Disrupting gender imbalances in labour markets: Field experiments on the impact of artificial intelligence in recruitment

Mallory Avery* (Monash University), Andreas Leibbrandt (Monash University), Joseph Vecci (University of Gothenburg)

Abstract

Advances in AI have produced a range of job applicant assessment tools to improve organizations' ability to find the right person for the right job faster and cheaper than before. However, there is great disagreement about how AI will change diversity in hiring and recruitment. In this paper, we partner with a large AI recruitment firm and use a series of field experiments to study how using AI in recruitment impacts gender diversity in a male-dominated labour market, both overall and separately for supply and demand. Using the recruitment for a real tech job, we find that using AI in recruitment leads to a 30 to 160 percent increase in the fraction of top applicants that are women, depending on the level of recruitment selectivity. This change is generated by shifts in both supply and demand. The use of AI substantially reduces the gender gap in application rates, driven by both increases for women and decreases for men. On the demand side, we find that providing evaluators with applicants' AI scores closes the gender gap in evaluations that otherwise disadvantaged female applicants. We conclude with suggestive evidence that substantial biases in the AI tool, penalizing women up to 25%, would have to be present to lead to greater gender imbalance than is present without AI at all.

Female-breadwinner couples and the transition to parenthood

Ruth Steinbring*, Francisco Perales, Janeen Baxter, Jack Lam (The University of Queensland)

Abstract

This paper examines household earnings arrangements and parenthood. Previous research has shown that parenthood is associated with a motherhood wage penalty with women withdrawing from the labour market or reducing their work hours. But few studies have examined within-couple relative earnings and breadwinning arrangements across the transition to parenthood. We identify three types of households – 'female-breadwinner households' (where women earn 60% or more of the couple's annual labour income); 'male-breadwinner households' (where women earn 40% or less of the joint income); and 'equal-earner households' (where women earn 40% to 60% of the joint income). Using longitudinal data from the Household Income and Labour Dynamics in Australia Survey and linear probability models, we find a substantial decrease in the percentage of couples in equal-earner households in the year prior to and after parenthood that is largely replaced by an increase in the percentage in male-breadwinner households. We observe little return to pre-parenthood earning arrangements for equal-earner and male-breadwinner households. For female-breadwinner households, we observe a gradual return to pre-parenthood arrangements. These results provide evidence that parenthood is a major milestone contributing to gender inequality and highlight the importance of policies for reducing the impact of parenthood on women's earnings.

*denotes presenter

Day 1 Session 2

Building the education revolution: The employment effects of fiscal stimulus in Australia
Timothy Watson* and Juha Tervala (Australian National University)

Abstract
This paper estimates the causal impact of the Great Recession-era Building the Education Revolution (BER) school infrastructure stimulus program on labour market outcomes in Australia. The evidence suggests that the program provided value for money, with costs per job-year saved most likely below $8,500 ($US 8,000) on average between 2009 and 2012. In 2009, the main year of program impact, roughly one third of employment benefits related to lowering unemployment, and two-thirds reduced labour force exit. Unemployment reductions were concentrated amongst men, while program effects on employment appear more equally distributed by gender than would be anticipated based on the gender composition of the construction industry. Employment benefits were highly concentrated amongst 25 to 34 year olds, were not greater in regions experiencing higher unemployment at the outset of the program, and geographic demand spillovers may have grown as the program progressed.

College majors and labour market mismatch
Michelle Rendall (Monash University), Satoshi Tanaka and Yi Zhang* (University of Queensland)

Abstract
This paper studies the extent of skill mismatch across college major-occupation combinations. We propose a general equilibrium framework to measure mismatch through output loss. The model relies on the estimation of college-occupation returns based on a Roy model. We use administrative tax panel data merging employment history and university degree information for 10% of the Australian workforce. We control for selection at the occupation choice by taking advantage of the regional variations in labour market conditions and changing government education policies. To estimate mismatch we exploit a policy change where subsidised university spaces became available to all Australian citizens and Permanent Residents irrespective of academic performance. Our results suggest that (1) STEM-related fields (IT, Commerce, and Engineering) are the main drivers of wage dispersion, but (2) Commerce, Health, and Education are the main driver of output loss, and (3) government education subsidies lead to larger mismatch and greater persistence of wage dispersion over the life-cycle.

