Research statement

Oliver Cassagneau-Francis[*]

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Overview

My research areas are labour economics, the economics of education, and applied microeconometrics. I address key questions concerning human capital, social mobility and inequality through the use of large surveys linked to administrative data and structural models estimated using advanced econometric techniques.

My research falls into two key strands: in one I investigate why different individuals (choose to) acquire different levels of human capital, with my current work focusing on higher education. I study the roles of wages, financial, and other factors in the decision to attend university. I also investigate their role in the socio-economic gap in degree attainment,[1] and in the huge growth in higher education seen in recent decades. The other strand of my research improves our understanding of the effects of human capital on labour market outcomes. I study the wage returns to formal training in France, an important topic given many governments' belief in (re)training as a solution to sectoral change and a more flexible labour force. In another paper I study the return to higher education, employing a novel methodology to survey data on two UK cohorts born 20 years apart to understand the evolution of the graduate wage premium.[2]

Methodologically, I estimate structural economic models using advanced econometric techniques to exploit data from large panel surveys often linked to adminstrative datasets. A key feature of my approach is the use of machine learning to capture unobserved heterogeneity across individuals. These approaches typically work best with reasonably large samples, and so are well-suited to large multi-use surveys, and administrative datasets.

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[*]Sciences Po, Paris; E-mail: `oliver.cassagneaufrancis@sciencespo.fr`

[1]Family background remains a major determinant of university attendance. For example in my data less than 25% of children of low-income parents attending university, versus over 50% for the children of high-income parents.

[2]The graduate wage premium (or graduate premium) is the (raw) gap between the average wages of graduates and non-graduates.

I plan to continue to use advanced econometric methods as well as introducing smaller surveys and experiments in my future work.

Human capital decisions

Typically, economics has focused on the importance of the graduate wage premium as the key driver of university attendance, and on credit constraints as the main barrier to investment in human capital. However, these purely pecuniary factors fail to fully explain observed educational and occupational choices (Cunha and Heckman, 2007; D'Haultfoeuille and Maurel, 2013; Arcidiacono et al., 2020). In my paper, *The role of earnings and other factors in explaining university attendance* (Cassagneau-Francis, 2021b), I shed new light on this key issue by comparing and quantifying the roles of earnings expectations and non-pecuniary factors in the decision to attend university in the UK. Recent work has made important advances to explore beyond wages in explaining educational and occupational choices, mainly in the US (Cunha and Heckman, 2007; Arcidiacono et al., 2020). These papers rely on a residual term to capture non-pecuniary factors—as they lack a direct measure—and find they play a major role in both educational and occupational decisions. Boneva and Rauh (2020) are an exception: they implement a survey of students in secondary education in the UK, eliciting expectations about both pecuniary and non-pecuniary factors.

My contribution builds upon this work, exploiting rich data on both observed outcomes and young people's expectations about non-pecuniary factors. I estimate a life-cycle utility model of university choice using panel data from a representative sample, which contains young people's expectations about the future and their realised outcomes. I use my model to investigate the factors affecting university attendance in England, answering three key questions: (i) How important are expectations about earnings versus other factors for 16–18 year olds when deciding to go to university? I find an even larger role for non-earnings factors than in previous work, with non-pecuniary factors four times as important as earnings in the decision to attend university. (ii) What drives the educational attainment gap between advantaged and less-advantaged potential students? In my results, earnings expectations are similar across socio-economic groups, suggesting differences in other factors are entirely responsible for the observed gap in attainment. (iii) How has the importance of these factors in the decision changed between the 1980s and today? I find the *expected* graduate premium actually fell slightly over this period. Therefore, without the simultaneous large increase in the expected non-pecuniary benefits of university, university attendance would have declined in recent decades.

These are already important results emphasising the range of costs and benefits that young people consider when making educational decisions. The current gap in attain-

ment between those from advantaged and less-advantaged backgrounds is not driven by differences in (expected) earnings, nor by difficulties in obtaining funding. To address this socio-economic imbalance policymakers should focus on other aspects of university life, aspects that are easier to affect than earnings and cheaper than reducing tuition fees. I am currently extending this work to further increase its policy relevance. I use detailed information on young people's expectations about life at, and after, university to decompose *other factors* into more meaningful, and more policy-relevant, categories. Separating expectations about debt and the monetary costs of attending university from the other factors, I find that financial factors do not play a major role in the decision. On the contrary, it appears that young people who are most concerned about the impact of student loan debt—and other monetary costs of attending university—are those who are most likely to attend.

