From: Dominic Macken [mailto:djmacken@macken.com.au]
Sent: Thursday, 5 November 2015 11:18 AM
To: AMOD; Chambers - Ross J
Cc: 'Katrina Seck'; 'Nick Tindley'; 'Luis Izzo'; 'Leanne Cruden'; 'Alexandra Terrill'
Subject: Modern Awards Review - Penalty Rates - AM2014/305 - Response by SDA Expert Witness Serena Yu to Reply Report of Lynne Pezzullo

Dear AMOD (and Practitioners),

We refer to the above matter and enclose the response of Serena Yu to the Further Report of Lynne Pezzullo dated 2 November 2015 commissioned on behalf of the clients of FCB Lawyers which was prepared by Ms Pezzullo in response to the expert report of Ms Yu dated 1 September 2015 entitled "Evaluating the impact of Sunday Penalty Rates in the NSW Retail Industry".

The leave of the Commission will be sought to tender the enclosed document on the occasion of Ms Yu giving evidence tomorrow.

Yours sincerely,

A J MACKEN & CO.

AM2014/305 Four yearly review of Modern Awards – Penalty Rates (the Review)

5 November, 2015

I, Serena Yu, hereby respond to Ms. Lynne Pezzullo's document dated 2 November, 2015 (**the Pezzullo Critique**). Ms. Pezzullo has prepared her document in response to my report, entitled "Evaluating the impact of Sunday Penalty Rates in the NSW Retail Industry", and originally submitted on 1 September 2015 (**the Yu Report**).

1. I have structured my response as follows. First, I provide a brief introduction on my relevant expertise and the position of the Yu Report. I then summarise my appraisal of the Pezzullo Critique, before addressing in detail my primary and secondary concerns with the issues raised by the Pezzullo Critique.

Introduction

2. I have been a full-time researcher since 2003, until recently working as a labour market researcher at the Workplace Research Centre (**WRC**) at the University of Sydney. During my 6 years at the WRC, I worked with a large range of government, NGO and private research clients, including the Fair Work Commission. My work has touched on many aspects of the world of work and public policy, and has been published in peer-reviewed academic journals. Some recent research highlights are listed below:

   a) Evaluating the part-time, full-time wage differential in Australia using wage decomposition techniques, research that was published in 2014 in the *Journal of Industrial Relations*.

   b) Modelling government subsidies paid to private education providers, in a 2015 report which significantly influenced the recommendations published in the Senate Committee's report entitled '*The operation, regulation and funding of private vocational education and training (VET) providers in Australia*'.

   c) Evaluating the impact of an increase in the Age Pension on retiree welfare, research to be published in *The Economic Record.*

   d) Analysing the then Department of Employment's database of enterprise agreements for the Fair Work Commission's 2013 report entitled '*Minimum wages and their role in the process and incentives to bargain*'

   e) Forecasting retirement incomes for the low-paid cleaning workforce in Australia, research presented in 2011 at an academic conference at the University of Sydney.

3. Over the same period, I worked towards completing both a Masters and then a Phd in Economics at the University of Sydney. My doctoral thesis, submitted earlier in 2015, made extensive use of the difference-in-difference (**DID**) methodology used in the Yu Report, and this specific work has been accepted for publication in the highly regarded journal, *The Economic Record.*

4. My curriculum vitae is included at Appendix B.

5. The Yu Report evaluates the impact of higher Sunday penalty rates on NSW retail industry employment. Despite the analytical complexity of the issue, the richness of the data brought to bear in the Report far exceeds what would have been available had the Review taken place ten years ago. Most importantly, the analysis in the Yu Report takes advantage of a rare phenomenon – a natural experiment induced by the transitional arrangements of the award modernisation process. The resulting exogenous increases in NSW Retail Sunday penalty rates (and not Victoria) allows for the use of the methodology adopted in the Yu Report, and firm conclusions to be drawn about the causal effect of these increases on employment.

Summary of conclusions

6. I have reviewed, at short notice, the criticisms raised of the Yu Report by the Pezzullo Critique. There are two key weaknesses in the Pezzullo Critique which seriously undermine its conclusions. These are as follows:

   a) The Pezzullo Critique seriously misunderstands the difference-in-difference (DID) model used in the Yu report. These misunderstandings concern the fundamental assumptions of the method; the advantages conferred on the DID method through the availability of a natural experiment and control group; and the estimation method used to derive the results. I have elaborated on these issues below in paragraphs 7a to 10.

   b) The Pezzullo Critique has presented a long and irrelevant list of specification tests as its basis of criticism. In my personal experience of the academic, blind peer-review process for a paper using the same methodology (see paragraph 3 above), the reviewers were not concerned with these tests. Nonetheless, I have engaged with this basis of criticism, undertaking all of the suggested tests, and ultimately showing their irrelevance (see paragraphs 11a to 11k below). Consequently, I can conclude even more firmly that the findings presented in the Yu Report are robust to a very large range of statistical concerns.

