RECENT DEVELOPMENTS IN HEALTH ECONOMETRICS

A Volume in Honour of Andrew Jones

Edited by Badi H. Baltagi
and Francesco Moscone

CONTRIBUTIONS TO ECONOMIC ANALYSIS

VOLUME 297

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EDITORIAL INTRODUCTION

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We are immensely honoured to serve as Guest Editors for this special volume of *Contributions in Economic Analysis* by Emerald Publishing as a tribute to the outstanding contribution of Professor Andrew Jones to the field of health econometrics and his extensive dedication to the profession.

Andrew is a long-time friend to both editors and contributors to this volume. He is Professor of Economics at the University of York, United Kingdom (UK), where he also assumed the role of Head of the Department of Economics and Related Studies from 2011 to 2015. His tenure saw the flourishing of the MSc in Health Economics at York, resulting in over 500 graduates coming from more than 70 different nations. In addition, he has diligently supervised 27 PhD candidates, shaping the future of health economics scholarship. Notably, he served as the editor of *Health Economics* from 1995 to 2019, playing a pivotal role in advancing research in the field.

Andrew Jones' research covers the area of microeconometrics and health economics, with specific interests in understanding the determinants of health, investigating the economics of addiction and addressing socioeconomic disparities in health and healthcare delivery. His seminal chapter on 'Health econometrics' in the *Handbook of Health Economics* has acquired remarkable recognition, with 770 citations on Google Scholar. Professor Jones exhibits a profound interest in the practical application and dissemination of econometric techniques in the area of health economics.

In 1992, Professor Jones established the European Workshops on Econometrics and Health Economics, as evidence of his commitment to fostering collaborative academic discourse. This initiative, co-organised with Owen O'Donnell, has significantly contributed to the advancement of interdisciplinary research in this area.

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Andrew serves as the research director of the Health, Econometrics and Data Group (HEDG), leading innovative studies at the intersection of economics, econometrics and health. His dedication to exploring inequality of opportunity in health is exemplified by his Leverhulme Trust Major Research Fellowship, held from 2017 to 2020, which employs cutting-edge biosocial data to shed light on critical issues in health economics.

With a prolific publication record, comprising 96 articles, 15 book chapters and 16 editorials spanning from 1989 to 2023, Professor Jones has made a profound impact on the academic landscape. His authoritative books, including 'Applied Health Economics', 'Applied Econometrics for Health Economists' and 'Data Visualization and Health Econometrics', stand as enduring contributions to the field. Additionally, his editorial endeavours, such as 'Econometric Analysis of Health Data' and 'The Elgar Companion to Health Economics', as well as three edited volumes of 'The Oxford Encyclopedia of Health Economics' reflect his dedication to shaping the discourse in health economics.

Professor Jones' significant accomplishments have been recognized with the prestigious Willard G. Manning Memorial Award for the finest research in Health Econometrics. He is also a distinguished author for the *Journal of Applied Econometrics*, awarded for his numerous publications in that journal. Professor Andrew Jones' enduring contributions to health econometrics continue to inspire and shape the trajectory of research in this vital field.

The influential health econometrics research carried out by Andrew during the past three decades or so is recognized in this volume with 12 peer-reviewed articles, written by some of the leading researchers in health econometrics. The diversity of the topics covered constitutes a tribute to the wide-ranging scope of Andrew's research interests and contributions.

1. CONTRIBUTIONS

Pastore, Rice and Jones investigate how selective schooling, where students are sorted by ability, affects adult health, well-being and labour market outcomes. Leveraging the shift from selective to non-selective secondary schooling in 1960s England and Wales, mixed-ability schools led to changes in school quality and peer ability. This research distinguishes between high-quality school attendance for high-ability students and low-quality attendance for low-ability students. It mitigates bias through entropy balancing and Ordinary Least Squares (OLS) regression. Selective schooling seems to have minimal impact on long-term health and well-being but slightly raises wages compared to mixed-ability systems. It also boosts aspirations for high-ability students. Early cognitive and non-cognitive abilities strongly correlate with adult outcomes, emphasising their lasting influence.

Lagarde and Scott explore how physicians contribute to disparities in healthcare access and use. This research analyses three types of decisions that physicians make that can impact these disparities: where they choose to practice, whether they work in public or private settings, and their behaviour in patient interactions. For each decision choice, they outline the challenges and provide

empirical evidence on potential policies to mitigate access disparities. The authors recommend that future research should concentrate on modifying healthcare systems to influence physician decisions, including expanding health insurance, balancing public and private sectors, and implementing financial incentives. Additionally, efforts should be made to diversify the physician workforce through training and policies.

