Perseverance with respect to long-term objectives is often included in the works of Heckman and Kautz (2013) as a component of soft skills. It frequently relates to people's motivation and determination and may therefore be a reason for higher income (Becchetti et al., 2013) by increasing the productivity of people on the job. In order to measure perseverance, part of the

supplementary survey on skills uses the “Grit Scale” developed by Duckworth *et al.* (2007). They call this social skill “grit” and define it as perseverance and passion in setting out to achieve a long-term objective. Individuals who maintain their efforts over several years despite setbacks exemplify this soft skill. The “Grit Scale” was adapted to the *Céreq* survey. Respondents were asked seven questions¹, and, on average, scored 3.03 on the perseverance scale.

Self-esteem

Self-esteem is often considered a central feature in both academic and professional success (Schulz, 2008). For Goldsmith *et al.* (1997) it is part of a “psychological capital,” which, like human capital, contributes to increased individual productivity, although it is far more difficult to observe and measure. Psychological capital influences earnings, especially through the sub-component of self-esteem, which is positively correlated with level of income. These and most other researchers measure self-esteem using the Rosenberg scale (1964). However, it was not possible to utilize this scale in the questionnaire. A more specific question focused on the respondent’s professional life was posed: “Do you think you can succeed professionally or personally as well as your co-workers in the same job as you?”².

Communication with others

Schulz (2008) claims that a number of soft skills seem particularly important in that they allow individuals to develop other skills. For example, this is the case of communication skills that may affect linguistic skills, behavioural skills such as self-esteem, relational skills (discussion, listening, etc.), and more communicational skills (organization, eloquence, etc.). This skill has been operationalized indirectly in the survey on the basis of a question regarding graduates’ satisfaction with exchanges and formal or informal collaboration with co-workers. A distinction is made between those who reply that they are rather or fully satisfied and the rest of the sample: We assume that this dissatisfaction may stem from personal difficulties in managing their communication with others. In the *Céreq* survey, 11% of the graduates said that they were dissatisfied.

Sociability

Sociability is measured in a variety of ways depending on the study. For example, Bryson and Freeman (2010) ask individuals if they participate in activities both at work and outside work. The number of activities workers participate in then forms a “sociability scale” which they include in their analysis. Once again, it was only possible to ask a single question to try to capture the concept of sociability. A dichotomous variable was used. Young people were asked whether they thought convivial moments with co-workers were important both professionally and for their personal wellbeing. This was the case for 86.5% of the respondents.

Risk-taking

Much research in economics has shown that uncertainty and risk have a non-negligible effect on people’s behaviour and on the decisions they make. Although risk-taking is often correlated with individual variables such as age or parents’ educational level (Dohmen *et al.*,

2011), it also seems to be related to cognitive skills (Borghans *et al.*, 2006, 2008). In particular, people who are more risk-averse are more likely to respond correctly on a cognitive test. Attitude towards risk may also orientate professional choices: The more risk-averse are often found in jobs where variations in returns are low (Bonin *et al.*, 2007). Attitude towards risk may therefore be an important determinant for earnings, beyond the other traditional factors used in the Mincer earnings function. In our study, respondents were asked whether they consider themselves always ready to take risks or whether they prefer to avoid risks.¹ This question is similar to that used for Dohmen *et al.* (2005)'s measure, later used by Bryson and Freeman (2010). Respondents scored 5.95 on average.

We examined the association between the various soft skills for all the graduates. Risk-taking, perseverance, and self-esteem are slightly correlated. Sociability and communication are also correlated, but only communication seems to be related to risk-taking and perseverance.

3.3. Field of study and level of soft skills

Table 1 gives a glimpse of the differences in soft skills by discipline. These differences reflect the French higher education system, which is characterized by a division between the *grandes écoles* (mainly business and engineering schools) and universities. Hawawini (2005) explains that behavioural skills such as the ability to work with others and to communicate effectively have been well integrated into the curriculum of most business schools in France. In line with these findings, we find in our data as well that graduates from engineering and business schools have better soft skills than university graduates. Differences remain moderate amongst university graduates of different disciplines; however, law and political science majors stand apart in that overall these students score less than 3 on the perseverance scale.