Primary concerns about the Pezzullo Critique

A significant number of comments in the Pezzullo Critique demonstrate a poor understanding of the DID methodology used in the Yu Report. These are discussed in turn.

7. As Pezzullo recognises (paragraph 3.5), the key assumption underlying the DID methodology is that NSW and Victorian employment exhibit similar trends. This is known as the 'common trend' assumption. The trend analysis in the Pezzullo Critique shows a poor understanding of this central requirement.

   a) First, the 'common trend' assumption requires that NSW and Victorian employment trends be similar in the period *before* the treatment period. In any policy evaluation using DID, the treatment (in this case, increasing Sunday penalty rates) may induce a deviation from the trend, and the common trend is not expected to hold in the 'after' period (in this case, post-2010). Pezzullo's analysis of the trend through the treatment period (from 2010 onwards) appears unaware of this fundamental property of the model, and the analysis of this period is irrelevant (Figures 3.1 and 3.2, and paragraphs 3.4, 3.5 and 3.8).

   b) Second, Pezzullo has chosen seemingly arbitrary periods in which to undertake her trend analysis (the vertical red lines in Figures 3.1 and 3.2). The 'common trend' assumption is expected to apply in full to the 'before' period (in this case, from 2000 to July 2010), and not to sub-periods effectively 'cherry-picked' by the researcher. This analysis in the Pezzullo Critique appears to be an exercise in data-mining[1], with the vertical lines bearing no relationship to the changes in penalty rates, nor the DID method. Nonetheless, I have replicated Pezzullo's analysis in Figures 1 and 2 below. It shows that, correcting for Pezzullo's errors, the common trend assumption is indeed valid. Note that the standard in the literature does not require that the parallel trends be precisely the same, rather that substantial grounds for invalidating the methodology be ruled out (e.g Hastings, 2004, p.322-323).

[1] By data-mining, I mean searching for patterns in the data without prior hypothesis for why these patterns might exist. The vertical red lines in Figure 3.1 denote different periods to that of Figure 3.2, do not represent periods when the penalty rate increases were implemented, and there is no justification given for why they were chosen.

Figure 1. Trend analysis of the total number employed in the retail industry

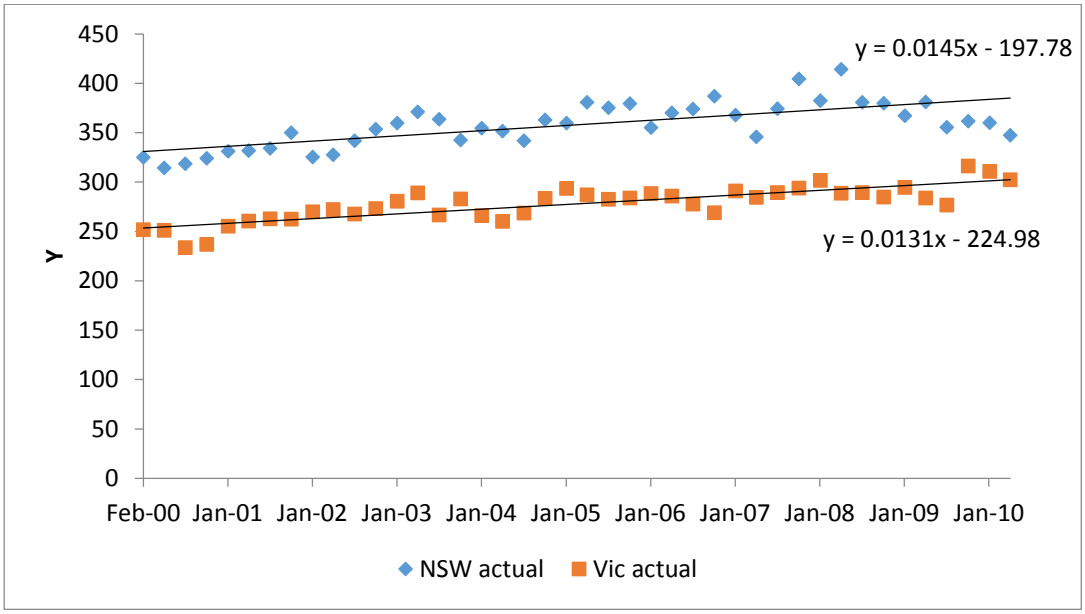
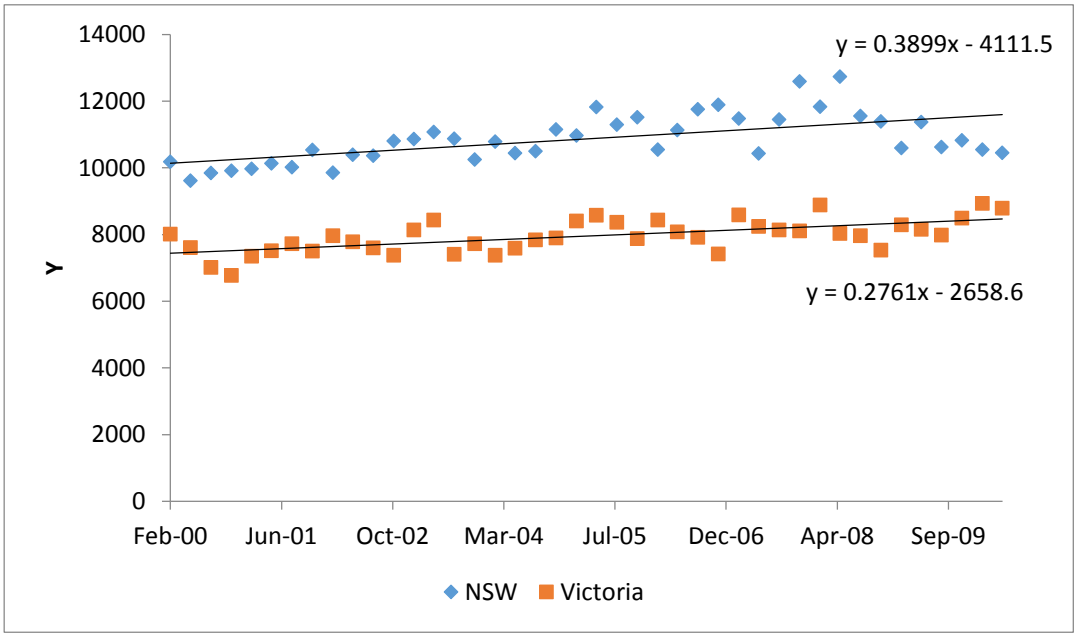


