Life Course Research Using Sequence Analysis:

Insights into the Youth Labour Market

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In this paper I explore the labour market fortunes of teenagers and young adults before and after the Global Financial Crisis (GFC). I examine the HILDA labour market activity calendar data using sequence analysis, an increasingly popular method for understanding the life course. I look at two cohorts of young people—a pre-GFC cohort and a post-GFC cohort—and use sequence analysis to understand their educational and labour market outcomes over the period from 2001 to 2016. Optimal matching of these sequences allows me to categorise these cohorts into three distinctive groups, whose analysis provides further insights.

I find that the youth labour market deteriorated during this period. Compared to the pre-GFC cohort, the post-GFC cohort were subject to greater levels of marginalisation in the labour market. Moreover, among those who did find employment, the quality of the jobs held by the post-GFC cohort was inferior to those held by the pre-GFC cohort. This applied to job security, hours of work and earnings. I conclude by suggesting that the weaker bargaining position of the workforce in the post-GFC period contributed to these outcomes.

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1 The Youth Labour Market

Introduction

There was a time when society valued the contributions young people made to the economy. Debate raged in Australia during the 1950s over proposals to raise the school leaving age. On the one hand, some commentators favoured raising the age in the hope that more young people might go on to higher education. Other commentators were concerned that this would leave the labour market without enough young workers: 'Will the advantage to the community of providing more education for these adolescents offset the economic consequences of their withdrawal from the labour market?'[1]

By the 1980s young people had become a liability to the economy. School retention rates soared and employers shed teenage labour in massive numbers. Indeed, one can regard the late 1970s and the 1980s as the era when the teenage full-time labour market collapsed. This was particularly so for teenage women: 30,000 full-time jobs disappeared during the 1970s, to be replaced by part-time jobs. During the late 1980s, 40,000 clerical jobs for teenage women disappeared. The only substantial growth in teenage employment was part-time casualised service sector jobs, such as cashiers and salesworkers.[2] In his overview of this period, Russell Ross observed that despite the addition of one million new jobs to the economy in the mid-1980s, full-time employment among teenagers fell in absolute terms.[3]

By the 1990s policy makers had rationalised this collapse: it was better that young people stayed longer at school. All the studies showed that a poor future lay in store for 'early school leavers'. A fifteen year old who might have walked into any job they liked in the 1950s, was now 'at risk' if they ventured outside the school walls. Best to wait until year 12, they were told, even though the academic curriculum of schools had barely altered to accommodate their interests or abilities. The overwhelming message to young people and their parents was that education was good, and more education—preferably university—was better. Indeed when ANOP surveyed young people about their further education plans in 1984, they found that 22 per cent were interested in TAFE and 19 per cent were interested in university. Yet by 1990 this enthusiasm for TAFE had halved to just 12 per cent, while 31 per cent now aspired to university.[4]

1. Don Spearritt 1958, *Some Activities of Australian Adolescents. Volume II: The Occupational Activities of Australian Adolescents*, Melbourne: Australian Council for Education Research, p. 98.
2. Ian Watson 1994, "Music While You Work': Teenage Women in the Australian Labour Market, 1947 to 1992', in: *Australian Journal of Social Issues* Vol. 29. No. 4, pp. 377–406; Richard Sweet 1988, 'The youth labour market: A twenty year perspective', in: *Youth Studies* Vol. 7. No. 3, pp. 31–36.
3. Russell Ross 1988, *Teenagers in the labour market: 1983-1988*, Discussion Paper 8, UNSW: Social Policy Research Centre.
4. Figures cited in Ian Watson 2015, *A Disappearing World: Studies in Class, Gender and Memory*, Melbourne: Australian

As the 21st century unfolded, young people remained locked out of full-time employment, and the barriers which faced teenagers now faced young adults. The same labour market pattern—the replacement of full-time jobs with casualised part-time jobs—had become the norm for young people. For several decades the combination of studying and working part-time had suited many teenagers at school or university, but as it kept extending higher in the age pyramid, warning bells began to ring. Research which showed a problem with large numbers of over-qualified workers suggested that the recipe of 'more education' might not be the solution to the problems of the labour market.[5] Maybe the problem lay in the labour market itself, not in the 'shortcomings' of young people. After all, all of the complaints about young people voiced by employers from the 1990s onward—and offered as excuses for not offering them full-time jobs—had been uttered regularly from the 1940s through to the 1960s, a period when young people occupied a secure niche in the labour market.

A new acronym always signals a new agenda. For some time now 'at risk' has been replaced by 'NEET'—neither in employment, education or training. Young people who fall into this category are indeed in peril: poverty and homelessness are real prospects for them. But an underlying current in this new acronym is that it's OK if young people find themselves in employment—no matter what the quality of that employment—or in education or training—no matter the suitability or usefulness. If they are NOT NEET, then they are safe. But this comfortable equation hides as much as it reveals: it says nothing about the transformation of the labour market into a more insecure world; it says nothing about the collapse of a high-quality technical training system; and it says nothing about the endemic problem of rendering schools more relevant to all the students.

In this paper I turn the spotlight onto the labour market and look more closely at the post-school transitions of teenagers and young adults. While much of the labour market story for young people has unfolded over decades, one can nevertheless pinpoint key moments—such as the recessions of the mid-1970s and early-1980s—when major upheavals took place. In this paper I look at another key moment—the Global Financial Crisis (GFC) in 2008—and examine some of its consequences for the youth labour market in Australia.


Scholarly Publishing, p. 24.

5. Research from the early 2000s showed 'close to 30 per cent of workers are overeducated and are underutilising their skills'. About 21 per cent of workers with a degree were working in jobs which did not require that level of education, while about 46 per cent of workers with a vocational qualification were in jobs not requiring that level of skill. Ingrid Linsley 2005, 'Causes of Overeducation in the Australian Labour Market', in: *Australian Journal of Labour Economics* Vol. 8. No. 2, pp. 121–143, p. 121. See also Kostas G. Mavromaras et al. 2007, *The Problem of Overskilling in Australia and Britain*, Discussion Paper No. 3136, IZA; Ian Watson 2008b, *Skills in use: labour market and workplace trends in skills use in Australia*, Report for NSW Department of Education and Training (Skills Ecosystem Project).

The GFC and the labour market

Was the GFC a watershed when it came to labour market changes? There seems to be some evidence that the labour market began to change in subtle ways during the 2000s, and that the GFC crystallised some of these changes. In particular, the changing role of part-time employment in employer adjustments to product demand became more pronounced. As is well known the long-term trend in Australia has been for the share of employment held by part-time workers to increase, rising from about 15% in the late 1970s to over 31% in recent times. Part of this has been attributed to the increasing participation of women in the labour market, and the increasing dominance of service sector jobs in the economy.

With increased part-time employment has come increased under-employment. The interaction between unemployment and underemployment across the business cycle demonstrates a particular pattern. This is evident in Figure 1: in the recovery following each recession (1982, 1991) the underemployment rate remained high even as the unemployment rate fell. By the early 2000s the underemployment rate surpassed the unemployment rate for the first time, and has remained at high levels ever since.