Concerning the *grandes écoles*, students from engineering schools and business schools consider themselves more persevering than other young people (3.11 and 3.15 respectively). The same goes for risk-taking. Engineering and business school students declare to be more risk-seeking than the others. On a scale from 1 to 10 for willingness to take risks, they rate themselves on average at 6.08 and 6.21 respectively. However, young university graduates in economics and management also seem more risk-seeking (with an average score of 6.07). The conclusions of this comparison of risk-taking scores must not be overstated, however, given the Kruskal Wallis test results. No significant difference is found for sociability and communication indicators by field of study. This might be due to the low number of individuals who replied negatively to these items.

Table I: Non-academic skills by field of study

4. The effects of soft skills on earnings: a quantile analysis

4.1. Methodology

Our objective is to measure the effects that soft skills may have on the income of young graduates. A quantile analysis is used because it is more appropriate than a Mincer earnings function for our research questions; however, an OLS regression is included (Mincer model) by way of comparison for each estimate. Quantile regression has two points of interest in the context of our study. First, quantile regressions are sometimes more suitable for variables such as graduate earnings collected from declarative surveys. Quantiles prove more robust to discrepant values than OLS regressions because they are less sensitive to them. Second, it is important to go beyond the average effects that non-academic skills may have on earnings across the income distribution. There is no reason to suppose that the impact of such skills (among other things) should be the same in different quantiles for the conditional distribution

of income. It can be assumed that some soft skills have greater influence for better-paid jobs that involve, for example, more responsibilities.

This method gives insight into how conditional quantiles change when the determinants of the variable of interest (here earnings) vary. The aim is to make an estimate applied to the entire sample for several quantiles. It is important to specify that it is not a matter of dividing up the sample depending on the quantiles of the variable of interest and then conducting linear regressions on the subsamples thus obtained. More specifically, our study uses the median, and the first and last quartiles.

The endogenous variable corresponds therefore to the logarithm of the salary earned by an individual. The explanatory variables are the observable characteristics of the employee, namely, sex, father's socio-economic status, work experience, human capital, working hours, field of study, and finally non-academic skills. It is posited for each quantile θ :

$$\text{Quantile}_\theta(\ln W_i) = \alpha_\theta + \beta_\theta A_i + \partial_\theta Z_i + \gamma_\theta W_i + \delta_\theta S_i + \varepsilon_{\theta i} \quad (1)$$

where, α is a constant term, $\ln W_i$ is the logarithm of the wages earned by individual i . The vector A_i represents gender and father's socio-economic status. A distinction is made between fathers in managerial positions and others. The vector Z_i includes human capital variables such as level of diploma, fields of study and grade for *baccalaureat*. The level of diploma achieved is used to identify graduates with a first degree (three years of schooling after the baccalaureate, such as bachelors degree or vocational diplomas), a Master degree from universities or a Master-level school diploma (five years' theoretical studies after the *baccalaureat*). Two types of master degrees can be distinguished: master degree from universities and Master-level school diploma from *grandes écoles*. This categorization reflects the French educational system, which is characterized by a dual and hierarchical opposition between universities and *grandes écoles*. Paul and Murdoch (2000) explain why higher education in France seems complex: in particular, because it juxtaposes university sector and a great number of schools with generally limited access. Level of diploma is included to capture the fact that some types of post-secondary schooling provide a higher educational yield than others (sheepskin effect). Grade for *baccalaureat* represents a part of human capital. The *baccalaureat* is the final diploma of upper secondary education in France and conditions access to higher education. Individuals obtain a grade for this diploma. The "pass or credit" and "distinction or honours" grades are often used for evaluating individuals' levels of diplomas. It can be perceived as a signal of academic skills, and, more specifically, cognitive and hard skills.