Figure 2. Trend analysis of total hours worked in the retail industry



8. In paragraphs 3.12, 3.13, and 3.14, Pezzullo presents an incorrect understanding of the model used in the Report. This cannot be attributed to unclear language in the Yu Report.

   a) In paragraph 3.14, Pezzullo claims that "it is not actually necessary to use data from Victoria". In fact, the use of the control group (in this case, Victorian retail) is central to the DID method, and paragraph 3.14 fails to understand the major advantage that a natural experiment has conferred on the analysis in the Yu Report. It is the differencing of the two states' outcomes which "removes… biases from comparisons over time in the treatment group that could be a

result of time trends unrelated to the treatment" (Imbens & Wooldridge, 2009:67). The Pezzullo claim demonstrates an absence of understanding that without Victoria as a counterfactual scenario, it is impossible to disentangle other trend factors influencing NSW retail employment.

b) Yet in paragraph 3.5, Pezzullo contends that all states and territories (rather than just NSW and Victoria) should have been included for a more complete analysis. This not only presumes that employment trends across the states are comparable, but more importantly, shows a clear lack of awareness of how the award modernisation process (specifically, the transitional arrangements) affected the states and territories differently. In particular, there were variable changes in Sunday penalty rates (as well as other conditions) across the states. The DID model requires that the control group receive 'zero treatment' (i.e no change in Sunday penalty rates), which is why Victoria was chosen for the Yu Report. Again, Pezzullo misunderstands the importance of a comparable control group in the experimental research design.

c) The Pezzullo Critique contends that the methodology in the Yu Report does not follow standard formulations (para 3.12), and suggests an alternative whereby separate state-based regressions are compared (para 3.13). The Yu Report does follow standard practice, as expressed in key texts in the literature, and there is no requirement to use only two cross-sections (Angrist & Pischke, 2009; Imbens & Wooldridge, 2009). Pezzullo's suggestion to separate the modelling of the two states again shows a lack of understanding of the double-differencing principle underpinning the DID method, and ignores one of its greatest strengths. This strength is the ability to compare efficiently, if needed, multiple treatment groups across multiple treatment periods – for example, Gruber (1994) uses DID to evaluate the introduction of maternity leave across 8 US states.