Figure 1: Unemployment and underemployment rates, Australia, 1978 to 2018
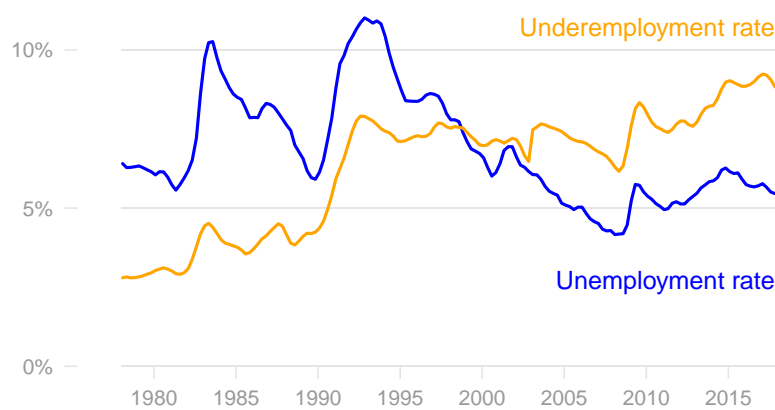
Source: Trend data from ABS *Labour Force Survey*, Cat. No. 6202.0 (6202001.xls and 6202022.xls).

In the early 2000s, as the unemployment rate fell, so too did the underemployment rate. However, in the period since the end of 2014, as the unemployment rate has begun to fall, the underemployment rate appears to be stuck at an elevated level, leading the ABS to comment about an 'increasing divergence between

the rates'.[6]

In general terms, employers adjust to fluctuations in the business cycle by varying hours: either reducing or increasing the hours of existing workers, or engaging and sacking part-time workers. In a severe downturn—such as the recessions of the early 1980s and 1990s—they also sacked large numbers of full-time workers. In the downturn of the early 2000s, and in the wake of the GFC, they again sacked full-time workers, but to a much lesser extent. As Jeff Borland observed, employers increasingly turned to using an 'hours adjustment to downturns' during the 2000s.[7]

For young people, the 21st century appears depressingly familiar. As Figure 2 shows, with every recession or severe downturn the employment rates of young people (those aged 15 to 24 year olds) fall sharply. In the case of young men, not only are these falls greater than for young women, but the recovery after each downturn is much weaker. Consequently, over the course of the last 40 years the employment rate for young men has fallen 10 percentage points, while that for young women has risen 5 percentage points.

However, what does appear distinctive about the 2000s is that both young men and women shared in the strong economic growth of the early 2000s—and both also shared in the steep downturn following the GFC. Both failed to gain any increase in employment from the economic stimulus, and only in the most recent period is there an indication that their employment fortunes may be improving. In summary, the years 2008–2009 appear to be a significant turning point, with this slide in the employment rate reversing a decade of increasing employment.

6. ABS, 'Spotlight on Underemployment', *Labour Force, Australia*, Nov 2016, Cat. No. 6202.0., page 11.

7. See 269–89 Jeff Borland 2012, 'Industrial Relations Reform: Chasing a Pot of Gold at the End of the Rainbow?', in: *The Australian Economic Review* Vol. 45. No. 3, pp. 269–89, pp. 275–76.

Figure 2: Employment to population ratios, 15 to 24 year olds, Australia 1978 to 2018
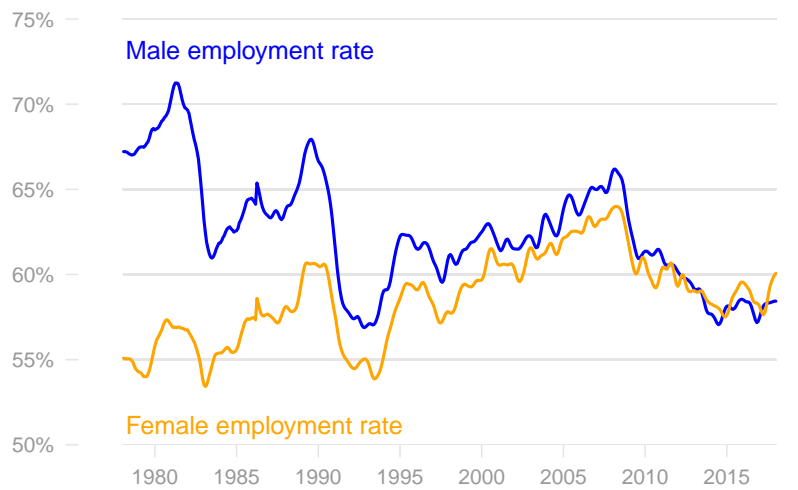
Figure 3: Full-time employment to population ratios, 15 to 24 year olds, Australia 1978 to 2018
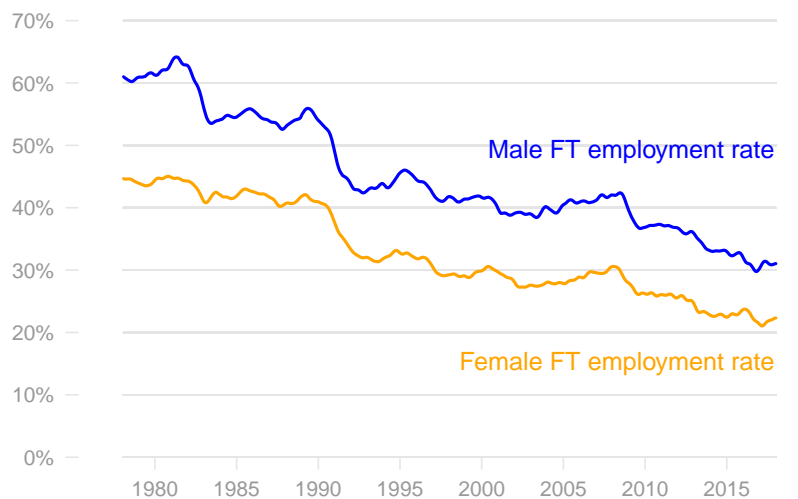
However, that earlier decade of growth was primarily due to the increased part-time employment of young people. When it came to full-time employment, the story was uniformly negative. As Figure 3 shows, over the last 40 years the full-time employment to population ratio for 15 to 24 year olds halved for both young men and young women: from 61% to 31% for males and from 45% to 22% for

females. This partly reflected steadily increasing school and higher-education participation and it partly reflected shrinking full-time employment opportunities in the youth labour market. However, unlike *total* employment, there was no rebound after a recession or severe downturn. Not only were the job losses steeper with each downturn, but any recovery was so muted that the following years saw their employment virtually plateau at the newly reduced level.

Again, the pre- and post-GFC periods seem to stand out for full-time employment. For both young men and women this plateau showed slight upward movement in the pre-GFC period, whereas in the post-GFC period the story was one of a relentless downward slide.

2 Sequence analysis

For many years most life course research drew on retrospective reporting: collecting information about past events or situations recalled by informants during interviews. In recent decades researchers have been blessed with numerous longitudinal datasets which are based on (mostly) contemporaneous reporting. In the case of Australia, a number of such datasets now exist, with the Household, Income and Labour Dynamics in Australia (HILDA) Survey pre-eminent.[8] I discuss HILDA in more detail below. In general, longitudinal datasets provide researchers with detailed information over many years on the annual 'states' or situations in which individuals find themselves. In some cases, this is supplemented with more frequent 'calendar' information, usually gathered retrospectively during the survey interview, but sometimes derived from diaries maintained by respondents.