The vector W_i includes professional experience and working time³. Experience often makes it possible to increase the level of earnings throughout the career. Here it corresponds to the number of months spent in employment. Unlike the Mincer wage equation, experience squared was not included in our model because all of the young graduates have more or less the same amount of experience in the labour market. In fact, these young people left the educational system in the same year. On average individuals have spent only two years and eight months in employment and the standard deviation is low. Therefore, this variable does not provide any additional information⁴.

Finally, S_i is a vector of non-academic skills: perseverance ("Grit"), self-esteem, risk-taking, sociability, and communication skills. These skills are introduced in separate estimates.

4.2 Results

Tables 2 and 3 (in the Appendices) show the results of different estimates of graduate earnings. Table 3 corresponds to an analysis where wage estimates are repeated, introducing

³ Given the small proportion of part-time workers among these young graduates, we do not present the results excluding part-time workers. However, we did conduct these analyses and the results were not substantially changed.

⁴ For example, Bunel and Guironnet (2017) used the same data than ours and did not include experience squared for those reasons.

the soft skills one at a time. The first column presents the results of the OLS regression, while the following columns present the results of the quantile analysis (first and last quartile and median, columns 2–4).

In Table 2, the first three soft skills, which are significant in the quantile equations, were introduced simultaneously. All the results are quite consistent with traditional wage equation findings. The various estimates show that earnings increase quite markedly with young people's human capital, that is, their diploma level and professional experience. They also highlight certain inequalities, with young men and children of executives generally enjoying higher incomes. Lastly, wage differentials are also evident between disciplines, notably to the detriment of graduates in the arts and human sciences.

Beyond these traditional findings, columns 2–4 of Table 2 show differences by quartile, that is, at different levels of the wage distribution. Having a master's degree rather than a bachelor's degree has a strong effect for the first quartile and declines for others. The opposite is observed for graduates of non-university schools, which are more heterogeneous due to the fact that the category includes both elite business and engineering schools (*grandes écoles*) and other less selective ones. These differences may account for the higher yield over the last quartile. Similar results are found for fields of study: only management studies, in which selection is very hierarchical amongst the various institutes and different diplomas, have higher yields for the last quartile. Obtaining a pass or credit grade on the high-school leaving diploma, a measure of academic skills, also acts on the last quartile of the distribution. Conversely, professional experience has a slightly greater effect on the lower end of the distribution. Quantile estimates also show that sources of inequality increase with higher incomes. Women are thus more heavily penalized in the highest quartile, which might suggest a glass-ceiling effect. Children of executives, on the other hand, have a greater advantage in this same quartile, which underscores the relevance of social capital for access to the most highly skilled jobs. Lastly, the coefficient corresponding to the constant can be considered the quantile of graduates having the reference modalities: here, being a female with a bachelor of arts degree and a father who is an executive, with a pass or credit for the high-school leaving examination. This coefficient increases with the quantiles, which seems intuitive. The coefficient of the constant of the OLS estimates is close to the median, which indicates a degree of symmetry in the distribution of the wage logarithm.

The quantile estimate results support the hypothesis that these skills do not influence individuals' earnings in the same way at different levels of the wage distribution.

Perseverance

The "grit" variable plays a role in determining wages: an individual who declares to be persevering at work (in other words, who has a high score on the perseverance scale described earlier) is more likely to receive a higher income (5%) than others (Table 3, column 1 OLS). This result is consistent with the findings of Duckworth *et al.* (2007), who found that those who are persevering attain a far higher level of studies than others. It can be assumed that this skill continues to be an asset over the longer term in the labour market. Conversely, this result is not significant for the first quartile, that is, for the lowest earnings. Furthermore, OLS estimates for the return to "grit" fail to be statistically significant when it is integrated with other soft skills (Table 2), except in the second quartile, where returns to grit are positive and significant.

Self-esteem

Compared with an individual who declares that she or he succeeds less than others, a graduate who claims to have high self-esteem receives an 8% higher wage according to the OLS estimate (column 1, Table 3). Conversely, in the quantile regression, self-esteem does not impact the first quartile of the wage distribution (column 2), but does especially influence the

last quartile (column 4). Self-esteem still has a very significant influence on the top end of the distribution when others skills are integrated, but only for the last quartile (Table 2). These findings suggest that relying on OLS estimates may be misleading.