9. In paragraphs 3.32, 3.33, 3.34, 3.36 and 3.38, the Pezzullo Critique suggests that the analysis of HILDA data would benefit from panel data techniques which allow for the possibility of unobserved individual effects, such as fixed or random effects estimation. This remark indicates that Pezzullo is unaware that the DID model *is* in fact a form of fixed effects estimation (Angrist & Pischke, 2009, p.170). As Imbens and Wooldridge (2009, p.67) show, the model allowing for these time-invariant individual effects (defined as $\mu_i$in Pezzullo paragraph 3.32) results in the same estimator as that presented in the Yu Report. The equivalence of the two arises because the individual effect is differenced away in the model. This means that if there are unobserved factors influencing an individual's likelihood of working on Sunday, they are effectively removed from the model. The Pezzullo Critique has consequently failed to understand that these unobserved effects are in fact controlled for in the research.

10. In summary, the Pezzullo Critique has failed to understand three critical tenets of the DID method – the common trend assumption, the use of a control group, and the method's ability to control for unobserved effects. Given these central weaknesses of the Pezzullo Critique, I reject its conclusions, namely that the findings of the Yu Report are unfounded (paragraph 2.4). There are also other, less critical misunderstandings expressed in the Pezzullo Critique[2].

Addressing secondary concerns about the Pezzullo Critique

Issue 1: The Pezzullo Critique sets out a long list of specification tests that are posited as relevant and potentially casting doubt on the results in the Yu Report.

Response: The suggested specification tests are mostly irrelevant for reasons explained in detail below. Nonetheless, all tests were undertaken to address Pezzullo's basis of critique , and none materially altered the Yu Report's results. It can be concluded then that the findings in the Yu Report are robust to a very extensive range of statistical concerns.

11. I hereby address the concerns raised with regard to statistical testing in the Pezzullo Critique.

    a) A range of specification tests were conducted on the model, although not all were reported. The most important of these however, were the 'placebo tests' presented in the Yu Report (p.26-27). These are designed to detect spurious treatment effects where there should be none. The term borrows from medical language, where randomised controlled experiments require a finding of no placebo effect to validate the finding of a genuine treatment effect. In this research, a finding of a 'placebo effect' would indicate a poorly identified model. This follows the approach of Atalay and Barrett (2015), for example, in evaluating the impact of higher Age Pension age eligibility on labour force participation. Contrary to the remarks in paragraph 3.41 and 3.42, it is inadvisable to seek to "'find' an effect when one is present" (paragraph 3.42) outside the current natural experiment. Pezzullo's advice to find an alternative instance where Sunday penalty rates rose by the same amount, with comparable treatment and control groups, is infeasible in a social policy space where natural experiments are already rare. The placebo tests presented in the Yu Report do not invalidate the model's findings.

[2] In paragraph 3.9, the Pezzullo Critique suggests that any change in NSW employment could be due to a range of explanatory variables, and presents Figure 3.3 as an example. One main advantage of the DID methodology is to move away from simply 'eye-balling' trend data, and drawing unreasonable conclusions.

b) In addition, at the time of undertaking the original analysis, multiple error structures were tested, including robust, bootstrapped, clustered and unadjusted standard errors[3]. The error structures are important for my conclusions about whether a result is significant. None of these error structures materially altered the results of the research.

c) The Pezzullo Critique raises the issue of serial correlation in paragraphs 3.21 and 3.22a. Serial correlation does not induce bias in estimates, but may lead to invalid statistical inference (typically by underestimating standard errors). If relevant, it would mean that while the coefficient estimates in the Yu Report are reliable, the conclusions about their significance may not. Bertrand et al (2004) show that serial correlation is a risk for over-estimation of t-statistics and thus over-estimation of treatment effects. This was not a present risk for the analysis in the Yu Report, which did not find large t-stats or significant treatment effects. Nonetheless, a test for autocorrelation did suggest the presence of serially correlated residuals. Consequently, finite distributed models of lag(1) and lag (2) were undertaken to eliminate the presence of serial correlation (Wooldridge, 2012, section 11.4). The modelling had no material effect on the significance of the coefficient estimates, and the results are shown in Table 2 in Appendix A.

d) The Ramsey RESET test (paragraph 3.22b) tests for nonlinearity, that is whether the regression should also include variables such as unemployment^2, unemployment^3, etc. It is difficult to hypothesise why these terms would be relevant to the model. A RESET test would only raise concerns about misspecification if its test statistic had p-values of less than 0.05. Output from the RESET test produced a p-value of 0.1496 (for total employment, and a value of 0.6087 for total hours), meaning that I cannot reject that the coefficients on these nonlinear terms are zero. The RESET test therefore shows no indication of model misspecification.

e) The Chow test (paragraph 3.22c) is used to identify structural breaks in a data set. In the Yu Report, the analysis is exploiting a potential structural break in employment (from the period pre to post 2010), so a Chow test is irrelevant.

f) In paragraphs 3.24 to 3.28, Pezzullo suggests that testing for stationarity is important. To my knowledge, no DID studies have accounted for nonstationary processes. A quick inspection of long term employment data (see Figures 2 and 3 in the Yu Report) will easily suggest that employment data does not behave as a random walk. Nonetheless, I conducted Augmented Dickey-Fuller (**ADF**) tests to confirm that the employment data (both numbers of workers and hours) are stationary processes. This approach was confirmed by paragraph 3.27 in the Pezzullo Critique.