The techniques available for life course analysis are numerous: event history analysis and the analysis of transitions between states are well known traditional approaches which seek to develop models oriented towards causality.[9] Researchers often aim to discover a model which generates the observable data, and because of the time dimension, allows them to discuss causality rather than just correlation. Sequence analysis is *not* part of this tradition, but its results can be incorporated into modelling, as a subsequent stage in the research. Much of the pioneering work on sequence analysis was conducted in the 1990s by Andrew Abbott and colleagues, and software advances in recent years have spurred further interest in the method. A recent collection of studies edited by Philippe Blanchard and colleagues illustrates the breadth of innovation currently underway in the field. The methodology has been applied to a diversity of themes but has been particularly fruitful in exploring work careers, school to work transitions, and patterns of family formation.[10]

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8. The survey was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). For an introduction to the approach behind the HILDA survey see Nicole Watson and Mark Wooden 2002, *The Household, Income and Labour Dynamics in Australia (HILDA) Survey: Wave 1 Survey Methodology*, HILDA Project Technical Paper Series No. 1/02, Melbourne Institute of Applied Economics and Social Research, University of Melbourne.

9. See, for example, Paul D. Allison 1984, *Event History Analysis: Regression for Longitudinal Event Data*, Newbury: Sage Publications. Analysis of survival data, and more recent approaches to competing risks and multistate modelling, are also part of this tradition of the causal modelling of longitudinal data. See, for example, Torben Martinussen and Thomas H. Scheike 2010, *Dynamic Regression Models for Survival Data*, New York: Springer; Jan Beyersmann et al. 2012, *Competing Risks and Multistate Models with R*, New York: Springer.

10. See Andrew Abbott and Alexandra Hrycak 1990, 'Measuring Resemblance in Sequence Data: An Optimal Matching Analysis of Musicians' Careers', in: *American Journal of Sociology* Vol. 96. No. 1, pp. 144–185; Andrew Abbott and Angela Tsay 2000, 'Sequence Analysis and Optimal Matching Methods in Sociology: Review and Prospect', in: *Sociological Methods and Research* Vol. 29. No. 1, pp. 3–33; Philippe Blanchard et al., (eds.) 2014, *Advances in Sequence Analysis: Theory, Method, Applications*, London: Springer; Duncan McVicar and Michael Anyadike-Danes 2002, 'Predicting Successful and Unsuccessful Transitions from School to Work by Using Sequence Methods', in: *Journal of the Royal Statistical Society. Series A (Statistics in Society)* Vol. 165. No. 2, pp. 317–334; Arnstein Aassve et al. 2007, 'Strings of Adulthood: A Sequence Analysis of Young British Women's Work-Family Trajectories', in: *European Journal of Population* Vol. 23. No. 3/4, pp. 369–388; Christian Brzinsky-Fay and Heike Solga 2016, 'Compressed, postponed, or disadvantaged? School-to-work transition patterns and early occupational attainment in West Germany', in: *Research in Social Stratification and*

In essence, sequence analysis looks for patterns in the mutually exclusive states which individuals pass through (for example: education / job / unemployed / not in the labour force) and when accumulated over the a sufficiently large number of observations appear quite distinctive. These states are assigned an 'alphabet', for example, EJUN, and the longitudinal calendar data is then recast into such sequences, for example: EEEJJUNNJUJ. When related to young people, such states might represent school-to-work, or school-to-further-education, transitions.

While each sequence may often be unique, it is possible to move beyond individual patterns—the specific life-course 'biographies' of individuals— and explore sociological and economic questions about the functioning of the youth labour market. This can be done by transforming the sequences in such a way that *groups of individuals* can be matched according to their 'similarity'. One common method—optimal matching—uses substitution, insertion and deletion of particular states in the sequence to make these transformations. Such operations entail a penalty, that is a cost, which can be counted to provide a single numeric measure of similarity (or dissimilarity) called a 'distance'. To transform EEJJUNNN into EEJJJJJU, for example, might entail a higher cost than transforming the same sequence into EEJJUUNN, thus giving the latter comparison a lower distance score than the former. In other words, the third sequence is closer to the first than the second, and thus the third individual has a greater 'similarity' to the first when it comes it comes to their life course.

Various clustering techniques can then be applied to this distance measure and these allow the researcher to construct discrete categories of individuals based on their similarity. Such categories lend themselves to further analysis, through descriptive statistics and regression modelling, and thereby allow researchers to link these groups of individuals to their personal and social characteristics, as well as to the wider historical and economic context. For those researchers interested in the former, these linkages may point backwards towards 'origins' at the start of the period of study, that is, to characteristics such as gender, ethnicity, family and parental background, or the family's socio-economic setting. In the case of the latter—the historical and economic context—the linkages may point forward to the labour market 'destinations' of these individuals. In this case, the focus is on the kinds of jobs or other labour market states in which these individuals find themselves at the end of the period of study. Whereas the former approach is more inclined towards a classic 'labour supply' perspective, the latter is more suited to studying the historical evolution of the labour market itself. In this paper, my approach is firmly within this second tradition,

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although I do make use of an 'origins' analysis at a particular stage in evaluating the validity of my findings. Labour supply approaches are vulnerable to naïve forms of methodological individualism—such as explaining labour market outcomes by recourse to the characteristics of individuals—whereas a focus on the types of jobs held or patterns of unemployment is consistent with regarding the labour market as a *structure of locations*, a perspective which is sociologically more convincing.[11]

One of the most controversial aspects of sequence analysis is the choice of the substitution-costs matrix which is used in the transformation process. Some researchers use fixed measures, others use transition probabilities between states. Despite the lack of a definitive approach, research suggests that the choice does not exert substantive influence on the results.[12] Of more consequence is the conceptualisation of the sequences. The distance measure might have good reliability, but what about its validity? In other words, how do these distances map into 'sociologically meaningful intuitions of similarity, particularly when time is continuous'.[13] Most of the recent developments in the field explore these kind of conceptual issues and this has given rise to interesting innovations in methodology, such as incorporating network analysis and introducing different distance algorithms, such as 'time-warping'.[14]

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11. For more on this structural perspective on the labour market see James K. Galbraith 1998, *Created Unequal: The Crisis in American Pay*, Chicago: University of Chicago Press; Ian Watson 2013, 'Bridges or traps? Casualisation and labour market transitions in Australia', in: *Journal of Industrial Relations* Vol. 55. No. 1, pp. 6–37. For more on the methodological individualism which underpins the neo-classical quest to find micro-foundations for macro-economic outcomes, see Steve Keen 2001, *Debunking Economics—Revised and Expanded Edition: The Naked Emperor Dethroned?*, London: Zed Books.

12. Laurent Lesnard 2014, 'Using Optimal Matching Analysis in Sociology: Cost Setting and Sociology of Time', in: *Advances in Sequence Analysis: Theory, Method, Applications*, ed. by Philippe Blanchard et al., London: Springer, p. 40.