Day 1 Session 3

The effect of COVID-19 vaccinations on economic activity in Australia
Aaron Wong (e61 Institute)

Abstract
I estimate the effect of Australia's COVID-19 vaccination rollout on economic activity using weekly transactions and payroll jobs data from August to December 2021. I identify effects through instrumenting vaccination rates with vaccine distribution site density interacted with state-level vaccine allocations in a fixed effects model. I find that vaccinations significantly increased consumer spending, jobs and mobility. Spending and jobs increased by 0.2 and 0.1 percentage points in the following week for every additional 1 percentage point of completed vaccinations. However, estimates of the dynamic response indicate that spending was brought forward in response to the vaccinations and the cumulative effect is around zero. Spending on discretionary purchases and services responded more strongly than overall spending. Using real-time payroll jobs data, I found that jobs held by young people, particularly women, and in discretionary services industries and small businesses increased the most in response to more vaccinations, highlighting the equity benefits of vaccines in offsetting the uneven effects of the pandemic. Vaccinations also increased mobility away from home as measured by Google's mobility indices by 0.25 to 0.75 percentage points for a 1 percentage point increase in completed vaccinations. Together, these results show that a faster vaccine rollout could have improved economic outcomes and reduced the negative impacts of lockdowns.

Partner violence and the financial well-being of women: HILDA research results
Bruce Chapman and Matt Taylor* (Australian National University)

Abstract
The paper explains the analysis and document the results of research into the financial consequences of physical violence perpetrated against Australian women in domestic partnerships. We seek to address the question: what are the financial implications for women who experience partner violence (PV)? We believe that this is the first attempt to use longitudinal data to explore the effects of PV on the equivalised household incomes and wages and salaries of Australian women victims and is likely to be the first such attempt in this area internationally. The results are striking: for both mothers and childless women separating after experiencing violence there is a very substantial financial penalty compared to women separating without the experience of violence. There are important limitations of the data related to a small sample size, with the empirical implications being addressed through the use of fixed effects modelling.

Day 2 Session 1

Extreme heat, work attendance and hours worked

Andrew Ireland*, David Johnston, Rachel Knott (Monash University)

Abstract

We study the causal effects of heat on daily work attendance and weekly hours worked using a longitudinal sample containing over 9 million days of responses from Australian workers between 2001 to 2019. We find that extreme temperatures >38°C (100°F) lead to a 1.2% reduction in work attendance, compared to days when temperatures are 22–26°C. Workers do not make up this lost time by working more hours on other days during the week. We find large effects for workers in both outdoor- and indoor-based occupations, indicating the effect is not solely due to avoidance of unpleasant environmental conditions at work. Analysis on the stated reasons for reduced hours indicate that labour demand factors (no work available, plant breakdown) are important mechanisms behind the reduced hours worked in extreme heat.

Precarious employment, mental health and financial literacy

Alison Preston* and Ethan Slaven (University of Western Australia)

Abstract

Drawing on data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey this paper has two aims. The first is to examine whether casual (precarious) employment is associated with mental health. The second is to examine the relationship between financial literacy and mental health. With regard the latter, our specific interest is in understanding whether the mental health gap between casual and non-casual employees may be explained, in part, by differences in their financial literacy. The focus is on male employees aged 20-64. The dependent variable is the widely used SF-36 mental health. Panel analysis for the period 2001-2019 shows that casuals have significantly (p<0.05) lower mental health than non-casuals; the gap is around 1.2 percent, *ceteris paribus.* The financial literacy analysis is necessarily cross-sectional and is based on 2016 data. Those who are more financially literate (as measured by the capacity to answer two questions covering interest rates and inflation) have better mental health. Decomposition analysis using the Oaxaca-Blinder technique suggests that, in 2016, around one third of the mental health differential between casuals and non-casuals relates to differences in their characteristics (e.g., age, marital status, under and over-employment, financial literacy etc.). Differences in financial literacy accounts for a marginally significant (p<0.1) 10.2 percent of the 33.0 percent explained mental health gap.

Lifecycle earnings risk and insurance: New evidence from Australia

Darapheak Tin* & Chung Tan (Australian National University)

Abstract

This paper studies the nature of earnings dynamics in Australia, using the Household, Income and Labour Dynamics in Australia (HILDA) Survey 2001-2020. Our findings indicate that the distribution of earnings shocks displays negative skewness and excess kurtosis, deviating from the conventional linearity and normality assumptions. There is variation in the sources of earning shocks. Wage changes are strongly associated with earnings changes and account more for the dispersion of earnings shocks; meanwhile, the contribution of hour changes is largely absent in upward movement and relatively small in downward movement of earnings changes. Furthermore, family and government insurance play distinct roles in reducing exposure to earnings risk. Government insurance embedded in the targeted transfer system is more important in mitigating the dispersion of earnings shocks, whereas family insurance via income pooling and adjustment of secondary earners' labour market activities is dominant in reducing the magnitude and likelihood of extreme and rare shocks. Finally, the magnitude and persistence of earnings risk as well as the insurance role of family and government vary significantly across primary earner's gender, marital and parental status.