[3] Error structures refer to assumptions made about how the residuals in a regression behave. Violating these assumptions may affect the reliability and significance of the resulting estimates. For an introductory explanation, see Gujarati (2004, chapters 11-12).

g) Contrary to paragraph 3.28 of the Pezzullo Critique, the ADF tests found that retail sales data was also stationary around a trend. To overcome this potential disagreement, I removed the retail sales variable from the models, and found the results virtually unchanged. These results are presented in Table 3 in Appendix A.

h) Pezzullo (paragraph 3.31) also suggests the variables denoting general economic conditions may be endogenous, giving the example that higher retail employment may decrease unemployment (known as reverse causality). To test the importance of this assertion, and as a check on my initial results, I removed these variables entirely from the models. These results are reported in Table 4 in Appendix A. The results are not materially different from those reported in Table 3 in the Yu report[4]. These findings indicate that reverse causality is not a major concern.

i) In paragraph 3.31, Pezzullo raises the issue of multicollinearity. This is specifically accounted for in the Yu Report on p.21. Multicollinearity simply means that the predictor variables move together; it does not induce either bias or inconsistency in the estimates of the treatment variables. The variables controlling for general economic conditions are indeed collinear (but not correlated with the treatment dummy variables), and were found to be jointly highly significant. This means that together, their coefficients are significantly different from zero, and should be included in the model.

j) Paragraph 3.40 recommends a similar range of specification tests for the individual-level model as for the aggregate-level model. The specification tests for microeconometric models are different than for time-series data, and are still an emerging field (Angrist & Pischke, 2009). In addition to the placebo model reported on p. 27 of the Yu Report, the tests undertaken at the time of the original analysis included testing error structures robust to heteroscedasticity and autocorrelation[5] across individuals. Different error structures did not alter the conclusions of the Yu Report.

k) Finally, paragraph 3.6 in the Pezzullo Critique suggests that state-based time trends should also be tested. This was indeed tested, and had no impact on the conclusions of the Yu Report. The results are presented in Table 5 in Appendix A.

[4] By 'not materially different', I mean that the coefficient estimates exhibit the same pattern as in the Yu Report, namely that a large negative coefficient in the first year is followed by insignificant estimates of both directions in the following years.

[5] Heteroscedasticity and autocorrelation represent violations of asssumptions required for valid conclusions to be drawn about the statistical significance of results. For further detail, see Gujarati (2004, chapters 11 and 12).

Issue 2: The Pezzullo Critique contends that the Yu Report uses imprecise language.

Response: The Yu Report was not intended for a technical audience, and the style was modified for this purpose, with a focus on minimising jargon.

12. Here I address the specific concerns raised in the Pezzullo Critique.

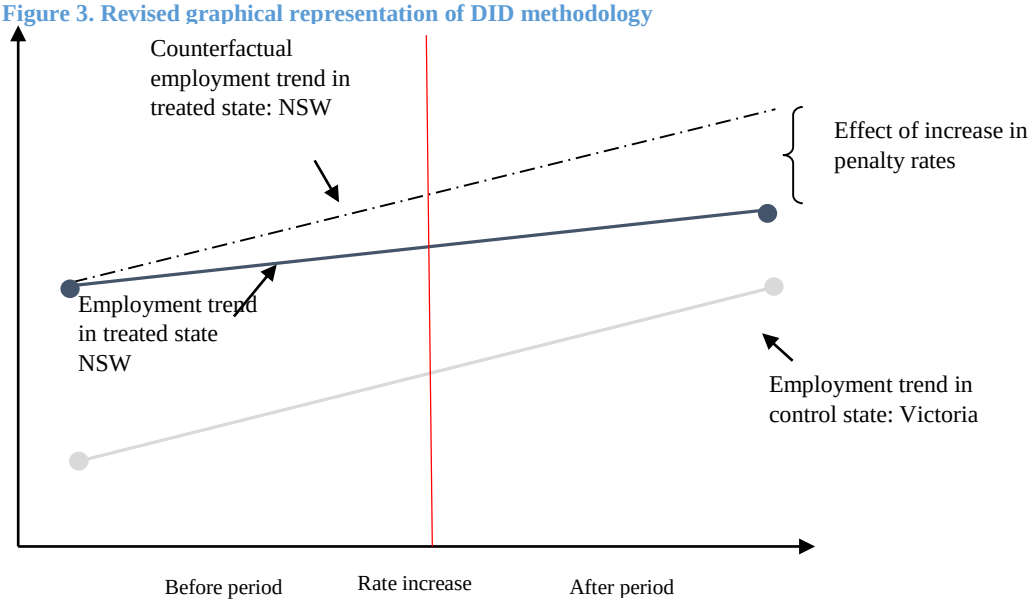
a) In paragraph 3.7, Pezzullo refers to the ambiguity of the time trend in my modelling. As Pezzullo correctly infers, a linear time trend has been used, and γ_t is the coefficient estimated using ordinary least squares (OLS).