In the next stage of this project, I will employ dynamic programming methods to fully utilise the longitudinal dimension of my data. I have so far treated the decision as a static problem, a useful assumption to simplify and focus my analysis. However, educational decisions are not static: young people make a series of choices that are important in their decision to attend university (or not). There is a rich tradition of dynamic programming techniques in economics pioneered by Rust (1987), and applied across a variety of important topics. They have been used to study the career decisions of young men (Keane and Wolpin, 1997), and the returns to college majors (Arcidiacono, 2004), examples among a number of applications to educational and occupational decisions. Assessing how my results change when moving from a static to a dynamic model is an important contribution both methodologically and to further our understanding of young people's decisions.

I plan to complement this work with another project addressing similar questions, using a different methodology. Rather than using existing data, I would collect my own data in UK secondary schools. I am in contact with a number of secondary school teachers, at both state and private schools in England, who have expressed a willingness to be involved in the project. Administering my own survey will allow me to collect detailed information on young people's expectations and beliefs, via specially designed surveys and interviews informed by previous work. A further possibility, as my relationships with the schools develop and we learn more about the important factors in the decision, is a series of "information experiments" to investigate the impacts of providing different types of information to the students.

Returns to human capital

In order to understand the impact of human capital on social mobility and inequality, we not only need to understand human capital decisions, but also the (possibly heteroge-

neous) effects of this human capital on people's outcomes.

In our paper, *A non-parametric finite-mixture approach to difference-in-difference estimation, with an application to professional training and wages* (Cassagneau-Francis et al., 2020), my coauthors and I apply a novel methodology to new linked employee-employer survey and administrative data to measure the wage returns to training in France. One of our main contributions is methodological: our approach is in the spirit of difference-in-difference estimation, but we use a combination of economically motivated exclusion restrictions and discrete mixtures (to capture unobserved heterogeneity) to relax the common-trends assumption usually required in such analyses. We prove the non-parametric identification of our discrete-mixture model, and demonstrate a viable estimation strategy via the EM algorithm.

Empirically, we find average effects of training on wages of between 2–4% depending on our specification, inline with previous work. Our framework allows the returns to vary across *types*,[3] and we find significant heterogeneity in the effects of training across these different types. For some types we estimate treatment effects of over 10%, while for others the effects of training on wages are slightly negative. We are in the process of extending our work to try to better understand the drivers of these differences in the effects of training. These findings and our extensions are especially important given the focus of governments around the world on training as a solution to labour market changes, especially those driven by technology. If the benefits of training are different across different workers, then misinformed policies towards worker training could lead to inefficiencies and even increases in wage inequality. Another direct relevance of our work for policy is the effectiveness of our policy variable in encouraging people to train: the provision of information on training opportunities to workers by their employers.

Returning to higher education, in *Revisiting the wage returns to university via a finite-mixture approach to difference-in-difference estimation* (Cassagneau-Francis, 2021a) I apply the framework we developed in Cassagneau-Francis et al. (2020) to estimate the wage returns to a university degree in England. By exploiting the same UK cohort studies I used in Cassagneau-Francis (2021b) I study how the returns to a university degree have changed over a period of huge expansion in higher education. Recent work has documented that the aggregate return—or graduate wage premium—has been surprisingly stable over this period. Blundell et al. (2021) propose a mechanism to explain the flat graduate premium through purposeful changes in firms' demand for high- and low-skilled workers. However, these aggregate measures obscure the heterogeneous effects of degrees on different types of workers, effects that are vitally important to understand inequalities, especially among graduates. My work will shed light on these important differential effects of degrees on the wages of different types of workers. Again, given the dynamic

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[3]We use latent types to capture unobserved heterogeneity.

nature of the decision to attend university, and the impact of subsequent subject and occupational choices, dynamic programming methods will play a key role in this work.

The next step is to analyse the returns to different degree subjects, and to degrees from different institutions—the *intensive* rather than *extensive* margin of higher education choices. New degree subjects and new institutions have and continue to play a major role in the growth of higher education in the UK. However, there has been little work analysing the differential returns to these "new" degrees and institutions relative to their older peers. Building upon notable exceptions, including the recent work by Jack Britton and coauthors (Belfield et al., 2018a,b; Britton et al., 2020), I will apply dynamic discrete-choice methods incorporating unobserved heterogeneity to improve our understanding of returns at the intensive margin. Important descriptive work has uncovered the differing returns to a degree across socio-economic groups (Britton et al., 2019) and across subjects (Britton et al., 2020). Further work to uncover the mechanisms behind these differences is of vital importance to ensure higher education has a positive impact on inequality and social mobility.

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