Riganti, Moran and Siciliani's study underscores the need for improved healthcare access in European countries. They use European Union (EU)-developed indicators on self-reported unmet needs for comparison, emphasising the importance of considering factors beyond health systems' control in cross-country assessments. The research focuses on the impact of demographic and socioeconomic adjustments on unmet needs and examines disparities based on socioeconomic status. Findings show that adjusting for age, gender and chronic conditions reduces dispersion of unmet medical needs in the EU. Additionally, controlling for income, primarily due to affordability, further reduces dispersion. Socioeconomic disparities in income and education vary by reason for unmet needs, with income disparities being primarily related to affordability. Affordability emerges as the primary cause of unmet dental care needs. Notably, they report that income and education gradients are more pronounced for dental care than medical care.

Nikolaidis, Duarte, Griffin and Lomas employ flexible parametric models to analyse gestational diabetes mellitus (GDM) biomarkers and predict extreme values. They integrate these distributions into an economic decision model, evaluating cost-effective diagnostic thresholds and strategies. Using data from the Born in Bradford study, they identify optimal distributions and assess strategies like 'Testing and Treating', 'Treat all' and 'Do Nothing'. The latter emerges as the cost-effective approach. However, considering long-term benefits for mothers and offsprings may alter this decision.

Carrieri and Principe pay homage to Andrew Jones' significant contributions in health programme evaluation, risky health behaviour and income-related health disparities by reviewing pertinent empirical studies conducted in Italy. Their chapter begins by analysing the impact of reimbursement systems on healthcare behaviour, particularly the shift from incurred-cost-based to prospective systems in hospitals. The authors delve into incentive-driven practices like up-coding and cream skimming, while also considering the potential benefits of primary care incentives and the mixed outcomes associated with cost-sharing schemes. The chapter concludes by emphasising the necessity of accounting for socioeconomic status-related health disparities in the allocation of resources within the Italian National Health Service (NHS), drawing parallels with the experience of the British NHS.

The study by Adem, Hollingsworth and Zucchelli addresses the economic costs of depression, including reduced productivity and increased healthcare utilisation. While the link between employment and mental health is explored, the impact of different types of economic inactivity on depression in older individuals is less understood. They utilise various models and data from the English Longitudinal Study of Ageing to examine how different forms of inactivity may have

varying effects on depression. Their findings suggest that transitions to involuntary inactivity (such as unemployment) do not significantly influence depression, while transitions to voluntary inactivity (like retirement) appear to reduce it.

In their work, Silvia Balia and Erica Delugas delve into the intersection of mental health, lifestyle and retirement. Their work introduces a mediation model designed to differentiate the indirect and direct impacts of retirement on health, taking into account the mediating role of lifestyles. They specifically examine the risk of depression, with physical inactivity serving as a potential mediator of retirement's effect. Their findings reveal a notable indirect effect through the mediator though it is relatively modest when compared to the direct effect. This analysis underscores the significance of delving deeper into the role of lifestyle factors in the connection between retirement and health, offering insights into the potential pathways through which retirement influences well-being.

Steuart and Bradford examined the impact of medical cannabis access on opioid use trends using the Callaway and Sant'Anna (2021) difference-in-differences estimator. Analysing data on all opioid shipments to United States (US) pharmacies from 2006 to 2014, they found no significant change in the total morphine milligramme equivalent (MME) units of opioids shipped after the introduction of medical cannabis dispensaries. However, they observed a decrease in the highest MME dosage strengths across all opioids, particularly with commonly diverted ones. This reduction included a 12.2% decrease in 50–89 MME doses and a 13.8% decrease in 90+ MME doses. Additionally, there was a 6.0% increase in low-to-moderate dose opioids (0–49 MMEs), suggesting patients may be using cannabis alongside opioids to achieve a lower opioid dosage.

von Hinke, James, Sorensen, Sievertsen and Vitt present a study that examines the prevalence, trends and diversity of maternal smoking around birth in the UK, with a particular focus on the war and post-war reconstruction era, where systematic data on maternal smoking behaviour is limited. In this context, they emphasise significant events, the dissemination of new information regarding the dangers of smoking and shifts in government policies targeting smoking reduction. The study reveals substantial shifts in smoking rates over three decades, underscores the emergence of a social gradient in smoking and identifies genetic variations in smoking trends.

Van Gestel, Avdic and O'Donnel investigate concerns about low adherence to clinical practice guidelines and the limited adoption of new medical technologies. They suggest benchmarking clinical practice based on the minimum likelihood of a recommended treatment or new technology leading to better outcomes. This bound can be estimated from outcome distributions. They demonstrate this method by examining Swedish cardiologists' adoption of drug-eluting stents, finding a significant portion falls below the benchmark.