Risk and returns to education

Maria Jahroni* & Kieron Meagher (Australian National University)

Abstract

Education choice produces uncertain income. We investigate how education choices in terms of an individual's highest qualification and the field of study contribute to future earnings. Traditional analysis of returns to education tends to focus on average or median earnings rather than analysing the whole distribution of earnings. However, there is variability of earnings and it is important to take into account this risk component into modelling returns to education. Therefore, we analyse the full distributional impacts in terms of risk and returns of education on earnings. We use GAMLSS regressions to estimate different shapes of earnings distributions for our 45 education categories by modelling the first four moments of the earnings distribution (mean, variance, skewness and kurtosis) as functions of our education categories and a rich set of socio-demographic and ability controls. We find substantial differences in the shape of earnings distributions across our education categories. There is no single ranking of education categories like on the mean with OLS, hence risk preferences matter in choosing field of study. Thus, it is important to consider the full distributional impact and include the risk component when modelling returns to education. Our findings have practical implications for individuals, as higher education is a major financial decision, and a thorough understanding of the relationship between education and future earnings helps students to make informed decisions about their education. There are also applications in public policy from a fiscal policy perspective, such as public investment in education and student loan programs.

Day 2 Session 3

The changing nature of occupations and the returns to task intensities in the post-millennium
Francesco Roncone (University of Adelaide)

Abstract
This study provides a unified approach for the identification of recent changes in the importance of cognitive and manual tasks within occupations. My results show that only non-routine cognitive occupations experienced an increase in cognitive intensity from 2008 to 2017 while routine cognitive and routine manual occupations noticeably decreased in cognitive intensity. Moreover, all occupation groups show a decrease in manual intensity consistent with a general reduction in the importance of manual tasks due to task automation. Motivated by these findings, I disentangle the effects of occupational changes on the workforce. I find that young and middle-aged men who have at least a college degree are more often sorted into occupations that are disproportionately increasing in cognitive intensity. In contrast, women who hold at most a high-school degree experienced the largest decline in cognitive intensity in their job. Task changes within occupations are also systematically related to the wage structure in the U.S. labour market. Based on this relationship, I unveil two facts: (i) changes within occupations account for almost all of the recent increase in the return to cognitive tasks, and (ii) taking into account task changes is crucial for the understanding of heterogeneous wage changes between occupation groups.

Greedy jobs and the gender wage gap
Kristen Sobeck (Australian National University)

Abstract
Goldin (2014, 2021) argues that remaining gender pay gaps in the United States arise from greedy jobs within occupations. Individuals employed in greedy jobs are not easily substitutable. They work long hours and/or at potentially unpredictable times of the day that engender compensating differentials resulting in an earnings to hours elasticity that often exceeds one. This research replicates (Goldin, 2014) using Australian data and reaches similar conclusions. It shows that occupation explains a large share of the gender wage gap, the gap varies by occupation, and it tends to be highest in occupations where greedy jobs proliferate. It also identifies differences in occupational pay gaps observed in the two countries and discusses some of factors that underlie the divergence. In particular, differences in occupational classifications and the importance of collective bargaining in Australia, relative to the United States, both contribute to cross-country differences in pay gaps observed at the occupational level.

How do parents adjust their work hours when schools are closed?
Monica Wang*, Benedict Gordon & Nathan Deutscher (The Australian Treasury)

A key barrier to female labour force participation is unpaid work, particularly caring for children when they are not attending school. Using novel microdata, we show that school holidays and COVID-19 induced closures decrease hours worked for parents of school-aged children, the former having a much larger impact. School holidays decrease hours worked by 8.4 per cent. COVID-19 school closures decrease hours worked by an average of 0.9 per cent; a small effect that may in part reflect the context of these closures (e.g. essential workers exempted). In both cases, larger relative effects are found for mothers. Policies such as continued support for outside school hours care (through the Childcare Subsidy) can potentially ameliorate this hit to female labour force participation. International evidence suggests that more lasting effects of pandemic school closures may come through student learning outcomes. While there is limited Australian data available, 57 per cent of parents reported that school closures led to worse learning outcomes for their children.