b) In paragraphs 3.11 and 3.16, Pezzullo refers to the definition of the treatment dummy variables D_{sk}. In all variations of DID models, these dummy variables are the interaction between the treated group (here, NSW retail), and the time period of the observation. For example, $D_{s1} = 1$ if an observation is in NSW and after July 1, 2010, and zero otherwise. Similarly, $D_{s2} = 1$ if an observation is in NSW and after July 1, 2011; and so forth for D_{s3}, D_{s4}, and D_{s5}. This is what was meant by "the dummy variables denote whether the observation took place in NSW in a period after each penalty rate change"(p16). The Pezzullo Critique did not follow this definition of these critical variables, and consequently its interpretation of the model is invalid. In particular, paragraphs 3.17, 3.18, 3.19, and 3.20 allude to a new model which does not correspond to that presented in the Yu Report.

c) In Figures 6 and 7 in the Yu Report (referred to in paragraph 3.15), the font size of the legend was distorted in the transfer from Microsoft Excel to Word. In all cases in the Yu Report, NSW has been shown in blue, and Victoria in grey.

d) The criticisms of Figure 1 in the Yu Report found in paragraphs 3.17 and 3.18 are based on an incorrect understanding of the model specification. Figure 1 in the Yu Report is a highly simplified representation of the methodology, intended to assist readers less familiar with regression equations. For the purpose of clarity, I include a revised figure here below (Figure 3), based on just one penalty rate increase (instead of 5). This simplified explanation is easily extended to multiple treatments. In words, the effect of increasing Sunday penalty rates in NSW is the deviation from the employment trend that would otherwise have occurred in the absence of the increase.

Figure 3. Revised graphical representation of DID methodology



e) Paragraph 3.15 also questions the units of reporting used. The model uses a standard logarithmic transformation of the number employed and hours worked. This was explained in footnote 13, on p.20 of the Yu Report. The transformation allows for ease of interpretation of the regression coefficients (Gujarati, 2004, chapter 6).

f) Paragraphs 3.9, 3.15, and 3.29 raise questions about the definition of retail sales data used in the Yu Report. The retail sales data was sourced from the Australian Bureau of Statistics' Retail Trade dataset (catalogue number 8501.0). Retail sales is included in the DID model as a control for industry demand. The data was lagged by one-month, to recognise the potential delay of employers adjusting their employee numbers or hours following changes in market demand. This assumption was tested, and did not affect the direction, magnitude or significance of the regression results. The retail sales data represents turnover at current prices, and is not inflation adjusted. Inflation-adjusted retail sales are very unlikely to make a difference to the results, as Table 3 in Appendix A shows that the removal of the variable altogether is inconsequential.

g) Paragraph 3.35 expresses confusion on the estimation method used to analyse HILDA data. On p. 17 of the Yu Report, it clearly states that a linear probability model was used, and the results were compared to a nonlinear probit model (Footnote 10).

h) Paragraphs 3.37 and 3.38 note the unreported state and time trends, and wave dummy variables. The individual-level model did include state-specific and time trend effects, where the time trend has been defined by wave dummy variables (t=1,2,3,4,5,6, and 7). These effects were not reported to allow greater focus on the individual-level attributes. They are reported below in Table 6 in Appendix A, and can be read in conjunction with Table 4 in the Yu Report.

References

Angrist, J. D., and Pischke, J.-S. (2009), *Mostly harmless econometrics*. Princeton University Press, New York.

Atalay, K., and Barrett, G. F. (2014), The impact of age pension eligibility age on retirement and program dependence: Evidence from an Australian experiment. *Review of Economics and Statistics*, 97, 71-87.

Bertrand, M., Duflo, E. & Mullainathan, S. (2004), How much should we trust differences-in-differences estimates?. *The Quarterly Journal of Economics*, 119(1): 249-275.

Gruber, J. (1994), The incidence of mandated maternity benefits. *The American Economic Review*, 84(3):622-641.