13. Brendan Halpin 2014, 'Three Narratives of Sequence Analysis', in: *Advances in Sequence Analysis: Theory, Method, Applications*, ed. by Philippe Blanchard et al., London: Springer, p. 75.

14. See Ivano Bison 2014, 'Sequence as Network: An Attempt to Apply Network Analysis to Sequence Analysis', in: *Advances in Sequence Analysis: Theory, Method, Applications*, ed. by Philippe Blanchard et al., London: Springer and Halpin 2014. Time warping involves stretching and shrinking sequences in the process of substitution, reflecting the expansion and compression of time which is how people often experience different stages in their lives. In other words, time is not uniform across one's lifespan but can slow down and speed up at different stages.

3 Data and method

The HILDA labour market activity calendar

The HILDA survey provides one of the best longitudinal datasets in Australia and provides researchers with an extensive range of data items relevant to the labour market. Conducted annually since 2001, it is based on a survey of Australian households carefully sampled to be representative of the Australian population. The survey collects information on the households, and on the individuals living in those households. As with any longitudinal survey, the representativeness of the sample declines as changes in the composition of the broader population may not be reflected in the sample. Over time, the main differences between the HILDA sample and the broader population have related to recent migrants. The survey designers 'refreshed' the sample in 2011 to address divergences like this.[15]

From a labour market perspective, the HILDA survey collects an annual contemporary 'snapshot' of the education/labour market states (referred to as 'states' for convenience) in which respondents are located. In addition, the survey also collects some retrospective data. Some of these are about states in the interval between annual snapshots, such as previous jobs for those who changed jobs or became unemployed. While this retrospective data is valuable, the information about jobs is not as rich as the annual data. There is no earnings information, for example.

The other retrospective information provided in HILDA is collected from a labour market activity calendar: a basic listing of the states in which respondents were located at one third of each month during the year. With 16 years of data this means one can (potentially) examine the 576 states which a respondent has passed through. When multiplied across many thousands of individuals, the data management aspects of analysing calendar data can be formidable. Fortunately, modern software eases this burden and the time delays in processing what can be millions of data records are not onerous.

The annual data snapshot can be used productively with sequence analysis, for example, interspersing these annual states with states recalled since the previous interview, or with key life events which have taken place in the past year (such as marriage, birth of a child, loss of a job, retirement). However, I would argue that the most fruitful insights into the operations of the labour market come from utilising the detailed calendar data, despite its challenges. As well as the data management task, another issue involves the treatment of the 'seams',

15. For more on issues related to the longitudinal sample design in HILDA see Nicole Watson 2012, *Longtitudinal and Cross-sectional Weighting Methodology for the HILDA Survey*, HILDA Project Technical Paper Series 2/12, University of Melbourne: Melbourne Institute of Applied Economic and Social Research.

the windows where the data from two adjacent surveys overlap and provide inconsistent information about what that individual was doing during that 'spell'. Within the HILDA literature the issue of overlapping seams has been raised, but the usage of the calendar data has been quite limited, and thus there are no well-established conventions as to how to resolve some of the seam issues.[16] For the purposes of this analysis, several approaches were tested, and the state distribution plots provided by sequence analysis proved very useful in this testing. The approach which produced the least number of anomalies over the year (in terms of artificial 'spikes') was, not surprisingly, one in which the most recently recalled information was prioritised over the least recent.[17]

Methodology

The calendar data covering 16 waves of the HILDA survey were converted to sequences suitable for sequence analysis using the TraMineR package in R. The subsequent analysis was also conducted using a combination of TraMineR and the cluster package.[18]

The key research question was: did the labour market fortunes of school leavers differ in notable ways between the period before the GFC and the period afterwards. To explore this I created two cohorts: one group made up of 16 year olds in 2001/2002 and another group of 16 year olds in 2008/2009. This provided samples of 385 and 400 young people in each cohort and each were followed for 7.5 years.[19] Eight mutually exclusive categories for describing states were con-

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16. Studies which have made use of the calendar data include Nick Carroll 2006, 'Explaining Unemployment Duration in Australia', in: *Economic Record* Vol. 82. No. 258, pp. 298–314; A. M. Dockery 2004, 'Looking Inside the Unemployment Spell', in: *Australian Journal of Labour Economics* Vol. 7. No. 2, pp. 175–198; Ian Watson 2008a, 'Low Paid Jobs and Unemployment: Labour Market Transitions and Churning in the Australian Labour Market, 2001 to 2006', in: *Australian Journal of Labour Economics* Vol. 11. No. 1, pp. 71–96. A comprehensive study of the seam effects in HILDA has been undertaken by Nicole Watson, see Nicole Watson 2009, *Disentangling Overlapping Seams: The experience of the HILDA Suvey*, Conference Paper, University of Melbourne: Melbourne Institute of Applied Economic and Social Rearch, URL: http://melbourneinstitute.unimelb.edu.au/assets/documents/hilda-bibliography/conference-papers-lectures/2009/Watson_Challenges_Insights_IMS09.pdf.

17. In other words, where there were discrepancies for particular weeks over the calendar period (which averaged between 14 and 18 months), those weeks closest to the interview date were accepted ahead of those weeks furthest away. While this does not eliminate all the potential sources of recall error, it does minimise some of the memory and telescoping problems outlined by Nicole Watson which attach to retrospective reporting (ibid., pp. 2–3). In her modelling of the sources of misclassification error in the HILDA calendar data, Nicole Watson found that for young people the most likely mistakes related to spells not in the labour force (ibid., p. 18). For researchers using *Stata*, a new command by Hannes Kröger can facilitate the management of seams. See Hannes Kröger 2015, 'newspell: Easy management of complex spell data', in: *The Stata Journal* Vol. 15. No. 1, pp. 155–172.

18. For R, see R Core Team 2017, *R: A Language and Environment for Statistical Computing*, R Foundation for Statistical Computing, Vienna, Austria, URL: https://www.R-project.org/. For TraMineR see Alexis Gabadinho et al. 2011, 'Analyzing and Visualizing State Sequences in R with TraMineR', in: *Journal of Statistical Software* Vol. 40. No. 4, R package version 2.0-8, pp. 1–37, DOI: 10.18637/jss.v040.i04 and Alexis Gabadinho et al. 2010, *Mining sequence data in R with the TraMineR package: A user's guide*, University of Geneva: URL: http://mephisto.unige.ch/traminer. For cluster Martin Maechler et al. 2017, *cluster: Cluster Analysis Basics and Extensions*, R package version 2.0.6. A similar (but less comprehensive) package for *Stata* is also available. See Ulrich Kohler et al. 2006, 'Sequence Analysis with Stata', in: *Stata Journal* Vol. 6. No. 4, pp. 435–460.