We assume that this skill has a greater influence on better-paid jobs that involve, for example, more responsibilities. Hiller and Hambrick (2005) conclude that some executives may have true self-confidence. Others try to make the link between certain job characteristics. For example, in his literature review, Tharenou (1979) indicates that several studies show that jobs which involves learning and participation in decision making are positively associated with self-esteem.

Risk taking

The introduction of a risk-taking illustrates that this variable too is closely related to the remuneration of young graduates. Risk-taking individuals are more likely to earn higher wages. The differences between quantiles remain moderate, and the return is statistically significant in all segments of the distribution.

Perhaps surprisingly, “risk-taking” appears to be an important determinant of wages across all components of the income distribution. Several authors show that higher average willingness to take risks in a particular occupation is associated with higher earnings in that occupation (Bonni et al., 2007; Bryson and Freeman, 2010). Some researchers have found that executives are more likely to be risk-takers (Lefebvre, Mason and Lefebvre, 1997). In addition, people who try to start a new business seem to have a greater willingness to engage in risks (Nicholson et al., 2005). They also show that there are differences in terms of job functions, a relatively high risk orientation can be expected for people in sales and marketing, and low in finance. However, there is no evidence in the literature that there is a link between the willingness to take risks and the level of remuneration of jobs.

Other variables

Given the low dispersion of responses to questions about “sociability” and “communication”, these two variables are not significant in the quantile regressions. The OLS results indicate, though, a positive effect on wages of the communication variabl, but a non-significant effect for the sociability variable.

Table II: Effect of all soft skills on wage distribution

5. Discussion and conclusion

All of the results obtained in this study indicate, first and foremost, that soft skills, as measured in the *Génération 2010* survey, contribute to explaining pay differentials amongst young post-secondary graduates in France. Although level of diploma and field of study still have an influence on young people’s wages, perseverance, self-esteem, risk-taking, and communication do affect wages, even when controlling for social variables and human capital. Second, the quantile analysis indicates that the effect is generally larger for the top end of the wage distribution, which suggests the importance of these skills for attaining the highest skilled jobs. It is important to note that it is the opposite for other variables that may indicate individuals’ levels of human capital. Obtaining a master’s degree or having more professional experience has a greater effect on the lower end of the wage distribution. However, at the top end of the distribution, the effect of these skills is consistent with the effect of other academic (e.g., high grades for the high-school leaving diploma) or social (e.g.,

father's occupation) selection variables. In fact, it appears as if there are two labour markets for post-secondary graduates: The first gives access to the most highly skilled and best paid jobs, but requires, in addition to a diploma, different academic and non-academic skills as well as networks for getting a job; whereas the second offers less well paid jobs, but for which the objective components of human capital, diploma, and experience seem to be far more protective.

This research does have several limitations though. First, the construction of the indicators capturing soft skills is not ideal: Most of the skills are highly declarative and may have more to do with the feeling of having skills than actually possessing them. The measurement is indirect and decontextualized from professional situations, which opens the way to individual subjectivity. Moreover, we were unable to determine soft-skills level of graduates just after their completed their studies. Therefore, endogeneity problem may occur. First, we cannot assert that a causal connection exists between soft skills and the academic and professional careers of graduates or even cognitive skills. A soft-skills variable could be endogenous if it is correlated with the error term in the model. In this case, the endogeneity source would be caused by an omitted variable and the estimate for soft-skills variables would be higher than the correct value. Another issue can be considered: the type of job held by graduates may allow them to augment their levels of soft skills, while also being correlated with earnings. The soft-skills variable could be jointly determined with earnings. It is another source of endogeneity called simultaneity. There is also a potential endogeneity bias due to a possible effect of educational attainment on soft skills. For example, Heckman et al. (2011), show that personality traits affect schooling choices even when correcting for selection into education. Thus, there is a potential bias because we have included in the model a regressor that is not only a predictor of the dependent variable, but might also be predicted by other independent variables in the model. However, the correlations between soft skills and level of diploma as well as between soft skills and field of study remain moderate⁵. In addition, we could take into account geographic areas and in particular the urban-rural divide as Cunningham et al. (2016) and Abel et al. (2014) have done in their articles. We suppose in fact that differences in level of soft-skills of graduates are related to both urban and rural areas. However, our sample is representative nationally but not in terms of regions. That is why we do not explore the impact of agglomerative environments in our models. Lastly, this research is limited by the fact that we look only at graduates in employment, whereas it might be predicted that a deficit in soft skills would be far more penalizing for job seekers.