Gujarati, D. (2004), *Basic Econometrics 4th Edition*, Tata McGraw Hill, New York.

Hastings, Justine S. 2004. "Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence from Contract Changes in Southern California." American Economic Review, 94(1): 317–28.

Imbens, G. W., and Wooldridge, J. M. (2009), Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47: 5-86.

Wooldridge, J.M. (2012), *Introductory Econometrics: A modern approach 5th Edition*, South-Western, Cengage Learning, Ohio, USA.

Appendix A: Additional Modelling

13. The tables below contain the results of the additional modelling and reporting undertaken as a result of the suggestions in the Pezzullo Critique[6]. The key message is that the long list of suggested statistical tests is shown to be, as expected, irrelevant to the findings reported in the Yu Report. In the end, the overall impact of higher Sunday penalty rates in NSW on employment is found to be not statistically different from zero, and this conclusion is now found to be robust to a very large range of statistical concerns.

14. Table 1 presents the original results, as reported in Table 3 in the Yu Report

Table 1. Original results for model of total number employed

Date of change in NSW Sunday penalty rates	Coefficient	Robust standard error
July 1, 2010	**-0.047*** **	(0.016)
July 1, 2011	**0.029**	(0.022)
July 1, 2012	**-0.010**	(0.023)
July 1, 2013	**-0.020**	(0.023)
July 1, 2014	**0.008**	(0.018)

15. Initial tests showed that the data was serially correlated. Table 2 presents the results for a finite distributed-lag model, where control variables have been added with lags of 1 and 2 periods. Tests of this extended model showed no remaining serial correlation. Table 2 shows that there were no significant impacts in any year arising from higher Sunday penalty rates in NSW retail.

Table 2. Results from a finite distributed-lag model of total number employed

Date of change in NSW Sunday penalty rates	Coefficient	Robust standard error
July 1, 2010	**-0.027**	(0.018)
July 1, 2011	**0.034**	(0.021)
July 1, 2012	**0.002**	(0.024)
July 1, 2013	**-0.024**	(0.026)
July 1, 2014	**0.016**	(0.023)

16. The Pezzullo Critique questions the non-stationarity of the retail sales variable. The removal of this variable from the model did not materially alter the results, as shown in Table 3.

[6] Due to the very short turnaround time given to respond to the Pezzullo Critique, results are presented for models of the total number of workers only, although the results for aggregate hours were very similar. In addition, the results are shown only for the treatment dummy variables (not full controls), as these are the estimates upon which the conclusions in the Yu Report were drawn. In the tables in Appendix A, the coefficients, comparable across the many model specifications, are highlighted in bold text.

Table 3. Model of total number employed, without retail sales variable

Date of change in NSW Sunday penalty rates	Coefficient	Robust standard error
July 1, 2010	**-0.037****	(0.018)
July 1, 2011	**0.018**	(0.020)
July 1, 2012	**-0.004**	(0.023)
July 1, 2013	**-0.017**	(0.026)
July 1, 2014	**0.026**	(0.022)

17. Pezzullo suggests that inclusion of the variables accounting for general economic conditions may induce reverse causality and bias the results in the Yu Report. Removal of all these variables leads to the results in Table 4 below. It should be emphasised that the results in Table 4 are presented as a check only, and not as an alternative set of results, as there is strong economic and statistical justification for the inclusion of the additional control variables.

Table 4. Model of total number employed, without additional control variables

Date of change in NSW Sunday penalty rates	Coefficient	Robust standard error
July 1, 2010	**-0.076*****	(0.017)
July 1, 2011	**0.013**	(0.017)
July 1, 2012	**-0.019**	(0.024)
July 1, 2013	**-0.031**	(0.024)
July 1, 2014	**0.025**	(0.017)

18. Pezzullo suggests that a state-based trend may alter the original results. The model presented in Table 5 includes a state-based trend, and shows no material difference from the original results.

Table 5. Model of total number employed, with added state-based trend

Date of change in NSW Sunday penalty rates	Coefficient	Robust standard error
July 1, 2010	**-0.046****	(0.019)
July 1, 2011	**0.029**	(0.022)
July 1, 2012	**-0.010**	(0.023)
July 1, 2013	**-0.020**	(0.023)
July 1, 2014	**0.008**	(0.018)

19. Table 6 addresses paragraph 3.6 in Pezzullo Critique.

Table 6. Effect on probability of working Sundays, state and time effects only

Variable	Probability of working Sundays					
	Model 1		Model 2		Model 3	
	Est.	Std. Err	Est.	Std. Err	Est.	Std. Err
State (NSW) effects	0.039*	(0.021)	0.027	(0.021)	-0.001	(0.026)
Time trend effects	0.001	(0.005)	0.000	(0.005)	-0.005	(0.006)

Appendix B: Curriculum Vitae

Serena Yu
Curriculum Vitae
+61 411 355 587
serena.yu@sydney.edu.au
22/45 Holt St, Surry Hills, NSW 2010.