19. A two year period was chosen to maximise sample size and to take account of young people turning 16 at different times during the year. This meant potentially 270 observations on each individual, though some individuals had fewer observations. The decision rule for inclusion in the scope of the analysis was to select individuals who were present for

structed on the basis of the calendar entries for each third of one month. The states (and their 'alphabets') were as follows:

1. Job: jb
2. More than one job: jbs
3. Full-time education: eft
4. Job and full-time education: eftjb
5. Job and part-time education: eptjb
6. Unemployed: une
7. Not in the labour force: nlf
8. Missing: *

Once the sequences were constructed an optimum matching procedure was employed to create a distance matrix. This was in turn analysed using cluster analysis to derive three groups within each cohort. The groups were initially described on the basis of their state characteristics with regard to work and education, as these emerged from the state distribution plots. This categorisation took place before any further exploration of their other characteristics, and was thus an entirely inductive procedure. These three groups were described as follows:

1. Working: where the state distribution plots showed a dominance of work;
2. Mixed: where the state distribution plots showed a mix between work and education, as well as work and education combinations;
3. Education: where the state distribution plots showed a dominance of full-time education (and within that, a dominance of a job alongside full-time education).

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at least 5 waves of an 8 wave period. Unlike some statistical procedures which discard missing data, sequence analysis can incorporate missing periods in a sequence. These missing periods may be due to non-response for the data items or non-response to the survey. In the case of the latter, absence from the survey and re-entry can in itself be informative.

4 Findings

The two cohorts are compared in Figure 4 and Table 1. The visual impression is
that the main differences lie in greater levels of unemployment and time outside
the labour market for the post-GFC cohort. This is confirmed in the duration
averages (Table 1), which show that the duration of unemployment was about
two thirds greater for the post-GFC cohort. The time spent outside the labour
market was also greater by about one third. This table also highlights a differ-
ence in the mix between education and work: full-time education by itself was
nearly one quarter lower, while part-time education and holding a job were also
about one fifth lower. These were slightly offset by higher percentages in full-
time education and in holding multiple jobs.
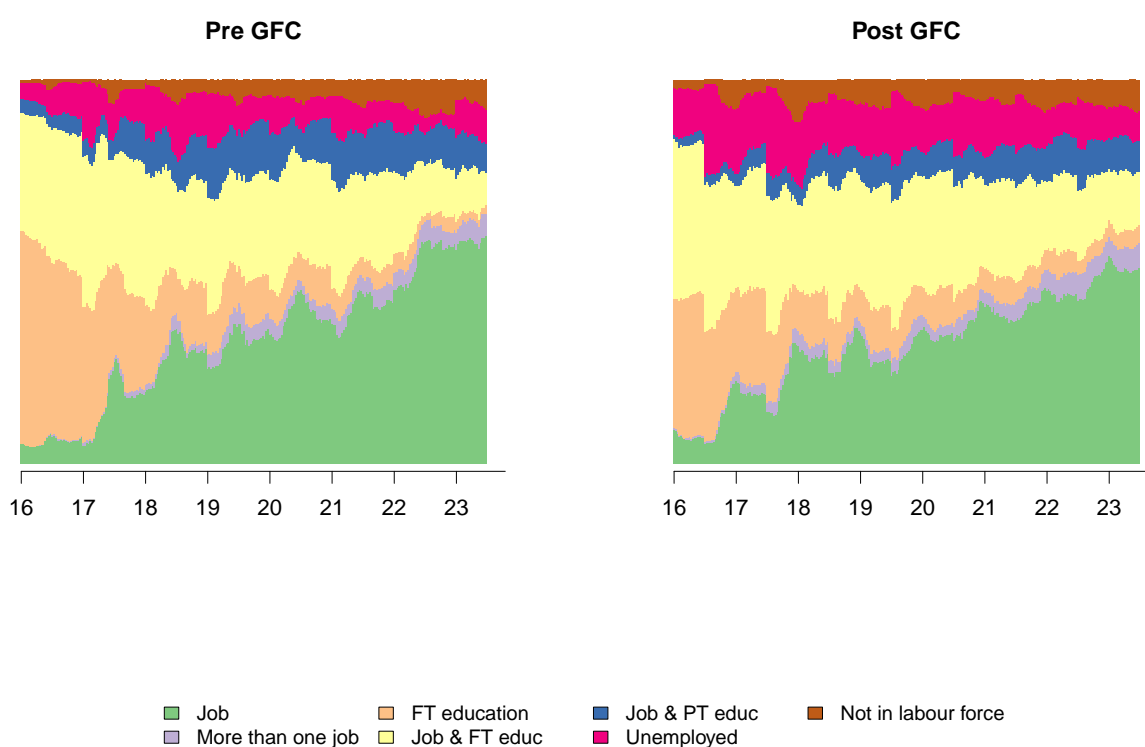
Figure 4: State distribution before and after the GFC

**Table 1: Average cumulative duration of time in various states,
pre GFC and post GFC (months)**

Period	jb	jbs	eft	eftjb	eptjb	une	nlf
Pre GFC	25.5	2.3	14.0	21.5	7.5	6.7	3.4
Post GFC	25.9	2.9	10.7	23.4	5.9	11.1	4.6
Difference (months)	0.5	0.5	-3.3	2.0	-1.6	4.4	1.2
Difference (percentage)	1.8	23.2	-23.3	9.1	-21.4	65.3	34.5

Notes: jb = Job, jbs = More than one job, eft = FT education, eftjb = FT education and job, eptjb = PT education and
job, une = Unemployed, nlf = Not in labour force
Source: HILDA Release 16.

Labour market marginalisation

The state distribution graphs also illustrate that the pattern of vulnerability is different between the two periods. For the pre-GFC cohort the most vulnerable ages for unemployment were between 17 and 19, and from 20 onward the proportion of time spent unemployed declined. By contrast, for the post-GFC cohort this early vulnerability extended for a longer period, and only eased slightly from about age 22 onward. What is more, the vulnerability for the youngest age group of 16 was greater in the post-GFC cohort. This latter finding no doubt reflects the poor labour market conditions at the start of this cohort's period of observation, that is, 2008 to 2009.[20]

If we now turn to the three groups identified by the cluster analysis—*working*, *mixed* and *education*—the differences are notable. These are shown in Figures 5 and 6 and the differences in duration are shown in Figure 7. Looking first at distribution patterns it is clear that the major differences concerned both working and mixed groups, with minimal differences evident among those in the education group. For those in the working group, greater levels of unemployment were evident in the post-GFC cohort, particularly in the 16½ to 18½ year old range (by aged 23, both groups were similar). The most notable differences are in the comparisons between pre-GFC and post-GFC cohorts who were in the mixed category. The much lower amounts of job activity, and the much greater levels of unemployment, are both striking features of this comparison. What is more, this vulnerability to unemployment extends from age 16 onward, with very little moderation over the next eight years. The vulnerability to being outside the labour market is also evident much earlier, increasing from 18 years onward.

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20. Note that these graphs are labelled with the age range from 16 to 23, but the actual data is organised around calendar dates. This means that the actual ages of young people will vary across each year, according to an individual's own date of birth. The labelling is for convenience in drawing comparisons between the two time periods.