Despite these limitations, this research is valuable in that it illustrates the heterogeneous character of skills that young post-secondary graduates can acquire. The diploma does not seem to homogenize all of the skills that young people may develop in their academic and then professional experiences. While some young people take advantage of soft skills early and benefit from them in the labour market, it is likely even more important for those less endowed with these skills to further develop them before entering the labour market.

Based on our findings, it is logical to ask whether universities, in France and other countries, should offer training to improve post-secondary graduates' soft skills. Some specific education and training schemes have been developed in various countries and at various policy levels so as to improve proficiency in these skills (Deil Amen, 2006; Mason et al., 2009; Pang and Hung, 2012). However, the efficiency of such training is sometimes debated. Oosterbeek et al. (2009) and Groh et al. (2016) find that soft-skills training does not have any direct and significant impact on employment or on students' self-assessed skills. Yet,

⁵ We examined the correlation matrix of the coefficients of the relationships between soft skills and level of diploma and field of studies.

in the longer term, training programs could be efficient by better responding to employers' expectations in terms of soft-skills.

Notes

1. They also show the importance of such skills in predicting tobacco and alcohol use, delinquency and autonomy in adolescence.
2. Each question comprises five items ranging from "That is not at all like me" to "That is very much like me". It was not possible to include the eighth question on the scale of Duckworth et al. (2007) in the analysis. A scoring method is used whereby each item is associated with a number of points. The total number of points is then divided by seven, i.e. the number of questions on our perseverance scale. The maximum score is therefore five for "very persevering" and the lowest score is one ("not at all persevering").
3. This question comprises four items: "No, I do not think so", "Yes, I think I will do as well as others", "Yes, I think I will do a little better than others", and "I think I will do much better than others". The final two items are grouped together, as are the first two. All told, 38.8% of respondents think they will do better than others.
4. The question was: "Do you think of yourself as someone who is always willing to take risks or do you try to avoid risks?" Respondents rated themselves from one to 10: one if they never want to take risks and 10 if they are always ready to take risks.
5. The Kruskal-Wallis test is a non-parametric test for comparing means. Here the mean social skills score for each field of study is compared. The p-value is given. If it is lower than 0.05, the null hypothesis is rejected, and we can conclude that at least one of the distribution functions is different from the others. The differences in terms of social skills by field of study are significant.

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Appendix 1. Components of soft-skills constructs

Grit

1. New ideas and projects sometimes distract me from previous ones.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
2. Setbacks don't discourage me.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
3. I have been obsessed with a certain idea or project for a short time but later lost interest.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
4. I am a hard worker.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
5. I often set a goal but later choose to pursue a different one.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
6. I have difficulty maintaining my focus on projects that take more than a few months to complete.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all
7. I finish whatever I begin.
 - Very much like me
 - Mostly like me
 - Somewhat like me
 - Not much like me
 - Not like me at all

Self-esteem

"Do you think you can succeed professionally or personally as well as your co-workers in the same job as you?"

- No, I don't think
- Yes, I think I will do as well as others
- Yes, I think I will do a little better than others
- I think I will do much better than others

$\begin{cases} 1 & \text{if they think they will do a little better or much better than others} \\ 0 & \text{if they think they don't or they will do as well as others} \end{cases}$

Communication with others

"Are you satisfied with exchanges and formal or informal collaboration with your co-workers?"