Professional Profile

- Experienced researcher in both academic and commercial settings.
- Expert in quantitative methods including survey data, longitudinal and discrete choice analysis.
- Accomplished end-to-end researcher, from business development to research design, report writing and communication of research results.
- Research interests include health economics, labour economics, public policy, and ageing and retirement.

Qualifications and Prizes

- Phd in Economics (University of Sydney – thesis submitted, expected completion 2015)
  Supervisor: Professor Garry Barrett
  Awarded the $50,000 p.a. three-year CMCRC Phd Scholarship.
- M.Ec (University of Sydney)
- Chartered Financial Analyst (CFA)
- Actuary in the Institute of Actuaries of Australia (AIAA)
- B.Com (Actuarial Studies and Finance, UNSW)
  Awarded the $11,000 p.a.four-year Co-op Scholarship

Career History

June 2015 – Current
Senior Research Fellow, Centre for Health Economics Research and Evaluation
Business School, University of Technology, Sydney

March 2009 – June 2015
Senior Research Analyst, Workplace Research Centre
Business School, University of Sydney

December 2002 – February 2009
Senior Quantitative Analyst
Macquarie Funds Group, Macquarie Bank

Research highlights

"Retiree welfare and the 2009 pension increase: Impacts from an Australian experiment", The Economic Record, Accepted for publication, October 2015.

"Evaluating the impact of Sunday penalty rates in the NSW retail industry", Report prepared for the Shop, Distributive and Allied Employees Association (SDA), 2015.

"The capture of public wealth by the for-profit VET sector", Report prepared for the Australian Education Union, 2015 (with D.Oliver).

"Is there a part-time/ full-time pay differential in Australia?" Journal of Industrial Relations, 2015, 57(1): 24 – 47 (with A. Preston).

"Linking qualifications and the labour market through capabilities and vocational streams", Report prepared for the National Centre for Vocational Education Research (NCVER), 2015, available here (with L.Wheelahan and J.Buchanan).

"Work life balance: work intensification and job insecurity as job stressors", Journal of Labour and Industry, 2014, 24(3): 203 – 216.

"Building effective skills strategies to foster quality job creation and growth", 6th Expert Meeting of the Employment and Skills Strategies in Southeast Asia (ESSSA) Initiative, Local Employment and Employment Development (LEED) Division of the Organisation for Economic Co-operation and Development (OECD), September 17-18, 2014 Bangkok Thailand, available here (with J. Barr).

"Minimum wages and their role in the process and incentives to bargain", Report prepared for the Fair Work Commission, 2013, available here (with Buchanan J, Bretherton T, Frino B, Jakubauskas M, Schutz J, & Verma G).

"Changing employment portfolios and inclusive growth in Australia: Redistributing risks at work" in Inclusive Growth in Australia: Social Policy as Economic Investment, ed. Paul Smyth and John Buchanan, Allen and Unwin , Sydney, Australia, 2013, pp. 65-88 (with Buchanan J, Dymski G, Froud J, Johal S, & Williams K).

"Developing the Authorised Officer workforce", Report prepared for the Australian Children's Education and Care Quality Authority, 2013 (with D.Oliver and G.Verma).

Rafferty M, Yu S & Wright S 2011, "Cleaning up in retirement: A study of retirement incomes among women cleaners in Australia", Women, Work and Collectivism Symposium, Sydney, University of Sydney, May 11, 2011 (with M. Rafferty & S. Wright).

"Understanding the nature of vocations today: exploring labour market pathways", Report prepared for the National Centre for Vocational Education Research (NCVER), 2012, available here (with T. Bretherton & J. Schutz).

"Financial literacy in a transitional demographic", Report prepared for the Commonwealth Bank Foundation, 2011 (with M. Rafferty).

"Shifting Risk: Work and working life in Australia", Report prepared for the Australian Council of Trade Unions, 2010, available here (with M. Rafferty).

"Profile of Women's Employment in NSW: Trends and issues", Report prepared for the Office for Women's Policy, NSW Department of Premier and Cabinet, 2010 (with T. Fattore, S. Wright, S. Baldwin, A. Heron & M. Baird).

"Skills for Green Jobs in Australia", Report prepared for the International Labour Organisation, Geneva, 2010, available here (with M.Rafferty).

"Impact analysis of the proposed strengthened Australian Qualifications Framework', Report prepared for the Australian Qualifications Framework Council, 2010 (with J.Buchanan, L.Wheelahan, J.Keating & S.Marginson).