Figure 5: State distribution for pre-GFC cohort

Working

Mixed

Education

- Job
- More than one job
- FT education
- Job & FT educ
- Job & PT educ
- Unemployed
- Not in labour force
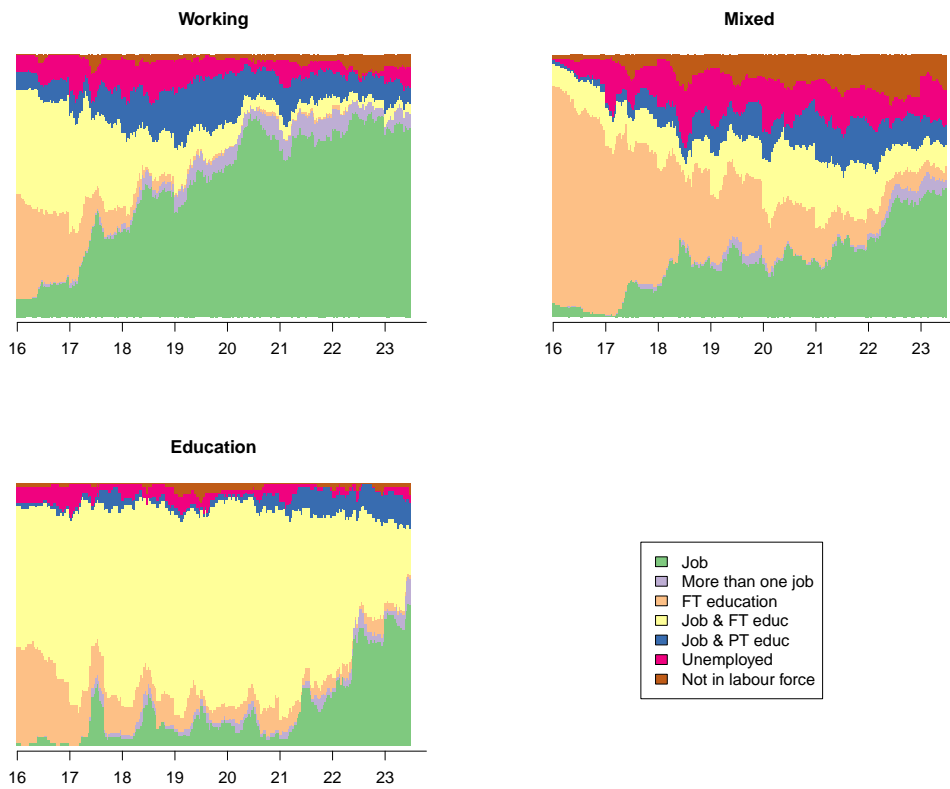
Figure 6: State distribution for post-GFC cohort

Working

Mixed

Education

- Job
- More than one job
- FT education
- Job & FT educ
- Job & PT educ
- Unemployed
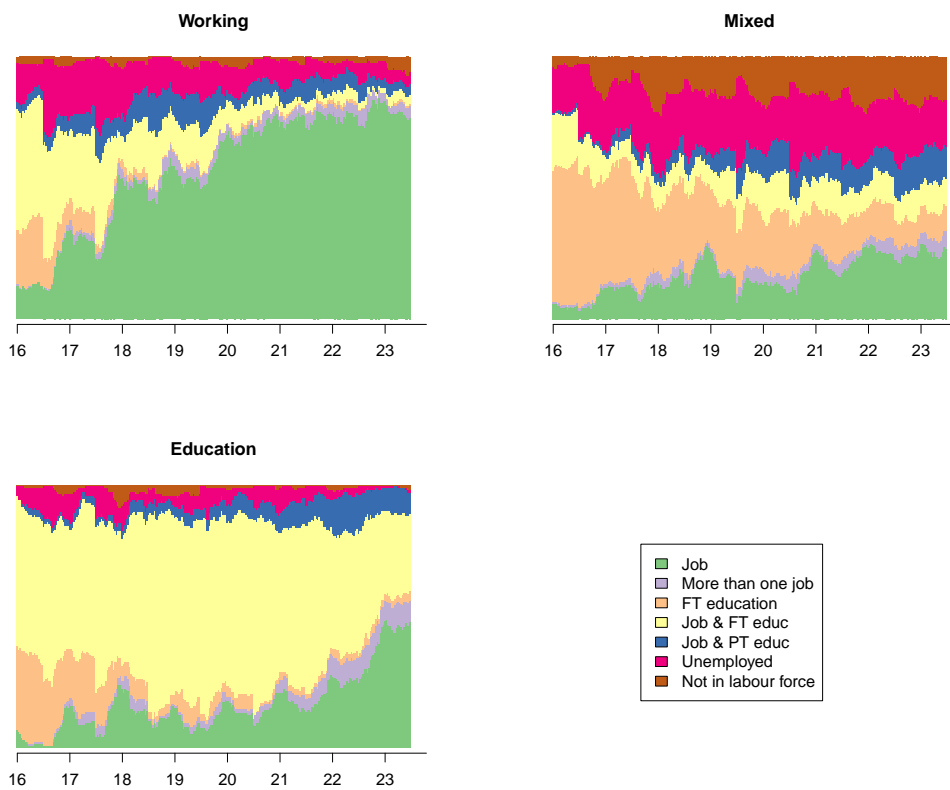- Not in labour force

Figure 7: Average duration of time in various states, pre and post GFC, by group

Turning now to the cumulative duration of time spent in these states, there were minimal differences between pre-GFC and post-GRC cohorts for the working and education groups, but it was a very different story with the mixed category. The average duration in unemployment among the post-GFC cohort was twice that of the pre-GFC cohort (18 months compared to 9 months), and their time outside the labour market was also much greater (11 months compared to 6 months). Meanwhile, their duration in full-time education and jobs, or in combinations of education with jobs, was lower. Holding multiple jobs was also greater among the post-GFC cohort, but this duration was of a very small magnitude. The results for this group are summarised in Table 2.

Table 2: Average cumulative duration of time in various states, pre GFC and post GFC, mixed group (months)

Period	jb	jbs	eft	eftjb	eptjb	une	nlf
Pre GFC	16.1	1.3	25.4	11.0	6.8	9.1	6.3
Post GFC	13.7	2.7	21.8	9.4	6.2	18.1	11.0
Difference (months)	-2.4	1.4	-3.6	-1.6	-0.6	9.0	4.7
Difference (percentage)	-14.9	107.7	-14.2	-14.5	-8.8	98.9	74.6

Notes: jb = Job, jbs = More than one job, eft = FT education, eftjb = FT education and job, eptjb = PT education and job, une = Unemployed, nlf = Not in labour force
Source: HILDA Release 16.

Quality of employment

What about those young people who found themselves in employment? Were there differences between the post-GFC cohort compared to the pre-GFC cohort? Three useful measures of job quality are the forms of employment (permanent or casual), the hours worked, and the earnings. On all three measures, the post-GFC cohort fared much worse than the pre-GFC cohort. These results are summarised in Table 3, 4, 5 and 6.

Looking first at forms of employment and full-time / part-time status, Table 3 shows that the post-GFC cohort fared considerably worse than the pre-GFC cohort when it came to permanent full-time employment: 37% compared to 53%. While this was something common to all three groups, the mixed group showed the greatest difference: 31% to 47%. At the other end of the spectrum, the differences in casual part-time employment were also notable. Among the post-GFC cohort the overall level was much higher, at 31%, compared to 16% among the pre-GFC cohort. Again, the mixed groups showed the greatest differences: 36% compared to just 22%.