- Not at all satisfied
- Rather dissatisfied
- Rather satisfied
- Fully satisfied

$\begin{cases} 1 & \text{if they are rather or fully satisfied} \\ 0 & \text{if they are not at all satisfied or rather dissatisfied} \end{cases}$

Sociability

"Do you think convivial moments with co-workers are important:

- Professionally
 - Don't agree
 - Agree
- Personally
 - Don't agree
 - Agree"

$\begin{cases} 1 & \text{if they think it's important both professionally and personally} \\ 0 & \text{otherwise} \end{cases}$

Risk-taking

"Do you think of yourself as someone who is always willing to take risks or do you try to avoid risks?"

Respondents rated themselves from one to 10: one if they never want to take risks and 10 if they are always ready to take risks.

Appendix 2. Descriptive statistics

Table IV : Descriptive statistics

	Definition	Mean	Std dev.
Wage	Wage after graduation	2, 502	4,825
Experience	Months of work experience	29	7.5
Social Background	=1 if executive father	0.41	0.49

Gender	=1 if man	0.44	0.50
Soft-skills:			
Grit	Scale from 1 to 7	3.03	0.48
Risk taking	Scale from 1 to 10	5.94	1.87
Self-esteem	=1 if “self-confidence”	0.39	0.49
Sociability	=1 if “highly sociable”	0.87	0.33
Communication	=1 if “good communication”	0.11	0.31
Academic capital:			
Bachelor’s degree	=1 if “a baccalaureate degree”	0.21	
Master’s degree	=1 if “a master degree”	0.59	
Master-level schools	=1 if “master-level school”	0.20	
Branch of study:			
Human sciences	=1 if human science discipline	0.25	
Law	=1 if law discipline	0.07	
Economics, management	=1 if Economics, management disciplines	0.18	
Earth and life sciences	=1 if Earth and life sciences discipline	0.08	
Fundamental sciences	=1 if Fundamental sciences discipline	0.19	

Source: “Génération 2010” survey of the Céreq

Appendix 3. Summary – Effect of social skills on wages

Table III : the effect of soft skills introduced one at a time on wages

OLS Regression	Quantile Regression
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	0.25	0.50	0.75
Grit	0.0469*	NS	0.0359**
Self-esteem	0.0753***	NS	0.0310*
Risk taking	0.0172**	0.0131***	0.0121***
Sociability	NS	NS	NS
Communication	0.104**	NS	NS

Note: *** p<0.01, ** p<0.05, * p<0.1
NS: Not statistically significant

Source: "Génération 2010" survey of the Céreq

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The effect of soft skills on French graduate pay

Table I: Non-academic skills by field of study

	<i>Law</i>	<i>Economics, Management</i>	<i>Human sciences</i>	<i>Earth and life Sciences</i>	<i>Fundamental sciences</i>	<i>Engineering school</i>	<i>Business school</i>	<i>Overall</i>	<i>Statistical tests</i>
<i>Perseverance (Grit)</i> Scale: 1 – 4.86	2.96	3.02	2.99	3.03	3.02	3.11	3.15	3.03	KW test ^b p-value: 0.02
<i>Risk taking</i> Scale: 1 – 10	5.88	6.07	5.91	5.81	5.82	6.08	6.21	5.95	KW test p-value: 0.27
Self-esteem (%) Dummy variable	34.7	46.1	27.8	24.8	42.2	46.2	50	38.2	Chi2 test p-value: <.0001
Sociability (%) Dummy variable	85.7	86.3	85.9	86.6	84.8	86.4	91.8	86.3	Chi2 Test p-value: 0.8010
Communication (%) Dummy variable	92.6	87.5	86.8	89.2	90.8	87.8	94.3	89	Chi2 Test p-value: 0.3290