Basu reviews the econometric approaches typically used to deal with the spike of zeros when modelling non-negative outcomes such as expenditures, income or consumption. This research studies how alternate behavioural assumptions may be required to understand the economic rationale for why zeros were generated in the data, how they should be modelled, how the model parameters should be estimated and how the results should be interpreted. This chapter argues that a

key distinction is understanding whether the goal is to model the true zeros or some other hidden figures behind the zeros observed in the data. The data generation process for both the true zeros and the hidden figures can have rich behavioural content, which may trigger the use of some multi-part models and hurdles.

Mullahy highlights the importance of multiple chronic conditions (MCCs) as indicators of individual and population health. The paper emphasises that considering both the 'intensity' (count) and 'composition' (patterns) of MCCs is crucial for a comprehensive understanding of MCC health outcomes. The study, based on US Behavioural Risk Factors Surveillance System (BRFSS) data, demonstrates that focussing solely on intensity provides an incomplete picture of MCC health outcomes.

Andrew, on behalf of the community of health economics and econometric scholars, we express our gratitude for all the inspiring work you have given us and look forward to your future contributions.

Badi and Francesco

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TRACKING PUPILS INTO ADULTHOOD: SELECTIVE SCHOOLS AND LONG-TERM HUMAN CAPITAL

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ABSTRACT

We explore the effect of selective schooling, where students are assigned to different schools by ability, on adult health, well-being and labour market outcomes. We exploit the 1960s transition from a selective to a non-selective secondary schooling system in England and Wales. The introductio3n of mixed-ability schools decreased average school quality and peer ability for high-ability pupils, while it increased them for low-ability pupils. We therefore distinguish between two treatment effects: that of high-quality school attendance for high-ability pupils and that of lower-quality school attendance for low-ability pupils, with mixed-ability schools as the alternative. We address selection bias by balancing individual pre-treatment characteristics via entropy balancing, followed by ordinary least squares (OLS) regression. Selective schooling does not affect long-term health and well-being, while it marginally raises hourly wages, compared to a mixed-ability system, and school aspirations for high-ability pupils. Cognitive and non-cognitive abilities measured prior to secondary school are significantly and positively associated with all adult outcomes.

Keywords: Ability tracking; educational reform; well-being; health; entropy balancing; instrumental variables

1. INTRODUCTION

Education policy may be one of the most effective tools to improve life opportunities for individuals across all backgrounds. A central concern, however, in the

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provision of public education is whether and, if so, how to tailor the curriculum around pupils' ability. Tracking students by ability into different schools at a young age is a controversial policy. On the one hand, it can be seen as a way to improve learning and teaching efficiency, by catering for different abilities separately; on the other hand, such systems have been shown to favour children from affluent backgrounds, who are generally more supported by their families and more prepared to take entry tests (Burgess et al., 2018; Cribb et al., 2013). If less advantaged students are more likely to be excluded from the upper tracks, then selective schooling will reinforce existing inequality gaps in education.

Several countries incorporate selection by ability in their secondary schooling systems, including Australia, England, France, Germany, the Netherlands, Switzerland and the United States. Attending an upper track school is generally linked to better educational outcomes, but the presence of tracking is also associated with higher inequality in education and earnings, often leading to low social mobility (Brunello & Checchi, 2007; Burgess et al., 2017, 2020; Hanushek & Wößmann, 2006). There are, however, several other non-monetary benefits of education, which accrue over time through a variety of pathways, including health and well-being (Grossman, 1972). In this chapter, we assess the human capital effects of selective versus non-selective schooling, by looking at long-term health, well-being and labour market outcomes for a British cohort. We do this by exploiting the comprehensive schooling reform implemented in England and Wales in the 1960s, which caused some areas to transition from a selective to a non-selective system of secondary education earlier than others. The empirical analysis relies on data from the National Child Development Study (NCDS), a British cohort study of individuals born in March 1958, allowing us to follow their lives to date. Depending on the area in which they resided at the time, NCDS children were exposed to either a selective or a non-selective system. In selective areas, an entry test determined whether a pupil was offered a place in a selective grammar school, representing the more academic track, or in a vocational secondary modern school, the main alternative for low-scoring pupils. In the non-selective system, schools were converted into or created as comprehensive schools receiving pupils of all abilities. Attendance at different school types exposed pupils to different curricula, teacher quality and peer ability, thus offering an opportunity to explore the long-term human capital effects of variation in school quality. To assess the impact of selective schooling, our empirical approach exploits the differential ability of pupils within that system by estimating two treatment effects. First, we explore long-term effects of attending grammar, compared to comprehensive, for pupils of high cognitive ability. Second, we investigate the effect of attending secondary modern, compared to comprehensive, for pupils of lower ability. An advantage of separating treatment effects is that for each, we make treatment and control groups more comparable. This chapter builds on the literature exploring health impacts of the comprehensive reform in the 1960s (Basu et al., 2018; Jones et al., 2011, 2012). However, we expand on this literature by splitting the sample by cognitive ability, in order to assess the link of selective schooling to biometric markers for cardiovascular