Table 3: Forms of employment and hours worked, pre GFC and post GFC, by groups (%)

Category	Pre GFC				Post GFC			
	Work	Mixed	Educ	Total	Work	Mixed	Educ	Total
Perm FT	60	47	51	53	45	31	33	37
Perm PT	11	4	12	9	9	9	14	11
Casual FT	22	26	14	21	21	24	19	21
Casual PT	7	22	23	16	24	36	35	31
Total	100	100	100	100	100	100	100	100
n	231	161	130	522	206	118	208	532

Notes: Casual includes fixed-term contracts. *Source*: HILDA Release 16. Data weighted.

Casual employment means more insecure work: not only does it represent no clear career pathway, but it also means intermittent employment. This is compounded by the amount of work available. This can be assessed more precisely by looking at a finer distribution of hours worked. Table 4 shows this distribution of hours for each group within each cohort. Again, the differences between the post-GFC and pre-GFC cohorts are striking, particularly in the category of shortest hours worked. For the post-GFC cohort some 17% worked for less than 16 hours per week, compared with 9% in the pre-GFC cohort. Both the mixed and education groups had the greatest differences between these cohorts. In the case of the former the contrast between post-GFC and pre-GFC was 16% to 11%, while for the latter the contrast was 29% to 15%.

Table 4: Distribution of hours worked, pre GFC and post GFC, by groups (%)

Hours	Pre GFC				Post GFC			
	Work	Mixed	Educ	Total	Work	Mixed	Educ	Total
1 to 15	5	11	15	9	5	16	29	17
16 to 24	4	10	7	7	4	11	12	9
25 to 34	10	7	13	10	23	16	7	15
35 to 40	49	47	38	46	49	40	38	42
41 to 49	20	15	16	17	11	7	6	8
50 or more	13	11	10	11	8	10	7	8
Total	100	100	100	100	100	100	100	100
n	243	174	133	550	225	125	213	563

Notes: Weekly hours worked in main job.
Source: HILDA Release 16. Data weighted.

This hours profile suggests that underemployment—where workers want more hours of work than employers are offering—may also be a point of difference between the two cohorts. Table 5 does indeed show such a difference. Some 27% of the post-GFC cohort were underemployed, compared with 21% of the pre-GFC cohort. Again, the mixed group showed the strongest differences: 33% of the post-GFC cohort were underemployed compared with 21% of the pre-GFC cohort.

Table 5: Underemployment: pre GFC and post GFC, by groups (%)

Hours	Pre GFC				Post GFC			
	Work	Mixed	Educ	Total	Work	Mixed	Educ	Total
Underemployed	26	21	14	21	23	33	27	27
Not underemployed	74	79	86	79	77	67	73	73
Total	100	100	100	100	100	100	100	100
n	243	174	133	550	225	125	214	564

Notes: Percentage of employees wanting more hours of work.
Source: HILDA Release 16. Data weighted.

Turning to employee earnings the differences between the two periods are again notable. Because earnings growth for all workers has slowed in recent years, the most useful measure for comparison is a relative one: what each cohort was earning relative to the median for all workers in the relevant time period. Because the employed young adults in each cohort were aged about 24 during this time period, one would expect them to be earning less than the all-worker average, so our interest lies in the differences in relativities. As Table 6 shows the earnings ratios for all three groups in the post-GFC cohort were lower than for those in the pre-GFC cohort.

Table 6: Hourly earnings, pre GFC and post GFC by group, (% ratio)

Group	Pre GFC	Post GFC
Working	86.6	77.3
Mixed	85.3	79.3
Education	87.7	81.1

Notes: Ratio is for each cohort's median earnings to median earnings for all employees in the last two years of each period.
Source: HILDA Release 16. Data weighted.

Validity of comparisons

To summarise the story, all the various measures discussed in the last two sections point in the same direction. Those young people entering the labour market in the post-GFC period fared much worse than those young people who entered in the pre-GFC period. However, is this a genuine period effect? With any analysis like this there are always three effects occurring simultaneously: period effects (historical events), ageing effects (life cycle) and cohort effects (generational aspects).[21] The ageing effect is ruled out, because each group has been matched on this measure (both are in the 16 to 24 year age range). But this leaves the cohort effect entangled with the period effect. In other words, perhaps there is something about the pre-GFC generation which is quite different to the post-GFC generation that makes them more likely to have fared better in the school-to-work transition than their later peers? To test this supposition, a broad range of personal and family characteristics were examined to see if the pre-GFC cohort differed significantly from the post-GFC cohort.[22] Various SEIFA measures of relative socio-economic advantage and disadvantage showed no differences; neither cohort differed on their Indigenous heritage; whether English was the first language at home showed no difference; the household composition and the parents' marriage situation showed no differences; the father's employment history showed no differences; the school sector attended by each cohort showed no difference.

In three areas there were significant differences: the pre-GFC cohort was less highly educated than the post-GFC cohort and the pre-GFC group had a higher proportion of non-English speaking migrants among them. On the other hand, the pre-GFC group had a greater proportion of parents working as managers and professionals. These differences were small in magnitude and work in opposing directions: the former suggests worse labour market outcomes for the

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21. See, for example, Norval D. Glenn 1976, 'Cohort Analysts' Futile Quest: Statistical Attempts to Separate Age, Period and Cohort Effects', in: *American Sociological Review* Vol. 41. No. 5, pp. 900–904; Norval D. Glenn 1977, *Cohort Analysis*, Newbury Park: Sage; Mason, Karen Oppenheim et al. 1973, 'Some Methodological Issues in Cohort Analysis of Archival Data', in: *American Sociological Review* Vol. 38. No. 2, pp. 242–258.
22. Differences were based on chi-square test of independence.

pre-GFC cohort, the latter suggests better labour market outcomes. This suggests that these cohort differences have probably cancelled each other out. Further evidence for this conclusion is the fact that a multi-level logistic regression applied to the pooled data shows that none of the variables which distinguish the two cohorts has a significant effect on employment outcomes. It seems reasonable to conclude that cohort effects were unlikely to play a significant part in the labour market differences examined in this paper.

5 Conclusion

The analysis in this paper suggests that period effects are the most likely driving force for the differences between the cohorts? The GFC seems to signal a labour market watershed, but what exactly were the changes during this period which might explain the deteriorating labour market fortunes of young adults? The opening discussion in this paper suggested that employer strategies to manage fluctuations in their product demand—using 'hours adjustments'—might be one mechanism. While Australia did not fall into a technical recession during the GFC, the dramatic drop in GDP growth in the wake of the financial crisis did constitute a major economic downturn. Consequently, the post-GFC period may have seen an extension in the use of casual jobs and underemployment, exacerbating long-term trends. The post-GFC period has also seen the rapid growth in the 'gig economy', in which various forms of casual jobs (often in the guise of self-employed contracting) and underemployment have become more widespread, particularly among younger workers.