Source: "Génération 2010" survey of the Céreq

The effect of soft skills on French graduate pay

Table II: The effect of soft skills on wage distribution

VARIABLES	OLS	(1) q25	(2) q50	(3) q75
Experience	0.00912*** (0.00180)	0.0100*** (0.00109)	0.0116*** (0.00127)	0.00821*** (0.00186)
<i>Sex: female (ref.)</i>	0.0715** (0.0285)	0.0420*** (0.0161)	0.0696*** (0.0207)	0.0485*** (0.0183)
<i>Working time : part time (ref.)</i>	0.462*** (0.0542)	0.489*** (0.0300)	0.349*** (0.0521)	0.318*** (0.0484)
<i>Diploma: bachelor's degree (ref.)</i>				
Masters degree (universities)	0.193*** (0.0345)	0.188*** (0.0169)	0.202*** (0.0175)	0.223*** (0.0219)
Master-level schools ("Grandes écoles")	0.524*** (0.0502)	0.472*** (0.0254)	0.454*** (0.0264)	0.453*** (0.0360)
<i>Field of study: human sciences (ref.)</i>				
Law	0.148*** (0.0548)	0.120*** (0.0351)	0.112*** (0.0409)	0.117*** (0.0409)
Economics, management	0.0736* (0.0411)	0.0662** (0.0281)	0.0980*** (0.0255)	0.0964*** (0.0265)
Earth and life sciences	0.105** (0.0536)	0.0548** (0.0253)	0.0374 (0.0294)	0.0603 (0.0555)
Fundamental sciences	0.159*** (0.0431)	0.140*** (0.0237)	0.130*** (0.0230)	0.0981*** (0.0299)
<i>Father's social background: other than executive (ref.)</i>				
Executive father	0.0467* (0.0271)	0.0371** (0.0154)	0.0564*** (0.0175)	0.0684*** (0.0182)
<i>Grade for baccalaureate: pass or credit (ref.)</i>				
Distinction or Honours	0.0479 (0.0320)	0.0355 (0.0219)	0.0478** (0.0192)	0.0420* (0.0217)
<i>Perseverance (Grit)</i>	0.0316 (0.0279)	-0.00199 (0.0169)	0.0252* (0.0145)	0.0295 (0.0206)
<i>Self-esteem</i>	0.0637** (0.0283)	0.0191 (0.0169)	0.0246 (0.0189)	0.0714*** (0.0238)
<i>Risk taking</i>	0.0129* (0.00722)	0.0131** (0.00555)	0.0105** (0.00412)	0.0107*** (0.00384)
Constant	6.310*** (0.113)	6.221*** (0.0683)	6.356*** (0.0694)	6.607*** (0.104)
N	1,291	1,291	1,291	1,291
R-squared	0.218			

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: "Génération 2010" survey of the Céreq

The effect of soft skills on French graduate pay

Table III : the effect of soft skills introduced one at a time on wages

	OLS Regression	Quantile Regression		
		0.25	0.50	0.75
Grit	0.0469*	NS	0.0359**	0.0522**
Self-esteem	0.0753***	NS	0.0310*	0.0807***
Risk taking	0.0172**	0.0131***	0.0121***	0.0143***
Sociability	NS	NS	NS	NS
Communication	0.104**	NS	NS	NS

Note: *** p<0.01, ** p<0.05, * p<0.1
NS: Not statistically significant

Source: “Génération 2010” survey of the Céreq

The effect of soft skills on French graduate pay

Table IV : Descriptive statistics

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Risk taking	Scale from 1 to 10	5.94	1.87
Self-esteem	=1 if “self-confidence”	0.39	0.49
Sociability	=1 if “highly sociable”	0.87	0.33
Communication	=1 if “good communication”	0.11	0.31
Academic capital:			
Bachelor’s degree	=1 if “a baccalaureate degree”	0.21	
Master’s degree	=1 if “a master degree”	0.59	
Master-level schools	=1 if “master-level school”	0.20	
Branch of study:			
Human sciences	=1 if human science discipline	0.25	
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Earth and life sciences	=1 if Earth and life sciences discipline	0.08	
Fundamental sciences	=1 if Fundamental sciences discipline	0.19	

Source: "Génération 2010" survey of the Céreq