**Figure 8: Trade union membership, Australia 1992 to 2013
(percentages and indexed)**
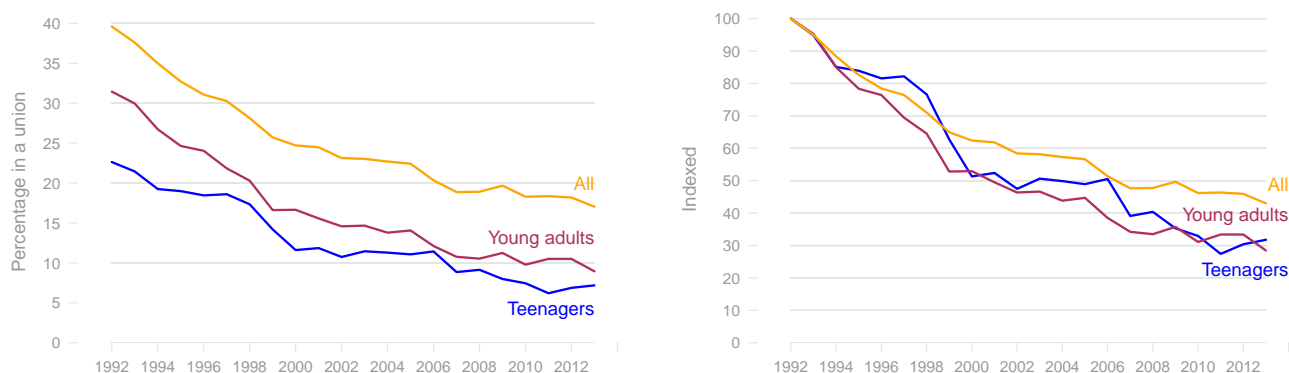
Source: ABS, *Employee Earnings, Benefits and Trade Union Membership, Australia*, Cat. No. 6310.0

The post-GFC period has also seen the further weakening of the trade union movement. Trade union membership has been in long-term decline for several decades: the percentage of the workforce in a union has more than halved since the early 1990s. Among young workers, the fall has been much greater: a 68% fall for teenagers and a 72% fall for young adults (see Figure 8). These declines are evident in this HILDA sample. As Table 7 shows, the post-GFC cohort had barely half the level of union membership of the pre-GFC cohort. While the union density of the mixed groups did not differ, they were dramatically different among the working and education groups.

Table 7: Trade union membership, pre GFC and post GFC, by groups (%)

	Pre GFC				Post GFC			
Category	Work	Mixed	Educ	Total	Work	Mixed	Educ	Total
Belonged to a union	18	11	18	16	10	11	8	9
Did not belong	82	89	82	84	90	89	92	91
Total	100	100	100	100	100	100	100	100
n	242	174	133	549	225	125	215	565

Notes: Based on variable which measures membership of a trade union or employee association. *Source*: HILDA Release 16. Data weighted.

The steady decline in union membership is also consistent with the earnings differences between the pre-GFC and post-GFC cohorts. As we saw earlier, not only did the latter have access to fewer hours of work, but they also faced lower hourly rates of pay. Both of these are symptomatic of weaker bargaining positions. While young workers are generally less powerful in such situations than their older peers, the comparison here is with another group of workers of the same age and at the same stages in their working lives. This suggests that life-cycle effects were not relevant, again leaving us to focus on the extent to which the post-GFC period was one where workers have been unable to stem the tide of labour market adversity. The stagnation in wages growth over the last few years for all workers—something that has even troubled members of the establishment like the Reserve Bank governor—is consistent with this picture of workers' weak bargaining power.

Do any policy implications follow from this analysis? The proverbial advice for young people to stay in education longer seems hollow. While it certainly helps a particular individual to move up the pecking order, it does not solve these labour market problems for young people *as a whole*. The labour market turned against young people decades ago, and the tide continues to run against them. Moreover, the finding that the post-GFC cohort was better educated than the pre-GFC cohort—and yet endured worse labour market and job outcomes— is also a sobering rejoinder to the proverbial advice. The most useful advice

to offer young people in the post-GFC world of work is to join a union, avoid working for franchisees, and steer clear of the gig economy as long as possible.

The answer to a failing labour market lies in macro-economic interventions, such as fiscal expansion by the Commonwealth Government. In the immediate wake of the GFC, the Labor Government acted decisively with its fiscal stimulus package.[23] Looking at various labour market indicators in the time series data one can discern a notable improvement in the period 2009 to 2011. However, that stimulus was too modest, and was not sustained—terminated in the panic to return to the goal of a fiscal surplus—and the same labour market indicators began to deteriorate in the period after 2011. It is clear that a generalised fiscal expansion is needed to return to full-employment. The sustained weakness in economic growth over the last five years has made that strategy inevitable. The national accounts data for that period show that government spending (mainly state government infrastructure), household consumption (heavily funded by private debt) and intermittent dwelling construction have provided the main engines of growth in the Australian economy.[24]

Will such an expansion benefit young workers? The risk remains that a generalised rebound in labour demand may not resuscitate the youth labour market, and is unlikely to improve the prospects for marginalised young adults, such as those young people in the *mixed* group discussed in this paper. The concept of a 'Youth Job Guarantee'—whereby every young person at a particular age is guaranteed full-time employment at the minimum wage—is probably the only strategy likely to reverse the damage which 30 years of neglect has inflicted on the youth labour market.[25]

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23. The unemployment rate in Australia rose dramatically during 2008–2009 with the onset of the GFC: from 4.1% in 2008 to 5.8% by 2009. The fiscal stimulus helped arrest, and then reverse, this rise in the unemployment rate. The mining industry's attempt to claim credit for this were disputed strongly by the Commonwealth Treasury Secretary, Ken Henry. See Ken Henry 2010, 'Evidence before Senate Economics Legislation Committee, Estimates', in: *Hansard* Vol. 27 May 2010, E17. See also Jeff Borland 2011, 'The Australian Labour Market in the 2000s: The Quiet Decade', in: *The Australian Economy in the 2000s*, ed. by Hugo Gerard and Jonathan Kearns, Proceedings of a Conference, 15–16 August 2011, Sydney: Reserve Bank of Australia.

24. See contributions to GDP growth in ABS, *Australian National Accounts: National Income, Expenditure and Product*, Cat. No. 5206.0

25. For more on the importance of the concept of a job guarantee as an effective measure to simultaneously ensure full-employment and low inflation, see William Mitchell 1998, 'The buffer stock employment model and the NAIRU: the path to full employment', in: *Journal of Economic Issues* Vol. 32. No. 2; William F. Mitchell and Joan Muysken 2008, *Full employment abandoned: shifting sands and policy failures*, Aldershot: Edward Elgar; and Beth Cook et al. 2008, *Creating effective local labour markets: a new framework for regional employment policy*, University of Newcastle, Australia: Centre of Full Employmentloyment and Equity. At various times the concept has been known by other names (such as the government being the 'employer of last resort'), but it derives its coherence from using *employment* as a buffer stock to maintain price stability. This contrasts with neo-liberal approaches, such as the NAIRU (the so-called 'natural rate of unemployment'), which use *unemployment* as the buffer stock. In terms of social welfare outcomes, the differences between each approach are obvious.

Acknowledgements

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